

# RTI Connex Traditional C++ API

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<b>1 RTI Connex</b>	<b>1</b>
1.1 Available Documentation . . . . .	1
1.1.1 The documents for the Core Libraries and Utilities are: . . . . .	2
1.1.2 The API Reference HTML documentation contains: . . . . .	2
1.2 Feedback and Support for this Release. . . . .	2
<b>2 Module Index</b>	<b>3</b>
2.1 Modules . . . . .	3
<b>3 Namespace Index</b>	<b>7</b>
3.1 Namespace List . . . . .	7
<b>4 Hierarchical Index</b>	<b>9</b>
4.1 Class Hierarchy . . . . .	9
<b>5 Class Index</b>	<b>17</b>
5.1 Class List . . . . .	17
<b>6 File Index</b>	<b>35</b>
6.1 File List . . . . .	35
<b>7 Module Documentation</b>	<b>37</b>
7.1 RTI Connex Exceptions . . . . .	37
7.1.1 Detailed Description . . . . .	38
7.2 Clock Selection . . . . .	38
7.2.1 Available Clocks . . . . .	38
7.2.2 Clock Selection Strategy . . . . .	39
7.2.3 Configuring Clock Selection . . . . .	39
7.3 Domain Module . . . . .	39
7.3.1 Detailed Description . . . . .	40
7.4 DomainParticipantFactory . . . . .	40
7.4.1 Detailed Description . . . . .	41
7.4.2 Macro Definition Documentation . . . . .	41
7.4.2.1 DDSTheParticipantFactory . . . . .	42
7.4.3 Typedef Documentation . . . . .	42
7.4.3.1 DDSDomainParticipantFactory_RegisterTypeFunction . . . . .	42
7.4.4 Function Documentation . . . . .	42
7.4.4.1 DDS_DomainParticipantFactoryQos_equals() . . . . .	42
7.4.4.2 print() . . . . .	43
7.4.4.3 to_string() [1/6] . . . . .	43
7.4.4.4 to_string() [2/6] . . . . .	44

---

7.4.4.5 to_string() [3/6]	45
7.4.4.6 to_string() [4/6]	46
7.4.4.7 to_string() [5/6]	46
7.4.4.8 to_string() [6/6]	47
7.4.5 Variable Documentation	48
7.4.5.1 DDS_PARTICIPANT_QOS_DEFAULT	48
7.4.5.2 DDS_PARTICIPANT_CONFIG_PARAMS_DEFAULT	49
7.5 DomainParticipants	49
7.5.1 Detailed Description	50
7.5.2 Typedef Documentation	51
7.5.2.1 DDS_DomainId_t	51
7.5.3 Function Documentation	51
7.5.3.1 DDS_DomainParticipantQos_equals()	51
7.5.3.2 print()	51
7.5.3.3 to_string() [1/6]	52
7.5.3.4 to_string() [2/6]	53
7.5.3.5 to_string() [3/6]	53
7.5.3.6 to_string() [4/6]	54
7.5.3.7 to_string() [5/6]	55
7.5.3.8 to_string() [6/6]	56
7.5.4 Variable Documentation	56
7.5.4.1 DDS_TOPIC_QOS_DEFAULT	56
7.5.4.2 DDS_PUBLISHER_QOS_DEFAULT	57
7.5.4.3 DDS_SUBSCRIBER_QOS_DEFAULT	58
7.5.4.4 DDS_FLOW_CONTROLLER_PROPERTY_DEFAULT	58
7.5.4.5 DDS_SQLFILTER_NAME	59
7.5.4.6 DDS_STRINGMATCHFILTER_NAME	59
7.6 Built-in Topics	59
7.6.1 Detailed Description	60
7.7 Topic Module	61
7.7.1 Detailed Description	62
7.8 Topics	62
7.8.1 Detailed Description	64
7.8.2 Typedef Documentation	64
7.8.2.1 DDS_PrintFormatProperty	64
7.8.3 Enumeration Type Documentation	64
7.8.3.1 DDS_PrintFormatKind	64
7.8.4 Function Documentation	65
7.8.4.1 DDS_TopicQos_equals()	65

---

7.8.4.2	print()	65
7.8.4.3	to_string() [1/6]	66
7.8.4.4	to_string() [2/6]	66
7.8.4.5	to_string() [3/6]	67
7.8.4.6	to_string() [4/6]	68
7.8.4.7	to_string() [5/6]	69
7.8.4.8	to_string() [6/6]	69
7.8.5	Variable Documentation	70
7.8.5.1	DDS_PRINT_FORMAT_PROPERTY_DEFAULT	70
7.9	Zero Copy Transfer Over Shared Memory	70
7.10	User Data Type Support	71
7.10.1	Detailed Description	72
7.10.2	Macro Definition Documentation	72
7.10.2.1	DDS_TYPESUPPORT_CPP	72
7.10.2.2	DDS_DATAWRITER_CPP	73
7.10.2.3	DDS_DATAREADER_W_DATA_CONSISTENCY_CHECK	73
7.10.3	Typedef Documentation	74
7.10.3.1	DDS_InstanceHandle_t	74
7.10.4	Function Documentation	74
7.10.4.1	DDS_InstanceHandle_equals()	74
7.10.4.2	DDS_InstanceHandle_compare()	75
7.10.4.3	DDS_InstanceHandle_copy()	75
7.10.4.4	DDS_InstanceHandle_is_nil()	75
7.10.5	Variable Documentation	76
7.10.5.1	DDS_HANDLE_NIL	76
7.11	Type Code Support	76
7.11.1	Detailed Description	80
7.11.2	Accessing a Local ::DDS_TypeCode	80
7.11.3	Accessing a Remote ::DDS_TypeCode	80
7.11.4	Macro Definition Documentation	81
7.11.4.1	DDS_TYPECODE_MEMBER_ID_INVALID	81
7.11.4.2	DDS_TYPECODE_INDEX_INVALID	81
7.11.4.3	DDS_TYPECODE_NOT_BITFIELD	81
7.11.4.4	DDS_VM_NONE	81
7.11.4.5	DDS_VM_CUSTOM	82
7.11.4.6	DDS_VM_ABSTRACT	82
7.11.4.7	DDS_VM_TRUNCATABLE	82
7.11.4.8	DDS_PRIVATE_MEMBER	83
7.11.4.9	DDS_PUBLIC_MEMBER	83

---

7.11.4.10	DDS_TYPECODE_NONKEY_MEMBER	83
7.11.4.11	DDS_TYPECODE_KEY_MEMBER	84
7.11.4.12	DDS_TYPECODE_NONKEY_REQUIRED_MEMBER	84
7.11.4.13	DDS_TypeCode_PrintFormat_INITIALIZER	85
7.11.5	Typedef Documentation	85
7.11.5.1	DDS_ValueModifier	85
7.11.5.2	DDS_Visibility	85
7.11.6	Enumeration Type Documentation	85
7.11.6.1	DDS_TypeCodePrintFormatKind	85
7.11.6.2	DDS_TCKind	86
7.11.6.3	DDS_ExtensibilityKind	87
7.11.7	Variable Documentation	87
7.11.7.1	DDS_g_tc_null	87
7.11.7.2	DDS_g_tc_short	88
7.11.7.3	DDS_g_tc_long	88
7.11.7.4	DDS_g_tc_ushort	88
7.11.7.5	DDS_g_tc_ulong	89
7.11.7.6	DDS_g_tc_float	89
7.11.7.7	DDS_g_tc_double	89
7.11.7.8	DDS_g_tc_boolean	90
7.11.7.9	DDS_g_tc_char	90
7.11.7.10	DDS_g_tc_octet	90
7.11.7.11	DDS_g_tc_longlong	91
7.11.7.12	DDS_g_tc_ulonglong	91
7.11.7.13	DDS_g_tc_longdouble	91
7.11.7.14	DDS_g_tc_wchar	92
7.12	Built-in Types	92
7.12.1	Detailed Description	92
7.12.2	Managing Memory for Builtin Types	93
7.12.3	Typecodes for Builtin Types	94
7.13	Built-in Topic's Trust Types	95
7.13.1	Detailed Description	96
7.13.2	Typedef Documentation	96
7.13.2.1	DDS_ParticipantTrustAttributesMask	97
7.13.2.2	DDS_PluginParticipantTrustAttributesMask	97
7.13.2.3	DDS_ParticipantTrustProtectionInfo	97
7.13.2.4	DDS_EndpointTrustAttributesMask	97
7.13.2.5	DDS_PluginEndpointTrustAttributesMask	97
7.13.2.6	DDS_VendorEndpointTrustAttributesMask	97

---

7.13.2.7 DDS_EndpointTrustProtectionInfo . . . . .	97
7.13.2.8 DDS_TrustAlgorithmBit . . . . .	98
7.13.2.9 DDS_TrustAlgorithmSet . . . . .	98
7.13.2.10 DDS_TrustAlgorithmRequirements . . . . .	98
7.13.2.11 DDS_ParticipantTrustSignatureAlgorithmInfo . . . . .	98
7.13.2.12 DDS_ParticipantTrustKeyEstablishmentAlgorithmInfo . . . . .	98
7.13.2.13 DDS_ParticipantTrustInterceptorAlgorithmInfo . . . . .	98
7.13.2.14 DDS_ParticipantTrustAlgorithmInfo . . . . .	99
7.13.2.15 DDS_EndpointTrustInterceptorAlgorithmInfo . . . . .	99
7.13.2.16 DDS_EndpointTrustAlgorithmInfo . . . . .	99
7.14 Dynamic Data . . . . .	99
7.14.1 Detailed Description . . . . .	100
7.14.2 Macro Definition Documentation . . . . .	101
7.14.2.1 DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED . . . . .	101
7.14.3 Typedef Documentation . . . . .	101
7.14.3.1 DDS_DynamicDataMemberId . . . . .	101
7.14.4 Variable Documentation . . . . .	102
7.14.4.1 DDS_DYNAMIC_DATA_PROPERTY_DEFAULT . . . . .	102
7.14.4.2 DDS_DYNAMIC_DATA_TYPE_PROPERTY_DEFAULT . . . . .	102
7.14.4.3 DDS_DYNAMIC_DATA_JSON_PARSER_PROPERTIES_DEFAULT . . . . .	103
7.15 Publication Module . . . . .	103
7.15.1 Detailed Description . . . . .	103
7.16 Publishers . . . . .	103
7.16.1 Detailed Description . . . . .	104
7.16.2 Function Documentation . . . . .	105
7.16.2.1 DDS_PublisherQos_equals() . . . . .	105
7.16.2.2 print() . . . . .	105
7.16.2.3 to_string() [1/6] . . . . .	106
7.16.2.4 to_string() [2/6] . . . . .	106
7.16.2.5 to_string() [3/6] . . . . .	107
7.16.2.6 to_string() [4/6] . . . . .	108
7.16.2.7 to_string() [5/6] . . . . .	109
7.16.2.8 to_string() [6/6] . . . . .	109
7.16.3 Variable Documentation . . . . .	110
7.16.3.1 DDS_DATAWRITER_QOS_DEFAULT . . . . .	110
7.16.3.2 DDS_DATAWRITER_QOS_USE_TOPIC_QOS . . . . .	111
7.17 Data Writers . . . . .	111
7.17.1 Detailed Description . . . . .	112
7.17.2 Function Documentation . . . . .	113

---

7.17.2.1	DDS_DataWriterQos_equals()	113
7.17.2.2	print()	113
7.17.2.3	to_string() [1/6]	114
7.17.2.4	to_string() [2/6]	114
7.17.2.5	to_string() [3/6]	115
7.17.2.6	to_string() [4/6]	116
7.17.2.7	to_string() [5/6]	117
7.17.2.8	to_string() [6/6]	117
7.18	Flow Controllers	118
7.18.1	Detailed Description	119
7.18.2	Enumeration Type Documentation	119
7.18.2.1	DDS_FlowControllerSchedulingPolicy	119
7.18.3	Variable Documentation	121
7.18.3.1	DDS_DEFAULT_FLOW_CONTROLLER_NAME	121
7.18.3.2	DDS_FIXED_RATE_FLOW_CONTROLLER_NAME	122
7.18.3.3	DDS_ON_DEMAND_FLOW_CONTROLLER_NAME	123
7.19	Subscription Module	124
7.19.1	Detailed Description	125
7.19.2	Access to data samples	125
7.19.2.1	Data access patterns	125
7.20	Subscribers	126
7.20.1	Detailed Description	127
7.20.2	Function Documentation	127
7.20.2.1	DDS_SubscriberQos_equals()	127
7.20.2.2	print()	128
7.20.2.3	to_string() [1/6]	128
7.20.2.4	to_string() [2/6]	129
7.20.2.5	to_string() [3/6]	130
7.20.2.6	to_string() [4/6]	130
7.20.2.7	to_string() [5/6]	131
7.20.2.8	to_string() [6/6]	132
7.20.3	Variable Documentation	132
7.20.3.1	DDS_DATAREADER_QOS_DEFAULT	133
7.20.3.2	DDS_DATAREADER_QOS_USE_TOPIC_QOS	133
7.21	DataReaders	134
7.21.1	Detailed Description	136
7.21.2	Enumeration Type Documentation	136
7.21.2.1	DDS_SampleLostStatusKind	136
7.21.2.2	DDS_SampleRejectedStatusKind	140



7.21.3 Function Documentation	142
7.21.3.1 DDS_DataReaderQos_equals()	142
7.21.3.2 print()	142
7.21.3.3 to_string() [1/6]	143
7.21.3.4 to_string() [2/6]	144
7.21.3.5 to_string() [3/6]	144
7.21.3.6 to_string() [4/6]	145
7.21.3.7 to_string() [5/6]	146
7.21.3.8 to_string() [6/6]	147
7.22 Read Conditions	147
7.22.1 Detailed Description	148
7.23 Query Conditions	148
7.23.1 Detailed Description	148
7.24 Data Samples	148
7.24.1 Detailed Description	149
7.24.2 Function Documentation	149
7.24.2.1 DDS_CoherentSetInfo_equals()	149
7.24.2.2 DDS_CoherentSetInfo_copy()	150
7.24.2.3 DDS_SampleInfo_get_sample_identity()	150
7.24.2.4 DDS_SampleInfo_get_related_sample_identity()	150
7.25 Topic Queries	151
7.25.1 Detailed Description	152
7.25.2 Debugging Topic Queries	152
7.25.2.1 The Built-in ServiceRequest DataReader	153
7.25.2.2 The on_service_request_accepted DataWriter Listener Callback	153
7.25.2.3 Reading TopicQuery Samples	153
7.25.3 Typedef Documentation	154
7.25.3.1 DDS_TopicQuerySelection	154
7.25.3.2 DDS_TopicQueryData	154
7.25.4 Enumeration Type Documentation	154
7.25.4.1 DDS_TopicQuerySelectionKind	154
7.25.5 Variable Documentation	155
7.25.5.1 DDS_TOPIC_QUERY_SELECTION_USE_READER_CONTENT_FILTER	155
7.25.5.2 DDS_TOPIC_QUERY_SELECTION_SELECT_ALL	155
7.26 Sample States	155
7.26.1 Detailed Description	156
7.26.2 Typedef Documentation	156
7.26.2.1 DDS_SampleStateMask	156
7.26.3 Enumeration Type Documentation	156

---

7.26.3.1 DDS_SampleStateKind . . . . .	156
7.26.4 Variable Documentation . . . . .	157
7.26.4.1 DDS_ANY_SAMPLE_STATE . . . . .	157
7.27 View States . . . . .	157
7.27.1 Detailed Description . . . . .	158
7.27.2 Typedef Documentation . . . . .	158
7.27.2.1 DDS_ViewStateMask . . . . .	158
7.27.3 Enumeration Type Documentation . . . . .	158
7.27.3.1 DDS_ViewStateKind . . . . .	158
7.27.4 Variable Documentation . . . . .	159
7.27.4.1 DDS_ANY_VIEW_STATE . . . . .	159
7.28 Instance States . . . . .	159
7.28.1 Detailed Description . . . . .	160
7.28.2 Typedef Documentation . . . . .	160
7.28.2.1 DDS_InstanceStateMask . . . . .	160
7.28.3 Enumeration Type Documentation . . . . .	160
7.28.3.1 DDS_InstanceStateKind . . . . .	160
7.28.4 Variable Documentation . . . . .	161
7.28.4.1 DDS_ANY_INSTANCE_STATE . . . . .	161
7.28.4.2 DDS_NOT_ALIVE_INSTANCE_STATE . . . . .	161
7.29 Stream Kinds . . . . .	161
7.29.1 Detailed Description . . . . .	162
7.29.2 Typedef Documentation . . . . .	162
7.29.2.1 DDS_StreamKindMask . . . . .	162
7.29.3 Enumeration Type Documentation . . . . .	162
7.29.3.1 DDS_StreamKind . . . . .	162
7.30 Infrastructure Module . . . . .	162
7.30.1 Detailed Description . . . . .	164
7.30.2 Variable Documentation . . . . .	164
7.30.2.1 DDS_QOS_PRINT_ALL . . . . .	164
7.31 Built-in Sequences . . . . .	164
7.31.1 Detailed Description . . . . .	165
7.32 Multi-channel DataWriters . . . . .	165
7.32.1 What is a Multi-channel DataWriter? . . . . .	166
7.32.2 Configuration on the Writer Side . . . . .	166
7.32.3 Configuration on the Reader Side . . . . .	166
7.32.4 Reliability with Multi-Channel DataWriters . . . . .	166
7.32.4.1 Reliable Delivery . . . . .	166
7.32.4.2 Reliable Protocol Considerations . . . . .	167

---

7.33	Transports	167
7.33.1	Detailed Description	168
7.33.2	Overview	168
7.33.3	Transport Aliases	168
7.33.4	Transport Lifecycle	169
7.33.5	Transport Class Attributes	169
7.33.6	Transport Instance Attributes	170
7.33.7	Transport Network Address	171
7.33.8	Transport Send Route	171
7.33.9	Transport Receive Route	172
7.34	Installing Transport Plugins	172
7.34.1	Detailed Description	173
7.34.2	Loading Transport Plugins through Property QoS Policy of Domain Participant	173
7.34.3	Typedef Documentation	176
7.34.3.1	NDDS_Transport_Handle_t	176
7.34.3.2	NDDS_Transport_create_plugin	176
7.34.4	Function Documentation	177
7.34.4.1	NDDS_Transport_Handle_is_nil()	177
7.34.5	Variable Documentation	177
7.34.5.1	NDDS_TRANSPORT_HANDLE_NIL	177
7.35	Built-in Transport Plugins	177
7.35.1	Detailed Description	178
7.36	Creating New Transport Plugins	178
7.37	Queries and Filters Syntax	179
7.37.1	Syntax for DDS Queries and Filters	179
7.37.2	SQL grammar in BNF	179
7.37.3	Token expression	180
7.37.4	String Parameters	182
7.37.5	Type compatability in Predicate	182
7.37.6	SQL Extension: Regular Expression Matching	183
7.37.7	Character Encoding	184
7.37.8	Unicode Normalization	184
7.37.9	Examples	185
7.38	Logging and Version	185
7.38.1	Detailed Description	185
7.39	General Utilities and Compliance Configuration	185
7.39.1	Detailed Description	186
7.40	Observability	186
7.40.1	Detailed Description	186

---

7.41 Request-Reply Pattern . . . . .	186
7.41.1 Detailed Description . . . . .	186
7.42 Requester . . . . .	187
7.42.1 Detailed Description . . . . .	187
7.43 Replier . . . . .	187
7.43.1 Detailed Description . . . . .	187
7.44 Infrastructure . . . . .	188
7.44.1 Detailed Description . . . . .	189
7.44.2 Function Documentation . . . . .	189
7.44.2.1 make_valid_sample_iterator() . . . . .	189
7.44.2.2 move() . . . . .	190
7.45 Utilities . . . . .	190
7.45.1 Detailed Description . . . . .	191
7.46 Durability and Persistence . . . . .	191
7.46.1 Durable Writer History . . . . .	191
7.46.2 Durable Reader State . . . . .	192
7.46.3 Data Durability . . . . .	192
7.46.4 Durability and Persistence Based on Virtual GUID . . . . .	192
7.46.5 Configuring Durable Writer History . . . . .	193
7.46.6 Configuring Durable Reader State . . . . .	195
7.46.7 Configuring Data Durability . . . . .	196
7.47 System Properties . . . . .	196
7.47.1 System Properties List . . . . .	196
7.47.2 System Resource Consideration . . . . .	197
7.48 Configuring QoS Profiles with XML . . . . .	197
7.48.1 Loading QoS Profiles from XML Resources . . . . .	197
7.48.2 URL . . . . .	199
7.48.2.1 URL groups . . . . .	199
7.48.2.2 NDDS_QOS_PROFILES environment variable . . . . .	199
7.48.2.3 Built-In QoS Profiles . . . . .	199
7.49 Publication Example . . . . .	199
7.49.1 A typical publication example . . . . .	200
7.50 Subscription Example . . . . .	200
7.50.1 A typical subscription example . . . . .	201
7.51 Participant Use Cases . . . . .	201
7.51.1 Turning off auto-enable of newly created participant(s) . . . . .	202
7.51.2 Getting the factory . . . . .	202
7.51.3 Setting up a participant . . . . .	202
7.51.4 Tearing down a participant . . . . .	203

---

7.52 Topic Use Cases . . . . .	203
7.52.1 Registering a user data type . . . . .	203
7.52.2 Setting up a topic . . . . .	203
7.52.3 Tearing down a topic . . . . .	204
7.53 FlowController Use Cases . . . . .	204
7.53.1 Creating a flow controller . . . . .	204
7.53.2 Flow controlling a data writer . . . . .	204
7.53.3 Using the built-in flow controllers . . . . .	205
7.53.4 Shaping the network traffic for a particular transport . . . . .	206
7.53.5 Coalescing multiple samples in a single network packet . . . . .	206
7.54 Publisher Use Cases . . . . .	206
7.54.1 Setting up a publisher . . . . .	206
7.54.2 Tearing down a publisher . . . . .	206
7.55 DataWriter Use Cases . . . . .	207
7.55.1 Setting up a data writer . . . . .	207
7.55.2 Managing instances . . . . .	207
7.55.3 Sending data . . . . .	208
7.55.4 Tearing down a data writer . . . . .	208
7.56 Subscriber Use Cases . . . . .	208
7.56.1 Setting up a subscriber . . . . .	208
7.56.2 Set up subscriber to access received data . . . . .	209
7.56.3 Access received data via a subscriber . . . . .	209
7.56.4 Access received data coherently and/or in order . . . . .	210
7.56.5 Tearing down a subscriber . . . . .	210
7.57 DataReader Use Cases . . . . .	210
7.57.1 Setting up a data reader . . . . .	210
7.57.2 Managing instances . . . . .	211
7.57.3 Set up reader to access received data . . . . .	211
7.57.4 Access received data via a reader . . . . .	211
7.57.5 Taking data . . . . .	211
7.57.6 Reading data . . . . .	212
7.57.7 Tearing down a data reader . . . . .	213
7.58 Entity Use Cases . . . . .	213
7.58.1 Enabling an entity . . . . .	213
7.58.2 Checking if a status changed on an entity. . . . .	213
7.58.3 Changing the QoS for an entity . . . . .	213
7.58.4 Changing the listener and enabling/disabling statuses associated with it . . . . .	214
7.58.5 Enabling/Disabling statuses associated with a status condition . . . . .	214
7.59 Waitset Use Cases . . . . .	215

---

7.59.1	Setting up a wait-set . . . . .	215
7.59.2	Waiting for condition(s) to trigger . . . . .	216
7.59.3	Tearing down a wait-set . . . . .	216
7.60	Transport Use Cases . . . . .	216
7.60.1	Changing the automatically registered built-in transports . . . . .	216
7.60.2	Changing the properties of the automatically registered builtin transports . . . . .	217
7.60.3	Creating a transport . . . . .	217
7.60.4	Deleting a transport . . . . .	217
7.60.5	Registering a transport with a participant . . . . .	218
7.60.6	Adding receive routes for a transport . . . . .	219
7.60.7	Adding send routes for a transport . . . . .	219
7.61	Filter Use Cases . . . . .	219
7.61.1	Introduction   . . . . .	219
7.61.1.1	Overview of ContentFilteredTopic . . . . .	220
7.61.1.2	Overview of QueryCondition . . . . .	220
7.61.2	Filtering with ContentFilteredTopic . . . . .	221
7.61.3	Filtering with Query Conditions . . . . .	221
7.61.4	Filtering Performance . . . . .	222
7.62	Creating Custom Content Filters . . . . .	222
7.62.1	Introduction . . . . .	223
7.62.2	The Custom Content Filter API . . . . .	223
7.62.2.1	The compile function . . . . .	223
7.62.2.2	The evaluate function . . . . .	223
7.62.2.3	The finalize function . . . . .	224
7.62.3	Example Using C format strings . . . . .	224
7.62.3.1	Writing the Compile Function . . . . .	224
7.62.3.2	Writing the Evaluate Function . . . . .	224
7.62.3.3	Writing the Finalize Function . . . . .	224
7.62.3.4	Registering the Filter . . . . .	225
7.62.3.5	Unregistering the Filter . . . . .	225
7.63	Large Data Use Cases . . . . .	225
7.63.1	Introduction   . . . . .	225
7.63.2	Writing Large Data . . . . .	226
7.63.3	Receiving Large Data . . . . .	226
7.64	Request-Reply Examples . . . . .	226
7.64.1	Request-Reply Examples . . . . .	226
7.64.2	Requester Creation . . . . .	228
7.64.3	Creating a Requester with optional parameters . . . . .	228
7.64.4	Basic Requester example . . . . .	228

---

7.64.5 Taking loaned samples . . . . .	229
7.64.6 Taking samples by copy . . . . .	229
7.64.7 Correlating requests and replies . . . . .	230
7.64.8 Basic Requester example using SampleRef . . . . .	231
7.64.9 Creating a Replier . . . . .	232
7.64.10 Basic Replier example . . . . .	232
7.64.11 SimpleReplier example . . . . .	233
7.64.12 Error handling example . . . . .	233
7.64.13 Configuring Request-Reply QoS profiles . . . . .	234
7.65 Documentation Roadmap . . . . .	235
7.66 Conventions . . . . .	236
7.66.1 Unsupported Features . . . . .	236
7.66.2 API Naming Conventions . . . . .	236
7.66.2.1 Structure & Class Names . . . . .	236
7.66.3 API Documentation Terms . . . . .	236
7.66.4 Stereotypes . . . . .	237
7.66.4.1 Extensions . . . . .	237
7.66.4.2 Experimental . . . . .	237
7.66.4.3 Types . . . . .	237
7.66.4.4 Method Parameters . . . . .	238
7.67 Using DDS:: Namespace . . . . .	238
7.67.1 DDS Namespace Support . . . . .	238
7.67.2 DDS Namespace and Primitive Types . . . . .	239
7.68 RTI Connex DDS API Reference . . . . .	239
7.68.1 Detailed Description . . . . .	240
7.68.2 Overview . . . . .	240
7.68.3 Conceptual Model . . . . .	241
7.68.4 Modules . . . . .	242
7.69 Additional RTI Connex Communication Patterns . . . . .	242
7.69.1 Detailed Description . . . . .	243
7.70 Programming How-To's . . . . .	243
7.70.1 Detailed Description . . . . .	244
7.71 Interface . . . . .	244
7.71.1 Detailed Description . . . . .	245
7.71.2 Enumeration Type Documentation . . . . .	245
7.71.2.1 NDDS_Transport_Interface_Status_t . . . . .	245
7.72 Transport Plugins Configuration . . . . .	245
7.72.1 Detailed Description . . . . .	247
7.72.2 Macro Definition Documentation . . . . .	247

---

7.72.2.1	NDDS_TRANSPORT_PORT_INVALID	247
7.72.2.2	NDDS_TRANSPORT_UUID_SIZE	248
7.72.2.3	NDDS_TRANSPORT_LENGTH_UNLIMITED	248
7.72.2.4	NDDS_TRANSPORT_INTERFACE_RANK_UNKNOWN	248
7.72.2.5	NDDS_TRANSPORT_UUID_UNKNOWN	248
7.72.2.6	NDDS_TRANSPORT_ALLOCATION_SETTINGS_MAX_COUNT_UNLIMITED	248
7.72.2.7	NDDS_TRANSPORT_ALLOCATION_SETTINGS_INCREMENTAL_COUNT_AUTOMATIC	248
7.72.2.8	NDDS_TRANSPORT_ALLOCATION_SETTINGS_DEFAULT	249
7.72.2.9	NDDS_TRANSPORT_CLASSID_INVALID	249
7.72.2.10	NDDS_TRANSPORT_CLASSID_UDPv4	249
7.72.2.11	NDDS_TRANSPORT_CLASSID_SHMEM	249
7.72.2.12	NDDS_TRANSPORT_CLASSID_SHMEM_510	250
7.72.2.13	NDDS_TRANSPORT_CLASSID_UDPv6	250
7.72.2.14	NDDS_TRANSPORT_CLASSID_UDPv6_510	250
7.72.2.15	NDDS_TRANSPORT_CLASSID_TCPV4_LAN	250
7.72.2.16	NDDS_TRANSPORT_CLASSID_TCPV4_WAN	250
7.72.2.17	NDDS_TRANSPORT_CLASSNAME_TCPV4_WAN	250
7.72.2.18	NDDS_TRANSPORT_CLASSID_TLsv4_LAN	251
7.72.2.19	NDDS_TRANSPORT_CLASSID_TLsv4_WAN	251
7.72.2.20	NDDS_TRANSPORT_CLASSID_UDPv4_WAN	251
7.72.2.21	NDDS_TRANSPORT_CLASSID_RESERVED_RANGE	251
7.72.2.22	NDDS_TRANSPORT_PROPERTY_BIT_BUFFER_ALWAYS_LOANED	251
7.72.2.23	NDDS_TRANSPORT_PROPERTY_GATHER_SEND_BUFFER_COUNT_MIN	252
7.72.3	Typedef Documentation	252
7.72.3.1	NDDS_Transport_Port_t	252
7.72.3.2	NDDS_Transport_ClassId_t	252
7.73	Transport Address	252
7.73.1	Detailed Description	253
7.73.2	Macro Definition Documentation	254
7.73.2.1	NDDS_TRANSPORT_ADDRESS_INVALID_INITIALIZER	254
7.73.2.2	NDDS_TRANSPORT_ADDRESS_STRING_BUFFER_SIZE	254
7.73.3	Function Documentation	255
7.73.3.1	NDDS_Transport_Address_to_string()	255
7.73.3.2	NDDS_Transport_Address_to_string_with_protocol_family_format()	255
7.73.3.3	NDDS_Transport_Address_from_string()	256
7.73.3.4	NDDS_Transport_Address_print()	256
7.73.3.5	NDDS_Transport_Address_is_ipv4()	257
7.73.3.6	NDDS_Transport_Address_is_multicast()	257
7.73.4	Variable Documentation	258



7.73.4.1	NDDS_TRANSPORT_ADDRESS_INVALID	258
7.74	UDP Transport Plugin definitions	258
7.74.1	Detailed Description	259
7.74.2	Macro Definition Documentation	259
7.74.2.1	NDDS_TRANSPORT_UDP_PROPERTIES_BITMAP_DEFAULT	259
7.74.2.2	NDDS_TRANSPORT_UDP_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT	259
7.74.2.3	NDDS_TRANSPORT_UDP_SOCKET_BUFFER_SIZE_OS_DEFAULT	259
7.74.2.4	NDDS_TRANSPORT_UDP_SEND_SOCKET_BUFFER_SIZE_DEFAULT	260
7.74.2.5	NDDS_TRANSPORT_UDP_RECV_SOCKET_BUFFER_SIZE_DEFAULT	260
7.74.2.6	NDDS_TRANSPORT_UDP_MULTICAST_TTL_DEFAULT	260
7.74.3	Typedef Documentation	260
7.74.3.1	NDDS_Transport_UDP_Port	260
7.75	Shared Memory Transport	260
7.75.1	Detailed Description	261
7.75.2	Compatibility of Sender and Receiver Transports	261
7.75.3	Crashing and Restarting Programs	262
7.75.4	Shared Resource Keys	262
7.75.5	Creating and Registering Shared Memory Transport Plugin	262
7.75.6	Shared Memory Transport Property Names in Property QoS Policy of Domain Participant	263
7.75.7	Macro Definition Documentation	264
7.75.7.1	NDDS_TRANSPORT_SHMEM_ADDRESS_BIT_COUNT	264
7.75.7.2	NDDS_TRANSPORT_SHMEM_PROPERTIES_BITMAP_DEFAULT	264
7.75.7.3	NDDS_TRANSPORT_SHMEM_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT	264
7.75.7.4	NDDS_TRANSPORT_SHMEM_MESSAGE_SIZE_MAX_DEFAULT	265
7.75.7.5	NDDS_TRANSPORT_SHMEM_RECEIVED_MESSAGE_COUNT_MAX_DEFAULT	265
7.75.7.6	NDDS_TRANSPORT_SHMEM_RECEIVE_BUFFER_SIZE_DEFAULT	265
7.75.7.7	NDDS_TRANSPORT_SHMEM_MAJOR_AFTER_BUG_14240_FIX	265
7.75.7.8	NDDS_TRANSPORT_SHMEM_PROPERTY_DEFAULT	265
7.75.8	Function Documentation	265
7.75.8.1	NDDS_Transport_Shmem_new()	265
7.75.8.2	NDDS_Transport_Shmem_create()	266
7.76	UDPv4 Transport	266
7.76.1	Detailed Description	268
7.76.2	UDPv4 Transport Property Names in Property QoS Policy of Domain Participant	269
7.76.3	Macro Definition Documentation	271
7.76.3.1	NDDS_TRANSPORT_UDPV4_ADDRESS_BIT_COUNT	271
7.76.3.2	NDDS_TRANSPORT_UDPV4_WAN_ADDRESS_BIT_COUNT	271
7.76.3.3	NDDS_TRANSPORT_UDPV4_PROPERTIES_BITMAP_DEFAULT	271
7.76.3.4	NDDS_TRANSPORT_UDPV4_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT	271

---

7.76.3.5	NDDS_TRANSPORT_UDPV4_SOCKET_BUFFER_SIZE_OS_DEFAULT	272
7.76.3.6	NDDS_TRANSPORT_UDPV4_SEND_SOCKET_BUFFER_SIZE_DEFAULT	272
7.76.3.7	NDDS_TRANSPORT_UDPV4_RECV_SOCKET_BUFFER_SIZE_DEFAULT	272
7.76.3.8	NDDS_TRANSPORT_UDPV4_PAYLOAD_SIZE_MAX	272
7.76.3.9	NDDS_TRANSPORT_UDPV4_MESSAGE_SIZE_MAX_DEFAULT	272
7.76.3.10	NDDS_TRANSPORT_UDPV4_MULTICAST_TTL_DEFAULT	273
7.76.3.11	NDDS_TRANSPORT_UDPV4_BLOCKING_NEVER	273
7.76.3.12	NDDS_TRANSPORT_UDPV4_BLOCKING_ALWAYS	273
7.76.3.13	NDDS_TRANSPORT_UDPV4_BLOCKING_DEFAULT	273
7.76.3.14	NDDS_TRANSPORT_UDPV4_PROPERTY_DEFAULT	273
7.76.3.15	NDDS_Transport_UDPv4_string_to_address_cEA	273
7.76.4	Function Documentation	274
7.76.4.1	NDDS_Transport_UDPv4_new()	274
7.76.4.2	NDDS_Transport_UDPv4_create()	275
7.76.4.3	NDDS_Transport_UDPv4_create_from_properties_with_prefix()	276
7.77	Real-Time WAN Transport	276
7.77.1	Detailed Description	277
7.77.2	Real-Time WAN Transport Property	278
7.77.3	Macro Definition Documentation	280
7.77.3.1	NDDS_TRANSPORT_UDPV4_WAN_PROPERTY_DEFAULT	280
7.77.4	Function Documentation	280
7.77.4.1	NDDS_Transport_UDPv4_WAN_new()	281
7.77.4.2	NDDS_Transport_UDPv4_WAN_create()	281
7.77.4.3	NDDS_Transport_UDPv4_WAN_create_from_properties_with_prefix()	282
7.78	UDPv6 Transport	283
7.78.1	Detailed Description	284
7.78.2	UDPv6 Transport Property Names in Property QoS Policy of Domain Participant	285
7.78.3	Macro Definition Documentation	287
7.78.3.1	NDDS_TRANSPORT_UDPV6_ADDRESS_BIT_COUNT	287
7.78.3.2	NDDS_TRANSPORT_UDPV6_PROPERTIES_BITMAP_DEFAULT	287
7.78.3.3	NDDS_TRANSPORT_UDPV6_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT	287
7.78.3.4	NDDS_TRANSPORT_UDPV6_SOCKET_BUFFER_SIZE_OS_DEFAULT	287
7.78.3.5	NDDS_TRANSPORT_UDPV6_SEND_SOCKET_BUFFER_SIZE_DEFAULT	288
7.78.3.6	NDDS_TRANSPORT_UDPV6_RECV_SOCKET_BUFFER_SIZE_DEFAULT	288
7.78.3.7	NDDS_TRANSPORT_UDPV6_PAYLOAD_SIZE_MAX	288
7.78.3.8	NDDS_TRANSPORT_UDPV6_MESSAGE_SIZE_MAX_DEFAULT	288
7.78.3.9	NDDS_TRANSPORT_UDPV6_MULTICAST_TTL_DEFAULT	288
7.78.3.10	NDDS_TRANSPORT_UDPV6_BLOCKING_NEVER	289
7.78.3.11	NDDS_TRANSPORT_UDPV6_BLOCKING_ALWAYS	289

---

7.78.3.12	DDS_TRANSPORT_UDPv6_PROPERTY_DEFAULT	289
7.78.3.13	DDS_Transport_UDPv6_string_to_address_cEA	289
7.78.4	Function Documentation	290
7.78.4.1	DDS_Transport_UDPv6_new()	290
7.78.4.2	DDS_Transport_UDPv6_create()	291
7.78.4.3	DDS_Transport_UDPv6_create_from_properties_with_prefix()	292
7.79	AsyncWaitSet	292
7.79.1	Detailed Description	293
7.79.2	Variable Documentation	293
7.79.2.1	DDS_ASYNC_WAITSET_PROPERTY_DEFAULT	293
7.79.2.2	COMPLETION_TOKEN_USE_IMPLICIT_AND_WAIT	293
7.79.2.3	COMPLETION_TOKEN_IGNORE	294
7.80	Participant Built-in Topics	294
7.80.1	Detailed Description	295
7.80.2	Typedef Documentation	295
7.80.2.1	DDS_ParticipantBuiltinTopicData	295
7.80.3	Variable Documentation	295
7.80.3.1	DDS_PARTICIPANT_TOPIC_NAME	295
7.81	Topic Built-in Topics	295
7.81.1	Detailed Description	296
7.81.2	Typedef Documentation	296
7.81.2.1	DDS_TopicBuiltinTopicData	296
7.81.3	Variable Documentation	297
7.81.3.1	DDS_TOPIC_TOPIC_NAME	297
7.82	Publication Built-in Topics	297
7.82.1	Detailed Description	298
7.82.2	Typedef Documentation	298
7.82.2.1	DDS_PublicationBuiltinTopicData	298
7.82.3	Variable Documentation	298
7.82.3.1	DDS_PUBLICATION_TOPIC_NAME	298
7.83	Subscription Built-in Topics	298
7.83.1	Detailed Description	299
7.83.2	Typedef Documentation	299
7.83.2.1	DDS_SubscriptionBuiltinTopicData	299
7.83.3	Variable Documentation	300
7.83.3.1	DDS_SUBSCRIPTION_TOPIC_NAME	300
7.84	ServiceRequest Built-in Topic	300
7.84.1	Detailed Description	301
7.84.2	Typedef Documentation	301

---

7.84.2.1 DDS_ServiceRequest . . . . .	301
7.84.3 Variable Documentation . . . . .	302
7.84.3.1 DDS_UNKNOWN_SERVICE_REQUEST_ID . . . . .	302
7.84.3.2 DDS_TOPIC_QUERY_SERVICE_REQUEST_ID . . . . .	302
7.84.3.3 DDS_LOCATOR_REACHABILITY_SERVICE_REQUEST_ID . . . . .	302
7.84.3.4 DDS_INSTANCE_STATE_SERVICE_REQUEST_ID . . . . .	302
7.84.3.5 DDS_MONITORING_LIBRARY_COMMAND_SERVICE_REQUEST_ID . . . . .	302
7.84.3.6 DDS_MONITORING_LIBRARY_REPLY_SERVICE_REQUEST_ID . . . . .	303
7.84.3.7 DDS_SERVICE_REQUEST_TOPIC_NAME . . . . .	303
7.85 Common types and functions . . . . .	303
7.85.1 Detailed Description . . . . .	305
7.85.2 Macro Definition Documentation . . . . .	305
7.85.2.1 DDS_LOCATOR_ADDRESS_LENGTH_MAX . . . . .	305
7.85.2.2 DDS_PROTOCOLVERSION_1_0 . . . . .	306
7.85.2.3 DDS_PROTOCOLVERSION_1_1 . . . . .	306
7.85.2.4 DDS_PROTOCOLVERSION_1_2 . . . . .	306
7.85.2.5 DDS_PROTOCOLVERSION_2_0 . . . . .	306
7.85.2.6 DDS_PROTOCOLVERSION_2_1 . . . . .	306
7.85.2.7 DDS_PROTOCOLVERSION . . . . .	306
7.85.2.8 DDS_VENDOR_ID_LENGTH_MAX . . . . .	307
7.85.2.9 DDS_PRODUCTVERSION_UNKNOWN . . . . .	307
7.85.3 Typedef Documentation . . . . .	307
7.85.3.1 DDS_Locator_t . . . . .	307
7.85.3.2 DDS_ProtocolVersion_t . . . . .	307
7.85.3.3 DDS_BuiltinTopicKey_t . . . . .	308
7.85.4 Function Documentation . . . . .	308
7.85.4.1 DDS_BuiltinTopicKey_equals() . . . . .	308
7.85.4.2 DDS_BuiltinTopicKey_copy() . . . . .	308
7.85.4.3 DDS_BuiltinTopicKey_to_guid() . . . . .	309
7.85.4.4 DDS_BuiltinTopicKey_from_guid() . . . . .	309
7.85.4.5 DDS_BuiltinTopicKey_to_instance_handle() . . . . .	309
7.85.4.6 DDS_BuiltinTopicKey_from_instance_handle() . . . . .	310
7.85.5 Variable Documentation . . . . .	310
7.85.5.1 DDS_LOCATOR_INVALID . . . . .	310
7.85.5.2 DDS_LOCATOR_KIND_INVALID . . . . .	310
7.85.5.3 DDS_LOCATOR_PORT_INVALID . . . . .	311
7.85.5.4 DDS_LOCATOR_ADDRESS_INVALID . . . . .	311
7.85.5.5 DDS_LOCATOR_KIND_UDPv4 . . . . .	311
7.85.5.6 DDS_LOCATOR_KIND_UDPv4_WAN . . . . .	311

---

7.85.5.7 DDS_LOCATOR_KIND_SHMEM . . . . .	311
7.85.5.8 DDS_LOCATOR_KIND_SHMEM_510 . . . . .	311
7.85.5.9 DDS_LOCATOR_KIND_UDPv6 . . . . .	312
7.85.5.10 DDS_LOCATOR_KIND_UDPv6_510 . . . . .	312
7.85.5.11 DDS_LOCATOR_KIND_RESERVED . . . . .	312
7.86 String Built-in Type . . . . .	312
7.86.1 Detailed Description . . . . .	312
7.87 KeyedString Built-in Type . . . . .	312
7.87.1 Detailed Description . . . . .	313
7.87.2 Typedef Documentation . . . . .	313
7.87.2.1 DDS_KeyedString . . . . .	313
7.88 Octets Built-in Type . . . . .	313
7.88.1 Detailed Description . . . . .	314
7.88.2 Typedef Documentation . . . . .	314
7.88.2.1 DDS_Octets . . . . .	314
7.89 KeyedOctets Built-in Type . . . . .	314
7.89.1 Detailed Description . . . . .	315
7.89.2 Typedef Documentation . . . . .	315
7.89.2.1 DDS_KeyedOctets . . . . .	315
7.90 DDS-Specific Primitive Types . . . . .	315
7.90.1 Detailed Description . . . . .	316
7.90.2 Macro Definition Documentation . . . . .	317
7.90.2.1 DDS_BOOLEAN_TRUE . . . . .	317
7.90.2.2 DDS_BOOLEAN_FALSE . . . . .	317
7.90.3 Typedef Documentation . . . . .	317
7.90.3.1 DDS_Char . . . . .	317
7.90.3.2 DDS_Wchar . . . . .	317
7.90.3.3 DDS_Octet . . . . .	318
7.90.3.4 DDS_UInt8 . . . . .	318
7.90.3.5 DDS_Int8 . . . . .	318
7.90.3.6 DDS_Short . . . . .	318
7.90.3.7 DDS_UnsignedShort . . . . .	318
7.90.3.8 DDS_Long . . . . .	318
7.90.3.9 DDS_UnsignedLong . . . . .	319
7.90.3.10 DDS_LongLong . . . . .	319
7.90.3.11 DDS_UnsignedLongLong . . . . .	319
7.90.3.12 DDS_Float . . . . .	319
7.90.3.13 DDS_Double . . . . .	319
7.90.3.14 DDS_LongDouble . . . . .	320

---

7.90.3.15 DDS_Boolean . . . . .	320
7.90.3.16 DDS_Enum . . . . .	320
7.91 Time Support . . . . .	320
7.91.1 Detailed Description . . . . .	322
7.91.2 Macro Definition Documentation . . . . .	322
7.91.2.1 DDS_TIME_ZERO . . . . .	322
7.91.3 Function Documentation . . . . .	322
7.91.3.1 from_micros() [1/2] . . . . .	322
7.91.3.2 from_millis() [1/2] . . . . .	323
7.91.3.3 from_nanos() [1/2] . . . . .	323
7.91.3.4 from_seconds() [1/2] . . . . .	323
7.91.3.5 from_micros() [2/2] . . . . .	323
7.91.3.6 from_millis() [2/2] . . . . .	323
7.91.3.7 from_nanos() [2/2] . . . . .	324
7.91.3.8 from_seconds() [2/2] . . . . .	324
7.91.3.9 DDS_Time_is_zero() . . . . .	324
7.91.3.10 DDS_Time_is_invalid() . . . . .	324
7.91.3.11 DDS_Duration_is_infinite() . . . . .	325
7.91.3.12 DDS_Duration_is_auto() . . . . .	325
7.91.3.13 DDS_Duration_is_zero() . . . . .	325
7.91.4 Variable Documentation . . . . .	325
7.91.4.1 DDS_TIME_MAX . . . . .	325
7.91.4.2 DDS_TIME_INVALID_SEC . . . . .	326
7.91.4.3 DDS_TIME_INVALID_NSEC . . . . .	326
7.91.4.4 DDS_TIME_INVALID . . . . .	326
7.91.4.5 DDS_DURATION_INFINITE_SEC . . . . .	326
7.91.4.6 DDS_DURATION_INFINITE_NSEC . . . . .	326
7.91.4.7 DDS_DURATION_INFINITE . . . . .	326
7.91.4.8 DDS_DURATION_AUTO_SEC . . . . .	327
7.91.4.9 DDS_DURATION_AUTO_NSEC . . . . .	327
7.91.4.10 DDS_DURATION_AUTO . . . . .	327
7.91.4.11 DDS_DURATION_ZERO_SEC . . . . .	327
7.91.4.12 DDS_DURATION_ZERO_NSEC . . . . .	327
7.91.4.13 DDS_DURATION_ZERO . . . . .	327
7.92 GUID Support . . . . .	328
7.92.1 Detailed Description . . . . .	329
7.92.2 Typedef Documentation . . . . .	329
7.92.2.1 DDS RTPS_GuidPrefix_t . . . . .	329
7.92.2.2 DDS RTPS_EntityId_t . . . . .	329

---

7.92.2.3	DDS RTPS_GUID_t	329
7.92.2.4	DDS_GUID_t	329
7.92.3	Function Documentation	329
7.92.3.1	DDS_GUID_equals()	329
7.92.3.2	DDS_GUID_compare()	330
7.92.3.3	DDS_GUID_copy()	330
7.92.4	Variable Documentation	331
7.92.4.1	DDS_GUID_AUTO	331
7.92.4.2	DDS_GUID_UNKNOWN	331
7.92.4.3	DDS_GUID_ZERO	331
7.93	Sequence Number Support	331
7.93.1	Detailed Description	332
7.93.2	Typedef Documentation	332
7.93.2.1	DDS_SequenceNumber_t	332
7.93.3	Variable Documentation	332
7.93.3.1	DDS_SEQUENCE_NUMBER_UNKNOWN	332
7.93.3.2	DDS_SEQUENCE_NUMBER_ZERO	333
7.93.3.3	DDS_SEQUENCE_NUMBER_MAX	333
7.93.3.4	DDS_AUTO_SEQUENCE_NUMBER	333
7.94	Exception Codes	333
7.94.1	Detailed Description	334
7.94.2	Enumeration Type Documentation	334
7.94.2.1	DDS_ExceptionCode_t	334
7.95	Return Codes	335
7.95.1	Detailed Description	335
7.95.2	Standard Return Codes	336
7.95.3	Enumeration Type Documentation	336
7.95.3.1	DDS_ReturnCode_t	336
7.96	Status Kinds	337
7.96.1	Detailed Description	338
7.96.2	Changes in Status	339
7.96.2.1	Changes in plain communication status	340
7.96.2.2	Changes in read communication status	340
7.96.3	Macro Definition Documentation	341
7.96.3.1	DDS_STATUS_MASK_NONE	341
7.96.3.2	DDS_STATUS_MASK_ALL	341
7.96.4	Typedef Documentation	341
7.96.4.1	DDS_StatusMask	342
7.96.5	Enumeration Type Documentation	342

---

7.96.5.1 DDS_StatusKind	342
7.97 Thread Settings	350
7.97.1 Detailed Description	351
7.97.2 Macro Definition Documentation	351
7.97.2.1 DDS_THREAD_SETTINGS_KIND_MASK_DEFAULT	351
7.97.3 Typedef Documentation	351
7.97.3.1 DDS_ThreadSettingsKindMask	351
7.97.4 Enumeration Type Documentation	352
7.97.4.1 DDS_ThreadSettingsKind	352
7.97.4.2 DDS_ThreadSettingsCpuRotationKind	352
7.97.5 Controlling CPU Core Affinity for RTI Threads	352
7.98 QoS Policies	353
7.98.1 Detailed Description	358
7.98.2 Specifying QoS on entities	359
7.98.3 QoS compatibility	359
7.98.4 Macro Definition Documentation	360
7.98.4.1 DDS_QosPrintFormat_INITIALIZER	360
7.98.4.2 DDS_QOS_POLICY_COUNT	360
7.98.5 Enumeration Type Documentation	360
7.98.5.1 DDS_QosPolicyId_t	360
7.99 ASYNCHRONOUS_PUBLISHER	363
7.99.1 Detailed Description	363
7.99.2 Variable Documentation	363
7.99.2.1 DDS_ASYNCHRONOUSPUBLISHER_QOS_POLICY_NAME	363
7.100 AVAILABILITY	364
7.100.1 Detailed Description	364
7.100.2 Variable Documentation	364
7.100.2.1 DDS_AVAILABILITY_QOS_POLICY_NAME	364
7.101 BATCH	364
7.101.1 Detailed Description	365
7.101.2 Variable Documentation	365
7.101.2.1 DDS_BATCH_QOS_POLICY_NAME	365
7.102 DATABASE	365
7.102.1 Detailed Description	365
7.102.2 Variable Documentation	366
7.102.2.1 DDS_DATABASE_QOS_POLICY_NAME	366
7.103 DATA_READER_PROTOCOL	366
7.103.1 Detailed Description	366
7.103.2 Variable Documentation	366



7.103.2.1 DDS_DATAREADERPROTOCOL_QOS_POLICY_NAME . . . . .	366
7.104 DATA_READER_RESOURCE_LIMITS . . . . .	367
7.104.1 Detailed Description . . . . .	367
7.104.2 Enumeration Type Documentation . . . . .	367
7.104.2.1 DDS_DataReaderInstanceRemovalKind . . . . .	367
7.104.3 Variable Documentation . . . . .	369
7.104.3.1 DDS_DATAREADERRESOURCELIMITS_QOS_POLICY_NAME . . . . .	369
7.104.3.2 DDS_AUTO_MAX_TOTAL_INSTANCES . . . . .	369
7.105 DATA_REPRESENTATION . . . . .	369
7.105.1 Detailed Description . . . . .	370
7.105.2 Typedef Documentation . . . . .	370
7.105.2.1 DDS_DataRepresentationId_t . . . . .	370
7.105.3 Variable Documentation . . . . .	370
7.105.3.1 DDS_XCDR_DATA_REPRESENTATION . . . . .	370
7.105.3.2 DDS_XML_DATA_REPRESENTATION . . . . .	371
7.105.3.3 DDS_XCDR2_DATA_REPRESENTATION . . . . .	371
7.105.3.4 DDS_AUTO_DATA_REPRESENTATION . . . . .	371
7.105.3.5 DDS_DATA_REPRESENTATION_QOS_POLICY_NAME . . . . .	371
7.106 Compression Settings . . . . .	372
7.106.1 Detailed Description . . . . .	373
7.106.2 Macro Definition Documentation . . . . .	373
7.106.2.1 DDS_COMPRESSION_ID_MASK_NONE . . . . .	373
7.106.2.2 DDS_COMPRESSION_ID_MASK_ALL . . . . .	373
7.106.2.3 DDS_COMPRESSION_LEVEL_BEST_COMPRESSION . . . . .	373
7.106.2.4 DDS_COMPRESSION_LEVEL_BEST_SPEED . . . . .	374
7.106.2.5 DDS_COMPRESSION_LEVEL_DEFAULT . . . . .	374
7.106.2.6 DDS_COMPRESSION_THRESHOLD_DEFAULT . . . . .	374
7.106.2.7 DDS_COMPRESSION_ID_MASK_PUBLICATION_DEFAULT . . . . .	374
7.106.2.8 DDS_COMPRESSION_ID_MASK_SUBSCRIPTION_DEFAULT . . . . .	375
7.106.3 Typedef Documentation . . . . .	375
7.106.3.1 DDS_CompressionId_t . . . . .	375
7.106.3.2 DDS_CompressionIdMask . . . . .	375
7.106.4 Variable Documentation . . . . .	375
7.106.4.1 DDS_COMPRESSION_ID_ZLIB . . . . .	375
7.106.4.2 DDS_COMPRESSION_ID_BZIP2 . . . . .	376
7.106.4.3 DDS_COMPRESSION_ID_LZ4 . . . . .	376
7.107 DATA_TAG . . . . .	376
7.107.1 Detailed Description . . . . .	377
7.107.2 Typedef Documentation . . . . .	377

---

7.107.2.1 DDS_DataTagQosPolicy . . . . .	377
7.107.3 Usage . . . . .	377
7.107.4 Function Documentation . . . . .	378
7.107.4.1 get_number_of_tags() . . . . .	378
7.107.4.2 assert_tag() . . . . .	378
7.107.4.3 add_tag() . . . . .	379
7.107.4.4 lookup_tag() . . . . .	380
7.107.4.5 remove_tag() . . . . .	380
7.107.5 Variable Documentation . . . . .	381
7.107.5.1 DDS_DATATAG_QOS_POLICY_NAME . . . . .	381
7.108 DATA_WRITER_PROTOCOL . . . . .	381
7.108.1 Detailed Description . . . . .	381
7.108.2 Variable Documentation . . . . .	381
7.108.2.1 DDS_DATAWRITERPROTOCOL_QOS_POLICY_NAME . . . . .	382
7.109 DATA_WRITER_RESOURCE_LIMITS . . . . .	382
7.109.1 Detailed Description . . . . .	382
7.109.2 Enumeration Type Documentation . . . . .	382
7.109.2.1 DDS_DataWriterResourceLimitsInstanceReplacementKind . . . . .	383
7.109.3 Variable Documentation . . . . .	384
7.109.3.1 DDS_DATAWRITERRESOURCELIMITS_QOS_POLICY_NAME . . . . .	385
7.110 DATA_WRITER_TRANSFER_MODE . . . . .	385
7.110.1 Detailed Description . . . . .	385
7.110.2 Variable Documentation . . . . .	385
7.110.2.1 DDS_DATAWRITERTRANSFERMODE_QOS_POLICY_NAME . . . . .	385
7.111 DEADLINE . . . . .	385
7.111.1 Detailed Description . . . . .	386
7.111.2 Variable Documentation . . . . .	386
7.111.2.1 DDS_DEADLINE_QOS_POLICY_NAME . . . . .	386
7.112 DESTINATION_ORDER . . . . .	386
7.112.1 Detailed Description . . . . .	387
7.112.2 Enumeration Type Documentation . . . . .	387
7.112.2.1 DDS_DestinationOrderQosPolicyKind . . . . .	387
7.112.2.2 DDS_DestinationOrderQosPolicyScopeKind . . . . .	388
7.112.3 Variable Documentation . . . . .	388
7.112.3.1 DDS_DESTINATIONORDER_QOS_POLICY_NAME . . . . .	388
7.113 DISCOVERY . . . . .	388
7.113.1 Detailed Description . . . . .	389
7.113.2 Variable Documentation . . . . .	389
7.113.2.1 DDS_DISCOVERY_QOS_POLICY_NAME . . . . .	389

---

7.114 DISCOVERY_CONFIG . . . . .	389
7.114.1 Detailed Description . . . . .	391
7.114.2 Macro Definition Documentation . . . . .	391
7.114.2.1 DDS_DISCOVERYCONFIG_BUILTIN_PLUGIN_MASK_NONE . . . . .	391
7.114.2.2 DDS_DISCOVERYCONFIG_BUILTIN_PLUGIN_MASK_DEFAULT . . . . .	391
7.114.2.3 DDS_DISCOVERYCONFIG_BUILTIN_CHANNEL_MASK_NONE . . . . .	391
7.114.2.4 DDS_DISCOVERYCONFIG_BUILTIN_CHANNEL_MASK_DEFAULT . . . . .	392
7.114.2.5 DDS_DISCOVERYCONFIG_BUILTIN_CHANNEL_MASK_ALL . . . . .	392
7.114.3 Typedef Documentation . . . . .	392
7.114.3.1 DDS_DiscoveryConfigBuiltinPluginKindMask . . . . .	392
7.114.3.2 DDS_DiscoveryConfigBuiltinChannelKindMask . . . . .	393
7.114.4 Enumeration Type Documentation . . . . .	393
7.114.4.1 DDS_DiscoveryConfigBuiltinPluginKind . . . . .	393
7.114.4.2 DDS_DiscoveryConfigBuiltinChannelKind . . . . .	394
7.114.4.3 DDS_RemoteParticipantPurgeKind . . . . .	395
7.114.5 Variable Documentation . . . . .	396
7.114.5.1 DDS_DISCOVERYCONFIG_QOS_POLICY_NAME . . . . .	396
7.115 DOMAIN_PARTICIPANT_RESOURCE_LIMITS . . . . .	396
7.115.1 Detailed Description . . . . .	397
7.115.2 Enumeration Type Documentation . . . . .	397
7.115.2.1 DDS_DomainParticipantResourceLimitsIgnoredEntityReplacementKind . . . . .	397
7.115.3 Variable Documentation . . . . .	397
7.115.3.1 DDS_AUTO_COUNT . . . . .	398
7.115.3.2 DDS_DOMAINPARTICIPANTRESOURCELIMITS_QOS_POLICY_NAME . . . . .	398
7.116 DURABILITY . . . . .	398
7.116.1 Detailed Description . . . . .	399
7.116.2 Enumeration Type Documentation . . . . .	399
7.116.2.1 DDS_PersistentJournalKind . . . . .	399
7.116.2.2 DDS_PersistentSynchronizationKind . . . . .	400
7.116.2.3 DDS_DurabilityQosPolicyKind . . . . .	400
7.116.3 Variable Documentation . . . . .	401
7.116.3.1 DDS_DURABILITY_QOS_POLICY_NAME . . . . .	401
7.116.3.2 DDS_AUTO_WRITER_DEPTH . . . . .	401
7.117 DURABILITY_SERVICE . . . . .	402
7.117.1 Detailed Description . . . . .	402
7.117.2 Variable Documentation . . . . .	402
7.117.2.1 DDS_DURABILITYSERVICE_QOS_POLICY_NAME . . . . .	402
7.118 ENTITY_FACTORY . . . . .	402
7.118.1 Detailed Description . . . . .	403

---

7.118.2 Variable Documentation	403
7.118.2.1 DDS_ENTITYFACTORY_QOS_POLICY_NAME	403
7.119 ENTITY_NAME	403
7.119.1 Detailed Description	404
7.119.2 Variable Documentation	404
7.119.2.1 DDS_ENTITYNAME_QOS_POLICY_NAME	404
7.120 EVENT	404
7.120.1 Detailed Description	404
7.120.2 Variable Documentation	404
7.120.2.1 DDS_EVENT_QOS_POLICY_NAME	405
7.121 HISTORY	405
7.121.1 Detailed Description	405
7.121.2 Enumeration Type Documentation	405
7.121.2.1 DDS_HistoryQosPolicyKind	405
7.121.3 Variable Documentation	406
7.121.3.1 DDS_HISTORY_QOS_POLICY_NAME	406
7.122 GROUP_DATA	406
7.122.1 Detailed Description	407
7.122.2 Variable Documentation	407
7.122.2.1 DDS_GROUPDATA_QOS_POLICY_NAME	407
7.123 LATENCY_BUDGET	407
7.123.1 Detailed Description	407
7.123.2 Variable Documentation	408
7.123.2.1 DDS_LATENCYBUDGET_QOS_POLICY_NAME	408
7.124 LIFESPAN	408
7.124.1 Detailed Description	408
7.124.2 Variable Documentation	408
7.124.2.1 DDS_LIFESPAN_QOS_POLICY_NAME	408
7.125 LIVELINESS	409
7.125.1 Detailed Description	409
7.125.2 Enumeration Type Documentation	409
7.125.2.1 DDS_LivelinessQosPolicyKind	409
7.125.3 Variable Documentation	410
7.125.3.1 DDS_LIVELINESS_QOS_POLICY_NAME	410
7.126 LOCATORFILTER	410
7.126.1 Detailed Description	411
7.126.2 Variable Documentation	411
7.126.2.1 DDS_LOCATORFILTER_QOS_POLICY_NAME	411
7.127 LOGGING	411

---

7.127.1 Detailed Description . . . . .	412
7.128 MONITORING . . . . .	412
7.128.1 Detailed Description . . . . .	412
7.128.2 Variable Documentation . . . . .	413
7.128.2.1 DDS_MONITORING_QOS_POLICY_NAME . . . . .	413
7.129 MULTICHANNEL . . . . .	413
7.129.1 Detailed Description . . . . .	413
7.129.2 Variable Documentation . . . . .	413
7.129.2.1 DDS_MULTICHANNEL_QOS_POLICY_NAME . . . . .	414
7.130 OWNERSHIP . . . . .	414
7.130.1 Detailed Description . . . . .	414
7.130.2 Enumeration Type Documentation . . . . .	414
7.130.2.1 DDS_OwnershipQosPolicyKind . . . . .	414
7.130.3 Variable Documentation . . . . .	415
7.130.3.1 DDS_OWNERSHIP_QOS_POLICY_NAME . . . . .	415
7.131 OWNERSHIP_STRENGTH . . . . .	415
7.131.1 Detailed Description . . . . .	416
7.131.2 Variable Documentation . . . . .	416
7.131.2.1 DDS_OWNERSHIPSTRENGTH_QOS_POLICY_NAME . . . . .	416
7.132 PARTITION . . . . .	416
7.132.1 Detailed Description . . . . .	416
7.132.2 Variable Documentation . . . . .	416
7.132.2.1 DDS_PARTITION_QOS_POLICY_NAME . . . . .	417
7.133 PRESENTATION . . . . .	417
7.133.1 Detailed Description . . . . .	417
7.133.2 Enumeration Type Documentation . . . . .	417
7.133.2.1 DDS_PresentationQosPolicyAccessScopeKind . . . . .	417
7.133.3 Variable Documentation . . . . .	418
7.133.3.1 DDS_PRESENTATION_QOS_POLICY_NAME . . . . .	418
7.134 PROFILE . . . . .	418
7.134.1 Detailed Description . . . . .	419
7.134.2 Variable Documentation . . . . .	419
7.134.2.1 DDS_PROFILE_QOS_POLICY_NAME . . . . .	419
7.135 PROPERTY . . . . .	419
7.135.1 Detailed Description . . . . .	420
7.135.2 Typedef Documentation . . . . .	421
7.135.2.1 DDS_PropertyQosPolicy . . . . .	421
7.135.3 Usage . . . . .	421
7.135.3.1 Reasons for Using the PropertyQosPolicy . . . . .	422

---

7.135.3.2 DDS_PropertyQosPolicyMutability . . . . .	422
7.135.4 Enumeration Type Documentation . . . . .	422
7.135.4.1 DDS_PropertyQosPolicyMutability . . . . .	422
7.135.5 Function Documentation . . . . .	423
7.135.5.1 DDS_PropertyQosPolicyHelper_get_property_mutability() . . . . .	423
7.135.5.2 get_number_of_properties() . . . . .	423
7.135.5.3 assert_property() . . . . .	424
7.135.5.4 add_property() . . . . .	424
7.135.5.5 assert_pointer_property() . . . . .	425
7.135.5.6 add_pointer_property() . . . . .	426
7.135.5.7 lookup_property() . . . . .	427
7.135.5.8 remove_property() . . . . .	427
7.135.5.9 get_properties() . . . . .	428
7.135.6 Variable Documentation . . . . .	428
7.135.6.1 DDS_PROPERTY_QOS_POLICY_NAME . . . . .	429
7.136 PUBLISH_MODE . . . . .	429
7.136.1 Detailed Description . . . . .	429
7.136.2 Macro Definition Documentation . . . . .	430
7.136.2.1 DDS_PUBLICATION_PRIORITY_UNDEFINED . . . . .	430
7.136.2.2 DDS_PUBLICATION_PRIORITY_AUTOMATIC . . . . .	430
7.136.3 Enumeration Type Documentation . . . . .	430
7.136.3.1 DDS_PublishModeQosPolicyKind . . . . .	430
7.136.4 Variable Documentation . . . . .	431
7.136.4.1 DDS_PUBLISHMODE_QOS_POLICY_NAME . . . . .	432
7.137 READER_DATA_LIFECYCLE . . . . .	432
7.137.1 Detailed Description . . . . .	432
7.137.2 Variable Documentation . . . . .	432
7.137.2.1 DDS_READERDATALIFECYCLE_QOS_POLICY_NAME . . . . .	432
7.138 RECEIVER_POOL . . . . .	432
7.138.1 Detailed Description . . . . .	433
7.138.2 Variable Documentation . . . . .	433
7.138.2.1 DDS_RECEIVERPOOL_QOS_POLICY_NAME . . . . .	433
7.138.2.2 DDS_LENGTH_AUTO . . . . .	433
7.139 RELIABILITY . . . . .	433
7.139.1 Detailed Description . . . . .	434
7.139.2 Enumeration Type Documentation . . . . .	434
7.139.2.1 DDS_ReliabilityQosPolicyKind . . . . .	434
7.139.2.2 DDS_ReliabilityQosPolicyAcknowledgmentModeKind . . . . .	435
7.139.2.3 DDS_InstanceStateConsistencyKind . . . . .	436

---

7.139.3 Variable Documentation	437
7.139.3.1 DDS_RELIABILITY_QOS_POLICY_NAME	437
7.140 RESOURCE_LIMITS	437
7.140.1 Detailed Description	437
7.140.2 Variable Documentation	437
7.140.2.1 DDS_RESOURCELIMITS_QOS_POLICY_NAME	438
7.140.2.2 DDS_LENGTH_UNLIMITED	438
7.141 SERVICE	438
7.141.1 Detailed Description	439
7.141.2 Enumeration Type Documentation	439
7.141.2.1 DDS_ServiceQosPolicyKind	439
7.141.3 Variable Documentation	439
7.141.3.1 DDS_SERVICE_QOS_POLICY_NAME	440
7.142 SYSTEM_RESOURCE_LIMITS	440
7.142.1 Detailed Description	440
7.142.2 Variable Documentation	440
7.142.2.1 DDS_SYSTEMRESOURCELIMITS_QOS_POLICY_NAME	440
7.143 TIME_BASED_FILTER	440
7.143.1 Detailed Description	441
7.143.2 Variable Documentation	441
7.143.2.1 DDS_TIMEBASEDFILTER_QOS_POLICY_NAME	441
7.144 TOPIC_DATA	441
7.144.1 Detailed Description	442
7.144.2 Variable Documentation	442
7.144.2.1 DDS_TOPICDATA_QOS_POLICY_NAME	442
7.145 TOPIC_QUERY_DISPATCH	442
7.145.1 Detailed Description	442
7.145.2 Variable Documentation	442
7.145.2.1 DDS_TOPICQUERYDISPATCH_QOS_POLICY_NAME	443
7.146 TRANSPORT_BUILTIN	443
7.146.1 Detailed Description	444
7.146.2 Macro Definition Documentation	444
7.146.2.1 DDS_TRANSPORTBUILTIN_MASK_NONE	444
7.146.2.2 DDS_TRANSPORTBUILTIN_MASK_DEFAULT	445
7.146.2.3 DDS_TRANSPORTBUILTIN_MASK_ALL	445
7.146.3 Typedef Documentation	445
7.146.3.1 DDS_TransportBuiltinKindMask	445
7.146.4 Enumeration Type Documentation	445
7.146.4.1 DDS_TransportBuiltinKind	445

---

7.146.5	Variable Documentation	446
7.146.5.1	DDS_TRANSPORTBUILTIN_QOS_POLICY_NAME	446
7.146.5.2	DDS_TRANSPORTBUILTIN_SHMEM_ALIAS	446
7.146.5.3	DDS_TRANSPORTBUILTIN_UDPv4_ALIAS	446
7.146.5.4	DDS_TRANSPORTBUILTIN_UDPv4_WAN_ALIAS	446
7.146.5.5	DDS_TRANSPORTBUILTIN_UDPv6_ALIAS	447
7.147	TRANSPORT_MULTICAST	447
7.147.1	Detailed Description	447
7.147.2	Enumeration Type Documentation	448
7.147.2.1	DDS_TransportMulticastQosPolicyKind	448
7.147.3	Variable Documentation	448
7.147.3.1	DDS_TRANSPORTMULTICAST_QOS_POLICY_NAME	448
7.148	TRANSPORT_MULTICAST_MAPPING	448
7.148.1	Detailed Description	449
7.148.2	Variable Documentation	449
7.148.2.1	DDS_TRANSPORTMULTICASTMAPPING_QOS_POLICY_NAME	449
7.149	TRANSPORT_PRIORITY	449
7.149.1	Detailed Description	449
7.149.2	Variable Documentation	450
7.149.2.1	DDS_TRANSPORTPRIORITY_QOS_POLICY_NAME	450
7.150	TRANSPORT_SELECTION	450
7.150.1	Detailed Description	450
7.150.2	Variable Documentation	450
7.150.2.1	DDS_TRANSPORTSELECTION_QOS_POLICY_NAME	450
7.151	TRANSPORT_UNICAST	451
7.151.1	Detailed Description	451
7.151.2	Variable Documentation	451
7.151.2.1	DDS_TRANSPORTUNICAST_QOS_POLICY_NAME	451
7.152	TYPE_CONSISTENCY_ENFORCEMENT	451
7.152.1	Detailed Description	452
7.152.2	Enumeration Type Documentation	452
7.152.2.1	DDS_TypeConsistencyKind	452
7.152.3	Variable Documentation	453
7.152.3.1	DDS_TYPE_CONSISTENCY_ENFORCEMENT_QOS_POLICY_NAME	453
7.153	TYPESUPPORT	453
7.153.1	Detailed Description	454
7.153.2	Enumeration Type Documentation	454
7.153.2.1	DDS_CdrPaddingKind	454
7.153.3	Variable Documentation	455



---

7.153.3.1 DDS_TYPESUPPORT_QOS_POLICY_NAME . . . . .	455
7.154 USER_DATA . . . . .	455
7.154.1 Detailed Description . . . . .	455
7.154.2 Variable Documentation . . . . .	455
7.154.2.1 DDS_USERDATA_QOS_POLICY_NAME . . . . .	455
7.155 WRITER_DATA_LIFECYCLE . . . . .	456
7.155.1 Detailed Description . . . . .	456
7.155.2 Variable Documentation . . . . .	456
7.155.2.1 DDS_WRITERDATALIFECYCLE_QOS_POLICY_NAME . . . . .	456
7.156 WIRE_PROTOCOL . . . . .	456
7.156.1 Detailed Description . . . . .	457
7.156.2 Macro Definition Documentation . . . . .	457
7.156.2.1 DDS_RTPS_RESERVED_PORT_MASK_DEFAULT . . . . .	458
7.156.2.2 DDS_RTPS_RESERVED_PORT_MASK_NONE . . . . .	458
7.156.2.3 DDS_RTPS_RESERVED_PORT_MASK_ALL . . . . .	459
7.156.3 Typedef Documentation . . . . .	459
7.156.3.1 DDS_RtpsReservedPortKindMask . . . . .	459
7.156.4 Enumeration Type Documentation . . . . .	459
7.156.4.1 DDS_RtpsReservedPortKind . . . . .	459
7.156.4.2 DDS_WireProtocolQosPolicyAutoKind . . . . .	460
7.156.5 Variable Documentation . . . . .	460
7.156.5.1 DDS_RTI_BACKWARDS_COMPATIBLE_RTPS_WELL_KNOWN_PORTS . . . . .	460
7.156.5.2 DDS_INTEROPERABLE_RTPS_WELL_KNOWN_PORTS . . . . .	461
7.156.5.3 DDS_WIREPROTOCOL_QOS_POLICY_NAME . . . . .	462
7.157 Extended Qos Support . . . . .	462
7.157.1 Detailed Description . . . . .	462
7.158 Unicast Settings . . . . .	462
7.158.1 Detailed Description . . . . .	462
7.159 Multicast Settings . . . . .	463
7.159.1 Detailed Description . . . . .	463
7.160 Multicast Mapping . . . . .	463
7.160.1 Detailed Description . . . . .	463
7.161 NDDS_DISCOVERY_PEERS . . . . .	464
7.161.1 Peer Descriptor Format . . . . .	465
7.161.1.1 Locator Format . . . . .	465
7.161.1.2 Address Format . . . . .	466
7.161.2 NDDS_DISCOVERY_PEERS Environment Variable Format . . . . .	466
7.161.3 NDDS_DISCOVERY_PEERS File Format . . . . .	468
7.161.4 NDDS_DISCOVERY_PEERS Precedence . . . . .	469

---

7.161.5	NDDS_DISCOVERY_PEERS Default Value	469
7.161.6	Builtin Transport Class Names	470
7.161.7	NDDS_DISCOVERY_PEERS and Local Host Communication	470
7.162	Entity Support	471
7.162.1	Detailed Description	471
7.163	Conditions and WaitSets	471
7.163.1	Detailed Description	472
7.163.2	Macro Definition Documentation	472
7.163.2.1	DDS_WaitSetProperty_t_INITIALIZER	472
7.164	Cookie	473
7.164.1	Detailed Description	473
7.164.2	Function Documentation	473
7.164.2.1	to_pointer()	473
7.165	Sample Flags	473
7.165.1	Detailed Description	474
7.165.2	Typedef Documentation	474
7.165.2.1	DDS_SampleFlagBits	474
7.165.2.2	DDS_SampleFlag	474
7.165.3	Enumeration Type Documentation	475
7.165.3.1	DDS_SampleFlagBits	475
7.166	WriteParams	476
7.166.1	Detailed Description	476
7.166.2	Function Documentation	476
7.166.2.1	DDS_SampleIdentity_equals()	477
7.166.2.2	DDS_WriteParams_reset()	478
7.166.3	Variable Documentation	478
7.166.3.1	writer_guid	478
7.166.3.2	sequence_number	478
7.166.3.3	DDS_AUTO_SAMPLE_IDENTITY	479
7.166.3.4	DDS_UNKNOWN_SAMPLE_IDENTITY	479
7.166.3.5	DDS_WRITEPARAMS_DEFAULT	479
7.167	Heap Support in C	479
7.167.1	Detailed Description	479
7.167.2	Function Documentation	480
7.167.2.1	DDS_Heap_calloc()	480
7.167.2.2	DDS_Heap_malloc()	480
7.167.2.3	DDS_Heap_free()	481
7.168	Builtin Qos Profiles	481
7.168.1	Detailed Description	485

---

7.168.2 Variable Documentation . . . . .	486
7.168.2.1 DDS_BUILTIN_QOS_LIB . . . . .	487
7.168.2.2 DDS_PROFILE_BASELINE_ROOT . . . . .	487
7.168.2.3 DDS_PROFILE_BASELINE . . . . .	487
7.168.2.4 DDS_PROFILE_BASELINE_5_0_0 . . . . .	487
7.168.2.5 DDS_PROFILE_BASELINE_5_1_0 . . . . .	488
7.168.2.6 DDS_PROFILE_BASELINE_5_2_0 . . . . .	488
7.168.2.7 DDS_PROFILE_BASELINE_5_3_0 . . . . .	488
7.168.2.8 DDS_PROFILE_BASELINE_6_0_0 . . . . .	488
7.168.2.9 DDS_PROFILE_BASELINE_6_1_0 . . . . .	488
7.168.2.10 DDS_PROFILE_BASELINE_7_0_0 . . . . .	489
7.168.2.11 DDS_PROFILE_BASELINE_7_1_0 . . . . .	489
7.168.2.12 DDS_PROFILE_GENERIC_COMMON . . . . .	489
7.168.2.13 DDS_PROFILE_GENERIC_MONITORING_COMMON . . . . .	489
7.168.2.14 DDS_PROFILE_GENERIC_CONNEXT_MICRO_COMPATIBILITY . . . . .	490
7.168.2.15 DDS_PROFILE_GENERIC_CONNEXT_MICRO_COMPATIBILITY_2_4_9 . . . . .	490
7.168.2.16 DDS_PROFILE_GENERIC_CONNEXT_MICRO_COMPATIBILITY_2_4_3 . . . . .	490
7.168.2.17 DDS_PROFILE_GENERIC_OTHER_DDS_VENDOR_COMPATIBILITY . . . . .	490
7.168.2.18 DDS_PROFILE_GENERIC_510_TRANSPORT_COMPATIBILITY . . . . .	491
7.168.2.19 DDS_BUILTIN_QOS_LIB_EXP . . . . .	491
7.168.2.20 DDS_PROFILE_GENERIC_STRICT_RELIABLE . . . . .	491
7.168.2.21 DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE . . . . .	491
7.168.2.22 DDS_PROFILE_GENERIC_BEST_EFFORT . . . . .	492
7.168.2.23 DDS_PROFILE_GENERIC_STRICT_RELIABLE_HIGH_THROUGHPUT . . . . .	492
7.168.2.24 DDS_PROFILE_GENERIC_STRICT_RELIABLE_LOW_LATENCY . . . . .	492
7.168.2.25 DDS_PROFILE_GENERIC_PARTICIPANT_LARGE_DATA . . . . .	493
7.168.2.26 DDS_PROFILE_GENERIC_PARTICIPANT_LARGE_DATA_MONITORING . . . . .	493
7.168.2.27 DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA . . . . .	494
7.168.2.28 DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA . . . . .	494
7.168.2.29 DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_FAST_FLOW . . . . .	494
7.168.2.30 DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_MEDIUM_FLOW . . . . .	495
7.168.2.31 DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_SLOW_FLOW . . . . .	495
7.168.2.32 DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA_FAST_FLOW . . . . .	495
7.168.2.33 DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA_MEDIUM_FLOW . . . . .	495
7.168.2.34 DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA_SLOW_FLOW . . . . .	496
7.168.2.35 DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_TRANSIENT_LOCAL . . . . .	496
7.168.2.36 DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_TRANSIENT . . . . .	496
7.168.2.37 DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_PERSISTENT . . . . .	496
7.168.2.38 DDS_PROFILE_GENERIC_AUTO_TUNING . . . . .	497

---

7.168.2.39	DDS_PROFILE_GENERIC_MINIMAL_MEMORY_FOOTPRINT . . . . .	497
7.168.2.40	DDS_PROFILE_GENERIC_SECURITY . . . . .	497
7.168.2.41	DDS_PROFILE_GENERIC_MONITORING2 . . . . .	498
7.168.2.42	DDS_PROFILE_PATTERN_PERIODIC_DATA . . . . .	499
7.168.2.43	DDS_PROFILE_PATTERN_STREAMING . . . . .	499
7.168.2.44	DDS_PROFILE_PATTERN_RELIABLE_STREAMING . . . . .	499
7.168.2.45	DDS_PROFILE_PATTERN_EVENT . . . . .	500
7.168.2.46	DDS_PROFILE_PATTERN_ALARM_EVENT . . . . .	500
7.168.2.47	DDS_PROFILE_PATTERN_STATUS . . . . .	500
7.168.2.48	DDS_PROFILE_PATTERN_ALARM_STATUS . . . . .	501
7.168.2.49	DDS_PROFILE_PATTERN_LAST_VALUE_CACHE . . . . .	501
7.168.2.50	DDS_BUILTIN_QOS_SNIPPET_LIB . . . . .	501
7.168.2.51	DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_COMMON . . . . .	502
7.168.2.52	DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_KEEP_ALL . . . . .	502
7.168.2.53	DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_KEEP_LAST . . . . .	503
7.168.2.54	DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_HIGH_RATE . . . . .	503
7.168.2.55	DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_LOW_LATENCY . . . . .	504
7.168.2.56	DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_LARGE_DATA . . . . .	504
7.168.2.57	DDS_SNIPPET_OPTIMIZATION_DATACACHE_LARGE_DATA_DYNAMICMEMALLOC505 . . . . .	505
7.168.2.58	DDS_SNIPPET_OPTIMIZATION_DISCOVERY_COMMON . . . . .	505
7.168.2.59	DDS_SNIPPET_OPTIMIZATION_DISCOVERY_PARTICIPANT_COMPACT . . . . .	506
7.168.2.60	DDS_SNIPPET_OPTIMIZATION_DISCOVERY_ENDPOINT_FAST . . . . .	506
7.168.2.61	DDS_SNIPPET_OPTIMIZATION_TRANSPORT_LARGE_BUFFERS . . . . .	506
7.168.2.62	DDS_SNIPPET_QOS_POLICY_RELIABILITY_RELIABLE . . . . .	507
7.168.2.63	DDS_SNIPPET_QOS_POLICY_RELIABILITY_BEST_EFFORT . . . . .	507
7.168.2.64	DDS_SNIPPET_QOS_POLICY_HISTORY_KEEP_LAST_1 . . . . .	508
7.168.2.65	DDS_SNIPPET_QOS_POLICY_HISTORY_KEEP_ALL . . . . .	508
7.168.2.66	DDS_SNIPPET_QOS_POLICY_PUBLISH_MODE_ASYNCHRONOUS . . . . .	508
7.168.2.67	DDS_SNIPPET_QOS_POLICY_DURABILITY_TRANSIENT_LOCAL . . . . .	509
7.168.2.68	DDS_SNIPPET_QOS_POLICY_DURABILITY_TRANSIENT . . . . .	509
7.168.2.69	DDS_SNIPPET_QOS_POLICY_DURABILITY_PERSISTENT . . . . .	510
7.168.2.70	DDS_SNIPPET_QOS_POLICY_BATCHING_ENABLE . . . . .	510
7.168.2.71	DDS_SNIPPET_FEATURE_FLOW_CONTROLLER_838MBPS . . . . .	511
7.168.2.72	DDS_SNIPPET_FEATURE_FLOW_CONTROLLER_209MBPS . . . . .	511
7.168.2.73	DDS_SNIPPET_FEATURE_FLOW_CONTROLLER_52MBPS . . . . .	512
7.168.2.74	DDS_SNIPPET_FEATURE_AUTO_TUNING_ENABLE . . . . .	512
7.168.2.75	DDS_SNIPPET_FEATURE_MONITORING_ENABLE . . . . .	513
7.168.2.76	DDS_SNIPPET_FEATURE_MONITORING2_ENABLE . . . . .	513
7.168.2.77	DDS_SNIPPET_FEATURE_SECURITY_ENABLE . . . . .	513

---

7.168.2.78	DDS_SNIPPET_FEATURE_TOPIC_QUERY_ENABLE	514
7.168.2.79	DDS_SNIPPET_TRANSPORT_TCP_LAN_CLIENT	514
7.168.2.80	DDS_SNIPPET_TRANSPORT_TCP_WAN_SYMMETRIC_CLIENT	515
7.168.2.81	DDS_SNIPPET_TRANSPORT_TCP_WAN_ASYMMETRIC_SERVER	515
7.168.2.82	DDS_SNIPPET_TRANSPORT_TCP_WAN_ASYMMETRIC_CLIENT	515
7.168.2.83	DDS_SNIPPET_TRANSPORT_UDP_AVOID_IP_FRAGMENTATION	516
7.168.2.84	DDS_SNIPPET_TRANSPORT_UDP_WAN	516
7.168.2.85	DDS_SNIPPET_COMPATIBILITY_CONNEXT_MICRO_VERSION_2_4_3	516
7.168.2.86	DDS_SNIPPET_COMPATIBILITY_OTHER_DDS_VENDORS_ENABLE	517
7.168.2.87	DDS_SNIPPET_5_1_0_TRANSPORT_ENABLE	517
7.169	DomainParticipantConfigParams	517
7.169.1	Detailed Description	518
7.169.2	Macro Definition Documentation	518
7.169.2.1	DDS_DomainParticipantConfigParams_t_INITIALIZER	518
7.169.3	Variable Documentation	518
7.169.3.1	DDS_DOMAIN_ID_USE_XML_CONFIG	518
7.169.3.2	DDS_ENTITY_NAME_USE_XML_CONFIG	518
7.169.3.3	DDS_QOS_ELEMENT_NAME_USE_XML_CONFIG	519
7.170	User-managed Threads	519
7.170.1	Detailed Description	519
7.170.2	Typedef Documentation	519
7.170.2.1	DDSThreadFactory_OnSpawnedFunction	519
7.171	Observability Library	520
7.171.1	Detailed Description	520
7.171.2	Function Documentation	521
7.171.2.1	RTI_Monitoring_initialize()	521
7.171.3	Variable Documentation	521
7.171.3.1	RTI_MONITORING_PERIODIC_TOPIC_NAME	521
7.171.3.2	RTI_MONITORING_EVENT_TOPIC_NAME	522
7.171.3.3	RTI_MONITORING_LOGGING_TOPIC_NAME	522
7.172	Version	522
7.172.1	Detailed Description	522
7.173	Logging	523
7.173.1	Detailed Description	524
7.173.2	Enumeration Type Documentation	524
7.173.2.1	NDDS_Config_LogVerbosity	524
7.173.2.2	NDDS_Config_LogLevel	525
7.173.2.3	NDDS_Config_SyslogLevel	526
7.173.2.4	NDDS_Config_LogCategory	526

---

7.173.2.5 NDDS_Config_LogPrintFormat . . . . .	527
7.173.2.6 NDDS_Config_LogFacility . . . . .	528
7.173.2.7 NDDS_Config_SyslogVerbosity . . . . .	528
7.174 Activity Context . . . . .	530
7.174.1 Detailed Description . . . . .	531
7.174.2 Macro Definition Documentation . . . . .	531
7.174.2.1 NDDS_CONFIG_ACTIVITY_CONTEXT_ATTRIBUTE_MASK_DEFAULT . . . . .	532
7.174.2.2 NDDS_CONFIG_ACTIVITY_CONTEXT_ATTRIBUTE_MASK_NONE . . . . .	532
7.174.2.3 NDDS_CONFIG_ACTIVITY_CONTEXT_ATTRIBUTE_MASK_ALL . . . . .	532
7.174.3 Typedef Documentation . . . . .	532
7.174.3.1 NDDS_Config_ActivityContextAttributeKindMask . . . . .	532
7.174.4 Enumeration Type Documentation . . . . .	532
7.174.4.1 NDDS_Config_ActivityContextAttributeKind . . . . .	532
7.174.5 Function Documentation . . . . .	534
7.174.5.1 set_attribute_mask() . . . . .	535
7.175 Compliance Configuration . . . . .	535
7.175.1 Detailed Description . . . . .	535
7.175.2 Macro Definition Documentation . . . . .	536
7.175.2.1 NDDS_CONFIG_XTYPES_COMPLIANCE_MASK_VENDOR . . . . .	536
7.175.2.2 NDDS_CONFIG_XTYPES_COMPLIANCE_MASK_DEFAULT . . . . .	536
7.175.3 Typedef Documentation . . . . .	536
7.175.3.1 NDDS_Config_XTypesComplianceMask . . . . .	537
7.175.4 Enumeration Type Documentation . . . . .	537
7.175.4.1 NDDS_Config_XTypesComplianceMaskBits . . . . .	537
7.176 Heap Monitoring . . . . .	539
7.176.1 Detailed Description . . . . .	540
7.176.2 Enumeration Type Documentation . . . . .	540
7.176.2.1 NDDS_Utility_HeapMonitoringSnapshotContentFormat . . . . .	540
7.177 Network Capture . . . . .	540
7.177.1 Detailed Description . . . . .	542
7.177.2 Capturing . . . . .	542
7.177.3 Macro Definition Documentation . . . . .	543
7.177.3.1 NDDS_UTILITY_NETWORK_CAPTURE_CONTENT_MASK_DEFAULT . . . . .	543
7.177.3.2 NDDS_UTILITY_NETWORK_CAPTURE_CONTENT_MASK_NONE . . . . .	543
7.177.3.3 NDDS_UTILITY_NETWORK_CAPTURE_CONTENT_MASK_ALL . . . . .	543
7.177.3.4 NDDS_UTILITY_NETWORK_CAPTURE_TRAFFIC_MASK_DEFAULT . . . . .	544
7.177.3.5 NDDS_UTILITY_NETWORK_CAPTURE_TRAFFIC_MASK_NONE . . . . .	544
7.177.3.6 NDDS_UTILITY_NETWORK_CAPTURE_TRAFFIC_MASK_ALL . . . . .	544
7.177.4 Typedef Documentation . . . . .	544

---

7.177.4.1	NDDS_UTILITY_NetworkCaptureContentKindMask	544
7.177.4.2	NDDS_UTILITY_NetworkCaptureTrafficKindMask	545
7.177.4.3	NDDS_UTILITY_NetworkCaptureParams_t	545
7.177.5	Enumeration Type Documentation	545
7.177.5.1	NDDS_UTILITY_NetworkCaptureContentKind	545
7.177.5.2	NDDS_UTILITY_NetworkCaptureTrafficKind	546
7.177.6	Variable Documentation	546
7.177.6.1	NDDS_UTILITY_NETWORK_CAPTURE_PARAMETERS_DEFAULT	546
7.178	Other Utilities	546
7.178.1	Detailed Description	547
7.179	Octet Buffer Support	547
7.179.1	Detailed Description	547
7.179.2	Conventions	548
7.179.3	Usage	548
7.179.4	Function Documentation	548
7.179.4.1	DDS_OctetBuffer_alloc()	549
7.179.4.2	DDS_OctetBuffer_dup()	549
7.179.4.3	DDS_OctetBuffer_free()	550
7.180	SampleProcessor	550
7.181	Sequence Support	550
7.181.1	Detailed Description	551
7.182	String Support	551
7.182.1	Detailed Description	551
7.182.2	String Conventions	552
7.182.3	Usage	552
7.182.4	Function Documentation	553
7.182.4.1	DDS_String_alloc()	553
7.182.4.2	DDS_String_dup()	553
7.182.4.3	DDS_String_replace()	554
7.182.4.4	DDS_String_free()	554
7.182.4.5	DDS_Wstring_alloc()	555
7.182.4.6	DDS_Wstring_length()	555
7.182.4.7	DDS_Wstring_copy()	556
7.182.4.8	DDS_Wstring_copy_and_widen()	556
7.182.4.9	DDS_Wstring_dup()	557
7.182.4.10	DDS_Wstring_dup_and_widen()	557
7.182.4.11	DDS_Wstring_free()	558
7.183	FlatData Builders	558
7.183.1	Detailed Description	559

---

7.183.2 Builder Error Management . . . . .	560
7.183.3 Function Documentation . . . . .	560
7.183.3.1 build_data() . . . . .	560
7.183.3.2 discard_builder() . . . . .	561
7.184 FlatData Samples . . . . .	561
7.184.1 Detailed Description . . . . .	562
7.184.2 Typedef Documentation . . . . .	562
7.184.2.1 MyFlatFinal . . . . .	562
7.184.2.2 MyFlatMutable . . . . .	563
7.184.2.3 MyFlatUnion . . . . .	563
7.185 FlatData Offsets . . . . .	564
7.185.1 Detailed Description . . . . .	565
7.185.2 Offset Error Management . . . . .	566
7.185.3 Function Documentation . . . . .	566
7.185.3.1 plain_cast() [1/2] . . . . .	566
7.185.3.2 plain_cast() [2/2] . . . . .	568
7.186 FlatData Topic-Types . . . . .	568
7.186.1 Detailed Description . . . . .	569
7.186.2 Publishing FlatData . . . . .	570
7.186.3 Subscribing to FlatData . . . . .	570
<b>8 Namespace Documentation</b>	<b>571</b>
8.1 connext Namespace Reference . . . . .	571
8.1.1 Detailed Description . . . . .	573
8.2 rti Namespace Reference . . . . .	573
8.2.1 Detailed Description . . . . .	573
8.3 rti::flat Namespace Reference . . . . .	573
8.3.1 Detailed Description . . . . .	575
<b>9 Class Documentation</b>	<b>577</b>
9.1 rti::flat::AbstractAlignedList< ElementOffset > Class Template Reference . . . . .	577
9.1.1 Detailed Description . . . . .	577
9.1.2 Member Typedef Documentation . . . . .	578
9.1.2.1 iterator . . . . .	578
9.1.3 Member Function Documentation . . . . .	578
9.1.3.1 begin() . . . . .	578
9.1.3.2 end() . . . . .	578
9.2 rti::flat::AbstractBuilder Class Reference . . . . .	579
9.2.1 Detailed Description . . . . .	579
9.2.2 Constructor & Destructor Documentation . . . . .	579



---

9.2.2.1 ~AbstractBuilder()	579
9.2.3 Member Function Documentation	580
9.2.3.1 discard()	580
9.2.3.2 is_nested()	580
9.2.3.3 is_valid()	580
9.2.3.4 capacity()	581
9.2.3.5 check_failure()	581
9.3 rti::flat::AbstractListBuilder< DHeaderGen > Class Template Reference	581
9.3.1 Detailed Description	582
9.3.2 Member Function Documentation	582
9.3.2.1 element_count()	582
9.4 rti::flat::AbstractPrimitiveList< T > Class Template Reference	582
9.4.1 Detailed Description	582
9.4.2 Member Function Documentation	583
9.4.2.1 get_element()	583
9.4.2.2 set_element()	583
9.5 rti::flat::AbstractSequenceBuilder< DHeaderGen > Class Template Reference	584
9.5.1 Detailed Description	584
9.5.2 Member Function Documentation	584
9.5.2.1 element_count()	585
9.6 rti::flat::AggregationBuilder Class Reference	585
9.6.1 Detailed Description	585
9.7 connext::AlreadyDeletedException Class Reference	585
9.7.1 Detailed Description	586
9.8 connext::BadParameterException Class Reference	586
9.8.1 Detailed Description	586
9.9 DDS_AcknowledgmentInfo Struct Reference	586
9.9.1 Detailed Description	587
9.9.2 Member Data Documentation	587
9.9.2.1 subscription_handle	587
9.9.2.2 sample_identity	587
9.9.2.3 valid_response_data	587
9.9.2.4 response_data	588
9.10 DDS_AckResponseData_t Struct Reference	588
9.10.1 Detailed Description	588
9.10.2 Member Data Documentation	588
9.10.2.1 value	588
9.11 DDS_AllocationSettings_t Struct Reference	588
9.11.1 Detailed Description	589

---

9.11.2 Member Data Documentation . . . . .	589
9.11.2.1 initial_count . . . . .	589
9.11.2.2 max_count . . . . .	589
9.11.2.3 incremental_count . . . . .	590
9.12 DDS_AnnotationParameterValue Struct Reference . . . . .	590
9.12.1 Detailed Description . . . . .	590
9.13 DDS_AynchronousPublisherQosPolicy Struct Reference . . . . .	590
9.13.1 Detailed Description . . . . .	591
9.13.2 Usage . . . . .	591
9.13.3 Member Data Documentation . . . . .	592
9.13.3.1 disable_asynchronous_write . . . . .	592
9.13.3.2 thread . . . . .	592
9.13.3.3 disable_asynchronous_batch . . . . .	592
9.13.3.4 asynchronous_batch_thread . . . . .	593
9.13.3.5 disable_topic_query_publication . . . . .	593
9.13.3.6 topic_query_publication_thread . . . . .	593
9.14 DDS_AsyncWaitSetProperty_t Struct Reference . . . . .	594
9.14.1 Detailed Description . . . . .	594
9.14.2 Member Data Documentation . . . . .	594
9.14.2.1 waitset_property . . . . .	594
9.14.2.2 thread_pool_size . . . . .	595
9.14.2.3 thread_settings . . . . .	595
9.14.2.4 thread_name_prefix . . . . .	595
9.14.2.5 wait_timeout . . . . .	596
9.14.2.6 level . . . . .	596
9.15 DDS_AvailabilityQosPolicy Struct Reference . . . . .	596
9.15.1 Detailed Description . . . . .	597
9.15.2 Usage . . . . .	597
9.15.3 Consistency . . . . .	598
9.15.4 Member Data Documentation . . . . .	599
9.15.4.1 enable_required_subscriptions . . . . .	599
9.15.4.2 max_data_availability_waiting_time . . . . .	599
9.15.4.3 max_endpoint_availability_waiting_time . . . . .	599
9.15.4.4 required_matched_endpoint_groups . . . . .	600
9.16 DDS_BatchQosPolicy Struct Reference . . . . .	600
9.16.1 Detailed Description . . . . .	601
9.16.2 Member Data Documentation . . . . .	601
9.16.2.1 enable . . . . .	601
9.16.2.2 max_data_bytes . . . . .	601

---

9.16.3 Consistency	602
9.16.3.1 max_samples	602
9.16.4 Consistency	602
9.16.4.1 max_flush_delay	602
9.16.5 Consistency	602
9.16.5.1 source_timestamp_resolution	603
9.16.6 Consistency	603
9.16.6.1 thread_safe_write	603
9.16.7 Consistency	603
9.17 DDS_BooleanSeq Struct Reference	604
9.17.1 Detailed Description	604
9.18 DDS_BuiltinTopicKey_t Struct Reference	604
9.18.1 Detailed Description	604
9.18.2 Member Data Documentation	605
9.18.2.1 value	605
9.19 DDS_BuiltinTopicReaderResourceLimits_t Struct Reference	605
9.19.1 Detailed Description	606
9.19.2 Member Data Documentation	606
9.19.2.1 initial_samples	606
9.19.2.2 max_samples	606
9.19.2.3 initial_infos	607
9.19.2.4 max_infos	607
9.19.2.5 initial_outstanding_reads	607
9.19.2.6 max_outstanding_reads	607
9.19.2.7 max_samples_per_read	608
9.19.2.8 disable_fragmentation_support	608
9.19.2.9 max_fragmented_samples	608
9.19.2.10 initial_fragmented_samples	609
9.19.2.11 max_fragmented_samples_per_remote_writer	609
9.19.2.12 max_fragments_per_sample	609
9.19.2.13 dynamically_allocate_fragmented_samples	610
9.20 DDS_ChannelSettings_t Struct Reference	610
9.20.1 Detailed Description	610
9.20.2 Member Data Documentation	611
9.20.2.1 multicast_settings	611
9.20.2.2 filter_expression	611
9.20.2.3 priority	612
9.21 DDS_ChannelSettingsSeq Struct Reference	612
9.21.1 Detailed Description	612

---

9.22 DDS_CharSeq Struct Reference . . . . .	613
9.22.1 Detailed Description . . . . .	613
9.23 DDS_CoherentSetInfo_t Struct Reference . . . . .	613
9.23.1 Detailed Description . . . . .	613
9.23.2 Member Data Documentation . . . . .	613
9.23.2.1 group_guid . . . . .	614
9.23.2.2 coherent_set_sequence_number . . . . .	614
9.23.2.3 group_coherent_set_sequence_number . . . . .	614
9.23.2.4 incomplete_coherent_set . . . . .	614
9.24 DDS_CompressionSettings_t Struct Reference . . . . .	614
9.24.1 Detailed Description . . . . .	615
9.24.2 Member Data Documentation . . . . .	615
9.24.2.1 compression_ids . . . . .	615
9.24.2.2 writer_compression_level . . . . .	616
9.24.2.3 writer_compression_threshold . . . . .	616
9.25 DDS_ContentFilterProperty_t Struct Reference . . . . .	616
9.25.1 Detailed Description . . . . .	617
9.25.2 Member Data Documentation . . . . .	617
9.25.2.1 content_filter_topic_name . . . . .	617
9.25.2.2 related_topic_name . . . . .	617
9.25.2.3 filter_class_name . . . . .	617
9.25.2.4 filter_expression . . . . .	618
9.25.2.5 expression_parameters . . . . .	618
9.26 DDS_Cookie_t Struct Reference . . . . .	618
9.26.1 Detailed Description . . . . .	618
9.26.2 Member Data Documentation . . . . .	618
9.26.2.1 value . . . . .	618
9.27 DDS_CookieSeq Struct Reference . . . . .	619
9.27.1 Detailed Description . . . . .	619
9.28 DDS_DatabaseQosPolicy Struct Reference . . . . .	619
9.28.1 Detailed Description . . . . .	620
9.28.2 Member Data Documentation . . . . .	620
9.28.2.1 thread . . . . .	620
9.28.2.2 shutdown_timeout . . . . .	621
9.28.2.3 cleanup_period . . . . .	621
9.28.2.4 shutdown_cleanup_period . . . . .	621
9.28.2.5 initial_records . . . . .	621
9.28.2.6 max_skiplist_level . . . . .	622
9.28.2.7 max_weak_references . . . . .	622

---

9.28.2.8 initial_weak_references . . . . .	623
9.29 DDS_DataReaderCacheStatus Struct Reference . . . . .	623
9.29.1 Detailed Description . . . . .	624
9.29.2 Member Data Documentation . . . . .	624
9.29.2.1 sample_count_peak . . . . .	625
9.29.2.2 sample_count . . . . .	625
9.29.2.3 old_source_timestamp_dropped_sample_count . . . . .	625
9.29.2.4 tolerance_source_timestamp_dropped_sample_count . . . . .	625
9.29.2.5 ownership_dropped_sample_count . . . . .	626
9.29.2.6 content_filter_dropped_sample_count . . . . .	626
9.29.2.7 time_based_filter_dropped_sample_count . . . . .	626
9.29.2.8 expired_dropped_sample_count . . . . .	626
9.29.2.9 virtual_duplicate_dropped_sample_count . . . . .	627
9.29.2.10 replaced_dropped_sample_count . . . . .	627
9.29.2.11 writer_removed_batch_sample_dropped_sample_count . . . . .	627
9.29.2.12 total_samples_dropped_by_instance_replacement . . . . .	627
9.29.2.13 alive_instance_count . . . . .	628
9.29.2.14 alive_instance_count_peak . . . . .	628
9.29.2.15 no_writers_instance_count . . . . .	628
9.29.2.16 no_writers_instance_count_peak . . . . .	628
9.29.2.17 disposed_instance_count . . . . .	629
9.29.2.18 disposed_instance_count_peak . . . . .	629
9.29.2.19 detached_instance_count . . . . .	629
9.29.2.20 detached_instance_count_peak . . . . .	629
9.29.2.21 compressed_sample_count . . . . .	630
9.30 DDS_DataReaderProtocolQosPolicy Struct Reference . . . . .	630
9.30.1 Detailed Description . . . . .	630
9.30.2 Member Data Documentation . . . . .	631
9.30.2.1 virtual_guid . . . . .	631
9.30.2.2 rtps_object_id . . . . .	631
9.30.2.3 expects_inline_qos . . . . .	632
9.30.2.4 disable_positive_acks . . . . .	632
9.30.2.5 propagate_dispose_of_unregistered_instances . . . . .	633
9.30.2.6 propagate_unregister_of_disposed_instances . . . . .	633
9.30.2.7 rtps_reliable_reader . . . . .	633
9.31 DDS_DataReaderProtocolStatus Struct Reference . . . . .	633
9.31.1 Detailed Description . . . . .	636
9.31.2 Member Data Documentation . . . . .	636
9.31.2.1 received_sample_count . . . . .	636

---

9.31.2.2	received_sample_count_change	637
9.31.2.3	received_sample_bytes	637
9.31.2.4	received_sample_bytes_change	637
9.31.2.5	duplicate_sample_count	637
9.31.2.6	duplicate_sample_count_change	638
9.31.2.7	duplicate_sample_bytes	638
9.31.2.8	duplicate_sample_bytes_change	638
9.31.2.9	filtered_sample_count	638
9.31.2.10	filtered_sample_count_change	638
9.31.2.11	filtered_sample_bytes	639
9.31.2.12	filtered_sample_bytes_change	639
9.31.2.13	received_heartbeat_count	639
9.31.2.14	received_heartbeat_count_change	639
9.31.2.15	received_heartbeat_bytes	639
9.31.2.16	received_heartbeat_bytes_change	640
9.31.2.17	sent_ack_count	640
9.31.2.18	sent_ack_count_change	640
9.31.2.19	sent_ack_bytes	640
9.31.2.20	sent_ack_bytes_change	640
9.31.2.21	sent_nack_count	640
9.31.2.22	sent_nack_count_change	641
9.31.2.23	sent_nack_bytes	641
9.31.2.24	sent_nack_bytes_change	641
9.31.2.25	received_gap_count	641
9.31.2.26	received_gap_count_change	641
9.31.2.27	received_gap_bytes	641
9.31.2.28	received_gap_bytes_change	642
9.31.2.29	rejected_sample_count	642
9.31.2.30	rejected_sample_count_change	642
9.31.2.31	first_available_sample_sequence_number	642
9.31.2.32	last_available_sample_sequence_number	642
9.31.2.33	last_committed_sample_sequence_number	643
9.31.2.34	uncommitted_sample_count	643
9.31.2.35	out_of_range_rejected_sample_count	643
9.31.2.36	received_fragment_count	643
9.31.2.37	dropped_fragment_count	643
9.31.2.38	reassembled_sample_count	644
9.31.2.39	sent_nack_fragment_count	644
9.31.2.40	sent_nack_fragment_bytes	644

---

9.32 DDS_DataReaderQos Struct Reference . . . . .	644
9.32.1 Detailed Description . . . . .	646
9.32.2 Member Function Documentation . . . . .	647
9.32.2.1 operator==( ) . . . . .	647
9.32.2.2 operator!=( ) . . . . .	648
9.32.3 Member Data Documentation . . . . .	648
9.32.3.1 durability . . . . .	648
9.32.3.2 deadline . . . . .	648
9.32.3.3 latency_budget . . . . .	648
9.32.3.4 liveliness . . . . .	649
9.32.3.5 reliability . . . . .	649
9.32.3.6 destination_order . . . . .	649
9.32.3.7 history . . . . .	649
9.32.3.8 resource_limits . . . . .	649
9.32.3.9 user_data . . . . .	649
9.32.3.10 ownership . . . . .	650
9.32.3.11 time_based_filter . . . . .	650
9.32.3.12 reader_data_lifecycle . . . . .	650
9.32.3.13 representation . . . . .	650
9.32.3.14 type_consistency . . . . .	650
9.32.3.15 data_tags . . . . .	650
9.32.3.16 reader_resource_limits . . . . .	651
9.32.3.17 protocol . . . . .	651
9.32.3.18 transport_selection . . . . .	651
9.32.3.19 unicast . . . . .	651
9.32.3.20 multicast . . . . .	651
9.32.3.21 property . . . . .	652
9.32.3.22 service . . . . .	652
9.32.3.23 availability . . . . .	652
9.32.3.24 subscription_name . . . . .	652
9.32.3.25 transport_priority . . . . .	652
9.32.3.26 type_support . . . . .	652
9.33 DDS_DataReaderResourceLimitsInstanceReplacementSettings Struct Reference . . . . .	653
9.33.1 Detailed Description . . . . .	653
9.33.2 Member Data Documentation . . . . .	653
9.33.2.1 alive_instance_removal . . . . .	653
9.33.2.2 disposed_instance_removal . . . . .	654
9.33.2.3 no_writers_instance_removal . . . . .	654
9.34 DDS_DataReaderResourceLimitsQosPolicy Struct Reference . . . . .	654

---

9.34.1 Detailed Description . . . . .	656
9.34.2 Member Data Documentation . . . . .	656
9.34.2.1 max_remote_writers . . . . .	656
9.34.2.2 max_remote_writers_per_instance . . . . .	657
9.34.2.3 max_samples_per_remote_writer . . . . .	657
9.34.2.4 max_infos . . . . .	657
9.34.2.5 initial_remote_writers . . . . .	658
9.34.2.6 initial_remote_writers_per_instance . . . . .	658
9.34.2.7 initial_infos . . . . .	658
9.34.2.8 initial_outstanding_reads . . . . .	659
9.34.2.9 max_outstanding_reads . . . . .	659
9.34.2.10 max_samples_per_read . . . . .	659
9.34.2.11 disable_fragmentation_support . . . . .	659
9.34.2.12 max_fragmented_samples . . . . .	660
9.34.2.13 initial_fragmented_samples . . . . .	660
9.34.2.14 max_fragmented_samples_per_remote_writer . . . . .	660
9.34.2.15 max_fragments_per_sample . . . . .	661
9.34.2.16 dynamically_allocate_fragmented_samples . . . . .	661
9.34.2.17 max_total_instances . . . . .	662
9.34.2.18 max_remote_virtual_writers . . . . .	662
9.34.2.19 initial_remote_virtual_writers . . . . .	663
9.34.2.20 max_remote_virtual_writers_per_instance . . . . .	663
9.34.2.21 initial_remote_virtual_writers_per_instance . . . . .	663
9.34.2.22 max_remote_writers_per_sample . . . . .	664
9.34.2.23 max_query_condition_filters . . . . .	664
9.34.2.24 max_app_ack_response_length . . . . .	664
9.34.2.25 keep_minimum_state_for_instances . . . . .	665
9.34.2.26 initial_topic_queries . . . . .	665
9.34.2.27 max_topic_queries . . . . .	665
9.34.2.28 shmем_ref_transfer_mode_attached_segment_allocation . . . . .	666
9.34.2.29 instance_replacement . . . . .	666
9.34.2.30 autopurge_remote_not_alive_writer_delay . . . . .	667
9.35 DDS_DataRepresentationIdSeq Struct Reference . . . . .	667
9.35.1 Detailed Description . . . . .	668
9.36 DDS_DataRepresentationQosPolicy Struct Reference . . . . .	668
9.36.1 Detailed Description . . . . .	668
9.36.2 Member Data Documentation . . . . .	669
9.36.2.1 value . . . . .	669
9.36.2.2 compression_settings . . . . .	670



---

9.37 DDS_DataTags Struct Reference . . . . .	670
9.37.1 Detailed Description . . . . .	670
9.37.2 Member Data Documentation . . . . .	670
9.37.2.1 tags . . . . .	671
9.38 DDS_DataWriterCacheStatus Struct Reference . . . . .	671
9.38.1 Detailed Description . . . . .	671
9.38.2 Member Data Documentation . . . . .	672
9.38.2.1 sample_count_peak . . . . .	672
9.38.2.2 sample_count . . . . .	672
9.38.2.3 alive_instance_count . . . . .	672
9.38.2.4 alive_instance_count_peak . . . . .	672
9.38.2.5 disposed_instance_count . . . . .	672
9.38.2.6 disposed_instance_count_peak . . . . .	673
9.38.2.7 unregistered_instance_count . . . . .	673
9.38.2.8 unregistered_instance_count_peak . . . . .	673
9.39 DDS_DataWriterProtocolQosPolicy Struct Reference . . . . .	673
9.39.1 Detailed Description . . . . .	674
9.39.2 Member Data Documentation . . . . .	674
9.39.2.1 virtual_guid . . . . .	674
9.39.2.2 rtps_object_id . . . . .	675
9.39.2.3 push_on_write . . . . .	675
9.39.2.4 disable_positive_acks . . . . .	675
9.39.2.5 disable_inline_keyhash . . . . .	676
9.39.2.6 serialize_key_with_dispose . . . . .	676
9.39.2.7 propagate_app_ack_with_no_response . . . . .	677
9.39.2.8 rtps_reliable_writer . . . . .	677
9.39.2.9 initial_virtual_sequence_number . . . . .	677
9.40 DDS_DataWriterProtocolStatus Struct Reference . . . . .	678
9.40.1 Detailed Description . . . . .	680
9.40.2 Member Data Documentation . . . . .	680
9.40.2.1 pushed_sample_count . . . . .	680
9.40.2.2 pushed_sample_count_change . . . . .	680
9.40.2.3 pushed_sample_bytes . . . . .	681
9.40.2.4 pushed_sample_bytes_change . . . . .	681
9.40.2.5 filtered_sample_count . . . . .	681
9.40.2.6 filtered_sample_count_change . . . . .	681
9.40.2.7 filtered_sample_bytes . . . . .	681
9.40.2.8 filtered_sample_bytes_change . . . . .	682
9.40.2.9 sent_heartbeat_count . . . . .	682

---

9.40.2.10 sent_heartbeat_count_change . . . . .	682
9.40.2.11 sent_heartbeat_bytes . . . . .	682
9.40.2.12 sent_heartbeat_bytes_change . . . . .	682
9.40.2.13 pulled_sample_count . . . . .	683
9.40.2.14 pulled_sample_count_change . . . . .	683
9.40.2.15 pulled_sample_bytes . . . . .	683
9.40.2.16 pulled_sample_bytes_change . . . . .	683
9.40.2.17 received_ack_count . . . . .	684
9.40.2.18 received_ack_count_change . . . . .	684
9.40.2.19 received_ack_bytes . . . . .	684
9.40.2.20 received_ack_bytes_change . . . . .	684
9.40.2.21 received_nack_count . . . . .	684
9.40.2.22 received_nack_count_change . . . . .	684
9.40.2.23 received_nack_bytes . . . . .	685
9.40.2.24 received_nack_bytes_change . . . . .	685
9.40.2.25 sent_gap_count . . . . .	685
9.40.2.26 sent_gap_count_change . . . . .	685
9.40.2.27 sent_gap_bytes . . . . .	685
9.40.2.28 sent_gap_bytes_change . . . . .	685
9.40.2.29 rejected_sample_count . . . . .	686
9.40.2.30 rejected_sample_count_change . . . . .	686
9.40.2.31 send_window_size . . . . .	686
9.40.2.32 first_available_sample_sequence_number . . . . .	686
9.40.2.33 last_available_sample_sequence_number . . . . .	686
9.40.2.34 first_unacknowledged_sample_sequence_number . . . . .	687
9.40.2.35 first_available_sample_virtual_sequence_number . . . . .	687
9.40.2.36 last_available_sample_virtual_sequence_number . . . . .	687
9.40.2.37 first_unacknowledged_sample_virtual_sequence_number . . . . .	687
9.40.2.38 first_unacknowledged_sample_subscription_handle . . . . .	687
9.40.2.39 first_unelapsed_keep_duration_sample_sequence_number . . . . .	688
9.40.2.40 pushed_fragment_count . . . . .	688
9.40.2.41 pushed_fragment_bytes . . . . .	688
9.40.2.42 pulled_fragment_count . . . . .	688
9.40.2.43 pulled_fragment_bytes . . . . .	688
9.40.2.44 received_nack_fragment_count . . . . .	689
9.40.2.45 received_nack_fragment_bytes . . . . .	689
9.41 DDS_DataWriterQos Struct Reference . . . . .	689
9.41.1 Detailed Description . . . . .	691
9.41.2 Member Function Documentation . . . . .	692

---

9.41.2.1 operator==( )	692
9.41.2.2 operator!=( )	692
9.41.3 Member Data Documentation	692
9.41.3.1 durability	692
9.41.3.2 durability_service	693
9.41.3.3 deadline	693
9.41.3.4 latency_budget	693
9.41.3.5 liveliness	693
9.41.3.6 reliability	693
9.41.3.7 destination_order	693
9.41.3.8 history	694
9.41.3.9 resource_limits	694
9.41.3.10 transport_priority	694
9.41.3.11 lifespan	694
9.41.3.12 user_data	694
9.41.3.13 ownership	694
9.41.3.14 ownership_strength	695
9.41.3.15 writer_data_lifecycle	695
9.41.3.16 representation	695
9.41.3.17 data_tags	695
9.41.3.18 writer_resource_limits	695
9.41.3.19 protocol	695
9.41.3.20 transport_selection	696
9.41.3.21 unicast	696
9.41.3.22 publish_mode	696
9.41.3.23 property	696
9.41.3.24 service	696
9.41.3.25 batch	697
9.41.3.26 multi_channel	697
9.41.3.27 availability	697
9.41.3.28 publication_name	697
9.41.3.29 topic_query_dispatch	697
9.41.3.30 transfer_mode	697
9.41.3.31 type_support	698
9.42 DDS_DataWriterResourceLimitsQosPolicy Struct Reference	698
9.42.1 Detailed Description	699
9.42.2 Member Data Documentation	699
9.42.2.1 initial_concurrent_blocking_threads	699
9.42.2.2 max_concurrent_blocking_threads	700

---

9.42.2.3	max_remote_reader_filters	700
9.42.2.4	initial_batches	700
9.42.2.5	max_batches	701
9.42.2.6	instance_replacement	701
9.42.2.7	replace_empty_instances	702
9.42.2.8	autoregister_instances	702
9.42.2.9	initial_virtual_writers	702
9.42.2.10	max_virtual_writers	703
9.42.2.11	max_remote_readers	703
9.42.2.12	max_app_ack_remote_readers	703
9.42.2.13	initial_active_topic_queries	703
9.42.2.14	max_active_topic_queries	704
9.42.2.15	writer_loaned_sample_allocation	704
9.42.2.16	initialize_writer_loaned_sample	705
9.43	DDS_DataWriterShmemRefTransferModeSettings Struct Reference	705
9.43.1	Detailed Description	705
9.43.2	Member Data Documentation	705
9.43.2.1	enable_data_consistency_check	706
9.44	DDS_DataWriterTransferModeQosPolicy Struct Reference	706
9.44.1	Detailed Description	706
9.44.2	Member Data Documentation	706
9.44.2.1	shmem_ref_settings	707
9.45	DDS_DeadlineQosPolicy Struct Reference	707
9.45.1	Detailed Description	707
9.45.2	Usage	708
9.45.3	Compatibility	708
9.45.4	Consistency	708
9.45.5	Member Data Documentation	708
9.45.5.1	period	709
9.46	DDS_DestinationOrderQosPolicy Struct Reference	709
9.46.1	Detailed Description	709
9.46.2	Usage	710
9.46.3	Compatibility	711
9.46.4	Member Data Documentation	711
9.46.4.1	kind	711
9.46.4.2	scope	711
9.46.4.3	source_timestamp_tolerance	711
9.47	DDS_DiscoveryConfigQosPolicy Struct Reference	712
9.47.1	Detailed Description	714

---

9.47.2 Member Data Documentation . . . . .	714
9.47.2.1 participant_liveliness_lease_duration . . . . .	715
9.47.2.2 participant_liveliness_assert_period . . . . .	715
9.47.2.3 participant_announcement_period . . . . .	715
9.47.2.4 remote_participant_purge_kind . . . . .	716
9.47.2.5 max_liveliness_loss_detection_period . . . . .	716
9.47.2.6 initial_participant_announcements . . . . .	716
9.47.2.7 new_remote_participant_announcements . . . . .	717
9.47.2.8 min_initial_participant_announcement_period . . . . .	717
9.47.2.9 max_initial_participant_announcement_period . . . . .	717
9.47.2.10 participant_reader_resource_limits . . . . .	718
9.47.2.11 publication_reader . . . . .	718
9.47.2.12 publication_reader_resource_limits . . . . .	718
9.47.2.13 subscription_reader . . . . .	718
9.47.2.14 subscription_reader_resource_limits . . . . .	719
9.47.2.15 publication_writer . . . . .	719
9.47.2.16 publication_writer_data_lifecycle . . . . .	720
9.47.2.17 subscription_writer . . . . .	720
9.47.2.18 subscription_writer_data_lifecycle . . . . .	721
9.47.2.19 builtin_discovery_plugins . . . . .	721
9.47.2.20 enabled_builtin_channels . . . . .	721
9.47.2.21 participant_message_reader_reliability_kind . . . . .	721
9.47.2.22 participant_message_reader . . . . .	722
9.47.2.23 participant_message_writer . . . . .	722
9.47.2.24 publication_writer_publish_mode . . . . .	723
9.47.2.25 subscription_writer_publish_mode . . . . .	723
9.47.2.26 asynchronous_publisher . . . . .	723
9.47.2.27 default_domain_announcement_period . . . . .	723
9.47.2.28 ignore_default_domain_announcements . . . . .	724
9.47.2.29 service_request_writer . . . . .	724
9.47.2.30 service_request_writer_data_lifecycle . . . . .	725
9.47.2.31 service_request_writer_publish_mode . . . . .	725
9.47.2.32 service_request_reader . . . . .	725
9.47.2.33 locator_reachability_assert_period . . . . .	726
9.47.2.34 locator_reachability_lease_duration . . . . .	726
9.47.2.35 locator_reachability_change_detection_period . . . . .	727
9.47.2.36 secure_volatile_writer . . . . .	727
9.47.2.37 secure_volatile_writer_publish_mode . . . . .	728
9.47.2.38 secure_volatile_reader . . . . .	728

9.47.2.39 endpoint_type_object_lb_serialization_threshold . . . . .	728
9.47.2.40 dns_tracker_polling_period . . . . .	729
9.47.2.41 participant_configuration_writer_publish_mode . . . . .	729
9.47.2.42 participant_configuration_writer . . . . .	729
9.47.2.43 participant_configuration_writer_data_lifecycle . . . . .	730
9.47.2.44 participant_configuration_reader . . . . .	730
9.47.2.45 participant_configuration_reader_resource_limits . . . . .	731
9.48 DDS_DiscoveryQosPolicy Struct Reference . . . . .	731
9.48.1 Detailed Description . . . . .	731
9.48.2 Usage . . . . .	732
9.48.3 Member Data Documentation . . . . .	732
9.48.3.1 enabled_transports . . . . .	732
9.48.3.2 initial_peers . . . . .	733
9.48.3.3 multicast_receive_addresses . . . . .	733
9.48.3.4 metatraffic_transport_priority . . . . .	734
9.48.3.5 accept_unknown_peers . . . . .	734
9.48.3.6 enable_endpoint_discovery . . . . .	734
9.49 DDS_DomainParticipantConfigParams_t Struct Reference . . . . .	734
9.49.1 Detailed Description . . . . .	735
9.49.2 Member Data Documentation . . . . .	735
9.49.2.1 domain_id . . . . .	735
9.49.2.2 participant_name . . . . .	735
9.49.2.3 participant_qos_library_name . . . . .	736
9.49.2.4 participant_qos_profile_name . . . . .	736
9.49.2.5 domain_entity_qos_library_name . . . . .	736
9.49.2.6 domain_entity_qos_profile_name . . . . .	736
9.50 DDS_DomainParticipantFactoryQos Struct Reference . . . . .	737
9.50.1 Detailed Description . . . . .	738
9.50.2 Member Function Documentation . . . . .	738
9.50.2.1 operator==( ) . . . . .	738
9.50.2.2 operator!=( ) . . . . .	738
9.50.3 Member Data Documentation . . . . .	739
9.50.3.1 entity_factory . . . . .	739
9.50.3.2 resource_limits . . . . .	739
9.50.3.3 profile . . . . .	739
9.50.3.4 logging . . . . .	739
9.50.3.5 monitoring . . . . .	739
9.51 DDS_DomainParticipantProtocolStatus Struct Reference . . . . .	740
9.51.1 Detailed Description . . . . .	740

---

9.51.2 Member Data Documentation . . . . .	740
9.51.2.1 corrupted_rtps_message_count . . . . .	740
9.51.2.2 corrupted_rtps_message_count_change . . . . .	740
9.51.2.3 last_corrupted_message_timestamp . . . . .	741
9.52 DDS_DomainParticipantQos Struct Reference . . . . .	741
9.52.1 Detailed Description . . . . .	742
9.52.2 Member Function Documentation . . . . .	743
9.52.2.1 operator==( ) . . . . .	743
9.52.2.2 operator!=( ) . . . . .	743
9.52.3 Member Data Documentation . . . . .	743
9.52.3.1 user_data . . . . .	744
9.52.3.2 entity_factory . . . . .	744
9.52.3.3 wire_protocol . . . . .	744
9.52.3.4 transport_builtin . . . . .	744
9.52.3.5 default_unicast . . . . .	744
9.52.3.6 discovery . . . . .	744
9.52.3.7 resource_limits . . . . .	745
9.52.3.8 event . . . . .	745
9.52.3.9 receiver_pool . . . . .	745
9.52.3.10 database . . . . .	745
9.52.3.11 discovery_config . . . . .	745
9.52.3.12 property . . . . .	745
9.52.3.13 participant_name . . . . .	746
9.52.3.14 multicast_mapping . . . . .	746
9.52.3.15 service . . . . .	746
9.52.3.16 partition . . . . .	746
9.52.3.17 type_support . . . . .	746
9.53 DDS_DomainParticipantResourceLimitsQosPolicy Struct Reference . . . . .	746
9.53.1 Detailed Description . . . . .	750
9.53.2 Member Data Documentation . . . . .	750
9.53.2.1 local_writer_allocation . . . . .	750
9.53.2.2 local_reader_allocation . . . . .	751
9.53.2.3 local_publisher_allocation . . . . .	751
9.53.2.4 local_subscriber_allocation . . . . .	751
9.53.2.5 local_topic_allocation . . . . .	751
9.53.2.6 remote_writer_allocation . . . . .	752
9.53.2.7 remote_reader_allocation . . . . .	752
9.53.2.8 remote_participant_allocation . . . . .	752
9.53.2.9 matching_writer_reader_pair_allocation . . . . .	752

---

9.53.2.10 matching_reader_writer_pair_allocation . . . . .	753
9.53.2.11 ignored_entity_allocation . . . . .	753
9.53.2.12 content_filtered_topic_allocation . . . . .	753
9.53.2.13 content_filter_allocation . . . . .	753
9.53.2.14 read_condition_allocation . . . . .	754
9.53.2.15 query_condition_allocation . . . . .	754
9.53.2.16 outstanding_asynchronous_sample_allocation . . . . .	754
9.53.2.17 flow_controller_allocation . . . . .	754
9.53.2.18 local_writer_hash_buckets . . . . .	755
9.53.2.19 local_reader_hash_buckets . . . . .	755
9.53.2.20 local_publisher_hash_buckets . . . . .	755
9.53.2.21 local_subscriber_hash_buckets . . . . .	755
9.53.2.22 local_topic_hash_buckets . . . . .	755
9.53.2.23 remote_writer_hash_buckets . . . . .	756
9.53.2.24 remote_reader_hash_buckets . . . . .	756
9.53.2.25 remote_participant_hash_buckets . . . . .	756
9.53.2.26 matching_writer_reader_pair_hash_buckets . . . . .	756
9.53.2.27 matching_reader_writer_pair_hash_buckets . . . . .	757
9.53.2.28 ignored_entity_hash_buckets . . . . .	757
9.53.2.29 content_filtered_topic_hash_buckets . . . . .	757
9.53.2.30 content_filter_hash_buckets . . . . .	757
9.53.2.31 flow_controller_hash_buckets . . . . .	757
9.53.2.32 max_gather_destinations . . . . .	758
9.53.2.33 participant_user_data_max_length . . . . .	758
9.53.2.34 topic_data_max_length . . . . .	758
9.53.2.35 publisher_group_data_max_length . . . . .	758
9.53.2.36 subscriber_group_data_max_length . . . . .	759
9.53.2.37 writer_user_data_max_length . . . . .	759
9.53.2.38 reader_user_data_max_length . . . . .	759
9.53.2.39 max_partitions . . . . .	759
9.53.2.40 max_partition_cumulative_characters . . . . .	760
9.53.2.41 type_code_max_serialized_length . . . . .	760
9.53.2.42 type_object_max_serialized_length . . . . .	760
9.53.2.43 serialized_type_object_dynamic_allocation_threshold . . . . .	761
9.53.2.44 type_object_max_deserialized_length . . . . .	761
9.53.2.45 deserialized_type_object_dynamic_allocation_threshold . . . . .	761
9.53.2.46 contentfilter_property_max_length . . . . .	762
9.53.2.47 channel_seq_max_length . . . . .	762
9.53.2.48 channel_filter_expression_max_length . . . . .	762



---

9.53.2.49	participant_property_list_max_length	762
9.53.2.50	participant_property_string_max_length	763
9.53.2.51	writer_property_list_max_length	763
9.53.2.52	writer_property_string_max_length	763
9.53.2.53	reader_property_list_max_length	763
9.53.2.54	reader_property_string_max_length	764
9.53.2.55	max_endpoint_groups	764
9.53.2.56	max_endpoint_group_cumulative_characters	764
9.53.2.57	transport_info_list_max_length	764
9.53.2.58	ignored_entity_replacement_kind	765
9.53.2.59	remote_topic_query_allocation	765
9.53.2.60	remote_topic_query_hash_buckets	765
9.53.2.61	writer_data_tag_list_max_length	766
9.53.2.62	writer_data_tag_string_max_length	766
9.53.2.63	reader_data_tag_list_max_length	766
9.53.2.64	reader_data_tag_string_max_length	766
9.53.2.65	shmem_ref_transfer_mode_max_segments	767
9.54	DDS_DoubleSeq Struct Reference	767
9.54.1	Detailed Description	767
9.55	DDS_DurabilityQosPolicy Struct Reference	767
9.55.1	Detailed Description	768
9.55.2	Usage	768
9.55.2.1	Transient and Persistent Durability	769
9.55.3	Compatibility	770
9.55.4	Member Data Documentation	770
9.55.4.1	kind	770
9.55.4.2	direct_communication	770
9.55.4.3	writer_depth	771
9.55.4.4	storage_settings	771
9.56	DDS_DurabilityServiceQosPolicy Struct Reference	771
9.56.1	Detailed Description	772
9.56.2	Usage	772
9.56.3	Member Data Documentation	773
9.56.3.1	service_cleanup_delay	773
9.56.3.2	history_kind	773
9.56.3.3	history_depth	773
9.56.3.4	max_samples	773
9.56.3.5	max_instances	774
9.56.3.6	max_samples_per_instance	774

---

9.57 DDS_Duration_t Struct Reference . . . . .	774
9.57.1 Detailed Description . . . . .	774
9.57.2 Member Data Documentation . . . . .	775
9.57.2.1 sec . . . . .	775
9.57.2.2 nanosec . . . . .	775
9.58 DDS_DynamicData Struct Reference . . . . .	775
9.58.1 Detailed Description . . . . .	783
9.58.2 Member Names and IDs . . . . .	783
9.58.2.1 Hierarchical Member Names . . . . .	784
9.58.3 Arrays and Sequences . . . . .	785
9.58.4 Available Functionality . . . . .	785
9.58.4.1 Lifecycle and Utility Methods . . . . .	785
9.58.4.2 Getters and Setters . . . . .	786
9.58.4.3 Query and Iteration . . . . .	788
9.58.4.4 Type/Object Association . . . . .	789
9.58.4.5 Performance Considerations . . . . .	789
9.58.5 Constructor & Destructor Documentation . . . . .	790
9.58.5.1 DDS_DynamicData() . . . . .	790
9.58.5.2 ~DDS_DynamicData() . . . . .	791
9.58.6 Member Function Documentation . . . . .	791
9.58.6.1 is_valid() . . . . .	792
9.58.6.2 copy() . . . . .	792
9.58.6.3 equal() . . . . .	793
9.58.6.4 operator=() . . . . .	793
9.58.6.5 operator==(()) . . . . .	794
9.58.6.6 clear_all_members() . . . . .	794
9.58.6.7 clear_optional_member() . . . . .	794
9.58.6.8 clear_member() . . . . .	795
9.58.6.9 is_cdr() . . . . .	796
9.58.6.10 get_cdr_buffer() . . . . .	797
9.58.6.11 set_cdr_buffer() . . . . .	797
9.58.6.12 from_cdr_buffer() . . . . .	798
9.58.6.13 to_cdr_buffer() . . . . .	798
9.58.6.14 to_cdr_buffer_ex() . . . . .	799
9.58.6.15 to_string() . . . . .	799
9.58.6.16 from_string() . . . . .	800
9.58.6.17 print() . . . . .	801
9.58.6.18 get_info() . . . . .	802
9.58.6.19 bind_type() . . . . .	802

---

9.58.6.20	unbind_type()	803
9.58.6.21	bind_complex_member()	803
9.58.6.22	unbind_complex_member()	805
9.58.6.23	get_type()	806
9.58.6.24	get_type_kind()	806
9.58.6.25	get_member_count()	807
9.58.6.26	member_exists()	807
9.58.6.27	member_exists_in_type()	808
9.58.6.28	get_member_info()	809
9.58.6.29	get_member_info_by_index()	810
9.58.6.30	get_member_type()	811
9.58.6.31	is_member_key()	811
9.58.6.32	get_long()	812
9.58.6.33	get_short()	813
9.58.6.34	get_ulong()	814
9.58.6.35	get_ushort()	815
9.58.6.36	get_float()	816
9.58.6.37	get_double()	816
9.58.6.38	get_boolean()	817
9.58.6.39	get_char()	818
9.58.6.40	get_octet()	819
9.58.6.41	get_longlong()	819
9.58.6.42	get_ulonglong()	820
9.58.6.43	get_longdouble()	821
9.58.6.44	get_wchar()	822
9.58.6.45	get_string()	823
9.58.6.46	get_wstring()	824
9.58.6.47	get_int8()	825
9.58.6.48	get_uint8()	826
9.58.6.49	get_complex_member()	826
9.58.6.50	get_long_array()	827
9.58.6.51	get_short_array()	828
9.58.6.52	get_ulong_array()	829
9.58.6.53	get_ushort_array()	830
9.58.6.54	get_float_array()	831
9.58.6.55	get_double_array()	832
9.58.6.56	get_boolean_array()	833
9.58.6.57	get_char_array()	833
9.58.6.58	get_octet_array()	834

---

9.58.6.59	get_longlong_array()	835
9.58.6.60	get_ulonglong_array()	836
9.58.6.61	get_longdouble_array()	837
9.58.6.62	get_wchar_array()	838
9.58.6.63	get_int8_array()	839
9.58.6.64	get_uint8_array()	840
9.58.6.65	get_long_seq()	841
9.58.6.66	get_short_seq()	841
9.58.6.67	get_ulong_seq()	842
9.58.6.68	get_ushort_seq()	843
9.58.6.69	get_float_seq()	844
9.58.6.70	get_double_seq()	845
9.58.6.71	get_boolean_seq()	846
9.58.6.72	get_char_seq()	846
9.58.6.73	get_octet_seq()	847
9.58.6.74	get_longlong_seq()	848
9.58.6.75	get_ulonglong_seq()	849
9.58.6.76	get_longdouble_seq()	850
9.58.6.77	get_wchar_seq()	851
9.58.6.78	get_int8_seq()	851
9.58.6.79	get_uint8_seq()	852
9.58.6.80	set_long()	853
9.58.6.81	set_short()	854
9.58.6.82	set_ulong()	855
9.58.6.83	set_ushort()	855
9.58.6.84	set_float()	856
9.58.6.85	set_double()	857
9.58.6.86	set_boolean()	857
9.58.6.87	set_char()	858
9.58.6.88	set_octet()	859
9.58.6.89	set_longlong()	860
9.58.6.90	set_ulonglong()	860
9.58.6.91	set_longdouble()	861
9.58.6.92	set_wchar()	862
9.58.6.93	set_string()	862
9.58.6.94	set_wstring()	863
9.58.6.95	set_int8()	864
9.58.6.96	set_uint8()	865
9.58.6.97	set_complex_member()	865

---

9.58.6.98	set_long_array()	867
9.58.6.99	set_short_array()	868
9.58.6.100	set_ulong_array()	869
9.58.6.101	set_ushort_array()	869
9.58.6.102	set_float_array()	870
9.58.6.103	set_double_array()	871
9.58.6.104	set_boolean_array()	872
9.58.6.105	set_char_array()	873
9.58.6.106	set_octet_array()	874
9.58.6.107	set_longlong_array()	875
9.58.6.108	set_ulonglong_array()	875
9.58.6.109	set_longdouble_array()	876
9.58.6.110	set_wchar_array()	877
9.58.6.111	set_int8_array()	878
9.58.6.112	set_uint8_array()	879
9.58.6.113	set_long_seq()	880
9.58.6.114	set_short_seq()	881
9.58.6.115	set_ulong_seq()	881
9.58.6.116	set_ushort_seq()	882
9.58.6.117	set_float_seq()	883
9.58.6.118	set_double_seq()	884
9.58.6.119	set_boolean_seq()	884
9.58.6.120	set_char_seq()	885
9.58.6.121	set_octet_seq()	886
9.58.6.122	set_longlong_seq()	887
9.58.6.123	set_ulonglong_seq()	888
9.58.6.124	set_longdouble_seq()	888
9.58.6.125	set_wchar_seq()	889
9.58.6.126	set_int8_seq()	890
9.58.6.127	set_uint8_seq()	891
9.59	DDS_DynamicDataInfo Struct Reference	892
9.59.1	Detailed Description	892
9.59.2	Member Data Documentation	892
9.59.2.1	member_count	892
9.59.2.2	stored_size	892
9.60	DDS_DynamicDataJsonParserProperties_t Struct Reference	892
9.60.1	Detailed Description	893
9.61	DDS_DynamicDataMemberInfo Struct Reference	893
9.61.1	Detailed Description	893

---

9.61.2 Member Data Documentation . . . . .	893
9.61.2.1 member_id . . . . .	893
9.61.2.2 member_name . . . . .	894
9.61.2.3 member_exists . . . . .	894
9.61.2.4 member_kind . . . . .	894
9.61.2.5 element_count . . . . .	894
9.61.2.6 element_kind . . . . .	895
9.62 DDS_DynamicDataProperty_t Struct Reference . . . . .	895
9.62.1 Detailed Description . . . . .	895
9.62.2 Member Data Documentation . . . . .	895
9.62.2.1 buffer_initial_size . . . . .	895
9.62.2.2 buffer_max_size . . . . .	896
9.63 DDS_DynamicDataSeq Struct Reference . . . . .	896
9.63.1 Detailed Description . . . . .	896
9.64 DDS_DynamicDataTypeProperty_t Struct Reference . . . . .	896
9.64.1 Detailed Description . . . . .	897
9.64.2 Member Data Documentation . . . . .	897
9.64.2.1 data . . . . .	897
9.64.2.2 serialization . . . . .	897
9.65 DDS_DynamicDataTypeSerializationProperty_t Struct Reference . . . . .	897
9.65.1 Detailed Description . . . . .	898
9.65.2 Member Data Documentation . . . . .	898
9.65.2.1 use_42e_compatible_alignment . . . . .	898
9.65.2.2 max_size_serialized . . . . .	898
9.65.2.3 min_size_serialized . . . . .	899
9.65.2.4 trim_to_size . . . . .	899
9.65.2.5 skip_deserialization . . . . .	899
9.66 DDS_EndpointGroup_t Struct Reference . . . . .	900
9.66.1 Detailed Description . . . . .	900
9.66.2 Member Data Documentation . . . . .	900
9.66.2.1 role_name . . . . .	900
9.66.2.2 quorum_count . . . . .	900
9.67 DDS_EndpointGroupSeq Struct Reference . . . . .	900
9.67.1 Detailed Description . . . . .	901
9.68 DDS_EndpointTrustAlgorithmInfo Struct Reference . . . . .	901
9.68.1 Detailed Description . . . . .	901
9.68.2 Member Data Documentation . . . . .	901
9.68.2.1 interceptor . . . . .	901
9.69 DDS_EndpointTrustInterceptorAlgorithmInfo Struct Reference . . . . .	902

---

9.69.1 Detailed Description . . . . .	902
9.69.2 Member Data Documentation . . . . .	902
9.69.2.1 required_mask . . . . .	902
9.69.2.2 supported_mask . . . . .	902
9.70 DDS_EndpointTrustProtectionInfo Struct Reference . . . . .	902
9.70.1 Detailed Description . . . . .	903
9.70.2 Member Data Documentation . . . . .	903
9.70.2.1 bitmask . . . . .	903
9.70.2.2 plugin_bitmask . . . . .	903
9.71 DDS_EntityFactoryQosPolicy Struct Reference . . . . .	903
9.71.1 Detailed Description . . . . .	904
9.71.2 Usage . . . . .	904
9.71.3 Member Data Documentation . . . . .	905
9.71.3.1 autoenable_created_entities . . . . .	905
9.72 DDS_EntityNameQosPolicy Struct Reference . . . . .	905
9.72.1 Detailed Description . . . . .	905
9.72.2 Usage . . . . .	906
9.72.3 Member Data Documentation . . . . .	906
9.72.3.1 name . . . . .	906
9.72.3.2 role_name . . . . .	906
9.73 DDS_EnumMember Struct Reference . . . . .	906
9.73.1 Detailed Description . . . . .	907
9.73.2 Member Data Documentation . . . . .	907
9.73.2.1 name . . . . .	907
9.73.2.2 ordinal . . . . .	907
9.74 DDS_EnumMemberSeq Struct Reference . . . . .	907
9.74.1 Detailed Description . . . . .	908
9.75 DDS_EventQosPolicy Struct Reference . . . . .	908
9.75.1 Detailed Description . . . . .	908
9.75.2 Member Data Documentation . . . . .	909
9.75.2.1 thread . . . . .	909
9.75.2.2 initial_count . . . . .	909
9.75.2.3 max_count . . . . .	909
9.76 DDS_ExpressionProperty Struct Reference . . . . .	910
9.76.1 Detailed Description . . . . .	910
9.76.2 Member Data Documentation . . . . .	910
9.76.2.1 key_only_filter . . . . .	910
9.76.2.2 writer_side_filter_optimization . . . . .	910
9.77 DDS_FilterSampleInfo Struct Reference . . . . .	911

9.77.1 Detailed Description . . . . .	911
9.77.2 Member Data Documentation . . . . .	911
9.77.2.1 related_sample_identity . . . . .	911
9.77.2.2 related_source_guid . . . . .	911
9.77.2.3 related_reader_guid . . . . .	912
9.78 DDS_FloatSeq Struct Reference . . . . .	912
9.78.1 Detailed Description . . . . .	912
9.79 DDS_FlowControllerProperty_t Struct Reference . . . . .	912
9.79.1 Detailed Description . . . . .	913
9.79.2 Member Data Documentation . . . . .	913
9.79.2.1 scheduling_policy . . . . .	913
9.79.2.2 token_bucket . . . . .	913
9.80 DDS_FlowControllerTokenBucketProperty_t Struct Reference . . . . .	914
9.80.1 Detailed Description . . . . .	914
9.80.2 Member Data Documentation . . . . .	915
9.80.2.1 max_tokens . . . . .	915
9.80.2.2 tokens_added_per_period . . . . .	915
9.80.2.3 tokens_leaked_per_period . . . . .	915
9.80.2.4 period . . . . .	916
9.80.2.5 bytes_per_token . . . . .	916
9.81 DDS_GroupDataQosPolicy Struct Reference . . . . .	916
9.81.1 Detailed Description . . . . .	917
9.81.2 Usage . . . . .	917
9.81.3 Member Data Documentation . . . . .	918
9.81.3.1 value . . . . .	918
9.82 DDS_GUID_t Struct Reference . . . . .	918
9.82.1 Detailed Description . . . . .	918
9.82.2 Member Data Documentation . . . . .	918
9.82.2.1 value . . . . .	918
9.83 DDS_HistoryQosPolicy Struct Reference . . . . .	919
9.83.1 Detailed Description . . . . .	919
9.83.2 Usage . . . . .	920
9.83.3 Consistency . . . . .	920
9.83.4 Member Data Documentation . . . . .	921
9.83.4.1 kind . . . . .	921
9.83.4.2 depth . . . . .	921
9.84 DDS_InconsistentTopicStatus Struct Reference . . . . .	921
9.84.1 Detailed Description . . . . .	922
9.84.2 Member Data Documentation . . . . .	922



---

9.84.2.1 total_count . . . . .	922
9.84.2.2 total_count_change . . . . .	923
9.85 DDS_InstanceHandleSeq Struct Reference . . . . .	923
9.85.1 Detailed Description . . . . .	923
9.86 DDS_Int8Seq Struct Reference . . . . .	923
9.86.1 Detailed Description . . . . .	923
9.87 DDS_InvalidLocalIdentityAdvanceNoticeStatus Struct Reference . . . . .	924
9.87.1 Detailed Description . . . . .	924
9.87.2 Member Data Documentation . . . . .	924
9.87.2.1 expiration_time . . . . .	924
9.88 DDS_KeyedOctets Struct Reference . . . . .	924
9.88.1 Detailed Description . . . . .	925
9.88.2 Constructor & Destructor Documentation . . . . .	925
9.88.2.1 DDS_KeyedOctets() [1/2] . . . . .	925
9.88.2.2 DDS_KeyedOctets() [2/2] . . . . .	925
9.88.2.3 ~DDS_KeyedOctets() . . . . .	926
9.88.3 Member Data Documentation . . . . .	926
9.88.3.1 key . . . . .	926
9.88.3.2 length . . . . .	926
9.88.3.3 value . . . . .	926
9.89 DDS_KeyedOctetsSeq Struct Reference . . . . .	926
9.89.1 Detailed Description . . . . .	927
9.90 DDS_KeyedString Struct Reference . . . . .	927
9.90.1 Detailed Description . . . . .	927
9.90.2 Constructor & Destructor Documentation . . . . .	927
9.90.2.1 DDS_KeyedString() [1/2] . . . . .	928
9.90.2.2 DDS_KeyedString() [2/2] . . . . .	928
9.90.2.3 ~DDS_KeyedString() . . . . .	928
9.90.3 Member Data Documentation . . . . .	928
9.90.3.1 key . . . . .	929
9.90.3.2 value . . . . .	929
9.91 DDS_KeyedStringSeq Struct Reference . . . . .	929
9.91.1 Detailed Description . . . . .	929
9.92 DDS_LatencyBudgetQosPolicy Struct Reference . . . . .	929
9.92.1 Detailed Description . . . . .	930
9.92.2 Usage . . . . .	930
9.92.3 Compatibility . . . . .	930
9.92.4 Member Data Documentation . . . . .	931
9.92.4.1 duration . . . . .	931

---

9.93 DDS_LifespanQosPolicy Struct Reference . . . . .	931
9.93.1 Detailed Description . . . . .	931
9.93.2 Usage . . . . .	932
9.93.3 Member Data Documentation . . . . .	932
9.93.3.1 duration . . . . .	932
9.94 DDS_LivelinessChangedStatus Struct Reference . . . . .	932
9.94.1 Detailed Description . . . . .	933
9.94.2 Member Data Documentation . . . . .	933
9.94.2.1 alive_count . . . . .	933
9.94.2.2 not_alive_count . . . . .	934
9.94.2.3 alive_count_change . . . . .	934
9.94.2.4 not_alive_count_change . . . . .	934
9.94.2.5 last_publication_handle . . . . .	934
9.95 DDS_LivelinessLostStatus Struct Reference . . . . .	934
9.95.1 Detailed Description . . . . .	935
9.95.2 Member Data Documentation . . . . .	935
9.95.2.1 total_count . . . . .	935
9.95.2.2 total_count_change . . . . .	935
9.96 DDS_LivelinessQosPolicy Struct Reference . . . . .	936
9.96.1 Detailed Description . . . . .	936
9.96.2 Usage . . . . .	937
9.96.3 Compatibility . . . . .	938
9.96.4 Member Data Documentation . . . . .	938
9.96.4.1 kind . . . . .	938
9.96.4.2 lease_duration . . . . .	938
9.96.4.3 assertions_per_lease_duration . . . . .	939
9.97 DDS_Locator_t Struct Reference . . . . .	939
9.97.1 Detailed Description . . . . .	939
9.97.2 Member Data Documentation . . . . .	939
9.97.2.1 kind . . . . .	940
9.97.2.2 port . . . . .	940
9.97.2.3 address . . . . .	940
9.98 DDS_LocatorFilter_t Struct Reference . . . . .	940
9.98.1 Detailed Description . . . . .	940
9.98.2 Member Data Documentation . . . . .	941
9.98.2.1 locators . . . . .	941
9.98.2.2 filter_expression . . . . .	941
9.99 DDS_LocatorFilterQosPolicy Struct Reference . . . . .	941
9.99.1 Detailed Description . . . . .	942

---

9.99.2 Member Data Documentation	942
9.99.2.1 locator_filters	942
9.99.2.2 filter_name	942
9.100 DDS_LocatorFilterSeq Struct Reference	943
9.100.1 Detailed Description	943
9.101 DDS_LocatorSeq Struct Reference	943
9.101.1 Detailed Description	943
9.102 DDS_LoggingQosPolicy Struct Reference	943
9.102.1 Detailed Description	944
9.102.2 Member Data Documentation	944
9.102.2.1 verbosity	944
9.102.2.2 category	945
9.102.2.3 print_format	945
9.102.2.4 output_file	945
9.102.2.5 output_file_suffix	946
9.102.2.6 max_bytes_per_file	946
9.102.2.7 max_files	947
9.103 DDS_LongDoubleSeq Struct Reference	947
9.103.1 Detailed Description	947
9.104 DDS_LongLongSeq Struct Reference	947
9.104.1 Detailed Description	948
9.105 DDS_LongSeq Struct Reference	948
9.105.1 Detailed Description	948
9.106 DDS_MonitoringDedicatedParticipantSettings Struct Reference	948
9.106.1 Detailed Description	949
9.106.2 Member Data Documentation	949
9.106.2.1 enable	949
9.106.2.2 domain_id	949
9.106.2.3 participant_qos_profile_name	949
9.106.2.4 collector_initial_peers	950
9.107 DDS_MonitoringDistributionSettings Struct Reference	950
9.107.1 Detailed Description	950
9.107.2 Member Data Documentation	951
9.107.2.1 dedicated_participant	951
9.107.2.2 publisher_qos_profile_name	951
9.107.2.3 event_settings	951
9.107.2.4 periodic_settings	951
9.107.2.5 logging_settings	952
9.108 DDS_MonitoringEventDistributionSettings Struct Reference	952

---

9.108.1 Detailed Description . . . . .	952
9.108.2 Member Data Documentation . . . . .	953
9.108.2.1 concurrency_level . . . . .	953
9.108.2.2 datawriter_qos_profile_name . . . . .	953
9.108.2.3 thread . . . . .	953
9.108.2.4 publication_period . . . . .	954
9.109 DDS_MonitoringLoggingDistributionSettings Struct Reference . . . . .	954
9.109.1 Detailed Description . . . . .	954
9.109.2 Member Data Documentation . . . . .	955
9.109.2.1 concurrency_level . . . . .	955
9.109.2.2 max_historical_logs . . . . .	955
9.109.2.3 datawriter_qos_profile_name . . . . .	955
9.109.2.4 thread . . . . .	956
9.109.2.5 publication_period . . . . .	956
9.110 DDS_MonitoringLoggingForwardingSettings Struct Reference . . . . .	956
9.110.1 Detailed Description . . . . .	957
9.110.2 Member Data Documentation . . . . .	957
9.110.2.1 middleware_forwarding_level . . . . .	957
9.110.2.2 security_event_forwarding_level . . . . .	957
9.110.2.3 service_forwarding_level . . . . .	957
9.110.2.4 user_forwarding_level . . . . .	958
9.111 DDS_MonitoringMetricSelection Struct Reference . . . . .	958
9.111.1 Detailed Description . . . . .	958
9.111.2 Member Data Documentation . . . . .	958
9.111.2.1 resource_selection . . . . .	959
9.111.2.2 enabled_metrics_selection . . . . .	959
9.111.2.3 disabled_metrics_selection . . . . .	960
9.112 DDS_MonitoringMetricSelectionSeq Struct Reference . . . . .	960
9.112.1 Detailed Description . . . . .	960
9.113 DDS_MonitoringPeriodicDistributionSettings Struct Reference . . . . .	960
9.113.1 Detailed Description . . . . .	961
9.113.2 Member Data Documentation . . . . .	961
9.113.2.1 datawriter_qos_profile_name . . . . .	961
9.113.2.2 thread . . . . .	961
9.113.2.3 polling_period . . . . .	962
9.114 DDS_MonitoringQosPolicy Struct Reference . . . . .	962
9.114.1 Detailed Description . . . . .	962
9.114.2 Member Data Documentation . . . . .	962
9.114.2.1 enable . . . . .	962

---

9.114.2.2 application_name . . . . .	963
9.114.2.3 distribution_settings . . . . .	963
9.114.2.4 telemetry_data . . . . .	963
9.115 DDS_MonitoringTelemetryData Struct Reference . . . . .	963
9.115.1 Detailed Description . . . . .	964
9.115.2 Member Data Documentation . . . . .	964
9.115.2.1 metrics . . . . .	964
9.115.2.2 logs . . . . .	964
9.116 DDS_MultiChannelQosPolicy Struct Reference . . . . .	964
9.116.1 Detailed Description . . . . .	965
9.116.2 Usage . . . . .	965
9.116.3 Member Data Documentation . . . . .	966
9.116.3.1 channels . . . . .	966
9.116.3.2 filter_name . . . . .	966
9.117 DDS_Octets Struct Reference . . . . .	967
9.117.1 Detailed Description . . . . .	967
9.117.2 Constructor & Destructor Documentation . . . . .	968
9.117.2.1 DDS_Octets() [1/2] . . . . .	968
9.117.2.2 DDS_Octets() [2/2] . . . . .	968
9.117.2.3 ~DDS_Octets() . . . . .	968
9.117.3 Member Data Documentation . . . . .	968
9.117.3.1 length . . . . .	969
9.117.3.2 value . . . . .	969
9.118 DDS_OctetSeq Struct Reference . . . . .	969
9.118.1 Detailed Description . . . . .	969
9.119 DDS_OctetsSeq Struct Reference . . . . .	969
9.119.1 Detailed Description . . . . .	970
9.120 DDS_OfferedDeadlineMissedStatus Struct Reference . . . . .	970
9.120.1 Detailed Description . . . . .	970
9.120.2 Member Data Documentation . . . . .	970
9.120.2.1 total_count . . . . .	971
9.120.2.2 total_count_change . . . . .	971
9.120.2.3 last_instance_handle . . . . .	971
9.121 DDS_OfferedIncompatibleQosStatus Struct Reference . . . . .	971
9.121.1 Detailed Description . . . . .	972
9.121.2 Member Data Documentation . . . . .	972
9.121.2.1 total_count . . . . .	972
9.121.2.2 total_count_change . . . . .	972
9.121.2.3 last_policy_id . . . . .	972

9.121.2.4 policies . . . . .	973
9.122 DDS_OwnershipQosPolicy Struct Reference . . . . .	973
9.122.1 Detailed Description . . . . .	973
9.122.2 Usage . . . . .	974
9.122.2.1 SHARED ownership . . . . .	974
9.122.2.2 EXCLUSIVE ownership . . . . .	974
9.122.3 Compatibility . . . . .	975
9.122.4 Relationship between registration, liveliness and ownership . . . . .	975
9.122.4.1 Ownership Resolution on Redundant Systems . . . . .	975
9.122.4.2 Detection of Loss in Topological Connectivity . . . . .	977
9.122.4.3 Semantic Difference between unregister_instance and dispose . . . . .	977
9.122.5 Member Data Documentation . . . . .	977
9.122.5.1 kind . . . . .	978
9.123 DDS_OwnershipStrengthQosPolicy Struct Reference . . . . .	978
9.123.1 Detailed Description . . . . .	978
9.123.2 Member Data Documentation . . . . .	978
9.123.2.1 value . . . . .	979
9.124 DDS_ParticipantBuiltinTopicData Struct Reference . . . . .	979
9.124.1 Detailed Description . . . . .	980
9.124.2 Member Data Documentation . . . . .	980
9.124.2.1 key . . . . .	980
9.124.2.2 user_data . . . . .	980
9.124.2.3 property . . . . .	980
9.124.2.4 rtps_protocol_version . . . . .	980
9.124.2.5 rtps_vendor_id . . . . .	981
9.124.2.6 dds_builtin_endpoints . . . . .	981
9.124.2.7 default_unicast_locators . . . . .	981
9.124.2.8 product_version . . . . .	981
9.124.2.9 participant_name . . . . .	981
9.124.2.10 domain_id . . . . .	981
9.124.2.11 transport_info . . . . .	982
9.124.2.12 reachability_lease_duration . . . . .	982
9.124.2.13 partition . . . . .	982
9.124.2.14 trust_protection_info . . . . .	982
9.124.2.15 trust_algorithm_info . . . . .	983
9.124.2.16 partial_configuration . . . . .	983
9.125 DDS_ParticipantBuiltinTopicDataSeq Struct Reference . . . . .	984
9.125.1 Detailed Description . . . . .	984
9.126 DDS_ParticipantTrustAlgorithmInfo Struct Reference . . . . .	984

---

9.126.1 Detailed Description . . . . .	984
9.126.2 Member Data Documentation . . . . .	984
9.126.2.1 signature . . . . .	985
9.126.2.2 key_establishment . . . . .	985
9.126.2.3 interceptor . . . . .	985
9.127 DDS_ParticipantTrustInterceptorAlgorithmInfo Struct Reference . . . . .	985
9.127.1 Detailed Description . . . . .	985
9.127.2 Member Data Documentation . . . . .	986
9.127.2.1 supported_mask . . . . .	986
9.127.2.2 builtin_endpoints_required_mask . . . . .	986
9.127.2.3 builtin_kx_endpoints_required_mask . . . . .	986
9.127.2.4 user_endpoints_default_required_mask . . . . .	986
9.128 DDS_ParticipantTrustKeyEstablishmentAlgorithmInfo Struct Reference . . . . .	986
9.128.1 Detailed Description . . . . .	987
9.128.2 Member Data Documentation . . . . .	987
9.128.2.1 shared_secret . . . . .	987
9.129 DDS_ParticipantTrustProtectionInfo Struct Reference . . . . .	987
9.129.1 Detailed Description . . . . .	987
9.129.2 Member Data Documentation . . . . .	987
9.129.2.1 bitmask . . . . .	988
9.129.2.2 plugin_bitmask . . . . .	988
9.130 DDS_ParticipantTrustSignatureAlgorithmInfo Struct Reference . . . . .	988
9.130.1 Detailed Description . . . . .	988
9.130.2 Member Data Documentation . . . . .	988
9.130.2.1 trust_chain . . . . .	989
9.130.2.2 message_auth . . . . .	989
9.131 DDS_PartitionQosPolicy Struct Reference . . . . .	989
9.131.1 Detailed Description . . . . .	989
9.131.2 Usage . . . . .	990
9.131.3 Member Data Documentation . . . . .	991
9.131.3.1 name . . . . .	991
9.132 DDS_PersistentStorageSettings Struct Reference . . . . .	991
9.132.1 Detailed Description . . . . .	992
9.132.2 Member Data Documentation . . . . .	993
9.132.2.1 enable . . . . .	993
9.132.2.2 file_name . . . . .	993
9.132.2.3 trace_file_name . . . . .	993
9.132.2.4 journal_kind . . . . .	994
9.132.2.5 synchronization_kind . . . . .	994

---

9.132.2.6 vacuum . . . . .	994
9.132.2.7 restore . . . . .	994
9.132.2.8 writer_instance_cache_allocation . . . . .	995
9.132.2.9 writer_sample_cache_allocation . . . . .	995
9.132.2.10 writer_memory_state . . . . .	996
9.132.2.11 reader_checkpoint_frequency . . . . .	996
9.133 DDS_PresentationQosPolicy Struct Reference . . . . .	996
9.133.1 Detailed Description . . . . .	997
9.133.2 Usage . . . . .	998
9.133.3 Compatibility . . . . .	999
9.133.4 Member Data Documentation . . . . .	1000
9.133.4.1 access_scope . . . . .	1000
9.133.4.2 coherent_access . . . . .	1000
9.133.4.3 ordered_access . . . . .	1000
9.133.4.4 drop_incomplete_coherent_set . . . . .	1000
9.134 DDS_PrintFormatProperty Struct Reference . . . . .	1001
9.134.1 Detailed Description . . . . .	1001
9.134.2 Member Data Documentation . . . . .	1001
9.134.2.1 kind . . . . .	1001
9.134.2.2 pretty_print . . . . .	1002
9.134.2.3 enum_as_int . . . . .	1002
9.134.2.4 include_root_elements . . . . .	1002
9.135 DDS_ProductVersion_t Struct Reference . . . . .	1003
9.135.1 Detailed Description . . . . .	1003
9.135.2 Member Data Documentation . . . . .	1003
9.135.2.1 major . . . . .	1003
9.135.2.2 minor . . . . .	1003
9.135.2.3 release . . . . .	1004
9.135.2.4 revision . . . . .	1004
9.136 DDS_ProfileQosPolicy Struct Reference . . . . .	1004
9.136.1 Detailed Description . . . . .	1004
9.136.2 Member Data Documentation . . . . .	1005
9.136.2.1 string_profile . . . . .	1005
9.136.2.2 url_profile . . . . .	1005
9.136.2.3 ignore_user_profile . . . . .	1005
9.136.2.4 ignore_environment_profile . . . . .	1005
9.136.2.5 ignore_resource_profile . . . . .	1006
9.137 DDS_Property_t Struct Reference . . . . .	1006
9.137.1 Detailed Description . . . . .	1006



---

9.137.2 Member Data Documentation . . . . .	1006
9.137.2.1 name . . . . .	1006
9.137.2.2 value . . . . .	1007
9.137.2.3 propagate . . . . .	1007
9.138 DDS_PropertyQosPolicy Struct Reference . . . . .	1007
9.138.1 Detailed Description . . . . .	1007
9.138.2 Usage . . . . .	1008
9.138.2.1 Reasons for Using the PropertyQosPolicy . . . . .	1008
9.138.3 Member Data Documentation . . . . .	1009
9.138.3.1 value . . . . .	1009
9.139 DDS_PropertySeq Struct Reference . . . . .	1009
9.139.1 Detailed Description . . . . .	1009
9.140 DDS_ProtocolVersion_t Struct Reference . . . . .	1009
9.140.1 Detailed Description . . . . .	1009
9.140.2 Member Data Documentation . . . . .	1010
9.140.2.1 major . . . . .	1010
9.140.2.2 minor . . . . .	1010
9.141 DDS_PublicationBuiltinTopicData Struct Reference . . . . .	1010
9.141.1 Detailed Description . . . . .	1012
9.141.2 Member Data Documentation . . . . .	1012
9.141.2.1 key . . . . .	1012
9.141.2.2 participant_key . . . . .	1012
9.141.2.3 topic_name . . . . .	1013
9.141.2.4 type_name . . . . .	1013
9.141.2.5 durability . . . . .	1013
9.141.2.6 durability_service . . . . .	1013
9.141.2.7 deadline . . . . .	1014
9.141.2.8 latency_budget . . . . .	1014
9.141.2.9 liveliness . . . . .	1014
9.141.2.10 reliability . . . . .	1014
9.141.2.11 lifespan . . . . .	1014
9.141.2.12 user_data . . . . .	1014
9.141.2.13 ownership . . . . .	1015
9.141.2.14 ownership_strength . . . . .	1015
9.141.2.15 destination_order . . . . .	1015
9.141.2.16 presentation . . . . .	1015
9.141.2.17 partition . . . . .	1015
9.141.2.18 topic_data . . . . .	1016
9.141.2.19 group_data . . . . .	1016

---

9.141.2.20 representation	1016
9.141.2.21 data_tags	1016
9.141.2.22 type_code	1016
9.141.2.23 publisher_key	1016
9.141.2.24 property	1017
9.141.2.25 unicast_locators	1017
9.141.2.26 virtual_guid	1017
9.141.2.27 service	1017
9.141.2.28 rtps_protocol_version	1017
9.141.2.29 rtps_vendor_id	1018
9.141.2.30 product_version	1018
9.141.2.31 locator_filter	1018
9.141.2.32 disable_positive_acks	1018
9.141.2.33 publication_name	1018
9.141.2.34 trust_protection_info	1019
9.141.2.35 trust_algorithm_info	1019
9.142 DDS_PublicationBuiltinTopicDataSeq Struct Reference	1019
9.142.1 Detailed Description	1019
9.143 DDS_PublicationMatchedStatus Struct Reference	1020
9.143.1 Detailed Description	1020
9.143.2 Member Data Documentation	1020
9.143.2.1 total_count	1021
9.143.2.2 total_count_change	1021
9.143.2.3 current_count	1021
9.143.2.4 current_count_peak	1021
9.143.2.5 current_count_change	1021
9.143.2.6 last_subscription_handle	1022
9.144 DDS_PublisherQos Struct Reference	1022
9.144.1 Detailed Description	1023
9.144.2 Member Function Documentation	1023
9.144.2.1 operator==( )	1023
9.144.2.2 operator!=( )	1024
9.144.3 Member Data Documentation	1024
9.144.3.1 presentation	1024
9.144.3.2 partition	1024
9.144.3.3 group_data	1024
9.144.3.4 entity_factory	1025
9.144.3.5 asynchronous_publisher	1025
9.144.3.6 publisher_name	1025

---

9.145 DDS_PublishModeQosPolicy Struct Reference . . . . .	1025
9.145.1 Detailed Description . . . . .	1026
9.145.2 Usage . . . . .	1026
9.145.3 Member Data Documentation . . . . .	1027
9.145.3.1 kind . . . . .	1027
9.145.3.2 flow_controller_name . . . . .	1027
9.145.3.3 priority . . . . .	1028
9.146 DDS_QosPolicyCount Struct Reference . . . . .	1029
9.146.1 Detailed Description . . . . .	1029
9.146.2 Member Data Documentation . . . . .	1030
9.146.2.1 policy_id . . . . .	1030
9.146.2.2 count . . . . .	1030
9.147 DDS_QosPolicyCountSeq Struct Reference . . . . .	1030
9.147.1 Detailed Description . . . . .	1030
9.148 DDS_QosPrintAll_t Struct Reference . . . . .	1030
9.148.1 Detailed Description . . . . .	1031
9.149 DDS_QosPrintFormat Struct Reference . . . . .	1031
9.149.1 Detailed Description . . . . .	1031
9.149.2 Member Data Documentation . . . . .	1031
9.149.2.1 is_standalone . . . . .	1032
9.149.2.2 print_private . . . . .	1032
9.149.2.3 indent . . . . .	1033
9.150 DDS_QueryConditionParams Struct Reference . . . . .	1033
9.150.1 Detailed Description . . . . .	1034
9.150.2 Member Data Documentation . . . . .	1034
9.150.2.1 as_readconditionparams . . . . .	1034
9.150.2.2 query_expression . . . . .	1034
9.150.2.3 query_parameters . . . . .	1034
9.151 DDS_ReadConditionParams Struct Reference . . . . .	1034
9.151.1 Detailed Description . . . . .	1035
9.151.2 Member Data Documentation . . . . .	1035
9.151.2.1 sample_states . . . . .	1035
9.151.2.2 view_states . . . . .	1035
9.151.2.3 instance_states . . . . .	1035
9.151.2.4 stream_kinds . . . . .	1035
9.152 DDS_ReaderDataLifecycleQosPolicy Struct Reference . . . . .	1035
9.152.1 Detailed Description . . . . .	1036
9.152.2 Member Data Documentation . . . . .	1037
9.152.2.1 autopurge_nowriter_samples_delay . . . . .	1037

---

9.152.2.2 autopurge_disposed_samples_delay . . . . .	1037
9.152.2.3 autopurge_disposed_instances_delay . . . . .	1038
9.152.2.4 autopurge_nowriter_instances_delay . . . . .	1038
9.153 DDS_ReceiverPoolQosPolicy Struct Reference . . . . .	1038
9.153.1 Detailed Description . . . . .	1039
9.153.2 Usage . . . . .	1039
9.153.3 Member Data Documentation . . . . .	1039
9.153.3.1 thread . . . . .	1040
9.153.3.2 buffer_size . . . . .	1040
9.153.3.3 buffer_alignment . . . . .	1041
9.154 DDS_ReliabilityQosPolicy Struct Reference . . . . .	1041
9.154.1 Detailed Description . . . . .	1041
9.154.2 Usage . . . . .	1042
9.154.3 Compatibility . . . . .	1043
9.154.4 Member Data Documentation . . . . .	1043
9.154.4.1 kind . . . . .	1043
9.154.4.2 max_blocking_time . . . . .	1043
9.154.4.3 acknowledgment_kind . . . . .	1044
9.154.4.4 instance_state_consistency_kind . . . . .	1044
9.155 DDS_ReliableReaderActivityChangedStatus Struct Reference . . . . .	1044
9.155.1 Detailed Description . . . . .	1045
9.155.2 Member Data Documentation . . . . .	1045
9.155.2.1 active_count . . . . .	1045
9.155.2.2 inactive_count . . . . .	1045
9.155.2.3 active_count_change . . . . .	1046
9.155.2.4 inactive_count_change . . . . .	1046
9.155.2.5 last_instance_handle . . . . .	1046
9.156 DDS_ReliableWriterCacheChangedStatus Struct Reference . . . . .	1046
9.156.1 Detailed Description . . . . .	1047
9.156.2 Member Data Documentation . . . . .	1047
9.156.2.1 empty_reliable_writer_cache . . . . .	1047
9.156.2.2 full_reliable_writer_cache . . . . .	1047
9.156.2.3 low_watermark_reliable_writer_cache . . . . .	1048
9.156.2.4 high_watermark_reliable_writer_cache . . . . .	1048
9.156.2.5 unacknowledged_sample_count . . . . .	1048
9.156.2.6 unacknowledged_sample_count_peak . . . . .	1048
9.156.2.7 replaced_unacknowledged_sample_count . . . . .	1049
9.157 DDS_ReliableWriterCacheEventCount Struct Reference . . . . .	1049
9.157.1 Detailed Description . . . . .	1049

---

9.157.2 Member Data Documentation . . . . .	1049
9.157.2.1 total_count . . . . .	1049
9.157.2.2 total_count_change . . . . .	1050
9.158 DDS_RequestedDeadlineMissedStatus Struct Reference . . . . .	1050
9.158.1 Detailed Description . . . . .	1050
9.158.2 Member Data Documentation . . . . .	1050
9.158.2.1 total_count . . . . .	1050
9.158.2.2 total_count_change . . . . .	1050
9.158.2.3 last_instance_handle . . . . .	1051
9.159 DDS_RequestedIncompatibleQosStatus Struct Reference . . . . .	1051
9.159.1 Detailed Description . . . . .	1051
9.159.2 Member Data Documentation . . . . .	1051
9.159.2.1 total_count . . . . .	1052
9.159.2.2 total_count_change . . . . .	1052
9.159.2.3 last_policy_id . . . . .	1052
9.159.2.4 policies . . . . .	1052
9.160 DDS_ResourceLimitsQosPolicy Struct Reference . . . . .	1052
9.160.1 Detailed Description . . . . .	1053
9.160.2 Usage . . . . .	1054
9.160.3 Consistency . . . . .	1054
9.160.4 Member Data Documentation . . . . .	1055
9.160.4.1 max_samples . . . . .	1055
9.160.4.2 max_instances . . . . .	1055
9.160.4.3 max_samples_per_instance . . . . .	1055
9.160.4.4 initial_samples . . . . .	1056
9.160.4.5 initial_instances . . . . .	1056
9.160.4.6 instance_hash_buckets . . . . .	1056
9.161 DDS_RTPS_EntityId_t Struct Reference . . . . .	1056
9.161.1 Detailed Description . . . . .	1056
9.162 DDS_RTPS_GUID_t Struct Reference . . . . .	1057
9.162.1 Detailed Description . . . . .	1057
9.163 DDS_RtpsReliableReaderProtocol_t Struct Reference . . . . .	1057
9.163.1 Detailed Description . . . . .	1057
9.163.2 Member Data Documentation . . . . .	1058
9.163.2.1 min_heartbeat_response_delay . . . . .	1058
9.163.2.2 max_heartbeat_response_delay . . . . .	1058
9.163.2.3 heartbeat_suppression_duration . . . . .	1059
9.163.2.4 nack_period . . . . .	1059
9.163.2.5 receive_window_size . . . . .	1059

---

9.163.2.6	round_trip_time	1060
9.163.2.7	app_ack_period	1060
9.163.2.8	min_app_ack_response_keep_duration	1060
9.163.2.9	samples_per_app_ack	1061
9.164	DDS_RtpsReliableWriterProtocol_t Struct Reference	1061
9.164.1	Detailed Description	1063
9.164.2	Member Data Documentation	1063
9.164.2.1	low_watermark	1063
9.164.2.2	high_watermark	1064
9.164.2.3	heartbeat_period	1064
9.164.2.4	fast_heartbeat_period	1065
9.164.2.5	late_joiner_heartbeat_period	1065
9.164.2.6	virtual_heartbeat_period	1066
9.164.2.7	samples_per_virtual_heartbeat	1066
9.164.2.8	max_heartbeat_retries	1067
9.164.2.9	inactivate_nonprogressing_readers	1067
9.164.2.10	heartbeats_per_max_samples	1067
9.164.2.11	min_nack_response_delay	1069
9.164.2.12	max_nack_response_delay	1069
9.164.2.13	nack_suppression_duration	1069
9.164.2.14	max_bytes_per_nack_response	1070
9.164.2.15	disable_positive_acks_min_sample_keep_duration	1070
9.164.2.16	disable_positive_acks_max_sample_keep_duration	1071
9.164.2.17	disable_positive_acks_enable_adaptive_sample_keep_duration	1071
9.164.2.18	disable_positive_acks_decrease_sample_keep_duration_factor	1072
9.164.2.19	disable_positive_acks_increase_sample_keep_duration_factor	1072
9.164.2.20	min_send_window_size	1072
9.164.2.21	max_send_window_size	1073
9.164.2.22	send_window_update_period	1074
9.164.2.23	send_window_increase_factor	1074
9.164.2.24	send_window_decrease_factor	1075
9.164.2.25	enable_multicast_periodic_heartbeat	1075
9.164.2.26	multicast_resend_threshold	1076
9.164.2.27	disable_repair_piggyback_heartbeat	1076
9.165	DDS_RtpsWellKnownPorts_t Struct Reference	1076
9.165.1	Detailed Description	1077
9.165.2	Member Data Documentation	1078
9.165.2.1	port_base	1078
9.165.2.2	domain_id_gain	1079

---

9.165.2.3 participant_id_gain . . . . .	1080
9.165.2.4 builtin_multicast_port_offset . . . . .	1080
9.165.2.5 builtin_unicast_port_offset . . . . .	1080
9.165.2.6 user_multicast_port_offset . . . . .	1081
9.165.2.7 user_unicast_port_offset . . . . .	1081
9.166 DDS_SampleIdentity_t Struct Reference . . . . .	1081
9.166.1 Detailed Description . . . . .	1081
9.167 DDS_SampleInfo Struct Reference . . . . .	1082
9.167.1 Detailed Description . . . . .	1083
9.167.2 Interpretation of the SampleInfo . . . . .	1083
9.167.3 Interpretation of the SampleInfo disposed_generation_count and no_writers_generation_count	1084
9.167.4 Interpretation of the SampleInfo sample_rank, generation_rank and absolute_generation_rank	1084
9.167.5 Interpretation of the SampleInfo counters and ranks . . . . .	1085
9.167.6 Member Data Documentation . . . . .	1085
9.167.6.1 sample_state . . . . .	1086
9.167.6.2 view_state . . . . .	1086
9.167.6.3 instance_state . . . . .	1086
9.167.6.4 source_timestamp . . . . .	1087
9.167.6.5 instance_handle . . . . .	1087
9.167.6.6 publication_handle . . . . .	1087
9.167.6.7 disposed_generation_count . . . . .	1087
9.167.6.8 no_writers_generation_count . . . . .	1088
9.167.6.9 sample_rank . . . . .	1088
9.167.6.10 generation_rank . . . . .	1088
9.167.6.11 absolute_generation_rank . . . . .	1089
9.167.6.12 valid_data . . . . .	1089
9.167.6.13 reception_timestamp . . . . .	1089
9.167.6.14 publication_sequence_number . . . . .	1090
9.167.6.15 reception_sequence_number . . . . .	1090
9.167.6.16 original_publication_virtual_guid . . . . .	1090
9.167.6.17 original_publication_virtual_sequence_number . . . . .	1090
9.167.6.18 related_original_publication_virtual_guid . . . . .	1091
9.167.6.19 related_original_publication_virtual_sequence_number . . . . .	1091
9.167.6.20 flag . . . . .	1091
9.167.6.21 source_guid . . . . .	1091
9.167.6.22 related_source_guid . . . . .	1092
9.167.6.23 related_subscription_guid . . . . .	1092
9.167.6.24 topic_query_guid . . . . .	1092
9.167.6.25 coherent_set_info . . . . .	1092

---

9.168 DDS_SampleInfoSeq Struct Reference . . . . .	1093
9.168.1 Detailed Description . . . . .	1093
9.169 DDS_SampleLostStatus Struct Reference . . . . .	1093
9.169.1 Detailed Description . . . . .	1093
9.169.2 Member Data Documentation . . . . .	1093
9.169.2.1 total_count . . . . .	1093
9.169.2.2 total_count_change . . . . .	1094
9.169.2.3 last_reason . . . . .	1094
9.170 DDS_SampleRejectedStatus Struct Reference . . . . .	1094
9.170.1 Detailed Description . . . . .	1094
9.170.2 Member Data Documentation . . . . .	1094
9.170.2.1 total_count . . . . .	1095
9.170.2.2 total_count_change . . . . .	1095
9.170.2.3 last_reason . . . . .	1095
9.170.2.4 last_instance_handle . . . . .	1095
9.171 DDS_SequenceNumber_t Struct Reference . . . . .	1095
9.171.1 Detailed Description . . . . .	1096
9.171.2 Member Data Documentation . . . . .	1096
9.171.2.1 high . . . . .	1096
9.171.2.2 low . . . . .	1096
9.172 DDS_ServiceQosPolicy Struct Reference . . . . .	1096
9.172.1 Detailed Description . . . . .	1097
9.172.2 Member Data Documentation . . . . .	1097
9.172.2.1 kind . . . . .	1097
9.173 DDS_ServiceRequest Struct Reference . . . . .	1097
9.173.1 Detailed Description . . . . .	1098
9.173.2 Member Data Documentation . . . . .	1098
9.173.2.1 service_id . . . . .	1098
9.173.2.2 instance_id . . . . .	1098
9.173.2.3 request_body . . . . .	1099
9.174 DDS_ServiceRequestAcceptedStatus Struct Reference . . . . .	1099
9.174.1 Detailed Description . . . . .	1099
9.174.2 Member Data Documentation . . . . .	1100
9.174.2.1 total_count . . . . .	1100
9.174.2.2 total_count_change . . . . .	1100
9.174.2.3 current_count . . . . .	1100
9.174.2.4 current_count_change . . . . .	1100
9.174.2.5 last_request_handle . . . . .	1100
9.174.2.6 service_id . . . . .	1101



---

9.175 DDS_ServiceRequestSeq Struct Reference . . . . .	1101
9.175.1 Detailed Description . . . . .	1101
9.176 DDS_ShortSeq Struct Reference . . . . .	1101
9.176.1 Detailed Description . . . . .	1101
9.177 DDS_StringSeq Struct Reference . . . . .	1102
9.177.1 Detailed Description . . . . .	1102
9.178 DDS_StructMember Struct Reference . . . . .	1103
9.178.1 Detailed Description . . . . .	1103
9.178.2 Member Data Documentation . . . . .	1103
9.178.2.1 name . . . . .	1103
9.178.2.2 type . . . . .	1104
9.178.2.3 is_pointer . . . . .	1104
9.178.2.4 bits . . . . .	1104
9.178.2.5 is_key . . . . .	1104
9.178.2.6 id . . . . .	1104
9.178.2.7 is_optional . . . . .	1104
9.179 DDS_StructMemberSeq Struct Reference . . . . .	1105
9.179.1 Detailed Description . . . . .	1105
9.180 DDS_SubscriberQos Struct Reference . . . . .	1105
9.180.1 Detailed Description . . . . .	1106
9.180.2 Member Function Documentation . . . . .	1106
9.180.2.1 operator==( ) . . . . .	1106
9.180.2.2 operator!=( ) . . . . .	1107
9.180.3 Member Data Documentation . . . . .	1107
9.180.3.1 presentation . . . . .	1107
9.180.3.2 partition . . . . .	1107
9.180.3.3 group_data . . . . .	1107
9.180.3.4 entity_factory . . . . .	1108
9.180.3.5 subscriber_name . . . . .	1108
9.181 DDS_SubscriptionBuiltinTopicData Struct Reference . . . . .	1108
9.181.1 Detailed Description . . . . .	1110
9.181.2 Member Data Documentation . . . . .	1110
9.181.2.1 key . . . . .	1110
9.181.2.2 participant_key . . . . .	1110
9.181.2.3 topic_name . . . . .	1110
9.181.2.4 type_name . . . . .	1111
9.181.2.5 durability . . . . .	1111
9.181.2.6 deadline . . . . .	1111
9.181.2.7 latency_budget . . . . .	1111

---

9.181.2.8 liveliness . . . . .	1111
9.181.2.9 reliability . . . . .	1112
9.181.2.10 ownership . . . . .	1112
9.181.2.11 destination_order . . . . .	1112
9.181.2.12 user_data . . . . .	1112
9.181.2.13 time_based_filter . . . . .	1112
9.181.2.14 presentation . . . . .	1113
9.181.2.15 partition . . . . .	1113
9.181.2.16 topic_data . . . . .	1113
9.181.2.17 group_data . . . . .	1113
9.181.2.18 type_consistency . . . . .	1113
9.181.2.19 representation . . . . .	1113
9.181.2.20 data_tags . . . . .	1114
9.181.2.21 type_code . . . . .	1114
9.181.2.22 subscriber_key . . . . .	1114
9.181.2.23 property . . . . .	1114
9.181.2.24 unicast_locators . . . . .	1114
9.181.2.25 multicast_locators . . . . .	1115
9.181.2.26 content_filter_property . . . . .	1115
9.181.2.27 virtual_guid . . . . .	1115
9.181.2.28 service . . . . .	1115
9.181.2.29 rtps_protocol_version . . . . .	1115
9.181.2.30 rtps_vendor_id . . . . .	1116
9.181.2.31 product_version . . . . .	1116
9.181.2.32 disable_positive_acks . . . . .	1116
9.181.2.33 subscription_name . . . . .	1116
9.181.2.34 trust_protection_info . . . . .	1116
9.181.2.35 trust_algorithm_info . . . . .	1117
9.182 DDS_SubscriptionBuiltinTopicDataSeq Struct Reference . . . . .	1117
9.182.1 Detailed Description . . . . .	1117
9.183 DDS_SubscriptionMatchedStatus Struct Reference . . . . .	1117
9.183.1 Detailed Description . . . . .	1118
9.183.2 Member Data Documentation . . . . .	1118
9.183.2.1 total_count . . . . .	1119
9.183.2.2 total_count_change . . . . .	1119
9.183.2.3 current_count . . . . .	1119
9.183.2.4 current_count_peak . . . . .	1119
9.183.2.5 current_count_change . . . . .	1119
9.183.2.6 last_publication_handle . . . . .	1120

---

9.184 DDS_SystemResourceLimitsQosPolicy Struct Reference . . . . .	1120
9.184.1 Detailed Description . . . . .	1120
9.184.2 Usage . . . . .	1121
9.184.3 Member Data Documentation . . . . .	1121
9.184.3.1 max_objects_per_thread . . . . .	1121
9.184.3.2 initial_objects_per_thread . . . . .	1121
9.185 DDS_Tag Struct Reference . . . . .	1122
9.185.1 Detailed Description . . . . .	1122
9.185.2 Member Data Documentation . . . . .	1122
9.185.2.1 name . . . . .	1122
9.185.2.2 value . . . . .	1122
9.186 DDS_TagSeq Struct Reference . . . . .	1122
9.186.1 Detailed Description . . . . .	1123
9.187 DDS_ThreadSettings_t Struct Reference . . . . .	1123
9.187.1 Detailed Description . . . . .	1123
9.187.2 Member Data Documentation . . . . .	1123
9.187.2.1 mask . . . . .	1123
9.187.2.2 priority . . . . .	1124
9.187.2.3 stack_size . . . . .	1124
9.187.2.4 cpu_list . . . . .	1124
9.187.2.5 cpu_rotation . . . . .	1124
9.188 DDS_Time_t Struct Reference . . . . .	1125
9.188.1 Detailed Description . . . . .	1125
9.188.2 Member Data Documentation . . . . .	1125
9.188.2.1 sec . . . . .	1125
9.188.2.2 nanosec . . . . .	1126
9.189 DDS_TimeBasedFilterQosPolicy Struct Reference . . . . .	1126
9.189.1 Detailed Description . . . . .	1126
9.189.2 Usage . . . . .	1127
9.189.3 Consistency . . . . .	1127
9.189.4 Member Data Documentation . . . . .	1128
9.189.4.1 minimum_separation . . . . .	1128
9.190 DDS_TopicBuiltinTopicData Struct Reference . . . . .	1128
9.190.1 Detailed Description . . . . .	1129
9.190.2 Member Data Documentation . . . . .	1130
9.190.2.1 key . . . . .	1130
9.190.2.2 name . . . . .	1130
9.190.2.3 type_name . . . . .	1130
9.190.2.4 durability . . . . .	1131

---

9.190.2.5 durability_service . . . . .	1131
9.190.2.6 deadline . . . . .	1131
9.190.2.7 latency_budget . . . . .	1131
9.190.2.8 liveliness . . . . .	1131
9.190.2.9 reliability . . . . .	1131
9.190.2.10 transport_priority . . . . .	1132
9.190.2.11 lifespan . . . . .	1132
9.190.2.12 destination_order . . . . .	1132
9.190.2.13 history . . . . .	1132
9.190.2.14 resource_limits . . . . .	1132
9.190.2.15 ownership . . . . .	1132
9.190.2.16 topic_data . . . . .	1133
9.190.2.17 representation . . . . .	1133
9.191 DDS_TopicBuiltinTopicDataSeq Struct Reference . . . . .	1133
9.191.1 Detailed Description . . . . .	1133
9.192 DDS_TopicDataQosPolicy Struct Reference . . . . .	1133
9.192.1 Detailed Description . . . . .	1134
9.192.2 Usage . . . . .	1134
9.192.3 Member Data Documentation . . . . .	1134
9.192.3.1 value . . . . .	1134
9.193 DDS_TopicQos Struct Reference . . . . .	1135
9.193.1 Detailed Description . . . . .	1136
9.193.2 Member Function Documentation . . . . .	1136
9.193.2.1 operator==( ) . . . . .	1137
9.193.2.2 operator!=( ) . . . . .	1137
9.193.3 Member Data Documentation . . . . .	1137
9.193.3.1 topic_data . . . . .	1137
9.193.3.2 durability . . . . .	1137
9.193.3.3 durability_service . . . . .	1138
9.193.3.4 deadline . . . . .	1138
9.193.3.5 latency_budget . . . . .	1138
9.193.3.6 liveliness . . . . .	1138
9.193.3.7 reliability . . . . .	1138
9.193.3.8 destination_order . . . . .	1138
9.193.3.9 history . . . . .	1139
9.193.3.10 resource_limits . . . . .	1139
9.193.3.11 transport_priority . . . . .	1139
9.193.3.12 lifespan . . . . .	1139
9.193.3.13 ownership . . . . .	1139

---

9.193.3.14 representation	1139
9.194 DDS_TopicQueryData Struct Reference	1140
9.194.1 Detailed Description	1140
9.194.2 Member Data Documentation	1140
9.194.2.1 topic_query_selection	1140
9.194.2.2 topic_name	1140
9.194.2.3 original_related_reader_guid	1141
9.195 DDS_TopicQueryDispatchQosPolicy Struct Reference	1141
9.195.1 Detailed Description	1141
9.195.2 Member Data Documentation	1142
9.195.2.1 enable	1142
9.195.2.2 publication_period	1142
9.195.2.3 samples_per_period	1142
9.196 DDS_TopicQuerySelection Struct Reference	1143
9.196.1 Detailed Description	1143
9.196.2 Member Data Documentation	1143
9.196.2.1 filter_class_name	1143
9.196.2.2 filter_expression	1144
9.196.2.3 filter_parameters	1144
9.196.2.4 kind	1144
9.197 DDS_TransportBuiltinQosPolicy Struct Reference	1144
9.197.1 Detailed Description	1145
9.197.2 Member Data Documentation	1145
9.197.2.1 mask	1145
9.198 DDS_TransportInfo_t Struct Reference	1145
9.198.1 Detailed Description	1146
9.198.2 Member Data Documentation	1146
9.198.2.1 class_id	1146
9.198.2.2 message_size_max	1146
9.199 DDS_TransportInfoSeq Struct Reference	1146
9.199.1 Detailed Description	1146
9.200 DDS_TransportMulticastMapping_t Struct Reference	1147
9.200.1 Detailed Description	1147
9.200.2 Member Data Documentation	1147
9.200.2.1 addresses	1147
9.200.2.2 topic_expression	1148
9.200.2.3 mapping_function	1148
9.201 DDS_TransportMulticastMappingFunction_t Struct Reference	1148
9.201.1 Detailed Description	1148

---

9.201.2 Member Data Documentation . . . . .	1148
9.201.2.1 dll . . . . .	1149
9.201.2.2 function_name . . . . .	1149
9.202 DDS_TransportMulticastMappingQosPolicy Struct Reference . . . . .	1149
9.202.1 Detailed Description . . . . .	1150
9.202.2 Member Data Documentation . . . . .	1151
9.202.2.1 value . . . . .	1151
9.203 DDS_TransportMulticastMappingSeq Struct Reference . . . . .	1151
9.203.1 Detailed Description . . . . .	1151
9.204 DDS_TransportMulticastQosPolicy Struct Reference . . . . .	1151
9.204.1 Detailed Description . . . . .	1152
9.204.2 Member Data Documentation . . . . .	1152
9.204.2.1 value . . . . .	1152
9.204.2.2 kind . . . . .	1153
9.205 DDS_TransportMulticastSettings_t Struct Reference . . . . .	1153
9.205.1 Detailed Description . . . . .	1153
9.205.2 Member Data Documentation . . . . .	1154
9.205.2.1 transports . . . . .	1154
9.205.2.2 receive_address . . . . .	1154
9.205.2.3 receive_port . . . . .	1155
9.206 DDS_TransportMulticastSettingsSeq Struct Reference . . . . .	1155
9.206.1 Detailed Description . . . . .	1155
9.207 DDS_TransportPriorityQosPolicy Struct Reference . . . . .	1155
9.207.1 Detailed Description . . . . .	1156
9.207.2 Usage . . . . .	1156
9.207.3 Member Data Documentation . . . . .	1157
9.207.3.1 value . . . . .	1157
9.208 DDS_TransportSelectionQosPolicy Struct Reference . . . . .	1157
9.208.1 Detailed Description . . . . .	1157
9.208.2 Member Data Documentation . . . . .	1158
9.208.2.1 enabled_transports . . . . .	1158
9.209 DDS_TransportUnicastQosPolicy Struct Reference . . . . .	1158
9.209.1 Detailed Description . . . . .	1159
9.209.2 Usage . . . . .	1159
9.209.3 Member Data Documentation . . . . .	1160
9.209.3.1 value . . . . .	1160
9.210 DDS_TransportUnicastSettings_t Struct Reference . . . . .	1160
9.210.1 Detailed Description . . . . .	1160
9.210.2 Member Data Documentation . . . . .	1161

---

9.210.2.1 transports	1161
9.210.2.2 receive_port	1161
9.211 DDS_TransportUnicastSettingsSeq Struct Reference	1161
9.211.1 Detailed Description	1162
9.212 DDS_TrustAlgorithmRequirements Struct Reference	1162
9.212.1 Detailed Description	1162
9.212.2 Member Data Documentation	1162
9.212.2.1 supported_mask	1162
9.212.2.2 required_mask	1163
9.213 DDS_TypeAllocationParams_t Struct Reference	1163
9.213.1 Detailed Description	1163
9.213.2 Member Function Documentation	1163
9.213.2.1 set_allocate_pointers()	1164
9.213.2.2 set_allocate_optional_members()	1164
9.213.3 Member Data Documentation	1164
9.213.3.1 allocate_pointers	1164
9.213.3.2 allocate_optional_members	1164
9.214 DDS_TypeCode Struct Reference	1164
9.214.1 Detailed Description	1167
9.214.2 Member Function Documentation	1168
9.214.2.1 kind()	1168
9.214.2.2 extensibility_kind()	1168
9.214.2.3 equal()	1171
9.214.2.4 name()	1172
9.214.2.5 member_count()	1172
9.214.2.6 member_name()	1173
9.214.2.7 find_member_by_name()	1174
9.214.2.8 member_type()	1175
9.214.2.9 member_label_count()	1176
9.214.2.10 member_label()	1176
9.214.2.11 member_ordinal()	1177
9.214.2.12 is_member_key()	1178
9.214.2.13 is_member_required()	1180
9.214.2.14 is_member_pointer()	1181
9.214.2.15 is_member_bitfield()	1181
9.214.2.16 member_bitfield_bits()	1182
9.214.2.17 member_visibility()	1183
9.214.2.18 discriminator_type()	1184
9.214.2.19 length()	1184

---

9.214.2.20	array_dimension_count()	1185
9.214.2.21	array_dimension()	1186
9.214.2.22	element_count()	1187
9.214.2.23	content_type()	1187
9.214.2.24	is_alias_pointer()	1188
9.214.2.25	default_index()	1189
9.214.2.26	concrete_base_type()	1189
9.214.2.27	type_modifier()	1190
9.214.2.28	member_id()	1191
9.214.2.29	find_member_by_id()	1192
9.214.2.30	get_type_object_serialized_size()	1193
9.214.2.31	get_cdr_serialized_sample_max_size()	1193
9.214.2.32	cdr_serialized_sample_max_size() [1/2]	1194
9.214.2.33	cdr_serialized_sample_min_size() [1/2]	1194
9.214.2.34	cdr_serialized_sample_key_max_size() [1/2]	1195
9.214.2.35	cdr_serialized_sample_max_size() [2/2]	1196
9.214.2.36	cdr_serialized_sample_min_size() [2/2]	1196
9.214.2.37	cdr_serialized_sample_key_max_size() [2/2]	1197
9.214.2.38	add_member_to_enum()	1197
9.214.2.39	add_member_to_union()	1198
9.214.2.40	add_member()	1199
9.214.2.41	add_member_ex()	1201
9.214.2.42	default_value()	1203
9.214.2.43	min_value()	1203
9.214.2.44	max_value()	1204
9.214.2.45	member_default_value()	1205
9.214.2.46	member_min_value()	1205
9.214.2.47	member_max_value()	1206
9.214.2.48	print_IDL()	1207
9.214.2.49	print()	1208
9.214.2.50	to_string() [1/2]	1208
9.214.2.51	to_string() [2/2]	1209
9.215	DDS_TypeCodeFactory Struct Reference	1210
9.215.1	Detailed Description	1211
9.215.2	Member Function Documentation	1212
9.215.2.1	get_instance()	1212
9.215.2.2	clone_tc()	1212
9.215.2.3	delete_tc()	1213
9.215.2.4	get_primitive_tc()	1213



---

9.215.2.5 create_struct_tc() [1/2]	1214
9.215.2.6 create_struct_tc() [2/2]	1215
9.215.2.7 create_value_tc() [1/2]	1215
9.215.2.8 create_value_tc() [2/2]	1216
9.215.2.9 create_union_tc() [1/2]	1217
9.215.2.10 create_union_tc() [2/2]	1218
9.215.2.11 create_enum_tc() [1/2]	1218
9.215.2.12 create_enum_tc() [2/2]	1220
9.215.2.13 create_alias_tc()	1221
9.215.2.14 create_string_tc()	1221
9.215.2.15 create_wstring_tc()	1222
9.215.2.16 create_sequence_tc()	1223
9.215.2.17 create_array_tc() [1/2]	1223
9.215.2.18 create_array_tc() [2/2]	1224
9.216 DDS_TypeCodePrintFormatProperty Struct Reference	1224
9.216.1 Detailed Description	1225
9.216.2 Member Data Documentation	1225
9.216.2.1 indent	1225
9.216.2.2 print_ordinals	1226
9.216.2.3 print_kind	1226
9.216.2.4 print_complete_type	1227
9.217 DDS_TypeConsistencyEnforcementQosPolicy Struct Reference	1228
9.217.1 Detailed Description	1228
9.217.2 Member Data Documentation	1229
9.217.2.1 kind	1229
9.217.2.2 ignore_sequence_bounds	1229
9.217.2.3 ignore_string_bounds	1230
9.217.2.4 ignore_member_names	1230
9.217.2.5 prevent_type_widening	1230
9.217.2.6 force_type_validation	1230
9.217.2.7 ignore_enum_literal_names	1231
9.218 DDS_TypeDeallocationParams_t Struct Reference	1231
9.218.1 Detailed Description	1231
9.218.2 Member Function Documentation	1231
9.218.2.1 set_delete_pointers()	1232
9.218.2.2 set_delete_optional_members()	1232
9.218.3 Member Data Documentation	1232
9.218.3.1 delete_pointers	1232
9.218.3.2 delete_optional_members	1232

---

9.219 DDS_TypeSupportQosPolicy Struct Reference . . . . .	1232
9.219.1 Detailed Description . . . . .	1233
9.219.2 Usage . . . . .	1233
9.219.3 Member Data Documentation . . . . .	1234
9.219.3.1 plugin_data . . . . .	1234
9.219.3.2 cdr_padding_kind . . . . .	1234
9.220 DDS_UInt8Seq Struct Reference . . . . .	1234
9.220.1 Detailed Description . . . . .	1234
9.221 DDS_UnionMember Struct Reference . . . . .	1235
9.221.1 Detailed Description . . . . .	1235
9.221.2 Member Data Documentation . . . . .	1235
9.221.2.1 name . . . . .	1235
9.221.2.2 is_pointer . . . . .	1235
9.221.2.3 labels . . . . .	1236
9.221.2.4 type . . . . .	1236
9.222 DDS_UnionMemberSeq Struct Reference . . . . .	1236
9.222.1 Detailed Description . . . . .	1236
9.223 DDS_UnsignedLongLongSeq Struct Reference . . . . .	1236
9.223.1 Detailed Description . . . . .	1236
9.224 DDS_UnsignedLongSeq Struct Reference . . . . .	1237
9.224.1 Detailed Description . . . . .	1237
9.225 DDS_UnsignedShortSeq Struct Reference . . . . .	1237
9.225.1 Detailed Description . . . . .	1237
9.226 DDS_UserDataQosPolicy Struct Reference . . . . .	1237
9.226.1 Detailed Description . . . . .	1238
9.226.2 Usage . . . . .	1238
9.226.3 Member Data Documentation . . . . .	1238
9.226.3.1 value . . . . .	1239
9.227 DDS_ValueMember Struct Reference . . . . .	1239
9.227.1 Detailed Description . . . . .	1239
9.227.2 Member Data Documentation . . . . .	1240
9.227.2.1 name . . . . .	1240
9.227.2.2 type . . . . .	1240
9.227.2.3 is_pointer . . . . .	1240
9.227.2.4 bits . . . . .	1240
9.227.2.5 is_key . . . . .	1240
9.227.2.6 access . . . . .	1241
9.227.2.7 id . . . . .	1241
9.227.2.8 is_optional . . . . .	1241

---

9.228 DDS_ValueMemberSeq Struct Reference . . . . .	1241
9.228.1 Detailed Description . . . . .	1241
9.229 DDS_VendorId_t Struct Reference . . . . .	1241
9.229.1 Detailed Description . . . . .	1242
9.229.2 Member Data Documentation . . . . .	1242
9.229.2.1 vendorId . . . . .	1242
9.230 DDS_WaitSetProperty_t Struct Reference . . . . .	1242
9.230.1 Detailed Description . . . . .	1242
9.230.2 Member Data Documentation . . . . .	1243
9.230.2.1 max_event_count . . . . .	1243
9.230.2.2 max_event_delay . . . . .	1243
9.231 DDS_WcharSeq Struct Reference . . . . .	1243
9.231.1 Detailed Description . . . . .	1244
9.232 DDS_WireProtocolQosPolicy Struct Reference . . . . .	1244
9.232.1 Detailed Description . . . . .	1245
9.232.2 Usage . . . . .	1245
9.232.3 Member Data Documentation . . . . .	1247
9.232.3.1 participant_id . . . . .	1248
9.232.3.2 rtps_host_id . . . . .	1248
9.232.3.3 rtps_app_id . . . . .	1249
9.232.3.4 rtps_instance_id . . . . .	1249
9.232.3.5 rtps_well_known_ports . . . . .	1250
9.232.3.6 rtps_reserved_port_mask . . . . .	1250
9.232.3.7 rtps_auto_id_kind . . . . .	1250
9.232.3.8 compute_crc . . . . .	1250
9.232.3.9 check_crc . . . . .	1250
9.233 DDS_WriteParams_t Struct Reference . . . . .	1251
9.233.1 Detailed Description . . . . .	1251
9.233.2 Member Data Documentation . . . . .	1251
9.233.2.1 replace_auto . . . . .	1252
9.233.2.2 identity . . . . .	1252
9.233.2.3 related_sample_identity . . . . .	1252
9.233.2.4 source_timestamp . . . . .	1253
9.233.2.5 cookie . . . . .	1253
9.233.2.6 handle . . . . .	1253
9.233.2.7 priority . . . . .	1253
9.233.2.8 flag . . . . .	1254
9.233.2.9 source_guid . . . . .	1255
9.233.2.10 related_source_guid . . . . .	1255

---

9.233.2.11 related_reader_guid . . . . .	1256
9.234 DDS_WriterDataLifecycleQosPolicy Struct Reference . . . . .	1256
9.234.1 Detailed Description . . . . .	1256
9.234.2 Usage . . . . .	1257
9.234.3 Member Data Documentation . . . . .	1257
9.234.3.1 autodispose_unregistered_instances . . . . .	1257
9.234.3.2 autopurge_unregistered_instances_delay . . . . .	1258
9.234.3.3 autopurge_disposed_instances_delay . . . . .	1258
9.235 DDS_WstringSeq Struct Reference . . . . .	1259
9.235.1 Detailed Description . . . . .	1259
9.236 DDSAsyncWaitSet Class Reference . . . . .	1259
9.236.1 Detailed Description . . . . .	1260
9.236.2 AsyncWaitSet Thread Orchestration . . . . .	1261
9.236.3 AsyncWaitSet Thread Safety . . . . .	1261
9.236.3.1 Condition Locking . . . . .	1262
9.236.4 AsyncWaitSet Events and Resources . . . . .	1262
9.236.5 Constructor & Destructor Documentation . . . . .	1263
9.236.5.1 DDSAsyncWaitSet() [1/4] . . . . .	1263
9.236.5.2 DDSAsyncWaitSet() [2/4] . . . . .	1263
9.236.5.3 DDSAsyncWaitSet() [3/4] . . . . .	1263
9.236.5.4 DDSAsyncWaitSet() [4/4] . . . . .	1264
9.236.5.5 ~DDSAsyncWaitSet() . . . . .	1264
9.236.6 Member Function Documentation . . . . .	1265
9.236.6.1 start() . . . . .	1265
9.236.6.2 start_with_completion_token() . . . . .	1265
9.236.6.3 stop() . . . . .	1266
9.236.6.4 stop_with_completion_token() . . . . .	1267
9.236.6.5 attach_condition() . . . . .	1268
9.236.6.6 detach_condition() . . . . .	1268
9.236.6.7 attach_condition_with_completion_token() . . . . .	1269
9.236.6.8 detach_condition_with_completion_token() . . . . .	1270
9.236.6.9 unlock_condition() . . . . .	1270
9.236.6.10 get_property() . . . . .	1271
9.236.6.11 get_conditions() . . . . .	1271
9.236.6.12 create_completion_token() . . . . .	1272
9.236.6.13 delete_completion_token() . . . . .	1272
9.237 DDSAsyncWaitSetCompletionToken Class Reference . . . . .	1273
9.237.1 Detailed Description . . . . .	1273
9.237.2 AsyncWaitSetCompletionToken management . . . . .	1274

---

9.237.3 Member Function Documentation	1274
9.237.3.1 wait()	1274
9.238 DDSAsyncWaitSetListener Class Reference	1275
9.238.1 Detailed Description	1275
9.238.2 Member Function Documentation	1275
9.238.2.1 on_thread_spawned()	1275
9.238.2.2 on_thread_deleted()	1276
9.238.2.3 on_wait_timeout()	1276
9.239 DDSCondition Class Reference	1276
9.239.1 Detailed Description	1277
9.239.2 Member Function Documentation	1277
9.239.2.1 get_trigger_value()	1277
9.239.2.2 set_handler()	1277
9.239.2.3 get_handler()	1278
9.239.2.4 dispatch()	1278
9.240 DDSConditionHandler Class Reference	1278
9.240.1 Detailed Description	1279
9.240.2 Member Function Documentation	1279
9.240.2.1 on_condition_triggered()	1279
9.241 DDSConditionSeq Struct Reference	1279
9.241.1 Detailed Description	1279
9.242 DDSContentFilter Class Reference	1280
9.242.1 Detailed Description	1280
9.242.2 Member Function Documentation	1280
9.242.2.1 compile()	1281
9.242.2.2 evaluate()	1282
9.242.2.3 finalize()	1282
9.243 DDSContentFilteredTopic Class Reference	1283
9.243.1 Detailed Description	1284
9.243.2 Member Function Documentation	1284
9.243.2.1 narrow()	1284
9.243.2.2 get_filter_expression()	1285
9.243.2.3 get_expression_parameters()	1285
9.243.2.4 set_expression_parameters()	1286
9.243.2.5 set_expression()	1286
9.243.2.6 append_to_expression_parameter()	1286
9.243.2.7 remove_from_expression_parameter()	1287
9.243.2.8 get_related_topic()	1288
9.244 DDSDataReader Class Reference	1288

---

9.244.1 Detailed Description	1291
9.244.2 Member Function Documentation	1293
9.244.2.1 create_readcondition()	1293
9.244.2.2 create_readcondition_w_params()	1293
9.244.2.3 create_querycondition()	1294
9.244.2.4 create_querycondition_w_params()	1294
9.244.2.5 delete_readcondition()	1295
9.244.2.6 delete_contained_entities()	1295
9.244.2.7 wait_for_historical_data()	1296
9.244.2.8 acknowledge_sample() [1/2]	1296
9.244.2.9 acknowledge_all() [1/2]	1297
9.244.2.10 acknowledge_sample() [2/2]	1297
9.244.2.11 acknowledge_all() [2/2]	1298
9.244.2.12 get_matched_publications()	1299
9.244.2.13 get_matched_publication_data()	1300
9.244.2.14 is_matched_publication_alive()	1300
9.244.2.15 get_matched_publication_participant_data()	1301
9.244.2.16 get_topicdescription()	1302
9.244.2.17 get_subscriber()	1302
9.244.2.18 get_sample_rejected_status()	1302
9.244.2.19 get_liveliness_changed_status()	1303
9.244.2.20 get_requested_deadline_missed_status()	1303
9.244.2.21 get_requested_incompatible_qos_status()	1303
9.244.2.22 get_sample_lost_status()	1304
9.244.2.23 get_subscription_matched_status()	1304
9.244.2.24 get_datareader_cache_status()	1305
9.244.2.25 get_datareader_protocol_status()	1305
9.244.2.26 get_matched_publication_datareader_protocol_status()	1305
9.244.2.27 set_qos()	1306
9.244.2.28 get_qos()	1307
9.244.2.29 set_qos_with_profile()	1307
9.244.2.30 set_property()	1308
9.244.2.31 set_listener()	1309
9.244.2.32 get_listener()	1309
9.244.2.33 create_topic_query()	1310
9.244.2.34 delete_topic_query()	1310
9.244.2.35 lookup_topic_query()	1310
9.244.2.36 take_discovery_snapshot() [1/2]	1311
9.244.2.37 take_discovery_snapshot() [2/2]	1312

---

9.244.2.38 enable() . . . . .	1312
9.244.2.39 get_statuscondition() . . . . .	1313
9.244.2.40 get_status_changes() . . . . .	1314
9.244.2.41 get_instance_handle() . . . . .	1314
9.245 DDSDataReaderListener Class Reference . . . . .	1315
9.245.1 Detailed Description . . . . .	1315
9.245.2 Member Function Documentation . . . . .	1316
9.245.2.1 on_requested_deadline_missed() . . . . .	1316
9.245.2.2 on_liveliness_changed() . . . . .	1316
9.245.2.3 on_requested_incompatible_qos() . . . . .	1316
9.245.2.4 on_sample_rejected() . . . . .	1317
9.245.2.5 on_data_available() . . . . .	1317
9.245.2.6 on_sample_lost() . . . . .	1317
9.245.2.7 on_subscription_matched() . . . . .	1317
9.246 DDSDataReaderSeq Class Reference . . . . .	1317
9.246.1 Detailed Description . . . . .	1318
9.247 DDSDataReaderStatusConditionHandler Class Reference . . . . .	1318
9.247.1 Detailed Description . . . . .	1318
9.247.2 Constructor & Destructor Documentation . . . . .	1319
9.247.2.1 DDSDataReaderStatusConditionHandler() . . . . .	1319
9.247.2.2 ~DDSDataReaderStatusConditionHandler() . . . . .	1320
9.247.3 Member Function Documentation . . . . .	1320
9.247.3.1 on_condition_triggered() . . . . .	1320
9.248 DDSDataTagQosPolicyHelper Class Reference . . . . .	1320
9.248.1 Detailed Description . . . . .	1320
9.249 DDSDataWriter Class Reference . . . . .	1321
9.249.1 Detailed Description . . . . .	1323
9.249.2 Member Function Documentation . . . . .	1324
9.249.2.1 get_liveliness_lost_status() . . . . .	1324
9.249.2.2 get_offered_deadline_missed_status() . . . . .	1324
9.249.2.3 get_offered_incompatible_qos_status() . . . . .	1325
9.249.2.4 get_publication_matched_status() . . . . .	1325
9.249.2.5 get_reliable_writer_cache_changed_status() . . . . .	1326
9.249.2.6 get_reliable_reader_activity_changed_status() . . . . .	1326
9.249.2.7 get_datawriter_cache_status() . . . . .	1327
9.249.2.8 get_datawriter_protocol_status() . . . . .	1327
9.249.2.9 get_matched_subscription_datawriter_protocol_status() . . . . .	1327
9.249.2.10 is_matched_subscription_active() . . . . .	1328
9.249.2.11 get_service_request_accepted_status() . . . . .	1329

---

9.249.2.12	get_matched_subscription_datawriter_protocol_status_by_locator()	1329
9.249.2.13	assert_liveliness()	1330
9.249.2.14	get_matched_subscription_locators()	1330
9.249.2.15	get_matched_subscriptions()	1331
9.249.2.16	get_matched_subscription_data()	1332
9.249.2.17	get_matched_subscription_participant_data()	1333
9.249.2.18	get_topic()	1333
9.249.2.19	get_publisher()	1334
9.249.2.20	wait_for_acknowledgments()	1334
9.249.2.21	is_sample_app_acknowledged()	1335
9.249.2.22	wait_for_asynchronous_publishing()	1335
9.249.2.23	set_qos()	1336
9.249.2.24	set_property()	1337
9.249.2.25	set_qos_with_profile()	1337
9.249.2.26	get_qos()	1338
9.249.2.27	set_listener()	1339
9.249.2.28	get_listener()	1339
9.249.2.29	flush()	1340
9.249.2.30	take_discovery_snapshot() [1/2]	1340
9.249.2.31	take_discovery_snapshot() [2/2]	1341
9.249.2.32	enable()	1342
9.249.2.33	get_statuscondition()	1343
9.249.2.34	get_status_changes()	1343
9.249.2.35	get_instance_handle()	1344
9.250	DDSDataWriterListener Class Reference	1344
9.250.1	Detailed Description	1345
9.250.2	Member Function Documentation	1345
9.250.2.1	on_offered_deadline_missed()	1346
9.250.2.2	on_liveliness_lost()	1346
9.250.2.3	on_offered_incompatible_qos()	1346
9.250.2.4	on_publication_matched()	1347
9.250.2.5	on_reliable_writer_cache_changed()	1347
9.250.2.6	on_reliable_reader_activity_changed()	1348
9.250.2.7	on_sample_removed()	1348
9.250.2.8	on_instance_replaced()	1349
9.250.2.9	on_application_acknowledgment()	1349
9.250.2.10	on_service_request_accepted()	1350
9.251	DDSDomainEntity Class Reference	1350
9.251.1	Detailed Description	1351



---

9.252 DDSDomainParticipant Class Reference . . . . .	1351
9.252.1 Detailed Description . . . . .	1357
9.252.2 Member Function Documentation . . . . .	1358
9.252.2.1 get_default_datawriter_qos() . . . . .	1358
9.252.2.2 set_default_datawriter_qos() . . . . .	1359
9.252.2.3 set_default_datawriter_qos_with_profile() . . . . .	1360
9.252.2.4 get_default_datareader_qos() . . . . .	1360
9.252.2.5 set_default_datareader_qos() . . . . .	1361
9.252.2.6 set_default_datareader_qos_with_profile() . . . . .	1362
9.252.2.7 get_default_flowcontroller_property() . . . . .	1362
9.252.2.8 set_default_flowcontroller_property() . . . . .	1363
9.252.2.9 register_contentfilter() . . . . .	1364
9.252.2.10 lookup_contentfilter() . . . . .	1365
9.252.2.11 unregister_contentfilter() . . . . .	1365
9.252.2.12 get_default_library() . . . . .	1366
9.252.2.13 get_default_profile() . . . . .	1366
9.252.2.14 get_default_profile_library() . . . . .	1367
9.252.2.15 set_default_library() . . . . .	1367
9.252.2.16 set_default_profile() . . . . .	1368
9.252.2.17 get_default_topic_qos() . . . . .	1368
9.252.2.18 set_default_topic_qos() . . . . .	1369
9.252.2.19 set_default_topic_qos_with_profile() . . . . .	1370
9.252.2.20 get_default_publisher_qos() . . . . .	1371
9.252.2.21 set_default_publisher_qos() . . . . .	1372
9.252.2.22 set_default_publisher_qos_with_profile() . . . . .	1373
9.252.2.23 get_default_subscriber_qos() . . . . .	1374
9.252.2.24 set_default_subscriber_qos() . . . . .	1374
9.252.2.25 set_default_subscriber_qos_with_profile() . . . . .	1375
9.252.2.26 create_publisher() . . . . .	1376
9.252.2.27 create_publisher_with_profile() . . . . .	1377
9.252.2.28 delete_publisher() . . . . .	1378
9.252.2.29 create_subscriber() . . . . .	1379
9.252.2.30 create_subscriber_with_profile() . . . . .	1380
9.252.2.31 delete_subscriber() . . . . .	1381
9.252.2.32 get_publishers() . . . . .	1381
9.252.2.33 get_subscribers() . . . . .	1382
9.252.2.34 create_topic() . . . . .	1382
9.252.2.35 create_topic_with_profile() . . . . .	1384
9.252.2.36 delete_topic() . . . . .	1385

---

9.252.2.37 create_contentfilteredtopic()	1386
9.252.2.38 create_contentfilteredtopic_with_filter()	1386
9.252.2.39 delete_contentfilteredtopic()	1387
9.252.2.40 create_multitopic()	1388
9.252.2.41 delete_multitopic()	1389
9.252.2.42 find_topic()	1389
9.252.2.43 lookup_topicdescription()	1390
9.252.2.44 create_flowcontroller()	1391
9.252.2.45 delete_flowcontroller()	1392
9.252.2.46 lookup_flowcontroller()	1392
9.252.2.47 get_builtin_subscriber()	1393
9.252.2.48 ignore_participant()	1394
9.252.2.49 banish_ignored_participants()	1394
9.252.2.50 ignore_topic()	1395
9.252.2.51 ignore_publication()	1396
9.252.2.52 ignore_subscription()	1397
9.252.2.53 get_domain_id()	1397
9.252.2.54 get_current_time()	1398
9.252.2.55 register_durable_subscription()	1398
9.252.2.56 delete_durable_subscription()	1399
9.252.2.57 assert_liveliness()	1399
9.252.2.58 resume_endpoint_discovery()	1400
9.252.2.59 delete_contained_entities()	1401
9.252.2.60 get_discovered_participants()	1402
9.252.2.61 get_discovered_participants_from_subject_name()	1402
9.252.2.62 get_discovered_participant_data()	1403
9.252.2.63 get_discovered_participant_subject_name()	1404
9.252.2.64 get_discovered_topics()	1405
9.252.2.65 get_discovered_topic_data()	1405
9.252.2.66 contains_entity()	1406
9.252.2.67 get_participant_protocol_status()	1407
9.252.2.68 set_property()	1407
9.252.2.69 set_qos()	1408
9.252.2.70 set_qos_with_profile()	1408
9.252.2.71 get_qos()	1409
9.252.2.72 add_peer()	1410
9.252.2.73 remove_peer()	1411
9.252.2.74 get_dns_tracker_polling_period()	1412
9.252.2.75 set_dns_tracker_polling_period()	1412

---

9.252.2.76 set_listener()	1413
9.252.2.77 get_listener()	1414
9.252.2.78 get_implicit_publisher()	1414
9.252.2.79 get_implicit_subscriber()	1415
9.252.2.80 create_datawriter()	1415
9.252.2.81 create_datawriter_with_profile()	1416
9.252.2.82 delete_datawriter()	1417
9.252.2.83 create_datareader()	1418
9.252.2.84 create_datareader_with_profile()	1420
9.252.2.85 delete_datareader()	1421
9.252.2.86 lookup_publisher_by_name()	1421
9.252.2.87 lookup_subscriber_by_name()	1422
9.252.2.88 lookup_datawriter_by_name()	1423
9.252.2.89 lookup_datareader_by_name()	1424
9.252.2.90 take_discovery_snapshot() [1/2]	1425
9.252.2.91 take_discovery_snapshot() [2/2]	1425
9.253 DDSDomainParticipantFactory Class Reference	1426
9.253.1 Detailed Description	1428
9.253.2 Member Function Documentation	1429
9.253.2.1 get_instance()	1429
9.253.2.2 finalize_instance()	1430
9.253.2.3 set_default_participant_qos()	1430
9.253.2.4 set_default_participant_qos_with_profile()	1431
9.253.2.5 get_default_participant_qos()	1432
9.253.2.6 set_default_library()	1433
9.253.2.7 get_default_library()	1433
9.253.2.8 set_default_profile()	1434
9.253.2.9 get_default_profile()	1435
9.253.2.10 get_default_profile_library()	1435
9.253.2.11 get_participant_factory_qos_from_profile()	1436
9.253.2.12 get_participant_qos_from_profile()	1436
9.253.2.13 get_publisher_qos_from_profile()	1437
9.253.2.14 get_subscriber_qos_from_profile()	1437
9.253.2.15 get_datawriter_qos_from_profile()	1438
9.253.2.16 get_datawriter_qos_from_profile_w_topic_name()	1438
9.253.2.17 get_datareader_qos_from_profile()	1439
9.253.2.18 get_datareader_qos_from_profile_w_topic_name()	1440
9.253.2.19 get_topic_qos_from_profile()	1440
9.253.2.20 get_topic_qos_from_profile_w_topic_name()	1441

---

9.253.2.21	get_qos_profile_libraries()	1442
9.253.2.22	get_qos_profiles()	1442
9.253.2.23	create_participant()	1442
9.253.2.24	create_participant_with_profile()	1444
9.253.2.25	delete_participant()	1445
9.253.2.26	lookup_participant()	1446
9.253.2.27	set_qos()	1446
9.253.2.28	get_qos()	1447
9.253.2.29	load_profiles()	1447
9.253.2.30	reload_profiles()	1448
9.253.2.31	unload_profiles()	1448
9.253.2.32	unregister_thread()	1448
9.253.2.33	get_typecode_from_config()	1449
9.253.2.34	create_participant_from_config()	1449
9.253.2.35	create_participant_from_config_w_params()	1450
9.253.2.36	lookup_participant_by_name()	1451
9.253.2.37	register_type_support()	1451
9.253.2.38	get_participants()	1452
9.253.2.39	set_thread_factory()	1453
9.254	DDSDomainParticipantListener Class Reference	1454
9.254.1	Detailed Description	1454
9.254.2	Member Function Documentation	1455
9.254.2.1	on_invalid_local_identity_status_advance_notice()	1455
9.255	DDSDynamicDataReader Class Reference	1456
9.255.1	Detailed Description	1456
9.256	DDSDynamicDataTypeSupport Class Reference	1456
9.256.1	Detailed Description	1457
9.256.2	Constructor & Destructor Documentation	1457
9.256.2.1	DDSDynamicDataTypeSupport()	1458
9.256.2.2	~DDSDynamicDataTypeSupport()	1458
9.256.3	Member Function Documentation	1459
9.256.3.1	is_valid()	1459
9.256.3.2	register_type()	1459
9.256.3.3	unregister_type()	1460
9.256.3.4	get_type_name()	1460
9.256.3.5	get_data_type()	1460
9.256.3.6	create_data()	1461
9.256.3.7	delete_data()	1461
9.256.3.8	print_data()	1461

---

9.256.3.9 copy_data() . . . . .	1462
9.257 DDSDynamicDataWriter Class Reference . . . . .	1462
9.257.1 Detailed Description . . . . .	1462
9.258 DDSEntity Class Reference . . . . .	1463
9.258.1 Detailed Description . . . . .	1463
9.258.2 Abstract operations . . . . .	1464
9.258.2.1 set_qos (abstract) . . . . .	1464
9.258.2.2 get_qos (abstract) . . . . .	1465
9.258.2.3 set_listener (abstract) . . . . .	1465
9.258.2.4 get_listener (abstract) . . . . .	1466
9.258.3 Member Function Documentation . . . . .	1466
9.258.3.1 enable() . . . . .	1466
9.258.3.2 get_statuscondition() . . . . .	1467
9.258.3.3 get_status_changes() . . . . .	1468
9.258.3.4 get_instance_handle() . . . . .	1468
9.259 DDSFlowController Class Reference . . . . .	1468
9.259.1 Detailed Description . . . . .	1469
9.259.2 Member Function Documentation . . . . .	1469
9.259.2.1 set_property() . . . . .	1469
9.259.2.2 get_property() . . . . .	1470
9.259.2.3 trigger_flow() . . . . .	1470
9.259.2.4 get_name() . . . . .	1471
9.259.2.5 get_participant() . . . . .	1471
9.260 DDSGuardCondition Class Reference . . . . .	1471
9.260.1 Detailed Description . . . . .	1472
9.260.2 Constructor & Destructor Documentation . . . . .	1472
9.260.2.1 DDSGuardCondition() . . . . .	1472
9.260.2.2 ~DDSGuardCondition() . . . . .	1472
9.260.3 Member Function Documentation . . . . .	1473
9.260.3.1 get_trigger_value() . . . . .	1473
9.260.3.2 set_trigger_value() . . . . .	1473
9.261 DDSKeyedOctetsDataReader Class Reference . . . . .	1473
9.261.1 Detailed Description . . . . .	1475
9.261.2 Member Function Documentation . . . . .	1476
9.261.2.1 read() . . . . .	1476
9.261.2.2 take() . . . . .	1476
9.261.2.3 read_w_condition() . . . . .	1476
9.261.2.4 take_w_condition() . . . . .	1477
9.261.2.5 read_next_sample() . . . . .	1477

---

9.261.2.6	take_next_sample()	1477
9.261.2.7	read_instance()	1478
9.261.2.8	take_instance()	1478
9.261.2.9	read_instance_w_condition()	1478
9.261.2.10	take_instance_w_condition()	1479
9.261.2.11	read_next_instance()	1479
9.261.2.12	take_next_instance()	1479
9.261.2.13	read_next_instance_w_condition()	1480
9.261.2.14	take_next_instance_w_condition()	1480
9.261.2.15	return_loan()	1480
9.261.2.16	get_key_value() [1/2]	1481
9.261.2.17	get_key_value() [2/2]	1481
9.261.2.18	lookup_instance() [1/2]	1481
9.261.2.19	lookup_instance() [2/2]	1482
9.261.2.20	narrow()	1482
9.262	DDSKeyedOctetsDataWriter Class Reference	1482
9.262.1	Detailed Description	1485
9.262.2	Member Function Documentation	1485
9.262.2.1	narrow()	1485
9.262.2.2	register_instance() [1/2]	1485
9.262.2.3	register_instance() [2/2]	1486
9.262.2.4	register_instance_w_timestamp() [1/2]	1486
9.262.2.5	register_instance_w_timestamp() [2/2]	1486
9.262.2.6	unregister_instance() [1/2]	1487
9.262.2.7	unregister_instance() [2/2]	1487
9.262.2.8	unregister_instance_w_timestamp() [1/2]	1487
9.262.2.9	unregister_instance_w_timestamp() [2/2]	1488
9.262.2.10	create_data()	1488
9.262.2.11	delete_data()	1488
9.262.2.12	write() [1/3]	1489
9.262.2.13	write() [2/3]	1489
9.262.2.14	write() [3/3]	1489
9.262.2.15	write_w_timestamp() [1/3]	1490
9.262.2.16	write_w_timestamp() [2/3]	1490
9.262.2.17	write_w_timestamp() [3/3]	1491
9.262.2.18	write_w_params() [1/3]	1491
9.262.2.19	write_w_params() [2/3]	1492
9.262.2.20	write_w_params() [3/3]	1492
9.262.2.21	dispose() [1/2]	1493

---

9.262.2.22 dispose() [2/2]	1493
9.262.2.23 dispose_w_timestamp() [1/2]	1493
9.262.2.24 dispose_w_timestamp() [2/2]	1494
9.262.2.25 get_key_value() [1/2]	1494
9.262.2.26 get_key_value() [2/2]	1494
9.262.2.27 lookup_instance() [1/2]	1495
9.262.2.28 lookup_instance() [2/2]	1495
9.263 DDSKeyedOctetsTypeSupport Class Reference	1495
9.263.1 Detailed Description	1496
9.263.2 Member Function Documentation	1496
9.263.2.1 register_type()	1496
9.263.2.2 unregister_type()	1498
9.263.2.3 get_type_name()	1499
9.263.2.4 print_data()	1499
9.263.2.5 get_typecode()	1500
9.263.2.6 serialize_data_to_cdr_buffer()	1500
9.263.2.7 serialize_data_to_cdr_buffer_ex()	1500
9.263.2.8 deserialize_data_from_cdr_buffer()	1501
9.263.2.9 data_to_string()	1501
9.264 DDSKeyedStringDataReader Class Reference	1501
9.264.1 Detailed Description	1503
9.264.2 Member Function Documentation	1504
9.264.2.1 read()	1504
9.264.2.2 take()	1504
9.264.2.3 read_w_condition()	1504
9.264.2.4 take_w_condition()	1505
9.264.2.5 read_next_sample()	1505
9.264.2.6 take_next_sample()	1505
9.264.2.7 read_instance()	1506
9.264.2.8 take_instance()	1506
9.264.2.9 read_instance_w_condition()	1506
9.264.2.10 take_instance_w_condition()	1507
9.264.2.11 read_next_instance()	1507
9.264.2.12 take_next_instance()	1507
9.264.2.13 read_next_instance_w_condition()	1508
9.264.2.14 take_next_instance_w_condition()	1508
9.264.2.15 return_loan()	1508
9.264.2.16 get_key_value() [1/2]	1509
9.264.2.17 get_key_value() [2/2]	1509

---

9.264.2.18 lookup_instance() [1/2]	1509
9.264.2.19 lookup_instance() [2/2]	1510
9.264.2.20 narrow()	1510
9.265 DDSKeyedStringDataWriter Class Reference	1510
9.265.1 Detailed Description	1512
9.265.2 Member Function Documentation	1512
9.265.2.1 narrow()	1513
9.265.2.2 register_instance() [1/2]	1513
9.265.2.3 register_instance() [2/2]	1513
9.265.2.4 register_instance_w_timestamp() [1/2]	1513
9.265.2.5 register_instance_w_timestamp() [2/2]	1514
9.265.2.6 unregister_instance() [1/2]	1514
9.265.2.7 unregister_instance() [2/2]	1514
9.265.2.8 unregister_instance_w_timestamp() [1/2]	1515
9.265.2.9 unregister_instance_w_timestamp() [2/2]	1515
9.265.2.10 create_data()	1515
9.265.2.11 delete_data()	1516
9.265.2.12 write() [1/2]	1516
9.265.2.13 write() [2/2]	1516
9.265.2.14 write_w_timestamp() [1/2]	1517
9.265.2.15 write_w_timestamp() [2/2]	1517
9.265.2.16 write_w_params() [1/2]	1517
9.265.2.17 write_w_params() [2/2]	1518
9.265.2.18 dispose() [1/2]	1518
9.265.2.19 dispose() [2/2]	1518
9.265.2.20 dispose_w_timestamp() [1/2]	1519
9.265.2.21 dispose_w_timestamp() [2/2]	1519
9.265.2.22 get_key_value() [1/2]	1519
9.265.2.23 get_key_value() [2/2]	1520
9.265.2.24 lookup_instance() [1/2]	1520
9.265.2.25 lookup_instance() [2/2]	1520
9.266 DDSKeyedStringTypeSupport Class Reference	1520
9.266.1 Detailed Description	1521
9.266.2 Member Function Documentation	1521
9.266.2.1 register_type()	1521
9.266.2.2 unregister_type()	1523
9.266.2.3 get_type_name()	1524
9.266.2.4 print_data()	1524
9.266.2.5 get_typecode()	1525



---

9.266.2.6	serialize_data_to_cdr_buffer()	1525
9.266.2.7	serialize_data_to_cdr_buffer_ex()	1525
9.266.2.8	deserialize_data_from_cdr_buffer()	1526
9.266.2.9	data_to_string()	1526
9.267	DDSTListener Class Reference	1526
9.267.1	Detailed Description	1527
9.267.2	Access to Plain Communication Status	1527
9.267.3	Access to Read Communication Status	1528
9.267.4	Operations Allowed in Listener Callbacks	1528
9.267.5	Best Practices with Listeners	1528
9.268	DDSMultiTopic Class Reference	1529
9.268.1	Detailed Description	1530
9.268.2	Member Function Documentation	1531
9.268.2.1	narrow()	1531
9.268.2.2	get_subscription_expression()	1531
9.268.2.3	get_expression_parameters()	1531
9.268.2.4	set_expression_parameters()	1532
9.269	DDSOctetsDataReader Class Reference	1532
9.269.1	Detailed Description	1533
9.269.2	Member Function Documentation	1534
9.269.2.1	read()	1534
9.269.2.2	take()	1534
9.269.2.3	read_w_condition()	1534
9.269.2.4	take_w_condition()	1535
9.269.2.5	read_next_sample()	1535
9.269.2.6	take_next_sample()	1535
9.269.2.7	return_loan()	1536
9.269.2.8	narrow()	1536
9.270	DDSOctetsDataWriter Class Reference	1536
9.270.1	Detailed Description	1537
9.270.2	Member Function Documentation	1538
9.270.2.1	narrow()	1538
9.270.2.2	create_data()	1538
9.270.2.3	delete_data()	1539
9.270.2.4	write() [1/3]	1539
9.270.2.5	write() [2/3]	1539
9.270.2.6	write() [3/3]	1540
9.270.2.7	write_w_timestamp() [1/3]	1540
9.270.2.8	write_w_timestamp() [2/3]	1540

---

9.270.2.9 write_w_timestamp() [3/3]	1541
9.270.2.10 write_w_params() [1/3]	1541
9.270.2.11 write_w_params() [2/3]	1542
9.270.2.12 write_w_params() [3/3]	1542
9.271 DDSOctetsTypeSupport Class Reference	1543
9.271.1 Detailed Description	1543
9.271.2 Member Function Documentation	1544
9.271.2.1 register_type()	1544
9.271.2.2 unregister_type()	1545
9.271.2.3 get_type_name()	1545
9.271.2.4 print_data()	1546
9.271.2.5 get_typecode()	1546
9.271.2.6 serialize_data_to_cdr_buffer()	1546
9.271.2.7 serialize_data_to_cdr_buffer_ex()	1547
9.271.2.8 deserialize_data_from_cdr_buffer()	1547
9.271.2.9 data_to_string()	1547
9.272 DDSParticipantBuiltinTopicDataDataReader Class Reference	1548
9.272.1 Detailed Description	1548
9.273 DDSParticipantBuiltinTopicDataTypeSupport Class Reference	1548
9.273.1 Detailed Description	1548
9.274 DDSPropertyQosPolicyHelper Class Reference	1549
9.274.1 Detailed Description	1549
9.275 DDSPublicationBuiltinTopicDataDataReader Class Reference	1549
9.275.1 Detailed Description	1550
9.276 DDSPublicationBuiltinTopicDataTypeSupport Class Reference	1550
9.276.1 Detailed Description	1550
9.277 DDSPublisher Class Reference	1550
9.277.1 Detailed Description	1552
9.277.2 Member Function Documentation	1553
9.277.2.1 get_default_datawriter_qos()	1553
9.277.2.2 set_default_datawriter_qos()	1554
9.277.2.3 set_default_datawriter_qos_with_profile()	1555
9.277.2.4 set_default_library()	1556
9.277.2.5 get_default_library()	1556
9.277.2.6 set_default_profile()	1557
9.277.2.7 get_default_profile()	1557
9.277.2.8 get_default_profile_library()	1558
9.277.2.9 create_datawriter()	1558
9.277.2.10 create_datawriter_with_profile()	1560

9.277.2.11 delete_datawriter()	1561
9.277.2.12 lookup_datawriter()	1561
9.277.2.13 get_all_datawriters()	1562
9.277.2.14 suspend_publications()	1562
9.277.2.15 resume_publications()	1563
9.277.2.16 begin_coherent_changes()	1564
9.277.2.17 end_coherent_changes()	1565
9.277.2.18 get_participant()	1565
9.277.2.19 delete_contained_entities()	1566
9.277.2.20 copy_from_topic_qos()	1566
9.277.2.21 wait_for_acknowledgments()	1567
9.277.2.22 wait_for_asynchronous_publishing()	1567
9.277.2.23 set_qos()	1568
9.277.2.24 set_qos_with_profile()	1569
9.277.2.25 get_qos()	1569
9.277.2.26 set_listener()	1570
9.277.2.27 get_listener()	1570
9.277.2.28 lookup_datawriter_by_name()	1571
9.278 DDSPublisherListener Class Reference	1571
9.278.1 Detailed Description	1572
9.279 DDSPublisherSeq Class Reference	1572
9.279.1 Detailed Description	1573
9.280 DDSQueryCondition Class Reference	1573
9.280.1 Detailed Description	1573
9.280.2 Member Function Documentation	1574
9.280.2.1 get_query_expression()	1574
9.280.2.2 get_query_parameters()	1574
9.280.2.3 set_query_parameters()	1574
9.281 DDSReadCondition Class Reference	1574
9.281.1 Detailed Description	1575
9.281.2 Member Function Documentation	1575
9.281.2.1 get_sample_state_mask()	1576
9.281.2.2 get_view_state_mask()	1576
9.281.2.3 get_instance_state_mask()	1576
9.281.2.4 get_stream_kind_mask()	1576
9.281.2.5 get_datareader()	1576
9.282 DDSServiceRequestDataReader Class Reference	1577
9.282.1 Detailed Description	1577
9.283 DDSServiceRequestTypeSupport Class Reference	1577

---

9.283.1 Detailed Description . . . . .	1577
9.284 DDSStatusCondition Class Reference . . . . .	1578
9.284.1 Detailed Description . . . . .	1578
9.284.2 Member Function Documentation . . . . .	1578
9.284.2.1 get_enabled_statuses() . . . . .	1579
9.284.2.2 set_enabled_statuses() . . . . .	1579
9.284.2.3 get_entity() . . . . .	1579
9.285 DDSStringDataReader Class Reference . . . . .	1580
9.285.1 Detailed Description . . . . .	1581
9.285.2 Member Function Documentation . . . . .	1581
9.285.2.1 read() . . . . .	1581
9.285.2.2 take() . . . . .	1581
9.285.2.3 read_w_condition() . . . . .	1582
9.285.2.4 take_w_condition() . . . . .	1582
9.285.2.5 read_next_sample() . . . . .	1582
9.285.2.6 take_next_sample() . . . . .	1583
9.285.2.7 return_loan() . . . . .	1583
9.285.2.8 narrow() . . . . .	1583
9.286 DDSStringDataWriter Class Reference . . . . .	1584
9.286.1 Detailed Description . . . . .	1584
9.286.2 Member Function Documentation . . . . .	1585
9.286.2.1 narrow() . . . . .	1585
9.286.2.2 create_data() . . . . .	1585
9.286.2.3 delete_data() . . . . .	1586
9.286.2.4 write() . . . . .	1586
9.286.2.5 write_w_timestamp() . . . . .	1586
9.286.2.6 write_w_params() . . . . .	1587
9.287 DDSStringTypeSupport Class Reference . . . . .	1587
9.287.1 Detailed Description . . . . .	1588
9.287.2 Member Function Documentation . . . . .	1588
9.287.2.1 register_type() . . . . .	1588
9.287.2.2 unregister_type() . . . . .	1589
9.287.2.3 get_type_name() . . . . .	1590
9.287.2.4 print_data() . . . . .	1590
9.287.2.5 get_typecode() . . . . .	1590
9.287.2.6 serialize_data_to_cdr_buffer() . . . . .	1591
9.287.2.7 serialize_data_to_cdr_buffer_ex() . . . . .	1591
9.287.2.8 deserialize_data_from_cdr_buffer() . . . . .	1591
9.287.2.9 data_to_string() . . . . .	1592

---

9.288 DDSSubscriber Class Reference . . . . .	1592
9.288.1 Detailed Description . . . . .	1594
9.288.2 Member Function Documentation . . . . .	1595
9.288.2.1 get_default_datareader_qos() . . . . .	1595
9.288.2.2 set_default_datareader_qos() . . . . .	1595
9.288.2.3 set_default_datareader_qos_with_profile() . . . . .	1596
9.288.2.4 set_default_library() . . . . .	1597
9.288.2.5 get_default_library() . . . . .	1598
9.288.2.6 set_default_profile() . . . . .	1598
9.288.2.7 get_default_profile() . . . . .	1599
9.288.2.8 get_default_profile_library() . . . . .	1599
9.288.2.9 create_datareader() . . . . .	1600
9.288.2.10 create_datareader_with_profile() . . . . .	1601
9.288.2.11 delete_datareader() . . . . .	1603
9.288.2.12 delete_contained_entities() . . . . .	1603
9.288.2.13 lookup_datareader() . . . . .	1604
9.288.2.14 begin_access() . . . . .	1605
9.288.2.15 end_access() . . . . .	1606
9.288.2.16 get_datareaders() . . . . .	1606
9.288.2.17 get_all_datareaders() . . . . .	1607
9.288.2.18 notify_datareaders() . . . . .	1608
9.288.2.19 get_participant() . . . . .	1608
9.288.2.20 copy_from_topic_qos() . . . . .	1609
9.288.2.21 set_qos() . . . . .	1609
9.288.2.22 set_qos_with_profile() . . . . .	1610
9.288.2.23 get_qos() . . . . .	1611
9.288.2.24 set_listener() . . . . .	1611
9.288.2.25 get_listener() . . . . .	1612
9.288.2.26 lookup_datareader_by_name() . . . . .	1612
9.289 DDSSubscriberListener Class Reference . . . . .	1613
9.289.1 Detailed Description . . . . .	1613
9.289.2 Member Function Documentation . . . . .	1614
9.289.2.1 on_data_on_readers() . . . . .	1614
9.290 DDSSubscriberSeq Class Reference . . . . .	1614
9.290.1 Detailed Description . . . . .	1614
9.291 DDSSubscriptionBuiltinTopicDataDataReader Class Reference . . . . .	1614
9.291.1 Detailed Description . . . . .	1615
9.292 DDSSubscriptionBuiltinTopicDataTypeSupport Class Reference . . . . .	1615
9.292.1 Detailed Description . . . . .	1615

---

9.293 DDSThreadFactory Class Reference . . . . .	1615
9.293.1 Detailed Description . . . . .	1616
9.293.2 Member Function Documentation . . . . .	1616
9.293.2.1 create_thread() . . . . .	1616
9.293.2.2 delete_thread() . . . . .	1617
9.294 DDSTopic Class Reference . . . . .	1617
9.294.1 Detailed Description . . . . .	1618
9.294.2 Member Function Documentation . . . . .	1619
9.294.2.1 narrow() . . . . .	1619
9.294.2.2 get_inconsistent_topic_status() . . . . .	1619
9.294.2.3 set_qos() . . . . .	1619
9.294.2.4 set_qos_with_profile() . . . . .	1620
9.294.2.5 get_qos() . . . . .	1621
9.294.2.6 set_listener() . . . . .	1621
9.294.2.7 get_listener() . . . . .	1622
9.295 DDSTopicBuiltinTopicDataDataReader Class Reference . . . . .	1622
9.295.1 Detailed Description . . . . .	1623
9.296 DDSTopicBuiltinTopicDataTypeSupport Class Reference . . . . .	1623
9.296.1 Detailed Description . . . . .	1623
9.297 DDSTopicDescription Class Reference . . . . .	1624
9.297.1 Detailed Description . . . . .	1624
9.297.2 Member Function Documentation . . . . .	1624
9.297.2.1 get_type_name() . . . . .	1625
9.297.2.2 get_name() . . . . .	1625
9.297.2.3 get_participant() . . . . .	1626
9.298 DDSTopicListener Class Reference . . . . .	1626
9.298.1 Detailed Description . . . . .	1626
9.298.2 Member Function Documentation . . . . .	1627
9.298.2.1 on_inconsistent_topic() . . . . .	1627
9.299 DDSTopicQuery Class Reference . . . . .	1627
9.299.1 Detailed Description . . . . .	1627
9.299.2 Member Function Documentation . . . . .	1627
9.299.2.1 get_guid() . . . . .	1627
9.300 DDSTopicQueryHelper Class Reference . . . . .	1628
9.300.1 Detailed Description . . . . .	1628
9.300.2 Member Function Documentation . . . . .	1628
9.300.2.1 topic_query_data_from_service_request() . . . . .	1628
9.301 DDSTypeSupport Class Reference . . . . .	1629
9.301.1 Detailed Description . . . . .	1629

---

9.302 DDSWaitSet Class Reference . . . . .	1629
9.302.1 Detailed Description . . . . .	1630
9.302.2 Usage . . . . .	1630
9.302.3 Trigger State of a ::DDSStatusCondition . . . . .	1631
9.302.4 Trigger State of a ::DDSReadCondition . . . . .	1632
9.302.5 Trigger State of a ::DDSGuardCondition . . . . .	1632
9.302.6 Constructor & Destructor Documentation . . . . .	1632
9.302.6.1 ~DDSWaitSet() . . . . .	1633
9.302.6.2 DDSWaitSet() [1/2] . . . . .	1633
9.302.6.3 DDSWaitSet() [2/2] . . . . .	1634
9.302.7 Member Function Documentation . . . . .	1634
9.302.7.1 wait() . . . . .	1634
9.302.7.2 attach_condition() . . . . .	1635
9.302.7.3 detach_condition() . . . . .	1635
9.302.7.4 get_conditions() . . . . .	1636
9.302.7.5 set_property() . . . . .	1636
9.302.7.6 get_property() . . . . .	1637
9.303 DDSWriterContentFilter Class Reference . . . . .	1637
9.303.1 Detailed Description . . . . .	1638
9.303.2 Member Function Documentation . . . . .	1638
9.303.2.1 writer_compile() . . . . .	1638
9.303.2.2 writer_evaluate() . . . . .	1639
9.303.2.3 writer_finalize() . . . . .	1640
9.303.2.4 writer_attach() . . . . .	1640
9.303.2.5 writer_detach() . . . . .	1641
9.303.2.6 writer_return_loan() . . . . .	1641
9.304 rti::flat::FinalAlignedArrayOffset< ElementOffset, N > Class Template Reference . . . . .	1641
9.304.1 Detailed Description . . . . .	1642
9.304.2 Member Function Documentation . . . . .	1643
9.304.2.1 get_element() . . . . .	1643
9.305 rti::flat::FinalArrayOffset< ElementOffset, N > Class Template Reference . . . . .	1643
9.305.1 Detailed Description . . . . .	1644
9.305.2 Member Function Documentation . . . . .	1644
9.305.2.1 get_element() . . . . .	1644
9.306 rti::flat::FinalOffset< T > Class Template Reference . . . . .	1645
9.306.1 Detailed Description . . . . .	1645
9.307 rti::flat::FinalSequenceBuilder< ElementOffset > Class Template Reference . . . . .	1645
9.307.1 Detailed Description . . . . .	1646
9.307.2 Member Function Documentation . . . . .	1646

9.307.2.1	add_next()	1647
9.307.2.2	add_n()	1647
9.307.2.3	finish()	1647
9.308	rti::flat::flat_type_traits< T > Struct Template Reference	1647
9.308.1	Detailed Description	1647
9.309	Foo Struct Reference	1648
9.309.1	Detailed Description	1648
9.310	FooDataReader Class Reference	1649
9.310.1	Detailed Description	1650
9.310.2	Member Function Documentation	1651
9.310.2.1	narrow()	1651
9.310.2.2	read()	1651
9.310.2.3	take()	1652
9.310.2.4	read_w_condition()	1657
9.310.2.5	take_w_condition()	1658
9.310.2.6	read_next_sample()	1659
9.310.2.7	take_next_sample()	1660
9.310.2.8	read_instance()	1661
9.310.2.9	take_instance()	1663
9.310.2.10	read_instance_w_condition()	1664
9.310.2.11	take_instance_w_condition()	1666
9.310.2.12	read_next_instance()	1667
9.310.2.13	take_next_instance()	1668
9.310.2.14	read_next_instance_w_condition()	1670
9.310.2.15	take_next_instance_w_condition()	1671
9.310.2.16	return_loan()	1672
9.310.2.17	get_key_value()	1674
9.310.2.18	lookup_instance()	1674
9.310.2.19	is_data_consistent()	1675
9.311	FooDataWriter Class Reference	1676
9.311.1	Detailed Description	1677
9.311.2	Member Function Documentation	1678
9.311.2.1	narrow()	1678
9.311.2.2	register_instance()	1678
9.311.2.3	register_instance_w_timestamp()	1679
9.311.2.4	register_instance_w_params()	1680
9.311.2.5	unregister_instance()	1680
9.311.2.6	unregister_instance_w_timestamp()	1682
9.311.2.7	unregister_instance_w_params()	1683



---

9.311.2.8 write()	1683
9.311.2.9 write_w_timestamp()	1687
9.311.2.10 write_w_params()	1688
9.311.2.11 dispose()	1689
9.311.2.12 dispose_w_timestamp()	1690
9.311.2.13 dispose_w_params()	1691
9.311.2.14 get_key_value()	1692
9.311.2.15 lookup_instance()	1692
9.311.2.16 create_data()	1694
9.311.2.17 delete_data()	1694
9.311.2.18 get_loan()	1695
9.311.2.19 discard_loan()	1696
9.312 FooSeq Struct Reference	1697
9.312.1 Detailed Description	1698
9.312.2 Constructor & Destructor Documentation	1698
9.312.2.1 ~FooSeq()	1699
9.312.2.2 FooSeq() [1/2]	1699
9.312.2.3 FooSeq() [2/2]	1700
9.312.3 Member Function Documentation	1700
9.312.3.1 operator=()	1701
9.312.3.2 copy_no_alloc()	1702
9.312.3.3 from_array()	1703
9.312.3.4 to_array()	1704
9.312.3.5 operator[]() [1/2]	1704
9.312.3.6 operator[]() [2/2]	1705
9.312.3.7 length() [1/2]	1705
9.312.3.8 length() [2/2]	1705
9.312.3.9 ensure_length()	1706
9.312.3.10 maximum() [1/2]	1707
9.312.3.11 maximum() [2/2]	1707
9.312.3.12 loan_contiguous()	1708
9.312.3.13 loan_discontiguous()	1709
9.312.3.14 unloan()	1710
9.312.3.15 get_contiguous_buffer()	1710
9.312.3.16 get_discontiguous_buffer()	1711
9.312.3.17 has_ownership()	1711
9.313 FooTypeSupport Class Reference	1711
9.313.1 Detailed Description	1713
9.313.2 Member Function Documentation	1713

---

9.313.2.1 register_type()	1713
9.313.2.2 unregister_type()	1714
9.313.2.3 create_data()	1715
9.313.2.4 create_data_ex()	1715
9.313.2.5 copy_data()	1716
9.313.2.6 delete_data()	1716
9.313.2.7 delete_data_ex()	1717
9.313.2.8 initialize_data()	1718
9.313.2.9 initialize_data_ex()	1718
9.313.2.10 finalize_data()	1719
9.313.2.11 finalize_data_ex()	1720
9.313.2.12 get_type_name()	1720
9.313.2.13 print_data()	1721
9.313.2.14 serialize_data_to_cdr_buffer()	1721
9.313.2.15 serialize_data_to_cdr_buffer_ex()	1722
9.313.2.16 deserialize_data_from_cdr_buffer()	1722
9.313.2.17 data_to_string()	1723
9.313.2.18 get_typecode()	1724
9.314 connex::IllegalOperationException Class Reference	1724
9.314.1 Detailed Description	1724
9.315 connex::ImmutablePolicyException Class Reference	1724
9.315.1 Detailed Description	1725
9.316 connex::InconsistentPolicyException Class Reference	1725
9.316.1 Detailed Description	1725
9.317 connex::IsInvalidSamplePredicate< T > Class Template Reference	1725
9.317.1 Detailed Description	1725
9.318 connex::IsReplyRelatedPredicate< T > Class Template Reference	1725
9.318.1 Detailed Description	1726
9.318.2 Constructor & Destructor Documentation	1726
9.318.2.1 IsReplyRelatedPredicate()	1726
9.318.3 Member Function Documentation	1726
9.318.3.1 operator>()	1726
9.319 connex::IsValidSamplePredicate< T > Class Template Reference	1727
9.319.1 Detailed Description	1727
9.320 connex::LoanedSamples< T > Class Template Reference	1727
9.320.1 Detailed Description	1728
9.320.2 Member Typedef Documentation	1729
9.320.2.1 iterator	1730
9.320.2.2 const_iterator	1730

---

9.320.3	Constructor & Destructor Documentation	1730
9.320.3.1	LoanedSamples() [1/2]	1730
9.320.3.2	LoanedSamples() [2/2]	1730
9.320.3.3	~LoanedSamples()	1731
9.320.4	Member Function Documentation	1731
9.320.4.1	move_construct_from_loans()	1731
9.320.4.2	release()	1732
9.320.4.3	operator[]() [1/2]	1733
9.320.4.4	operator[]() [2/2]	1733
9.320.4.5	length()	1734
9.320.4.6	return_loan()	1734
9.320.4.7	operator LoanMemento()	1735
9.320.4.8	begin() [1/2]	1735
9.320.4.9	end() [1/2]	1735
9.320.4.10	begin() [2/2]	1736
9.320.4.11	end() [2/2]	1736
9.321	connext::LoanedSamples< T >::LoanMemento Struct Reference	1736
9.321.1	Detailed Description	1736
9.322	connext::LogicException Class Reference	1737
9.322.1	Detailed Description	1737
9.323	connext::MessagingLibraryVersion Class Reference	1737
9.323.1	Detailed Description	1738
9.323.2	Member Function Documentation	1738
9.323.2.1	major_version()	1738
9.323.2.2	minor_version()	1738
9.323.2.3	release_version()	1738
9.323.2.4	build_version()	1738
9.324	connext::MessagingVersion Class Reference	1738
9.324.1	Detailed Description	1739
9.324.2	Member Function Documentation	1739
9.324.2.1	get_api_version()	1739
9.324.2.2	get_api_version_string()	1739
9.324.2.3	get_api_build_version()	1739
9.325	rti::flat::MutableArrayBuilder< ElementBuilder, N > Class Template Reference	1740
9.325.1	Detailed Description	1740
9.325.2	Member Typedef Documentation	1741
9.325.2.1	Offset	1741
9.325.3	Member Function Documentation	1741
9.325.3.1	build_next()	1741

---

9.325.3.2 finish()	1742
9.326 rti::flat::MutableArrayOffset< ElementOffset, N > Class Template Reference	1742
9.326.1 Detailed Description	1742
9.326.2 Member Function Documentation	1743
9.326.2.1 get_element()	1743
9.327 rti::flat::MutableOffset Class Reference	1743
9.327.1 Detailed Description	1744
9.328 rti::flat::MutableSequenceBuilder< ElementBuilder > Class Template Reference	1744
9.328.1 Detailed Description	1744
9.328.2 Member Typedef Documentation	1745
9.328.2.1 Offset	1745
9.328.3 Member Function Documentation	1745
9.328.3.1 build_next()	1745
9.328.3.2 finish()	1746
9.329 MyFlatFinalOffset Class Reference	1746
9.329.1 Detailed Description	1747
9.329.2 Member Typedef Documentation	1747
9.329.2.1 ConstOffset	1747
9.329.3 Constructor & Destructor Documentation	1748
9.329.3.1 MyFlatFinalOffset()	1748
9.329.4 Member Function Documentation	1748
9.329.4.1 my_primitive() [1/2]	1748
9.329.4.2 my_complex() [1/2]	1748
9.329.4.3 my_primitive_array() [1/2]	1748
9.329.4.4 my_complex_array() [1/2]	1749
9.329.4.5 my_primitive() [2/2]	1749
9.329.4.6 my_complex() [2/2]	1749
9.329.4.7 my_primitive_array() [2/2]	1749
9.329.4.8 my_complex_array() [2/2]	1749
9.330 MyFlatMutableBuilder Class Reference	1750
9.330.1 Detailed Description	1751
9.330.1.1 Adding fixed-size members	1751
9.330.1.2 Building variable-size members	1751
9.330.1.3 Choosing which members are included	1752
9.330.2 Member Typedef Documentation	1752
9.330.2.1 Offset	1752
9.330.3 Constructor & Destructor Documentation	1752
9.330.3.1 MyFlatMutableBuilder() [1/2]	1752
9.330.3.2 MyFlatMutableBuilder() [2/2]	1753

9.330.4 Member Function Documentation . . . . .	1753
9.330.4.1 finish() . . . . .	1753
9.330.4.2 finish_sample() . . . . .	1754
9.330.4.3 add_my_primitive() . . . . .	1754
9.330.4.4 add_my_optional_primitive() . . . . .	1754
9.330.4.5 add_my_primitive_array() . . . . .	1755
9.330.4.6 build_my_primitive_seq() . . . . .	1755
9.330.4.7 add_my_final() . . . . .	1755
9.330.4.8 add_my_final_array() . . . . .	1755
9.330.4.9 build_my_final_seq() . . . . .	1756
9.330.4.10 build_my_mutable() . . . . .	1756
9.330.4.11 build_my_mutable_array() . . . . .	1756
9.330.4.12 build_my_mutable_seq() . . . . .	1756
9.330.4.13 build_my_string() . . . . .	1756
9.330.4.14 build_my_string_seq() . . . . .	1757
9.331 MyFlatMutableOffset Class Reference . . . . .	1757
9.331.1 Detailed Description . . . . .	1758
9.331.2 Member Typedef Documentation . . . . .	1758
9.331.2.1 ConstOffset . . . . .	1759
9.331.3 Constructor & Destructor Documentation . . . . .	1759
9.331.3.1 MyFlatMutableOffset() . . . . .	1759
9.331.4 Member Function Documentation . . . . .	1759
9.331.4.1 my_primitive() [1/2] . . . . .	1759
9.331.4.2 my_optional_primitive() . . . . .	1759
9.331.4.3 my_primitive_array() [1/2] . . . . .	1760
9.331.4.4 my_primitive_seq() [1/2] . . . . .	1760
9.331.4.5 my_final() [1/2] . . . . .	1760
9.331.4.6 my_final_array() [1/2] . . . . .	1760
9.331.4.7 my_final_seq() [1/2] . . . . .	1760
9.331.4.8 my_mutable() [1/2] . . . . .	1761
9.331.4.9 my_mutable_array() [1/2] . . . . .	1761
9.331.4.10 my_mutable_seq() [1/2] . . . . .	1761
9.331.4.11 my_string() [1/2] . . . . .	1761
9.331.4.12 my_string_seq() [1/2] . . . . .	1761
9.331.4.13 my_primitive() [2/2] . . . . .	1762
9.331.4.14 my_primitive_array() [2/2] . . . . .	1762
9.331.4.15 my_primitive_seq() [2/2] . . . . .	1762
9.331.4.16 my_final() [2/2] . . . . .	1762
9.331.4.17 my_final_array() [2/2] . . . . .	1762

---

9.331.4.18 my_final_seq() [2/2]	1763
9.331.4.19 my_mutable() [2/2]	1763
9.331.4.20 my_mutable_array() [2/2]	1763
9.331.4.21 my_mutable_seq() [2/2]	1763
9.331.4.22 my_string() [2/2]	1763
9.331.4.23 my_string_seq() [2/2]	1763
9.332 MyFlatUnionBuilder Class Reference	1764
9.332.1 Detailed Description	1764
9.332.2 Member Typedef Documentation	1765
9.332.2.1 Offset	1765
9.332.3 Constructor & Destructor Documentation	1765
9.332.3.1 MyFlatUnionBuilder()	1765
9.332.4 Member Function Documentation	1765
9.332.4.1 finish()	1765
9.332.4.2 finish_sample()	1766
9.332.4.3 add_my_primitive()	1766
9.332.4.4 build_my_mutable()	1766
9.332.4.5 add_my_final()	1766
9.333 MyFlatUnionOffset Class Reference	1767
9.333.1 Detailed Description	1768
9.333.2 Member Typedef Documentation	1768
9.333.2.1 ConstOffset	1768
9.333.3 Constructor & Destructor Documentation	1768
9.333.3.1 MyFlatUnionOffset()	1768
9.333.4 Member Function Documentation	1768
9.333.4.1 _d()	1769
9.333.4.2 my_primitive() [1/2]	1769
9.333.4.3 my_mutable() [1/2]	1769
9.333.4.4 my_final() [1/2]	1770
9.333.4.5 my_primitive() [2/2]	1770
9.333.4.6 my_mutable() [2/2]	1770
9.333.4.7 my_final() [2/2]	1770
9.334 NDDS_Config_LibraryVersion_t Struct Reference	1771
9.334.1 Detailed Description	1771
9.334.2 Member Data Documentation	1771
9.334.2.1 major	1771
9.334.2.2 minor	1771
9.334.2.3 release	1772
9.334.2.4 build	1772

---

9.335 NDDS_Config_LogMessage Struct Reference . . . . .	1772
9.335.1 Detailed Description . . . . .	1772
9.335.2 Member Data Documentation . . . . .	1772
9.335.2.1 text . . . . .	1773
9.335.2.2 level . . . . .	1773
9.335.2.3 is_security_message . . . . .	1773
9.335.2.4 message_id . . . . .	1773
9.335.2.5 timestamp . . . . .	1774
9.335.2.6 facility . . . . .	1774
9.336 NDDS_Transport_Address_t Struct Reference . . . . .	1774
9.336.1 Detailed Description . . . . .	1774
9.336.2 Member Data Documentation . . . . .	1774
9.336.2.1 network_ordered_value . . . . .	1775
9.337 NDDS_Transport_Interface_t Struct Reference . . . . .	1775
9.337.1 Detailed Description . . . . .	1775
9.337.2 Member Data Documentation . . . . .	1775
9.337.2.1 transport_classid . . . . .	1775
9.337.2.2 address . . . . .	1776
9.337.2.3 status . . . . .	1776
9.337.2.4 rank . . . . .	1776
9.338 NDDS_Transport_Property_t Struct Reference . . . . .	1776
9.338.1 Detailed Description . . . . .	1777
9.338.2 Member Data Documentation . . . . .	1777
9.338.2.1 classid . . . . .	1778
9.338.2.2 address_bit_count . . . . .	1778
9.338.2.3 properties_bitmap . . . . .	1779
9.338.2.4 gather_send_buffer_count_max . . . . .	1779
9.338.2.5 message_size_max . . . . .	1779
9.338.2.6 allow_interfaces_list . . . . .	1780
9.338.2.7 allow_interfaces_list_length . . . . .	1780
9.338.2.8 deny_interfaces_list . . . . .	1781
9.338.2.9 deny_interfaces_list_length . . . . .	1781
9.338.2.10 allow_multicast_interfaces_list . . . . .	1782
9.338.2.11 allow_multicast_interfaces_list_length . . . . .	1782
9.338.2.12 deny_multicast_interfaces_list . . . . .	1782
9.338.2.13 deny_multicast_interfaces_list_length . . . . .	1783
9.338.2.14 transport_uuid . . . . .	1783
9.338.2.15 thread_name_prefix . . . . .	1783
9.338.2.16 max_interface_count . . . . .	1784

---

9.339 NDDS_Transport_Shmem_Property_t Struct Reference . . . . .	1784
9.339.1 Detailed Description . . . . .	1785
9.339.2 Member Data Documentation . . . . .	1785
9.339.2.1 parent . . . . .	1785
9.339.2.2 received_message_count_max . . . . .	1785
9.339.2.3 receive_buffer_size . . . . .	1786
9.339.2.4 enable_udp_debugging . . . . .	1786
9.339.2.5 udp_debugging_address . . . . .	1787
9.339.2.6 udp_debugging_port . . . . .	1787
9.340 NDDS_Transport_UDP_WAN_CommPortsMappingInfo Struct Reference . . . . .	1787
9.340.1 Detailed Description . . . . .	1787
9.340.2 Member Data Documentation . . . . .	1787
9.340.2.1 rtps_port . . . . .	1788
9.340.2.2 host_port . . . . .	1788
9.340.2.3 public_port . . . . .	1788
9.341 NDDS_Transport_UDPv4_Property_t Struct Reference . . . . .	1788
9.341.1 Detailed Description . . . . .	1789
9.341.2 Member Data Documentation . . . . .	1790
9.341.2.1 parent . . . . .	1790
9.341.2.2 send_socket_buffer_size . . . . .	1790
9.341.2.3 recv_socket_buffer_size . . . . .	1790
9.341.2.4 unicast_enabled . . . . .	1791
9.341.2.5 multicast_enabled . . . . .	1791
9.341.2.6 multicast_ttl . . . . .	1791
9.341.2.7 multicast_loopback_disabled . . . . .	1791
9.341.2.8 ignore_loopback_interface . . . . .	1792
9.341.2.9 ignore_nonup_interfaces . . . . .	1792
9.341.2.10 ignore_nonrunning_interfaces . . . . .	1793
9.341.2.11 no_zero_copy . . . . .	1793
9.341.2.12 send_blocking . . . . .	1793
9.341.2.13 use_checksum . . . . .	1794
9.341.2.14 transport_priority_mask . . . . .	1794
9.341.2.15 transport_priority_mapping_low . . . . .	1794
9.341.2.16 transport_priority_mapping_high . . . . .	1795
9.341.2.17 send_ping . . . . .	1795
9.341.2.18 force_interface_poll_detection . . . . .	1795
9.341.2.19 interface_poll_period . . . . .	1795
9.341.2.20 reuse_multicast_receive_resource . . . . .	1796
9.341.2.21 protocol_overhead_max . . . . .	1796



---

9.341.2.22	disable_interface_tracking	1796
9.341.2.23	join_multicast_group_timeout	1797
9.341.2.24	public_address	1797
9.341.2.25	port_offset	1798
9.342	NDDS_Transport_UDPv4_WAN_Property_t Struct Reference	1798
9.342.1	Detailed Description	1799
9.342.2	Member Data Documentation	1799
9.342.2.1	parent	1799
9.342.2.2	send_socket_buffer_size	1800
9.342.2.3	recv_socket_buffer_size	1800
9.342.2.4	ignore_loopback_interface	1800
9.342.2.5	ignore_nonup_interfaces	1801
9.342.2.6	ignore_nonrunning_interfaces	1801
9.342.2.7	no_zero_copy	1802
9.342.2.8	send_blocking	1802
9.342.2.9	use_checksum	1802
9.342.2.10	transport_priority_mask	1803
9.342.2.11	transport_priority_mapping_low	1803
9.342.2.12	transport_priority_mapping_high	1803
9.342.2.13	send_ping	1804
9.342.2.14	force_interface_poll_detection	1804
9.342.2.15	interface_poll_period	1804
9.342.2.16	protocol_overhead_max	1804
9.342.2.17	disable_interface_tracking	1805
9.342.2.18	public_address	1805
9.342.2.19	comm_ports_list	1806
9.342.2.20	comm_ports_list_length	1807
9.342.2.21	port_offset	1807
9.342.2.22	binding_ping_period	1807
9.343	NDDS_Transport_UDPv6_Property_t Struct Reference	1808
9.343.1	Detailed Description	1809
9.343.2	Member Data Documentation	1809
9.343.2.1	parent	1809
9.343.2.2	send_socket_buffer_size	1809
9.343.2.3	recv_socket_buffer_size	1810
9.343.2.4	unicast_enabled	1810
9.343.2.5	multicast_enabled	1810
9.343.2.6	multicast_ttl	1810
9.343.2.7	multicast_loopback_disabled	1811

9.343.2.8 ignore_loopback_interface . . . . .	1811
9.343.2.9 ignore_nonrunning_interfaces . . . . .	1812
9.343.2.10 no_zero_copy . . . . .	1812
9.343.2.11 send_blocking . . . . .	1812
9.343.2.12 enable_v4mapped . . . . .	1813
9.343.2.13 transport_priority_mask . . . . .	1813
9.343.2.14 transport_priority_mapping_low . . . . .	1813
9.343.2.15 transport_priority_mapping_high . . . . .	1814
9.343.2.16 send_ping . . . . .	1814
9.343.2.17 force_interface_poll_detection . . . . .	1814
9.343.2.18 interface_poll_period . . . . .	1814
9.343.2.19 reuse_multicast_receive_resource . . . . .	1815
9.343.2.20 protocol_overhead_max . . . . .	1815
9.343.2.21 disable_interface_tracking . . . . .	1815
9.343.2.22 join_multicast_group_timeout . . . . .	1816
9.343.2.23 public_address . . . . .	1816
9.343.2.24 port_offset . . . . .	1817
9.344 NDDS_Transport_UUID Struct Reference . . . . .	1817
9.344.1 Detailed Description . . . . .	1817
9.345 NDDS_Utility_NetworkCaptureParams_t Struct Reference . . . . .	1817
9.345.1 Detailed Description . . . . .	1818
9.345.2 Member Data Documentation . . . . .	1818
9.345.2.1 transports . . . . .	1818
9.345.2.2 dropped_content . . . . .	1818
9.345.2.3 traffic . . . . .	1818
9.345.2.4 parse_encrypted_content . . . . .	1819
9.345.2.5 checkpoint_thread_settings . . . . .	1819
9.345.2.6 frame_queue_size . . . . .	1819
9.346 NDDSConfigActivityContext Class Reference . . . . .	1820
9.346.1 Detailed Description . . . . .	1820
9.347 NDDSConfigCompliance Class Reference . . . . .	1820
9.347.1 Detailed Description . . . . .	1820
9.347.2 Member Function Documentation . . . . .	1820
9.347.2.1 get_xtypes_mask() . . . . .	1821
9.347.2.2 set_xtypes_mask() . . . . .	1821
9.347.2.3 load_compliance_masks() . . . . .	1822
9.348 NDDSConfigLogger Class Reference . . . . .	1822
9.348.1 Detailed Description . . . . .	1823
9.348.2 Member Function Documentation . . . . .	1823

---

9.348.2.1	get_instance()	1824
9.348.2.2	finalize_instance()	1824
9.348.2.3	get_verbosity()	1824
9.348.2.4	get_verbosity_by_category()	1824
9.348.2.5	set_verbosity()	1825
9.348.2.6	set_verbosity_by_category()	1825
9.348.2.7	get_output_file()	1825
9.348.2.8	set_output_file()	1825
9.348.2.9	set_output_file_set()	1826
9.348.2.10	get_output_device()	1826
9.348.2.11	set_output_device()	1826
9.348.2.12	get_print_format()	1827
9.348.2.13	set_print_format()	1827
9.348.2.14	get_print_format_by_log_level()	1827
9.348.2.15	set_print_format_by_log_level()	1827
9.348.2.16	emergency()	1828
9.348.2.17	alert()	1828
9.348.2.18	critical()	1828
9.348.2.19	error()	1828
9.348.2.20	warning()	1828
9.348.2.21	notice()	1829
9.348.2.22	informational()	1829
9.348.2.23	debug()	1829
9.349	NDDConfigLoggerDevice Class Reference	1829
9.349.1	Detailed Description	1830
9.349.2	Member Function Documentation	1830
9.349.2.1	write()	1830
9.349.2.2	close()	1830
9.350	NDDConfigVersion Class Reference	1831
9.350.1	Detailed Description	1831
9.350.2	Member Function Documentation	1831
9.350.2.1	get_instance()	1831
9.350.2.2	get_product_version()	1832
9.350.2.3	get_cpp_api_version()	1832
9.350.2.4	get_c_api_version()	1832
9.350.2.5	get_core_version()	1832
9.350.2.6	to_string()	1832
9.351	NDDSLM Class Reference	1832
9.351.1	Detailed Description	1833

---

9.351.2 Member Function Documentation	1833
9.351.2.1 unload_activation_library()	1833
9.352 NDDSTransportSupport Class Reference	1833
9.352.1 Detailed Description	1834
9.352.2 Member Function Documentation	1834
9.352.2.1 register_transport()	1834
9.352.2.2 lookup_transport()	1835
9.352.2.3 add_send_route()	1836
9.352.2.4 add_receive_route()	1837
9.352.2.5 get_builtin_transport_property()	1837
9.352.2.6 set_builtin_transport_property()	1838
9.352.2.7 get_transport_plugin()	1839
9.353 NDDSTransportUtility Class Reference	1839
9.353.1 Detailed Description	1840
9.353.2 Member Function Documentation	1840
9.353.2.1 sleep()	1840
9.353.2.2 spin()	1841
9.353.2.3 get_spin_per_microsecond()	1841
9.353.2.4 enable_heap_monitoring()	1841
9.353.2.5 disable_heap_monitoring()	1842
9.353.2.6 pause_heap_monitoring()	1842
9.353.2.7 resume_heap_monitoring()	1842
9.353.2.8 take_heap_snapshot()	1842
9.354 NDDSTransportUtilityHeapMonitoring Class Reference	1842
9.354.1 Detailed Description	1843
9.354.2 Member Function Documentation	1843
9.354.2.1 enable() [1/2]	1843
9.354.2.2 enable() [2/2]	1843
9.354.2.3 disable()	1844
9.354.2.4 pause()	1844
9.354.2.5 resume()	1844
9.354.2.6 take_heap_snapshot()	1845
9.355 NDDSTransportUtilityNetworkCapture Class Reference	1846
9.355.1 Detailed Description	1847
9.355.2 Member Function Documentation	1847
9.355.2.1 enable()	1847
9.355.2.2 disable()	1848
9.355.2.3 set_default_params()	1849
9.355.2.4 start() [1/4]	1849

---

9.355.2.5 start() [2/4]	1850
9.355.2.6 start() [3/4]	1851
9.355.2.7 start() [4/4]	1851
9.355.2.8 stop() [1/2]	1852
9.355.2.9 stop() [2/2]	1853
9.355.2.10 pause() [1/2]	1853
9.355.2.11 pause() [2/2]	1854
9.355.2.12 resume() [1/2]	1854
9.355.2.13 resume() [2/2]	1855
9.356 connext::NotEnabledException Class Reference	1855
9.356.1 Detailed Description	1855
9.357 rti::flat::OffsetBase Class Reference	1856
9.357.1 Detailed Description	1857
9.357.2 Member Function Documentation	1857
9.357.2.1 is_null()	1857
9.357.2.2 is_cpp_compatible()	1857
9.357.2.3 get_buffer()	1858
9.357.2.4 get_buffer_size()	1858
9.357.3 Friends And Related Function Documentation	1858
9.357.3.1 operator<	1858
9.357.3.2 operator>	1859
9.357.3.3 operator<=	1859
9.357.3.4 operator>=	1859
9.357.3.5 operator==	1860
9.357.3.6 operator!=	1860
9.358 connext::OutOfResourcesException Class Reference	1860
9.358.1 Detailed Description	1860
9.359 connext::PreconditionNotMetException Class Reference	1861
9.359.1 Detailed Description	1861
9.360 rti::flat::PrimitiveArrayOffset< T, N > Class Template Reference	1861
9.360.1 Detailed Description	1861
9.360.2 Member Function Documentation	1862
9.360.2.1 element_count()	1862
9.361 rti::flat::PrimitiveConstOffset< T > Struct Template Reference	1862
9.361.1 Detailed Description	1863
9.361.2 Member Function Documentation	1863
9.361.2.1 get()	1863
9.362 rti::flat::PrimitiveOffset< T > Struct Template Reference	1863
9.362.1 Detailed Description	1863

---

9.362.2 Member Function Documentation	1864
9.362.2.1 set()	1864
9.363 rti::flat::PrimitiveSequenceBuilder< T > Class Template Reference	1864
9.363.1 Detailed Description	1865
9.363.2 Member Function Documentation	1865
9.363.2.1 add_next()	1865
9.363.2.2 add_n() [1/3]	1866
9.363.2.3 add_n() [2/3]	1866
9.363.2.4 add_n() [3/3]	1866
9.363.2.5 finish()	1867
9.364 rti::flat::PrimitiveSequenceOffset< T > Class Template Reference	1867
9.364.1 Detailed Description	1868
9.364.2 Member Function Documentation	1868
9.364.2.1 element_count()	1868
9.365 connext::Replier< TReq, TRep > Class Template Reference	1868
9.365.1 Detailed Description	1870
9.365.2 Member Typedef Documentation	1871
9.365.2.1 Request	1871
9.365.2.2 Reply	1871
9.365.2.3 ReplyDataWriter	1871
9.365.2.4 RequestDataReader	1871
9.365.3 Constructor & Destructor Documentation	1872
9.365.3.1 Replier() [1/2]	1872
9.365.3.2 Replier() [2/2]	1873
9.365.3.3 ~Replier()	1873
9.365.4 Member Function Documentation	1874
9.365.4.1 send_reply() [1/3]	1874
9.365.4.2 send_reply() [2/3]	1874
9.365.4.3 send_reply() [3/3]	1875
9.365.4.4 receive_request() [1/2]	1876
9.365.4.5 receive_request() [2/2]	1876
9.365.4.6 receive_requests() [1/2]	1876
9.365.4.7 receive_requests() [2/2]	1877
9.365.4.8 wait_for_requests() [1/2]	1877
9.365.4.9 wait_for_requests() [2/2]	1877
9.365.4.10 take_request() [1/2]	1878
9.365.4.11 take_request() [2/2]	1878
9.365.4.12 take_requests()	1879
9.365.4.13 read_request() [1/2]	1879

---

9.365.4.14 read_request() [2/2] . . . . .	1879
9.365.4.15 read_requests() . . . . .	1879
9.365.4.16 get_request_datareader() . . . . .	1880
9.365.4.17 get_reply_datawriter() . . . . .	1880
9.366 connex::ReplierListener< TReq, TRep > Class Template Reference . . . . .	1880
9.366.1 Detailed Description . . . . .	1880
9.366.2 Member Function Documentation . . . . .	1881
9.366.2.1 on_request_available() . . . . .	1881
9.367 connex::ReplierParams< TReq, TRep > Class Template Reference . . . . .	1881
9.367.1 Detailed Description . . . . .	1882
9.367.2 Constructor & Destructor Documentation . . . . .	1882
9.367.2.1 ReplierParams() . . . . .	1882
9.367.3 Member Function Documentation . . . . .	1882
9.367.3.1 replier_listener() . . . . .	1883
9.367.3.2 service_name() . . . . .	1883
9.367.3.3 request_topic_name() . . . . .	1883
9.367.3.4 reply_topic_name() . . . . .	1883
9.367.3.5 qos_profile() . . . . .	1884
9.367.3.6 datawriter_qos() . . . . .	1884
9.367.3.7 datareader_qos() . . . . .	1884
9.367.3.8 publisher() . . . . .	1885
9.367.3.9 subscriber() . . . . .	1885
9.367.3.10 request_type_support() . . . . .	1885
9.367.3.11 reply_type_support() . . . . .	1886
9.368 connex::Requester< TReq, TRep > Class Template Reference . . . . .	1886
9.368.1 Detailed Description . . . . .	1888
9.368.2 Member Typedef Documentation . . . . .	1889
9.368.2.1 Request . . . . .	1889
9.368.2.2 Reply . . . . .	1890
9.368.2.3 RequestDataWriter . . . . .	1890
9.368.2.4 ReplyDataReader . . . . .	1890
9.368.2.5 RequestTypeSupport . . . . .	1890
9.368.2.6 ReplyTypeSupport . . . . .	1890
9.368.3 Constructor & Destructor Documentation . . . . .	1890
9.368.3.1 Requester() [1/2] . . . . .	1890
9.368.3.2 Requester() [2/2] . . . . .	1891
9.368.3.3 ~Requester() . . . . .	1891
9.368.4 Member Function Documentation . . . . .	1892
9.368.4.1 send_request() [1/3] . . . . .	1892

---

9.368.4.2 send_request() [2/3]	1892
9.368.4.3 send_request() [3/3]	1893
9.368.4.4 receive_reply() [1/2]	1894
9.368.4.5 receive_reply() [2/2]	1894
9.368.4.6 receive_replies() [1/2]	1895
9.368.4.7 receive_replies() [2/2]	1895
9.368.4.8 wait_for_replies() [1/3]	1896
9.368.4.9 wait_for_replies() [2/3]	1897
9.368.4.10 wait_for_replies() [3/3]	1897
9.368.4.11 take_reply() [1/4]	1898
9.368.4.12 take_reply() [2/4]	1899
9.368.4.13 take_replies() [1/3]	1899
9.368.4.14 take_reply() [3/4]	1900
9.368.4.15 take_reply() [4/4]	1901
9.368.4.16 take_replies() [2/3]	1902
9.368.4.17 take_replies() [3/3]	1903
9.368.4.18 read_reply() [1/4]	1904
9.368.4.19 read_reply() [2/4]	1904
9.368.4.20 read_replies() [1/3]	1904
9.368.4.21 read_reply() [3/4]	1905
9.368.4.22 read_reply() [4/4]	1905
9.368.4.23 read_replies() [2/3]	1905
9.368.4.24 read_replies() [3/3]	1906
9.368.4.25 get_request_datawriter()	1906
9.368.4.26 get_reply_datareader()	1907
9.369 connext::RequesterParams Class Reference	1907
9.369.1 Detailed Description	1908
9.369.2 Constructor & Destructor Documentation	1908
9.369.2.1 RequesterParams()	1908
9.369.3 Member Function Documentation	1909
9.369.3.1 service_name()	1909
9.369.3.2 request_topic_name()	1909
9.369.3.3 reply_topic_name()	1909
9.369.3.4 qos_profile()	1910
9.369.3.5 datawriter_qos()	1910
9.369.3.6 datareader_qos()	1910
9.369.3.7 publisher()	1911
9.369.3.8 subscriber()	1911
9.369.3.9 request_type_support()	1911



---

9.369.3.10 reply_type_support()	1911
9.370 connext::RuntimeException Class Reference	1912
9.370.1 Detailed Description	1912
9.371 connext::Sample< T > Class Template Reference	1912
9.371.1 Detailed Description	1913
9.371.2 Constructor & Destructor Documentation	1913
9.371.2.1 Sample() [1/3]	1913
9.371.2.2 Sample() [2/3]	1913
9.371.2.3 Sample() [3/3]	1914
9.371.3 Member Function Documentation	1914
9.371.3.1 identity()	1914
9.371.3.2 related_identity()	1914
9.371.3.3 data() [1/2]	1915
9.371.3.4 info() [1/2]	1915
9.371.3.5 data() [2/2]	1915
9.371.3.6 info() [2/2]	1916
9.372 rti::flat::Sample< OffsetType > Class Template Reference	1916
9.372.1 Detailed Description	1916
9.372.2 Member Typedef Documentation	1917
9.372.2.1 Offset	1917
9.372.2.2 ConstOffset	1918
9.372.3 Member Function Documentation	1918
9.372.3.1 root() [1/2]	1918
9.372.3.2 root() [2/2]	1918
9.372.3.3 create_data()	1919
9.372.3.4 clone()	1919
9.372.3.5 delete_data()	1919
9.373 connext::SampleIterator< T, IsConst > Class Template Reference	1920
9.373.1 Detailed Description	1920
9.374 connext::SampleRef< T > Class Template Reference	1920
9.374.1 Detailed Description	1921
9.374.2 Constructor & Destructor Documentation	1921
9.374.2.1 SampleRef() [1/4]	1921
9.374.2.2 SampleRef() [2/4]	1922
9.374.2.3 SampleRef() [3/4]	1922
9.374.2.4 SampleRef() [4/4]	1922
9.374.3 Member Function Documentation	1923
9.374.3.1 operator=()	1923
9.374.3.2 data()	1923

---

9.374.3.3 info()	1924
9.374.3.4 operator T&()	1924
9.374.3.5 set_data()	1924
9.374.3.6 set_info()	1925
9.374.3.7 is_nil_data()	1925
9.374.3.8 is_nil_info()	1925
9.374.3.9 identity()	1926
9.374.3.10 related_identity()	1926
9.375 rti::flat::Sequenceliterator< E, OffsetKind > Class Template Reference	1926
9.375.1 Detailed Description	1928
9.375.2 Member Typedef Documentation	1929
9.375.2.1 iterator_category	1929
9.375.2.2 value_type	1929
9.375.2.3 reference	1930
9.375.2.4 pointer	1930
9.375.2.5 difference_type	1930
9.375.3 Constructor & Destructor Documentation	1930
9.375.3.1 Sequenceliterator()	1930
9.375.4 Member Function Documentation	1930
9.375.4.1 is_null()	1931
9.375.4.2 operator*()	1931
9.375.4.3 operator->()	1931
9.375.4.4 advance()	1931
9.375.4.5 operator++() [1/2]	1932
9.375.4.6 operator++() [2/2]	1932
9.375.5 Friends And Related Function Documentation	1932
9.375.5.1 operator<	1932
9.375.5.2 operator>	1933
9.375.5.3 operator<=	1933
9.375.5.4 operator>=	1933
9.375.5.5 operator==	1933
9.375.5.6 operator!=	1934
9.376 rti::flat::SequenceOffset< ElementOffset > Class Template Reference	1934
9.376.1 Detailed Description	1934
9.376.2 Member Function Documentation	1935
9.376.2.1 get_element()	1935
9.376.2.2 element_count()	1935
9.377 connext::SimpleReplier< TReq, TRep > Class Template Reference	1935
9.377.1 Detailed Description	1936

---

9.377.2 Constructor & Destructor Documentation	1936
9.377.2.1 SimpleReplier() [1/2]	1936
9.377.2.2 SimpleReplier() [2/2]	1937
9.377.2.3 ~SimpleReplier()	1937
9.378 connext::SimpleReplierListener< TReq, TRep > Class Template Reference	1937
9.378.1 Detailed Description	1937
9.378.2 Member Function Documentation	1938
9.378.2.1 on_request_available()	1938
9.378.2.2 return_loan()	1938
9.379 connext::SimpleReplierParams< TReq, TRep > Class Template Reference	1939
9.379.1 Detailed Description	1939
9.379.2 Constructor & Destructor Documentation	1940
9.379.2.1 SimpleReplierParams()	1940
9.379.3 Member Function Documentation	1940
9.379.3.1 service_name()	1940
9.379.3.2 request_topic_name()	1941
9.379.3.3 reply_topic_name()	1941
9.379.3.4 qos_profile()	1941
9.379.3.5 datawriter_qos()	1941
9.379.3.6 datareader_qos()	1942
9.379.3.7 publisher()	1942
9.379.3.8 subscriber()	1942
9.379.3.9 request_type_support()	1943
9.379.3.10 reply_type_support()	1943
9.380 rti::flat::StringBuilder Class Reference	1943
9.380.1 Detailed Description	1944
9.380.2 Member Function Documentation	1944
9.380.2.1 set_string()	1944
9.380.2.2 finish()	1944
9.381 rti::flat::StringOffset Class Reference	1945
9.381.1 Detailed Description	1945
9.381.2 Member Function Documentation	1945
9.381.2.1 get_string() [1/2]	1945
9.381.2.2 get_string() [2/2]	1946
9.381.2.3 element_count()	1946
9.382 connext::TimeoutException Class Reference	1946
9.382.1 Detailed Description	1946
9.383 TransportAllocationSettings_t Struct Reference	1947
9.383.1 Detailed Description	1947

---

9.384 rti::flat::UnionBuilder< Discriminator > Class Template Reference . . . . .	1947
9.384.1 Detailed Description . . . . .	1948
9.385 connext::UnsupportedException Class Reference . . . . .	1948
9.385.1 Detailed Description . . . . .	1948
9.386 connext::WriteSample< T > Class Template Reference . . . . .	1948
9.386.1 Detailed Description . . . . .	1949
9.386.2 Constructor & Destructor Documentation . . . . .	1949
9.386.2.1 WriteSample() [1/4] . . . . .	1950
9.386.2.2 WriteSample() [2/4] . . . . .	1950
9.386.2.3 WriteSample() [3/4] . . . . .	1950
9.386.2.4 WriteSample() [4/4] . . . . .	1950
9.386.3 Member Function Documentation . . . . .	1950
9.386.3.1 data() [1/2] . . . . .	1951
9.386.3.2 info() [1/2] . . . . .	1951
9.386.3.3 data() [2/2] . . . . .	1951
9.386.3.4 info() [2/2] . . . . .	1951
9.386.3.5 identity() . . . . .	1952
9.387 connext::WriteSampleRef< T > Class Template Reference . . . . .	1952
9.387.1 Detailed Description . . . . .	1952
9.387.2 Constructor & Destructor Documentation . . . . .	1953
9.387.2.1 WriteSampleRef() [1/3] . . . . .	1953
9.387.2.2 WriteSampleRef() [2/3] . . . . .	1953
9.387.2.3 WriteSampleRef() [3/3] . . . . .	1953
9.387.3 Member Function Documentation . . . . .	1954
9.387.3.1 data() . . . . .	1954
9.387.3.2 info() . . . . .	1954
9.387.3.3 set_data() . . . . .	1954
9.387.3.4 set_info() . . . . .	1955
9.387.3.5 is_nil_data() . . . . .	1955
9.387.3.6 identity() . . . . .	1955
<b>10 File Documentation</b> . . . . .	<b>1957</b>
10.1 AggregationBuilders.hpp . . . . .	1957
10.2 Builder.hpp . . . . .	1962
10.3 BuilderHelper.hpp . . . . .	1969
10.4 ExceptionHelper.hpp . . . . .	1972
10.5 FlatSample.hpp . . . . .	1975
10.6 FlatSampleImpl.hpp . . . . .	1977
10.7 FlatTypeTraits.hpp . . . . .	1978

---

10.8 Offset.hpp . . . . .	1980
10.9 rtiflat.hpp . . . . .	1989
10.10 SequenceBuilders.hpp . . . . .	1989
10.11 SequenceIterator.hpp . . . . .	1998
10.12 SequenceOffsets.hpp . . . . .	2001
10.13 Interpreter.hpp . . . . .	2009
10.14 Stream.hpp . . . . .	2012
<b>11 Example Documentation</b>	<b>2019</b>
11.1 HelloWorld.idl . . . . .	2019
11.1.1 IDL Type Description . . . . .	2019
11.1.1.1 HelloWorld.idl . . . . .	2019
11.2 HelloWorld.cxx . . . . .	2020
11.2.1 Programming Language Type Description . . . . .	2020
11.2.1.1 HelloWorld.h . . . . .	2020
11.2.1.2 HelloWorld.cxx . . . . .	2021
11.3 HelloWorldSupport.cxx . . . . .	2025
11.3.1 User Data Type Support . . . . .	2025
11.3.1.1 HelloWorldSupport.h . . . . .	2026
11.3.1.2 HelloWorldSupport.cxx . . . . .	2026
11.4 HelloWorldPlugin.cxx . . . . .	2027
11.4.1 RTI Connex Implementation Support . . . . .	2027
11.4.1.1 HelloWorldPlugin.h . . . . .	2028
11.4.1.2 HelloWorldPlugin.cxx . . . . .	2030
11.5 HelloWorld_publisher.cxx . . . . .	2038
11.5.1 RTI Connex Publication Example . . . . .	2038
11.5.1.1 HelloWorld_publisher.cxx . . . . .	2038
11.6 HelloWorld_subscriber.cxx . . . . .	2041
11.6.1 RTI Connex Subscription Example . . . . .	2041
11.6.1.1 HelloWorld_subscriber.cxx . . . . .	2041
<b>Index</b>	<b>2045</b>



# Chapter 1

## RTI Connex

### Core Libraries and Utilities

Real-Time Innovations, Inc.

RTI Connex is network middleware for real-time distributed applications. It provides the communications services that programmers need to distribute time-critical data between embedded and/or enterprise devices or nodes. RTI Connex uses the publish-subscribe communications model to make data distribution efficient and robust.

The RTI Connex Application Programming Interface (API) is based on the OMG's Data Distribution Service (DDS) specification, version 1.4. The most recent publication of this specification can be found in the [Catalog of OMG Specifications](#) under "Platform Categories".

**Note:** this documentation is for the **RTI Connex Traditional C++ API**, the **RTI Connex Modern C++ API** is also available.

### 1.1 Available Documentation.

The documentation for this release is provided in two forms: the API Reference HTML documentation and PDF documents. If you are new to RTI Connex, the **Documentation Roadmap** (p. 235) will provide direction on how to learn about this product.

### 1.1.1 The documents for the Core Libraries and Utilities are:

- **What 's New.** An overview of the new features in this release.
- **Release Notes.** System requirements, compatibility, what's fixed in this release, and known issues.
- **Platform Notes.** Specific details, such as compilation setting and libraries, related to building and using RTI Connex on the various supported platforms.
- **Getting Started Guide.** Core value and concepts behind the product, taking you step-by-step through the creation of a simple example application. Developers should read this document first.
- **Code Generator User's Manual.** Information about using rttidsgen to generate code from data types.
- **User's Manual.** Introduction to RTI Connex, product tour and conceptual presentation of the functionality of RTI Connex.
- **QoS Reference Guide.** A compact summary of supported Quality of Service (QoS) policies.
- **XML-Based Application Creation Getting Started Guide.** Details on how to use XML-↔ Based Application Creation.
- **Extensible Types Guide.** Additional information about extensible types.
- See more `documentation` on RTI Community.

### 1.1.2 The API Reference HTML documentation contains:

- **RTI Connex DDS API Reference** (p. 239) - The RTI Connex API reference.
- **Additional RTI Connex Communication Patterns** (p. 242) - RTI Connex APIs for additional communication patterns
- **Programming How-To's** (p. 243) - Describes and shows the common tasks done using the API.

The API Reference HTML documentation can be accessed through the tree view in the left frame of the web browser window. The bulk of the documentation is found under the entry labeled "Modules".

## 1.2 Feedback and Support for this Release.

We welcome any input on how to improve RTI Connex to suit your needs. If you have questions or comments about this release, please visit the RTI Customer Portal at <https://support.rti.com>.

The Customer Portal provides access to RTI software, documentation, and support. It also allows you to log support cases. Furthermore, the portal provides detailed solutions and a free public knowledge base. To access the software, documentation or log support cases, the RTI Customer Portal requires a username and password. You will receive this in the email confirming your purchase. If you do not have this email, please contact [license@rti.com](mailto:license@rti.com). Resetting your login password can be done directly at the RTI Customer Portal.



# Chapter 2

## Module Index

### 2.1 Modules

Here is a list of all modules:

Documentation Roadmap . . . . .	235
Conventions . . . . .	236
Using DDS:: Namespace . . . . .	238
RTI Connex DDS API Reference . . . . .	239
Domain Module . . . . .	39
DomainParticipantFactory . . . . .	40
DomainParticipantConfigParams . . . . .	517
DomainParticipants . . . . .	49
Built-in Topics . . . . .	59
Participant Built-in Topics . . . . .	294
Topic Built-in Topics . . . . .	295
Publication Built-in Topics . . . . .	297
Subscription Built-in Topics . . . . .	298
ServiceRequest Built-in Topic . . . . .	300
Common types and functions . . . . .	303
Topic Module . . . . .	61
Topics . . . . .	62
Zero Copy Transfer Over Shared Memory . . . . .	70
User Data Type Support . . . . .	71
Type Code Support . . . . .	76
Built-in Types . . . . .	92
String Built-in Type . . . . .	312
KeyedString Built-in Type . . . . .	312
Octets Built-in Type . . . . .	313
KeyedOctets Built-in Type . . . . .	314
Built-in Topic's Trust Types . . . . .	95
Dynamic Data . . . . .	99
DDS-Specific Primitive Types . . . . .	315
FlatData Topic-Types . . . . .	568
FlatData Builders . . . . .	558

FlatData Samples . . . . .	561
FlatData Offsets . . . . .	564
Publication Module . . . . .	103
Publishers . . . . .	103
Data Writers . . . . .	111
Flow Controllers . . . . .	118
Multi-channel DataWriters . . . . .	165
Subscription Module . . . . .	124
Subscribers . . . . .	126
DataReaders . . . . .	134
Read Conditions . . . . .	147
Query Conditions . . . . .	148
Topic Queries . . . . .	151
Data Samples . . . . .	148
Sample States . . . . .	155
View States . . . . .	157
Instance States . . . . .	159
Stream Kinds . . . . .	161
SampleProcessor . . . . .	550
Infrastructure Module . . . . .	162
Clock Selection . . . . .	38
Time Support . . . . .	320
GUID Support . . . . .	328
Sequence Number Support . . . . .	331
Exception Codes . . . . .	333
Return Codes . . . . .	335
Status Kinds . . . . .	337
QoS Policies . . . . .	353
ASYNCHRONOUS_PUBLISHER . . . . .	363
AVAILABILITY . . . . .	364
BATCH . . . . .	364
DATABASE . . . . .	365
DATA_READER_PROTOCOL . . . . .	366
DATA_READER_RESOURCE_LIMITS . . . . .	367
DATA_REPRESENTATION . . . . .	369
Compression Settings . . . . .	372
DATA_TAG . . . . .	376
DATA_WRITER_PROTOCOL . . . . .	381
DATA_WRITER_RESOURCE_LIMITS . . . . .	382
DATA_WRITER_TRANSFER_MODE . . . . .	385
DEADLINE . . . . .	385
DESTINATION_ORDER . . . . .	386
DISCOVERY . . . . .	388
NDDS_DISCOVERY_PEERS . . . . .	464
DISCOVERY_CONFIG . . . . .	389
DOMAIN_PARTICIPANT_RESOURCE_LIMITS . . . . .	396
DURABILITY . . . . .	398
DURABILITY_SERVICE . . . . .	402
ENTITY_FACTORY . . . . .	402
ENTITY_NAME . . . . .	403
EVENT . . . . .	404
HISTORY . . . . .	405
GROUP_DATA . . . . .	406

LATENCY_BUDGET	407
LIFESPAN	408
LIVELINESS	409
LOCATORFILTER	410
LOGGING	411
MONITORING	412
MULTICHANNEL	413
OWNERSHIP	414
OWNERSHIP_STRENGTH	415
PARTITION	416
PRESENTATION	417
PROFILE	418
PROPERTY	419
PUBLISH_MODE	429
READER_DATA_LIFECYCLE	432
RECEIVER_POOL	432
RELIABILITY	433
RESOURCE_LIMITS	437
SERVICE	438
SYSTEM_RESOURCE_LIMITS	440
TIME_BASED_FILTER	440
TOPIC_DATA	441
TOPIC_QUERY_DISPATCH	442
TRANSPORT_BUILTIN	443
TRANSPORT_MULTICAST	447
Multicast Settings	463
Multicast Mapping	463
TRANSPORT_MULTICAST_MAPPING	448
TRANSPORT_PRIORITY	449
TRANSPORT_SELECTION	450
TRANSPORT_UNICAST	451
Unicast Settings	462
TYPE_CONSISTENCY_ENFORCEMENT	451
TYPESUPPORT	453
USER_DATA	455
WRITER_DATA_LIFECYCLE	456
WIRE_PROTOCOL	456
Extended Qos Support	462
Thread Settings	350
Entity Support	471
Conditions and WaitSets	471
AsyncWaitSet	292
Cookie	473
Sample Flags	473
WriteParams	476
Heap Support in C	479
Builtin Qos Profiles	481
User-managed Threads	519
Octet Buffer Support	547
Sequence Support	550
Built-in Sequences	164
String Support	551
Transports	167
Installing Transport Plugins	172

Built-in Transport Plugins . . . . .	177
UDP Transport Plugin definitions . . . . .	258
Shared Memory Transport . . . . .	260
UDPv4 Transport . . . . .	266
Real-Time WAN Transport . . . . .	276
UDPv6 Transport . . . . .	283
Creating New Transport Plugins . . . . .	178
Transport Plugins Configuration . . . . .	245
Transport Address . . . . .	252
Queries and Filters Syntax . . . . .	179
Logging and Version . . . . .	185
Version . . . . .	522
Logging . . . . .	523
Activity Context . . . . .	530
General Utilities and Compliance Configuration . . . . .	185
Compliance Configuration . . . . .	535
Heap Monitoring . . . . .	539
Network Capture . . . . .	540
Other Utilities . . . . .	546
Observability . . . . .	186
Observability Library . . . . .	520
Durability and Persistence . . . . .	191
System Properties . . . . .	196
Configuring QoS Profiles with XML . . . . .	197
Additional RTI Connex Communication Patterns . . . . .	242
Request-Reply Pattern . . . . .	186
Requester . . . . .	187
Replier . . . . .	187
Infrastructure . . . . .	188
RTI Connex Exceptions . . . . .	37
Utilities . . . . .	190
Programming How-To's . . . . .	243
Publication Example . . . . .	199
Subscription Example . . . . .	200
Participant Use Cases . . . . .	201
Topic Use Cases . . . . .	203
FlowController Use Cases . . . . .	204
Publisher Use Cases . . . . .	206
DataWriter Use Cases . . . . .	207
Subscriber Use Cases . . . . .	208
DataReader Use Cases . . . . .	210
Entity Use Cases . . . . .	213
Waitset Use Cases . . . . .	215
Transport Use Cases . . . . .	216
Filter Use Cases . . . . .	219
Creating Custom Content Filters . . . . .	222
Large Data Use Cases . . . . .	225
Request-Reply Examples . . . . .	226
Interface . . . . .	244

## Chapter 3

# Namespace Index

### 3.1 Namespace List

Here is a list of all documented namespaces with brief descriptions:

<b>connext</b>	Namespace for Connext . . . . .	571
<b>rti</b>	The RTI namespace . . . . .	573
<b>rti::flat</b>	<< <i>extension</i> >> (p. 237) Support for <b>FlatData Topic-Types</b> (p. 568) . . . . .	573



# Chapter 4

## Hierarchical Index

### 4.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

rti::flat::AbstractBuilder	579
rti::flat::AbstractListBuilder< detail::DHeaderGenerator >	581
rti::flat::AbstractSequenceBuilder< detail::DHeaderGenerator >	584
rti::flat::FinalSequenceBuilder< ElementOffset >	1645
rti::flat::MutableSequenceBuilder< ElementBuilder >	1744
rti::flat::MutableArrayBuilder< ElementBuilder, N >	1740
rti::flat::AbstractListBuilder< detail::primitive_sequence_dheader_gen< T >::type >	581
rti::flat::AbstractSequenceBuilder< detail::primitive_sequence_dheader_gen< T >::type >	584
rti::flat::PrimitiveSequenceBuilder< T >	1864
rti::flat::AbstractListBuilder< detail::primitive_sequence_dheader_gen< char >::type >	581
rti::flat::AbstractSequenceBuilder< detail::primitive_sequence_dheader_gen< char >::type >	584
rti::flat::PrimitiveSequenceBuilder< char >	1864
rti::flat::StringBuilder	1943
rti::flat::AbstractListBuilder< DHeaderGen >	581
rti::flat::AbstractSequenceBuilder< DHeaderGen >	584
rti::flat::AggregationBuilder	585
rti::flat::UnionBuilder< int32_t >	1947
MyFlatUnionBuilder	1764
MyFlatMutableBuilder	1750
rti::flat::UnionBuilder< Discriminator >	1947
DDS_AcknowledgmentInfo	586
DDS_AckResponseData_t	588
DDS_AllocationSettings_t	588
DDS_AnnotationParameterValue	590
DDS_AsynchronousPublisherQosPolicy	590
DDS_AsyncWaitSetProperty_t	594
DDS_AvailabilityQosPolicy	596
DDS_BatchQosPolicy	600
DDS_BooleanSeq	604
DDS_BuiltinTopicKey_t	604

DDS_BuiltinTopicReaderResourceLimits_t	605
DDS_ChannelSettings_t	610
DDS_ChannelSettingsSeq	612
DDS_CharSeq	613
DDS_CoherentSetInfo_t	613
DDS_CompressionSettings_t	614
DDS_ContentFilterProperty_t	616
DDS_Cookie_t	618
DDS_CookieSeq	619
DDS_DatabaseQosPolicy	619
DDS_DataReaderCacheStatus	623
DDS_DataReaderProtocolQosPolicy	630
DDS_DataReaderProtocolStatus	633
DDS_DataReaderQos	644
DDS_DataReaderResourceLimitsInstanceReplacementSettings	653
DDS_DataReaderResourceLimitsQosPolicy	654
DDS_DataRepresentationIdSeq	667
DDS_DataRepresentationQosPolicy	668
DDS_DataTags	670
DDS_DataWriterCacheStatus	671
DDS_DataWriterProtocolQosPolicy	673
DDS_DataWriterProtocolStatus	678
DDS_DataWriterQos	689
DDS_DataWriterResourceLimitsQosPolicy	698
DDS_DataWriterShmemRefTransferModeSettings	705
DDS_DataWriterTransferModeQosPolicy	706
DDS_DeadlineQosPolicy	707
DDS_DestinationOrderQosPolicy	709
DDS_DiscoveryConfigQosPolicy	712
DDS_DiscoveryQosPolicy	731
DDS_DomainParticipantConfigParams_t	734
DDS_DomainParticipantFactoryQos	737
DDS_DomainParticipantProtocolStatus	740
DDS_DomainParticipantQos	741
DDS_DomainParticipantResourceLimitsQosPolicy	746
DDS_DoubleSeq	767
DDS_DurabilityQosPolicy	767
DDS_DurabilityServiceQosPolicy	771
DDS_Duration_t	774
DDS_DynamicData	775
DDS_DynamicDataInfo	892
DDS_DynamicDataJsonParserProperties_t	892
DDS_DynamicDataMemberInfo	893
DDS_DynamicDataProperty_t	895
DDS_DynamicDataSeq	896
DDS_DynamicDataTypeProperty_t	896
DDS_DynamicDataTypeSerializationProperty_t	897
DDS_EndpointGroup_t	900
DDS_EndpointGroupSeq	900
DDS_EndpointTrustAlgorithmInfo	901
DDS_EndpointTrustInterceptorAlgorithmInfo	902
DDS_EndpointTrustProtectionInfo	902
DDS_EntityFactoryQosPolicy	903
DDS_EntityNameQosPolicy	905



DDS_EnumMember	906
DDS_EnumMemberSeq	907
DDS_EventQosPolicy	908
DDS_ExpressionProperty	910
DDS_FilterSampleInfo	911
DDS_FloatSeq	912
DDS_FlowControllerProperty_t	912
DDS_FlowControllerTokenBucketProperty_t	914
DDS_GroupDataQosPolicy	916
DDS_GUID_t	918
DDS_HistoryQosPolicy	919
DDS_InconsistentTopicStatus	921
DDS_InstanceHandleSeq	923
DDS_Int8Seq	923
DDS_InvalidLocalIdentityAdvanceNoticeStatus	924
DDS_KeyedOctets	924
DDS_KeyedOctetsSeq	926
DDS_KeyedString	927
DDS_KeyedStringSeq	929
DDS_LatencyBudgetQosPolicy	929
DDS_LifespanQosPolicy	931
DDS_LivelinessChangedStatus	932
DDS_LivelinessLostStatus	934
DDS_LivelinessQosPolicy	936
DDS_Locator_t	939
DDS_LocatorFilter_t	940
DDS_LocatorFilterQosPolicy	941
DDS_LocatorFilterSeq	943
DDS_LocatorSeq	943
DDS_LoggingQosPolicy	943
DDS_LongDoubleSeq	947
DDS_LongLongSeq	947
DDS_LongSeq	948
DDS_MonitoringDedicatedParticipantSettings	948
DDS_MonitoringDistributionSettings	950
DDS_MonitoringEventDistributionSettings	952
DDS_MonitoringLoggingDistributionSettings	954
DDS_MonitoringLoggingForwardingSettings	956
DDS_MonitoringMetricSelection	958
DDS_MonitoringMetricSelectionSeq	960
DDS_MonitoringPeriodicDistributionSettings	960
DDS_MonitoringQosPolicy	962
DDS_MonitoringTelemetryData	963
DDS_MultiChannelQosPolicy	964
DDS_Octets	967
DDS_OctetSeq	969
DDS_OctetsSeq	969
DDS_OfferedDeadlineMissedStatus	970
DDS_OfferedIncompatibleQosStatus	971
DDS_OwnershipQosPolicy	973
DDS_OwnershipStrengthQosPolicy	978
DDS_ParticipantBuiltinTopicData	979
DDS_ParticipantBuiltinTopicDataSeq	984
DDS_ParticipantTrustAlgorithmInfo	984

DDS_ParticipantTrustInterceptorAlgorithmInfo . . . . .	985
DDS_ParticipantTrustKeyEstablishmentAlgorithmInfo . . . . .	986
DDS_ParticipantTrustProtectionInfo . . . . .	987
DDS_ParticipantTrustSignatureAlgorithmInfo . . . . .	988
DDS_PartitionQosPolicy . . . . .	989
DDS_PersistentStorageSettings . . . . .	991
DDS_PresentationQosPolicy . . . . .	996
DDS_PrintFormatProperty . . . . .	1001
DDS_ProductVersion_t . . . . .	1003
DDS_ProfileQosPolicy . . . . .	1004
DDS_Property_t . . . . .	1006
DDS_PropertyQosPolicy . . . . .	1007
DDS_PropertySeq . . . . .	1009
DDS_ProtocolVersion_t . . . . .	1009
DDS_PublicationBuiltinTopicData . . . . .	1010
DDS_PublicationBuiltinTopicDataSeq . . . . .	1019
DDS_PublicationMatchedStatus . . . . .	1020
DDS_PublisherQos . . . . .	1022
DDS_PublishModeQosPolicy . . . . .	1025
DDS_QosPolicyCount . . . . .	1029
DDS_QosPolicyCountSeq . . . . .	1030
DDS_QosPrintAll_t . . . . .	1030
DDS_QosPrintFormat . . . . .	1031
DDS_QueryConditionParams . . . . .	1033
DDS_ReadConditionParams . . . . .	1034
DDS_ReaderDataLifecycleQosPolicy . . . . .	1035
DDS_ReceiverPoolQosPolicy . . . . .	1038
DDS_ReliabilityQosPolicy . . . . .	1041
DDS_ReliableReaderActivityChangedStatus . . . . .	1044
DDS_ReliableWriterCacheChangedStatus . . . . .	1046
DDS_ReliableWriterCacheEventCount . . . . .	1049
DDS_RequestedDeadlineMissedStatus . . . . .	1050
DDS_RequestedIncompatibleQosStatus . . . . .	1051
DDS_ResourceLimitsQosPolicy . . . . .	1052
DDS_RTPS_EntityId_t . . . . .	1056
DDS_RTPS_GUID_t . . . . .	1057
DDS_RtpsReliableReaderProtocol_t . . . . .	1057
DDS_RtpsReliableWriterProtocol_t . . . . .	1061
DDS_RtpsWellKnownPorts_t . . . . .	1076
DDS_SampleIdentity_t . . . . .	1081
DDS_SampleInfo . . . . .	1082
DDS_SampleInfoSeq . . . . .	1093
DDS_SampleLostStatus . . . . .	1093
DDS_SampleRejectedStatus . . . . .	1094
DDS_SequenceNumber_t . . . . .	1095
DDS_ServiceQosPolicy . . . . .	1096
DDS_ServiceRequest . . . . .	1097
DDS_ServiceRequestAcceptedStatus . . . . .	1099
DDS_ServiceRequestSeq . . . . .	1101
DDS_ShortSeq . . . . .	1101
DDS_StringSeq . . . . .	1102
DDS_StructMember . . . . .	1103
DDS_StructMemberSeq . . . . .	1105
DDS_SubscriberQos . . . . .	1105

DDS_SubscriptionBuiltinTopicData	1108
DDS_SubscriptionBuiltinTopicDataSeq	1117
DDS_SubscriptionMatchedStatus	1117
DDS_SystemResourceLimitsQosPolicy	1120
DDS_Tag	1122
DDS_TagSeq	1122
DDS_ThreadSettings_t	1123
DDS_Time_t	1125
DDS_TimeBasedFilterQosPolicy	1126
DDS_TopicBuiltinTopicData	1128
DDS_TopicBuiltinTopicDataSeq	1133
DDS_TopicDataQosPolicy	1133
DDS_TopicQos	1135
DDS_TopicQueryData	1140
DDS_TopicQueryDispatchQosPolicy	1141
DDS_TopicQuerySelection	1143
DDS_TransportBuiltinQosPolicy	1144
DDS_TransportInfo_t	1145
DDS_TransportInfoSeq	1146
DDS_TransportMulticastMapping_t	1147
DDS_TransportMulticastMappingFunction_t	1148
DDS_TransportMulticastMappingQosPolicy	1149
DDS_TransportMulticastMappingSeq	1151
DDS_TransportMulticastQosPolicy	1151
DDS_TransportMulticastSettings_t	1153
DDS_TransportMulticastSettingsSeq	1155
DDS_TransportPriorityQosPolicy	1155
DDS_TransportSelectionQosPolicy	1157
DDS_TransportUnicastQosPolicy	1158
DDS_TransportUnicastSettings_t	1160
DDS_TransportUnicastSettingsSeq	1161
DDS_TrustAlgorithmRequirements	1162
DDS_TypeAllocationParams_t	1163
DDS_TypeCode	1164
DDS_TypeCodeFactory	1210
DDS_TypeCodePrintFormatProperty	1224
DDS_TypeConsistencyEnforcementQosPolicy	1228
DDS_TypeDeallocationParams_t	1231
DDS_TypeSupportQosPolicy	1232
DDS_UInt8Seq	1234
DDS_UnionMember	1235
DDS_UnionMemberSeq	1236
DDS_UnsignedLongLongSeq	1236
DDS_UnsignedLongSeq	1237
DDS_UnsignedShortSeq	1237
DDS_UserDataQosPolicy	1237
DDS_ValueMember	1239
DDS_ValueMemberSeq	1241
DDS_VendorId_t	1241
DDS_WaitSetProperty_t	1242
DDS_WcharSeq	1243
DDS_WireProtocolQosPolicy	1244
DDS_WriteParams_t	1251
DDS_WriterDataLifecycleQosPolicy	1256

DDS_WstringSeq . . . . .	1259
DDSAsyncWaitSet . . . . .	1259
DDSAsyncWaitSetCompletionToken . . . . .	1273
DDSAsyncWaitSetListener . . . . .	1275
DDSCondition . . . . .	1276
DDSGuardCondition . . . . .	1471
DDSReadCondition . . . . .	1574
DDSQueryCondition . . . . .	1573
DDSStatusCondition . . . . .	1578
DDSConditionHandler . . . . .	1278
DDSDataReaderStatusConditionHandler . . . . .	1318
DDSConditionSeq . . . . .	1279
DDSContentFilter . . . . .	1280
DDSWriterContentFilter . . . . .	1637
DDSDataReaderSeq . . . . .	1317
DDSDataTagQosPolicyHelper . . . . .	1320
DDSDomainParticipantFactory . . . . .	1426
DDSEntity . . . . .	1463
DDSDomainEntity . . . . .	1350
DDSDataReader . . . . .	1288
DDSDynamicDataReader . . . . .	1456
DDSDynamicDataReader . . . . .	1456
DDSKeyedOctetsDataReader . . . . .	1473
DDSKeyedStringDataReader . . . . .	1501
DDSOctetsDataReader . . . . .	1532
DDSParticipantBuiltinTopicDataDataReader . . . . .	1548
DDSPublicationBuiltinTopicDataDataReader . . . . .	1549
DDSServiceRequestDataReader . . . . .	1577
DDSStringDataReader . . . . .	1580
DDSSubscriptionBuiltinTopicDataDataReader . . . . .	1614
DDSTopicBuiltinTopicDataDataReader . . . . .	1622
FooDataReader . . . . .	1649
DDSDataWriter . . . . .	1321
DDSDynamicDataWriter . . . . .	1462
DDSDynamicDataWriter . . . . .	1462
DDSKeyedOctetsDataWriter . . . . .	1482
DDSKeyedStringDataWriter . . . . .	1510
DDSOctetsDataWriter . . . . .	1536
DDSStringDataWriter . . . . .	1584
FooDataWriter . . . . .	1676
DDSPublisher . . . . .	1550
DDSSubscriber . . . . .	1592
DDSTopic . . . . .	1617
DDSDomainParticipant . . . . .	1351
DDSFlowController . . . . .	1468
DDSListener . . . . .	1526
DDSDataReaderListener . . . . .	1315
DDSSubscriberListener . . . . .	1613
DDSDomainParticipantListener . . . . .	1454
DDSDataWriterListener . . . . .	1344
DDSPublisherListener . . . . .	1571
DDSDomainParticipantListener . . . . .	1454

DDSTopicListener . . . . .	1626
DDSDomainParticipantListener . . . . .	1454
DDSParticipantBuiltinTopicDataTypeSupport . . . . .	1548
DDSPROPERTYQOSPolicyHelper . . . . .	1549
DDSPublicationBuiltinTopicDataTypeSupport . . . . .	1550
DDSPublisherSeq . . . . .	1572
DDSServiceRequestTypeSupport . . . . .	1577
DDSSubscriberSeq . . . . .	1614
DDSSubscriptionBuiltinTopicDataTypeSupport . . . . .	1615
DDSThreadFactory . . . . .	1615
DDSTopicBuiltinTopicDataTypeSupport . . . . .	1623
DDSTopicDescription . . . . .	1624
DDSContentFilteredTopic . . . . .	1283
DDSMultiTopic . . . . .	1529
DDSTopic . . . . .	1617
DDSTopicQuery . . . . .	1627
DDSTopicQueryHelper . . . . .	1628
DDSTypeSupport . . . . .	1629
DDSDynamicDataTypeSupport . . . . .	1456
DDSKeyedOctetsTypeSupport . . . . .	1495
DDSKeyedStringTypeSupport . . . . .	1520
DDSOctetsTypeSupport . . . . .	1543
DDSStringTypeSupport . . . . .	1587
FooTypeSupport . . . . .	1711
DDSWaitSet . . . . .	1629
rti::flat::flat_type_traits< T > . . . . .	1647
rti::flat::flat_type_traits< PrimitiveSequenceOffset< char > > . . . . .	1647
Foo . . . . .	1648
FooSeq . . . . .	1697
connex::IsValidSamplePredicate< T > . . . . .	1725
connex::IsReplyRelatedPredicate< T > . . . . .	1725
connex::IsValidSamplePredicate< T > . . . . .	1727
connex::LoanedSamples< T > . . . . .	1727
connex::LoanedSamples< T >::LoanMemento . . . . .	1736
connex::LogicException . . . . .	1737
connex::AlreadyDeletedException . . . . .	585
connex::BadParameterException . . . . .	586
connex::IllegalOperationException . . . . .	1724
connex::ImmutablePolicyException . . . . .	1724
connex::InconsistentPolicyException . . . . .	1725
connex::NotEnabledException . . . . .	1855
connex::PreconditionNotMetException . . . . .	1861
connex::UnsupportedException . . . . .	1948
connex::MessagingLibraryVersion . . . . .	1737
connex::MessagingVersion . . . . .	1738
NDDS_Config_LibraryVersion_t . . . . .	1771
NDDS_Config_LogMessage . . . . .	1772
NDDS_Transport_Address_t . . . . .	1774
NDDS_Transport_Interface_t . . . . .	1775
NDDS_Transport_Property_t . . . . .	1776
NDDS_Transport_Shmem_Property_t . . . . .	1784
NDDS_Transport_UDP_WAN_CommPortsMappingInfo . . . . .	1787
NDDS_Transport_UDPv4_Property_t . . . . .	1788

NDDS_Transport_UDPv4_WAN_Property_t	1798
NDDS_Transport_UDPv6_Property_t	1808
NDDS_Transport_UUID	1817
NDDS_Utility_NetworkCaptureParams_t	1817
NDDSSConfigActivityContext	1820
NDDSSConfigCompliance	1820
NDDSSConfigLogger	1822
NDDSSConfigLoggerDevice	1829
NDDSSConfigVersion	1831
NDDSLM	1832
NDDSTransportSupport	1833
NDDSUtility	1839
NDDSUtilityHeapMonitoring	1842
NDDSUtilityNetworkCapture	1846
rti::flat::OffsetBase	1856
rti::flat::AbstractPrimitiveList< char >	582
rti::flat::PrimitiveSequenceOffset< char >	1867
rti::flat::StringOffset	1945
rti::flat::FinalOffset< MyFlatFinalOffset >	1645
MyFlatFinalOffset	1746
rti::flat::AbstractAlignedList< ElementOffset >	577
rti::flat::FinalAlignedArrayOffset< ElementOffset, N >	1641
rti::flat::MutableArrayOffset< ElementOffset, N >	1742
rti::flat::SequenceOffset< ElementOffset >	1934
rti::flat::AbstractPrimitiveList< T >	582
rti::flat::PrimitiveArrayOffset< T, N >	1861
rti::flat::PrimitiveSequenceOffset< T >	1867
rti::flat::FinalArrayOffset< ElementOffset, N >	1643
rti::flat::FinalOffset< T >	1645
rti::flat::MutableOffset	1743
MyFlatMutableOffset	1757
MyFlatUnionOffset	1767
rti::flat::PrimitiveConstOffset< T >	1862
rti::flat::PrimitiveOffset< T >	1863
connext::Replier< TReq, TRep >	1868
connext::ReplierListener< TReq, TRep >	1880
connext::ReplierParams< TReq, TRep >	1881
connext::Requester< TReq, TRep >	1886
connext::RequesterParams	1907
connext::RuntimeException	1912
connext::OutOfResourcesException	1860
connext::TimeoutException	1946
connext::Sample< T >	1912
rti::flat::Sample< OffsetType >	1916
connext::SampleIterator< T, IsConst >	1920
connext::SampleRef< T >	1920
rti::flat::SequenceIterator< E, OffsetKind >	1926
connext::SimpleReplier< TReq, TRep >	1935
connext::SimpleReplierListener< TReq, TRep >	1937
connext::SimpleReplierParams< TReq, TRep >	1939
TransportAllocationSettings_t	1947
connext::WriteSample< T >	1948
connext::WriteSampleRef< T >	1952

## Chapter 5

# Class Index

### 5.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

<b>rti::flat::AbstractAlignedList</b> < <b>ElementOffset</b> >	
Base class of Offsets to sequences and arrays of non-primitive members . . . . .	577
<b>rti::flat::AbstractBuilder</b>	
Base class of all <b>Builders</b> (p. 558) . . . . .	579
<b>rti::flat::AbstractListBuilder</b> < <b>DHeaderGen</b> >	
Base class of all array and sequence builders . . . . .	581
<b>rti::flat::AbstractPrimitiveList</b> < <b>T</b> >	
Base class for Offsets to sequences and arrays of primitive types . . . . .	582
<b>rti::flat::AbstractSequenceBuilder</b> < <b>DHeaderGen</b> >	
Base class of Builders for sequence members . . . . .	584
<b>rti::flat::AggregationBuilder</b>	
Base class of struct and union builders . . . . .	585
<b>connext::AlreadyDeletedException</b>	
The object target of this operation has already been deleted . . . . .	585
<b>connext::BadParameterException</b>	
Illegal parameter value . . . . .	586
<b>DDS_AcknowledgmentInfo</b>	
Information about an application-level acknowledged sample . . . . .	586
<b>DDS_AckResponseData_t</b>	
Data payload of an application-level acknowledgment . . . . .	588
<b>DDS_AllocationSettings_t</b>	
Resource allocation settings . . . . .	588
<b>DDS_AnnotationParameterValue</b>	
Annotation parameter value . . . . .	590
<b>DDS_AsynchronousPublisherQosPolicy</b>	
Configures the mechanism that sends user data in an external middleware thread . . . . .	590
<b>DDS_AsyncWaitSetProperty_t</b>	
Specifies the <b>DDSAsyncWaitSet</b> (p. 1259) behavior . . . . .	594
<b>DDS_AvailabilityQosPolicy</b>	
Configures the availability of data . . . . .	596

<b>DDS_BatchQosPolicy</b>	Used to configure batching of multiple samples into a single network packet in order to increase throughput for small samples . . . . .	600
<b>DDS_BooleanSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Boolean</b> (p. 320) > . . . . .	604
<b>DDS_BuiltinTopicKey_t</b>	The key type of the built-in topic types . . . . .	604
<b>DDS_BuiltinTopicReaderResourceLimits_t</b>	Built-in topic reader's resource limits . . . . .	605
<b>DDS_ChannelSettings_t</b>	Type used to configure the properties of a channel . . . . .	610
<b>DDS_ChannelSettingsSeq</b>	Declares IDL <i>sequence</i> < <b>DDS_ChannelSettings_t</b> (p. 610) > . . . . .	612
<b>DDS_CharSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Char</b> (p. 317) > . . . . .	613
<b>DDS_CoherentSetInfo_t</b>	<< <i>extension</i> >> (p. 237) Type definition for a coherent set info . . . . .	613
<b>DDS_CompressionSettings_t</b>	<< <i>extension</i> >> (p. 237) Settings related to compressing user data . . . . .	614
<b>DDS_ContentFilterProperty_t</b>	<< <i>extension</i> >> (p. 237) Type used to provide all the required information to enable content filtering	616
<b>DDS_Cookie_t</b>	<< <i>extension</i> >> (p. 237) Sequence of bytes . . . . .	618
<b>DDS_CookieSeq</b>	Declares IDL <i>sequence</i> < <b>DDS_Cookie_t</b> (p. 618) > . . . . .	619
<b>DDS_DatabaseQosPolicy</b>	Various threads and resource limits settings used by RTI Connex to control its internal database . .	619
<b>DDS_DataReaderCacheStatus</b>	<< <i>extension</i> >> (p. 237) The status of the reader's cache . . . . .	623
<b>DDS_DataReaderProtocolQosPolicy</b>	Along with <b>DDS_WireProtocolQosPolicy</b> (p. 1244) and <b>DDS_DataWriterProtocolQosPolicy</b> (p. 673), this QoS policy configures the DDS on-the-network protocol (RTPS) . . . . .	630
<b>DDS_DataReaderProtocolStatus</b>	<< <i>extension</i> >> (p. 237) The status of a reader's internal protocol related metrics, like the number of samples received, filtered, rejected; and status of wire protocol traffic . . . . .	633
<b>DDS_DataReaderQos</b>	QoS policies supported by a <b>DDSDataReader</b> (p. 1288) entity . . . . .	644
<b>DDS_DataReaderResourceLimitsInstanceReplacementSettings</b>	Instance replacement kind applied to each instance state . . . . .	653
<b>DDS_DataReaderResourceLimitsQosPolicy</b>	Various settings that configure how a <b>DDSDataReader</b> (p. 1288) allocates and uses physical memory for internal resources . . . . .	654
<b>DDS_DataRepresentationIdSeq</b>	Declares IDL <i>sequence</i> < <b>DDS_DataRepresentationId_t</b> (p. 370) > . . . . .	667
<b>DDS_DataRepresentationQosPolicy</b>	This QoS policy contains a list of representation identifiers and compression settings used by <b>DDSDataWriter</b> (p. 1321) and <b>DDSDataReader</b> (p. 1288) entities to negotiate which data representation and compression settings to use . . . . .	668
<b>DDS_DataTags</b>	Definition of <b>DDS_DataTagQosPolicy</b> (p. 377) . . . . .	670
<b>DDS_DataWriterCacheStatus</b>	<< <i>extension</i> >> (p. 237) The status of the DataWriter's cache. Provides information on cache related metrics such as the number of samples and instances in the DataWriter queue . . . . .	671



<b>DDS_DataWriterProtocolQosPolicy</b>	
Protocol that applies only to <b>DDSDataWriter</b> (p. 1321) instances	673
<b>DDS_DataWriterProtocolStatus</b>	
<< <i>extension</i> >> (p. 237) The status of a writer's internal protocol related metrics, like the number of samples pushed, pulled, filtered; and status of wire protocol traffic	678
<b>DDS_DataWriterQos</b>	
QoS policies supported by a <b>DDSDataWriter</b> (p. 1321) entity	689
<b>DDS_DataWriterResourceLimitsQosPolicy</b>	
Various settings that configure how a <b>DDSDataWriter</b> (p. 1321) allocates and uses physical memory for internal resources	698
<b>DDS_DataWriterShmemRefTransferModeSettings</b>	
Settings related to transferring data using shared memory references	705
<b>DDS_DataWriterTransferModeQosPolicy</b>	
<< <i>extension</i> >> (p. 237) Qos related to transferring data	706
<b>DDS_DeadlineQosPolicy</b>	
Expresses the maximum duration (deadline) within which an instance is expected to be updated	707
<b>DDS_DestinationOrderQosPolicy</b>	
Controls how the middleware will deal with data sent by multiple <b>DDSDataWriter</b> (p. 1321) entities for the same instance of data (i.e., same <b>DDSTopic</b> (p. 1617) and key)	709
<b>DDS_DiscoveryConfigQosPolicy</b>	
Settings for discovery configuration	712
<b>DDS_DiscoveryQosPolicy</b>	
<< <i>extension</i> >> (p. 237) Configures the mechanism used by the middleware to automatically discover and connect with new remote applications	731
<b>DDS_DomainParticipantConfigParams_t</b>	
<< <i>extension</i> >> (p. 237) Input paramaters for creating a participant from configuration. It allows to modify or override some of the properties of the entities defined in the configuration	734
<b>DDS_DomainParticipantFactoryQos</b>	
QoS policies supported by a <b>DDSDomainParticipantFactory</b> (p. 1426)	737
<b>DDS_DomainParticipantProtocolStatus</b>	
<< <i>extension</i> >> (p. 237) The status of a participant's protocol related metrics, like the number of corrupted messages, change in corrupted messages and timestamp of the last corrupted message	740
<b>DDS_DomainParticipantQos</b>	
QoS policies supported by a <b>DDSDomainParticipant</b> (p. 1351) entity	741
<b>DDS_DomainParticipantResourceLimitsQosPolicy</b>	
Various settings that configure how a <b>DDSDomainParticipant</b> (p. 1351) allocates and uses physical memory for internal resources, including the maximum sizes of various properties	746
<b>DDS_DoubleSeq</b>	
Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Double</b> (p. 319) >	767
<b>DDS_DurabilityQosPolicy</b>	
This QoS policy specifies whether or not RTI Connex will store and deliver previously published data samples to new <b>DDSDataReader</b> (p. 1288) entities that join the network later	767
<b>DDS_DurabilityServiceQosPolicy</b>	
Various settings to configure the external <i>RTI Persistence Service</i> used by RTI Connex for Data↔ Writers with a <b>DDS_DurabilityQosPolicy</b> (p. 767) setting of <b>DDS_PERSISTENT_DURABILITY_↔ QOS</b> (p. 401) or <b>DDS_TRANSIENT_DURABILITY_QOS</b> (p. 401)	771
<b>DDS_Duration_t</b>	
Type for <i>duration</i> representation	774
<b>DDS_DynamicData</b>	
A sample of any complex data type, which can be inspected and manipulated reflectively	775
<b>DDS_DynamicDataInfo</b>	
A descriptor for a <b>DDS_DynamicData</b> (p. 775) object	892
<b>DDS_DynamicDataJsonParserProperties_t</b>	
A collection of attributes used to configure <b>DDS_DynamicData</b> (p. 775) objects	892

<b>DDS_DynamicDataMemberInfo</b>	A descriptor for a single member (i.e. field) of dynamically defined data type . . . . .	893
<b>DDS_DynamicDataProperty_t</b>	A collection of attributes used to configure <b>DDS_DynamicData</b> (p. 775) objects . . . . .	895
<b>DDS_DynamicDataSeq</b>	An ordered collection of <b>DDS_DynamicData</b> (p. 775) elements . . . . .	896
<b>DDS_DynamicDataTypeProperty_t</b>	A collection of attributes used to configure <b>DDSDynamicDataTypeSupport</b> (p. 1456) objects . . . . .	896
<b>DDS_DynamicDataTypeSerializationProperty_t</b>	Properties that govern how data of a certain type will be serialized on the network . . . . .	897
<b>DDS_EndpointGroup_t</b>	Specifies a group of endpoints that can be collectively identified by a name and satisfied by a quorum	900
<b>DDS_EndpointGroupSeq</b>	A sequence of <b>DDS_EndpointGroup_t</b> (p. 900) . . . . .	900
<b>DDS_EndpointTrustAlgorithmInfo</b>	Trust Plugins algorithm information associated with the discovered endpoint . . . . .	901
<b>DDS_EndpointTrustInterceptorAlgorithmInfo</b>	Trust Plugins interception algorithm information associated with the discovered endpoint . . . . .	902
<b>DDS_EndpointTrustProtectionInfo</b>	Trust Plugins Protection information associated with the discovered endpoint . . . . .	902
<b>DDS_EntityFactoryQosPolicy</b>	A QoS policy for all <b>DDSEntity</b> (p. 1463) types that can act as factories for one or more other <b>DDSEntity</b> (p. 1463) types . . . . .	903
<b>DDS_EntityNameQosPolicy</b>	Assigns a name and a role name to a <b>DDSDomainParticipant</b> (p. 1351), <b>DDSPublisher</b> (p. 1550), <b>DDSSubscriber</b> (p. 1592), <b>DDSDataWriter</b> (p. 1321) or <b>DDSDataReader</b> (p. 1288). Except for <b>DDSPublisher</b> (p. 1550) and <b>DDSSubscriber</b> (p. 1592), these names will be visible during the discovery process and in RTI tools to help you visualize and debug your system . . . . .	905
<b>DDS_EnumMember</b>	A description of a member of an enumeration . . . . .	906
<b>DDS_EnumMemberSeq</b>	Defines a sequence of enumerator members . . . . .	907
<b>DDS_EventQosPolicy</b>	Settings for event . . . . .	908
<b>DDS_ExpressionProperty</b>	Provides additional information about the filter expression passed to <b>DDSWriterContentFilter</b> ↔ <b>::writer_compile</b> (p. 1638) . . . . .	910
<b>DDS_FilterSampleInfo</b>	Provides meta information associated with the sample . . . . .	911
<b>DDS_FloatSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Float</b> (p. 319) > . . . . .	912
<b>DDS_FlowControllerProperty_t</b>	Determines the flow control characteristics of the <b>DDSFlowController</b> (p. 1468) . . . . .	912
<b>DDS_FlowControllerTokenBucketProperty_t</b>	<b>DDSFlowController</b> (p. 1468) uses the popular token bucket approach for open loop network flow control. The flow control characteristics are determined by the token bucket properties . . . . .	914
<b>DDS_GroupDataQosPolicy</b>	Attaches a buffer of opaque data that is distributed by means of <b>Built-in Topics</b> (p. 59) during discovery . . . . .	916
<b>DDS_GUID_t</b>	Type for <i>GUID</i> (Global Unique Identifier) representation . . . . .	918
<b>DDS_HistoryQosPolicy</b>	Specifies the behavior of RTI Connex in the case where the value of a sample changes (one or more times) before it can be successfully communicated to one or more existing subscribers . . . . .	919

<b>DDS_InconsistentTopicStatus</b>	
<b>DDS_INCONSISTENT_TOPIC_STATUS</b> (p. 343)	921
<b>DDS_InstanceHandleSeq</b>	
Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_InstanceHandle_t</b> (p. 74) >	923
<b>DDS_Int8Seq</b>	
Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Int8</b> (p. 318) >	923
<b>DDS_InvalidLocalIdentityAdvanceNoticeStatus</b>	
<b>DDS_INVALID_LOCAL_IDENTITY_ADVANCE_NOTICE_STATUS</b> (p. 347)	924
<b>DDS_KeyedOctets</b>	
Built-in type consisting of a variable-length array of opaque bytes and a string that is the key	924
<b>DDS_KeyedOctetsSeq</b>	
Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_KeyedOctets</b> (p. 924) >	926
<b>DDS_KeyedString</b>	
Keyed string built-in type	927
<b>DDS_KeyedStringSeq</b>	
Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_KeyedString</b> (p. 927) >	929
<b>DDS_LatencyBudgetQosPolicy</b>	
Provides a hint as to the maximum acceptable delay from the time the data is written to the time it is received by the subscribing applications	929
<b>DDS_LifespanQosPolicy</b>	
Specifies how long the data written by the <b>DDSDataWriter</b> (p. 1321) is considered valid	931
<b>DDS_LivelinessChangedStatus</b>	
<b>DDS_LIVELINESS_CHANGED_STATUS</b> (p. 346)	932
<b>DDS_LivelinessLostStatus</b>	
<b>DDS_LIVELINESS_LOST_STATUS</b> (p. 346)	934
<b>DDS_LivelinessQosPolicy</b>	
Specifies and configures the mechanism that allows <b>DDSDataReader</b> (p. 1288) entities to detect when <b>DDSDataWriter</b> (p. 1321) entities become disconnected or "dead."	936
<b>DDS_Locator_t</b>	
<< <i>extension</i> >> (p. 237) Type used to represent the addressing information needed to send a message to an RTPS Endpoint using one of the supported transports	939
<b>DDS_LocatorFilter_t</b>	
Specifies the configuration of an individual channel within a MultiChannel DataWriter	940
<b>DDS_LocatorFilterQosPolicy</b>	
The QoS policy used to report the configuration of a MultiChannel DataWriter as part of <b>DDS_PublicationBuiltinTopicData</b> (p. 1010)	941
<b>DDS_LocatorFilterSeq</b>	
Declares IDL <i>sequence</i> < <b>DDS_LocatorFilter_t</b> (p. 940) >	943
<b>DDS_LocatorSeq</b>	
Declares IDL <i>sequence</i> < <b>DDS_Locator_t</b> (p. 939) >	943
<b>DDS_LoggingQosPolicy</b>	
Configures the RTI Connex logging facility	943
<b>DDS_LongDoubleSeq</b>	
Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_LongDouble</b> (p. 319) >	947
<b>DDS_LongLongSeq</b>	
Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_LongLong</b> (p. 319) >	947
<b>DDS_LongSeq</b>	
Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Long</b> (p. 318) >	948
<b>DDS_MonitoringDedicatedParticipantSettings</b>	
Configures the use of a dedicated <b>DDSDomainParticipant</b> (p. 1351) to distribute the RTI Connex application telemetry data	948
<b>DDS_MonitoringDistributionSettings</b>	
Configures the distribution of telemetry data	950

<b>DDS_MonitoringEventDistributionSettings</b>	Configures the distribution of event metrics . . . . .	952
<b>DDS_MonitoringLoggingDistributionSettings</b>	Configures the distribution of log messages . . . . .	954
<b>DDS_MonitoringLoggingForwardingSettings</b>	Configures the forwarding levels of log messages for the different <b>NDDS_Config_LogFacility</b> (p. 528) . . . . .	956
<b>DDS_MonitoringMetricSelection</b>	This data structure is used to configure event and periodic metrics collection and distribution for a specific set of observable resources . . . . .	958
<b>DDS_MonitoringMetricSelectionSeq</b>	Declares IDL <code>sequence &lt; DDS_MonitoringMetricSelection (p. 958) &gt;</code> . . . . .	960
<b>DDS_MonitoringPeriodicDistributionSettings</b>	Configures the distribution of periodic metrics . . . . .	960
<b>DDS_MonitoringQosPolicy</b>	Configures the use of RTI Monitoring Library 2.0 to collect and distribute RTI Connexx telemetry data	962
<b>DDS_MonitoringTelemetryData</b>	Configures the telemetry data that will be distributed . . . . .	963
<b>DDS_MultiChannelQosPolicy</b>	Configures the ability of a DataWriter to send data on different multicast groups (addresses) based on the value of the data . . . . .	964
<b>DDS_Octets</b>	Built-in type consisting of a variable-length array of opaque bytes . . . . .	967
<b>DDS_OctetSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Octet</b> (p. 317) > . . . . .	969
<b>DDS_OctetsSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Octets</b> (p. 967) > . . . . .	969
<b>DDS_OfferedDeadlineMissedStatus</b>	<b>DDS_OFFERED_DEADLINE_MISSED_STATUS</b> (p. 343) . . . . .	970
<b>DDS_OfferedIncompatibleQosStatus</b>	<b>DDS_OFFERED_INCOMPATIBLE_QOS_STATUS</b> (p. 344) . . . . .	971
<b>DDS_OwnershipQosPolicy</b>	Specifies whether it is allowed for multiple <b>DDSDataWriter</b> (p. 1321) (s) to write the same instance of the data and if so, how these modifications should be arbitrated . . . . .	973
<b>DDS_OwnershipStrengthQosPolicy</b>	Specifies the value of the strength used to arbitrate among multiple <b>DDSDataWriter</b> (p. 1321) objects that attempt to modify the same instance of a data type (identified by <b>DDSTopic</b> (p. 1617) + key) . . . . .	978
<b>DDS_ParticipantBuiltinTopicData</b>	Entry created when a DomainParticipant object is discovered . . . . .	979
<b>DDS_ParticipantBuiltinTopicDataSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_ParticipantBuiltinTopicData</b> (p. 979) > . . . . .	984
<b>DDS_ParticipantTrustAlgorithmInfo</b>	Trust Plugins algorithm information associated with the discovered DomainParticipant . . . . .	984
<b>DDS_ParticipantTrustInterceptorAlgorithmInfo</b>	Trust Plugins interception algorithm information associated with the discovered DomainParticipant . . . . .	985
<b>DDS_ParticipantTrustKeyEstablishmentAlgorithmInfo</b>	Trust Plugins key establishment algorithm information associated with the discovered DomainParticipant . . . . .	986
<b>DDS_ParticipantTrustProtectionInfo</b>	Trust Plugins Protection information associated with the discovered DomainParticipant . . . . .	987
<b>DDS_ParticipantTrustSignatureAlgorithmInfo</b>	Trust Plugins signature algorithm information associated with the discovered DomainParticipant . . . . .	988

<b>DDS_PartitionQosPolicy</b>	Set of strings that introduces logical partitions in <b>DDSDomainParticipant</b> (p. 1351), <b>DDSPublisher</b> (p. 1550), or <b>DDSSubscriber</b> (p. 1592) entities . . . . .	989
<b>DDS_PersistentStorageSettings</b>	Configures durable writer history and durable reader state . . . . .	991
<b>DDS_PresentationQosPolicy</b>	Specifies how the samples representing changes to data instances are presented to a subscribing application . . . . .	996
<b>DDS_PrintFormatProperty</b>	A collection of attributes used to configure how data samples will be formatted when converted to a string . . . . .	1001
<b>DDS_ProductVersion_t</b>	<< <i>extension</i> >> (p. 237) Type used to represent the current version of RTI Connext . . . . .	1003
<b>DDS_ProfileQosPolicy</b>	Configures the way that XML documents containing QoS profiles are loaded by RTI Connext . . . . .	1004
<b>DDS_Property_t</b>	Properties are name/value pairs objects . . . . .	1006
<b>DDS_PropertyQosPolicy</b>	Stores name/value(string) pairs that can be used to configure certain parameters of RTI Connext that are not exposed through formal QoS policies. Can also be used to store and propagate application-specific name/value pairs that can be retrieved by user code during discovery . . . . .	1007
<b>DDS_PropertySeq</b>	Declares IDL <i>sequence</i> < <b>DDS_Property_t</b> (p. 1006) > . . . . .	1009
<b>DDS_ProtocolVersion_t</b>	<< <i>extension</i> >> (p. 237) Type used to represent the version of the RTPS protocol . . . . .	1009
<b>DDS_PublicationBuiltinTopicData</b>	Entry created when a <b>DDSDataWriter</b> (p. 1321) is discovered in association with its Publisher . . . . .	1010
<b>DDS_PublicationBuiltinTopicDataSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_PublicationBuiltinTopicData</b> (p. 1010) > . . . . .	1019
<b>DDS_PublicationMatchedStatus</b>	<b>DDS_PUBLICATION_MATCHED_STATUS</b> (p. 347) . . . . .	1020
<b>DDS_PublisherQos</b>	QoS policies supported by a <b>DDSPublisher</b> (p. 1550) entity . . . . .	1022
<b>DDS_PublishModeQosPolicy</b>	Specifies how RTI Connext sends application data on the network. This QoS policy can be used to tell RTI Connext to use its <i>own</i> thread to send data, instead of the user thread . . . . .	1025
<b>DDS_QosPolicyCount</b>	Type to hold a counter for a <b>DDS_QosPolicyId_t</b> (p. 360) . . . . .	1029
<b>DDS_QosPolicyCountSeq</b>	Declares IDL <i>sequence</i> < <b>DDS_QosPolicyCount</b> (p. 1029) > . . . . .	1030
<b>DDS_QosPrintAll_t</b>	Special type which is used to select the <i>to_string</i> overloads when printing Qos objects . . . . .	1030
<b>DDS_QosPrintFormat</b>	A collection of attributes used to configure how a QoS appears when printed . . . . .	1031
<b>DDS_QueryConditionParams</b>	<< <i>extension</i> >> (p. 237) Input parameters for <b>DDSDataReader::create_querycondition_w_↔params</b> (p. 1294) . . . . .	1033
<b>DDS_ReadConditionParams</b>	<< <i>extension</i> >> (p. 237) Input parameters for <b>DDSDataReader::create_readcondition_w_↔params</b> (p. 1293) . . . . .	1034
<b>DDS_ReaderDataLifecycleQosPolicy</b>	Controls how a DataReader manages the lifecycle of the data that it has received . . . . .	1035

<b>DDS_ReceiverPoolQosPolicy</b>	
Configures threads used by RTI Connex to receive and process data from transports (for example, UDP sockets) . . . . .	1038
<b>DDS_ReliabilityQosPolicy</b>	
Indicates the level of reliability offered/requested by RTI Connex . . . . .	1041
<b>DDS_ReliableReaderActivityChangedStatus</b>	
<< <i>extension</i> >> (p. 237) Describes the activity (i.e. are acknowledgements forthcoming) of reliable readers matched to a reliable writer . . . . .	1044
<b>DDS_ReliableWriterCacheChangedStatus</b>	
<< <i>extension</i> >> (p. 237) A summary of the state of a data writer's cache of unacknowledged samples written . . . . .	1046
<b>DDS_ReliableWriterCacheEventCount</b>	
<< <i>extension</i> >> (p. 237) The number of times the number of unacknowledged samples in the cache of a reliable writer hit a certain well-defined threshold . . . . .	1049
<b>DDS_RequestedDeadlineMissedStatus</b>	
<b>DDS_REQUESTED_DEADLINE_MISSED_STATUS</b> (p. 344) . . . . .	1050
<b>DDS_RequestedIncompatibleQosStatus</b>	
<b>DDS_REQUESTED_INCOMPATIBLE_QOS_STATUS</b> (p. 344) . . . . .	1051
<b>DDS_ResourceLimitsQosPolicy</b>	
Controls the amount of physical memory allocated for DDS entities, if dynamic allocations are allowed, and how they occur. Also controls memory usage among different instance values for keyed topics . . . . .	1052
<b>DDS_RTPS_EntityId_t</b>	
From the DDS-RTPS specification: type used to hold the suffix part of the globally-unique RTPS-entity identifiers . . . . .	1056
<b>DDS_RTPS_GUID_t</b>	
From the DDS-RTPS specification: type used to hold a globally-unique RTPS-entity identifier . . . . .	1057
<b>DDS_RtpsReliableReaderProtocol_t</b>	
Qos related to reliable reader protocol defined in RTPS . . . . .	1057
<b>DDS_RtpsReliableWriterProtocol_t</b>	
QoS related to the reliable writer protocol defined in RTPS . . . . .	1061
<b>DDS_RtpsWellKnownPorts_t</b>	
RTPS well-known port mapping configuration . . . . .	1076
<b>DDS_SampleIdentity_t</b>	
Type definition for a Sample Identity . . . . .	1081
<b>DDS_SampleInfo</b>	
Information that accompanies each sample that is read or taken . . . . .	1082
<b>DDS_SampleInfoSeq</b>	
Declares IDL <i>sequence</i> < <b>DDS_SampleInfo</b> (p. 1082) > . . . . .	1093
<b>DDS_SampleLostStatus</b>	
<b>DDS_SAMPLE_LOST_STATUS</b> (p. 345) . . . . .	1093
<b>DDS_SampleRejectedStatus</b>	
<b>DDS_SAMPLE_REJECTED_STATUS</b> (p. 345) . . . . .	1094
<b>DDS_SequenceNumber_t</b>	
Type for <i>sequence</i> number representation . . . . .	1095
<b>DDS_ServiceQosPolicy</b>	
Service associated with a DDS entity . . . . .	1096
<b>DDS_ServiceRequest</b>	
A request coming from one of the built-in services . . . . .	1097
<b>DDS_ServiceRequestAcceptedStatus</b>	
<b>DDS_SERVICE_REQUEST_ACCEPTED_STATUS</b> (p. 348) . . . . .	1099
<b>DDS_ServiceRequestSeq</b>	
Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_ServiceRequest</b> (p. 1097) > . . . . .	1101

<b>DDS_ShortSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Short</b> (p. 318) > . . . . .	1101
<b>DDS_StringSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < char* > with value type semantics . . . . .	1102
<b>DDS_StructMember</b>	A description of a member of a struct . . . . .	1103
<b>DDS_StructMemberSeq</b>	Defines a sequence of struct members . . . . .	1105
<b>DDS_SubscriberQos</b>	QoS policies supported by a <b>DDSSubscriber</b> (p. 1592) entity . . . . .	1105
<b>DDS_SubscriptionBuiltinTopicData</b>	Entry created when a <b>DDSDataReader</b> (p. 1288) is discovered in association with its Subscriber . . . . .	1108
<b>DDS_SubscriptionBuiltinTopicDataSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_SubscriptionBuiltinTopicData</b> (p. 1108) > . . . . .	1117
<b>DDS_SubscriptionMatchedStatus</b>	<b>DDS_SUBSCRIPTION_MATCHED_STATUS</b> (p. 347) . . . . .	1117
<b>DDS_SystemResourceLimitsQosPolicy</b>	<< <i>extension</i> >> (p. 237) Configures <b>DDSDomainParticipant</b> (p. 1351)-independent resources used by RTI Connext. Mainly used to change the maximum number of <b>DDSDomainParticipant</b> (p. 1351) entities that can be created within a single process (address space) . . . . .	1120
<b>DDS_Tag</b>	Tags are name/value pair objects . . . . .	1122
<b>DDS_TagSeq</b>	Declares IDL <i>sequence</i> < <b>DDS_Tag</b> (p. 1122) > . . . . .	1122
<b>DDS_ThreadSettings_t</b>	The properties of a thread of execution . . . . .	1123
<b>DDS_Time_t</b>	Type for <i>time</i> representation . . . . .	1125
<b>DDS_TimeBasedFilterQosPolicy</b>	Filter that allows a <b>DDSDataReader</b> (p. 1288) to specify that it is interested only in (potentially) a subset of the values of the data . . . . .	1126
<b>DDS_TopicBuiltinTopicData</b>	Entry created when a Topic object discovered . . . . .	1128
<b>DDS_TopicBuiltinTopicDataSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_TopicBuiltinTopicData</b> (p. 1128) > . . . . .	1133
<b>DDS_TopicDataQosPolicy</b>	Attaches a buffer of opaque data that is distributed by means of <b>Built-in Topics</b> (p. 59) during discovery . . . . .	1133
<b>DDS_TopicQos</b>	QoS policies supported by a <b>DDSTopic</b> (p. 1617) entity . . . . .	1135
<b>DDS_TopicQueryData</b>	<< <i>extension</i> >> (p. 237) Provides information about a <b>DDSTopicQuery</b> (p. 1627) . . . . .	1140
<b>DDS_TopicQueryDispatchQosPolicy</b>	Configures the ability of a <b>DDSDataWriter</b> (p. 1321) to publish samples in response to a <b>DDSTopicQuery</b> (p. 1627) . . . . .	1141
<b>DDS_TopicQuerySelection</b>	<< <i>extension</i> >> (p. 237) Specifies the data query that defines a <b>DDSTopicQuery</b> (p. 1627) . . . . .	1143
<b>DDS_TransportBuiltinQosPolicy</b>	Specifies which built-in transports are used . . . . .	1144
<b>DDS_TransportInfo_t</b>	Contains the <i>class_id</i> and <i>message_size_max</i> of an installed transport . . . . .	1145
<b>DDS_TransportInfoSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_TransportInfo_t</b> (p. 1145) > . . . . .	1146

<b>DDS_TransportMulticastMapping_t</b>	Type representing a list of multicast mapping elements . . . . .	1147
<b>DDS_TransportMulticastMappingFunction_t</b>	Type representing an external mapping function . . . . .	1148
<b>DDS_TransportMulticastMappingQosPolicy</b>	Specifies a list of topic_expressions and multicast addresses that can be used by an Entity with a specific topic name to receive data . . . . .	1149
<b>DDS_TransportMulticastMappingSeq</b>	Declares IDL <code>sequence&lt; DDS_TransportMulticastMapping_t</code> (p. 1147) > . . . . .	1151
<b>DDS_TransportMulticastQosPolicy</b>	Specifies the multicast address on which a <b>DDSDataReader</b> (p. 1288) wants to receive its data. It can also specify a port number as well as a subset of the available (at the <b>DDSDomainParticipant</b> (p. 1351) level) transports with which to receive the multicast data . . . . .	1151
<b>DDS_TransportMulticastSettings_t</b>	Type representing a list of multicast locators . . . . .	1153
<b>DDS_TransportMulticastSettingsSeq</b>	Declares IDL <code>sequence&lt; DDS_TransportMulticastSettings_t</code> (p. 1153) > . . . . .	1155
<b>DDS_TransportPriorityQosPolicy</b>	This QoS policy allows the application to take advantage of transports that are capable of sending messages with different priorities . . . . .	1155
<b>DDS_TransportSelectionQosPolicy</b>	Specifies the physical transports a <b>DDSDataWriter</b> (p. 1321) or <b>DDSDataReader</b> (p. 1288) may use to send or receive data . . . . .	1157
<b>DDS_TransportUnicastQosPolicy</b>	Specifies a subset of transports and a port number that can be used by an Entity to receive data . . . . .	1158
<b>DDS_TransportUnicastSettings_t</b>	Type representing a list of unicast locators . . . . .	1160
<b>DDS_TransportUnicastSettingsSeq</b>	Declares IDL <code>sequence&lt; DDS_TransportUnicastSettings_t</code> (p. 1160) > . . . . .	1161
<b>DDS_TrustAlgorithmRequirements</b>	Type to describe Trust Plugins algorithm requirements for an entity . . . . .	1162
<b>DDS_TypeAllocationParams_t</b>	Configures whether or not to allocate pointer and optional members . . . . .	1163
<b>DDS_TypeCode</b>	The definition of a particular data type, which you can use to inspect the name, members, and other properties of types generated with <code>rtiddsgen</code> (see the <code>Code Generator User's Manual</code> ) or to modify types you define yourself at runtime . . . . .	1164
<b>DDS_TypeCodeFactory</b>	A singleton factory for creating, copying, and deleting data type definitions dynamically . . . . .	1210
<b>DDS_TypeCodePrintFormatProperty</b>	A collection of attributes used to configure how a <code>TypeCode</code> appears when converted to a string . . . . .	1224
<b>DDS_TypeConsistencyEnforcementQosPolicy</b>	Defines the rules for determining whether the type used to publish a given topic is consistent with that used to subscribe to it . . . . .	1228
<b>DDS_TypeDeallocationParams_t</b>	Configures whether to release or not pointer and optional members . . . . .	1231
<b>DDS_TypeSupportQosPolicy</b>	Allows you to attach application-specific values to a <b>DDSDataWriter</b> (p. 1321) or <b>DDSDataReader</b> (p. 1288), which are passed to the serialization or deserialization routine of the associated data type and choose whether to set padding bytes to zero during serialization . . . . .	1232
<b>DDS_UInt8Seq</b>	Instantiates <code>FooSeq</code> (p. 1697) < <b>DDS_UInt8</b> (p. 318) > . . . . .	1234
<b>DDS_UnionMember</b>	A description of a member of a union . . . . .	1235



<b>DDS_UnionMemberSeq</b>	Defines a sequence of union members . . . . .	1236
<b>DDS_UnsignedLongLongSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_UnsignedLongLong</b> (p. 319) > . . . . .	1236
<b>DDS_UnsignedLongSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_UnsignedLong</b> (p. 318) > . . . . .	1237
<b>DDS_UnsignedShortSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_UnsignedShort</b> (p. 318) > . . . . .	1237
<b>DDS_UserDataQosPolicy</b>	Attaches a buffer of opaque data that is distributed by means of <b>Built-in Topics</b> (p. 59) during discovery . . . . .	1237
<b>DDS_ValueMember</b>	A description of a member of a value type . . . . .	1239
<b>DDS_ValueMemberSeq</b>	Defines a sequence of value members . . . . .	1241
<b>DDS_VendorId_t</b>	<< <i>extension</i> >> (p. 237) Type used to represent the vendor of the service implementing the RTPS protocol . . . . .	1241
<b>DDS_WaitSetProperty_t</b>	<< <i>extension</i> >> (p. 237) Specifies the <b>DDSWaitSet</b> (p. 1629) behavior for multiple trigger events . . . . .	1242
<b>DDS_WcharSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Wchar</b> (p. 317) > . . . . .	1243
<b>DDS_WireProtocolQosPolicy</b>	Specifies the wire-protocol-related attributes for the <b>DDSDomainParticipant</b> (p. 1351) . . . . .	1244
<b>DDS_WriteParams_t</b>	<< <i>extension</i> >> (p. 237) Input parameters for writing with <b>FooDataWriter::write_w_params</b> (p. 1688), <b>FooDataWriter::dispose_w_params</b> (p. 1691), <b>FooDataWriter::register_instance_w_params</b> (p. 1680), <b>FooDataWriter::unregister_instance_w_params</b> (p. 1683) . . . . .	1251
<b>DDS_WriterDataLifecycleQosPolicy</b>	Controls how a <b>DDSDataWriter</b> (p. 1321) handles the lifecycle of the instances (keys) that it is registered to manage . . . . .	1256
<b>DDS_WstringSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDS_Wchar</b> (p. 317)* > . . . . .	1259
<b>DDSAsyncWaitSet</b>	A class for dispatching <b>DDSCondition</b> (p. 1276) objects using separate threads of execution. You can see this class as an extension of a <b>DDSWaitSet</b> (p. 1629) that allows asynchronously waiting for the attached <b>DDSCondition</b> (p. 1276) objects to trigger and provide a notification by calling <b>DDSCondition::dispatch</b> (p. 1278) . . . . .	1259
<b>DDSAsyncWaitSetCompletionToken</b>	<< <i>interface</i> >> (p. 237) Implementation of the completion token role element of the asynchronous completion token pattern that is part of the <b>DDSAsyncWaitSet</b> (p. 1259) behavior . . . . .	1273
<b>DDSAsyncWaitSetListener</b>	<< <i>interface</i> >> (p. 237) Listener for receiving event notifications related to the thread pool of the <b>DDSAsyncWaitSet</b> (p. 1259) . . . . .	1275
<b>DDSCondition</b>	<< <i>interface</i> >> (p. 237) Root class for all the conditions that may be attached to a <b>DDSWaitSet</b> (p. 1629) . . . . .	1276
<b>DDSConditionHandler</b>	<< <i>extension</i> >> (p. 237) << <i>interface</i> >> (p. 237) Handler called by the <b>DDSCondition</b> ↔ : <b>dispatch</b> (p. 1278) . . . . .	1278
<b>DDSConditionSeq</b>	Instantiates <b>FooSeq</b> (p. 1697) < <b>DDSCondition</b> (p. 1276) > . . . . .	1279

<b>DDSContentFilter</b>	
<< <i>interface</i> >> (p. 237) Interface to be used by a custom filter of a <b>DDSContentFilteredTopic</b> (p. 1283) . . . . .	1280
<b>DDSContentFilteredTopic</b>	
<< <i>interface</i> >> (p. 237) Specialization of <b>DDSTopicDescription</b> (p. 1624) that allows for content-based subscriptions . . . . .	1283
<b>DDSDataReader</b>	
<< <i>interface</i> >> (p. 237) Allows the application to: (1) declare the data it wishes to receive (i.e. make a subscription) and (2) access the data received by the attached <b>DDSSubscriber</b> (p. 1592) . . . . .	1288
<b>DDSDataReaderListener</b>	
<< <i>interface</i> >> (p. 237) <b>DDSListener</b> (p. 1526) for reader status . . . . .	1315
<b>DDSDataReaderSeq</b>	
Declares IDL <i>sequence</i> < <b>DDSDataReader</b> (p. 1288) > . . . . .	1317
<b>DDSDataReaderStatusConditionHandler</b>	
<< <i>interface</i> >> (p. 237) Realization of a <b>DDSConditionHandler</b> (p. 1278) that handles the status of a <b>DDSDataReader</b> (p. 1288) . . . . .	1318
<b>DDSDataTagQosPolicyHelper</b>	
Policy helpers that facilitate management of the data tags in the input policy . . . . .	1320
<b>DDSDataWriter</b>	
<< <i>interface</i> >> (p. 237) Allows an application to set the value of the data to be published under a given <b>DDSTopic</b> (p. 1617) . . . . .	1321
<b>DDSDataWriterListener</b>	
<< <i>interface</i> >> (p. 237) <b>DDSListener</b> (p. 1526) for writer status . . . . .	1344
<b>DDSDomainEntity</b>	
<< <i>interface</i> >> (p. 237) Abstract base class for all DDS entities except for the <b>DDSDomainParticipant</b> (p. 1351) . . . . .	1350
<b>DDSDomainParticipant</b>	
<< <i>interface</i> >> (p. 237) Container for all <b>DDSDomainEntity</b> (p. 1350) objects . . . . .	1351
<b>DDSDomainParticipantFactory</b>	
<< <i>singleton</i> >> (p. 238) << <i>interface</i> >> (p. 237) Allows creation and destruction of <b>DDSDomainParticipant</b> (p. 1351) objects . . . . .	1426
<b>DDSDomainParticipantListener</b>	
<< <i>interface</i> >> (p. 237) Listener for participant status . . . . .	1454
<b>DDSDynamicDataReader</b>	
Reads (subscribes to) objects of type <b>DDS_DynamicData</b> (p. 775) . . . . .	1456
<b>DDSDynamicDataTypeSupport</b>	
A factory for registering a dynamically defined type and creating <b>DDS_DynamicData</b> (p. 775) objects . . . . .	1456
<b>DDSDynamicDataWriter</b>	
Writes (publishes) objects of type <b>DDS_DynamicData</b> (p. 775) . . . . .	1462
<b>DDSEntity</b>	
<< <i>interface</i> >> (p. 237) Abstract base class for all the DDS objects that support QoS policies, a listener, and a status condition . . . . .	1463
<b>DDSFlowController</b>	
<< <i>interface</i> >> (p. 237) A flow controller is the object responsible for shaping the network traffic by determining when attached asynchronous <b>DDSDataWriter</b> (p. 1321) instances are allowed to write data . . . . .	1468
<b>DDSGuardCondition</b>	
<< <i>interface</i> >> (p. 237) A specific <b>DDSCondition</b> (p. 1276) whose <i>trigger_value</i> is completely under the control of the application . . . . .	1471
<b>DDSKeyedOctetsDataReader</b>	
<< <i>interface</i> >> (p. 237) Instantiates <i>DataReader</i> < <b>DDS_KeyedOctets</b> (p. 924) > . . . . .	1473
<b>DDSKeyedOctetsDataWriter</b>	
<< <i>interface</i> >> (p. 237) Instantiates <i>DataWriter</i> < <b>DDS_KeyedOctets</b> (p. 924) > . . . . .	1482

<b>DDSKeyedOctetsTypeSupport</b>	
<< <i>interface</i> >> (p. 237) <b>DDS_KeyedOctets</b> (p. 924) type support	1495
<b>DDSKeyedStringDataReader</b>	
<< <i>interface</i> >> (p. 237) Instantiates <code>DataReader</code> < <b>DDS_KeyedString</b> (p. 927) >	1501
<b>DDSKeyedStringDataWriter</b>	
<< <i>interface</i> >> (p. 237) Instantiates <code>DataWriter</code> < <b>DDS_KeyedString</b> (p. 927) >	1510
<b>DDSKeyedStringTypeSupport</b>	
<< <i>interface</i> >> (p. 237) Keyed string type support	1520
<b>DDSListener</b>	
<< <i>interface</i> >> (p. 237) Abstract base class for all Listener interfaces	1526
<b>DDSMultiTopic</b>	
<b>[Not supported (optional)]</b> << <i>interface</i> >> (p. 237) A specialization of <b>DDSTopicDescription</b> (p. 1624) that allows subscriptions that combine/filter/rearrange data coming from several topics	1529
<b>DDSOctetsDataReader</b>	
<< <i>interface</i> >> (p. 237) Instantiates <code>DataReader</code> < <b>DDS_Octets</b> (p. 967) >	1532
<b>DDSOctetsDataWriter</b>	
<< <i>interface</i> >> (p. 237) Instantiates <code>DataWriter</code> < <b>DDS_Octets</b> (p. 967) >	1536
<b>DDSOctetsTypeSupport</b>	
<< <i>interface</i> >> (p. 237) <b>DDS_Octets</b> (p. 967) type support	1543
<b>DDSParticipantBuiltinTopicDataDataReader</b>	
Instantiates <code>DataReader</code> < <b>DDS_ParticipantBuiltinTopicData</b> (p. 979) >	1548
<b>DDSParticipantBuiltinTopicDataTypeSupport</b>	
Instantiates <code>TypeSupport</code> < <b>DDS_ParticipantBuiltinTopicData</b> (p. 979) >	1548
<b>DDSPROPERTYQOSPolicyHelper</b>	
Policy helpers that facilitate management of the properties in the input policy	1549
<b>DDSPublicationBuiltinTopicDataDataReader</b>	
Instantiates <code>DataReader</code> < <b>DDS_PublicationBuiltinTopicData</b> (p. 1010) >	1549
<b>DDSPublicationBuiltinTopicDataTypeSupport</b>	
Instantiates <code>TypeSupport</code> < <b>DDS_PublicationBuiltinTopicData</b> (p. 1010) >	1550
<b>DDSPublisher</b>	
<< <i>interface</i> >> (p. 237) A publisher is the object responsible for the actual dissemination of publications	1550
<b>DDSPublisherListener</b>	
<< <i>interface</i> >> (p. 237) <b>DDSListener</b> (p. 1526) for <b>DDSPublisher</b> (p. 1550) status	1571
<b>DDSPublisherSeq</b>	
Declares IDL <code>sequence</code> < <b>DDSPublisher</b> (p. 1550) >	1572
<b>DDSQueryCondition</b>	
<< <i>interface</i> >> (p. 237) These are specialised <b>DDSReadCondition</b> (p. 1574) objects that allow the application to also specify a filter on the locally available data	1573
<b>DDSReadCondition</b>	
<< <i>interface</i> >> (p. 237) Conditions specifically dedicated to read operations and attached to one <b>DDSDataReader</b> (p. 1288)	1574
<b>DDSServiceRequestDataReader</b>	
Instantiates <code>DataReader</code> < <b>DDS_ServiceRequest</b> (p. 1097) >	1577
<b>DDSServiceRequestTypeSupport</b>	
Instantiates <code>TypeSupport</code> < <b>DDS_ServiceRequest</b> (p. 1097) >	1577
<b>DDSStatusCondition</b>	
<< <i>interface</i> >> (p. 237) A specific <b>DDSCondition</b> (p. 1276) that is associated with each <b>DDSEntity</b> (p. 1463)	1578
<b>DDSStringDataReader</b>	
<< <i>interface</i> >> (p. 237) Instantiates <code>DataReader</code> < <code>char*</code> >	1580
<b>DDSStringDataWriter</b>	
<< <i>interface</i> >> (p. 237) Instantiates <code>DataWriter</code> < <code>char*</code> >	1584

<b>DDStringTypeSupport</b>	
<< <i>interface</i> >> (p. 237) String type support	. . . . . 1587
<b>DDSubscriber</b>	
<< <i>interface</i> >> (p. 237) A subscriber is the object responsible for actually receiving data from a subscription	. . . . . 1592
<b>DDSubscriberListener</b>	
<< <i>interface</i> >> (p. 237) <b>DDSListener</b> (p. 1526) for status about a subscriber	. . . . . 1613
<b>DDSubscriberSeq</b>	
Declares IDL <i>sequence</i> < <b>DDSubscriber</b> (p. 1592) >	. . . . . 1614
<b>DDSubscriptionBuiltinTopicDataReader</b>	
Instantiates <i>DataReader</i> < <b>DDS_SubscriptionBuiltinTopicData</b> (p. 1108) >	. . . . . 1614
<b>DDSubscriptionBuiltinTopicDataTypeSupport</b>	
Instantiates <i>TypeSupport</i> < <b>DDS_SubscriptionBuiltinTopicData</b> (p. 1108) >	. . . . . 1615
<b>DDThreadFactory</b>	
<< <i>extension</i> >> (p. 237) << <i>interface</i> >> (p. 237) Interface for providing the threads needed by the middleware. It consists of operations to create and delete threads. The interface depends on the <b>DDThreadFactory_OnSpawnedFunction</b> (p. 519) that specifies the operation to run in the new thread	. . . . . 1615
<b>DDSTopic</b>	
<< <i>interface</i> >> (p. 237) The most basic description of the data to be published and subscribed	. . . . . 1617
<b>DDSTopicBuiltinTopicDataReader</b>	
Instantiates <i>DataReader</i> < <b>DDS_TopicBuiltinTopicData</b> (p. 1128) >	. . . . . 1622
<b>DDSTopicBuiltinTopicDataTypeSupport</b>	
Instantiates <i>TypeSupport</i> < <b>DDS_TopicBuiltinTopicData</b> (p. 1128) >	. . . . . 1623
<b>DDSTopicDescription</b>	
<< <i>interface</i> >> (p. 237) Base class for <b>DDSTopic</b> (p. 1617), <b>DDContentFilteredTopic</b> (p. 1283), and <b>DDSMultiTopic</b> (p. 1529)	. . . . . 1624
<b>DDSTopicListener</b>	
<< <i>interface</i> >> (p. 237) <b>DDSListener</b> (p. 1526) for <b>DDSTopic</b> (p. 1617) entities	. . . . . 1626
<b>DDSTopicQuery</b>	
<< <i>extension</i> >> (p. 237) Allows a <b>DDSDataReader</b> (p. 1288) to query the sample cache of its matching <b>DDSDataWriter</b> (p. 1321)	. . . . . 1627
<b>DDSTopicQueryHelper</b>	
Helpers to provide utility operations related to <b>DDSTopicQuery</b> (p. 1627)	. . . . . 1628
<b>DDSTypeSupport</b>	
<< <i>interface</i> >> (p. 237) An abstract <i>marker</i> interface that has to be specialized for each concrete user data type that will be used by the application	. . . . . 1629
<b>DDWaitSet</b>	
<< <i>interface</i> >> (p. 237) Allows an application to wait until one or more of the attached <b>DDCondition</b> (p. 1276) objects has a <i>trigger_value</i> of <b>DDS_BOOLEAN_TRUE</b> (p. 317) or else until the timeout expires	. . . . . 1629
<b>DDWriterContentFilter</b>	
<< <i>interface</i> >> (p. 237) Interface to be used by a custom filter of a <b>DDContentFilteredTopic</b> (p. 1283)	. . . . . 1637
<b>rti::flat::FinalAlignedArrayOffset&lt; ElementOffset, N &gt;</b>	
Offset to an array of final elements	. . . . . 1641
<b>rti::flat::FinalArrayOffset&lt; ElementOffset, N &gt;</b>	
Offset to an array of final elements	. . . . . 1643
<b>rti::flat::FinalOffset&lt; T &gt;</b>	
The base class of all Offsets to a final struct type	. . . . . 1645
<b>rti::flat::FinalSequenceBuilder&lt; ElementOffset &gt;</b>	
Builds a sequence member of fixed-size elements	. . . . . 1645
<b>rti::flat::flat_type_traits&lt; T &gt;</b>	
Given a <b>Sample</b> (p. 1916), an <b>Offset</b> or a <b>Builder</b> , it allows obtaining the other types	. . . . . 1647

<b>Foo</b>	A representative user-defined data type . . . . .	1648
<b>FooDataReader</b>	<< <i>interface</i> >> (p. 237) << <i>generic</i> >> (p. 237) User data type-specific data reader . . . . .	1649
<b>FooDataWriter</b>	<< <i>interface</i> >> (p. 237) << <i>generic</i> >> (p. 237) User data type specific data writer . . . . .	1676
<b>FooSeq</b>	<< <i>interface</i> >> (p. 237) << <i>generic</i> >> (p. 237) A type-safe, ordered collection of elements. The type of these elements is referred to in this documentation as <b>Foo</b> (p. 1648) . . . . .	1697
<b>FooTypeSupport</b>	<< <i>interface</i> >> (p. 237) << <i>generic</i> >> (p. 237) User data type specific interface . . . . .	1711
<b>connext::IllegalOperationException</b>	The operation was called under improper circumstances . . . . .	1724
<b>connext::ImmutablePolicyException</b>	Application attempted to modify an immutable QoS policy . . . . .	1724
<b>connext::InconsistentPolicyException</b>	Application specified a set of QoS policies that are not consistent with each other . . . . .	1725
<b>connext::IsInvalidSamplePredicate&lt; T &gt;</b>	Predicate-class to determine if a sample contains invalid data . . . . .	1725
<b>connext::IsReplyRelatedPredicate&lt; T &gt;</b>	Predicate-class to match replies by their related request . . . . .	1725
<b>connext::IsValidSamplePredicate&lt; T &gt;</b>	Predicate-class to determine if a sample contains valid data . . . . .	1727
<b>connext::LoanedSamples&lt; T &gt;</b>	Provides access to a collection of middleware-loaned samples . . . . .	1727
<b>connext::LoanedSamples&lt; T &gt;::LoanMemento</b>	A simple value-type for the internal representation of the a <b>LoanedSamples</b> (p. 1727) object . . . . .	1736
<b>connext::LogicException</b>	Base class of all RTI Connext exceptions caused by a logic error . . . . .	1737
<b>connext::MessagingLibraryVersion</b>	The Connext Messaging Library version . . . . .	1737
<b>connext::MessagingVersion</b>	The Connext Messaging version . . . . .	1738
<b>rti::flat::MutableArrayBuilder&lt; ElementBuilder, N &gt;</b>	Builds an array member of variable-size elements . . . . .	1740
<b>rti::flat::MutableArrayOffset&lt; ElementOffset, N &gt;</b>	Offset to an array of variable-size elements . . . . .	1742
<b>rti::flat::MutableOffset</b>	The base class of all Offsets to a final struct type . . . . .	1743
<b>rti::flat::MutableSequenceBuilder&lt; ElementBuilder &gt;</b>	Builds a sequence member of variable-size elements . . . . .	1744
<b>MyFlatFinalOffset</b>	Represents the Offset to an arbitrary user-defined FlatData final IDL struct . . . . .	1746
<b>MyFlatMutableBuilder</b>	Represents the Builder for an arbitrary user-defined mutable type . . . . .	1750
<b>MyFlatMutableOffset</b>	Represents the Offset to an arbitrary user-defined FlatData mutable IDL struct . . . . .	1757
<b>MyFlatUnionBuilder</b>	Represents the Builder for an arbitrary user-defined mutable IDL union . . . . .	1764
<b>MyFlatUnionOffset</b>	Represents the Offset to an arbitrary user-defined FlatData mutable IDL union . . . . .	1767
<b>NDDS_Config_LibraryVersion_t</b>	The version of a single library shipped as part of an RTI Connext distribution . . . . .	1771

<b>NDDS_Config_LogMessage</b>	
Log message . . . . .	1772
<b>NDDS_Transport_Address_t</b>	
Addresses are stored individually as network-ordered bytes . . . . .	1774
<b>NDDS_Transport_Interface_t</b>	
Storage for the description of a network interface used by a Transport Plugin . . . . .	1775
<b>NDDS_Transport_Property_t</b>	
Base configuration structure that must be inherited by derived Transport Plugin classes . . . . .	1776
<b>NDDS_Transport_Shmem_Property_t</b>	
Subclass of <b>NDDS_Transport_Property_t</b> (p. 1776) allowing specification of parameters that are specific to the shared-memory transport . . . . .	1784
<b>NDDS_Transport_UDP_WAN_CommPortsMappingInfo</b>	
Type for storing UDP WAN communication ports . . . . .	1787
<b>NDDS_Transport_UDPv4_Property_t</b>	
Configurable IPv4/UDP Transport-Plugin properties . . . . .	1788
<b>NDDS_Transport_UDPv4_WAN_Property_t</b>	
Configurable IPv4/UDP WAN Transport-Plugin properties . . . . .	1798
<b>NDDS_Transport_UDPv6_Property_t</b>	
Configurable IPv6/UDP Transport-Plugin properties . . . . .	1808
<b>NDDS_Transport_UUID</b>	
Univocally identifies a transport plugin instance . . . . .	1817
<b>NDDS_Utility_NetworkCaptureParams_t</b>	
Input parameters for starting network capture . . . . .	1817
<b>NDDSConfigActivityContext</b>	
Activity Context APIs . . . . .	1820
<b>NDDSConfigCompliance</b>	
APIs to configure the XTypes compliance mask . . . . .	1820
<b>NDDSConfigLogger</b>	
<< <i>interface</i> >> (p. 237) The singleton type used to configure RTI Connex logging . . . . .	1822
<b>NDDSConfigLoggerDevice</b>	
<< <i>interface</i> >> (p. 237) Logging device interface. Use for user-defined logging devices . . . . .	1829
<b>NDDSConfigVersion</b>	
<< <i>interface</i> >> (p. 237) The version of an RTI Connex distribution . . . . .	1831
<b>NDDSLM</b>	
Other Utilities APIs . . . . .	1832
<b>NDDSTransportSupport</b>	
<< <i>interface</i> >> (p. 237) The utility class used to configure RTI Connex pluggable transports . . . . .	1833
<b>NDDSUtility</b>	
Other Utilities APIs . . . . .	1839
<b>NDDSUtilityHeapMonitoring</b>	
Heap Monitoring APIs . . . . .	1842
<b>NDDSUtilityNetworkCapture</b>	
Network Capture APIs . . . . .	1846
<b>connex::NotEnabledException</b>	
Operation invoked on a <b>DDSEntity</b> (p. 1463) that is not yet enabled . . . . .	1855
<b>rti::flat::OffsetBase</b>	
Base class of all Offset types . . . . .	1856
<b>connex::OutOfResourcesException</b>	
RTI Connex ran out of the resources needed to complete the operation . . . . .	1860
<b>connex::PreconditionNotMetException</b>	
A pre-condition for the operation was not met . . . . .	1861
<b>rti::flat::PrimitiveArrayOffset&lt; T, N &gt;</b>	
Offset to an array of primitive elements . . . . .	1861

<b>rti::flat::PrimitiveConstOffset</b> < T >	
A const Offset to an optional primitive member . . . . .	1862
<b>rti::flat::PrimitiveOffset</b> < T >	
An Offset to an optional primitive member . . . . .	1863
<b>rti::flat::PrimitiveSequenceBuilder</b> < T >	
Builds a sequence of primitive members . . . . .	1864
<b>rti::flat::PrimitiveSequenceOffset</b> < T >	
Offset to a sequence of primitive elements . . . . .	1867
<b>connext::Replier</b> < TReq, TRep >	
Allows receiving requests and sending replies . . . . .	1868
<b>connext::ReplierListener</b> < TReq, TRep >	
Called when a <b>connext::Replier</b> (p. 1868) has new available requests . . . . .	1880
<b>connext::ReplierParams</b> < TReq, TRep >	
Contains the parameters for creating a <b>connext::Replier</b> (p. 1868) . . . . .	1881
<b>connext::Requester</b> < TReq, TRep >	
Allows sending requests and receiving replies . . . . .	1886
<b>connext::RequesterParams</b>	
Contains the parameters for creating a <b>connext::Requester</b> (p. 1886) . . . . .	1907
<b>connext::RuntimeException</b>	
Generic, unspecified error . . . . .	1912
<b>connext::Sample</b> < T >	
A data sample and related info received from the middleware . . . . .	1912
<b>rti::flat::Sample</b> < OffsetType >	
The generic definition of FlatData topic-types . . . . .	1916
<b>connext::SampleIterator</b> < T, IsConst >	
STL-compliant random-access iterator for SampleRef<T> . . . . .	1920
<b>connext::SampleRef</b> < T >	
A data sample and related information received from the middleware . . . . .	1920
<b>rti::flat::SequenceIterator</b> < E, OffsetKind >	
Iterator for collections of Offsets . . . . .	1926
<b>rti::flat::SequenceOffset</b> < ElementOffset >	
Offset to a sequence of non-primitive elements . . . . .	1934
<b>connext::SimpleReplier</b> < TReq, TRep >	
A callback-based replier . . . . .	1935
<b>connext::SimpleReplierListener</b> < TReq, TRep >	
The listener called by a <b>SimpleReplier</b> (p. 1935) . . . . .	1937
<b>connext::SimpleReplierParams</b> < TReq, TRep >	
Contains the parameters for creating a <b>connext::SimpleReplier</b> (p. 1935) . . . . .	1939
<b>rti::flat::StringBuilder</b>	
Builds a string . . . . .	1943
<b>rti::flat::StringOffset</b>	
Offset to a string . . . . .	1945
<b>connext::TimeoutException</b>	
The operation timed out (does not apply to wait or receive operations) . . . . .	1946
<b>TransportAllocationSettings_t</b>	
Allocation settings used by various internal buffers . . . . .	1947
<b>rti::flat::UnionBuilder</b> < Discriminator >	
Base class of builders for user-defined mutable unions . . . . .	1947
<b>connext::UnsupportedException</b>	
Unsupported operation . . . . .	1948
<b>connext::WriteSample</b> < T >	
A sample for writing data . . . . .	1948
<b>connext::WriteSampleRef</b> < T >	
A reference to a data sample for writing . . . . .	1952





# Chapter 6

## File Index

### 6.1 File List

Here is a list of all documented files with brief descriptions:

<b>AggregationBuilders.hpp</b>	1957
<b>Builder.hpp</b>	1962
<b>BuilderHelper.hpp</b>	1969
<b>ExceptionHandler.hpp</b>	1972
<b>FlatSample.hpp</b>	1975
<b>FlatSampleImpl.hpp</b>	1977
<b>FlatTypeTraits.hpp</b>	1978
<b>Offset.hpp</b>	1980
<b>rtiflat.hpp</b>	1989
<b>SequenceBuilders.hpp</b>	1989
<b>SequenceIterator.hpp</b>	1998
<b>SequenceOffsets.hpp</b>	2001
<b>Interpreter.hpp</b>	2009
<b>Stream.hpp</b>	2012



# Chapter 7

## Module Documentation

### 7.1 RTI Connex Exceptions

RTI Connex return-code exceptions.

#### Classes

- class **connex::RuntimeException**  
*Generic, unspecified error.*
- class **connex::LogicException**  
*Base class of all RTI Connex exceptions caused by a logic error.*
- class **connex::UnsupportedException**  
*Unsupported operation.*
- class **connex::BadParameterException**  
*Illegal parameter value.*
- class **connex::PreconditionNotMetException**  
*A pre-condition for the operation was not met.*
- class **connex::ImmutablePolicyException**  
*Application attempted to modify an immutable QoS policy.*
- class **connex::InconsistentPolicyException**  
*Application specified a set of QoS policies that are not consistent with each other.*
- class **connex::NotEnabledException**  
*Operation invoked on a **DDSEntity** (p. 1463) that is not yet enabled.*
- class **connex::AlreadyDeletedException**  
*The object target of this operation has already been deleted.*
- class **connex::IllegalOperationException**  
*The operation was called under improper circumstances.*
- class **connex::TimeoutException**  
*The operation timed out (does not apply to wait or receive operations)*
- class **connex::OutOfResourcesException**  
*RTI Connex ran out of the resources needed to complete the operation.*

### 7.1.1 Detailed Description

RTI Connex return-code exceptions.

The request-reply API reports internal DDS errors as exceptions. Each RTI Connex return code maps to a exception.

All exceptions inherit from the C++ standard exceptions `std::logic_error` or `std::runtime_error`.

Note that `RETCODE_TIMEOUT` and `RETCODE_NO_DATA` are not thrown in the request-reply API, because they are not considered errors. For example in case of no data or timeouts operations may return empty containers (e.g. `connex::Requester::take_replies(int)` (p. 1899)) or false (e.g. `connex::Requester::wait_for_replies(int, const Duration_t&)` (p. 1896)).

See also

**Return Codes** (p. 335)

**Error handling example** (p. 233)

## 7.2 Clock Selection

APIs related to clock selection.

APIs related to clock selection.

RTI Connex uses clocks to measure time and generate timestamps.

The middleware uses two clocks, an internal clock and an external clock. The internal clock is used to measure time and handles all timing in the middleware. The external clock is used solely to generate timestamps, such as the source timestamp and the reception timestamp, in addition to providing the time given by `DDSDomainParticipant::get_current_time` (p. 1398).

### 7.2.1 Available Clocks

Two clock implementations are generally available, the monotonic clock and the realtime clock.

The monotonic clock provides times that are monotonic from a clock that is not adjustable. This clock is useful to use in order to not be subject to changes in the system or realtime clock, which may be adjusted by the user or via time synchronization protocols. However, this time generally starts from an arbitrary point in time, such as system startup. Note that this clock is not available for all architectures. Please see the [Platform Notes](#) for the architectures on which it is supported. For the purposes of clock selection, this clock can be referenced by the name "monotonic".

The realtime clock provides the realtime of the system. This clock may generally be monotonic but may not be guaranteed to be so. It is adjustable and may be subject to small and large changes in time. The time obtained from this clock is generally a meaningful time in that it is the amount of time from a known epoch. For the purposes of clock selection, this clock can be referenced by the names "realtime" or "system".

## 7.2.2 Clock Selection Strategy

By default, both the internal and external clocks use the real-time clock. If you want your application to be robust to changes in the system time, you may use the monotonic clock as the internal clock, and leave the system clock as the external clock. Note, however, that this may slightly diminish performance in that both the send and receive paths may need to obtain times from both clocks. Since the monotonic clock is not available on all architectures, you may want to specify "monotonic,realtime" for the `internal_clock` (see the table below). By doing so, the middleware will attempt to use the monotonic clock if available, and will fall back to the realtime clock if the monotonic clock is not available.

If you want your application to be robust to changes in the system time, you are not relying on source timestamps, and you want to avoid obtaining times from both clocks, you may use the monotonic clock for both the internal and external clocks.

## 7.2.3 Configuring Clock Selection

To configure the clock selection, use the **PROPERTY** (p. 419) QoS policy associated with the **DDSDomainParticipant** (p. 1351).

See also

**DDS\_PropertyQosPolicy** (p. 1007)

The following table lists the supported clock selection properties.

**Table 7.1 Clock Selection Properties**

Property	Description
<code>dds.clock.external_clock</code>	Comma-delimited list of clocks to use for the external clock, in the order of preference. Valid clock names are "realtime", "system", and "monotonic". Default: "realtime"
<code>dds.clock.internal_clock</code>	Comma-delimited list of clocks to use for the internal clock, in the order of preference. Valid clock names are "realtime", "system", and "monotonic". Default: "realtime"

## 7.3 Domain Module

Contains the **DDSDomainParticipant** (p. 1351) class that acts as an entrypoint of RTI Connex and acts as a factory for many of the classes. The **DDSDomainParticipant** (p. 1351) also acts as a container for the other objects that make up RTI Connex.

## Modules

- **DomainParticipantFactory**  
*DDSDomainParticipantFactory* (p. 1426) entity and associated elements
- **DomainParticipants**  
*DDSDomainParticipant* (p. 1351) entity and associated elements
- **Built-in Topics**  
*Built-in objects created by RTI Connex but accessible to the application.*

### 7.3.1 Detailed Description

Contains the **DDSDomainParticipant** (p. 1351) class that acts as an endpoint of RTI Connex and acts as a factory for many of the classes. The **DDSDomainParticipant** (p. 1351) also acts as a container for the other objects that make up RTI Connex.

## 7.4 DomainParticipantFactory

**DDSDomainParticipantFactory** (p. 1426) entity and associated elements

### Modules

- **DomainParticipantConfigParams**  
<<extension>> (p. 237) *DDS\_DomainParticipantConfigParams\_t* (p. 734)

### Classes

- struct **DDS\_DomainParticipantFactoryQos**  
*QoS policies supported by a DDSDomainParticipantFactory* (p. 1426).
- class **DDSDomainParticipantFactory**  
<<singleton>> (p. 238) <<interface>> (p. 237) *Allows creation and destruction of DDSDomainParticipant* (p. 1351) objects.

### Macros

- #define **DDSTheParticipantFactory DDSDomainParticipantFactory::get\_instance()**  
*Can be used as an alias for the singleton factory returned by the operation DDSDomainParticipantFactory::get\_instance* (p. 1429).

### Typedefs

- typedef **DDS\_ReturnCode\_t(\* DDSDomainParticipantFactory\_RegisterTypeFunction)** ( **DDSDomainParticipant** \*participant, const char \*type\_name)  
*Prototype of a register type function.*

## Functions

- **DDS\_Boolean DDS\_DomainParticipantFactoryQos\_equals** (const struct **DDS\_DomainParticipantFactoryQos** \*self, const struct **DDS\_DomainParticipantFactoryQos** \*other)  
*Compares two **DDS\_DomainParticipantFactoryQos** (p. 737) for equality.*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantFactoryQos::print** () const  
*Prints this **DDS\_DomainParticipantFactoryQos** (p. 737) to stdout.*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantFactoryQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantFactoryQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DomainParticipantFactoryQos** &base) const  
*Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantFactoryQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantFactoryQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DomainParticipantFactoryQos** &base, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantFactoryQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const  
*Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantFactoryQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).*

## Variables

- const struct **DDS\_DomainParticipantQos DDS\_PARTICIPANT\_QOS\_DEFAULT**  
*Special value for creating a **DomainParticipant** with default QoS.*
- const struct **DDS\_DomainParticipantConfigParams\_t DDS\_PARTICIPANT\_CONFIG\_PARAMS\_DEFAULT**  
*Special value for creating a **DDSDomainParticipant** (p. 1351) from configuration using default parameters.*

### 7.4.1 Detailed Description

**DDSDomainParticipantFactory** (p. 1426) entity and associated elements

### 7.4.2 Macro Definition Documentation

### 7.4.2.1 DDSTheParticipantFactory

```
#define DDSTheParticipantFactory DDSDomainParticipantFactory::get_instance()
```

Can be used as an alias for the singleton factory returned by the operation `DDSDomainParticipantFactory::get_instance` (p. 1429).

See also

`DDSDomainParticipantFactory::get_instance` (p. 1429)

Examples

`HelloWorld_publisher.cxx`, and `HelloWorld_subscriber.cxx`.

## 7.4.3 Typedef Documentation

### 7.4.3.1 DDSDomainParticipantFactory\_RegisterTypeFunction

```
typedef DDS_ReturnCode_t (* DDSDomainParticipantFactory_RegisterTypeFunction) ( DDSDomainParticipant
*participant, const char *type_name)
```

Prototype of a register type function.

Parameters

<i>participant</i>	<< <i>inout</i> >> (p. 238) <code>DDSDomainParticipant</code> (p. 1351) participant the type is registered with.
<i>type_name</i>	<< <i>in</i> >> (p. 238) Name the type is registered with.

Exceptions

<i>One</i>	of the <code>Standard Return Codes</code> (p. 336)
------------	--

## 7.4.4 Function Documentation

### 7.4.4.1 DDS\_DomainParticipantFactoryQos\_equals()

```
DDS_Boolean DDS_DomainParticipantFactoryQos_equals (
    const struct DDS_DomainParticipantFactoryQos * self,
    const struct DDS_DomainParticipantFactoryQos * other )
```



Compares two **DDS\_DomainParticipantFactoryQos** (p. 737) for equality.

#### Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This DomainParticipantFactoryQos.
<i>other</i>	<< <i>in</i> >> (p. 238) The other DomainParticipantFactoryQos to be compared with this DomainParticipantFactoryQos.

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two Qos objects are equal or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

Referenced by **DDS\_DomainParticipantFactoryQos::operator!=()**, and **DDS\_DomainParticipantFactoryQos::operator==()**.

#### 7.4.4.2 print()

```
DDS_ReturnCode_t DDS_DomainParticipantFactoryQos::print ( ) const [inline]
```

Prints this **DDS\_DomainParticipantFactoryQos** (p. 737) to stdout.

Only the differences between this **DDS\_DomainParticipantFactoryQos** (p. 737) and the documented default are printed. If you wish to print everything regardless, see **DDS\_DomainParticipantFactoryQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantFactoryQos&, const DDS\_QosPrintFormat&) const** (p. 45). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### 7.4.4.3 to\_string() [1/6]

```
DDS_ReturnCode_t DDS_DomainParticipantFactoryQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).

Only the differences between this **DDS\_DomainParticipantFactoryQos** (p. 737) and the documented default are printed to the string. If you wish to print everything regardless, see **DDS\_DomainParticipantFactoryQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantFactoryQos&, const DDS\_QosPrintFormat&) const** (p. 45). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

If the supplied buffer is NULL, the required length of the string is returned via the *string\_size* parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_DomainParticipantFactoryQos** (p. 737) is written to the buffer.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantFactoryQos</b> (p. 737). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DomainParticipantFactoryQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantFactoryQos&, const DDS\_QosPrintFormat&) const** (p. 45)

## 7.4.4.4 to\_string() [2/6]

```
DDS_ReturnCode_t DDS_DomainParticipantFactoryQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_DomainParticipantFactoryQos & base ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).

This overload behaves the same as **DDS\_DomainParticipantFactoryQos::to\_string** (p. 43) but allows the caller to specify the **DDS\_DomainParticipantFactoryQos** (p. 737), which is used as the base profile. Only the differences between the QoS and the base profile are included in the output string.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantFactoryQos</b> (p. 737). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <i>in</i> >> (p. 238) The <b>DDS_DomainParticipantFactoryQos</b> (p. 737) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

See also

**DDS\_DomainParticipantFactoryQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantFactoryQos&, const DDS\_QosPrintFormat&) const** (p. 45)

References **DDS\_QosPrintFormat\_INITIALIZER**.

#### 7.4.4.5 to\_string() [3/6]

```
DDS_ReturnCode_t DDS_DomainParticipantFactoryQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).

This overload behaves the same as **DDS\_DomainParticipantFactoryQos::to\_string** (p. 43) but allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the output.

Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantFactoryQos</b> (p. 737). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

See also

**DDS\_DomainParticipantFactoryQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantFactoryQos&, const DDS\_QosPrintFormat&) const** (p. 45)

References **DDS\_RETCODE\_ERROR**, and **DDS\_RETCODE\_OK**.

#### 7.4.4.6 to\_string() [4/6]

```
DDS_ReturnCode_t DDS_DomainParticipantFactoryQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_DomainParticipantFactoryQos & base,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).

Only the differences between this **DDS\_DomainParticipantFactoryQos** (p. 737) and the **DDS\_DomainParticipantFactoryQos** (p. 737) supplied as the base are printed to the string.

If the supplied buffer is NULL, the required length of the string is returned via the `string_size` parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_DomainParticipantFactoryQos** (p. 737) is written to the buffer.

##### Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantFactoryQos</b> (p. 737). If NULL, this function will return the required length of this buffer through the <code>string_size</code> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <i>in</i> >> (p. 238) The <b>DDS_DomainParticipantFactoryQos</b> (p. 737) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

##### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### 7.4.4.7 to\_string() [5/6]

```
DDS_ReturnCode_t DDS_DomainParticipantFactoryQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).

This overload behaves the same as **DDS\_DomainParticipantFactoryQos::to\_string** (p. 43) but prints the entire **DDS\_DomainParticipantFactoryQos** (p. 737) object. The only valid value for the argument of type **DDS\_QosPrintAll\_t** (p. 1030) is **DDS\_QOS\_PRINT\_ALL** (p. 164).

##### For example

```
DomainParticipantFactoryQos qos;
char *str = NULL;
DDS_UnsignedLong str_size = 0;
qos.to_string(str, str_size, QOS_PRINT_ALL);
```

The resultant string is formatted according to the default value for **DDS\_QosPrintFormat** (p. 1031).

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantFactoryQos</b> (p. 737). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DomainParticipantFactoryQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantFactoryQos&, const DDS\_QosPrintFormat&) const** (p. 45)

References **DDS\_QosPrintFormat\_INITIALIZER**.

## 7.4.4.8 to\_string() [6/6]

```
DDS_ReturnCode_t DDS_DomainParticipantFactoryQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantFactoryQos** (p. 737).

This overload behaves the same as the **DDS\_DomainParticipantFactoryQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_QosPrintAll\_t&) const** (p. 46) overload. The only difference is that it allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the resultant string.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantFactoryQos</b> (p. 737). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DomainParticipantFactoryQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantFactoryQos&, const DDS\_QosPrintFormat&) const** (p. 45)

## 7.4.5 Variable Documentation

### 7.4.5.1 DDS\_PARTICIPANT\_QOS\_DEFAULT

```
const struct DDS_DomainParticipantQos DDS_PARTICIPANT_QOS_DEFAULT [extern]
```

Special value for creating a DomainParticipant with default QoS.

When used in **DDSDomainParticipantFactory::create\_participant** (p. 1442), this special value is used to indicate that the **DDSDomainParticipant** (p. 1351) should be created with the default **DDSDomainParticipant** (p. 1351) QoS by means of the operation **DDSDomainParticipantFactory::get\_default\_participant\_qos()** (p. 1432) and using the resulting QoS to create the **DDSDomainParticipant** (p. 1351).

When used in **DDSDomainParticipantFactory::set\_default\_participant\_qos** (p. 1430), this special value is used to indicate that the default QoS should be reset back to the initial value that would be used if the **DDSDomainParticipantFactory::set\_default\_participant\_qos** (p. 1430) operation had never been called.

When used in **DDSDomainParticipant::set\_qos** (p. 1408), this special value is used to indicate that the QoS of the **DDSDomainParticipant** (p. 1351) should be changed to match the current default QoS set in the **DDSDomainParticipantFactory** (p. 1426) that the **DDSDomainParticipant** (p. 1351) belongs to.

RTI Connexx treats this special value as a constant.

## Warning

This value is a constant and should never be modified. You cannot use this value to *get* the default QoS values from the DomainParticipant factory; for this purpose, use **DDSDomainParticipantFactory::get\_default\_participant\_qos** (p. 1432).

## See also

**NDDS\_DISCOVERY\_PEERS** (p. 464)  
**DDSDomainParticipantFactory::create\_participant()** (p. 1442)  
**DDSDomainParticipantFactory::set\_default\_participant\_qos()** (p. 1430)  
**DDSDomainParticipant::set\_qos()** (p. 1408)

## Examples

**HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.

### 7.4.5.2 DDS\_PARTICIPANT\_CONFIG\_PARAMS\_DEFAULT

```
const struct DDS_DomainParticipantConfigParams_t DDS_PARTICIPANT_CONFIG_PARAMS_DEFAULT [extern]
```

Special value for creating a **DDSDomainParticipant** (p. 1351) from configuration using default parameters.

This value can be used only in **DDSDomainParticipantFactory::create\_participant\_from\_config\_w\_params** (p. 1450) and indicates that the **DDSDomainParticipant** (p. 1351) must be created applying the information defined in the participant configuration. That is, the domain ID, participant entity name, and QoS profiles for all the entities will be retrieved from the configuration.

RTI Connext treats this special value as a constant.

See also

**DDS\_DomainParticipantConfigParams\_t** (p. 734)

**DDSDomainParticipantFactory::create\_participant\_from\_config\_w\_params** (p. 1450)

## 7.5 DomainParticipants

**DDSDomainParticipant** (p. 1351) entity and associated elements

### Classes

- struct **DDS\_InvalidLocalIdentityAdvanceNoticeStatus**  
*DDS\_INVALID\_LOCAL\_IDENTITY\_ADVANCE\_NOTICE\_STATUS* (p. 347)
- struct **DDS\_DomainParticipantQos**  
*QoS policies supported by a DDSDomainParticipant* (p. 1351) entity.
- struct **DDS\_DomainParticipantProtocolStatus**  
<<*extension*>> (p. 237) *The status of a participant's protocol related metrics, like the number of corrupted messages, change in corrupted messages and timestamp of the last corrupted message.*
- class **DDSDomainParticipantListener**  
<<*interface*>> (p. 237) *Listener for participant status.*
- class **DDSDomainParticipant**  
<<*interface*>> (p. 237) *Container for all DDSDomainEntity* (p. 1350) objects.

### Typedefs

- typedef DDS\_DOMAINID\_TYPE\_NATIVE **DDS\_DomainId\_t**  
*An integer that indicates in which domain a DDSDomainParticipant* (p. 1351) *communicates.*

## Functions

- **DDS\_Boolean DDS\_DomainParticipantQos\_equals** (const struct **DDS\_DomainParticipantQos** \*self, const struct **DDS\_DomainParticipantQos** \*other)  
*Compares two **DDS\_DomainParticipantQos** (p. 741) for equality.*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantQos::print** () const  
*Prints this **DDS\_DomainParticipantQos** (p. 741) to stdout.*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_↔ size) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_↔ size, const **DDS\_DomainParticipantQos** &base) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_↔ size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_↔ size, const **DDS\_DomainParticipantQos** &base, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_↔ size, const **DDS\_QosPrintAll\_t** &) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t DDS\_DomainParticipantQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_↔ size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*

## Variables

- const struct **DDS\_TopicQos DDS\_TOPIC\_QOS\_DEFAULT**  
*Special value for creating a **DDSTopic** (p. 1617) with default QoS.*
- const struct **DDS\_PublisherQos DDS\_PUBLISHER\_QOS\_DEFAULT**  
*Special value for creating a **DDSPublisher** (p. 1550) with default QoS.*
- const struct **DDS\_SubscriberQos DDS\_SUBSCRIBER\_QOS\_DEFAULT**  
*Special value for creating a **DDSSubscriber** (p. 1592) with default QoS.*
- const struct **DDS\_FlowControllerProperty\_t DDS\_FLOW\_CONTROLLER\_PROPERTY\_DEFAULT**  
*<<extension>> (p. 237) Special value for creating a **DDSFlowController** (p. 1468) with default property.*
- const char \*const **DDS\_SQLFILTER\_NAME**  
*<<extension>> (p. 237) The name of the built-in SQL filter that can be used with **ContentFilteredTopics** and **MultiChannel DataWriters**.*
- const char \*const **DDS\_STRINGMATCHFILTER\_NAME**  
*<<extension>> (p. 237) The name of the built-in StringMatch filter that can be used with **ContentFilteredTopics** and **MultiChannel DataWriters**.*

### 7.5.1 Detailed Description

**DDSDomainParticipant** (p. 1351) entity and associated elements



## 7.5.2 Typedef Documentation

### 7.5.2.1 DDS\_DomainId\_t

```
typedef DDS_DOMAINID_TYPE_NATIVE DDS_DomainId_t
```

An integer that indicates in which domain a **DDSDomainParticipant** (p. 1351) communicates.

Participants with the same **DDS\_DomainId\_t** (p. 51) are said to be in the same domain, and can thus communicate with one another.

The lower limit for a domain ID is 0. The upper limit for a domain ID is determined by the guidelines stated in **DDS\_↔RtpsWellKnownPorts\_t** (p. 1076) (specifically **DDS\_RtpsWellKnownPorts\_t::domain\_id\_gain** (p. 1078))

## 7.5.3 Function Documentation

### 7.5.3.1 DDS\_DomainParticipantQos\_equals()

```
DDS_Boolean DDS_DomainParticipantQos_equals (
    const struct DDS_DomainParticipantQos * self,
    const struct DDS_DomainParticipantQos * other )
```

Compares two **DDS\_DomainParticipantQos** (p. 741) for equality.

#### Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This DomainParticipantQos.
<i>other</i>	<< <i>in</i> >> (p. 238) The other DomainParticipantQos to be compared with this DomainParticipantQos.

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two Qos objects are equal or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

Referenced by **DDS\_DomainParticipantQos::operator!=()**, and **DDS\_DomainParticipantQos::operator==()**.

### 7.5.3.2 print()

```
DDS_ReturnCode_t DDS_DomainParticipantQos::print ( ) const [inline]
```

Prints this **DDS\_DomainParticipantQos** (p. 741) to stdout.

Only the differences between this **DDS\_DomainParticipantQos** (p. 741) and the documented default are printed. If you wish to print everything regardless, see **DDS\_DomainParticipantQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantQos&, const DDS\_QosPrintFormat&) const** (p. 54). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

### 7.5.3.3 to\_string() [1/6]

```
DDS_ReturnCode_t DDS_DomainParticipantQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).

Only the differences between this **DDS\_DomainParticipantQos** (p. 741) and the documented default are printed. If you wish to print everything regardless, see **DDS\_DomainParticipantQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantQos&, const DDS\_QosPrintFormat&) const** (p. 54). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

If the supplied buffer is NULL, the required length of the string is returned via the `string_size` parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_DomainParticipantQos** (p. 741) is written to the buffer.

#### Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantQos</b> (p. 741). If NULL, this function will return the required length of this buffer through the <code>string_size</code> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### See also

**DDS\_DomainParticipantQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantQos&, const DDS\_QosPrintFormat&) const** (p. 54)

## 7.5.3.4 to\_string() [2/6]

```
DDS_ReturnCode_t DDS_DomainParticipantQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_DomainParticipantQos & base ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).

This overload behaves the same as **DDS\_DomainParticipantQos::to\_string** (p. 52) but allows the caller to specify the **DDS\_DomainParticipantQos** (p. 741), which is used as the base profile. Only the differences between the QoS and the base profile are included in the output string.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantQos</b> (p. 741). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <i>in</i> >> (p. 238) The <b>DDS_DomainParticipantQos</b> (p. 741) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DomainParticipantQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantQos&, const DDS\_QosPrintFormat&) const** (p. 54)

References **DDS\_QosPrintFormat\_INITIALIZER**.

## 7.5.3.5 to\_string() [3/6]

```
DDS_ReturnCode_t DDS_DomainParticipantQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).

This overload behaves the same as **DDS\_DomainParticipantQos::to\_string** (p. 52) but allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the output.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantQos</b> (p. 741). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DomainParticipantQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantQos&, const DDS\_QosPrintFormat&) const** (p. 54)

References **DDS\_RETCODE\_ERROR**, and **DDS\_RETCODE\_OK**.

## 7.5.3.6 to\_string() [4/6]

```
DDS_ReturnCode_t DDS_DomainParticipantQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_DomainParticipantQos & base,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).

Only the differences between this **DDS\_DomainParticipantQos** (p. 741) and the **DDS\_DomainParticipantQos** (p. 741) supplied as the base are printed to the string.

If the supplied buffer is NULL, the required length of the string is returned via the *string\_size* parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_DomainParticipantQos** (p. 741) is written to the buffer.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantQos</b> (p. 741). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <i>in</i> >> (p. 238) The <b>DDS_DomainParticipantQos</b> (p. 741) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## 7.5.3.7 to\_string() [5/6]

```
DDS_ReturnCode_t DDS_DomainParticipantQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).

This overload behaves the same as **DDS\_DomainParticipantQos::to\_string** (p. 52) but prints the entire **DDS\_DomainParticipantQos** (p. 741) object. The only valid value for the argument of type **DDS\_QosPrintAll\_t** (p. 1030) is **DDS\_QOS\_PRINT\_ALL** (p. 164).

## For example

```
DomainParticipantQos qos;
char *str = NULL;
DDS_UnsignedLong str_size = 0;
qos.to_string(str, str_size, QOS_PRINT_ALL);
```

The resultant string is formatted according to the default value for **DDS\_QosPrintFormat** (p. 1031).

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantQos</b> (p. 741). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DomainParticipantQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantQos&, const DDS\_QosPrintFormat&) const** (p. 54)

References **DDS\_QosPrintFormat\_INITIALIZER**.

### 7.5.3.8 to\_string() [6/6]

```
DDS_ReturnCode_t DDS_DomainParticipantQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).

This overload behaves the same as the **DDS\_DomainParticipantQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_QosPrintAll\_t&) const** (p. 55) overload. The only difference is that it allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the resultant string.

#### Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DomainParticipantQos</b> (p. 741). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### See also

**DDS\_DomainParticipantQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DomainParticipantQos&, const DDS\_QosPrintFormat&) const** (p. 54)

## 7.5.4 Variable Documentation

### 7.5.4.1 DDS\_TOPIC\_QOS\_DEFAULT

```
const struct DDS_TopicQos DDS_TOPIC_QOS_DEFAULT [extern]
```

Special value for creating a **DDSTopic** (p. 1617) with default QoS.

When used in **DDSDomainParticipant::create\_topic** (p. 1382), this special value is used to indicate that the **DDSTopic** (p. 1617) should be created with the default **DDSTopic** (p. 1617) QoS by means of the operation `get_default_topic_qos` and using the resulting QoS to create the **DDSTopic** (p. 1617).

When used in **DDSDomainParticipant::set\_default\_topic\_qos** (p. 1369), this special value is used to indicate that the default QoS should be reset back to the initial value that would be used if the **DDSDomainParticipant::set\_default\_topic\_qos** (p. 1369) operation had never been called.

When used in **DDSTopic::set\_qos** (p. 1619), this special value is used to indicate that the QoS of the **DDSTopic** (p. 1617) should be changed to match the current default QoS set in the **DDSDomainParticipant** (p. 1351) that the **DDSTopic** (p. 1617) belongs to.

### Warning

This value is a constant and should never be modified. You cannot use this value to *get* the default QoS values for a Topic; for this purpose, use **DDSDomainParticipant::get\_default\_topic\_qos** (p. 1368).

### See also

**DDSDomainParticipant::create\_topic** (p. 1382)

**DDSDomainParticipant::set\_default\_topic\_qos** (p. 1369)

**DDSTopic::set\_qos** (p. 1619)

### Examples

**HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.

#### 7.5.4.2 DDS\_PUBLISHER\_QOS\_DEFAULT

```
const struct DDS_PublisherQos DDS_PUBLISHER_QOS_DEFAULT [extern]
```

Special value for creating a **DDSPublisher** (p. 1550) with default QoS.

When used in **DDSDomainParticipant::create\_publisher** (p. 1376), this special value is used to indicate that the **DDSPublisher** (p. 1550) should be created with the default **DDSPublisher** (p. 1550) QoS by means of the operation **get\_default\_publisher\_qos** and using the resulting QoS to create the **DDSPublisher** (p. 1550).

When used in **DDSDomainParticipant::set\_default\_publisher\_qos** (p. 1372), this special value is used to indicate that the default QoS should be reset back to the initial value that would be used if the **DDSDomainParticipant::set\_default\_publisher\_qos** (p. 1372) operation had never been called.

When used in **DDSPublisher::set\_qos** (p. 1568), this special value is used to indicate that the QoS of the **DDSPublisher** (p. 1550) should be changed to match the current default QoS set in the **DDSDomainParticipant** (p. 1351) that the **DDSPublisher** (p. 1550) belongs to.

### Warning

This value is a constant and should never be modified. You cannot use this value to *get* the default QoS values for a Publisher; for this purpose, use **DDSDomainParticipant::get\_default\_publisher\_qos** (p. 1371).

### See also

**DDSDomainParticipant::create\_publisher** (p. 1376)

**DDSDomainParticipant::set\_default\_publisher\_qos** (p. 1372)

**DDSPublisher::set\_qos** (p. 1568)

### Examples

**HelloWorld\_publisher.cxx**.

### 7.5.4.3 DDS\_SUBSCRIBER\_QOS\_DEFAULT

```
const struct DDS_SubscriberQos DDS_SUBSCRIBER_QOS_DEFAULT [extern]
```

Special value for creating a **DDSSubscriber** (p. 1592) with default QoS.

When used in **DDSDomainParticipant::create\_subscriber** (p. 1379), this special value is used to indicate that the **DDSSubscriber** (p. 1592) should be created with the default **DDSSubscriber** (p. 1592) QoS by means of the operation **get\_default\_subscriber\_qos** and using the resulting QoS to create the **DDSSubscriber** (p. 1592).

When used in **DDSDomainParticipant::set\_default\_subscriber\_qos** (p. 1374), this special value is used to indicate that the default QoS should be reset back to the initial value that would be used if the **DDSDomainParticipant::set\_default\_subscriber\_qos** (p. 1374) operation had never been called.

When used in **DDSSubscriber::set\_qos** (p. 1609), this special value is used to indicate that the QoS of the **DDSSubscriber** (p. 1592) should be changed to match the current default QoS set in the **DDSDomainParticipant** (p. 1351) that the **DDSSubscriber** (p. 1592) belongs to.

#### Warning

This value is a constant and should never be modified. You cannot use this value to *get* the default QoS values for a Subscriber; for this purpose, use **DDSDomainParticipant::get\_default\_subscriber\_qos** (p. 1373).

#### See also

**DDSDomainParticipant::create\_subscriber** (p. 1379)  
**DDSDomainParticipant::get\_default\_subscriber\_qos** (p. 1373)  
**DDSSubscriber::set\_qos** (p. 1609)

#### Examples

**HelloWorld\_subscriber.cxx.**

### 7.5.4.4 DDS\_FLOW\_CONTROLLER\_PROPERTY\_DEFAULT

```
const struct DDS_FlowControllerProperty_t DDS_FLOW_CONTROLLER_PROPERTY_DEFAULT [extern]
```

<<*extension*>> (p. 237) Special value for creating a **DDSFlowController** (p. 1468) with default property.

When used in **DDSDomainParticipant::create\_flowcontroller** (p. 1391) and **DDSFlowController::set\_property** (p. 1469), this special value represents the set of values specified on the last successful call to **DDSDomainParticipant::set\_default\_flowcontroller\_property** (p. 1363), or else, if the call was never made, the default values listed in **DDS\_FlowControllerProperty\_t** (p. 912).

When used in **DDSDomainParticipant::set\_default\_flowcontroller\_property** (p. 1363), this special value indicates that the default QoS should be reset back to the initial value that would be used if the **DDSDomainParticipant::set\_default\_flowcontroller\_property** (p. 1363) operation had never been called.



### Warning

This value is a constant and should never be modified. You cannot use this value to *get* the default properties for a FlowController; for this purpose, use **DDSDomainParticipant::get\_default\_flowcontroller\_property** (p. 1362).

### See also

**DDSDomainParticipant::create\_flowcontroller** (p. 1391)

**DDSDomainParticipant::set\_default\_flowcontroller\_property** (p. 1363)

**DDSFlowController::set\_property** (p. 1469)

#### 7.5.4.5 DDS\_SQLFILTER\_NAME

```
const char* const DDS_SQLFILTER_NAME
```

<<**extension**>> (p. 237) The name of the built-in SQL filter that can be used with ContentFilteredTopics and MultiChannel DataWriters.

### See also

**Queries and Filters Syntax** (p. 179)

#### 7.5.4.6 DDS\_STRINGMATCHFILTER\_NAME

```
const char* const DDS_STRINGMATCHFILTER_NAME
```

<<**extension**>> (p. 237) The name of the built-in StringMatch filter that can be used with ContentFilteredTopics and MultiChannel DataWriters.

The StringMatch Filter is a subset of the SQL filter; it only supports the MATCH relational operator on a single string field.

### See also

**Queries and Filters Syntax** (p. 179)

## 7.6 Built-in Topics

Built-in objects created by RTI Connex but accessible to the application.

## Modules

- **Participant Built-in Topics**  
*Builtin topic for accessing information about the DomainParticipants discovered by RTI Connex.*
- **Topic Built-in Topics**  
*Builtin topic for accessing information about the Topics discovered by RTI Connex.*
- **Publication Built-in Topics**  
*Builtin topic for accessing information about the Publications discovered by RTI Connex.*
- **Subscription Built-in Topics**  
*Builtin topic for accessing information about the Subscriptions discovered by RTI Connex.*
- **ServiceRequest Built-in Topic**  
*Builtin topic for accessing requests from different services within RTI Connex.*
- **Common types and functions**  
*Types and functions related to the built-in topics.*

### 7.6.1 Detailed Description

Built-in objects created by RTI Connex but accessible to the application.

RTI Connex must discover and keep track of the remote entities, such as new participants in the domain. This information may also be important to the application, which may want to react to this discovery, or else access it on demand.

A set of built-in topics and corresponding **DDSDataReader** (p. 1288) objects are introduced to be used by the application to access this discovery information.

The information can be accessed as if it were normal application data. This allows the application to know when there are any changes in those values by means of the **DDSListener** (p. 1526) or the **DDSCondition** (p. 1276) mechanisms.

The built-in data-readers all belong to a built-in **DDSSubscriber** (p. 1592), which can be retrieved by using the method **DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393). The built-in **DDSDataReader** (p. 1288) objects can be retrieved by using the operation **DDSSubscriber::lookup\_datareader** (p. 1604), with the topic name as a parameter.

Built-in entities have default listener settings as well. The built-in **DDSSubscriber** (p. 1592) and all of its built-in topics have 'nil' listeners with all statuses appearing in their listener masks (acting as a NO-OP listener that does not reset communication status). The built-in DataReaders have null listeners with no statuses in their masks.

The information that is accessible about the remote entities by means of the built-in topics includes all the QoS policies that apply to the corresponding remote Entity. These QoS policies appear as normal 'data' fields inside the data read by means of the built-in Topic. Additional information is provided to identify the Entity and facilitate the application logic.

The built-in **DDSDataReader** (p. 1288) will not provide data pertaining to entities created from the same **DDSDomainParticipant** (p. 1351) under the assumption that such entities are already known to the application that created them.

The discovery information provided by each built-in reader won't be received until it is first looked up. And if the DomainParticipant was created in a disabled state (see **DDS\_EntityFactoryQosPolicy** (p. 903)), the built-in subscriber and readers will need to be enabled explicitly (by the **DDSEntity::enable** (p. 1466) operation).

Refer to **DDS\_ParticipantBuiltinTopicData** (p. 979), **DDS\_TopicBuiltinTopicData** (p. 1128), **DDS\_SubscriptionBuiltinTopicData** (p. 1108) and **DDS\_PublicationBuiltinTopicData** (p. 1010) for a description of all the built-in topics and their contents.

The QoS of the built-in **DDSSubscriber** (p. 1592) and **DDSDataReader** (p. 1288) objects is given by the following table:

Table 7.18 QoS of built-in *DDSSubscriber* (p. 1592) and *DDSDataReader* (p. 1288)

QoS	Value
<b>DDS_UserDataQoSPolicy</b> (p. 1237)	0-length sequence
<b>DDS_TopicDataQoSPolicy</b> (p. 1133)	0-length sequence
<b>DDS_GroupDataQoSPolicy</b> (p. 916)	0-length sequence
<b>DDS_DurabilityQoSPolicy</b> (p. 767)	<b>DDS_TRANSIENT_LOCAL_DURABILITY_QOS</b> (p. 401)
<b>DDS_DurabilityServiceQoSPolicy</b> (p. 771)	Does not apply as <b>DDS_DurabilityQoSPolicyKind</b> (p. 400) is <b>DDS_TRANSIENT_LOCAL_DURABILITY_QOS</b> (p. 401)
<b>DDS_PresentationQoSPolicy</b> (p. 996)	access_scope = <b>DDS_TOPIC_PRESENTATION_QOS</b> (p. 418) coherent_access = <b>DDS_BOOLEAN_FALSE</b> (p. 317) ordered_access = <b>DDS_BOOLEAN_FALSE</b> (p. 317)
<b>DDS_DeadlineQoSPolicy</b> (p. 707)	Period = infinite
<b>DDS_LatencyBudgetQoSPolicy</b> (p. 929)	duration = 0
<b>DDS_OwnershipQoSPolicy</b> (p. 973)	<b>DDS_SHARED_OWNERSHIP_QOS</b> (p. 415)
<b>DDS_OwnershipStrengthQoSPolicy</b> (p. 978)	value = 0
<b>DDS_LivelinessQoSPolicy</b> (p. 936)	kind = <b>DDS_AUTOMATIC_LIVELINESS_QOS</b> (p. 410) lease_duration = 0
<b>DDS_TimeBasedFilterQoSPolicy</b> (p. 1126)	minimum_separation = 0
<b>DDS_PartitionQoSPolicy</b> (p. 989)	0-length sequence
<b>DDS_ReliabilityQoSPolicy</b> (p. 1041)	kind = <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435) max_blocking_time = 100 milliseconds
<b>DDS_DestinationOrderQoSPolicy</b> (p. 709)	<b>DDS_BY_RECEPTION_TIMESTAMP</b> ↔ <b>DESTINATIONORDER_QOS</b> (p. 387)
<b>DDS_HistoryQoSPolicy</b> (p. 919)	kind = <b>DDS_KEEP_LAST_HISTORY_QOS</b> (p. 406) depth = 1
<b>DDS_ResourceLimitsQoSPolicy</b> (p. 1052)	max_samples = <b>DDS_LENGTH_UNLIMITED</b> (p. 438) max_instances = <b>DDS_LENGTH_UNLIMITED</b> (p. 438) max_samples_per_instance = <b>DDS_LENGTH_UNLIMITED</b> (p. 438)
<b>DDS_ReaderDataLifecycleQoSPolicy</b> (p. 1035)	autopurge_nowriter_samples_delay = infinite autopurge_disposed_samples_delay = infinite
<b>DDS_EntityFactoryQoSPolicy</b> (p. 903)	autoenable_created_entities = <b>DDS_BOOLEAN_TRUE</b> (p. 317)

## 7.7 Topic Module

Contains the **DDSTopic** (p. 1617), **DDSContentFilteredTopic** (p. 1283), and **DDSMultiTopic** (p. 1529) classes, the **DDSTopicListener** (p. 1626) interface, and more generally, all that is needed by an application to define **DDSTopic** (p. 1617) objects and attach QoS policies to them.

### Modules

- Topics

*DDSTopic* (p. 1617) entity and associated elements

- **Zero Copy Transfer Over Shared Memory**

<<extension>> (p. 237) *Zero Copy transfer over shared memory*

- **User Data Type Support**

*Defines generic classes and macros to support user data types.*

- **Type Code Support**

<<extension>> (p. 237) A **DDS\_TypeCode** (p. 1164) is a mechanism for representing a type at runtime. RTI Connext can use type codes to send type definitions on the network. You will need to understand this API in order to use the **Dynamic Data** (p. 99) capability or to inspect the type information you receive from remote readers and writers.

- **Built-in Types**

*RTI Connext provides a set of very simple data types for you to use with the topics in your application.*

- **Built-in Topic's Trust Types**

*Types used as part of **DDS\_ParticipantBuiltinTopicData** (p. 979), **DDS\_PublicationBuiltinTopicData** (p. 1010), **DDS\_←\_SubscriptionBuiltinTopicData** (p. 1108) to describe Trust Plugins configuration.*

- **Dynamic Data**

<<extension>> (p. 237) *The Dynamic Data API provides a way to interact with arbitrarily complex data types at runtime without the need for code generation.*

- **DDS-Specific Primitive Types**

*Basic DDS value types for use in user data types.*

- **FlatData Topic-Types**

<<extension>> (p. 237) *FlatData Language Binding for IDL topic-types*

### 7.7.1 Detailed Description

Contains the **DDSTopic** (p. 1617), **DDSContentFilteredTopic** (p. 1283), and **DDSMultiTopic** (p. 1529) classes, the **DDSTopicListener** (p. 1626) interface, and more generally, all that is needed by an application to define **DDSTopic** (p. 1617) objects and attach QoS policies to them.

## 7.8 Topics

**DDSTopic** (p. 1617) entity and associated elements

### Classes

- struct **DDS\_PrintFormatProperty**

*A collection of attributes used to configure how data samples will be formatted when converted to a string.*

- struct **DDS\_InconsistentTopicStatus**

**DDS\_INCONSISTENT\_TOPIC\_STATUS** (p. 343)

- struct **DDS\_TopicQos**

*QoS policies supported by a **DDSTopic** (p. 1617) entity.*

- struct **DDS\_ExpressionProperty**

*Provides additional information about the filter expression passed to **DDSWriterContentFilter::writer\_compile** (p. 1638)*

- struct **DDS\_FilterSampleInfo**

*Provides meta information associated with the sample.*

- class **DDSTopicDescription**  
 <<*interface*>> (p. 237) Base class for **DDSTopic** (p. 1617), **DDSContentFilteredTopic** (p. 1283), and **DDSMultiTopic** (p. 1529).
- class **DDSContentFilteredTopic**  
 <<*interface*>> (p. 237) Specialization of **DDSTopicDescription** (p. 1624) that allows for content-based subscriptions.
- class **DDSMultiTopic**  
**[Not supported (optional)]** <<*interface*>> (p. 237) A specialization of **DDSTopicDescription** (p. 1624) that allows subscriptions that combine/filter/rearrange data coming from several topics.
- class **DDSTopic**  
 <<*interface*>> (p. 237) The most basic description of the data to be published and subscribed.
- class **DDSTopicListener**  
 <<*interface*>> (p. 237) **DDSTopicListener** (p. 1526) for **DDSTopic** (p. 1617) entities.
- class **DDSContentFilter**  
 <<*interface*>> (p. 237) Interface to be used by a custom filter of a **DDSContentFilteredTopic** (p. 1283)
- class **DDSWriterContentFilter**  
 <<*interface*>> (p. 237) Interface to be used by a custom filter of a **DDSContentFilteredTopic** (p. 1283).

## Typedefs

- typedef struct **DDS\_PrintFormatProperty DDS\_PrintFormatProperty**  
 A collection of attributes used to configure how data samples will be formatted when converted to a string.

## Enumerations

- enum **DDS\_PrintFormatKind** {  
**DDS\_DEFAULT\_PRINT\_FORMAT** ,  
**DDS\_XML\_PRINT\_FORMAT** ,  
**DDS\_JSON\_PRINT\_FORMAT** }
- Format kinds available when converting data samples to string representations.

## Functions

- **DDS\_Boolean DDS\_TopicQos\_equals** (const struct **DDS\_TopicQos** \*self, const struct **DDS\_TopicQos** \*other)  
 Compares two **DDS\_TopicQos** (p. 1135) for equality.
- **DDS\_ReturnCode\_t DDS\_TopicQos::print** () const  
 Prints this **DDS\_TopicQos** (p. 1135) to stdout.
- **DDS\_ReturnCode\_t DDS\_TopicQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
 Obtains a string representation of this **DDS\_TopicQos** (p. 1135).
- **DDS\_ReturnCode\_t DDS\_TopicQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_TopicQos** &base) const  
 Obtains a string representation of this **DDS\_TopicQos** (p. 1135).
- **DDS\_ReturnCode\_t DDS\_TopicQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
 Obtains a string representation of this **DDS\_TopicQos** (p. 1135).

- `DDS_ReturnCode_t DDS_TopicQos::to_string` (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_TopicQos` &base, const `DDS_QosPrintFormat` &format) const  
Obtains a string representation of this `DDS_TopicQos` (p. 1135).
- `DDS_ReturnCode_t DDS_TopicQos::to_string` (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_QosPrintAll_t` &) const  
Obtains a string representation of this `DDS_TopicQos` (p. 1135).
- `DDS_ReturnCode_t DDS_TopicQos::to_string` (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_QosPrintAll_t` &, const `DDS_QosPrintFormat` &format) const  
Obtains a string representation of this `DDS_TopicQos` (p. 1135).

## Variables

- const struct `DDS_PrintFormatProperty DDS_PRINT_FORMAT_PROPERTY_DEFAULT`  
Sentinel constant indicating default values for `DDS_PrintFormatProperty` (p. 1001).

## 7.8.1 Detailed Description

`DDSTopic` (p. 1617) entity and associated elements

## 7.8.2 Typedef Documentation

### 7.8.2.1 `DDS_PrintFormatProperty`

```
typedef struct DDS_PrintFormatProperty DDS_PrintFormatProperty
```

A collection of attributes used to configure how data samples will be formatted when converted to a string.

## 7.8.3 Enumeration Type Documentation

### 7.8.3.1 `DDS_PrintFormatKind`

```
enum DDS_PrintFormatKind
```

Format kinds available when converting data samples to string representations.

## Enumerator

DDS_DEFAULT_PRINT_FORMAT	Use a default format specific to RTI Connexx to represent the data when converting to a string.
DDS_XML_PRINT_FORMAT	Use an XML format to represent the data when converting to a string.
DDS_JSON_PRINT_FORMAT	Use a JSON format to represent the data when converting to a string.

## 7.8.4 Function Documentation

### 7.8.4.1 DDS\_TopicQos\_equals()

```
DDS_Boolean DDS_TopicQos_equals (
    const struct DDS_TopicQos * self,
    const struct DDS_TopicQos * other )
```

Compares two **DDS\_TopicQos** (p. 1135) for equality.

## Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This TopicQos.
<i>other</i>	<< <i>in</i> >> (p. 238) The other TopicQos to be compared with this TopicQos

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two Qos objects are equal or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

Referenced by **DDS\_TopicQos::operator!=()**, and **DDS\_TopicQos::operator==()**.

### 7.8.4.2 print()

```
DDS_ReturnCode_t DDS_TopicQos::print ( ) const [inline]
```

Prints this **DDS\_TopicQos** (p. 1135) to stdout.

Only the differences between this **DDS\_TopicQos** (p. 1135) and the documented default are printed. If you wish to print everything regardless, see **DDS\_TopicQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_TopicQos&, const DDS\_QosPrintFormat&) const** (p. 68). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

### 7.8.4.3 to\_string() [1/6]

```
DDS_ReturnCode_t DDS_TopicQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size ) const [inline]
```

Obtains a string representation of this **DDS\_TopicQos** (p. 1135).

Only the differences between this **DDS\_TopicQos** (p. 1135) and the documented default are printed to the string. If you wish to print everything regardless, see **DDS\_TopicQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_TopicQos&, const DDS\_QosPrintFormat&) const** (p. 68). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

If the supplied buffer is NULL, the required length of the string is returned via the `string_size` parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_TopicQos** (p. 1135) is written to the buffer.

#### Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_TopicQos</b> (p. 1135). If NULL, this function will return the required length of this buffer through the <code>string_size</code> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### See also

**DDS\_TopicQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_TopicQos&, const DDS\_QosPrintFormat&) const** (p. 68)

### 7.8.4.4 to\_string() [2/6]

```
DDS_ReturnCode_t DDS_TopicQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_TopicQos & base ) const [inline]
```

Obtains a string representation of this **DDS\_TopicQos** (p. 1135).

This overload behaves the same as **DDS\_TopicQos::to\_string** (p. 65) but allows the caller to specify the **DDS\_TopicQos** (p. 1135), which is used as the base profile. Only the differences between the QoS and the base profile are included in the output string.



## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_TopicQos</b> (p. 1135). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <b>in</b> >> (p. 238) The <b>DDS_TopicQos</b> (p. 1135) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_TopicQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_TopicQos&, const DDS\_QosPrintFormat&) const** (p. 68)

References **DDS\_QosPrintFormat\_INITIALIZER**.

## 7.8.4.5 to\_string() [3/6]

```
DDS_ReturnCode_t DDS_TopicQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_TopicQos** (p. 1135).

This overload behaves the same as **DDS\_TopicQos::to\_string** (p. 65) but allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the output.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_TopicQos</b> (p. 1135). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_TopicQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_TopicQos&, const DDS\_QoSPrintFormat&) const** (p. 68)

References **DDS\_RETCODE\_ERROR**, and **DDS\_RETCODE\_OK**.

### 7.8.4.6 to\_string() [4/6]

```
DDS_ReturnCode_t DDS_TopicQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_TopicQos & base,
    const DDS_QoSPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_TopicQos** (p. 1135).

Only the differences between this **DDS\_TopicQos** (p. 1135) and the **DDS\_TopicQos** (p. 1135) supplied as the base are printed to the string.

If the supplied buffer is NULL, the required length of the string is returned via the `string_size` parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_TopicQos** (p. 1135) is written to the buffer.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_TopicQos</b> (p. 1135). If NULL, this function will return the required length of this buffer through the <code>string_size</code> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <b>in</b> >> (p. 238) The <b>DDS_TopicQos</b> (p. 1135) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_QoSPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

7.8.4.7 `to_string()` [5/6]

```
DDS_ReturnCode_t DDS_TopicQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ) const [inline]
```

Obtains a string representation of this **DDS\_TopicQos** (p. 1135).

This overload behaves the same as **DDS\_TopicQos::to\_string** (p. 65) but prints the entire **DDS\_TopicQos** (p. 1135) object. The only valid value for the argument of type **DDS\_QosPrintAll\_t** (p. 1030) is **DDS\_QOS\_PRINT\_ALL** (p. 164).

## For example

```
TopicQos qos;
char *str = NULL;
DDS_UnsignedLong str_size = 0;
qos.to_string(str, str_size, QOS_PRINT_ALL);
```

The resultant string is formatted according to the default value for **DDS\_QosPrintFormat** (p. 1031).

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_TopicQos</b> (p. 1135). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_TopicQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_TopicQos&, const DDS\_QosPrintFormat&) const** (p. 68)

References **DDS\_QosPrintFormat\_INITIALIZER**.

7.8.4.8 `to_string()` [6/6]

```
DDS_ReturnCode_t DDS_TopicQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_TopicQos** (p. 1135).

This overload behaves the same as the **DDS\_TopicQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_QosPrintAll\_t&) const** (p. 68) overload. The only difference is that it allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the resultant string.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_TopicQos</b> (p. 1135). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_TopicQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_TopicQos&, const DDS\_QosPrintFormat&) const** (p. 68)

## 7.8.5 Variable Documentation

### 7.8.5.1 DDS\_PRINT\_FORMAT\_PROPERTY\_DEFAULT

```
const struct DDS_PrintFormatProperty DDS_PRINT_FORMAT_PROPERTY_DEFAULT
```

Sentinel constant indicating default values for **DDS\_PrintFormatProperty** (p. 1001).

Pass this object instead of your own **DDS\_PrintFormatProperty** (p. 1001) object to use the default property values:

```
retCode = FooTypeSupport::data_to_string(
    sample,
    DDS_PRINT_FORMAT_PROPERTY_DEFAULT);
```

## See also

**DDS\_PrintFormatProperty** (p. 1001)

## 7.9 Zero Copy Transfer Over Shared Memory

<<**extension**>> (p. 237) Zero Copy transfer over shared memory

<<**extension**>> (p. 237) Zero Copy transfer over shared memory

## Note

For a description of Zero Copy transfer over shared memory and its benefits, and a tutorial, see the "Sending Large Data" chapter in the **RTI Connex User's Manual**.

For buildable **code examples**, see <https://community.rti.com/kb/flatdata-and-zerocopy-examples>.

Zero Copy transfer over shared memory is available in the C API, in the Traditional C++ API, and in the Modern C++ API.

## 7.10 User Data Type Support

Defines generic classes and macros to support user data types.

### Classes

- struct **DDS\_TypeAllocationParams\_t**  
*Configures whether or not to allocate pointer and optional members.*
- struct **DDS\_TypeDeallocationParams\_t**  
*Configures whether to release or not pointer and optional members.*
- struct **Foo**  
*A representative user-defined data type.*
- struct **DDS\_InstanceHandleSeq**  
*Instantiates `FooSeq` (p. 1697) < `DDS_InstanceHandle_t` (p. 74) > .*
- class **FooTypeSupport**  
*<<interface>> (p. 237) <<generic>> (p. 237) User data type specific interface.*
- class **DDSTypeSupport**  
*<<interface>> (p. 237) An abstract marker interface that has to be specialized for each concrete user data type that will be used by the application.*

### Macros

- #define **DDS\_TYPESUPPORT\_CPP**(TTypeSupport, TData)  
*Declares the interface required to support a user data type.*
- #define **DDS\_DATAWRITER\_CPP**(TDataWriter, TData)  
*Declares the interface required to support a user data type specific data writer.*
- #define **DDS\_DATAREADER\_W\_DATA\_CONSISTENCY\_CHECK**(TDataReader, TDataSeq, TData)  
*Declares the interface required to support a user data type-specific data reader.*

### Typedefs

- typedef **DDS\_HANDLE\_TYPE\_NATIVE DDS\_InstanceHandle\_t**  
*Type definition for an instance handle.*

### Functions

- **DDS\_Boolean DDS\_InstanceHandle\_equals** (const **DDS\_InstanceHandle\_t** \*self, const **DDS\_InstanceHandle\_t** \*other)  
*Compares this instance handle with another handle for equality.*
- int **DDS\_InstanceHandle\_compare** (const **DDS\_InstanceHandle\_t** \*self, const **DDS\_InstanceHandle\_t** \*other)  
*Compares this instance handle with another handle.*
- void **DDS\_InstanceHandle\_copy** (**DDS\_InstanceHandle\_t** \*self, const **DDS\_InstanceHandle\_t** \*other)  
*Copies this instance handle into another handle.*
- **DDS\_Boolean DDS\_InstanceHandle\_is\_nil** (const **DDS\_InstanceHandle\_t** \*self)  
*Compare this handle to `DDS_HANDLE_NIL` (p. 76).*

## Variables

- const **DDS\_InstanceHandle\_t DDS\_HANDLE\_NIL**

*The NIL instance handle.*

### 7.10.1 Detailed Description

Defines generic classes and macros to support user data types.

DDS specifies strongly typed interfaces to read and write user data. For each data class defined by the application, there is a number of specialised classes that are required to facilitate the type-safe interaction of the application with RTI Connex.

RTI Connex provides an automatic means to generate all these type-specific classes with the `rtiddsgen` utility. The complete set of automatic classes created for a hypothetical user data type named **Foo** (p. 1648) are shown below.

an application data type named **Foo** (p. 1648) "

The macros defined here declare the strongly typed APIs needed to support an arbitrary user defined data of type **Foo** (p. 1648).

#### See also

the `Code Generator User's Manual`

### 7.10.2 Macro Definition Documentation

#### 7.10.2.1 DDS\_TYPESUPPORT\_CPP

```
#define DDS_TYPESUPPORT_CPP (
    TTypeSupport,
    TData )
```

Declares the interface required to support a user data type.

#### Defines:

**FooTypeSupport** (p. 1711) TypeSupport of type **Foo** (p. 1648), i.e. **FooTypeSupport** (p. 1711)

#### Examples

**HelloWorldSupport.cxx.**

### 7.10.2.2 DDS\_DATAWRITER\_CPP

```
#define DDS_DATAWRITER_CPP(  
    TDataWriter,  
    TData )
```

Declares the interface required to support a user data type specific data writer.

**Uses:**

**FooTypeSupport** (p. 1711) user data type, **Foo** (p. 1648)

**Defines:**

**FooDataWriter** (p. 1676) **DDSDataWriter** (p.1321) of type **Foo** (p.1648), i.e. **FooDataWriter** (p. 1676)

### 7.10.2.3 DDS\_DATAREADER\_W\_DATA\_CONSISTENCY\_CHECK

```
#define DDS_DATAREADER_W_DATA_CONSISTENCY_CHECK(  
    TDataReader,  
    TDataSeq,  
    TData )
```

Declares the interface required to support a user data type-specific data reader.

**Uses:**

**FooTypeSupport** (p. 1711) user data type, **Foo** (p. 1648)  
**FooSeq** (p. 1697) sequence of user data type, `sequence<::Foo>`

**Defines:**

**FooDataReader** (p. 1649) **DDSDataReader** (p.1288) of type **Foo** (p.1648), i.e. **FooDataReader** (p. 1649)

**See also**

**FooSeq** (p. 1697)

**Examples**

**HelloWorldSupport.cxx.**

### 7.10.3 Typedef Documentation

#### 7.10.3.1 DDS\_InstanceHandle\_t

```
typedef DDS_HANDLE_TYPE_NATIVE DDS_InstanceHandle_t
```

Type definition for an instance handle.

Handle to identify different instances of the same **DDSTopic** (p. 1617) of a certain type.

See also

**FooDataWriter::register\_instance** (p. 1678)

**DDS\_SampleInfo::instance\_handle** (p. 1087)

### 7.10.4 Function Documentation

#### 7.10.4.1 DDS\_InstanceHandle\_equals()

```
DDS_Boolean DDS_InstanceHandle_equals (
    const DDS_InstanceHandle_t * self,
    const DDS_InstanceHandle_t * other )
```

Compares this instance handle with another handle for equality.

Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This handle. Cannot be NULL.
<i>other</i>	<< <i>in</i> >> (p. 238) The other handle to be compared with this handle. Cannot be NULL.

Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two handles have equal values, or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

See also

**DDS\_InstanceHandle\_is\_nil** (p. 75)



### 7.10.4.2 DDS\_InstanceHandle\_compare()

```
int DDS_InstanceHandle_compare (
    const DDS_InstanceHandle_t * self,
    const DDS_InstanceHandle_t * other )
```

Compares this instance handle with another handle.

#### Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This handle. Cannot be NULL.
<i>other</i>	<< <i>in</i> >> (p. 238) The other handle to be compared with this handle. Cannot be NULL.

#### Returns

If the two handles are equal, the function returns 0. If *self* is greater than *other* the function returns a positive number; otherwise, it returns a negative number.

#### See also

**DDS\_InstanceHandle\_is\_nil** (p. 75)

### 7.10.4.3 DDS\_InstanceHandle\_copy()

```
void DDS_InstanceHandle_copy (
    DDS_InstanceHandle_t * self,
    const DDS_InstanceHandle_t * other )
```

Copies this instance handle into another handle.

#### Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) The source handle. Cannot be NULL.
<i>other</i>	<< <i>in</i> >> (p. 238) The destination handle to be copied into. Cannot be NULL.

### 7.10.4.4 DDS\_InstanceHandle\_is\_nil()

```
DDS_Boolean DDS_InstanceHandle_is_nil (
    const DDS_InstanceHandle_t * self )
```

Compare this handle to **DDS\_HANDLE\_NIL** (p. 76).

**Returns**

**DDS\_BOOLEAN\_TRUE** (p. 317) if the given instance handle is equal to **DDS\_HANDLE\_NIL** (p. 76) or **DDS\_↔  
BOOLEAN\_FALSE** (p. 317) otherwise.

**See also**

**DDS\_InstanceHandle\_equals** (p. 74)

## 7.10.5 Variable Documentation

### 7.10.5.1 DDS\_HANDLE\_NIL

```
const DDS_InstanceHandle_t DDS_HANDLE_NIL [extern]
```

The NIL instance handle.

Special **DDS\_InstanceHandle\_t** (p. 74) value

**See also**

**DDS\_InstanceHandle\_is\_nil** (p. 75)

**Examples**

**HelloWorld\_publisher.cxx.**

## 7.11 Type Code Support

<<*extension*>> (p. 237) A **DDS\_TypeCode** (p. 1164) is a mechanism for representing a type at runtime. RTI Connext can use type codes to send type definitions on the network. You will need to understand this API in order to use the **Dynamic Data** (p. 99) capability or to inspect the type information you receive from remote readers and writers.

## Classes

- struct **DDS\_TypeCodePrintFormatProperty**  
A collection of attributes used to configure how a *TypeCode* appears when converted to a string.
- struct **DDS\_TypeCode**  
The definition of a particular data type, which you can use to inspect the name, members, and other properties of types generated with *rtiddsgen* (see the *Code Generator User's Manual*) or to modify types you define yourself at runtime.
- struct **DDS\_StructMember**  
A description of a member of a struct.
- struct **DDS\_StructMemberSeq**  
Defines a sequence of struct members.
- struct **DDS\_UnionMember**  
A description of a member of a union.
- struct **DDS\_UnionMemberSeq**  
Defines a sequence of union members.
- struct **DDS\_EnumMember**  
A description of a member of an enumeration.
- struct **DDS\_EnumMemberSeq**  
Defines a sequence of enumerator members.
- struct **DDS\_ValueMember**  
A description of a member of a value type.
- struct **DDS\_ValueMemberSeq**  
Defines a sequence of value members.
- struct **DDS\_TypeCodeFactory**  
A singleton factory for creating, copying, and deleting data type definitions dynamically.

## Macros

- #define **DDS\_TYPECODE\_MEMBER\_ID\_INVALID**  
A sentinel indicating an invalid *DDS\_TypeCode* (p. 1164) member ID.
- #define **DDS\_TYPECODE\_INDEX\_INVALID**  
A sentinel indicating an invalid *DDS\_TypeCode* (p. 1164) member index.
- #define **DDS\_TYPECODE\_NOT\_BITFIELD**  
Indicates that a member of a type is not a bitfield.
- #define **DDS\_VM\_NONE**  
Constant used to indicate that a value type has no modifiers.
- #define **DDS\_VM\_CUSTOM**  
Constant used to indicate that a value type has the *custom* modifier.
- #define **DDS\_VM\_ABSTRACT**  
Constant used to indicate that a value type has the *abstract* modifier.
- #define **DDS\_VM\_TRUNCATABLE**  
Constant used to indicate that a value type has the *truncatable* modifier.
- #define **DDS\_PRIVATE\_MEMBER**  
Constant used to indicate that a value type member is private.
- #define **DDS\_PUBLIC\_MEMBER**  
Constant used to indicate that a value type member is public.

- **#define DDS\_TYPECODE\_NONKEY\_MEMBER**  
*A flag indicating that a type member is optional and not part of the key.*
- **#define DDS\_TYPECODE\_KEY\_MEMBER**  
*A flag indicating that a type member is part of the key for that type, and therefore required.*
- **#define DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER**  
*A flag indicating that a type member is not part of the key but is nevertheless required.*
- **#define DDS\_TypeCode\_PrintFormat\_INITIALIZER**  
*Static initializer for `DDS_TypeCodePrintFormatProperty` (p. 1224).*

## Typedefs

- **typedef short DDS\_ValueModifier**  
*Modifier type for a value type.*
- **typedef short DDS\_Visibility**  
*Type to indicate the visibility of a value type member.*

## Enumerations

- **enum DDS\_TypeCodePrintFormatKind {**  
**DDS\_TYPE\_CODE\_PRINT\_KIND\_IDL ,**  
**DDS\_TYPE\_CODE\_PRINT\_KIND\_XML }**  
*The different formats to print a `DDS_TypeCode` (p. 1164).*
- **enum DDS\_TCKind {**  
**DDS\_TK\_NULL ,**  
**DDS\_TK\_SHORT ,**  
**DDS\_TK\_LONG ,**  
**DDS\_TK\_USHORT ,**  
**DDS\_TK\_ULONG ,**  
**DDS\_TK\_FLOAT ,**  
**DDS\_TK\_DOUBLE ,**  
**DDS\_TK\_BOOLEAN ,**  
**DDS\_TK\_CHAR ,**  
**DDS\_TK\_OCTET ,**  
**DDS\_TK\_STRUCT ,**  
**DDS\_TK\_UNION ,**  
**DDS\_TK\_ENUM ,**  
**DDS\_TK\_STRING ,**  
**DDS\_TK\_SEQUENCE ,**  
**DDS\_TK\_ARRAY ,**  
**DDS\_TK\_ALIAS ,**  
**DDS\_TK\_LONGLONG ,**  
**DDS\_TK\_ULONGLONG ,**  
**DDS\_TK\_LONGDOUBLE ,**  
**DDS\_TK\_WCHAR ,**  
**DDS\_TK\_WSTRING ,**  
**DDS\_TK\_VALUE ,**  
**DDS\_TK\_SPARSE ,**  
**DDS\_TK\_RAW\_BYTES = 0x7e ,**  
**DDS\_TK\_RAW\_BYTES\_KEYED = 0x7f ,**

```

DDS_TK_FINAL_EXTENSIBILITY = 0x4000 ,
DDS_TK_MUTABLE_EXTENSIBILITY = 0x2000 ,
DDS_TK_FLAT_DATA_LANGUAGE_BINDING = RTI_XCDR_TK_FLAGS_IS_FLAT_DATA ,
DDS_TK_SHMEM_REF_TRANSFER_MODE = RTI_XCDR_TK_FLAGS_IS_SHMEM_REF }

```

*Enumeration type for **DDS\_TypeCode** (p. 1164) kinds.*

- enum **DDS\_ExtensibilityKind** {  
**DDS\_FINAL\_EXTENSIBILITY** ,  
**DDS\_EXTENSIBLE\_EXTENSIBILITY** ,  
**DDS\_MUTABLE\_EXTENSIBILITY** }

*Type to indicate the extensibility of a type.*

## Variables

- **DDS\_TypeCode DDS\_g\_tc\_null**  
*Basic NULL type.*
- **DDS\_TypeCode DDS\_g\_tc\_short**  
*Basic 16-bit signed integer type.*
- **DDS\_TypeCode DDS\_g\_tc\_long**  
*Basic 32-bit signed integer type.*
- **DDS\_TypeCode DDS\_g\_tc\_ushort**  
*Basic unsigned 16-bit integer type.*
- **DDS\_TypeCode DDS\_g\_tc\_ulong**  
*Basic unsigned 32-bit integer type.*
- **DDS\_TypeCode DDS\_g\_tc\_float**  
*Basic 32-bit floating point type.*
- **DDS\_TypeCode DDS\_g\_tc\_double**  
*Basic 64-bit floating point type.*
- **DDS\_TypeCode DDS\_g\_tc\_boolean**  
*Basic Boolean type.*
- **DDS\_TypeCode DDS\_g\_tc\_char**  
*Basic single-byte character type.*
- **DDS\_TypeCode DDS\_g\_tc\_octet**  
*Basic octet/byte type.*
- **DDS\_TypeCode DDS\_g\_tc\_longlong**  
*Basic 64-bit integer type.*
- **DDS\_TypeCode DDS\_g\_tc\_ulonglong**  
*Basic unsigned 64-bit integer type.*
- **DDS\_TypeCode DDS\_g\_tc\_longdouble**  
*Basic 128-bit floating point type.*
- **DDS\_TypeCode DDS\_g\_tc\_wchar**  
*Basic four-byte character type.*

### 7.11.1 Detailed Description

<<*extension*>> (p. 237) A **DDS\_TypeCode** (p. 1164) is a mechanism for representing a type at runtime. RTI Connex can use type codes to send type definitions on the network. You will need to understand this API in order to use the **Dynamic Data** (p. 99) capability or to inspect the type information you receive from remote readers and writers.

Type codes are values that are used to describe arbitrarily complex types at runtime. Type code values are manipulated via the **DDS\_TypeCode** (p. 1164) class, which has an analogue in CORBA.

A **DDS\_TypeCode** (p. 1164) value consists of a type code *kind* (represented by the **DDS\_TCKind** (p. 86) enumeration) and a list of *members* (that is, fields). These members are recursive: each one has its own **DDS\_TypeCode** (p. 1164), and in the case of complex types (structures, arrays, and so on), these contained type codes contain their own members.

There are a number of uses for type codes. The type code mechanism can be used to unambiguously match type representations. The **DDS\_TypeCode::equal** (p. 1171) method is a more reliable test than comparing the string type names, requiring equivalent definitions of the types.

### 7.11.2 Accessing a Local ::DDS\_TypeCode

When generating types with `rtiddsgen`, type codes are always enabled. For these types, a **DDS\_TypeCode** (p. 1164) may be accessed by calling the `Foo_get_typecode` function for a type "Foo", which returns a **DDS\_TypeCode** (p. 1164) pointer. via the **FooTypeCode.VALUE** member. This API also includes support for dynamic creation of **DDS\_TypeCode** (p. 1164) values, typically for use with the **Dynamic Data** (p. 99) API. You can create a **DDS\_TypeCode** (p. 1164) using the **DDS\_TypeCodeFactory** (p. 1210) class. You will construct the **DDS\_TypeCode** (p. 1164) recursively, from the outside in: start with the type codes for primitive types, then compose them into complex types like arrays, structures, and so on. You will find the following methods helpful:

- **DDS\_TypeCodeFactory::get\_primitive\_tc** (p. 1213), which provides the **DDS\_TypeCode** (p. 1164) instances corresponding to the primitive types (e.g. **DDS\_TK\_LONG** (p. 86), **DDS\_TK\_SHORT** (p. 86), and so on).
- **DDS\_TypeCodeFactory::create\_string\_tc** (p. 1221) and **DDS\_TypeCodeFactory::create\_wstring\_tc** (p. 1222) create a **DDS\_TypeCode** (p. 1164) representing a text string with a certain *bound* (i.e. maximum length).
- **DDS\_TypeCodeFactory::create\_array\_tc** (p. 1223) and **DDS\_TypeCodeFactory::create\_sequence\_tc** (p. 1222) create a **DDS\_TypeCode** (p. 1164) for a collection based on the **DDS\_TypeCode** (p. 1164) for its elements.
- **DDS\_TypeCodeFactory::create\_struct\_tc** (p. 1214) and **DDS\_TypeCodeFactory::create\_value\_tc** (p. 1215) create a **DDS\_TypeCode** (p. 1164) for a structured type.

### 7.11.3 Accessing a Remote ::DDS\_TypeCode

In addition to being used locally, RTI Connex can transmit **DDS\_TypeCode** (p. 1164) on the network between participants. This information can be used to access information about types used remotely at runtime, for example to be able to publish or subscribe to topics of arbitrarily types (see **Dynamic Data** (p. 99)). This functionality is useful for a generic system monitoring tool like `rtiddsspy`.

Remote **DDS\_TypeCode** (p. 1164) information is shared during discovery over the publication and subscription built-in topics and can be accessed using the built-in readers for these topics; see **Built-in Topics** (p. 59). Discovered **DDS\_TypeCode** (p. 1164) values are not cached by RTI Connex upon receipt and are therefore not available from the built-in topic data returned by **DDSDDataWriter::get\_matched\_subscription\_data** (p. 1332) or **DDSDDataReader::get\_matched\_publication\_data** (p. 1300).

The space available locally to deserialize a discovered remote **DDS\_TypeCode** (p. 1164) is specified by the **DDSDomainParticipant** (p. 1351)'s **DDS\_DomainParticipantResourceLimitsQoSPolicy::type\_code\_max\_serialized\_length** (p. 760) QoS parameter. To support especially complex type codes, it may be necessary for you to increase the value of this parameter.

See also

**DDS\_TypeCode** (p. 1164)

**Dynamic Data** (p. 99)

the Code Generator User's Manual

**DDS\_SubscriptionBuiltinTopicData** (p. 1108)

**DDS\_PublicationBuiltinTopicData** (p. 1010)

## 7.11.4 Macro Definition Documentation

### 7.11.4.1 DDS\_TYPECODE\_MEMBER\_ID\_INVALID

```
#define DDS_TYPECODE_MEMBER_ID_INVALID
```

A sentinel indicating an invalid **DDS\_TypeCode** (p. 1164) member ID.

### 7.11.4.2 DDS\_TYPECODE\_INDEX\_INVALID

```
#define DDS_TYPECODE_INDEX_INVALID
```

A sentinel indicating an invalid **DDS\_TypeCode** (p. 1164) member index.

### 7.11.4.3 DDS\_TYPECODE\_NOT\_BITFIELD

```
#define DDS_TYPECODE_NOT_BITFIELD
```

Indicates that a member of a type is not a bitfield.

### 7.11.4.4 DDS\_VM\_NONE

```
#define DDS_VM_NONE
```

Constant used to indicate that a value type has no modifiers.

See also

**DDS\_ValueModifier** (p. 85)

Examples

**HelloWorld.cxx.**

#### 7.11.4.5 DDS\_VM\_CUSTOM

```
#define DDS_VM_CUSTOM
```

Constant used to indicate that a value type has the `custom` modifier.

This modifier is used to specify whether the value type uses custom marshaling.

See also

**DDS\_ValueModifier** (p. 85)

#### 7.11.4.6 DDS\_VM\_ABSTRACT

```
#define DDS_VM_ABSTRACT
```

Constant used to indicate that a value type has the `abstract` modifier.

An abstract value type may not be instantiated.

See also

**DDS\_ValueModifier** (p. 85)

#### 7.11.4.7 DDS\_VM\_TRUNCATABLE

```
#define DDS_VM_TRUNCATABLE
```

Constant used to indicate that a value type has the `truncatable` modifier.

A value with a state that derives from another value with a state can be declared as truncatable. A truncatable type means the object can be truncated to the base type.

See also

**DDS\_ValueModifier** (p. 85)



#### 7.11.4.8 DDS\_PRIVATE\_MEMBER

```
#define DDS_PRIVATE_MEMBER
```

Constant used to indicate that a value type member is private.

See also

**DDS\_Visibility** (p. 85)

**DDS\_PUBLIC\_MEMBER** (p. 83)

#### 7.11.4.9 DDS\_PUBLIC\_MEMBER

```
#define DDS_PUBLIC_MEMBER
```

Constant used to indicate that a value type member is public.

See also

**DDS\_Visibility** (p. 85)

**DDS\_PRIVATE\_MEMBER** (p. 82)

Examples

**HelloWorld.cxx.**

#### 7.11.4.10 DDS\_TYPECODE\_NONKEY\_MEMBER

```
#define DDS_TYPECODE_NONKEY_MEMBER
```

A flag indicating that a type member is optional and not part of the key.

If a type is used with the **Dynamic Data** (p. 99) facility, a **DDS\_DynamicData** (p. 775) sample of the type will only contain a value for a **DDS\_TYPECODE\_NONKEY\_MEMBER** (p. 83) field if one has been explicitly set (see, for example, **DDS\_↔\_DynamicData::set\_long** (p. 853)). The middleware will *not* assume any default value.

See also

**DDS\_TYPECODE\_KEY\_MEMBER** (p. 83)

**DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER** (p. 84)

**DDS\_TYPECODE\_KEY\_MEMBER** (p. 83)

**DDS\_TypeCode::add\_member** (p. 1199)

**DDS\_TypeCode::add\_member\_ex** (p. 1201)

**DDS\_TypeCode::is\_member\_key** (p. 1178)

**DDS\_TypeCode::is\_member\_required** (p. 1180)

**DDS\_StructMember::is\_key** (p. 1104)

**DDS\_ValueMember::is\_key** (p. 1240)

#### 7.11.4.11 DDS\_TYPECODE\_KEY\_MEMBER

```
#define DDS_TYPECODE_KEY_MEMBER
```

A flag indicating that a type member is part of the key for that type, and therefore required.

If a type is used with the **Dynamic Data** (p. 99) facility, all **DDS\_DynamicData** (p. 775) samples of the type will contain a value for all **DDS\_TYPECODE\_KEY\_MEMBER** (p. 83) fields. If you do not set a value of the member explicitly (see, for example, **DDS\_DynamicData::set\_long** (p. 853)), the middleware will assume a default "zero" value: numeric values will be set to zero; strings and sequences will be of zero length.

See also

- DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER** (p. 84)
- DDS\_TYPECODE\_NONKEY\_MEMBER** (p. 83)
- DDS\_TypeCode::add\_member** (p. 1199)
- DDS\_TypeCode::add\_member\_ex** (p. 1201)
- DDS\_TypeCode::is\_member\_key** (p. 1178)
- DDS\_TypeCode::is\_member\_required** (p. 1180)
- DDS\_StructMember::is\_key** (p. 1104)
- DDS\_ValueMember::is\_key** (p. 1240)

#### 7.11.4.12 DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER

```
#define DDS_TYPECODE_NONKEY_REQUIRED_MEMBER
```

A flag indicating that a type member is not part of the key but is nevertheless required.

This is the most common kind of member.

If a type is used with the **Dynamic Data** (p. 99) facility, all **DDS\_DynamicData** (p. 775) samples of the type will contain a value for all **DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER** (p. 84) fields. If you do not set a value of the member explicitly (see, for example, **DDS\_DynamicData::set\_long** (p. 853)), the middleware will assume a default "zero" value: numeric values will be set to zero; strings and sequences will be of zero length.

See also

- DDS\_TYPECODE\_KEY\_MEMBER** (p. 83)
- DDS\_TYPECODE\_NONKEY\_MEMBER** (p. 83)
- DDS\_TYPECODE\_KEY\_MEMBER** (p. 83)
- DDS\_TypeCode::add\_member** (p. 1199)
- DDS\_TypeCode::add\_member\_ex** (p. 1201)
- DDS\_TypeCode::is\_member\_key** (p. 1178)
- DDS\_TypeCode::is\_member\_required** (p. 1180)
- DDS\_StructMember::is\_key** (p. 1104)
- DDS\_ValueMember::is\_key** (p. 1240)

### 7.11.4.13 DDS\_TypeCode\_PrintFormat\_INITIALIZER

```
#define DDS_TypeCode_PrintFormat_INITIALIZER
```

Static initializer for **DDS\_TypeCodePrintFormatProperty** (p. 1224).

Use this initializer to ensure that new objects don't have uninitialized contents.

```
struct DDS_TypeCodePrintFormatProperty property = DDS_TypeCodePrintFormatProperty;
```

## 7.11.5 Typedef Documentation

### 7.11.5.1 DDS\_ValueModifier

```
typedef short DDS_ValueModifier
```

Modifier type for a value type.

See also

**DDS\_VM\_NONE** (p. 81)

**DDS\_VM\_CUSTOM** (p. 81)

**DDS\_VM\_ABSTRACT** (p. 82)

**DDS\_VM\_TRUNCATABLE** (p. 82)

### 7.11.5.2 DDS\_Visibility

```
typedef short DDS_Visibility
```

Type to indicate the visibility of a value type member.

See also

**DDS\_PRIVATE\_MEMBER** (p. 82)

**DDS\_PUBLIC\_MEMBER** (p. 83)

## 7.11.6 Enumeration Type Documentation

### 7.11.6.1 DDS\_TypeCodePrintFormatKind

```
enum DDS_TypeCodePrintFormatKind
```

The different formats to print a **DDS\_TypeCode** (p. 1164).

## Enumerator

DDS_TYPE_CODE_PRINT_KIND_IDL	Indicates that a <b>DDS_TypeCode</b> (p. 1164) is to be printed in IDL format.
DDS_TYPE_CODE_PRINT_KIND_XML	Indicates that a <b>DDS_TypeCode</b> (p. 1164) is to be printed in XML format.

## 7.11.6.2 DDS\_TCKind

```
enum DDS_TCKind
```

Enumeration type for **DDS\_TypeCode** (p. 1164) kinds.

Type code kinds are modeled as values of this type.

## Enumerator

DDS_TK_NULL	Indicates that a type code does not describe anything.
DDS_TK_SHORT	short type.
DDS_TK_LONG	long type.
DDS_TK_USHORT	unsigned short type.
DDS_TK_ULONG	unsigned long type.
DDS_TK_FLOAT	float type.
DDS_TK_DOUBLE	double type.
DDS_TK_BOOLEAN	boolean type.
DDS_TK_CHAR	char type.
DDS_TK_OCTET	octet type.
DDS_TK_STRUCT	struct type.
DDS_TK_UNION	union type.
DDS_TK_ENUM	enumerated type.
DDS_TK_STRING	string type.
DDS_TK_SEQUENCE	sequence type.
DDS_TK_ARRAY	array type.
DDS_TK_ALIAS	alias (typedef) type.
DDS_TK_LONGLONG	long long type.
DDS_TK_ULONGLONG	unsigned long long type.
DDS_TK_LONGDOUBLE	long double type.
DDS_TK_WCHAR	wide char type.
DDS_TK_WSTRING	wide string type.
DDS_TK_VALUE	value type.

### 7.11.6.3 DDS\_ExtensibilityKind

```
enum DDS_ExtensibilityKind
```

Type to indicate the extensibility of a type.

Enumerator

DDS_FINAL_EXTENSIBILITY	<p>Specifies that a type has FINAL extensibility. A type may be final, indicating that the range of its possible values is strictly defined. In particular, it is not possible to add elements to members of collection or aggregated types while maintaining type assignability. The following types are always final:</p> <ul style="list-style-type: none"> <li>• <b>DDS_TK_ARRAY</b> (p. 86)</li> <li>• All primitive types</li> </ul>
DDS_EXTENSIBLE_EXTENSIBILITY	<p>Specifies that a type has EXTENSIBLE extensibility. A type may be appendable (formerly called extensible), indicating that two types, where one contains all of the elements/members of the other plus additional elements/members appended to the end, may remain assignable.</p>
DDS_MUTABLE_EXTENSIBILITY	<p>Specifies that a type has MUTABLE extensibility. A type may be mutable, indicating that two types may differ from one another in the additional, removal, and/or transposition of elements/members while remaining assignable. The following types are always mutable:</p> <ul style="list-style-type: none"> <li>• <b>DDS_TK_SEQUENCE</b> (p. 86)</li> <li>• <b>DDS_TK_STRING</b> (p. 86)</li> <li>• <b>DDS_TK_WSTRING</b> (p. 86)</li> </ul>

## 7.11.7 Variable Documentation

### 7.11.7.1 DDS\_g\_tc\_null

```
DDS_TypeCode DDS_g_tc_null
```

Basic NULL type.

For new code, **DDS\_TypeCodeFactory::get\_primitive\_tc** (p. 1213) is preferred to using this global variable.

See also

**DDS\_TypeCodeFactory::get\_primitive\_tc** (p. 1213)

### 7.11.7.2 DDS\_g\_tc\_short

`DDS_TypeCode DDS_g_tc_short`

Basic 16-bit signed integer type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_Short` (p. 318)

### 7.11.7.3 DDS\_g\_tc\_long

`DDS_TypeCode DDS_g_tc_long`

Basic 32-bit signed integer type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_Long` (p. 318)

### 7.11.7.4 DDS\_g\_tc\_ushort

`DDS_TypeCode DDS_g_tc_ushort`

Basic unsigned 16-bit integer type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_UnsignedShort` (p. 318)

### 7.11.7.5 DDS\_g\_tc\_ulong

`DDS_TypeCode DDS_g_tc_ulong`

Basic unsigned 32-bit integer type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_UnsignedLong` (p. 318)

### 7.11.7.6 DDS\_g\_tc\_float

`DDS_TypeCode DDS_g_tc_float`

Basic 32-bit floating point type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_Float` (p. 319)

### 7.11.7.7 DDS\_g\_tc\_double

`DDS_TypeCode DDS_g_tc_double`

Basic 64-bit floating point type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_Double` (p. 319)

### 7.11.7.8 DDS\_g\_tc\_boolean

`DDS_TypeCode DDS_g_tc_boolean`

Basic Boolean type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_Boolean` (p. 320)

### 7.11.7.9 DDS\_g\_tc\_char

`DDS_TypeCode DDS_g_tc_char`

Basic single-byte character type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_Char` (p. 317)

### 7.11.7.10 DDS\_g\_tc\_octet

`DDS_TypeCode DDS_g_tc_octet`

Basic octet/byte type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_Octet` (p. 317)



### 7.11.7.11 DDS\_g\_tc\_longlong

`DDS_TypeCode DDS_g_tc_longlong`

Basic 64-bit integer type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_LongLong` (p. 319)

### 7.11.7.12 DDS\_g\_tc\_ulonglong

`DDS_TypeCode DDS_g_tc_ulonglong`

Basic unsigned 64-bit integer type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_UnsignedLongLong` (p. 319)

### 7.11.7.13 DDS\_g\_tc\_longdouble

`DDS_TypeCode DDS_g_tc_longdouble`

Basic 128-bit floating point type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_LongDouble` (p. 319)

### 7.11.7.14 DDS\_g\_tc\_wchar

`DDS_TypeCode DDS_g_tc_wchar`

Basic four-byte character type.

For new code, `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213) is preferred to using this global variable.

See also

`DDS_TypeCodeFactory::get_primitive_tc` (p. 1213)

`DDS_Wchar` (p. 317)

## 7.12 Built-in Types

RTI Connex provides a set of very simple data types for you to use with the topics in your application.

### Modules

- **String Built-in Type**  
*Built-in type consisting of a single character string.*
- **KeyedString Built-in Type**  
*Built-in type consisting of a string payload and a second string that is the key.*
- **Octets Built-in Type**  
*Built-in type consisting of a variable-length array of opaque bytes.*
- **KeyedOctets Built-in Type**  
*Built-in type consisting of a variable-length array of opaque bytes and a string that is the key.*

### 7.12.1 Detailed Description

RTI Connex provides a set of very simple data types for you to use with the topics in your application.

The middleware provides four built-in types:

- **String**: A payload consisting of a single string of characters. This type has no key.
- **DDS\_KeyedString** (p. 927): A payload consisting of a single string of characters and a second string, the key, that identifies the instance to which the sample belongs.
- **DDS\_Octets** (p. 967): A payload consisting of an opaque variable-length array of bytes. This type has no key.
- **DDS\_KeyedOctets** (p. 924): A payload consisting of an opaque variable-length array of bytes and a string, the key, that identifies the instance to which the sample belongs.

The **String** and **DDS\_KeyedString** (p. 927) types are appropriate for simple text-based applications. The **DDS\_Octets** (p. 967) and **DDS\_KeyedOctets** (p. 924) types are appropriate for applications that perform their own custom data serialization, such as legacy applications still in the process of migrating to RTI Connex. In most cases, string-based or structured data is preferable to opaque data, because the latter cannot be easily visualized in tools or used with content-based filters (see **DDSContentFilteredTopic** (p. 1283)).

The built-in types are very simple in order to get you up and running as quickly as possible. If you need a structured data type you can define your own type with exactly the fields you need in one of two ways:

- At compile time, by generating code from an IDL or XML file using the `rtiddsgen` utility
- At runtime, by using the **Dynamic Data** (p. 99) API

### 7.12.2 Managing Memory for Builtin Types

When a sample is written, the `DataWriter` serializes it and stores the result in a buffer obtained from a pool of preallocated buffers. In the same way, when a sample is received, the `DataReader` deserializes it and stores the result in a sample coming from a pool of preallocated samples.

For builtin types, the maximum size of the buffers/samples and depends on the nature of the application using the builtin type.

You can configure the maximum size of the builtin types on a per-`DataWriter` and per-`DataReader` basis using the **DDS\_PropertyQosPolicy** (p. 1007) in `DataWriters`, `DataReaders` or `Participants`.

The following table lists the supported builtin type properties to configure memory allocation. When the properties are defined in the `DomainParticipant`, they are applicable to all `DataWriters` and `DataReaders` belonging to the `DomainParticipant` unless they are overwritten in the `DataWriters` and `DataReaders`.

**Table 7.33 Builtin Types Allocation Properties**

Property	Description
<code>dds.builtin_type.string.alloc_size</code>	Maximum size of the strings published by the <b>DDSStringDataWriter</b> (p. 1584) or received by the <b>DDSStringDataReader</b> (p. 1580) (includes the NULL-terminated character). Default: <code>dds.builtin_type.string.max_size</code> if defined. Otherwise, 1024.
<code>dds.builtin_type.keyed_string.alloc_key_size</code>	Maximum size of the keys used by the <b>DDSKeyedStringDataWriter</b> (p. 1510) or <b>DDSKeyedStringDataReader</b> (p. 1501) (includes the NULL-terminated character). Default: <code>dds.builtin_type.keyed_string.max_key_size</code> if defined. Otherwise, 1024.
<code>dds.builtin_type.keyed_string.alloc_size</code>	Maximum size of the strings published by the <b>DDSKeyedStringDataWriter</b> (p. 1510) or received by the <b>DDSKeyedStringDataReader</b> (p. 1501) (includes the NULL-terminated character). Default: <code>dds.builtin_type.keyed_string.max_size</code> if defined. Otherwise, 1024.
<code>dds.builtin_type.octets.alloc_size</code>	Maximum size of the octet sequences published by the <b>DDSOctetsDataWriter</b> (p. 1536) or received by the <b>DDSOctetsDataReader</b> (p. 1532). Default: <code>dds.builtin_type.octets.max_size</code> if defined. Otherwise, 2048.
<code>dds.builtin_type.keyed_octets.alloc_key_size</code>	Maximum size of the key published by the <b>DDSKeyedOctetsDataWriter</b> (p. 1482) or received by the <b>DDSKeyedOctetsDataReader</b> (p. 1473) (includes the NULL-terminated character). Default: <code>dds.builtin_type.keyed_octets.max_key_size</code> if defined. Otherwise, 1024.
<code>dds.builtin_type.keyed_octets.alloc_size</code>	Maximum size of the octets sequences published by a <b>DDSKeyedOctetsDataWriter</b> (p. 1482) or received by a <b>DDSKeyedOctetsDataReader</b> (p. 1473). Default: <code>dds.builtin_type.keyed_octets.max_size</code> if defined. Otherwise, 2048.

The previous properties must be set consistently with respect to the corresponding `*.max_size` properties that set the maximum size of the builtin types in the typecode.

### 7.12.3 Typecodes for Builtin Types

The typecodes associated with the builtin types are generated from the following IDL type definitions:

```
module DDS {
    struct String {
        string value;
    };

    struct KeyedString {
        string key;
        string value;
    };

    struct Octets {
        sequence<octet> value;
    };

    struct KeyedOctets {
        string key;
        sequence<octet> value;
    };
};
```

The maximum size of the strings and sequences that will be included in the type code definitions can be configured on a per-DomainParticipant-basis by using the properties in following table.

**Table 7.34 Properties for Allocating Size of Builtin Types, per DomainParticipant**

Property	Description
<code>dds.builtin_type.string.max_size</code>	Maximum size of the strings published by the <code>StringDataWriters</code> and received by the <code>StringDataReaders</code> belonging to a <code>DomainParticipant</code> (includes the NULL-terminated character). Default: 1024.
<code>dds.builtin_type.keyed_string.max_key_size</code>	Maximum size of the keys used by the <code>KeyedStringDataWriters</code> and <code>KeyedStringDataReaders</code> belonging to a <code>DomainParticipant</code> (includes the NULL-terminated character). Default: 1024.
<code>dds.builtin_type.keyed_string.max_size</code>	Maximum size of the strings published by the <code>KeyedStringDataWriters</code> and received by the <code>KeyedStringDataReaders</code> belonging to a <code>DomainParticipant</code> using the builtin type (includes the NULL-terminated character). Default: 1024
<code>dds.builtin_type.octets.max_size</code>	Maximum size of the octet sequences published by the <code>OctetsDataWriters</code> and received by the <code>OctetsDataReader</code> belonging to a <code>DomainParticipant</code> . Default: 2048

Property	Description
dds.builtin_type.keyed_octets.max_key_size	Maximum size of the keys used by the KeyedOctetsStringDataWriters and KeyedOctetsStringDataReaders belonging to a DomainParticipant (includes the NULL-terminated character). Default: 1024.
dds.builtin_type.keyed_octets.max_size	Maximum size of the octet sequences published by the KeyedOctetsDataWriters and received by the KeyedOctetsDataReaders belonging to a DomainParticipant. Default: 2048

For more information about the built-in types, including how to control memory usage and maximum lengths, please see the "Data Types and DDS Data Samples" chapter in the `User's Manual`.

## 7.13 Built-in Topic's Trust Types

Types used as part of `DDS_ParticipantBuiltinTopicData` (p.979), `DDS_PublicationBuiltinTopicData` (p.1010), `DDS_SubscriptionBuiltinTopicData` (p.1108) to describe Trust Plugins configuration.

### Classes

- struct **DDS\_ParticipantTrustProtectionInfo**  
*Trust Plugins Protection information associated with the discovered DomainParticipant.*
- struct **DDS\_EndpointTrustProtectionInfo**  
*Trust Plugins Protection information associated with the discovered endpoint.*
- struct **DDS\_TrustAlgorithmRequirements**  
*Type to describe Trust Plugins algorithm requirements for an entity.*
- struct **DDS\_ParticipantTrustSignatureAlgorithmInfo**  
*Trust Plugins signature algorithm information associated with the discovered DomainParticipant.*
- struct **DDS\_ParticipantTrustKeyEstablishmentAlgorithmInfo**  
*Trust Plugins key establishment algorithm information associated with the discovered DomainParticipant.*
- struct **DDS\_ParticipantTrustInterceptorAlgorithmInfo**  
*Trust Plugins interception algorithm information associated with the discovered DomainParticipant.*
- struct **DDS\_ParticipantTrustAlgorithmInfo**  
*Trust Plugins algorithm information associated with the discovered DomainParticipant.*
- struct **DDS\_EndpointTrustInterceptorAlgorithmInfo**  
*Trust Plugins interception algorithm information associated with the discovered endpoint.*
- struct **DDS\_EndpointTrustAlgorithmInfo**  
*Trust Plugins algorithm information associated with the discovered endpoint.*

## Typedefs

- typedef **DDS\_UnsignedLong DDS\_ParticipantTrustAttributesMask**
- typedef **DDS\_UnsignedLong DDS\_PluginParticipantTrustAttributesMask**
- typedef struct **DDS\_ParticipantTrustProtectionInfo DDS\_ParticipantTrustProtectionInfo**  
*Trust Plugins Protection information associated with the discovered DomainParticipant.*
- typedef **DDS\_UnsignedLong DDS\_EndpointTrustAttributesMask**
- typedef **DDS\_UnsignedLong DDS\_PluginEndpointTrustAttributesMask**
- typedef **DDS\_UnsignedLong DDS\_VendorEndpointTrustAttributesMask**
- typedef struct **DDS\_EndpointTrustProtectionInfo DDS\_EndpointTrustProtectionInfo**  
*Trust Plugins Protection information associated with the discovered endpoint.*
- typedef **DDS\_UnsignedLong DDS\_TrustAlgorithmBit**
- typedef **DDS\_UnsignedLong DDS\_TrustAlgorithmSet**
- typedef struct **DDS\_TrustAlgorithmRequirements DDS\_TrustAlgorithmRequirements**  
*Type to describe Trust Plugins algorithm requirements for an entity.*
- typedef struct **DDS\_ParticipantTrustSignatureAlgorithmInfo DDS\_ParticipantTrustSignatureAlgorithmInfo**  
*Trust Plugins signature algorithm information associated with the discovered DomainParticipant.*
- typedef struct **DDS\_ParticipantTrustKeyEstablishmentAlgorithmInfo DDS\_ParticipantTrustKeyEstablishmentAlgorithmInfo**  
*Trust Plugins key establishment algorithm information associated with the discovered DomainParticipant.*
- typedef struct **DDS\_ParticipantTrustInterceptorAlgorithmInfo DDS\_ParticipantTrustInterceptorAlgorithmInfo**  
*Trust Plugins interception algorithm information associated with the discovered DomainParticipant.*
- typedef struct **DDS\_ParticipantTrustAlgorithmInfo DDS\_ParticipantTrustAlgorithmInfo**  
*Trust Plugins algorithm information associated with the discovered DomainParticipant.*
- typedef struct **DDS\_EndpointTrustInterceptorAlgorithmInfo DDS\_EndpointTrustInterceptorAlgorithmInfo**  
*Trust Plugins interception algorithm information associated with the discovered endpoint.*
- typedef struct **DDS\_EndpointTrustAlgorithmInfo DDS\_EndpointTrustAlgorithmInfo**  
*Trust Plugins algorithm information associated with the discovered endpoint.*

### 7.13.1 Detailed Description

Types used as part of **DDS\_ParticipantBuiltinTopicData** (p.979), **DDS\_PublicationBuiltinTopicData** (p.1010), **DDS\_SubscriptionBuiltinTopicData** (p.1108) to describe Trust Plugins configuration.

These types are used to describe how RTPS wire serialization, discovery, and liveliness interact with the loaded Trust Plugins.

The meaning of the contents of these types may vary depending on what Trust Plugins the DomainParticipant is using. For information about how these types interact with the RTI Security Plugins, please refer to the *RTI Security Plugins User's Manual*.

### 7.13.2 Typedef Documentation

#### 7.13.2.1 DDS\_ParticipantTrustAttributesMask

```
typedef DDS_UnsignedLong DDS_ParticipantTrustAttributesMask
```

#### 7.13.2.2 DDS\_PluginParticipantTrustAttributesMask

```
typedef DDS_UnsignedLong DDS_PluginParticipantTrustAttributesMask
```

#### 7.13.2.3 DDS\_ParticipantTrustProtectionInfo

```
typedef struct DDS_ParticipantTrustProtectionInfo DDS_ParticipantTrustProtectionInfo
```

Trust Plugins Protection information associated with the discovered DomainParticipant.

#### 7.13.2.4 DDS\_EndpointTrustAttributesMask

```
typedef DDS_UnsignedLong DDS_EndpointTrustAttributesMask
```

#### 7.13.2.5 DDS\_PluginEndpointTrustAttributesMask

```
typedef DDS_UnsignedLong DDS_PluginEndpointTrustAttributesMask
```

#### 7.13.2.6 DDS\_VendorEndpointTrustAttributesMask

```
typedef DDS_UnsignedLong DDS_VendorEndpointTrustAttributesMask
```

#### 7.13.2.7 DDS\_EndpointTrustProtectionInfo

```
typedef struct DDS_EndpointTrustProtectionInfo DDS_EndpointTrustProtectionInfo
```

Trust Plugins Protection information associated with the discovered endpoint.

### 7.13.2.8 DDS\_TrustAlgorithmBit

```
typedef DDS_UnsignedLong DDS_TrustAlgorithmBit
```

### 7.13.2.9 DDS\_TrustAlgorithmSet

```
typedef DDS_UnsignedLong DDS_TrustAlgorithmSet
```

### 7.13.2.10 DDS\_TrustAlgorithmRequirements

```
typedef struct DDS_TrustAlgorithmRequirements DDS_TrustAlgorithmRequirements
```

Type to describe Trust Plugins algorithm requirements for an entity.

### 7.13.2.11 DDS\_ParticipantTrustSignatureAlgorithmInfo

```
typedef struct DDS_ParticipantTrustSignatureAlgorithmInfo DDS_ParticipantTrustSignatureAlgorithmInfo
```

Trust Plugins signature algorithm information associated with the discovered DomainParticipant.

### 7.13.2.12 DDS\_ParticipantTrustKeyEstablishmentAlgorithmInfo

```
typedef struct DDS_ParticipantTrustKeyEstablishmentAlgorithmInfo DDS_ParticipantTrustKeyEstablishmentAlgorithmInfo
```

Trust Plugins key establishment algorithm information associated with the discovered DomainParticipant.

### 7.13.2.13 DDS\_ParticipantTrustInterceptorAlgorithmInfo

```
typedef struct DDS_ParticipantTrustInterceptorAlgorithmInfo DDS_ParticipantTrustInterceptorAlgorithmInfo
```

Trust Plugins interception algorithm information associated with the discovered DomainParticipant.



### 7.13.2.14 DDS\_ParticipantTrustAlgorithmInfo

```
typedef struct DDS_ParticipantTrustAlgorithmInfo DDS_ParticipantTrustAlgorithmInfo
```

Trust Plugins algorithm information associated with the discovered DomainParticipant.

### 7.13.2.15 DDS\_EndpointTrustInterceptorAlgorithmInfo

```
typedef struct DDS_EndpointTrustInterceptorAlgorithmInfo DDS_EndpointTrustInterceptorAlgorithmInfo
```

Trust Plugins interception algorithm information associated with the discovered endpoint.

### 7.13.2.16 DDS\_EndpointTrustAlgorithmInfo

```
typedef struct DDS_EndpointTrustAlgorithmInfo DDS_EndpointTrustAlgorithmInfo
```

Trust Plugins algorithm information associated with the discovered endpoint.

## 7.14 Dynamic Data

<<*extension*>> (p. 237) The Dynamic Data API provides a way to interact with arbitrarily complex data types at runtime without the need for code generation.

### Classes

- struct **DDS\_DynamicDataProperty\_t**  
*A collection of attributes used to configure DDS\_DynamicData (p. 775) objects.*
- struct **DDS\_DynamicDataTypeSerializationProperty\_t**  
*Properties that govern how data of a certain type will be serialized on the network.*
- struct **DDS\_DynamicDataInfo**  
*A descriptor for a DDS\_DynamicData (p. 775) object.*
- struct **DDS\_DynamicDataMemberInfo**  
*A descriptor for a single member (i.e. field) of dynamically defined data type.*
- struct **DDS\_DynamicData**  
*A sample of any complex data type, which can be inspected and manipulated reflectively.*
- struct **DDS\_DynamicDataSeq**  
*An ordered collection of DDS\_DynamicData (p. 775) elements.*
- struct **DDS\_DynamicDataTypeProperty\_t**  
*A collection of attributes used to configure DDSDynamicDataTypeSupport (p. 1456) objects.*
- struct **DDS\_DynamicDataJsonParserProperties\_t**  
*A collection of attributes used to configure DDS\_DynamicData (p. 775) objects.*
- class **DDSDynamicDataTypeSupport**  
*A factory for registering a dynamically defined type and creating DDS\_DynamicData (p. 775) objects.*
- class **DDSDynamicDataReader**  
*Reads (subscribes to) objects of type DDS\_DynamicData (p. 775).*
- class **DDSDynamicDataWriter**  
*Writes (publishes) objects of type DDS\_DynamicData (p. 775).*

## Macros

- `#define DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED`  
*A sentinel value that indicates that no member ID is needed in order to perform some operation.*

## Typedefs

- `typedef DDS_Long DDS_DynamicDataMemberId`  
*An integer that uniquely identifies some member of a data type within that type.*

## Variables

- `const struct DDS_DynamicDataProperty_t DDS_DYNAMIC_DATA_PROPERTY_DEFAULT`  
*Sentinel constant indicating default values for `DDS_DynamicDataProperty_t` (p. 895).*
- `const struct DDS_DynamicDataTypeProperty_t DDS_DYNAMIC_DATA_TYPE_PROPERTY_DEFAULT`  
*Sentinel constant indicating default values for `DDS_DynamicDataTypeProperty_t` (p. 896).*
- `struct DDS_DynamicDataJsonParserProperties_t DDS_DYNAMIC_DATA_JSON_PARSER_PROPERTIES_DEFAULT`  
*Sentinel constant indicating default values for `DDS_DynamicDataProperty_t` (p. 895).*

### 7.14.1 Detailed Description

<<*extension*>> (p. 237) The Dynamic Data API provides a way to interact with arbitrarily complex data types at runtime without the need for code generation.

This API allows you to define new data types, modify existing data types, and interact reflectively with samples. To use it, you will take the following steps:

**1. Obtain a `DDS_TypeCode` (p. 1164) (see `Type Code Support` (p. 76)) that defines the type definition you want to use.**

A `DDS_TypeCode` (p. 1164) includes a type's *kind* (`DDS_TCKind` (p. 86)), *name*, and *members* (that is, fields). You can create your own `DDS_TypeCode` (p. 1164) using the `DDS_TypeCodeFactory` (p. 1210) class – see, for example, the `DDS_TypeCodeFactory::create_struct_tc` (p. 1214) method. Alternatively, you can use a remote `DDS_TypeCode` (p. 1164) that you discovered on the network (see `Built-in Topics` (p. 59)) or one generated by `rtiddsgen` (see the `Code Generator User's Manual`).

**2. Wrap the `DDS_TypeCode` (p. 1164) in a `DDSDynamicDataTypeSupport` (p. 1456) object.**

See the constructor `DDSDynamicDataTypeSupport::DDSDynamicDataTypeSupport` (p. 1457). This object lets you connect the type definition to a `DDSDomainParticipant` (p. 1351) and manage data samples (of type `DDS_DynamicData` (p. 775)).

**3. Register the `DDSDynamicDataTypeSupport` (p. 1456) with one or more domain participants.**

See `DDSDynamicDataTypeSupport::register_type` (p. 1459). This action associates the data type with a logical name that you can use to create topics. (Starting with this step, working with a dynamically defined data type is almost exactly the same as working with a generated one.)

**4. Create a `DDSTopic` (p. 1617) from the `DDSDomainParticipant` (p. 1351).**

Use the name under which you registered your data type – see `DDSDomainParticipant::create_topic` (p. 1382). This `DDSTopic` (p. 1617) is what you will use to produce and consume data.

**5. Create a DDSDynamicDataWriter (p. 1462) and/or DDSDynamicDataReader (p. 1456).**

These objects will produce and/or consume data (of type **DDS\_DynamicData** (p. 775)) on the **DDSTopic** (p. 1617). You can create these objects directly from the **DDSDomainParticipant** (p. 1351) – see **DDSDomainParticipant::create\_datawriter** (p. 1415) and **DDSDomainParticipant::create\_datareader** (p. 1418) – or by first creating intermediate **DDSPublisher** (p. 1550) and **DDSSubscriber** (p. 1592) objects – see **DDSDomainParticipant::create\_publisher** (p. 1376) and **DDSDomainParticipant::create\_subscriber** (p. 1379).

**6. Write and/or read the data of interest.****7. Tear down the objects described above.**

You should delete them in the reverse order in which you created them. Note that unregistering your data type with the **DDSDomainParticipant** (p. 1351) is optional; all types are automatically unregistered when the **DDSDomainParticipant** (p. 1351) itself is deleted.

**7.14.2 Macro Definition Documentation****7.14.2.1 DDS\_DYNAMIC\_DATA\_MEMBER\_ID\_UNSPECIFIED**

```
#define DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED
```

A sentinel value that indicates that no member ID is needed in order to perform some operation.

Most commonly, this constant will be used in "get" operations to indicate that a lookup should be performed based on a name, not on an ID.

See also

**DDS\_DynamicDataMemberId** (p. 101)

**7.14.3 Typedef Documentation****7.14.3.1 DDS\_DynamicDataMemberId**

```
typedef DDS_Long DDS_DynamicDataMemberId
```

An integer that uniquely identifies some member of a data type within that type.

The range of a member ID is the range of an unsigned short integer, except for the value 0, which is reserved.

See also

**DDS\_DYNAMIC\_DATA\_MEMBER\_ID\_UNSPECIFIED** (p. 101)

## 7.14.4 Variable Documentation

### 7.14.4.1 DDS\_DYNAMIC\_DATA\_PROPERTY\_DEFAULT

```
const struct DDS_DynamicDataProperty_t DDS_DYNAMIC_DATA_PROPERTY_DEFAULT [extern]
```

Sentinel constant indicating default values for **DDS\_DynamicDataProperty\_t** (p. 895).

Pass this object instead of your own **DDS\_DynamicDataProperty\_t** (p. 895) object to use the default property values:

```
DDS_DynamicData* sample = new DDS_DynamicData(  
    myTypeCode,  
    &DDS_DYNAMIC_DATA_PROPERTY_DEFAULT);
```

See also

**DDS\_DynamicDataProperty\_t** (p. 895)

Examples

**HelloWorldPlugin.cxx.**

### 7.14.4.2 DDS\_DYNAMIC\_DATA\_TYPE\_PROPERTY\_DEFAULT

```
const struct DDS_DynamicDataTypeProperty_t DDS_DYNAMIC_DATA_TYPE_PROPERTY_DEFAULT [extern]
```

Sentinel constant indicating default values for **DDS\_DynamicDataTypeProperty\_t** (p. 896).

Pass this object instead of your own **DDS\_DynamicDataTypeProperty\_t** (p. 896) object to use the default property values:

```
DDS_DynamicDataTypeSupport* support = new DDS_DynamicDataTypeSupport(  
    myTypeCode,  
    &DDS_DYNAMIC_DATA_TYPE_PROPERTY_DEFAULT);
```

See also

**DDS\_DynamicDataTypeProperty\_t** (p. 896)

### 7.14.4.3 DDS\_DYNAMIC\_DATA\_JSON\_PARSER\_PROPERTIES\_DEFAULT

```
struct DDS_DynamicDataJsonParserProperties_t DDS_DYNAMIC_DATA_JSON_PARSER_PROPERTIES_DEFAULT
[extern]
```

Sentinel constant indicating default values for **DDS\_DynamicDataProperty\_t** (p. 895).

Pass this object instead of your own **DDS\_DynamicDataProperty\_t** (p. 895) object to use the default property values:

```
DDS_DynamicData* sample = new DDS_DynamicData(
    myTypeCode,
    &DDS_DYNAMIC_DATA_PROPERTY_DEFAULT);
```

See also

**DDS\_DynamicDataProperty\_t** (p. 895)

## 7.15 Publication Module

Contains the **DDSFlowController** (p. 1468), **DDSPublisher** (p. 1550), and **DDSDataWriter** (p. 1321) classes as well as the **DDSPublisherListener** (p. 1571) and **DDSDataWriterListener** (p. 1344) interfaces, and more generally, all that is needed on the publication side.

### Modules

- **Publishers**
  - DDSPublisher* (p. 1550) entity and associated elements
- **Data Writers**
  - DDSDataWriter* (p. 1321) entity and associated elements
- **Flow Controllers**
  - <<extension>> (p. 237) *DDSFlowController* (p. 1468) and associated elements
- **Multi-channel DataWriters**
  - APIs related to Multi-channel DataWriters.*

### 7.15.1 Detailed Description

Contains the **DDSFlowController** (p. 1468), **DDSPublisher** (p. 1550), and **DDSDataWriter** (p. 1321) classes as well as the **DDSPublisherListener** (p. 1571) and **DDSDataWriterListener** (p. 1344) interfaces, and more generally, all that is needed on the publication side.

"DCPS Publication package"

## 7.16 Publishers

**DDSPublisher** (p. 1550) entity and associated elements

## Classes

- struct **DDS\_PublisherQos**  
*QoS policies supported by a **DDSPublisher** (p. 1550) entity.*
- class **DDSPublisherListener**  
*<<interface>> (p. 237) **DDSListener** (p. 1526) for **DDSPublisher** (p. 1550) status.*
- class **DDSPublisherSeq**  
*Declares IDL sequence < **DDSPublisher** (p. 1550) > .*
- class **DDSPublisher**  
*<<interface>> (p. 237) A publisher is the object responsible for the actual dissemination of publications.*

## Functions

- **DDS\_Boolean DDS\_PublisherQos\_equals** (const struct **DDS\_PublisherQos** \*self, const struct **DDS\_PublisherQos** \*other)  
*Compares two **DDS\_PublisherQos** (p. 1022) for equality.*
- **DDS\_ReturnCode\_t DDS\_PublisherQos::print** () const  
*Prints this **DDS\_PublisherQos** (p. 1022) to stdout.*
- **DDS\_ReturnCode\_t DDS\_PublisherQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
*Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).*
- **DDS\_ReturnCode\_t DDS\_PublisherQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_PublisherQos** &base) const  
*Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).*
- **DDS\_ReturnCode\_t DDS\_PublisherQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).*
- **DDS\_ReturnCode\_t DDS\_PublisherQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_PublisherQos** &base, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).*
- **DDS\_ReturnCode\_t DDS\_PublisherQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const  
*Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).*
- **DDS\_ReturnCode\_t DDS\_PublisherQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).*

## Variables

- const struct **DDS\_DataWriterQos DDS\_DATAWRITER\_QOS\_DEFAULT**  
*Special value for creating **DDSDataWriter** (p. 1321) with default QoS.*
- const struct **DDS\_DataWriterQos DDS\_DATAWRITER\_QOS\_USE\_TOPIC\_QOS**  
*Special value for creating **DDSDataWriter** (p. 1321) with a combination of the default **DDS\_DataWriterQos** (p. 689) and the **DDS\_TopicQos** (p. 1135).*

### 7.16.1 Detailed Description

**DDSPublisher** (p. 1550) entity and associated elements

## 7.16.2 Function Documentation

### 7.16.2.1 DDS\_PublisherQos\_equals()

```
DDS_Boolean DDS_PublisherQos_equals (
    const struct DDS_PublisherQos * self,
    const struct DDS_PublisherQos * other )
```

Compares two **DDS\_PublisherQos** (p. 1022) for equality.

#### Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This PublisherQos.
<i>other</i>	<< <i>in</i> >> (p. 238) The other PublisherQos to be compared with this PublisherQos.

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two Qos objects are equal or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

Referenced by **DDS\_PublisherQos::operator!=()**, and **DDS\_PublisherQos::operator==()**.

### 7.16.2.2 print()

```
DDS_ReturnCode_t DDS_PublisherQos::print ( ) const [inline]
```

Prints this **DDS\_PublisherQos** (p. 1022) to stdout.

Only the differences between this **DDS\_PublisherQos** (p.1022) and the documented default are printed. If you wish to print everything regardless, see **DDS\_PublisherQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_PublisherQos&, const DDS\_QosPrintFormat&) const** (p. 108). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

### 7.16.2.3 to\_string() [1/6]

```
DDS_ReturnCode_t DDS_PublisherQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size ) const [inline]
```

Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).

Only the differences between this **DDS\_PublisherQos** (p. 1022) and the documented default are printed to `idref_↵` `PublisherQose` string. If you wish to print everything regardless, see **DDS\_PublisherQos::to\_string(char\*, DDS\_↵** **UnsignedLong&, const DDS\_PublisherQos&, const DDS\_QosPrintFormat&) const** (p. 108). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

If the supplied buffer is NULL, the required length of the string is returned via the `string_size` parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_PublisherQos** (p. 1022) is written to the buffer.

#### Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_PublisherQos</b> (p. 1022). If NULL, this function will return the required length of this buffer through the <code>string_size</code> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### See also

**DDS\_PublisherQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_PublisherQos&, const DDS\_↵** **QosPrintFormat&) const** (p. 108)

### 7.16.2.4 to\_string() [2/6]

```
DDS_ReturnCode_t DDS_PublisherQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_PublisherQos & base ) const [inline]
```

Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).

This overload behaves the same as **DDS\_PublisherQos::to\_string** (p. 105) but allows the caller to specify the **DDS\_↵** **PublisherQos** (p. 1022), which is used as the base profile. Only the differences between the QoS and the base profile are included in the output string.



## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_PublisherQos</b> (p. 1022). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <b>in</b> >> (p. 238) The <b>DDS_PublisherQos</b> (p. 1022) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_PublisherQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_PublisherQos&, const DDS\_QosPrintFormat&) const** (p. 108)

References **DDS\_QosPrintFormat\_INITIALIZER**.

## 7.16.2.5 to\_string() [3/6]

```
DDS_ReturnCode_t DDS_PublisherQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).

This overload behaves the same as **DDS\_PublisherQos::to\_string** (p. 105) but allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the output.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_PublisherQos</b> (p. 1022). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_PublisherQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_PublisherQos&, const DDS\_QoSPrintFormat&) const** (p. 108)

References **DDS\_RETCODE\_ERROR**, and **DDS\_RETCODE\_OK**.

## 7.16.2.6 to\_string() [4/6]

```
DDS_ReturnCode_t DDS_PublisherQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_PublisherQos & base,
    const DDS_QoSPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).

Only the differences between this **DDS\_PublisherQos** (p. 1022) and the **DDS\_PublisherQos** (p. 1022) supplied as the base are printed to the string.

If the supplied buffer is NULL, the required length of the string is returned via the string\_size parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_PublisherQos** (p. 1022) is written to the buffer.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_PublisherQos</b> (p. 1022). If NULL, this function will return the required length of this buffer through the string_size parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <b>in</b> >> (p. 238) The <b>DDS_PublisherQos</b> (p. 1022) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_QoSPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## 7.16.2.7 to\_string() [5/6]

```
DDS_ReturnCode_t DDS_PublisherQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ) const [inline]
```

Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).

This overload behaves the same as **DDS\_PublisherQos::to\_string** (p. 105) but prints the entire **DDS\_PublisherQos** (p. 1022) object. The only valid value for the argument of type **DDS\_QosPrintAll\_t** (p. 1030) is **DDS\_QOS\_PRINT\_ALL** (p. 164).

## For example

```
PublisherQos qos;
char *str = NULL;
DDS_UnsignedLong str_size = 0;
qos.to_string(str, str_size, QOS_PRINT_ALL);
```

The resultant string is formatted according to the default value for **DDS\_QosPrintFormat** (p. 1031).

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_PublisherQos</b> (p. 1022). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_PublisherQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_PublisherQos&, const DDS\_QosPrintFormat&) const** (p. 108)

References **DDS\_QosPrintFormat\_INITIALIZER**.

## 7.16.2.8 to\_string() [6/6]

```
DDS_ReturnCode_t DDS_PublisherQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_PublisherQos** (p. 1022).

This overload behaves the same as the **DDS\_PublisherQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_QosPrintAll\_t&) const** (p. 108) overload. The only difference is that it allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the resultant string.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_PublisherQos</b> (p. 1022). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_PublisherQos::to\_string**(char\*, **DDS\_UnsignedLong&**, const **DDS\_PublisherQos&**, const **DDS\_QosPrintFormat&**) const (p. 108)

### 7.16.3 Variable Documentation

#### 7.16.3.1 DDS\_DATAWRITER\_QOS\_DEFAULT

```
const struct DDS_DataWriterQos DDS_DATAWRITER_QOS_DEFAULT [extern]
```

Special value for creating **DDSDataWriter** (p. 1321) with default QoS.

When used in **DDSPublisher::create\_datawriter** (p. 1558), this special value is used to indicate that the **DDSDataWriter** (p. 1321) should be created with the default **DDSDataWriter** (p. 1321) QoS by means of the operation **get\_default\_datawriter\_qos** and using the resulting QoS to create the **DDSDataWriter** (p. 1321).

When used in **DDSPublisher::set\_default\_datawriter\_qos** (p. 1554), this special value is used to indicate that the default QoS should be reset back to the initial value that would be used if the **DDSPublisher::set\_default\_datawriter\_qos** (p. 1554) operation had never been called.

When used in **DDSDataWriter::set\_qos** (p. 1336), this special value is used to indicate that the QoS of the **DDSDataWriter** (p. 1321) should be changed to match the current default QoS set in the **DDSPublisher** (p. 1550) that the **DDSDataWriter** (p. 1321) belongs to.

## Warning

This value is a constant and should never be modified. You cannot use this value to *get* the default QoS values for a DataWriter; for this purpose, use **DDSDomainParticipant::get\_default\_datawriter\_qos** (p. 1358).

## See also

**DDSPublisher::create\_datawriter** (p. 1558)  
**DDSPublisher::set\_default\_datawriter\_qos** (p. 1554)  
**DDSDataWriter::set\_qos** (p. 1336)

## Examples

**HelloWorld\_publisher.cxx.**

### 7.16.3.2 DDS\_DATAWRITER\_QOS\_USE\_TOPIC\_QOS

```
const struct DDS_DataWriterQos DDS_DATAWRITER_QOS_USE_TOPIC_QOS [extern]
```

Special value for creating **DDSDataWriter** (p. 1321) with a combination of the default **DDS\_DataWriterQos** (p. 689) and the **DDS\_TopicQos** (p. 1135).

The use of this value is equivalent to the application obtaining the default **DDS\_DataWriterQos** (p. 689) and the **DDS\_TopicQos** (p. 1135) (by means of the operation **DDSTopic::get\_qos** (p. 1621)) and then combining these two QoS using the operation **DDSPublisher::copy\_from\_topic\_qos** (p. 1566) whereby any policy that is set on the **DDS\_TopicQos** (p. 1135) "overrides" the corresponding policy on the default QoS. The resulting QoS is then applied to the creation of the **DDSDataWriter** (p. 1321).

This value should only be used in **DDSPublisher::create\_datawriter** (p. 1558).

See also

- DDSPublisher::create\_datawriter** (p. 1558)
- DDSPublisher::get\_default\_datawriter\_qos** (p. 1553)
- DDSTopic::get\_qos** (p. 1621)
- DDSPublisher::copy\_from\_topic\_qos** (p. 1566)

## 7.17 Data Writers

**DDSDataWriter** (p. 1321) entity and associated elements

### Classes

- struct **DDS\_OfferedDeadlineMissedStatus**  
*DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS* (p. 343)
- struct **DDS\_LivelinessLostStatus**  
*DDS\_LIVELINESS\_LOST\_STATUS* (p. 346)
- struct **DDS\_OfferedIncompatibleQosStatus**  
*DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS* (p. 344)
- struct **DDS\_PublicationMatchedStatus**  
*DDS\_PUBLICATION\_MATCHED\_STATUS* (p. 347)
- struct **DDS\_ServiceRequestAcceptedStatus**  
*DDS\_SERVICE\_REQUEST\_ACCEPTED\_STATUS* (p. 348)
- struct **DDS\_ReliableWriterCacheEventCount**  
<<extension>> (p. 237) *The number of times the number of unacknowledged samples in the cache of a reliable writer hit a certain well-defined threshold.*
- struct **DDS\_ReliableWriterCacheChangedStatus**  
<<extension>> (p. 237) *A summary of the state of a data writer's cache of unacknowledged samples written.*
- struct **DDS\_ReliableReaderActivityChangedStatus**  
<<extension>> (p. 237) *Describes the activity (i.e. are acknowledgements forthcoming) of reliable readers matched to a reliable writer.*

- struct **DDS\_DataWriterCacheStatus**
  - <<**extension**>> (p. 237) *The status of the DataWriter's cache. Provides information on cache related metrics such as the number of samples and instances in the DataWriter queue.*
- struct **DDS\_DataWriterProtocolStatus**
  - <<**extension**>> (p. 237) *The status of a writer's internal protocol related metrics, like the number of samples pushed, pulled, filtered; and status of wire protocol traffic.*
- struct **DDS\_AcknowledgmentInfo**
  - Information about an application-level acknowledged sample.*
- struct **DDS\_DataWriterQos**
  - QoS policies supported by a **DDSDataWriter** (p. 1321) entity.*
- class **FooDataWriter**
  - <<**interface**>> (p. 237) <<**generic**>> (p. 237) *User data type specific data writer.*
- class **DDSDataWriterListener**
  - <<**interface**>> (p. 237) **DDSListener** (p. 1526) *for writer status.*
- class **DDSDataWriter**
  - <<**interface**>> (p. 237) *Allows an application to set the value of the data to be published under a given **DDSTopic** (p. 1617).*

## Functions

- **DDS\_Boolean DDS\_DataWriterQos\_equals** (const struct **DDS\_DataWriterQos** \*self, const struct **DDS\_DataWriterQos** \*other)
  - Compares two **DDS\_DataWriterQos** (p. 689) for equality.*
- **DDS\_ReturnCode\_t DDS\_DataWriterQos::print** () const
  - Prints this **DDS\_DataWriterQos** (p. 689) to stdout.*
- **DDS\_ReturnCode\_t DDS\_DataWriterQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const
  - Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).*
- **DDS\_ReturnCode\_t DDS\_DataWriterQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DataWriterQos** &base) const
  - Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).*
- **DDS\_ReturnCode\_t DDS\_DataWriterQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const
  - Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).*
- **DDS\_ReturnCode\_t DDS\_DataWriterQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DataWriterQos** &base, const **DDS\_QosPrintFormat** &format) const
  - Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).*
- **DDS\_ReturnCode\_t DDS\_DataWriterQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const
  - Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).*
- **DDS\_ReturnCode\_t DDS\_DataWriterQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const
  - Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).*

### 7.17.1 Detailed Description

**DDSDataWriter** (p. 1321) entity and associated elements

## 7.17.2 Function Documentation

### 7.17.2.1 DDS\_DataWriterQos\_equals()

```
DDS_Boolean DDS_DataWriterQos_equals (
    const struct DDS_DataWriterQos * self,
    const struct DDS_DataWriterQos * other )
```

Compares two **DDS\_DataWriterQos** (p. 689) for equality.

#### Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This DataWriterQos.
<i>other</i>	<< <i>in</i> >> (p. 238) The other DataWriterQos to be compared with this DataWriterQos.

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two Qos objects are equal or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

Referenced by **DDS\_DataWriterQos::operator!=()**, and **DDS\_DataWriterQos::operator==()**.

### 7.17.2.2 print()

```
DDS_ReturnCode_t DDS_DataWriterQos::print ( ) const [inline]
```

Prints this **DDS\_DataWriterQos** (p. 689) to stdout.

Only the differences between this **DDS\_DataWriterQos** (p. 689) and the documented default are printed. If you wish to print everything regardless, see **DDS\_DataWriterQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataWriterQos&, const DDS\_QosPrintFormat&) const** (p. 116). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

### 7.17.2.3 to\_string() [1/6]

```
DDS_ReturnCode_t DDS_DataWriterQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size ) const [inline]
```

Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).

Only the differences between this **DDS\_DataWriterQos** (p. 689) and the documented default are printed to the string. If you wish to print everything regardless, see **DDS\_DataWriterQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataWriterQos&, const DDS\_QosPrintFormat&) const** (p. 116). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

If the supplied buffer is NULL, the required length of the string is returned via the `string_size` parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_DataWriterQos** (p. 689) is written to the buffer.

#### Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataWriterQos</b> (p. 689). If NULL, this function will return the required length of this buffer through the <code>string_size</code> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### See also

**DDS\_DataWriterQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataWriterQos&, const DDS\_↔  
QosPrintFormat&) const** (p. 116)

### 7.17.2.4 to\_string() [2/6]

```
DDS_ReturnCode_t DDS_DataWriterQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_DataWriterQos & base ) const [inline]
```

Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).

This overload behaves the same as **DDS\_DataWriterQos::to\_string** (p. 113) but allows the caller to specify the **DDS\_↔  
\_DataWriterQos** (p. 689), which is used as the base profile. Only the differences between the QoS and the base profile are included in the output string.



## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataWriterQos</b> (p. 689). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <b>in</b> >> (p. 238) The <b>DDS_DataWriterQos</b> (p. 689) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DataWriterQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataWriterQos&, const DDS\_QoSPrintFormat&) const** (p. 116)

References **DDS\_QoSPrintFormat\_INITIALIZER**.

## 7.17.2.5 to\_string() [3/6]

```
DDS_ReturnCode_t DDS_DataWriterQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QoSPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).

This overload behaves the same as **DDS\_DataWriterQos::to\_string** (p. 113) but allows the caller to specify the **DDS\_QoSPrintFormat** (p. 1031) which is used to format the output.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataWriterQos</b> (p. 689). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_QoSPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DataWriterQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataWriterQos&, const DDS\_QosPrintFormat&) const** (p. 116)

References **DDS\_RETCODE\_ERROR**, and **DDS\_RETCODE\_OK**.

## 7.17.2.6 to\_string() [4/6]

```
DDS_ReturnCode_t DDS_DataWriterQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_DataWriterQos & base,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).

Only the differences between this **DDS\_DataWriterQos** (p. 689) and the **DDS\_DataWriterQos** (p. 689) supplied as the base are printed to the string.

If the supplied buffer is NULL, the required length of the string is returned via the string\_size parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_DataWriterQos** (p. 689) is written to the buffer.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataWriterQos</b> (p. 689). If NULL, this function will return the required length of this buffer through the string_size parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <b>in</b> >> (p. 238) The <b>DDS_DataWriterQos</b> (p. 689) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## 7.17.2.7 to\_string() [5/6]

```
DDS_ReturnCode_t DDS_DataWriterQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ) const [inline]
```

Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).

This overload behaves the same as **DDS\_DataWriterQos::to\_string** (p. 113) but prints the entire **DDS\_DataWriterQos** (p. 689) object. The only valid value for the argument of type **DDS\_QosPrintAll\_t** (p. 1030) is **DDS\_QOS\_PRINT\_ALL** (p. 164).

## For example

```
DataWriterQos qos;
char *str = NULL;
DDS_UnsignedLong str_size = 0;
qos.to_string(str, str_size, QOS_PRINT_ALL);
```

The resultant string is formatted according to the default value for **DDS\_QosPrintFormat** (p. 1031).

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataWriterQos</b> (p. 689). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DataWriterQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataWriterQos&, const DDS\_QosPrintFormat&) const** (p. 116)

References **DDS\_QosPrintFormat\_INITIALIZER**.

## 7.17.2.8 to\_string() [6/6]

```
DDS_ReturnCode_t DDS_DataWriterQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DataWriterQos** (p. 689).

This overload behaves the same as the **DDS\_DataWriterQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_QosPrintAll\_t&) const** (p. 116) overload. The only difference is that it allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the resultant string.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataWriterQos</b> (p. 689). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DataWriterQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataWriterQos&, const DDS\_QosPrintFormat&) const** (p. 116)

## 7.18 Flow Controllers

<<**extension**>> (p. 237) **DDSFlowController** (p. 1468) and associated elements

### Classes

- struct **DDS\_FlowControllerTokenBucketProperty\_t**  
*DDSFlowController* (p. 1468) uses the popular token bucket approach for open loop network flow control. The flow control characteristics are determined by the token bucket properties.
- struct **DDS\_FlowControllerProperty\_t**  
*Determines the flow control characteristics of the DDSFlowController* (p. 1468).
- class **DDSFlowController**  
 <<**interface**>> (p. 237) A flow controller is the object responsible for shaping the network traffic by determining when attached asynchronous **DDSDataWriter** (p. 1321) instances are allowed to write data.

### Enumerations

- enum **DDS\_FlowControllerSchedulingPolicy** {  
**DDS\_RR\_FLOW\_CONTROLLER\_SCHED\_POLICY** ,  
**DDS\_EDF\_FLOW\_CONTROLLER\_SCHED\_POLICY** ,  
**DDS\_HPF\_FLOW\_CONTROLLER\_SCHED\_POLICY** }  
*Kinds of flow controller scheduling policy.*

## Variables

- char \* **DDS\_DEFAULT\_FLOW\_CONTROLLER\_NAME**  
*[default]* Special value of **DDS\_PublishModeQosPolicy::flow\_controller\_name** (p. 1027) that refers to the built-in default flow controller.
- char \* **DDS\_FIXED\_RATE\_FLOW\_CONTROLLER\_NAME**  
 Special value of **DDS\_PublishModeQosPolicy::flow\_controller\_name** (p. 1027) that refers to the built-in fixed-rate flow controller.
- char \* **DDS\_ON\_DEMAND\_FLOW\_CONTROLLER\_NAME**  
 Special value of **DDS\_PublishModeQosPolicy::flow\_controller\_name** (p. 1027) that refers to the built-in on-demand flow controller.

### 7.18.1 Detailed Description

<<*extension*>> (p. 237) **DDSFlowController** (p. 1468) and associated elements

**DDSFlowController** (p. 1468) provides the network traffic shaping capability to asynchronous **DDSDataWriter** (p. 1321) instances. For use cases and advantages of publishing asynchronously, please refer to **DDS\_PublishModeQosPolicy** (p. 1025) of **DDS\_DataWriterQos** (p. 689).

See also

- DDS\_PublishModeQosPolicy** (p. 1025)
- DDS\_DataWriterQos::publish\_mode** (p. 696)
- DDS\_AsynchronousPublisherQosPolicy** (p. 590)

### 7.18.2 Enumeration Type Documentation

#### 7.18.2.1 DDS\_FlowControllerSchedulingPolicy

```
enum DDS_FlowControllerSchedulingPolicy
```

Kinds of flow controller scheduling policy.

Samples written by an asynchronous **DDSDataWriter** (p. 1321) are not sent in the context of the **FooDataWriter::write** (p. 1683) call. Instead, the middleware puts the samples in a queue for future processing. The **DDSFlowController** (p. 1468) associated with each asynchronous DataWriter instance determines when the samples are actually sent.

Each **DDSFlowController** (p. 1468) maintains a separate FIFO queue for each unique destination (remote application). Samples written by asynchronous **DDSDataWriter** (p. 1321) instances associated with the flow controller, are placed in the queues that correspond to the intended destinations of the sample.

When tokens become available, a flow controller must decide which queue(s) to grant tokens first. This is determined by the flow controller's scheduling policy. Once a queue has been granted tokens, it is serviced by the asynchronous publishing thread. The queued up samples will be coalesced and sent to the corresponding destination. The number of samples sent depends on the data size and the number of tokens granted.

QoS:

- DDS\_FlowControllerProperty\_t** (p. 912)

## Enumerator

DDS_RR_FLOW_CONTROLLER_SCHED_POLICY	<p>Indicates to flow control in a round-robin fashion. Whenever tokens become available, the flow controller distributes the tokens uniformly across all of its (non-empty) destination queues. No destinations are prioritized. Instead, all destinations are treated equally and are serviced in a round-robin fashion.</p>
DDS_EDF_FLOW_CONTROLLER_SCHED_POLICY	<p>Indicates to flow control in an earliest-deadline-first fashion. A sample's deadline is determined by the time it was written plus the latency budget of the <code>DataWriter</code> at the time of the write call (as specified in the <b>DDS_LatencyBudgetQosPolicy</b> (p. 929)). The relative priority of a flow controller's destination queue is determined by the earliest deadline across all samples it contains.</p> <p>When tokens become available, the <b>DDSFlowController</b> (p. 1468) distributes tokens to the destination queues in order of their deadline priority. In other words, the queue containing the sample with the earliest deadline is serviced first. The number of tokens granted equals the number of tokens required to send the first sample in the queue. Note that the priority of a queue may change as samples are sent (i.e. removed from the queue). If a sample must be sent to multiple destinations or two samples have an equal deadline value, the corresponding destination queues are serviced in a round-robin fashion.</p> <p>Hence, under the default <b>DDS_LatencyBudgetQosPolicy::duration</b> (p. 931) setting, an <code>EDF_FLOW_CONTROLLER_SCHED_POLICY</code> <b>DDSFlowController</b> (p. 1468) preserves the order in which the user calls <b>FooDataWriter::write</b> (p. 1683) across the <code>DataWriters</code> associated with the flow controller.</p> <p>Since the <b>DDS_LatencyBudgetQosPolicy</b> (p. 929) is mutable, a sample written second may contain an earlier deadline than the sample written first if the <b>DDS_LatencyBudgetQosPolicy::duration</b> (p. 931) value is sufficiently decreased in between writing the two samples. In that case, if the first sample is not yet written (still in queue waiting for its turn), it inherits the priority corresponding to the (earlier) deadline from the second sample.</p> <p>In other words, the priority of a destination queue is always determined by the earliest deadline among all samples contained in the queue. This priority inheritance approach is required in order to both honor the updated <b>DDS_LatencyBudgetQosPolicy::duration</b> (p. 931) and adhere to the <b>DDSDataWriter</b> (p. 1321) in-order data delivery guarantee.</p> <p><b>[default]</b> for <b>DDSDataWriter</b> (p. 1321)</p>

## Enumerator

DDS_HPF_FLOW_CONTROLLER_SCHED_POLICY	<p>Indicates to flow control in a highest-priority-first fashion. Determines the next destination queue to service as determined by the publication priority of the <b>DDSDataWriter</b> (p. 1321), channel of multi-channel DataWriter, or individual sample.</p> <p>The relative priority of a flow controller's destination queue is determined by the highest publication priority of all samples it contains.</p> <p>When tokens become available, the <b>DDSFlowController</b> (p. 1468) distributes tokens to the destination queues in order of their publication priority. In other words, the queue containing the sample with the highest publication priority is serviced first. The number of tokens granted equals the number of tokens required to send the first sample in the queue. Note that the priority of a queue may change as samples are sent (i.e. removed from the queue). If a sample must be sent to multiple destinations or two samples have an equal publication priority, the corresponding destination queues are serviced in a round-robin fashion.</p> <p>This priority inheritance approach is required in order to both honor the designated publication priority and adhere to the <b>DDSDataWriter</b> (p. 1321) in-order data delivery guarantee.</p>
--------------------------------------	--

### 7.18.3 Variable Documentation

#### 7.18.3.1 DDS\_DEFAULT\_FLOW\_CONTROLLER\_NAME

```
char* DDS_DEFAULT_FLOW_CONTROLLER_NAME [extern]
```

**[default]** Special value of **DDS\_PublishModeQosPolicy::flow\_controller\_name** (p. 1027) that refers to the built-in default flow controller.

RTI Connext provides several built-in **DDSFlowController** (p. 1468) for use with an asynchronous **DDSDataWriter** (p. 1321). The user can choose to use the built-in flow controllers and optionally modify their properties or can create a custom flow controller.

By default, flow control is disabled. That is, the built-in **DDS\_DEFAULT\_FLOW\_CONTROLLER\_NAME** (p. 121) flow controller does not apply any flow control. Instead, it allows data to be sent asynchronously as soon as it is written by the **DDSDataWriter** (p. 1321).

Essentially, this is equivalent to a user-created **DDSFlowController** (p. 1468) with the following **DDS\_FlowController**←  
**Property\_t** (p. 912) settings:

- **DDS\_FlowControllerProperty\_t::scheduling\_policy** (p. 913) = **DDS\_EDF\_FLOW\_CONTROLLER\_SCHED↔\_POLICY** (p. 120)
- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `max_tokens` = **DDS\_LENGTH\_UNLIMITED** (p. 438)
- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `tokens_added_per_period` = **DDS\_LENGTH↔\_UNLIMITED** (p. 438)
- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `tokens_leaked_per_period` = 0
- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `period` = 60 seconds
- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `bytes_per_token` = **DDS\_LENGTH\_UNLIMITED** (p. 438)

#### See also

- DDSPublisher::create\_datawriter** (p. 1558)
- DDSDomainParticipant::lookup\_flowcontroller** (p. 1392)
- DDSFlowController::set\_property** (p. 1469)
- DDS\_PublishModeQosPolicy** (p. 1025)
- DDS\_AsynchronousPublisherQosPolicy** (p. 590)

### 7.18.3.2 DDS\_FIXED\_RATE\_FLOW\_CONTROLLER\_NAME

```
char* DDS_FIXED_RATE_FLOW_CONTROLLER_NAME [extern]
```

Special value of **DDS\_PublishModeQosPolicy::flow\_controller\_name** (p. 1027) that refers to the built-in fixed-rate flow controller.

RTI Connext provides several builtin **DDSFlowController** (p. 1468) for use with an asynchronous **DDSDataWriter** (p. 1321). The user can choose to use the built-in flow controllers and optionally modify their properties or can create a custom flow controller.

The built-in **DDS\_FIXED\_RATE\_FLOW\_CONTROLLER\_NAME** (p. 122) flow controller shapes the network traffic by allowing data to be sent only once every second. Any accumulated samples destined for the same destination are coalesced into as few network packets as possible.

Essentially, this is equivalent to a user-created **DDSFlowController** (p. 1468) with the following **DDS\_FlowController↔Property\_t** (p. 912) settings:

- **DDS\_FlowControllerProperty\_t::scheduling\_policy** (p. 913) = **DDS\_EDF\_FLOW\_CONTROLLER\_SCHED↔\_POLICY** (p. 120)



- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `max_tokens = DDS_LENGTH_UNLIMITED` (p. 438)
- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `tokens_added_per_period = DDS_LENGTH_UNLIMITED` (p. 438)
- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `tokens_leaked_per_period = DDS_LENGTH_UNLIMITED` (p. 438)
- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `period = 1 second`
- **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) `bytes_per_token = DDS_LENGTH_UNLIMITED` (p. 438)

See also

- DDSPublisher::create\_datawriter** (p. 1558)
- DDSDomainParticipant::lookup\_flowcontroller** (p. 1392)
- DDSFlowController::set\_property** (p. 1469)
- DDS\_PublishModeQosPolicy** (p. 1025)
- DDS\_AsynchronousPublisherQosPolicy** (p. 590)

### 7.18.3.3 DDS\_ON\_DEMAND\_FLOW\_CONTROLLER\_NAME

```
char* DDS_ON_DEMAND_FLOW_CONTROLLER_NAME [extern]
```

Special value of **DDS\_PublishModeQosPolicy::flow\_controller\_name** (p. 1027) that refers to the built-in on-demand flow controller.

RTI Connext provides several builtin **DDSFlowController** (p. 1468) for use with an asynchronous **DDSDataWriter** (p. 1321). The user can choose to use the built-in flow controllers and optionally modify their properties or can create a custom flow controller.

The built-in **DDS\_ON\_DEMAND\_FLOW\_CONTROLLER\_NAME** (p. 123) allows data to be sent only when the user calls **DDSFlowController::trigger\_flow** (p. 1470). With each trigger, all accumulated data since the previous trigger is sent (across all **DDSPublisher** (p. 1550) or **DDSDataWriter** (p. 1321) instances). In other words, the network traffic shape is fully controlled by the user. Any accumulated samples destined for the same destination are coalesced into as few network packets as possible.

This external trigger source is ideal for users who want to implement some form of closed-loop flow control or who want to only put data on the wire every so many samples (e.g. with the number of samples based on **NDDS\_Transport\_Property\_t::gather\_send\_buffer\_count\_max** (p. 1779)).

Essentially, this is equivalent to a user-created **DDSFlowController** (p. 1468) with the following **DDS\_FlowController\_Property\_t** (p. 912) settings:

- `DDS_FlowControllerProperty_t::scheduling_policy` (p. 913) = `DDS_EDF_FLOW_CONTROLLER_SCHED↔_POLICY` (p. 120)
- `DDS_FlowControllerProperty_t::token_bucket` (p. 913) `max_tokens` = `DDS_LENGTH_UNLIMITED` (p. 438)
- `DDS_FlowControllerProperty_t::token_bucket` (p. 913) `tokens_added_per_period` = `DDS_LENGTH↔_UNLIMITED` (p. 438)
- `DDS_FlowControllerProperty_t::token_bucket` (p. 913) `tokens_leaked_per_period` = `DDS↔_LENGTH_UNLIMITED` (p. 438)
- `DDS_FlowControllerProperty_t::token_bucket` (p. 913) `period` = `DDS_DURATION_INFINITE` (p. 326)
- `DDS_FlowControllerProperty_t::token_bucket` (p. 913) `bytes_per_token` = `DDS_LENGTH_UNLIMITED` (p. 438)

See also

- `DDSPublisher::create_datawriter` (p. 1558)
- `DDSDomainParticipant::lookup_flowcontroller` (p. 1392)
- `DDSFlowController::trigger_flow` (p. 1470)
- `DDSFlowController::set_property` (p. 1469)
- `DDS_PublishModeQosPolicy` (p. 1025)
- `DDS_AsynchronousPublisherQosPolicy` (p. 590)

## 7.19 Subscription Module

Contains the `DDSSubscriber` (p. 1592), `DDSDataReader` (p. 1288), `DDSReadCondition` (p. 1574), `DDSQuery↔Condition` (p. 1573), and `DDSTopicQuery` (p. 1627) classes, as well as the `DDSSubscriberListener` (p. 1613) and `DDSDataReaderListener` (p. 1315) interfaces, and more generally, all that is needed on the subscription side.

### Modules

- **Subscribers**
  - `DDSSubscriber` (p. 1592) entity and associated elements*
- **DataReaders**
  - `DDSDataReader` (p. 1288) entity and associated elements*
- **Data Samples**
  - `DDS_SampleInfo` (p. 1082), `DDS_SampleStateKind` (p. 156), `DDS_ViewStateKind` (p. 158), `DDS_InstanceStateKind` (p. 160) and associated elements*
- **SampleProcessor**
  - <<experimental>> (p. 237) <<extension>> (p. 237) Utility to concurrently read and process the data samples received by `DDSDataReader` (p. 1288).*

### 7.19.1 Detailed Description

Contains the **DDSSubscriber** (p. 1592), **DDSDataReader** (p. 1288), **DDSReadCondition** (p. 1574), **DDSQueryCondition** (p. 1573), and **DDSTopicQuery** (p. 1627) classes, as well as the **DDSSubscriberListener** (p. 1613) and **DDSDataReaderListener** (p. 1315) interfaces, and more generally, all that is needed on the subscription side.

"DCPS Subscription package"

### 7.19.2 Access to data samples

Data is made available to the application by the following operations on **DDSDataReader** (p. 1288) objects: **FooDataReader::read** (p. 1651), **FooDataReader::read\_w\_condition** (p. 1657), **FooDataReader::take** (p. 1652), **FooDataReader::take\_w\_condition** (p. 1658), and the other variants of `read()` and `take()`.

The general semantics of the `read()` operation is that the application only gets access to the corresponding data (i.e. a precise instance value); the data remains the responsibility of RTI Connext and can be read again.

The semantics of the `take()` operations is that the application takes full responsibility for the data; that data will no longer be available locally to RTI Connext. Consequently, it is possible to access the same information multiple times only if all previous accesses were `read()` operations, not `take()`.

Each of these operations returns a collection of `Data` values and associated **DDS\_SampleInfo** (p. 1082) objects. Each data value represents an atom of data information (i.e., a value for one instance). This collection may contain samples related to the same or different instances (identified by the key). Multiple samples can refer to the same instance if the settings of the **HISTORY** (p. 405) QoS allow for it.

These operations reset the read communication statuses; see **Changes in read communication status** (p. 340).

**To return the memory back to the middleware, every `read()` or `take()` that retrieves a sequence of samples must be followed with a call to `FooDataReader::return_loan` (p. 1672).**

See also

**Interpretation of the SampleInfo** (p. 1083)

#### 7.19.2.1 Data access patterns

The application accesses data by means of the operations `read` or `take` on the **DDSDataReader** (p. 1288). These operations return an ordered collection of `DataSamples` consisting of a **DDS\_SampleInfo** (p. 1082) part and a `Data` part.

The way RTI Connext builds the collection depends on QoS policies set on the **DDSDataReader** (p. 1288) and **DDSSubscriber** (p. 1592), as well as the `source_timestamp` of the samples, and the parameters passed to the `read()` / `take()` operations, namely:

- the desired sample states (any combination of **DDS\_SampleStateKind** (p. 156))
- the desired view states (any combination of **DDS\_ViewStateKind** (p. 158))

- the desired instance states (any combination of **DDS\_InstanceStateKind** (p. 160))

The `read()` and `take()` operations are non-blocking and just deliver what is currently available that matches the specified states.

The `read_w_condition()` and `take_w_condition()` operations take a **DDSReadCondition** (p. 1574) object as a parameter instead of sample, view or instance states. The behaviour is that the samples returned will only be those for which the condition is **DDS\_BOOLEAN\_TRUE** (p. 317). These operations, in conjunction with **DDSReadCondition** (p. 1574) objects and a **DDSWaitSet** (p. 1629), allow performing waiting reads.

Once the data samples are available to the data readers, they can be read or taken by the application. The basic rule is that the application may do this in any order it wishes. This approach is very flexible and allows the application ultimate control.

To access data coherently, or in order, the **PRESENTATION** (p. 417) QoS must be set properly.

## 7.20 Subscribers

**DDSSubscriber** (p. 1592) entity and associated elements

### Classes

- struct **DDS\_SubscriberQos**  
*QoS policies supported by a **DDSSubscriber** (p. 1592) entity.*
- class **DDSSubscriberListener**  
*<<interface>> (p. 237) **DDSListener** (p. 1526) for status about a subscriber.*
- class **DDSSubscriberSeq**  
*Declares IDL sequence < **DDSSubscriber** (p. 1592) > .*
- class **DDSSubscriber**  
*<<interface>> (p. 237) A subscriber is the object responsible for actually receiving data from a subscription.*

### Functions

- **DDS\_Boolean DDS\_SubscriberQos\_equals** (const struct **DDS\_SubscriberQos** \*self, const struct **DDS\_SubscriberQos** \*other)  
*Compares two **DDS\_SubscriberQos** (p. 1105) for equality.*
- **DDS\_ReturnCode\_t DDS\_SubscriberQos::print** () const  
*Prints this **DDS\_SubscriberQos** (p. 1105) to stdout.*
- **DDS\_ReturnCode\_t DDS\_SubscriberQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
*Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).*
- **DDS\_ReturnCode\_t DDS\_SubscriberQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_SubscriberQos** &base) const  
*Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).*
- **DDS\_ReturnCode\_t DDS\_SubscriberQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).*

- **DDS\_ReturnCode\_t DDS\_SubscriberQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_SubscriberQos** &base, const **DDS\_QosPrintFormat** &format) const  
Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).
- **DDS\_ReturnCode\_t DDS\_SubscriberQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const  
Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).
- **DDS\_ReturnCode\_t DDS\_SubscriberQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).

## Variables

- const struct **DDS\_DataReaderQos DDS\_DATAREADER\_QOS\_DEFAULT**  
Special value for creating data reader with default QoS.
- const struct **DDS\_DataReaderQos DDS\_DATAREADER\_QOS\_USE\_TOPIC\_QOS**  
Special value for creating **DDSDataReader** (p. 1288) with a combination of the default **DDS\_DataReaderQos** (p. 644) and the **DDS\_TopicQos** (p. 1135).

### 7.20.1 Detailed Description

**DDSSubscriber** (p. 1592) entity and associated elements

### 7.20.2 Function Documentation

#### 7.20.2.1 DDS\_SubscriberQos\_equals()

```
DDS_Boolean DDS_SubscriberQos_equals (
    const struct DDS_SubscriberQos * self,
    const struct DDS_SubscriberQos * other )
```

Compares two **DDS\_SubscriberQos** (p. 1105) for equality.

#### Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This SubscriberQos.
<i>other</i>	<< <i>in</i> >> (p. 238) The other SubscriberQos to be compared with this SubscriberQos.

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two Qos objects are equal or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

Referenced by **DDS\_SubscriberQos::operator!=()**, and **DDS\_SubscriberQos::operator==()**.

### 7.20.2.2 print()

```
DDS_ReturnCode_t DDS_SubscriberQos::print ( ) const [inline]
```

Prints this **DDS\_SubscriberQos** (p. 1105) to stdout.

Only the differences between this **DDS\_SubscriberQos** (p. 1105) and the documented default are printed. If you wish to print everything regardless, see **DDS\_SubscriberQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_SubscriberQos&, const DDS\_QosPrintFormat&) const** (p. 130). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

### 7.20.2.3 to\_string() [1/6]

```
DDS_ReturnCode_t DDS_SubscriberQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size ) const [inline]
```

Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).

Only the differences between this **DDS\_SubscriberQos** (p. 1105) and the documented default are printed to the string. If you wish to print everything regardless, see **DDS\_SubscriberQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_SubscriberQos&, const DDS\_QosPrintFormat&) const** (p. 130). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

If the supplied buffer is NULL, the required length of the string is returned via the `string_size` parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_SubscriberQos** (p. 1105) is written to the buffer.

#### Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_SubscriberQos</b> (p. 1105). If NULL, this function will return the required length of this buffer through the <code>string_size</code> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_SubscriberQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_SubscriberQos&, const DDS\_↔  
QosPrintFormat&) const** (p. 130)

## 7.20.2.4 to\_string() [2/6]

```
DDS_ReturnCode_t DDS_SubscriberQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_SubscriberQos & base ) const [inline]
```

Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).

This overload behaves the same as **DDS\_SubscriberQos::to\_string** (p. 128) but allows the caller to specify the **DDS\_↔  
\_SubscriberQos** (p. 1105), which is used as the base profile. Only the differences between the QoS and the base profile are included in the output string.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_SubscriberQos</b> (p. 1105). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <b>in</b> >> (p. 238) The <b>DDS_SubscriberQos</b> (p. 1105) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_SubscriberQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_SubscriberQos&, const DDS\_↔  
QosPrintFormat&) const** (p. 130)

References **DDS\_QosPrintFormat\_INITIALIZER**.

### 7.20.2.5 to\_string() [3/6]

```
DDS_ReturnCode_t DDS_SubscriberQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).

This overload behaves the same as **DDS\_SubscriberQos::to\_string** (p. 128) but allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the output.

#### Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_SubscriberQos</b> (p. 1105). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### See also

**DDS\_SubscriberQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_SubscriberQos&, const DDS\_QosPrintFormat&) const** (p. 130)

References **DDS\_RETCODE\_ERROR**, and **DDS\_RETCODE\_OK**.

### 7.20.2.6 to\_string() [4/6]

```
DDS_ReturnCode_t DDS_SubscriberQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_SubscriberQos & base,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).

Only the differences between this **DDS\_SubscriberQos** (p. 1105) and the **DDS\_SubscriberQos** (p. 1105) supplied as the base are printed to the string.

If the supplied buffer is NULL, the required length of the string is returned via the *string\_size* parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_SubscriberQos** (p. 1105) is written to the buffer.



## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_SubscriberQos</b> (p. 1105). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <i>in</i> >> (p. 238) The <b>DDS_SubscriberQos</b> (p. 1105) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## 7.20.2.7 to\_string() [5/6]

```
DDS_ReturnCode_t DDS_SubscriberQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ) const [inline]
```

Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).

This overload behaves the same as **DDS\_SubscriberQos::to\_string** (p. 128) but prints the entire **DDS\_SubscriberQos** (p. 1105) object. The only valid value for the argument of type **DDS\_QosPrintAll\_t** (p. 1030) is **DDS\_QOS\_PRINT\_ALL** (p. 164).

## For example

```
SubscriberQos qos;
char *str = NULL;
DDS_UnsignedLong str_size = 0;
qos.to_string(str, str_size, QOS_PRINT_ALL);
```

The resultant string is formatted according to the default value for **DDS\_QosPrintFormat** (p. 1031).

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_SubscriberQos</b> (p. 1105). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_SubscriberQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_SubscriberQos&, const DDS\_QosPrintFormat&) const** (p. 130)

References **DDS\_QosPrintFormat\_INITIALIZER**.

### 7.20.2.8 to\_string() [6/6]

```
DDS_ReturnCode_t DDS_SubscriberQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).

This overload behaves the same as the **DDS\_SubscriberQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_QosPrintAll\_t&) const** (p. 131) overload. The only difference is that it allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the resultant string.

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_SubscriberQos</b> (p. 1105). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_SubscriberQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_SubscriberQos&, const DDS\_QosPrintFormat&) const** (p. 130)

## 7.20.3 Variable Documentation

### 7.20.3.1 DDS\_DATAREADER\_QOS\_DEFAULT

```
const struct DDS_DataReaderQos DDS_DATAREADER_QOS_DEFAULT [extern]
```

Special value for creating data reader with default QoS.

When used in **DDSSubscriber::create\_datareader** (p. 1599), this special value is used to indicate that the **DDSDataReader** (p. 1288) should be created with the default **DDSDataReader** (p. 1288) QoS by means of the operation **get\_default\_datareader\_qos** and using the resulting QoS to create the **DDSDataReader** (p. 1288).

When used in **DDSSubscriber::set\_default\_datareader\_qos** (p. 1595), this special value is used to indicate that the default QoS should be reset back to the initial value that would be used if the **DDSSubscriber::set\_default\_datareader\_qos** (p. 1595) operation had never been called.

When used in **DDSDataReader::set\_qos** (p. 1306), this special value is used to indicate that the QoS of the **DDSDataReader** (p. 1288) should be changed to match the current default QoS set in the **DDSSubscriber** (p. 1592) that the **DDSDataReader** (p. 1288) belongs to.

#### Warning

This value is a constant and should never be modified. You cannot use this value to *get* the default QoS values for a DataReader; for this purpose, use **DDSDomainParticipant::get\_default\_datareader\_qos** (p. 1360).

#### See also

**DDSSubscriber::create\_datareader** (p. 1599)  
**DDSSubscriber::set\_default\_datareader\_qos** (p. 1595)  
**DDSDataReader::set\_qos** (p. 1306)

#### Examples

**HelloWorld\_subscriber.cxx.**

### 7.20.3.2 DDS\_DATAREADER\_QOS\_USE\_TOPIC\_QOS

```
const struct DDS_DataReaderQos DDS_DATAREADER_QOS_USE_TOPIC_QOS [extern]
```

Special value for creating **DDSDataReader** (p. 1288) with a combination of the default **DDS\_DataReaderQos** (p. 644) and the **DDS\_TopicQos** (p. 1135).

The use of this value is equivalent to the application obtaining the default **DDS\_DataReaderQos** (p. 644) and the **DDS\_TopicQos** (p. 1135) (by means of the operation **DDSTopic::get\_qos** (p. 1621)) and then combining these two QoS using the operation **DDSSubscriber::copy\_from\_topic\_qos** (p. 1608) whereby any policy that is set on the **DDS\_TopicQos** (p. 1135) "overrides" the corresponding policy on the default QoS. The resulting QoS is then applied to the creation of the **DDSDataReader** (p. 1288).

This value should only be used in **DDSSubscriber::create\_datareader** (p. 1599).

#### See also

**DDSSubscriber::create\_datareader** (p. 1599)  
**DDSSubscriber::get\_default\_datareader\_qos** (p. 1595)  
**DDSTopic::get\_qos** (p. 1621)  
**DDSSubscriber::copy\_from\_topic\_qos** (p. 1608)

## 7.21 DataReaders

**DDSDataReader** (p. 1288) entity and associated elements

### Modules

- **Read Conditions**  
*DDSReadCondition* (p. 1574) and associated elements
- **Query Conditions**  
*DDSQueryCondition* (p. 1573) and associated elements
- **Topic Queries**  
*DDSTopicQuery* (p. 1627) and associated elements.

### Classes

- struct **DDS\_RequestedDeadlineMissedStatus**  
*DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS* (p. 344)
- struct **DDS\_LivelinessChangedStatus**  
*DDS\_LIVELINESS\_CHANGED\_STATUS* (p. 346)
- struct **DDS\_RequestedIncompatibleQosStatus**  
*DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS* (p. 344)
- struct **DDS\_SampleLostStatus**  
*DDS\_SAMPLE\_LOST\_STATUS* (p. 345)
- struct **DDS\_SampleRejectedStatus**  
*DDS\_SAMPLE\_REJECTED\_STATUS* (p. 345)
- struct **DDS\_SubscriptionMatchedStatus**  
*DDS\_SUBSCRIPTION\_MATCHED\_STATUS* (p. 347)
- struct **DDS\_DataReaderCacheStatus**  
<<extension>> (p. 237) *The status of the reader's cache.*
- struct **DDS\_DataReaderProtocolStatus**  
<<extension>> (p. 237) *The status of a reader's internal protocol related metrics, like the number of samples received, filtered, rejected; and status of wire protocol traffic.*
- struct **DDS\_DataReaderQos**  
*QoS policies supported by a DDSDataReader* (p. 1288) entity.
- class **FooDataReader**  
<<interface>> (p. 237) <<generic>> (p. 237) *User data type-specific data reader.*
- class **DDSDataReaderSeq**  
*Declares IDL sequence < DDSDataReader* (p. 1288) > .
- class **DDSDataReaderListener**  
<<interface>> (p. 237) *DDSListener* (p. 1526) *for reader status.*
- class **DDSDataReader**  
<<interface>> (p. 237) *Allows the application to: (1) declare the data it wishes to receive (i.e. make a subscription) and (2) access the data received by the attached DDSSubscriber* (p. 1592).

## Enumerations

- enum **DDS\_SampleLostStatusKind** {  
**DDS\_NOT\_LOST** = 0 ,  
**DDS\_LOST\_BY\_WRITER** = 1 ,  
**DDS\_LOST\_BY\_INSTANCES\_LIMIT** = 2 ,  
**DDS\_LOST\_BY\_REMOTE\_WRITERS\_PER\_INSTANCE\_LIMIT** = 3 ,  
**DDS\_LOST\_BY\_INCOMPLETE\_COHERENT\_SET** = 4 ,  
**DDS\_LOST\_BY\_LARGE\_COHERENT\_SET** = 5 ,  
**DDS\_LOST\_BY\_SAMPLES\_PER\_REMOTE\_WRITER\_LIMIT** = 6 ,  
**DDS\_LOST\_BY\_VIRTUAL\_WRITERS\_LIMIT** = 7 ,  
**DDS\_LOST\_BY\_REMOTE\_WRITERS\_PER\_SAMPLE\_LIMIT** = 8 ,  
**DDS\_LOST\_BY\_AVAILABILITY\_WAITING\_TIME** = 9 ,  
**DDS\_LOST\_BY\_REMOTE\_WRITER\_SAMPLES\_PER\_VIRTUAL\_QUEUE\_LIMIT** = 10 ,  
**DDS\_LOST\_BY\_OUT\_OF\_MEMORY** = 11 ,  
**DDS\_LOST\_BY\_UNKNOWN\_INSTANCE** = 12 ,  
**DDS\_LOST\_BY\_DESERIALIZATION\_FAILURE** = 13 ,  
**DDS\_LOST\_BY\_DECODE\_FAILURE** = 14 ,  
**DDS\_LOST\_BY\_SAMPLES\_PER\_INSTANCE\_LIMIT** = 15 ,  
**DDS\_LOST\_BY\_SAMPLES\_LIMIT** = 16 }

<<extension>> (p. 237) *Kinds of reasons why a sample was lost.*

- enum **DDS\_SampleRejectedStatusKind** {  
**DDS\_NOT\_REJECTED** = 0 ,  
**DDS\_REJECTED\_BY\_INSTANCES\_LIMIT** = 1 ,  
**DDS\_REJECTED\_BY\_SAMPLES\_LIMIT** = 2 ,  
**DDS\_REJECTED\_BY\_SAMPLES\_PER\_INSTANCE\_LIMIT** = 3 ,  
**DDS\_REJECTED\_BY\_SAMPLES\_PER\_REMOTE\_WRITER\_LIMIT** = 6 ,  
**DDS\_REJECTED\_BY\_REMOTE\_WRITER\_SAMPLES\_PER\_VIRTUAL\_QUEUE\_LIMIT** = 9 ,  
**DDS\_REJECTED\_BY\_DECODE\_FAILURE** = 10 }

*Kinds of reasons for rejecting a sample.*

## Functions

- **DDS\_Boolean DDS\_DataReaderQos\_equals** (const struct **DDS\_DataReaderQos** \*self, const struct **DDS\_DataReaderQos** \*other)  
*Compares two **DDS\_DataReaderQos** (p. 644) for equality.*
- **DDS\_ReturnCode\_t DDS\_DataReaderQos::print** () const  
*Prints this **DDS\_DataReaderQos** (p. 644) to stdout.*
- **DDS\_ReturnCode\_t DDS\_DataReaderQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
*Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).*
- **DDS\_ReturnCode\_t DDS\_DataReaderQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DataReaderQos** &base) const  
*Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).*
- **DDS\_ReturnCode\_t DDS\_DataReaderQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).*
- **DDS\_ReturnCode\_t DDS\_DataReaderQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DataReaderQos** &base, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).*

- **DDS\_ReturnCode\_t DDS\_DataReaderQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const  
Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).
- **DDS\_ReturnCode\_t DDS\_DataReaderQos::to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).

### 7.21.1 Detailed Description

**DDSDataReader** (p. 1288) entity and associated elements

### 7.21.2 Enumeration Type Documentation

#### 7.21.2.1 DDS\_SampleLostStatusKind

enum **DDS\_SampleLostStatusKind**

<<*extension*>> (p. 237) Kinds of reasons why a sample was lost.

MONITOR-273 We assign an integer to the names in order to be compatible with the DDSMonitoring types.

Enumerator

DDS_NOT_LOST	The sample was not lost. This constant is an extension to the DDS standard.
DDS_LOST_BY_WRITER	A <b>DDSDataWriter</b> (p. 1321) removed the sample before being received by the <b>DDSDataReader</b> (p. 1288). This constant is an extension to the DDS standard.
DDS_LOST_BY_INSTANCES_LIMIT	A resource limit on the number of instances ( <b>DDS_ResourceLimitsQosPolicy::max_instances</b> (p. 1055)) was reached. This constant is an extension to the DDS standard.  See also  <b>DDS_ResourceLimitsQosPolicy</b> (p. 1052)
DDS_LOST_BY_REMOTE_WRITERS_PER_INSTANCE_LIMIT	A resource limit on the number of remote writers for a single instance from which a <b>DDSDataReader</b> (p. 1288) may read ( <b>DDS_DataReaderResourceLimitsQosPolicy::max_remote_writers_per_instance</b> (p. 656)) was reached. This constant is an extension to the DDS standard.  See also  <b>DDS_DataReaderResourceLimitsQosPolicy</b> (p. 654)

## Enumerator

DDS_LOST_BY_INCOMPLETE_COHERENT_SET	<p>A sample is lost because it is part of an incomplete coherent set. An incomplete coherent set is a coherent set for which some of the samples are missing. For example, consider a <b>DDSDataWriter</b> (p. 1321) using <b>DDS_KEEP_LAST_HISTORY_QOS</b> (p. 406) with a depth of 1. The DataWriter publishes two samples of the same instance as part of a coherent set 'CS1'; the first sample of 'CS1' is replaced by a new sample before it can be successfully delivered to the <b>DDSDataReader</b> (p. 1288). In this case, the coherent set containing the two samples is considered incomplete. The new sample, by default, will not be provided to the application, and will be reported as <b>LOST_BY_INCOMPLETE_COHERENT_SET</b>. (You can change this default behavior by setting <b>DDS_PresentationQosPolicy::drop_incomplete_coherent_set</b> (p. 1000) to FALSE. If you do, the new sample will be provided to the application, but it will be marked as part of an incomplete coherent set in the <b>DDS_SampleInfo</b> (p. 1082) structure.)</p> <p>This constant is an extension to the DDS standard.</p>
DDS_LOST_BY_LARGE_COHERENT_SET	<p>A sample is lost because it is part of a large coherent set. A large coherent set is a coherent set that cannot fit all at once into the <b>DDSDataReader</b> (p. 1288) queue because resource limits are exceeded. For example, if <b>DDS_ResourceLimitsQosPolicy::max_samples_per_instance</b> (p. 1055) on the DataReader is 10 and the coherent set has 15 samples for a given instance, the coherent set is a large coherent set that will be considered incomplete.</p> <p>The resource limits that can lead to large coherent sets are: <b>DDS_ResourceLimitsQosPolicy::max_samples</b> (p. 1055), <b>DDS_ResourceLimitsQosPolicy::max_samples_per_instance</b> (p. 1055), <b>DDS_ResourceLimitsQosPolicy::max_instances</b> (p. 1055), and <b>DDS_DataReaderResourceLimitsQosPolicy::max_samples_per_remote_writer</b> (p. 657).</p> <p>This constant is an extension to the DDS standard.</p>

## Enumerator

<p>DDS_LOST_BY_SAMPLES_PER_REMOTE_↔ WRITER_LIMIT</p>	<p>When using <b>DDS_BEST_EFFORT_RELIABILITY_QOS</b> (p. 435): a resource limit on the number of samples from a given remote writer that a <b>DDSDataReader</b> (p. 1288) may store (<b>DDS_DataReaderResourceLimitsQosPolicy</b>↔↔<b>::max_samples_per_remote_writer</b> (p. 657)) was reached. When using <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435), reaching <b>DDS_DataReaderResourceLimitsQos</b>↔↔<b>Policy::max_samples_per_remote_writer</b> (p. 657) will trigger a rejection, not a loss, with reason <b>DDS_REJECTED_BY_SAMPLES_PER_REMOTE_↔ WRITER_LIMIT</b> (p. 141). This constant is an extension to the DDS standard.</p> <p>See also</p> <p><b>DDS_DataReaderResourceLimitsQosPolicy</b> (p. 654)</p>
<p>DDS_LOST_BY_VIRTUAL_WRITERS_LIMIT</p>	<p>A resource limit on the number of virtual writers from which a <b>DDSDataReader</b> (p. 1288) may read (<b>DDS_DataReaderResourceLimitsQosPolicy</b>↔↔<b>::max_↔ _remote_virtual_writers</b> (p. 662)) was reached. This constant is an extension to the DDS standard.</p> <p>See also</p> <p><b>DDS_DataReaderResourceLimitsQosPolicy</b> (p. 654)</p>
<p>DDS_LOST_BY_REMOTE_WRITERS_PER_↔ SAMPLE_LIMIT</p>	<p>A resource limit on the number of remote writers per sample (<b>DDS_DataReaderResourceLimitsQos</b>↔↔<b>Policy::max_remote_writers_per_sample</b> (p. 663)) was reached. This constant is an extension to the DDS standard.</p> <p>See also</p> <p><b>DDS_DataReaderResourceLimitsQosPolicy</b> (p. 654)</p>
<p>DDS_LOST_BY_AVAILABILITY_WAITING_TIME</p>	<p><b>DDS_AvailabilityQosPolicy::max_data_availability_↔ _waiting_time</b> (p. 599) expired. This constant is an extension to the DDS standard.</p> <p>See also</p> <p><b>DDS_AvailabilityQosPolicy</b> (p. 596)</p>



## Enumerator

DDS_LOST_BY_REMOTE_WRITER_SAMPLES_↔ PER_VIRTUAL_QUEUE_LIMIT	<p>A resource limit on the number of samples published by a remote writer on behalf of a virtual writer that a <b>DDSDataReader</b> (p. 1288) may store was reached. (This field is currently not used.) This constant is an extension to the DDS standard.</p> <p>See also</p> <p><b>DDS_DataReaderResourceLimitsQosPolicy</b> (p. 654)</p>
DDS_LOST_BY_OUT_OF_MEMORY	<p>A sample was lost because there was not enough memory to store the sample. This constant is an extension to the DDS standard.</p> <p>See also</p> <p><b>DDS_DataReaderResourceLimitsQosPolicy</b> (p. 654)</p>
DDS_LOST_BY_UNKNOWN_INSTANCE	<p>A received sample was lost because it doesn't contain enough information for the reader to know what instance it is associated with. This constant is an extension to the DDS standard.</p>
DDS_LOST_BY_DESERIALIZATION_FAILURE	<p>A received sample was lost because it could not be deserialized. This constant is an extension to the DDS standard.</p>
DDS_LOST_BY_DECODE_FAILURE	<p>When using <b>DDS_BEST_EFFORT_RELIABILITY_QOS</b> (p. 435): A received sample was lost because it could not be decoded. When using <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435), the sample will be rejected, not lost, with reason <b>DDS_REJECTED_BY_DECODE_FAILURE</b> (p. 142). This constant is an extension to the DDS standard.</p>
DDS_LOST_BY_SAMPLES_PER_INSTANCE_LIMIT	<p>When using <b>DDS_BEST_EFFORT_RELIABILITY_QOS</b> (p. 435): A resource limit on the number of samples per instance (<b>DDS_ResourceLimitsQosPolicy::max_samples_↔ per_instance</b> (p. 1055)) was reached. When using <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435), reaching <b>DDS_ResourceLimitsQosPolicy::max_↔ samples_per_instance</b> (p. 1055) will trigger a rejection, not a loss, with reason <b>DDS_REJECTED_BY_↔ SAMPLES_PER_INSTANCE_LIMIT</b> (p. 141). This constant is an extension to the DDS standard.</p> <p>See also</p> <p><b>DDS_ResourceLimitsQosPolicy</b> (p. 1052)</p>

## Enumerator

DDS_LOST_BY_SAMPLES_LIMIT	<p>When using <b>DDS_BEST_EFFORT_RELIABILITY_QOS</b> (p. 435): A resource limit on the number of samples (<b>DDS_ResourceLimitsQosPolicy::max_samples</b> (p. 1055)) was reached. When using <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435), reaching <b>DDS_ResourceLimitsQosPolicy::max_samples</b> (p. 1055) will trigger a rejection, not a loss, with reason <b>DDS_REJECTED_BY_SAMPLES_LIMIT</b> (p. 140). This constant is an extension to the DDS standard.</p> <p>See also</p> <p style="text-align: center;"><b>DDS_ResourceLimitsQosPolicy</b> (p. 1052)</p>
---------------------------	---

## 7.21.2.2 DDS\_SampleRejectedStatusKind

```
enum DDS_SampleRejectedStatusKind
```

Kinds of reasons for rejecting a sample.

MONITOR-273 We assign an integer to the names in order to be compatible with the DDSMonitoring types.

## Enumerator

DDS_NOT_REJECTED	The sample was not rejected.
DDS_REJECTED_BY_INSTANCES_LIMIT	<p>Connnext DDS does not reject samples based on instance limits (<b>DDS_ResourceLimitsQosPolicy::max_instances</b> (p. 1055)), so this value will never be used.</p> <p>See also</p> <p style="text-align: center;"><b>DDS_LOST_BY_INSTANCES_LIMIT</b>&lt;P&gt; (p. 136) This value is not currently used by our middleware, but has been kept because it is part of the DDS specification.</p>
DDS_REJECTED_BY_SAMPLES_LIMIT	<p>When using <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435): A resource limit on the number of samples (<b>DDS_ResourceLimitsQosPolicy::max_samples</b> (p. 1055)) was reached. When using <b>DDS_BEST_EFFORT_RELIABILITY_QOS</b> (p. 435), reaching <b>DDS_ResourceLimitsQosPolicy::max_samples</b> (p. 1055) will trigger a loss, not a rejection, with reason <b>DDS_LOST_BY_SAMPLES_LIMIT</b> (p. 140).</p> <p>See also</p> <p style="text-align: center;"><b>DDS_ResourceLimitsQosPolicy</b> (p. 1052)</p>
	Generated by Doxygen

## Enumerator

<p>DDS_REJECTED_BY_SAMPLES_PER_INSTANCE_↔ _LIMIT</p>	<p>When using <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435): A resource limit on the number of samples per instance (<b>DDS_ResourceLimitsQosPolicy::max_↔ samples_per_instance</b> (p. 1055)) was reached. When using <b>DDS_BEST_EFFORT_RELIABILITY_QOS</b> (p. 435), reaching <b>DDS_ResourceLimitsQosPolicy_↔ ::max_samples_per_instance</b> (p. 1055) will trigger a loss, not a rejection, with reason <b>DDS_LOST_BY_SAMPLES_PER_INSTANCE_LIMIT</b> (p. 139).</p> <p>See also</p> <p style="padding-left: 40px;">ResourceLimitsQosPolicy</p>
<p>DDS_REJECTED_BY_SAMPLES_PER_REMOTE_↔ WRITER_LIMIT</p>	<p>When using <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435): a resource limit on the number of samples from a given remote writer that a <b>DDSDataReader</b> (p. 1288) may store (<b>DDS_DataReaderResourceLimitsQos_↔ Policy::max_samples_per_remote_writer</b> (p. 657)) was reached. When using <b>DDS_BEST_EFFORT_RELIABILITY_QOS</b> (p. 435), reaching <b>DDS_DataReaderResourceLimitsQos_↔ Policy::max_samples_per_remote_writer</b> (p. 657) will trigger a loss, not a rejection, with reason <b>DDS_LOST_↔ _BY_SAMPLES_PER_REMOTE_WRITER_LIMIT</b> (p. 138). This constant is an extension to the DDS standard.</p> <p>See also</p> <p style="padding-left: 40px;"><b>DDS_DataReaderResourceLimitsQosPolicy</b> (p. 654)</p>
<p>DDS_REJECTED_BY_REMOTE_WRITER_↔ SAMPLES_PER_VIRTUAL_QUEUE_LIMIT</p>	<p>A resource limit on the number of samples published by a remote writer on behalf of a virtual writer that a <b>DDSDataReader</b> (p. 1288) may store was reached. (This field is currently not used.) This constant is an extension to the DDS standard.</p> <p>See also</p> <p style="padding-left: 40px;"><b>DDS_DataReaderResourceLimitsQosPolicy</b> (p. 654)</p>

## Enumerator

DDS_REJECTED_BY_DECODE_FAILURE	<p>When using <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435): A received sample was rejected because it could not be decoded. When using <b>DDS_BEST_EFFORT_RELIABILITY_QOS</b> (p. 435), the sample will be lost, not rejected, with reason <b>DDS_LOST_BY_DECODE_FAILURE</b> (p. 139). If a sample was rejected for this reason and the <b>DDSDataWriter</b> (p. 1321) set <b>DDS_DataWriter</b>↔<b>ProtocolQosPolicy::disable_inline_keyhash</b> (p. 675) to <b>DDS_BOOLEAN_TRUE</b> (p. 317), then <b>DDS_SampleRejectedStatus::last_instance_handle</b> (p. 1095) may not be correct if the sample was encrypted.</p> <p>This constant is an extension to the DDS standard.</p>
--------------------------------	--

## 7.21.3 Function Documentation

## 7.21.3.1 DDS\_DataReaderQos\_equals()

```
DDS_Boolean DDS_DataReaderQos_equals (
    const struct DDS_DataReaderQos * self,
    const struct DDS_DataReaderQos * other )
```

Compares two **DDS\_DataReaderQos** (p. 644) for equality.

## Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This DataReaderQos.
<i>other</i>	<< <i>in</i> >> (p. 238) The other DataReaderQos to be compared with this DataReaderQos.

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two Qos objects are equal or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

Referenced by **DDS\_DataReaderQos::operator!=()**, and **DDS\_DataReaderQos::operator==(())**.

## 7.21.3.2 print()

```
DDS_ReturnCode_t DDS_DataReaderQos::print ( ) const [inline]
```

Prints this **DDS\_DataReaderQos** (p. 644) to stdout.

Only the differences between this **DDS\_DataReaderQos** (p. 644) and the documented default are printed. If you wish to print everything regardless, see **DDS\_DataReaderQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataReaderQos&, const DDS\_QosPrintFormat&) const** (p. 145). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

### 7.21.3.3 to\_string() [1/6]

```
DDS_ReturnCode_t DDS_DataReaderQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size ) const [inline]
```

Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).

Only the differences between this **DDS\_DataReaderQos** (p. 644) and the documented default are printed to the string. If you wish to print everything regardless, see **DDS\_DataReaderQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataReaderQos&, const DDS\_QosPrintFormat&) const** (p. 145). The output is formatted according to the default values for **DDS\_QosPrintFormat** (p. 1031).

If the supplied buffer is NULL, the required length of the string is returned via the `string_size` parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_DataReaderQos** (p. 644) is written to the buffer.

#### Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataReaderQos</b> (p. 644). If NULL, this function will return the required length of this buffer through the <code>string_size</code> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### See also

**DDS\_DataReaderQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataReaderQos&, const DDS\_QosPrintFormat&) const** (p. 145)

### 7.21.3.4 to\_string() [2/6]

```
DDS_ReturnCode_t DDS_DataReaderQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_DataReaderQos & base ) const [inline]
```

Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).

This overload behaves the same as **DDS\_DataReaderQos::to\_string** (p. 143) but allows the caller to specify the **DDS\_↔\_DataReaderQos** (p. 644), which is used as the base profile. Only the differences between the QoS and the base profile are included in the output string.

#### Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataReaderQos</b> (p. 644). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <i>in</i> >> (p. 238) The <b>DDS_DataReaderQos</b> (p. 644) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.

#### Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

#### See also

**DDS\_DataReaderQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataReaderQos&, const DDS\_↔\_QosPrintFormat&) const** (p. 145)

References **DDS\_QosPrintFormat\_INITIALIZER**.

### 7.21.3.5 to\_string() [3/6]

```
DDS_ReturnCode_t DDS_DataReaderQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).

This overload behaves the same as **DDS\_DataReaderQos::to\_string** (p. 143) but allows the caller to specify the **DDS\_↔\_QosPrintFormat** (p. 1031) which is used to format the output.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataReaderQos</b> (p. 644). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DataReaderQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataReaderQos&, const DDS\_QosPrintFormat&) const** (p. 145)

References **DDS\_RETCODE\_ERROR**, and **DDS\_RETCODE\_OK**.

## 7.21.3.6 to\_string() [4/6]

```
DDS_ReturnCode_t DDS_DataReaderQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_DataReaderQos & base,
    const DDS_QosPrintFormat & format ) const [inline]
```

Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).

Only the differences between this **DDS\_DataReaderQos** (p. 644) and the **DDS\_DataReaderQos** (p. 644) supplied as the base are printed to the string.

If the supplied buffer is NULL, the required length of the string is returned via the *string\_size* parameter.

If the supplied buffer is not NULL, the string representation of the **DDS\_DataReaderQos** (p. 644) is written to the buffer.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataReaderQos</b> (p. 644). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>base</i>	<< <i>in</i> >> (p. 238) The <b>DDS_DataReaderQos</b> (p. 644) to be used as the base QoS profile. Only the differences with respect to this base profile will be included in the output string.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## 7.21.3.7 to\_string() [5/6]

```
DDS_ReturnCode_t DDS_DataReaderQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ) const [inline]
```

Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).

This overload behaves the same as **DDS\_DataReaderQos::to\_string** (p. 143) but prints the entire **DDS\_DataReaderQos** (p. 644) object. The only valid value for the argument of type **DDS\_QosPrintAll\_t** (p. 1030) is **DDS\_QOS\_PRINT\_ALL** (p. 164).

## For example

```
DataReaderQos qos;
char *str = NULL;
DDS_UnsignedLong str_size = 0;
qos.to_string(str, str_size, QOS_PRINT_ALL);
```

The resultant string is formatted according to the default value for **DDS\_QosPrintFormat** (p. 1031).

## Parameters

<i>string</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataReaderQos</b> (p. 644). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DataReaderQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataReaderQos&, const DDS\_QosPrintFormat&) const** (p. 145)

References **DDS\_QosPrintFormat\_INITIALIZER**.



## 7.21.3.8 to\_string() [6/6]

```

DDS_ReturnCode_t DDS_DataReaderQos::to_string (
    char * string,
    DDS_UnsignedLong & string_size,
    const DDS_QosPrintAll_t & ,
    const DDS_QosPrintFormat & format ) const [inline]

```

Obtains a string representation of this **DDS\_DataReaderQos** (p. 644).

This overload behaves the same as the **DDS\_DataReaderQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_QosPrintAll\_t&) const** (p. 146) overload. The only difference is that it allows the caller to specify the **DDS\_QosPrintFormat** (p. 1031) which is used to format the resultant string.

## Parameters

<i>string</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the string representation of this <b>DDS_DataReaderQos</b> (p. 644). If NULL, this function will return the required length of this buffer through the <i>string_size</i> parameter.
<i>string_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer.
<i>format</i>	<< <i>in</i> >> (p. 238) The <b>DDS_QosPrintFormat</b> (p. 1031) to be used to format the output string.

## Returns

**DDS\_RETCODE\_OK** (p. 336) if no error was encountered.

## See also

**DDS\_DataReaderQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_DataReaderQos&, const DDS\_QosPrintFormat&) const** (p. 145)

## 7.22 Read Conditions

**DDSReadCondition** (p. 1574) and associated elements

## Classes

- struct **DDS\_ReadConditionParams**
  - <<*extension*>> (p. 237) Input parameters for **DDSDataReader::create\_readcondition\_w\_params** (p. 1293)
- class **DDSReadCondition**
  - <<*interface*>> (p. 237) Conditions specifically dedicated to read operations and attached to one **DDSDataReader** (p. 1288).

### 7.22.1 Detailed Description

**DDSReadCondition** (p. 1574) and associated elements

## 7.23 Query Conditions

**DDSQueryCondition** (p. 1573) and associated elements

### Classes

- struct **DDS\_QueryConditionParams**  
*<<extension>>* (p. 237) *Input parameters for **DDSDataReader::create\_querycondition\_w\_params** (p. 1294)*
- class **DDSQueryCondition**  
*<<interface>>* (p. 237) *These are specialised **DDSReadCondition** (p. 1574) objects that allow the application to also specify a filter on the locally available data.*

### 7.23.1 Detailed Description

**DDSQueryCondition** (p. 1573) and associated elements

## 7.24 Data Samples

**DDS\_SampleInfo** (p. 1082), **DDS\_SampleStateKind** (p. 156), **DDS\_ViewStateKind** (p. 158), **DDS\_InstanceStateKind** (p. 160) and associated elements

### Modules

- **Sample States**  
***DDS\_SampleStateKind** (p. 156) and associated elements*
- **View States**  
***DDS\_ViewStateKind** (p. 158) and associated elements*
- **Instance States**  
***DDS\_InstanceStateKind** (p. 160) and associated elements*
- **Stream Kinds**  
***DDS\_StreamKind** (p. 162) and associated elements*

## Classes

- struct **DDS\_CoherentSetInfo\_t**  
 <<*extension*>> (p. 237) Type definition for a coherent set info.
- struct **DDS\_SampleInfo**  
 Information that accompanies each sample that is *read* or *taken*.
- struct **DDS\_SampleInfoSeq**  
 Declares IDL *sequence* < **DDS\_SampleInfo** (p. 1082) > .

## Functions

- **DDS\_Boolean DDS\_CoherentSetInfo\_equals** (const struct **DDS\_CoherentSetInfo\_t** \*self, const struct **DDS\_CoherentSetInfo\_t** \*other)  
 Compares this *CoherentSetInfo* with another *CoherentSetInfo* for equality.
- void **DDS\_CoherentSetInfo\_copy** (struct **DDS\_CoherentSetInfo\_t** \*self, const struct **DDS\_CoherentSetInfo\_t** \*other)  
 Copies another *CoherentSetInfo* into this *CoherentSetInfo*.
- void **DDS\_SampleInfo\_get\_sample\_identity** (const struct **DDS\_SampleInfo** \*self, struct **DDS\_SampleIdentity\_t** \*identity)  
 <<*extension*>> (p. 237) Retrieves the identity of the sample
- void **DDS\_SampleInfo\_get\_related\_sample\_identity** (const struct **DDS\_SampleInfo** \*self, struct **DDS\_SampleIdentity\_t** \*related\_identity)  
 <<*extension*>> (p. 237) Retrieves the identity of a sample related to this one

### 7.24.1 Detailed Description

**DDS\_SampleInfo** (p. 1082), **DDS\_SampleStateKind** (p. 156), **DDS\_ViewStateKind** (p. 158), **DDS\_InstanceStateKind** (p. 160) and associated elements

### 7.24.2 Function Documentation

#### 7.24.2.1 DDS\_CoherentSetInfo\_equals()

```
DDS_Boolean DDS_CoherentSetInfo_equals (
    const struct DDS_CoherentSetInfo_t * self,
    const struct DDS_CoherentSetInfo_t * other )
```

Compares this *CoherentSetInfo* with another *CoherentSetInfo* for equality.

#### Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This <i>CoherentSetInfo</i> . Cannot be NULL.
<i>other</i>	<< <i>in</i> >> (p. 238) The other <i>CoherentSetInfo</i> to be compared with this GUID. Cannot be NULL.

## Returns

**DDS\_BOOLEAN\_TRUE** (p.317) if the two `CoherentSetInfos` have equal values, or **DDS\_BOOLEAN\_FALSE** (p.317) otherwise.

7.24.2.2 `DDS_CoherentSetInfo_copy()`

```
void DDS_CoherentSetInfo_copy (
    struct DDS_CoherentSetInfo_t * self,
    const struct DDS_CoherentSetInfo_t * other )
```

Copies another `CoherentSetInfo` into this `CoherentSetInfo`.

## Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This <code>CoherentSetInfo</code> . Cannot be NULL.
<i>other</i>	<< <i>in</i> >> (p. 238) The other <code>CoherentSetInfo</code> to be copied.

7.24.2.3 `DDS_SampleInfo_get_sample_identity()`

```
void DDS_SampleInfo_get_sample_identity (
    const struct DDS_SampleInfo * self,
    struct DDS_SampleIdentity_t * identity )
```

<<*extension*>> (p. 237) Retrieves the identity of the sample

The identity is composed of the `DDS_SampleInfo::original_publication_virtual_guid` (p.1090) and the `DDS_SampleInfo::original_publication_virtual_sequence_number` (p.1090)

## See also

`DDS_SampleInfo_get_related_sample_identity` (p.150)

7.24.2.4 `DDS_SampleInfo_get_related_sample_identity()`

```
void DDS_SampleInfo_get_related_sample_identity (
    const struct DDS_SampleInfo * self,
    struct DDS_SampleIdentity_t * related_identity )
```

<<*extension*>> (p. 237) Retrieves the identity of a sample related to this one

A sample can be logically related to another sample, when the `DDSDataWriter` (p.1321) wrote it using `DDS_WriteParams_t::related_sample_identity` (p.1252). By default, a sample does not have a related sample, and this operation returns `DDS_UNKNOWN_SAMPLE_IDENTITY` (p.479).

The related identity is composed of the `DDS_SampleInfo::related_original_publication_virtual_guid` (p.1090) and the `DDS_SampleInfo::related_original_publication_virtual_sequence_number` (p.1091)

See also

**DDS\_WriteParams\_t::related\_sample\_identity** (p. 1252)

## 7.25 Topic Queries

**DDSTopicQuery** (p. 1627) and associated elements.

### Classes

- struct **DDS\_TopicQuerySelection**  
 <<extension>> (p. 237) Specifies the data query that defines a **DDSTopicQuery** (p. 1627)
- struct **DDS\_TopicQueryData**  
 <<extension>> (p. 237) Provides information about a **DDSTopicQuery** (p. 1627)
- class **DDSTopicQuery**  
 <<extension>> (p. 237) Allows a **DDSDataReader** (p. 1288) to query the sample cache of its matching **DDSDataWriter** (p. 1321).
- class **DDSTopicQueryHelper**  
 Helpers to provide utility operations related to **DDSTopicQuery** (p. 1627).

### Typedefs

- typedef struct **DDS\_TopicQuerySelection DDS\_TopicQuerySelection**  
 <<extension>> (p. 237) Specifies the data query that defines a **DDSTopicQuery** (p. 1627)
- typedef struct **DDS\_TopicQueryData DDS\_TopicQueryData**  
 <<extension>> (p. 237) Provides information about a **DDSTopicQuery** (p. 1627)

### Enumerations

- enum **DDS\_TopicQuerySelectionKind** {  
**DDS\_TOPIC\_QUERY\_SELECTION\_KIND\_HISTORY\_SNAPSHOT** ,  
**DDS\_TOPIC\_QUERY\_SELECTION\_KIND\_CONTINUOUS** }  
 Kinds of *TopicQuerySelection*.

### Variables

- const struct **DDS\_TopicQuerySelection DDS\_TOPIC\_QUERY\_SELECTION\_USE\_READER\_CONTENT\_FILTER**  
 Special value for creating a **DDSTopicQuery** (p. 1627) that applies the same filter as the *DataReader's DDSContentFilteredTopic* (p. 1283).
- const struct **DDS\_TopicQuerySelection DDS\_TOPIC\_QUERY\_SELECTION\_SELECT\_ALL**  
 Special value for creating a **DDSTopicQuery** (p. 1627) that selects all the samples in a **DDSDataWriter** (p. 1321) cache.

### 7.25.1 Detailed Description

**DDSTopicQuery** (p. 1627) and associated elements.

TopicQueries allow a **DDSDataReader** (p. 1288) to query the sample cache of its matching **DDSDataWriter** (p. 1321). A user can create a **DDSTopicQuery** (p. 1627) with the **DDSDataReader::create\_topic\_query** (p. 1309) API. When a DataReader

creates a TopicQuery, DDS will propagate it to other DomainParticipants and their DataWriters. When a DataWriter matching with the DataReader that created the TopicQuery receives it, it will send the cached samples that pass the TopicQuery's filter.

To configure how to dispatch a TopicQuery, the **DDS\_DataWriterQos** (p. 689) includes the **DDS\_TopicQueryDispatchQosPolicy** (p. 1141) policy. By default, a DataWriter ignores TopicQueries unless they are explicitly enabled using this policy.

The delivery of TopicQuery samples occurs in a separate RTPS channel. This allows DataReaders to receive TopicQuery samples and live samples in parallel. This is a key difference with respect to the Durability QoS policy.

Late-joining DataWriters will also discover existing TopicQueries. To delete a TopicQuery you must use **DDSDataReader::delete\_topic\_query** (p. 1310).

After deleting a TopicQuery, new DataWriters won't discover it and existing DataWriters currently publishing cached samples may stop before delivering all of them.

By default, a TopicQuery queries the samples that were in the DataWriter cache at the time the DataWriter receives the TopicQuery. However a TopicQuery can be created in a "continuous" mode. A DataWriter will continue delivering samples that pass a continuous TopicQuery filter until the DataReader application explicitly deletes it.

The samples received in response to a TopicQuery are stored in the associated DataReader's cache. Any of the read/take operations can retrieve TopicQuery samples. The field **DDS\_SampleInfo::topic\_query\_guid** (p. 1092) associates each sample to its TopicQuery. If the read sample is not in response to a TopicQuery then this field will be **DDS\_GUID\_UNKNOWN** (p. 331). Note that the same data may be received several times, depending on how many TopicQueries the DataReader creates and their TopicQuerySelection.

You can choose to read or take only TopicQuery samples, only live samples, or both. To support this ReadConditions and QueryConditions provide the **DDSDataReader::create\_querycondition\_w\_params** (p. 1294) and **DDSDataReader::create\_readcondition\_w\_params** (p. 1293) APIs.

Each TopicQuery is identified by a GUID that can be accessed using the **DDSTopicQuery::get\_guid** (p. 1627) method.

### 7.25.2 Debugging Topic Queries

There are a number of ways in which to gain more insight into what is happening in an application that is creating Topic Queries.

### 7.25.2.1 The Built-in ServiceRequest DataReader

TopicQueries are communicated to publishing applications through a built-in **DDS\_ServiceRequest** (p. 1097) channel. The ServiceRequest channel is designed to be generic so that it can be used for many different purposes, one of which is TopicQueries.

When a DataReader creates a TopicQuery, a **DDS\_ServiceRequest** (p. 1097) message is sent containing the TopicQuery information. Just as there are built-in DataReaders for **DDS\_ParticipantBuiltinTopicData** (p. 979), **DDS\_SubscriptionBuiltinTopicData** (p. 1108), and **DDS\_PublicationBuiltinTopicData** (p. 1010), there is a fourth built-in DataReader for ServiceRequests.

The new built-in DataReader can be retrieved using the built-in subscriber and **DDSSubscriber::lookup\_datareader** (p. 1604). The topic name is **DDS\_SERVICE\_REQUEST\_TOPIC\_NAME** (p. 303). Installing a listener with the **DDSDataReaderListener::on\_data\_available** (p. 1317) callback implemented will allow a publishing application to be notified whenever a TopicQuery has been received from a subscribing application.

The **DDS\_ServiceRequest::service\_id** (p. 1098) of a **DDS\_ServiceRequest** (p. 1097) corresponding to a **DDSTopicQuery** (p. 1627) will be **DDS\_TOPIC\_QUERY\_SERVICE\_REQUEST\_ID** (p. 302) and the **DDS\_ServiceRequest::instance\_id** (p. 1098) will be equal to the GUID of the **DDSTopicQuery** (p. 1627) (see **DDSTopicQuery::get\_guid** (p. 1627)).

The **DDS\_ServiceRequest::request\_body** (p. 1098) is a sequence of bytes containing more information about the TopicQuery. This information can be retrieved using the **DDSTopicQueryHelper::topic\_query\_data\_from\_service\_request** (p. 1628) function. The resulting **DDS\_TopicQueryData** (p. 1140) contains the **DDS\_TopicQuerySelection** (p. 1143) that the **DDSTopicQuery** (p. 1627) was created with, the GUID of the original DataReader that created the TopicQuery, and the topic name of that DataReader. Note: When TopicQueries are propagated through one or more Routing Services, the last DataReader that issued the TopicQuery will be a Routing Service DataReader. The **DDS\_TopicQueryData::original\_related\_reader\_guid** (p. 1140), however, will be that of the first DataReader to have created the TopicQuery.

### 7.25.2.2 The on\_service\_request\_accepted DataWriter Listener Callback

It is possible that a **DDS\_ServiceRequest** (p. 1097) for a **DDSTopicQuery** (p. 1627) is received but is not immediately dispatched to a DataWriter. This can happen, for example, if a DataWriter was not matching with a DataReader at the time that the TopicQuery was received by the publishing application. The **DDSDataWriterListener::on\_service\_request\_accepted** (p. 1350) callback notifies a DataWriter when a ServiceRequest has been dispatched to that DataWriter. The **DDS\_ServiceRequestAcceptedStatus** (p. 1099) provides information about how many ServiceRequests have been accepted by the DataWriter since the last time that the status was read. The status also includes the **DDS\_ServiceRequestAcceptedStatus::last\_request\_handle** (p. 1100), which is the **DDS\_InstanceHandle\_t** (p. 74) of the last ServiceRequest that was accepted. This instance handle can be used to read samples per instance from the built-in ServiceRequest DataReader and correlate which ServiceRequests have been dispatched to which DataWriters.

### 7.25.2.3 Reading TopicQuery Samples

Data samples that are received by a DataReader in response to a TopicQuery can be identified with two pieces of information from the corresponding **DDS\_SampleInfo** (p. 1082) to the sample. First, if the **DDS\_SampleInfo::topic\_query\_guid** (p. 1092) is not equal to **DDS\_GUID\_UNKNOWN** (p. 331) then the sample is in response to the TopicQuery with that GUID (see **DDSTopicQuery::get\_guid** (p. 1627)). Second, if the sample is in response to a TopicQuery and the **DDS\_SampleInfo::flag** (p. 1091) **DDS\_INTERMEDIATE\_TOPIC\_QUERY\_SAMPLE** (p. 475) flag is set then this is not the last sample in response to the TopicQuery for a DataWriter identified by **DDS\_SampleInfo::original\_publication\_virtual\_guid** (p. 1090). If that flag is not set then there will be no more samples corresponding to that TopicQuery coming from the DataWriter.

## 7.25.3 Typedef Documentation

### 7.25.3.1 DDS\_TopicQuerySelection

```
typedef struct DDS_TopicQuerySelection DDS_TopicQuerySelection
```

<<*extension*>> (p. 237) Specifies the data query that defines a **DDSTopicQuery** (p. 1627)

The query format is similar to the expression and parameters of a **DDSQueryCondition** (p. 1573) or a **DDSContentFilteredTopic** (p. 1283), as described in **DDSDomainParticipant::create\_contentfilteredtopic\_with\_filter** (p. 1386).

There are two special queries:

- **DDS\_TOPIC\_QUERY\_SELECTION\_SELECT\_ALL** (p. 155)
- **DDS\_TOPIC\_QUERY\_SELECTION\_USE\_READER\_CONTENT\_FILTER** (p. 155)

See also

**Queries and Filters Syntax** (p. 179)

### 7.25.3.2 DDS\_TopicQueryData

```
typedef struct DDS_TopicQueryData DDS_TopicQueryData
```

<<*extension*>> (p. 237) Provides information about a **DDSTopicQuery** (p. 1627)

Contains the information about a TopicQuery that can be retrieved using **DDSTopicQueryHelper::topic\_query\_data\_from\_service\_request** (p. 1628).

See also

**DDSTopicQueryHelper::topic\_query\_data\_from\_service\_request** (p. 1628)

## 7.25.4 Enumeration Type Documentation

### 7.25.4.1 DDS\_TopicQuerySelectionKind

```
enum DDS_TopicQuerySelectionKind
```

Kinds of TopicQuerySelection.

See also

**DDS\_TopicQuerySelection** (p. 1143)



## Enumerator

DDS_TOPIC_QUERY_SELECTION_KIND_↔ HISTORY_SNAPSHOT	Indicates that the <b>DDSTopicQuery</b> (p. 1627) may only select samples that were in the DataWriter cache upon reception. <b>[default]</b>
DDS_TOPIC_QUERY_SELECTION_KIND_↔ CONTINUOUS	Indicates that the <b>DDSTopicQuery</b> (p. 1627) may continue selecting samples published after its reception.  The subscribing application must explicitly delete the TopicQuery (see <b>DDSDataReader::delete_topic_query</b> (p. 1310)) to signal the DataWriters to stop publishing samples for it.

### 7.25.5 Variable Documentation

#### 7.25.5.1 DDS\_TOPIC\_QUERY\_SELECTION\_USE\_READER\_CONTENT\_FILTER

```
const struct DDS_TopicQuerySelection DDS_TOPIC_QUERY_SELECTION_USE_READER_CONTENT_FILTER [extern]
```

Special value for creating a **DDSTopicQuery** (p. 1627) that applies the same filter as the DataReader's **DDSContent**↔**FilteredTopic** (p. 1283).

If the **DDSDataReader** (p. 1288) that creates the **DDSTopicQuery** (p. 1627) uses a **DDSContentFilteredTopic** (p. 1283), this **DDS\_TopicQuerySelection** (p. 1143) value indicates that the TopicQuery should use the same filter.

Otherwise it behaves as **DDS\_TOPIC\_QUERY\_SELECTION\_SELECT\_ALL** (p. 155).

#### 7.25.5.2 DDS\_TOPIC\_QUERY\_SELECTION\_SELECT\_ALL

```
const struct DDS_TopicQuerySelection DDS_TOPIC_QUERY_SELECTION_SELECT_ALL [extern]
```

Special value for creating a **DDSTopicQuery** (p. 1627) that selects all the samples in a **DDSDataWriter** (p. 1321) cache.

## 7.26 Sample States

**DDS\_SampleStateKind** (p. 156) and associated elements

### Typedefs

- typedef **DDS\_UnsignedLong** **DDS\_SampleStateMask**  
*A bit-mask (list) of sample states, i.e. **DDS\_SampleStateKind** (p. 156).*

## Enumerations

- enum **DDS\_SampleStateKind** {  
**DDS\_READ\_SAMPLE\_STATE** = 0x0001 << 0 ,  
**DDS\_NOT\_READ\_SAMPLE\_STATE** = 0x0001 << 1 }

*Indicates whether or not a sample has ever been read.*

## Variables

- const **DDS\_SampleStateMask** **DDS\_ANY\_SAMPLE\_STATE**  
*Any sample state **DDS\_READ\_SAMPLE\_STATE** (p. 157) | **DDS\_NOT\_READ\_SAMPLE\_STATE** (p. 157).*

### 7.26.1 Detailed Description

**DDS\_SampleStateKind** (p. 156) and associated elements

### 7.26.2 Typedef Documentation

#### 7.26.2.1 DDS\_SampleStateMask

```
typedef DDS_UnsignedLong DDS_SampleStateMask
```

A bit-mask (list) of sample states, i.e. **DDS\_SampleStateKind** (p. 156).

### 7.26.3 Enumeration Type Documentation

#### 7.26.3.1 DDS\_SampleStateKind

```
enum DDS_SampleStateKind
```

Indicates whether or not a sample has ever been read.

For each sample received, the middleware internally maintains a `sample_state` relative to each **DDSDataReader** (p. 1288). The sample state can be either:

- **DDS\_READ\_SAMPLE\_STATE** (p. 157) indicates that the **DDSDataReader** (p. 1288) has already accessed that sample by means of a read or take operation.
- **DDS\_NOT\_READ\_SAMPLE\_STATE** (p. 157) indicates that the **DDSDataReader** (p. 1288) has not accessed that sample before.

The sample state will, in general, be different for each sample in the collection returned by read or take.

## Enumerator

DDS_READ_SAMPLE_STATE	Sample has been read.
DDS_NOT_READ_SAMPLE_STATE	Sample has not been read.

## 7.26.4 Variable Documentation

### 7.26.4.1 DDS\_ANY\_SAMPLE\_STATE

```
const DDS_SampleStateMask DDS_ANY_SAMPLE_STATE [extern]
```

Any sample state **DDS\_READ\_SAMPLE\_STATE** (p. 157) | **DDS\_NOT\_READ\_SAMPLE\_STATE** (p. 157).

## Examples

**HelloWorld\_subscriber.cxx.**

## 7.27 View States

**DDS\_ViewStateKind** (p. 158) and associated elements

### Typedefs

- typedef **DDS\_UnsignedLong DDS\_ViewStateMask**  
A bit-mask (list) of view states, i.e. **DDS\_ViewStateKind** (p. 158).

### Enumerations

- enum **DDS\_ViewStateKind** {  
**DDS\_NEW\_VIEW\_STATE** = 0x0001 << 0 ,  
**DDS\_NOT\_NEW\_VIEW\_STATE** = 0x0001 << 1 }  
*Indicates whether or not an instance is new.*

### Variables

- const **DDS\_ViewStateMask DDS\_ANY\_VIEW\_STATE**  
Any view state **DDS\_NEW\_VIEW\_STATE** (p. 159) | **DDS\_NOT\_NEW\_VIEW\_STATE** (p. 159).

### 7.27.1 Detailed Description

**DDS\_ViewStateKind** (p. 158) and associated elements

### 7.27.2 Typedef Documentation

#### 7.27.2.1 DDS\_ViewStateMask

```
typedef DDS_UnsignedLong DDS_ViewStateMask
```

A bit-mask (list) of view states, i.e. **DDS\_ViewStateKind** (p. 158).

### 7.27.3 Enumeration Type Documentation

#### 7.27.3.1 DDS\_ViewStateKind

```
enum DDS_ViewStateKind
```

Indicates whether or not an instance is new.

For each instance (identified by the key), the middleware internally maintains a view state relative to each **DDSDataReader** (p. 1288). The view state can be either:

- **DDS\_NEW\_VIEW\_STATE** (p. 159) indicates that either this is the first time that the **DDSDataReader** (p. 1288) has ever accessed samples of that instance, or else that the **DDSDataReader** (p. 1288) has accessed previous samples of the instance, but the instance has since been reborn (i.e. become not-alive and then alive again). These two cases are distinguished by examining the **DDS\_SampleInfo::disposed\_generation\_count** (p. 1087) and the **DDS\_SampleInfo::no\_writers\_generation\_count** (p. 1087).
- **DDS\_NOT\_NEW\_VIEW\_STATE** (p. 159) indicates that the **DDSDataReader** (p. 1288) has already accessed samples of the same instance and that the instance has not been reborn since.

The `view_state` available in the **DDS\_SampleInfo** (p. 1082) is a snapshot of the view state of the instance relative to the **DDSDataReader** (p. 1288) used to access the samples at the time the collection was obtained (i.e. at the time read or take was called). The `view_state` is therefore the same for all samples in the returned collection that refer to the same instance.

Once an instance has been detected as not having any "live" writers and all the samples associated with the instance are "taken" from the **DDSDataReader** (p. 1288), the middleware can reclaim all local resources regarding the instance. Future samples will be treated as "never seen."

## Enumerator

DDS_NEW_VIEW_STATE	New instance. This latest generation of the instance has not previously been accessed.
DDS_NOT_NEW_VIEW_STATE	Not a new instance. This latest generation of the instance has previously been accessed.

## 7.27.4 Variable Documentation

### 7.27.4.1 DDS\_ANY\_VIEW\_STATE

```
const DDS_ViewStateMask DDS_ANY_VIEW_STATE [extern]
```

Any view state **DDS\_NEW\_VIEW\_STATE** (p. 159) | **DDS\_NOT\_NEW\_VIEW\_STATE** (p. 159).

## Examples

**HelloWorld\_subscriber.cxx.**

## 7.28 Instance States

**DDS\_InstanceStateKind** (p. 160) and associated elements

### Typedefs

- typedef **DDS\_UnsignedLong DDS\_InstanceStateMask**  
A bit-mask (list) of instance states, i.e. **DDS\_InstanceStateKind** (p. 160).

### Enumerations

- enum **DDS\_InstanceStateKind** {  
**DDS\_ALIVE\_INSTANCE\_STATE** = 0x0001 << 0 ,  
**DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** = 0x0001 << 1 ,  
**DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** = 0x0001 << 2 }  
Indicates if the samples are from a live **DDSDataWriter** (p. 1321) or not.

### Variables

- const **DDS\_InstanceStateMask DDS\_ANY\_INSTANCE\_STATE**  
Any instance state **ALIVE\_INSTANCE\_STATE** | **NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** | **NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE**.
- const **DDS\_InstanceStateMask DDS\_NOT\_ALIVE\_INSTANCE\_STATE**  
Not alive instance state **NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** | **NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE**.

## 7.28.1 Detailed Description

**DDS\_InstanceStateKind** (p. 160) and associated elements

## 7.28.2 Typedef Documentation

### 7.28.2.1 DDS\_InstanceStateMask

```
typedef DDS_UnsignedLong DDS_InstanceStateMask
```

A bit-mask (list) of instance states, i.e. **DDS\_InstanceStateKind** (p. 160).

## 7.28.3 Enumeration Type Documentation

### 7.28.3.1 DDS\_InstanceStateKind

```
enum DDS_InstanceStateKind
```

Indicates if the samples are from a live **DDSDataWriter** (p. 1321) or not.

For each instance, the middleware internally maintains an instance state. The instance state can be:

- **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161) indicates that (a) samples have been received for the instance, (b) there are live **DDSDataWriter** (p. 1321) entities writing the instance, and (c) the instance has not been explicitly disposed (or else more samples have been received after it was disposed).
- **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) indicates the instance was explicitly disposed by a **DDSDataWriter** (p. 1321) by means of the dispose operation.
- **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) indicates the instance has been declared as not-alive by the **DDSDataReader** (p. 1288) because it detected that there are no live **DDSDataWriter** (p. 1321) entities writing that instance.

The precise behavior events that cause the instance state to change depends on the setting of the OWNERSHIP QoS:

- If **OWNERSHIP** (p. 414) is set to **DDS\_EXCLUSIVE\_OWNERSHIP\_QOS** (p. 415), then the instance state becomes **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) only if the **DDSDataWriter** (p. 1321) that "owns" the instance explicitly disposes it. The instance state becomes **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161) again only if the **DDSDataWriter** (p. 1321) that owns the instance writes it.
- If **OWNERSHIP** (p. 414) is set to **DDS\_SHARED\_OWNERSHIP\_QOS** (p. 415), then the instance state becomes **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) if any **DDSDataWriter** (p. 1321) explicitly disposes the instance. The instance state becomes **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161) as soon as any **DDSDataWriter** (p. 1321) writes the instance again.

The instance state available in the **DDS\_SampleInfo** (p. 1082) is a snapshot of the instance state of the instance at the time the collection was obtained (i.e. at the time read or take was called). The instance state is therefore the same for all samples in the returned collection that refer to the same instance.

## Enumerator

DDS_ALIVE_INSTANCE_STATE	Instance is currently in existence.
DDS_NOT_ALIVE_DISPOSED_INSTANCE_STATE	Not alive disposed instance. The instance has been disposed by a DataWriter.
DDS_NOT_ALIVE_NO_WRITERS_INSTANCE_STATE	Not alive no writers for instance. None of the <b>DDSDataWriter</b> (p. 1321) objects that are currently alive (according to the <b>LIVELINESS</b> (p. 409)) are writing the instance.

## 7.28.4 Variable Documentation

### 7.28.4.1 DDS\_ANY\_INSTANCE\_STATE

```
const DDS_InstanceStateMask DDS_ANY_INSTANCE_STATE [extern]
```

Any instance state ALIVE\_INSTANCE\_STATE | NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE | NOT\_ALIVE\_NO\_↔ WRITERS\_INSTANCE\_STATE.

## Examples

**HelloWorld\_subscriber.cxx.**

### 7.28.4.2 DDS\_NOT\_ALIVE\_INSTANCE\_STATE

```
const DDS_InstanceStateMask DDS_NOT_ALIVE_INSTANCE_STATE [extern]
```

Not alive instance state NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE | NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_↔ STATE.

## 7.29 Stream Kinds

**DDS\_StreamKind** (p. 162) and associated elements

### Typedefs

- typedef **DDS\_UnsignedLong DDS\_StreamKindMask**  
A bit-mask (list) of stream kinds, i.e. **DDS\_StreamKind** (p. 162).

## Enumerations

- enum `DDS_StreamKind` {  
`DDS_LIVE_STREAM = 0x0001 << 0` ,  
`DDS_TOPIC_QUERY_STREAM = 0x0001 << 1` }  
*Indicates if the samples are TopicQuery samples or not.*

### 7.29.1 Detailed Description

`DDS_StreamKind` (p. 162) and associated elements

### 7.29.2 Typedef Documentation

#### 7.29.2.1 `DDS_StreamKindMask`

```
typedef DDS_UnsignedLong DDS_StreamKindMask
```

A bit-mask (list) of stream kinds, i.e. `DDS_StreamKind` (p. 162).

### 7.29.3 Enumeration Type Documentation

#### 7.29.3.1 `DDS_StreamKind`

```
enum DDS_StreamKind
```

Indicates if the samples are TopicQuery samples or not.

Enumerator

<code>DDS_LIVE_STREAM</code>	Sample is a live data sample.
<code>DDS_TOPIC_QUERY_STREAM</code>	Sample is a TopicQuery sample.

## 7.30 Infrastructure Module

Defines the abstract classes and the interfaces that are refined by the other modules. Contains common definitions such as return codes, status values, and QoS policies.



## Modules

- **Clock Selection**  
*APIs related to clock selection.*
- **Time Support**  
*Time and duration types and defines.*
- **GUID Support**  
*<<extension>> (p. 237) GUID type and defines.*
- **Sequence Number Support**  
*<<extension>> (p. 237) Sequence number type and defines.*
- **Exception Codes**  
*<<extension>> (p. 237) Exception codes.*
- **Return Codes**  
*Types of return codes.*
- **Status Kinds**  
*Kinds of communication status.*
- **QoS Policies**  
*Quality of Service (QoS) policies.*
- **Entity Support**  
***DDSEntity** (p. 1463), **DDSListener** (p. 1526) and related items.*
- **Conditions and WaitSets**  
***DDSCondition** (p. 1276) and **DDSWaitSet** (p. 1629) and related items.*
- **Cookie**  
*<<extension>> (p. 237) Unique identifier for a written data sample*
- **Sample Flags**  
*<<extension>> (p. 237) Flags for samples.*
- **WriteParams**  
*<<extension>> (p. 237)*
- **Heap Support in C**  
*<<extension>> (p. 237) Heap allocation and free routines in C*
- **Builtin Qos Profiles**  
*<<extension>> (p. 237) QoS libraries, profiles, and snippets that are automatically built into RTI Connext.*
- **User-managed Threads**  
*User-managed thread infrastructure.*
- **Octet Buffer Support**  
*<<extension>> (p. 237) Octet buffer creation, cloning, and deletion.*
- **Sequence Support**  
*The **FooSeq** (p. 1697) interface allows you to work with variable-length collections of homogeneous data.*
- **String Support**  
*<<extension>> (p. 237) String creation, cloning, assignment, and deletion.*

## Classes

- struct **DDS\_QosPrintAll\_t**  
*Special type which is used to select the `to_string` overloads when printing Qos objects.*

## Variables

- const **DDS\_QosPrintAll\_t** **DDS\_QOS\_PRINT\_ALL**

*Sentinel value that is used to select the `to_string` overload which prints all of the values of a Qos object.*

### 7.30.1 Detailed Description

Defines the abstract classes and the interfaces that are refined by the other modules. Contains common definitions such as return codes, status values, and QoS policies.

"DCPS Infrastructure package"

### 7.30.2 Variable Documentation

#### 7.30.2.1 DDS\_QOS\_PRINT\_ALL

```
const DDS_QosPrintAll_t DDS_QOS_PRINT_ALL [extern]
```

Sentinel value that is used to select the `to_string` overload which prints all of the values of a Qos object.

This sentinel value is used to select the `to_string` overload which prints the entirety of a Qos object (e.g., **DDS\_DataReaderQos::to\_string(char\*, DDS\_UnsignedLong&, const DDS\_QosPrintAll\_t&) const** (p. 146)).

See also

**DDS\_QosPrintAll\_t** (p. 1030)

## 7.31 Built-in Sequences

Defines sequences of primitive data type. .

## Classes

- struct **DDS\_CharSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Char* (p. 317) >
- struct **DDS\_WcharSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Wchar* (p. 317) >
- struct **DDS\_OctetSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Octet* (p. 317) >
- struct **DDS\_UInt8Seq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_UInt8* (p. 318) >
- struct **DDS\_Int8Seq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Int8* (p. 318) >
- struct **DDS\_ShortSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Short* (p. 318) >
- struct **DDS\_UnsignedShortSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_UnsignedShort* (p. 318) >
- struct **DDS\_LongSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Long* (p. 318) >
- struct **DDS\_UnsignedLongSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_UnsignedLong* (p. 318) >
- struct **DDS\_LongLongSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_LongLong* (p. 319) >
- struct **DDS\_UnsignedLongLongSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_UnsignedLongLong* (p. 319) >
- struct **DDS\_FloatSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Float* (p. 319) >
- struct **DDS\_DoubleSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Double* (p. 319) >
- struct **DDS\_LongDoubleSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_LongDouble* (p. 319) >
- struct **DDS\_BooleanSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Boolean* (p. 320) >
- struct **DDS\_StringSeq**  
*Instantiates FooSeq* (p. 1697) < *char\** > with value type semantics.
- struct **DDS\_WstringSeq**  
*Instantiates FooSeq* (p. 1697) < *DDS\_Wchar* (p. 317)\* >

### 7.31.1 Detailed Description

Defines sequences of primitive data type. .

## 7.32 Multi-channel DataWriters

APIs related to Multi-channel DataWriters.

APIs related to Multi-channel DataWriters.

### 7.32.1 What is a Multi-channel DataWriter?

A Multi-channel **DDSDataWriter** (p. 1321) is a **DDSDataWriter** (p. 1321) that is configured to send data over multiple multicast addresses, according to some filtering criteria applied to the data.

To determine which multicast addresses will be used to send the data, the middleware evaluates a set of filters that are configured for the **DDSDataWriter** (p. 1321). Each filter "guards" a channel (a set of multicast addresses). Each time a multi-channel **DDSDataWriter** (p. 1321) writes data, the filters are applied. If a filter evaluates to true, the data is sent over that filter's associated channel (set of multicast addresses). We refer to this type of filter as a Channel Guard filter.

### 7.32.2 Configuration on the Writer Side

To configure a multi-channel **DDSDataWriter** (p. 1321), simply define a list of all its channels in the **DDS\_MultiChannelQosPolicy** (p. 964).

The **DDS\_MultiChannelQosPolicy** (p. 964) is propagated along with discovery traffic. The value of this policy is available in **DDS\_PublicationBuiltinTopicData::locator\_filter** (p. 1018).

### 7.32.3 Configuration on the Reader Side

No special changes are required in a subscribing application to get data from a multichannel **DDSDataWriter** (p. 1321). If you want the **DDSDataReader** (p. 1288) to subscribe to only a subset of the channels, use a **DDSContentFilteredTopic** (p. 1283).

For more information on Multi-channel DataWriters, refer to the `User's Manual`.

### 7.32.4 Reliability with Multi-Channel DataWriters

#### 7.32.4.1 Reliable Delivery

Reliable delivery is only guaranteed when the **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) is set to **DDS\_INSTANCE\_PRESENTATION\_QOS** (p. 418) and the filters in **DDS\_MultiChannelQosPolicy** (p. 964) are keyed-only based.

If any of the guard filters are based on non-key fields, RTI Connext only guarantees reception of the most recent data from the MultiChannel DataWriter.

### 7.32.4.2 Reliable Protocol Considerations

Reliability is maintained on a per-channel basis. Each channel has its own reliability channel send queue. The size of that queue is limited by `DDS_ResourceLimitsQosPolicy::max_samples` (p. 1055) and/or `DDS_DataWriterResourceLimitsQosPolicy::max_batches` (p. 700).

The protocol parameters described in `DDS_DataWriterProtocolQosPolicy` (p. 673) are applied per channel, with the following exceptions:

`DDS_RtpsReliableWriterProtocol_t::low_watermark` (p. 1063) and `DDS_RtpsReliableWriterProtocol_t::high_watermark` (p. 1063): The low watermark and high watermark control the queue levels (in number of samples) that determine when to switch between regular and fast heartbeat rates. With MultiChannel DataWriters, `high_watermark` and `low_watermark` refer to the DataWriter's queue (not the reliability channel queue). Therefore, periodic heartbeating cannot be controlled on a per-channel basis.

Important: With MultiChannel DataWriters, `low_watermark` and `high_watermark` refer to application samples even if batching is enabled. This behavior differs from the one without MultiChannel DataWriters (where `low_watermark` and `high_watermark` refer to batches).

`DDS_RtpsReliableWriterProtocol_t::heartbeats_per_max_samples` (p. 1067): This field defines the number of heartbeats per send queue. For MultiChannel DataWriters, the value is applied per channel. However, the send queue size that is used to calculate the a piggyback heartbeat rate is defined per DataWriter (see `DDS_ResourceLimitsQosPolicy::max_samples` (p. 1055))

Important: With MultiChannel DataWriters, `heartbeats_per_max_samples` refers to samples even if batching is enabled. This behavior differs from the one without MultiChannels DataWriters (where `heartbeats_per_max_samples` refers to batches).

With batching and MultiChannel DataWriters, the size of the DataWriter's send queue should be configured using `DDS_ResourceLimitsQosPolicy::max_samples` (p. 1055) instead of `max_batches` `DDS_DataWriterResourceLimitsQosPolicy::max_batches` (p. 700) in order to take advantage of `heartbeats_per_max_samples`.

## 7.33 Transports

APIs related to RTI Connex pluggable transports.

### Modules

- **Installing Transport Plugins**

*Installing and configuring transports used by RTI Connex.*

- **Built-in Transport Plugins**

*Transport plugins delivered with RTI Connex.*

- **Creating New Transport Plugins**

*Developing new transport plugins for RTI Connex.*

- **Transport Plugins Configuration**

*Transport plugins configuration with RTI Connex.*

- **Transport Address**

*Transport-independent addressing scheme using IPv6 presentation strings and numerically stored in network-ordered format.*

### 7.33.1 Detailed Description

APIs related to RTI Connex transport pluggable transports.

### 7.33.2 Overview

RTI Connex has a pluggable transports architecture. The core of RTI Connex is transport agnostic; it does not make any assumptions about the actual transports used to send and receive messages. Instead, the RTI Connex core uses an abstract "transport API" to interact with the **transport plugins** which implement that API.

A transport plugin implements the abstract transport API and performs the actual work of sending and receiving messages over a physical transport. A collection of **builtin plugins** (see **Built-in Transport Plugins** (p. 177)) is delivered with RTI Connex for commonly used transports. New transport plugins can easily be created, thus enabling RTI Connex applications to run over transports that may not even be conceived yet. This is a powerful capability and that distinguishes RTI Connex from competing middleware approaches.

RTI Connex also provides a set of APIs for installing and configuring transport plugins to be used in an application. So that RTI Connex applications work out of the box, a subset of the builtin transport plugins is preconfigured by default (see **DDS\_TransportBuiltinQosPolicy** (p. 1144)). You can "turn-off" some or all of the builtin transport plugins. In addition, you can configure other transport plugins for use by the application.

### 7.33.3 Transport Aliases

In order to use a transport plugin instance in an RTI Connex application, it must be registered with a **DDSDomainParticipant** (p. 1351). When you register a transport, you specify a sequence of "alias" strings to symbolically refer to the transport plugin. The same alias strings can be used to register more than one transport plugin.

You can register multiple transport plugins with a **DDSDomainParticipant** (p. 1351). An **alias** symbolically refers to one or more transport plugins registered with the **DDSDomainParticipant** (p. 1351). Builtin transport plugin instances can be referred to using preconfigured aliases (see **TRANSPORT\_BUILTIN** (p. 443)).

A transport plugin's class name is automatically used as an implicit alias. It can be used to refer to all the transport plugin instances of that class.

You can use aliases to refer to transport plugins, in order to specify:

- the transport plugins to use for **discovery** (see **DDS\_DiscoveryQosPolicy::enabled\_transports** (p. 732)), and for **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) entities (see **DDS\_TransportSelectionQosPolicy** (p. 1157)).
- the **multicast** addresses on which to receive discovery messages (see **DDS\_DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733)), and the multicast addresses and ports on which to receive user data (see **DDS\_DataReaderQos::multicast** (p. 651)).
- the **unicast ports** used for user data (see **DDS\_TransportUnicastQosPolicy** (p. 1158)) on both **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) entities.
- the transport plugins used to parse an address string in a locator (**Locator Format** (p. 465) and **NDDS\_DISCOVERY\_PEERS** (p. 464)).

A **DDSDomainParticipant** (p. 1351) (and contained its entities) start using a transport plugin after the **DDSDomainParticipant** (p. 1351) is enabled (see **DDSEntity::enable** (p. 1466)). An entity will use *all* the transport plugins that match the specified transport QoS policy. All transport plugins are treated uniformly, regardless of how they were created or registered; there is no notion of some transports being more "special" than others.

### 7.33.4 Transport Lifecycle

A transport plugin is owned by whomever creates it. Thus, if you create and register a transport plugin with a **DDSDomainParticipant** (p. 1351), you are responsible for deleting it by calling its destructor. Note that builtin transport plugins (**TRANSPORT\_BUILTIN** (p. 443)) and transport plugins that are loaded through the **PROPERTY** (p. 419) QoS policy (see **Loading Transport Plugins through Property QoS Policy of Domain Participant** (p. 173)) are automatically managed by RTI Connext.

A user-created transport plugin must not be deleted while it is still in use by a **DDSDomainParticipant** (p. 1351). This generally means that a user-created transport plugin instance can only be deleted after the **DDSDomainParticipant** (p. 1351) with which it was registered is deleted (see **DDSDomainParticipantFactory::delete\_participant** (p. 1445)). Note that a transport plugin *cannot* be "unregistered" from a **DDSDomainParticipant** (p. 1351).

A transport plugin instance cannot be registered with more than one **DDSDomainParticipant** (p. 1351) at a time. This requirement is necessary to guarantee the multi-threaded safety of the transport API.

If the same physical transport resources are to be used with more than one **DDSDomainParticipant** (p. 1351) in the same address space, the transport plugin should be written in such a way so that it can be instantiated multiple times—once for each **DDSDomainParticipant** (p. 1351) in the address space. Note that it is always possible to write the transport plugin so that multiple transport plugin instances share the same underlying resources; however the burden (if any) of guaranteeing multi-threaded safety to access shared resource shifts to the transport plugin developer.

### 7.33.5 Transport Class Attributes

A transport plugin instance is associated with two kinds of attributes:

- the *class* attributes that are decided by the plugin writer; these are invariant across all instances of the transport plugin class, and
- the *instance* attributes that can be set on a per instance basis by the transport plugin user.

Every transport plugin must specify the following class attributes.

**transport class id** (see **NDDS\_Transport\_Property\_t::classid** (p. 1777)) Identifies a transport plugin implementation class. It denotes a unique "class" to which the transport plugin instance belongs. The class is used to distinguish between different transport plugin implementations. Thus, a transport plugin vendor should ensure that its transport plugin implementation has a unique class.

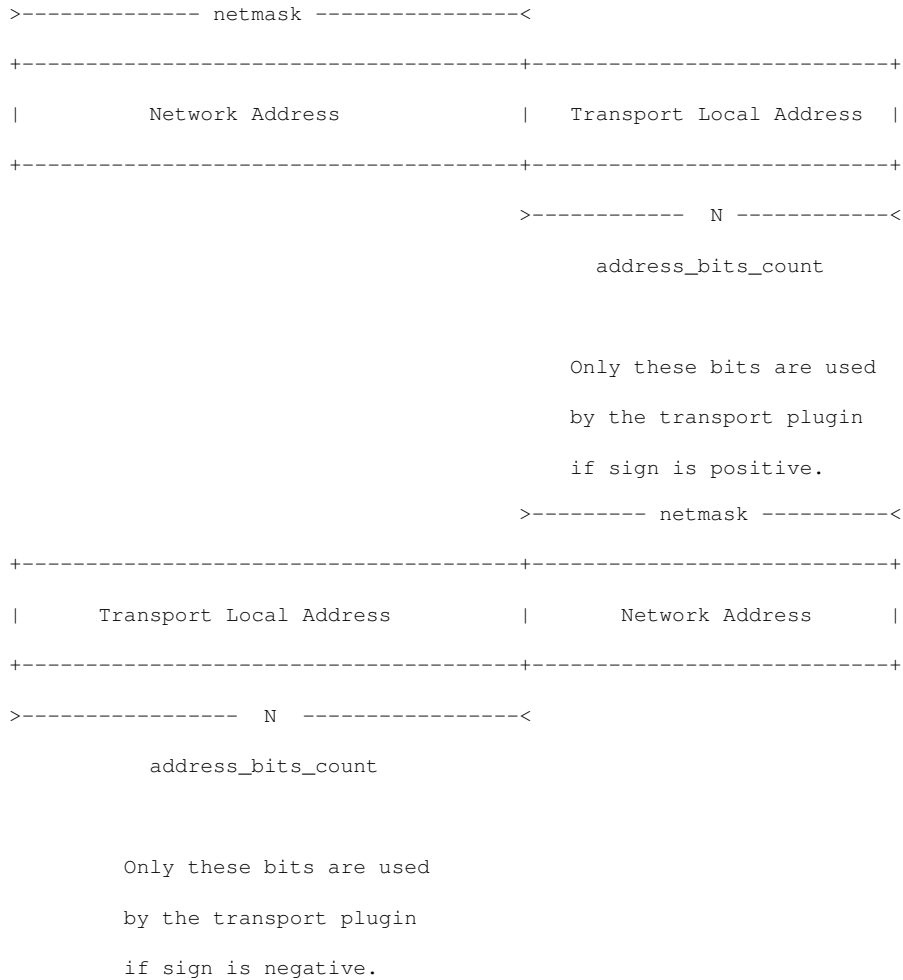
Two transport plugin instances report the same class *iff* they have compatible implementations. Transport plugin instances with mismatching classes are not allowed (by the RTI Connext Core) to communicate with one another.

Multiple implementations (possibly from different vendors) for a physical transport mechanism can co-exist in an RTI Connext application, provided they use different transport class IDs.

The class ID can also be used to distinguish between different transport protocols over the same physical transport network (e.g., UDP vs. TCP over the IP routing infrastructure).

**transport significant address bit count** (see **NDDS\_Transport\_Property\_t::address\_bit\_count** (p. 1778)) RTI Connext's addressing is modeled after the IPv6 and uses 128-bit addresses ( **Transport Address** (p. 252) ) to route messages.

A transport plugin is expected to map the transport's internal addressing scheme to 128-bit addresses. Depending on the sign of this attribute, this mapping uses only *N* least significant bits (LSB) if positive or *N* most significant bits (MSB) if negative; these bits are specified by this attribute.



The remaining bits of an address using the  $128 - \text{abs}(\text{bit address})$  representation will be considered as part of the "network address" (see **Transport Network Address** (p. 171)) and thus ignored by the transport plugin's internal addressing scheme.

For *unicast* addresses, the transport plugin is expected to ignore the higher ( $128 - \text{NDDS\_Transport\_Property\_t::address\_bit\_count}$  (p. 1778)) bits. RTI Connex is free to manipulate those bits freely in the addresses passed in/out to the transport plugin APIs.

Theoretically, the significant address bits count,  $N$  is related to the size of the underlying transport network as follows:

$$\text{address\_bits\_count} \geq \text{ceil}(\log_2(\text{total\_addressable\_transport\_unicast\_interfaces}))$$

The equality holds when the most compact (theoretical) internal address mapping scheme is used. A practical address mapping scheme may waste some bits.

### 7.33.6 Transport Instance Attributes

The *per instance* attributes to configure the plugin instance are generally passed in to the plugin constructor. These are defined by the transport plugin writer, and can be used to:

- customize the behavior of an instance of a transport plugin, including the send and the receiver buffer sizes, the maximum message size, various transport level classes of service (CoS), and so on.



- specify the resource values, network interfaces to use, various transport level policies, and so on.

RTI Connext requires that every transport plugin instance must specify the `NDDS_Transport_Property_t::message_size_max` (p. 1779) and `NDDS_Transport_Property_t::gather_send_buffer_count_max` (p. 1779).

It is up to the transport plugin developer to make these available for configuration to transport plugin user.

Note that it is important that the instance attributes are "compatible" between the sending side and the receiving side of communicating applications using different instances of a transport plugin class. For example, if one side is configured to send messages larger than can be received by the other side, then communications via the plugin may fail.

### 7.33.7 Transport Network Address

The address bits not used by the transport plugin for its internal addressing constitute its network address bits.

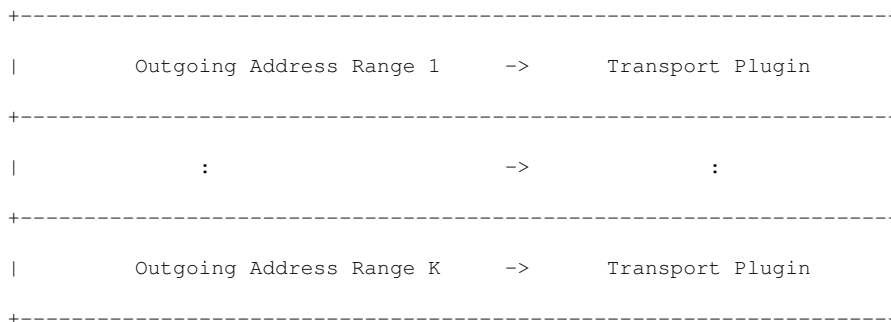
In order for RTI Connext to properly route the messages, each unicast interface in the RTI Connext *domain* must have a unique address. RTI Connext allows the user to specify the value of the network address when installing a transport plugin via the `NDDSTransportSupport::register_transport()` (p. 1834) API.

The network address for a transport plugin should be chosen such that the resulting fully qualified 128-bit address will be unique in the RTI Connext domain. Thus, if two instances of a transport plugin are registered with a `DDSDomainParticipant` (p. 1351), they will be at different network addresses in order for their unicast interfaces to have unique fully qualified 128-bit addresses. It is also possible to create multiple transports with the same network address, as it can be useful for certain use cases; note that this will require special entity configuration for most transports to avoid clashes in resource use (e.g. sockets for UDPv4 transport).

### 7.33.8 Transport Send Route

By default, a transport plugin is configured to send outgoing messages destined to addresses in the network address range at which the plugin was registered.

RTI Connext allows the user to configure the routing of outgoing messages via the `NDDSTransportSupport::add_send_route()` (p. 1836) API, so that a transport plugin will be used to send messages only to certain ranges of destination addresses. The method can be called multiple times for a transport plugin, with different address ranges.



The user can set up a routing table to restrict the use of a transport plugin to send messages to selected addresses ranges.

### 7.33.9 Transport Receive Route

By default, a transport plugin is configured to receive incoming messages destined to addresses in the network address range at which the plugin was registered.

RTI Connext allows the user to configure the routing of incoming messages via the `NDDSTransportSupport::add_receive_route()` (p. 1836) API, so that a transport plugin will be used to receive messages only on certain ranges of addresses. The method can be called multiple times for a transport plugin, with different address ranges.

```

+-----+
|      Transport Plugin      <- Incoming Address Range 1 |
+-----+
|          :                  <-          :                |
+-----+
|      Transport Plugin      <- Incoming Address Range M |
+-----+

```

The user can set up a routing table to restrict the use of a transport plugin to receive messages from selected ranges. For example, the user may restrict a transport plugin to

- receive messages from a certain multicast address range.
- receive messages only on certain unicast interfaces (when multiple unicast interfaces are available on the transport plugin).

## 7.34 Installing Transport Plugins

Installing and configuring transports used by RTI Connext.

### Classes

- class **NDDSTransportSupport**  
 <<*interface*>> (p. 237) *The utility class used to configure RTI Connext pluggable transports.*

### Typedefs

- typedef `NDDS_TRANSPORT_HANDLE_TYPE_NATIVE` **NDDS\_Transport\_Handle\_t**  
*An opaque type representing the handle to a transport plugin registered with a **DDSDomainParticipant** (p. 1351).*
- typedef `NDDS_Transport_Plugin`  `(*)( * NDDS_Transport_create_plugin) ( NDDS_Transport_Address_t *default_network_address_out, const struct DDS_PropertyQosPolicy *property_in)`  
*Function prototype for creating plugin through **DDS\_PropertyQosPolicy** (p. 1007).*

## Functions

- **DDS\_Boolean NDDS\_Transport\_Handle\_is\_nil** (const **NDDS\_Transport\_Handle\_t** \*self)  
*Is the given transport handle the NIL transport handle?*

## Variables

- const **NDDS\_Transport\_Handle\_t NDDS\_TRANSPORT\_HANDLE\_NIL**  
*The NIL transport handle.*

### 7.34.1 Detailed Description

Installing and configuring transports used by RTI Connext.

There is more than one way to install a transport plugin for use with RTI Connext:

- If it is a builtin transport plugin, by specifying a bitmask in **DDS\_TransportBuiltinQoSPolicy** (p. 1144) (see **Built-in Transport Plugins** (p. 177))
- For all other non-builtin transport plugins, by dynamically loading the plugin through **PROPERTY** (p. 419) QoS policy settings of **DDSDomainParticipant** (p. 1351) (only supported on architectures that support dynamic libraries, see **Loading Transport Plugins through Property QoS Policy of Domain Participant** (p. 173))
- By explicitly creating a transport plugin and registering the plugin with a **DDSDomainParticipant** (p. 1351) through **NDDSTransportSupport::register\_transport** (p. 1834) (for both builtin and non-builtin plugins)

In the first two cases, the lifecycle of the transport plugin is automatically managed by RTI Connext. In the last case, user is responsible for deleting the transport plugin after the **DDSDomainParticipant** (p. 1351) is deleted. See **Transport Lifecycle** (p. 169) for details.

### 7.34.2 Loading Transport Plugins through Property QoS Policy of Domain Participant

On architectures that support dynamic libraries, a non-builtin transport plugin written in C/C++ and built as a dynamic-link library (\*.dll/\*.so) can be loaded by RTI Connext through the **PROPERTY** (p. 419) QoS policy settings of the **DDSDomainParticipant** (p. 1351).

Dynamic libraries are supported on all architectures except INTEGRITY and certain VxWorks platforms. For VxWorks, dynamic libraries are only supported for architectures that are on Pentium/Arm CPUs AND use kernel mode.

The dynamic-link library (and all the dependent libraries) need to be in the library search path during runtime (in the **LD\_LIBRARY\_PATH** environment variable on Linux systems, **DYLD\_LIBRARY\_PATH** on macOS systems, or **Path** on Windows systems).

To allow dynamic loading of the transport plugin, the transport plugin must implement the RTI Connext abstract transport API and must provide a function with the signature **NDDS\_Transport\_create\_plugin** (p. 176) that can be called by RTI Connext to create an instance of the transport plugin. The name of the dynamic library that contains the transport plugin implementation, the name of the function and properties that can be used to create the plugin, and the aliases and network address that are used to register the plugin can all be specified through the **PROPERTY** (p. 419) QoS policy of the **DDSDomainParticipant** (p. 1351).

The following table lists the property names that are used to load the transport plugins dynamically:

Table 7.73 Properties for dynamically loading and registering transport plugins

Property Name	Description	Required?
dds.transport.load_plugins	Comma-separated strings indicating the prefix names of all plugins that will be loaded by RTI Connex. Up to 8 plugins may be specified. For example, "dds.transport.TCPv4.tcp1, dds.<transport.TCPv4.tcp2", In the following examples, <TRANSPORT_<PREFIX> is used to indicate one element of this string that is used as a prefix in the property names for all the settings that are related to the plugin. <TRANSPORT_PREFIX> must begin with "dds.transport." (such as "dds.transport.<mytransport").	YES
<TRANSPORT_PREFIX>.library	Should be set to the name of the dynamic library (*.so for Linux systems, *.dylib for macOS systems, and *.dll for Windows systems) that contains the transport plugin implementation. This library (and all the other dependent dynamic libraries) needs to be in the library search path used by RTI Connex during run time (pointed to by the environment variable <b>LD_LIBRARY_&lt;PATH</b> on Linux systems, <b>DYLD_LIBRARY_PATH</b> on macOS systems, or <b>Path</b> on Windows systems).	YES
<TRANSPORT_PREFIX>.create_function	Should be set to the name of the function with the prototype of <b>NDDS_Transport_create_&lt;plugin</b> (p. 176) that can be called by RTI Connex to create an instance of the plugin. The resulting transport plugin will then be registered by RTI Connex through <b>NDDSTransport_&lt;Support::register_transport</b> (p. 1834)	YES
<TRANSPORT_PREFIX>.aliases	Used to register the transport plugin returned by <b>NDDS_Transport_create_plugin</b> (p.176) (as specified by <TRANSPORT_<PREFIX>.create_function) to the <b>DDSDomainParticipant</b> (p.1351). Refer to <b>aliases_in</b> parameter in <b>NDDSTransport_&lt;Support::register_transport</b> (p.1834) for details. Aliases should be specified as a comma-separated string, with each comma delimiting an alias. If it is not specified, <TRANSPORT_<PREFIX> –without the leading "dds.transport" – is used as the default alias for the plugin.	NO

Property Name	Description	Required?
<TRANSPORT_PREFIX>.network_address	Used to register the transport plugin returned by <b>NDDS_Transport_create_plugin</b> (p.176) (as specified by <TRANSPORT_PREFIX>.create_function) to the <b>DDSDomainParticipant</b> (p.1351). Refer to <b>network_address_in</b> parameter in <b>NDDSTransportSupport::register_transport</b> (p.1834) for details. If it is not specified, the <b>network_address_out</b> output parameter from <b>NDDS_Transport_create_plugin</b> (p.176) is used. The default value is a zeroed out network address.	NO
<TRANSPORT_PREFIX>.<property_name>	Property that is passed into <b>NDDS_Transport_create_plugin</b> (p.176) (as specified by <TRANSPORT_PREFIX>.create_function) for creating the transport plugin. This property name-value pair will be passed to <b>NDDS_Transport_create_plugin</b> (p.176) after stripping out <TRANSPORT_PREFIX> from the property name. The parsing of this property and configuring the transport using this property should be handled by the implementation of each transport plugin. Multiple <TRANSPORT_PREFIX>.<property_name> can be specified. Note: "library", "create_function", "aliases" and "network_address" cannot be used as the <property_name> due to conflicts with other builtin property names.	NO

A transport plugin is dynamically created and registered to the **DDSDomainParticipant** (p.1351) by RTI Connext when:

- the **DDSDomainParticipant** (p.1351) is enabled,
- the first DataWriter/DataReader is created, or
- you lookup a builtin DataReader (**DDSSubscriber::lookup\_datareader** (p.1604)),

whichever happens first.

Any changes to the transport plugin related properties in the **PROPERTY** (p.419) QoS policy after the transport plugin has been registered with the **DDSDomainParticipant** (p.1351) will have no effect.

See also

**Transport Use Cases** (p.216)

### 7.34.3 Typedef Documentation

#### 7.34.3.1 NDDS\_Transport\_Handle\_t

```
typedef NDDS_TRANSPORT_HANDLE_TYPE_NATIVE NDDS_Transport_Handle_t
```

An opaque type representing the handle to a transport plugin registered with a **DDSDomainParticipant** (p. 1351).

A transport handle represents the association between a **DDSDomainParticipant** (p. 1351) and a transport plugin.

#### 7.34.3.2 NDDS\_Transport\_create\_plugin

```
typedef NDDS_Transport_Plugin *(* NDDS_Transport_create_plugin) ( NDDS_Transport_Address_t *default_network_address_out, const struct DDS_PropertyQoSPolicy *property_in)
```

Function prototype for creating plugin through **DDS\_PropertyQoSPolicy** (p. 1007).

By specifying some predefined property names in **DDS\_PropertyQoSPolicy** (p. 1007), RTI Connexx can call a function from a dynamic library to create a transport plugin and register the returned plugin with a **DDSDomainParticipant** (p. 1351).

This is the function prototype of the function as specified in "<TRANSPORT\_PREFIX>.create\_function" of **DDS\_PropertyQoSPolicy** (p. 1007) QoS policy that will be called by RTI Connexx to create the transport plugin. See **Loading Transport Plugins through Property QoS Policy of Domain Participant** (p. 173) for details.

##### Parameters

<i>default_network_address_out</i>	<< <b>out</b> >> (p. 238) Optional output parameter. If the network address is not specified in "<TRANSPORT_PREFIX>.network_address" in <b>DDS_PropertyQoSPolicy</b> (p. 1007), this is the default network address that is used to register the returned transport plugin using <b>NDDSTransportSupport::register_transport</b> (p. 1834) . This parameter will never be null. The default value is a zeroed-out network address.
<i>property_in</i>	<< <b>in</b> >> (p. 238) <b>property_in</b> contains all the name-value pair properties that matches the format "<TRANSPORT_PREFIX>.<property_name>" in <b>DDS_PropertyQoSPolicy</b> (p. 1007) that can be used to create the transport plugin. Only <property_name> is passed in - the plugin prefix will be stripped out in the property name. Note: predefined <TRANSPORT_PREFIX> properties "library", "create_function", "aliases" and "network_address" will not be passed to this function. This parameter will never be null.

##### Returns

Upon success, a valid non-NIL transport plugin. NIL upon failure.

## 7.34.4 Function Documentation

### 7.34.4.1 NDDS\_Transport\_Handle\_is\_nil()

```
DDS_Boolean NDDS_Transport_Handle_is_nil (
    const NDDS_Transport_Handle_t * self )
```

Is the given transport handle the NIL transport handle?

Returns

**DDS\_BOOLEAN\_TRUE** (p.317) if the given transport handle is equal to **NDDS\_TRANSPORT\_HANDLE\_NIL** (p. 177) or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

## 7.34.5 Variable Documentation

### 7.34.5.1 NDDS\_TRANSPORT\_HANDLE\_NIL

```
const NDDS_Transport_Handle_t NDDS_TRANSPORT_HANDLE_NIL [extern]
```

The NIL transport handle.

## 7.35 Built-in Transport Plugins

Transport plugins delivered with RTI Connext.

### Modules

- **UDP Transport Plugin definitions**  
*UDP Transport Plugin definitions.*
- **Shared Memory Transport**  
*Built-in transport plug-in for inter-process communications using shared memory (**NDDS\_TRANSPORT\_CLASSID\_↔SHMEM** (p. 249)).*
- **UDPv4 Transport**  
*Transport plug-in using UDP/IPv4 (**NDDS\_TRANSPORT\_CLASSID\_UDPv4** (p. 249)).*
- **Real-Time WAN Transport**  
*Transport plug-in using UDP/IPv4 for WAN communications. (**NDDS\_TRANSPORT\_CLASSID\_UDPv4\_WAN** (p. 251)).*
- **UDPv6 Transport**  
*Transport plug-in using UDP/IPv6 (**NDDS\_TRANSPORT\_CLASSID\_UDPv6** (p. 250)).*

### 7.35.1 Detailed Description

Transport plugins delivered with RTI Connext.

The **TRANSPORT\_BUILTIN** (p. 443) specifies the collection of transport plugins that can be automatically configured and managed by RTI Connext as a convenience to the user.

These transport plugins can simply be turned "on" or "off" by a specifying a bitmask in **DDS\_TransportBuiltinQosPolicy** (p. 1144), thus bypassing the steps for setting up a transport plugin. RTI Connext preconfigures the transport plugin properties, the network address, and the aliases to "factory defined" values.

If a builtin transport plugin is turned "on" in **DDS\_TransportBuiltinQosPolicy** (p. 1144), the plugin is implicitly created and registered to the corresponding **DDSDomainParticipant** (p. 1351) by RTI Connext when:

- the **DDSDomainParticipant** (p. 1351) is enabled,
- the first DataWriter/DataReader is created, or
- you lookup a builtin DataReader (**DDSSubscriber::lookup\_datareader** (p. 1604)),

whichever happens first.

Each builtin transport contains its own set of properties. For example, the **::UDPv4 Transport** (p. 266) allows the application to specify whether or not multicast is supported, the maximum size of the message, and provides a mechanism for the application to filter out network interfaces.

The builtin transport plugin properties can be changed by the method **NDDSTransportSupport::set\_builtin\_transport\_property()** (p. 1838) or by using the **PROPERTY** (p. 419) QoS policy associated with the **DDSDomainParticipant** (p. 1351). Builtin transport plugin properties specified in **DDS\_PropertyQosPolicy** (p. 1007) always overwrite the ones specified through **NDDSTransportSupport::set\_builtin\_transport\_property()** (p. 1838). Refer to the specific builtin transport for the list of property names that can be specified through **PROPERTY** (p. 419) QoS policy.

Any changes to the builtin transport properties after the builtin transports have been registered with will have no effect.

See also

**NDDSTransportSupport::set\_builtin\_transport\_property()** (p. 1838) **DDS\_PropertyQosPolicy** (p. 1007)

The built-in transport plugins can also be instantiated and registered by the user, following the steps for **Registering a transport with a participant** (p. 218). This is useful when the application needs different values for the network addresses.

## 7.36 Creating New Transport Plugins

Developing new transport plugins for RTI Connext.

Developing new transport plugins for RTI Connext.

RTI Connext provides an abstract "C" language API for creating new transport plugins. If you are interested in creating a new transport plugin for RTI Connext, please contact your RTI representative or email [sales@rti.com](mailto:sales@rti.com).



## 7.37 Queries and Filters Syntax

### 7.37.1 Syntax for DDS Queries and Filters

A subset of the WHERE clause in SQL is used in several parts of the specification:

- The *filter\_expression* in the **DDSContentFilteredTopic** (p. 1283)
- The *query\_expression* in the **DDSQueryCondition** (p. 1573)
- <<*extension*>> (p. 237) The *filter\_expression* in the **DDS\_TopicQuerySelection** (p. 1143)
- <<*extension*>> (p. 237) The *filter\_expression* in the **DDS\_ChannelSettings\_t** (p. 610)

Those expressions may use a subset of SQL, extended with the possibility to use program variables in the SQL expression. The allowed SQL expressions are defined with the BNF-grammar below.

The following notational conventions are made:

- *NonTerminals* are typeset in italics.
- 'Terminals' are quoted and typeset in a fixed width font. They are written in upper case in most cases in the BNF-grammar below, but should be case insensitive.
- **TOKENS** are typeset in bold.
- The notation (*element* // ',') represents a non-empty comma-separated list of *elements*.

### 7.37.2 SQL grammar in BNF

```

FilterExpression ::= Condition
Condition      ::= Predicate
                | Condition 'AND' Condition
                | Condition 'OR' Condition
                | 'NOT' Condition
                | '(' Condition ')'
Predicate     ::= ComparisonPredicate
                | BetweenPredicate
ComparisonPredicate ::= ComparisonTerm RelOp ComparisonTerm
ComparisonTerm    ::= FieldIdentifier
                | Parameter
BetweenPredicate  ::= FieldIdentifier 'BETWEEN' Range
                | FieldIdentifier 'NOT BETWEEN' Range
FieldIdentifier   ::= FIELDNAME
                | IDENTIFIER
RelOp            ::= '=' | '>' | '>=' | '<' | '<=' | '<>' | 'LIKE' | 'MATCH'
Range           ::= Parameter 'AND' Parameter
Parameter       ::= INTEGERVALUE
                | CHARVALUE
                | FLOATVALUE
                | STRING
                | ENUMERATEDVALUE
                | BOOLEANVALUE
                | NULLVALUE
                | PARAMETER

```

### 7.37.3 Token expression

The syntax and meaning of the tokens used in the SQL grammar is described as follows:

- **IDENTIFIER** - An identifier for a FIELDNAME, and is defined as any series of characters 'a', ..., 'z', 'A', ..., 'Z', '0', ..., '9', '\_' but may not start with a digit.

Formal notation:

```
IDENTIFIER: LETTER ( PART_LETTER)*
where LETTER: [ "A"-"Z", "_", "a"-"z" ]
      PART_LETTER: [ "A"-"Z", "_", "a"-"z", "0"-"9" ]
```

- **FIELDNAME** - A fieldname is a reference to a field in the data structure. The dot '.' is used to navigate through nested structures. The number of dots that may be used in a FIELDNAME is unlimited. The FIELDNAME can refer to fields at any depth in the data structure. The names of the field are those specified in the IDL definition of the corresponding structure, which may or may not match the fieldnames that appear on the language-specific (e.g., C/C++, Java) mapping of the structure. To reference to the  $n+1$  element in an array or sequence, use the notation '[ $n$ ]', where  $n$  is a natural number (zero included). FIELDNAME must resolve to a primitive IDL type; that is either boolean, octet, (unsigned) short, (unsigned) long, (unsigned) long long, float double, char, wchar, string, wstring, or enum.

Formal notation:

```
FIELDNAME: FieldNamePart ( "." FieldNamePart )*
where FieldNamePart : IDENTIFIER ( "[" Index "]" )*
      Index> : (["0"-"9"])+
              | ["0x", "0X"] (["0"-"9", "A"-"F", "a"-"f"])+
```

Primitive IDL types referenced by FIELDNAME are treated as different types in *Predicate* according to the following table:

Predicate Data Type	IDL Type
BOOLEANVALUE	boolean
INTEGERVALUE	octet, (unsigned) short, (unsigned) long, (unsigned) long long
FLOATVALUE	float, double
CHARVALUE	char, wchar
STRING	string, wstring
ENUMERATEDVALUE	enum

- **TOPICNAME** - A topic name is an identifier for a topic, and is defined as any series of characters 'a', ..., 'z', 'A', ..., 'Z', '0', ..., '9', '\_' but may not start with a digit.

Formal notation:

TOPICNAME : IDENTIFIER

- **INTEGERVALUE** - Any series of digits, optionally preceded by a plus or minus sign, representing a decimal integer value within the range of the system. 64-bit integers (int64 and uint64) must be followed by either l or L, otherwise the value is treated as a 32-bit integer. A hexadecimal number is preceded by 0x and must be a valid hexadecimal expression.

Formal notation:

```
INTEGERVALUE : ([ "+", "-" ])? ([ "0"-"9" ])+ [ ("L", "l") ]?
              | ([ "+", "-" ])? [ "0x", "0X" ] ([ "0"-"9", "A"-"F", "a"-"f" ])+ [ ("L", "l") ]?
```

- **CHARVALUE** - A single character enclosed between single quotes.

Formal notation:

```
CHARVALUE : "'" (~["'"])?''
```

- **FLOATVALUE** - Any series of digits, optionally preceded by a plus or minus sign and optionally including a floating point ('.'). A power-of-ten expression may be postfixed, which has the syntax *en* or *En*, where *n* is a number, optionally preceded by a plus or minus sign.

Formal notation:

```
FLOATVALUE : ([ "+", "-" ])? ([ "0"-"9" ])* ( "." )? ([ "0"-"9" ])+ ( EXPONENT )?
where EXPONENT: [ "e", "E" ] ([ "+", "-" ])? ([ "0"-"9" ])+
```

- **STRING** - Any series of characters encapsulated in single quotes, except the single quote itself.

Formal notation:

```
STRING : "'" (~["'"])* "'"
```

- **ENUMERATEDVALUE** - An enumerated value is a reference to a value declared within an enumeration. Enumerated values consist of the name of the enumeration label enclosed in single quotes. The name used for the enumeration label must correspond to the label names specified in the IDL definition of the enumeration.

Formal notation:

```
ENUMERATEDVALUE : "'" ["A" - "Z", "a" - "z"] ["A" - "Z", "a" - "z", "_", "0" - "9"]* "'"
```

- **BOOLEANVALUE** - Can either be 'TRUE' or 'FALSE', case insensitive.

Formal notation (case insensitive):

```
BOOLEANVALUE : ["TRUE", "FALSE"]
```

- **NULLVALUE** - Can be null, and is case insensitive.

Formal notation (case insensitive):

```
NULLVALUE : "null"
```

- **PARAMETER** - A parameter is of the form %*n*, where *n* represents a natural number (zero included) smaller than 100. It refers to the *n* + 1<sup>th</sup> argument in the given context. Argument can only in primitive type value format. It cannot be a FIELDNAME.

Formal notation:

```
PARAMETER : "%" (["0"-"9"])+
```

### 7.37.4 String Parameters

Strings used as parameter values must contain the enclosing quotation marks (') within the parameter value, and not place the quotation marks within the expression statement. For example, the following expression is legal:

```
" symbol MATCH %0 " with parameter 0 = " 'IBM' "
```

whereas the following expression will not compile:

```
" symbol MATCH '%0' " with parameter 0 = " IBM "
```

### 7.37.5 Type compatability in Predicate

Only certain combination of type comparisons are valid in *Predicate*. The following table marked all the compatible pairs with 'YES':

	BOOLEANVALUE	INTEGERVALUE	FLOATVALUE	CHARVALUE	STRING	ENUMERATEDVALUE
BOOLEAN	YES					
INTEGERVALUE		YES	YES			
FLOATVALUE		YES	YES			
CHARVALUE				YES	YES	YES
STRING				YES	YES(*1)	YES
ENUMERATEDVALUE		YES		YES(*2)	YES(*2)	YES(*3)

- (\*1) See **SQL Extension: Regular Expression Matching** (p. 183)
- (\*2) Because the formal notation of the Enumeration values, they are compatible with string and char literals, but they are not compatible with string or char variables, i.e., "MyEnum='EnumValue'" would be correct, but "MyEnum=MyString" is not allowed.
- (\*3) Only for same type Enums.

### 7.37.6 SQL Extension: Regular Expression Matching

The relational operator MATCH may only be used with string fields. The right-hand operator is a string *pattern*. A string pattern specifies a template that the left-hand field value must match. The characters `,^?*[]-^!%` have special meanings unless they are escaped by the escape character `\`.

MATCH is case-sensitive.

The pattern allows limited "wild card" matching under the following rules:

Character	Meaning
,	"," separates a list of alternate patterns. The field string is matched if it matches one or more of the patterns.
/	"/" in the pattern string matches a / in the field string. This character is used to separate a sequence of mandatory substrings.
?	"?" in the pattern string matches any single <i>non-special</i> characters in the field string.
*	"*" in the pattern string matches 0 or more <i>non-special</i> characters in field string.
<b>[charlist]</b>	Matches any one of the characters from the list of characters in <i>charlist</i> .
<b>[s-e]</b>	Matches any character any character from s to e, inclusive.
%	"%" is used to designate filter expressions parameters.
<b>[!charlist]</b> or <b>[^charlist]</b>	Matches any characters not in <i>charlist</i> (not supported).
<b>[!s-e]</b> or <b>[^s-e]</b>	Matches any characters not in the interval [s-e] (not supported).
\	Escape character for special characters.

The syntax is similar to the POSIX fnmatch syntax (1003.2-1992 section B.6). The MATCH syntax is also similar to the 'subject' strings of TIBCO Rendezvous.

**Note:** To use special characters as regular characters in regular expressions, you must escape them using the character `\`. For example, 'A]' is considered a malformed expression and the result is undefined.

### 7.37.7 Character Encoding

The default encoding for IDL strings is UTF-8. RTI Connext offers ISO 8859-1 as an alternative encoding for IDL strings.

In order to configure ISO 8859-1 as the encoding for filtering of IDL strings, you can set the DomainParticipant property **dds.domain\_participant.filtering\_character\_encoding** to ISO-8859:

The possible values for **dds.domain\_participant.filtering\_character\_encoding** are:

- **UTF-8** (default value)
- **ISO-8859-1**

### 7.37.8 Unicode Normalization

Unicode supports multiple ways to encode some characters, most notably accented characters. A composed character in Unicode can often have a number of different ways of representing the character. For example:

- Precomposed `é` is represented by `\u00e9`
- Composed `é` = `e` + `´` is represented by `\u00e9` + `\u0027`

The lexical comparison of the two characters above will return false. In order to do the correct comparison the characters need to be normalized, that is, reduced to the same character composition.

When the character encoding for filtering of IDL strings is UTF-8, the Unicode normalization behavior can be controlled using a DomainParticipant property called **dds.domain\_participant.filtering\_unicode\_normalization**.

The possible values of the normalization property are:

- **OFF**: Disables normalization
- **NFD**: Canonical Decomposition
- **NFC (default value)**: Canonical Decomposition, followed by Canonical Composition
- **NFK**: Compatibility Decomposition, followed by Canonical Composition
- **NFKC\_Casefold**: Casefold followed by NFKC normalization

Because normalization may affect performance, and it is enabled by default, the property allows disabling the normalization process per DomainParticipant using the value OFF. However, you should be aware that doing this may lead to unexpected behavior.

### 7.37.9 Examples

Assuming Topic "Location" has as an associated type a structure with fields "flight\_id, x, y, z", and Topic "FlightPlan" has as fields "flight\_id, source, destination". The following are examples of using these expressions.

Example of a **filter\_expression** (for **DDSContentFilteredTopic** (p. 1283)) or a **query\_expression** (for **DDSQueryCondition** (p. 1573)):

- "z < 1000 AND x < 23"

Examples of a **filter\_expression** using **MATCH** (for **DDSContentFilteredTopic** (p. 1283)) operator:

- "symbol MATCH 'NASDAQ/GOOG' "
- "symbol MATCH 'NASDAQ/[A-M]\*' "

## 7.38 Logging and Version

APIs of troubleshooting utilities and APIs designed to configure the overall behavior of RTI Connext.

### Modules

- **Version**  
*Retrieve information for the RTI Connext product, the core library, and the C, C++ or Java libraries.*
- **Logging**  
*Configure how much debugging information is reported during runtime and where it is logged.*

### 7.38.1 Detailed Description

APIs of troubleshooting utilities and APIs designed to configure the overall behavior of RTI Connext.

## 7.39 General Utilities and Compliance Configuration

API of general utilities used in the RTI Connext distribution.

### Modules

- **Compliance Configuration**  
*APIs to configure compliance with certain standard specifications.*
- **Heap Monitoring**  
*Monitor memory allocations done by the middleware on the native heap.*
- **Network Capture**  
*Save network traffic into a capture file for further analysis.*
- **Other Utilities**  
*Other Utilities, such as **NDDSUtility::spin** (p. 1840).*

### 7.39.1 Detailed Description

API of general utilities used in the RTI Connex distribution.

## 7.40 Observability

API of RTI Connex Observability Framework.

### Modules

- **Observability Library**  
*RTI Monitoring Library 2.0.*

### 7.40.1 Detailed Description

API of RTI Connex Observability Framework.

## 7.41 Request-Reply Pattern

Support for the request-reply communication pattern.

### Modules

- **Requester**  
*`connex::Requester` (p. 1886) and associated elements*
- **Replier**  
*`connex::Replier` (p. 1868), `connex::SimpleReplier` (p. 1935) and associated elements*

### 7.41.1 Detailed Description

Support for the request-reply communication pattern.

There are two basic entities that enable this pattern:

- **`connex::Requester`** (p. 1886)
- **`connex::Replier`** (p. 1868) (and a simpler version **`connex::SimpleReplier`** (p. 1935))

This functionality is built on top of RTI Connex.

A Requester publishes a request topic and subscribes to a reply topic. A Replier subscribes to the request topic and publishes the reply topic.

You can find more information about this pattern in `Request-Reply`, in the Core Libraries User's Manual.

Internal RTI Connex errors are reported as **exceptions** (p. 37).

To use request-reply in your application, include the following header file:

```
"ndds/ndds_requestreply_cpp.h"
```

See also

**Request-Reply Examples** (p. 226).



## 7.42 Requester

`connect::Requester` (p. 1886) and associated elements

### Classes

- class `connect::Requester`< `TReq`, `TRep` >  
*Allows sending requests and receiving replies.*
- class `connect::RequesterParams`  
*Contains the parameters for creating a `connect::Requester` (p. 1886).*

### 7.42.1 Detailed Description

`connect::Requester` (p. 1886) and associated elements

## 7.43 Replier

`connect::Replier` (p. 1868), `connect::SimpleReplier` (p. 1935) and associated elements

### Classes

- class `connect::Replier`< `TReq`, `TRep` >  
*Allows receiving requests and sending replies.*
- class `connect::SimpleReplierListener`< `TReq`, `TRep` >  
*The listener called by a `SimpleReplier` (p. 1935).*
- class `connect::ReplierListener`< `TReq`, `TRep` >  
*Called when a `connect::Replier` (p. 1868) has new available requests.*
- class `connect::ReplierParams`< `TReq`, `TRep` >  
*Contains the parameters for creating a `connect::Replier` (p. 1868).*
- class `connect::SimpleReplierParams`< `TReq`, `TRep` >  
*Contains the parameters for creating a `connect::SimpleReplier` (p. 1935).*
- class `connect::SimpleReplier`< `TReq`, `TRep` >  
*A callback-based replier.*

### 7.43.1 Detailed Description

`connect::Replier` (p. 1868), `connect::SimpleReplier` (p. 1935) and associated elements

## 7.44 Infrastructure

Infrastructure types for RTI Connex Messaging.

### Modules

- **RTI Connex Exceptions**  
*RTI Connex return-code exceptions.*

### Classes

- class **connex::Sample**< T >  
*A data sample and related info received from the middleware.*
- class **connex::SampleRef**< T >  
*A data sample and related information received from the middleware.*
- class **connex::WriteSample**< T >  
*A sample for writing data.*
- class **connex::WriteSampleRef**< T >  
*A reference to a data sample for writing.*
- class **connex::IsValidSamplePredicate**< T >  
*Predicate-class to determine if a sample contains valid data.*
- class **connex::IsInvalidSamplePredicate**< T >  
*Predicate-class to determine if a sample contains invalid data.*
- class **connex::IsReplyRelatedPredicate**< T >  
*Predicate-class to match replies by their related request.*
- class **connex::SampleIterator**< T, IsConst >  
*STL-compliant random-access iterator for SampleRef<T>*
- class **connex::LoanedSamples**< T >  
*Provides access to a collection of middleware-loaned samples.*

### Functions

- template<typename T, bool IsConst>  
**ValidSampleIterator**< T, IsConst > **connex::make\_valid\_sample\_iterator** ( **SampleIterator**< T, IsConst > related\_iterator)  
*Creates an iterator that only returns valid samples.*
- template<typename T >  
**LoanedSamples**< T > **connex::move** ( **LoanedSamples**< T > &ls) throw ()  
*Creates a new **LoanedSamples** (p. 1727) instance by moving the contents of an existing one.*

### 7.44.1 Detailed Description

Infrastructure types for RTI Connex Messaging.

This section describes the sample types used for reading and writing. These types encapsulate data and related information:

- **connex::Sample** (p. 1912) (used for reading)
- **connex::WriteSample** (p. 1948) (used for writing)

Sample and WriteSample are value types. They own the data and the related information and their constructor and destructor initializes and releases the data types.

There are two parallel versions that behave as reference types and hold references to existing data and information instances:

- **connex::SampleRef** (p. 1920)
- **connex::WriteSampleRef** (p. 1952)

There are different operations that provide loaned samples from the middleware. They return a **connex::LoadedSamples** (p. 1727). This container provides STL-compliant iterators.

Other convenience functions and types, useful in combination with STL algorithms are:

- **connex::make\_valid\_sample\_iterator()** (p. 189)
- **connex::IsValidSamplePredicate** (p. 1727)
- **connex::IsReplyRelatedPredicate** (p. 1725)

### 7.44.2 Function Documentation

#### 7.44.2.1 make\_valid\_sample\_iterator()

```
template<typename T , bool IsConst>
ValidSampleIterator< T, IsConst > connex::make_valid_sample_iterator (
    SampleIterator< T, IsConst > related_iterator )
```

Creates an iterator that only returns valid samples.

This operation returns an iterator adapter that behaves as the associated **connex::SampleIterator** (p. 1920) expect that it skips samples where **SampleRef::info()** (p. 1923).*valid\_data* is false

## Parameters

<i>related_iterator</i>	A regular <b>SampleIterator</b> (p. 1920) (e.g. <b>connext::LoanedSamples::begin</b> (p. 1735)) that serves as the start point.
-------------------------	---

## Returns

An iterator pointing to the first valid sample on or after *related\_iterator* or the end of the associated **connext::LoanedSamples** (p. 1727) if there are no valid samples.

## See also

**connext::LoanedSamples::begin** (p. 1735)

**Taking samples by copy** (p. 229)

## 7.44.2.2 move()

```
template<typename T >
LoanedSamples< T > connext::move (
    LoanedSamples< T > & ls ) throw ( )
```

Creates a new **LoanedSamples** (p. 1727) instance by moving the contents of an existing one.

The parameter object loses the ownership of the underlying samples and its state is reset as if it was default initialized. This function must be used to move any named **LoanedSamples** instance (lvalue) in and out of a function by-value. Using this function is not necessary if the original **LoanedSamples** is an rvalue. Moving is a very efficient operation and is guaranteed to not throw any exception.

## Parameters

<i>ls</i>	The <b>LoanedSamples</b> (p. 1727) object that transfers its ownership of the contained samples into the returned object. After this call, <i>ls</i> is empty.
-----------	--

## Returns

A new **LoanedSamples** (p. 1727) object, the new loan owner, with the same contents as *ls* had.

## See also

**connext::LoanedSamples** (p. 1727)

## 7.45 Utilities

Utilities for the RTI Connex Messaging module.

## Classes

- class **connext::MessagingLibraryVersion**  
*The Connext Messaging Library version.*
- class **connext::MessagingVersion**  
*The Connext Messaging version.*

### 7.45.1 Detailed Description

Utilities for the RTI Connext Messaging module.

Connext Messaging Utilities

## 7.46 Durability and Persistence

APIs related to RTI Connext Durability and Persistence.

APIs related to RTI Connext Durability and Persistence.

RTI Connext offers the following mechanisms for achieving durability and persistence:

- **Durable Writer History** (p. 191)
- **Durable Reader State** (p. 192)
- **Data Durability** (p. 192)

To use the first two features, you need a relational database, which is not included with RTI Connext. Supported databases are listed in the [Release Notes](#).

The third feature, provided by RTI Persistence Service, can use the filesystem or a relational database to persist information.

These three features can be used separately or in combination.

### 7.46.1 Durable Writer History

This feature allows a **DDSDataWriter** (p. 1321) to locally persist its local history cache so that it can survive shutdowns, crashes and restarts. When an application restarts, each **DDSDataWriter** (p. 1321) that has been configured to have durable writer history automatically loads all the data in its history cache from disk and can carry on sending data as if it had never stopped executing. To the rest of the system, it will appear as if the **DDSDataWriter** (p. 1321) had been temporarily disconnected from the network and then reappeared.

See also

**Configuring Durable Writer History** (p. 193)

### 7.46.2 Durable Reader State

This feature allows a **DDSDataReader** (p. 1288) to locally persist its state and remember the sequence numbers it has already received. When an application restarts, each **DDSDataReader** (p. 1288) that has been configured to have durable reader state automatically loads its state from disk and can carry on receiving data as if it had never stopped executing. Data that had already been received by the **DDSDataReader** (p. 1288) before the restart will not be provided to the application again.

See also

**Configuring Durable Reader State** (p. 195)

### 7.46.3 Data Durability

This feature is a full implementation of the OMG DDS Persistence Profile. The **DURABILITY** (p. 398) QoS lets an application configure a **DDSDataWriter** (p. 1321) such that the information written by the **DDSDataWriter** (p. 1321) survives beyond the lifetime of the **DDSDataWriter** (p. 1321). In this manner, a late-joining **DDSDataReader** (p. 1288) can subscribe and receive the information even after the **DDSDataWriter** (p. 1321) application is no longer executing. To use this feature, you need RTI Persistence Service – an optional product that can be purchased separately.

### 7.46.4 Durability and Persistence Based on Virtual GUID

Every modification to the global dataspace made by a **DDSDataWriter** (p. 1321) is identified by a pair (virtual GUID, sequence number).

- The virtual GUID (Global Unique Identifier) is a 16-byte character identifier associated with a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288); it is used to uniquely identify this entity in the global data space.
- The sequence number is a 64-bit identifier that identifies changes published by a specific **DDSDataWriter** (p. 1321).

Several **DDSDataWriter** (p. 1321) entities can be configured with the same virtual GUID. If each of these **DDSDataWriter** (p. 1321) entities publishes a sample with sequence number '0', the sample will only be received once by the **DDSDataReader** (p. 1288) entities subscribing to the content published by the **DDSDataWriter** (p. 1321) entities.

RTI Connext also uses the virtual GUID (Global Unique Identifier) to associate a persisted state (state in permanent storage) to the corresponding DDS entity.

For example, the history of a **DDSDataWriter** (p. 1321) will be persisted in a database table with a name generated from the virtual GUID of the **DDSDataWriter** (p. 1321). If the **DDSDataWriter** (p. 1321) is restarted, it must have associated the same virtual GUID to restore its previous history.

Likewise, the state of a **DDSDataReader** (p. 1288) will be persisted in a database table whose name is generated from the **DDSDataReader** (p. 1288) virtual GUID

A **DDSDataWriter** (p. 1321)'s virtual GUID can be configured using **DDS\_DataWriterProtocolQosPolicy::virtual\_guid** (p. 674). Similarly, a **DDSDataReader** (p. 1288)'s virtual GUID can be configured using **DDS\_DataReaderProtocolQosPolicy::virtual\_guid** (p. 631).

The **DDS\_PublicationBuiltinTopicData** (p. 1010) and **DDS\_SubscriptionBuiltinTopicData** (p. 1108) structures include the virtual GUID associated with the discovered publication or subscription.

Refer to the `User's Manual` for additional use cases.

See also

**DDS\_DataWriterProtocolQosPolicy::virtual\_guid** (p. 674) **DDS\_DataReaderProtocolQosPolicy::virtual\_guid** (p. 631).

### 7.46.5 Configuring Durable Writer History

To configure a **DDSDataWriter** (p. 1321) to have durable writer history, use the **PROPERTY** (p. 419) QoS policy associated with the **DDSDataWriter** (p. 1321) or the **DDSDomainParticipant** (p. 1351).

Properties defined for the **DDSDomainParticipant** (p. 1351) will be applied to all the **DDSDataWriter** (p. 1321) objects belonging to the **DDSDomainParticipant** (p. 1351), unless the property is overwritten by the **DDSDataWriter** (p. 1321).

See also

**DDS\_PropertyQosPolicy** (p. 1007)

The following table lists the supported durable writer history properties.

**Table 7.80 Durable Writer History Properties**

Property	Description
dds.data_writer.history.plugin_name	Must be set to "dds.data_writer.history.odbc_plugin.builtin" to enable durable writer history in the DataWriter. This property is required.
dds.data_writer.history.odbc_plugin.builtin.dsn	The ODBC DSN (Data Source Name) associated with the database where the writer history must be persisted. This property is required.
dds.data_writer.history.odbc_plugin.builtin.driver	This property tells RTI Connex which ODBC driver to load. If the property is not specified, RTI Connex will try to use the standard ODBC driver manager library : UnixOdbc (odbc32.dll) on Linux systems; the Windows ODBC driver manager (libodbc.so) on Windows systems.
dds.data_writer.history.odbc_plugin.builtin.username	Configures the username used to connect to the database. This property is not used if it is unspecified. There is no default value.
dds.data_writer.history.odbc_plugin.builtin.password	Configures the password used to connect to the database. This property is not used if it is unspecified. There is no default value.
dds.data_writer.history.odbc_plugin.builtin.shared	If set to 1, RTI Connex creates a single connection per DSN that will be shared across DataWriters within the same Publisher. If set to 0 (the default), a <b>DDSDataWriter</b> (p. 1321) will create its own database connection. Default: 0

Property	Description
dds.data_writer.history.odbc_plugin.builtin.instance_↔ cache_max_size	These properties configure the resource limits associated with the ODBC writer history caches. To minimize the number of accesses to the database, RTI Connexx uses two caches, one for samples and one for instances. The initial and maximum sizes of these caches are configured using these properties. The resource limits <code>initial_instances</code> , <code>max_↔instances</code> , <code>initial_samples</code> , <code>max_samples</code> and <code>max_↔samples_per_instance</code> in the <b>DDS_ResourceLimits_↔QosPolicy</b> (p. 1052) are used to configure the maximum number of samples and instances that can be stored in the relational database. Default: <b>DDS_Resource_↔LimitsQosPolicy::max_instances</b> (p. 1055)
dds.data_writer.history.odbc_plugin.builtin.instance_↔ cache_init_size	See description above. Default: <b>DDS_Resource_↔LimitsQosPolicy::initial_instances</b> (p. 1056)
dds.data_writer.history.odbc_plugin.builtin.sample_↔ cache_max_size	See description above. Default: 32 (the minimum)
dds.data_writer.history.odbc_plugin.builtin.sample_↔ cache_init_size	See description above. Default: 32
dds.data_writer.history.odbc_plugin.builtin.restore	This property indicates whether or not the persisted writer history must be restored once the <b>DDSDataWriter</b> (p. 1321) is restarted. If the value is 0, the content of the database associated with the <b>DDSDataWriter</b> (p. 1321) being restarted will be deleted. If the value is 1, the <b>DDSDataWriter</b> (p. 1321) will restore its previous state from the database content. Default: 1
dds.data_writer.history.odbc_plugin.builtin.in_memory_↔ _state	This property determines how much state will be kept in memory by the ODBC writer history in order to avoid accessing the database. When <code>in_memory_state</code> is equal to 1, <code>instance_↔cache_max_size</code> is always equal to <b>DDS_Resource_↔LimitsQosPolicy::max_instances</b> (p. 1055) (it cannot be changed). In addition, the ODBC writer history will keep in memory a fixed state overhead of 24 bytes per sample. In this operating mode, the ODBC writer history provides the best performance. However, the restore operation will be slower and the maximum number of samples that the writer history can manage will be limited by the available physical memory. If <code>in_memory_state</code> is equal to 0, all the state will be kept in the underlying database. In this operating mode, the maximum number of samples in the writer history will not be limited by the physical memory available unless the underlying database is an in-memory database (Times_↔Ten). Default: 1



### 7.46.6 Configuring Durable Reader State

To configure a **DDSDataReader** (p. 1288) with durable reader state, use the **PROPERTY** (p. 419) QoS policy associated with the **DDSDataReader** (p. 1288) or **DDSDomainParticipant** (p. 1351).

A property defined in the **DDSDomainParticipant** (p. 1351) will be applicable to all the **DDSDataReader** (p. 1288) belonging to the **DDSDomainParticipant** (p. 1351) unless it is overwritten by the **DDSDataReader** (p. 1288).

See also

**DDS\_PropertyQosPolicy** (p. 1007)

The following table lists the supported durable reader state properties.

**Table 7.81 Durable Reader State Properties**

Property	Description
dds.data_reader.state.odbc.dsn	The ODBC DSN (Data Source Name) associated with the database where the <b>DDSDataReader</b> (p. 1288) state must be persisted. This property is required.
dds.data_reader.state.filter_redundant_samples	To enable durable reader state, this property must be set to 1. Otherwise, the reader state will not be kept and/or persisted. When the reader state is not maintained, RTI Connext does not filter duplicate samples that may be coming from the same virtual writer. By default, this property is set to 1.
dds.data_reader.state.odbc.driver	This property is used to indicate which ODBC driver to load. If the property is not specified, RTI Connext will try to use the standard ODBC driver manager library↔ : UnixOdbc (odbc32.dll) on Linux systems; the Windows ODBC driver manager (libodbc.so) on Windows systems).
dds.data_reader.state.odbc.username	This property configures the username used to connect to the database. This property is not used if it is unspecified. There is no default value.
dds.data_reader.state.odbc.password	This property configures the password used to connect to the database. This property is not used if it is unspecified. There is no default value.
dds.data_reader.state.restore	This property indicates if the persisted <b>DDSData</b> ↔ <b>Reader</b> (p. 1288) state must be restored or not once the <b>DDSDataReader</b> (p. 1288) is restarted. If this property is 0, the previous state will be deleted from the database. If it is 1, the <b>DDSDataReader</b> (p. 1288) will restore its previous state from the database content. Default: 1
dds.data_reader.state.checkpoint_frequency	This property controls how often the reader state is stored in the database. A value of N means to store the state once every N samples. A high value will provide better performance. However, if the reader is restarted it may receive some duplicate samples. These samples will be filtered by the middleware and they will not be propagated to the application. Default: 1

Property	Description
dds.data_reader.state.persistence_service.request_↔ depth	This property indicates the number of most recent historical samples that the persisted <b>DDSDataReader</b> (p. 1288) wants to receive when it starts up. Default: 0

### 7.46.7 Configuring Data Durability

RTI Connext implements **DDS\_TRANSIENT\_DURABILITY\_QOS** (p. 401) and **DDS\_PERSISTENT\_DURABILITY\_↔  
QOS** (p. 401) durability using RTI Persistence Service, available for purchase as a separate RTI product.

For more information on RTI Persistence Service, refer to the `User's Manual`, or the RTI Persistence Service API Reference HTML documentation.

See also

**DURABILITY** (p. 398)

## 7.47 System Properties

System Properties.

System Properties.

RTI Connext uses the **DDS\_PropertyQosPolicy** (p. 1007) of a DomainParticipant to maintain a set of properties that provide system information such as hostname.

Unless the default **DDS\_DomainParticipantQos** (p. 741) value is overwritten, the system properties are automatically set in the **DDS\_DomainParticipantQos** (p. 741) obtained by calling the method **DDSDomainParticipantFactory↔  
::get\_default\_participant\_qos** (p. 1432) or using the constant **DDS\_PARTICIPANT\_QOS\_DEFAULT** (p. 48).

System properties are also automatically set in the **DDS\_DomainParticipantQos** (p. 741) loaded from an XML QoS profile unless you disable property inheritance using the attribute **inherit** in the XML tag `<property>`.

By default, the system properties are propagated to other DomainParticipants in the system and can be accessed through **DDS\_ParticipantBuiltinTopicData::property** (p. 980).

You can disable the propagation of individual properties by setting the flag **DDS\_Property\_t::propagate** (p. 1007) to **DDS\_BOOLEAN\_FALSE** (p. 317) or by removing the property using the method **DDSPropertyQosPolicyHelper↔  
::remove\_property** (p. 427).

The number of system properties set on the **DDS\_DomainParticipantQos** (p. 741) is platform specific.

### 7.47.1 System Properties List

The following table lists the supported system properties. For more information, see `System Properties`, in the `Core Libraries User's Manual`.

Property Name	Description
dds.sys_info.hostname	Name of the host where the process is running
dds.sys_info.process_id	Process ID
dds.sys_info.username	Name of the user running the process
dds.sys_info.execution_timestamp	Time when the execution started
dds.sys_info.creation_timestamp	Time when the executable was created
dds.sys_info.executable_filepath	Name and full path of the executable
dds.sys_info.target	Architecture for which the library was compiled

### 7.47.2 System Resource Consideration

System properties are affected by the resource limits `DDS_DomainParticipantResourceLimitsQosPolicy`↔  
`::participant_property_list_max_length` (p. 762) and `DDS_DomainParticipantResourceLimitsQosPolicy`↔  
`::participant_property_string_max_length` (p. 762).

## 7.48 Configuring QoS Profiles with XML

APIs related to XML QoS Profiles.

APIs related to XML QoS Profiles.

### 7.48.1 Loading QoS Profiles from XML Resources

A 'QoS profile' is a group of QoS settings, specified in XML format. By using QoS profiles, you can change QoS settings without recompiling the application.

The QoS profiles are loaded the first time any of the following operations are called:

- `DDSDomainParticipantFactory::create_participant` (p. 1442)
- `DDSDomainParticipantFactory::create_participant_with_profile` (p. 1443)
- `DDSDomainParticipantFactory::set_default_participant_qos_with_profile` (p. 1431)
- `DDSDomainParticipantFactory::get_default_participant_qos` (p. 1432)
- `DDSDomainParticipantFactory::set_default_library` (p. 1433)
- `DDSDomainParticipantFactory::set_default_profile` (p. 1434)
- `DDSDomainParticipantFactory::get_participant_qos_from_profile` (p. 1436)
- `DDSDomainParticipantFactory::get_topic_qos_from_profile` (p. 1440)
- `DDSDomainParticipantFactory::get_topic_qos_from_profile_w_topic_name` (p. 1441)

- **DDSDomainParticipantFactory::get\_publisher\_qos\_from\_profile** (p. 1437)
- **DDSDomainParticipantFactory::get\_subscriber\_qos\_from\_profile** (p. 1437)
- **DDSDomainParticipantFactory::get\_datawriter\_qos\_from\_profile** (p. 1438)
- **DDSDomainParticipantFactory::get\_datawriter\_qos\_from\_profile\_w\_topic\_name** (p. 1438)
- **DDSDomainParticipantFactory::get\_datareader\_qos\_from\_profile** (p. 1439)
- **DDSDomainParticipantFactory::get\_datareader\_qos\_from\_profile\_w\_topic\_name** (p. 1440)
- **DDSDomainParticipantFactory::get\_qos\_profile\_libraries** (p. 1442)
- **DDSDomainParticipantFactory::get\_qos\_profiles** (p. 1442)
- **DDSDomainParticipantFactory::load\_profiles** (p. 1447)

The QoS profiles are reloaded replacing previously loaded profiles when the following operations are called:

- **DDSDomainParticipantFactory::set\_qos** (p. 1446)
- **DDSDomainParticipantFactory::reload\_profiles** (p. 1447)

The **DDSDomainParticipantFactory::unload\_profiles** (p. 1448) operation will free the resources associated with the XML QoS profiles.

There are five ways to configure the XML resources (listed by load order):

- The file `NDDS_QOS_PROFILES.xml` in `$NDDSHOME/resource/xml` is loaded if it exists and **DDS\_ProfileQosPolicy::ignore\_resource\_profile** (p. 1005) in **DDS\_ProfileQosPolicy** (p. 1004) is set to **DDS\_BOOLEAN\_FALSE** (p. 317) (first to be loaded). An example file, `NDDS_QOS_PROFILES.example.xml`, is available for reference.
- The URL groups separated by semicolons referenced by the environment variable `NDDS_QOS_PROFILES` are loaded if they exist and **DDS\_ProfileQosPolicy::ignore\_environment\_profile** (p. 1005) in **DDS\_ProfileQosPolicy** (p. 1004) is set to **DDS\_BOOLEAN\_FALSE** (p. 317).
- The file `USER_QOS_PROFILES.xml` in the working directory will be loaded if it exists and **DDS\_ProfileQosPolicy::ignore\_user\_profile** (p. 1005) in **DDS\_ProfileQosPolicy** (p. 1004) is set to **DDS\_BOOLEAN\_FALSE** (p. 317).
- The URL groups referenced by **DDS\_ProfileQosPolicy::url\_profile** (p. 1005) in **DDS\_ProfileQosPolicy** (p. 1004) will be loaded if specified.
- The sequence of XML strings referenced by **DDS\_ProfileQosPolicy::string\_profile** (p. 1005) will be loaded if specified (last to be loaded).

The above methods can be combined together.

## 7.48.2 URL

The location of the XML resources (only files and strings are supported) is specified using a URL (Uniform Resource Locator) format. For example:

File Specification: `file:///usr/local/default_dds.xml`

String Specification: `str://"<dds><qos_library> . . . </qos_library>&lt;/dds>"`

If the URL schema name is omitted, RTI Connext will assume a file name. For example:

File Specification: `/usr/local/default_dds.xml`

### 7.48.2.1 URL groups

To provide redundancy and fault tolerance, you can specify multiple locations for a single XML document via URL groups. The syntax of a URL group is as follows:

`[URL1 | URL2 | URL2 | . . . | URLn]`

For example:

`[ file:///usr/local/default_dds.xml | file:///usr/local/alternative_default_dds.xml ]`

Only one of the elements in the group will be loaded by RTI Connext, starting from the left.

Brackets are not required for groups with a single URL.

### 7.48.2.2 NDDS\_QOS\_PROFILES environment variable

The environment variable `NDDS_QOS_PROFILES` contains a list of URL groups separated by `'`:

The URL groups referenced by the environment variable are loaded if they exist and `DDS_ProfileQosPolicy::ignore_environment_profile` (p. 1005) is set to `DDS_BOOLEAN_FALSE` (p. 317)

### 7.48.2.3 Built-In QoS Profiles

There are also a number of built-in QoS profiles that can be used without having to load any configurations from outside XML resources. For more information on these built-in profiles see **Built-in QoS Profiles** (p. 481).

For more information on XML Configuration, refer to the `User's Manual`.

## 7.49 Publication Example

A data publication example.

A data publication example.

### 7.49.1 A typical publication example

#### Prep

- Create user data types using `rtiddsgen`. See the `Code Generator User's Manual`.

#### Set up

- **Get the factory** (p. 202)
- **Set up participant** (p. 202)
- **Set up publisher** (p. 206)
- **Register user data type(s)** (p. 203)
- **Set up topic(s)** (p. 203)
- **Set up data writer(s)** (p. 207)

#### Adjust the desired quality of service (QoS)

- **Adjust QoS on entities as necessary** (p. 213)

#### Send data

- **Send data** (p. 208)

#### Tear down

- **Tear down data writer(s)** (p. 208)
- **Tear down topic(s)** (p. 204)
- **Tear down publisher** (p. 206)
- **Tear down participant** (p. 203)

## 7.50 Subscription Example

A data subscription example.

A data subscription example.

### 7.50.1 A typical subscription example

#### Prep

- Create user data types using `rtiddsgen`. See the `Code Generator User's Manual`.

#### Set up

- **Get the factory** (p. 202)
- **Set up participant** (p. 202)
- **Set up subscriber** (p. 208)
- **Register user data type(s)** (p. 203)
- **Set up topic(s)** (p. 203)
- **Set up data reader(s)** (p. 210)
  
- **Set up data reader** (p. 211) **OR Set up subscriber** (p. 209) to receive data

#### Adjust the desired quality of service (QoS)

- **Adjust QoS on entities as necessary** (p. 213)

#### Receive data

- Access received data either **via a reader** (p. 211) **OR via a subscriber** (p. 209) (possibly in a **ordered or coherent** (p. 210) manner)

#### Tear down

- **Tear down data reader(s)** (p. 213)
- **Tear down topic(s)** (p. 204)
- **Tear down subscriber** (p. 210)
- **Tear down participant** (p. 203)

## 7.51 Participant Use Cases

Working with domain participants.

Working with domain participants.

### 7.51.1 Turning off auto-enable of newly created participant(s)

- [Get the factory \(p. 202\)](#)
- [Change the value of the ENTITY\\_FACTORY \(p. 402\) for the DDSDomainParticipantFactory \(p. 1426\)](#)

```
DDS_DomainParticipantFactoryQos factory_qos;

if (factory->get_qos(factory_qos) != DDS_RETCODE_OK) {
    printf("***Error: failed to get domain participant factory qos\n");
}
/* Change the QosPolicy to create disabled participants */
factory_qos.entity_factory.autoenable_created_entities = DDS_BOOLEAN_FALSE;
if (factory->set_qos(factory_qos) != DDS_RETCODE_OK) {
    printf("***Error: failed to set domain participant factory qos\n");
}
```

### 7.51.2 Getting the factory

- [Get the DDSDomainParticipantFactory \(p. 1426\) instance:](#)

```
DDSDomainParticipantFactory* factory = NULL;
factory = DDSDomainParticipantFactory::get_instance();
if (factory == NULL) {
    // ... error
}
```

### 7.51.3 Setting up a participant

- [Get the factory \(p. 202\)](#)
- [Create DDSDomainParticipant \(p. 1351\):](#)

```
DDS_DomainParticipantQos participant_qos;
DDSDomainParticipantListener* participant_listener = NULL;
DDS_ReturnCode_t retcode;
// Set the initial peers. This list includes all the computers the
// application may communicate with, along with the maximum number of
// RTI Data Distribution Service participants that can concurrently
// run on that computer. This list only needs to be a superset of the
// actual list of computers and participants that will be running at
// any time.
const char* NDDS_DISCOVERY_INITIAL_PEERS[] = {
    "host1",
    "10.10.30.192",
    "1@localhost",
    "2@host2",
    "my://", /* all unicast addr on transport plugins with alias "my" */
    "2@shmem://", /* shared memory */
    "FF00:ABCD::0",
    "sf://0/0/R", /* StarFabric transport plugin */
    "1@FF00:0:1234::0",
    "225.1.2.3",
    "3@225.1.0.55",
    "FAA0::0#0/0/R",
};
const DDS_Long NDDS_DISCOVERY_INITIAL_PEERS_LENGTH =
    sizeof(NDDS_DISCOVERY_INITIAL_PEERS)/sizeof(const char*);
// initialize participant_qos with default values
retcode = factory->get_default_participant_qos(participant_qos);
if (retcode != DDS_RETCODE_OK) {
    printf("***Error: failed to get default participant qos\n");
}
if (!participant_qos.discovery.initial_peers.from_array(
    NDDS_DISCOVERY_INITIAL_PEERS,
    NDDS_DISCOVERY_INITIAL_PEERS_LENGTH)) {
    printf("***Error: failed to set discovery.initial_peers qos\n");
}
// Create the participant
```



```

DDSDomainParticipant* participant =
    factory->create_participant(domain_id,
                               participant_qos,
                               participant_listener,
                               DDS_STATUS_MASK_NONE);
if (participant == NULL) {
    printf("***Error: failed to create domain participant\n");
};
return participant;

```

### 7.51.4 Tearing down a participant

- **Get the factory** (p. 202)
- **Delete DDSDomainParticipant** (p. 1351):
 

```

DDS_ReturnCode_t retcode;
retcode = factory->delete_participant(participant);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}

```

## 7.52 Topic Use Cases

Working with topics.

Working with topics.

### 7.52.1 Registering a user data type

- **Set up participant** (p. 202)
- **Register user data type of type T under the name "My\_Type"**

```

const char* type_name = "My_Type";
DDS_ReturnCode_t retcode;
retcode = FooTypeSupport::register_type(participant, type_name);
if (retcode != DDS_RETCODE_OK) {
    // ... error
}

```

### 7.52.2 Setting up a topic

- **Set up participant** (p. 202)
- **Ensure user data type is registered** (p. 203)
- **Create a DDSTopic** (p. 1617) under the name "my\_topic"
 

```

const char* topic_name = "my_topic";
const char* type_name = "My_Type"; // user data type
DDS_TopicQos topic_qos;
DDS_ReturnCode_t retcode;
// MyTopicListener is user defined and
// extends DDSListener
DDSListener* topic_listener = new MyTopicListener(); // or = NULL
retcode = participant->get_default_topic_qos(topic_qos);
if (retcode != DDS_RETCODE_OK) {
    // ... error
}
DDS_Topic* topic = participant->create_topic(topic_name, type_name,
                                           topic_qos, topic_listener,
                                           DDS_STATUS_MASK_ALL);

if (topic == NULL) {
    // ... error
};

```

### 7.52.3 Tearing down a topic

- Delete **DDSTopic** (p. 1617):
 

```
DDS_ReturnCode_t retcode;
retcode = participant->delete_topic(topic);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

## 7.53 FlowController Use Cases

Working with flow controllers.

Working with flow controllers.

### 7.53.1 Creating a flow controller

- Set up participant (p. 202)
- Create a flow controller
 

```
DDS_ReturnCode_t retcode;
DDSFlowController *controller = NULL;
DDS_FlowControllerProperty_t property;
retcode = participant->get_default_flowcontroller_property(property);
if (retcode != DDS_RETCODE_OK) {
    printf("***Error: failed to get default flow controller property\n");
}
// optionally modify flow controller property values
controller = participant->create_flowcontroller(
    "my flow controller name", property);
if (controller == NULL) {
    printf("***Error: failed to create flow controller\n");
}
```

### 7.53.2 Flow controlling a data writer

- Set up participant (p. 202)
- Create flow controller (p. 204)
- Create an asynchronous data writer, **FooDataWriter** (p. 1676), of user data type **Foo** (p. 1648) :

```
DDS_DataWriterQos writer_qos;
DDS_ReturnCode_t retcode;
// MyWriterListener is user defined and
// extends DDSDataWriterListener
MyWriterListener* writer_listener = new MyWriterListener(); // or = NULL
retcode = publisher->get_default_datawriter_qos(writer_qos);
if (retcode != DDS_RETCODE_OK) {
    // ... error
}
/* Change the writer QoS to publish asynchronously */
writer_qos.publish_mode.kind = DDS_ASYNCHRONOUS_PUBLISH_MODE_QOS;
/* Setup to use the previously created flow controller */
writer_qos.publish_mode.flow_controller_name =
    DDS_String_dup("my flow controller name");
/* Samples queued for asynchronous write are subject to the History QoS policy */
writer_qos.history.kind = DDS_KEEP_ALL_HISTORY_QOS;
FooDataWriter* writer = publisher->create_datawriter(topic,
                                                    writer_qos,
                                                    writer_listener,
                                                    DDS_STATUS_MASK_ALL);
```

```

if (writer == NULL) {
    // ... error
};
/* Send data asynchronously... */
/* Wait for asynchronous send completes, if desired */
retcode = writer->wait_for_asynchronous_publishing(timeout);
if (retcode != DDS_RETCODE_OK) {
    printf("***Error: failed to wait for asynchronous publishing\n");
}

```

### 7.53.3 Using the built-in flow controllers

RTI Connext provides several built-in flow controllers.

The **DDS\_DEFAULT\_FLOW\_CONTROLLER\_NAME** (p. 121) built-in flow controller provides the basic asynchronous writer behavior. When calling **FooDataWriter::write** (p. 1683), the call signals the **DDSPublisher** (p. 1550) asynchronous publishing thread (**DDS\_PublisherQos::asynchronous\_publisher** (p. 1025)) to send the actual data. As with any **DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431) **DDSDataWriter** (p. 1321), the **FooDataWriter::write** (p. 1683) call returns immediately afterwards. The data is sent immediately in the context of the **DDSPublisher** (p. 1550) asynchronous publishing thread.

When using the **DDS\_FIXED\_RATE\_FLOW\_CONTROLLER\_NAME** (p. 122) flow controller, data is also sent in the context of the **DDSPublisher** (p. 1550) asynchronous publishing thread, but at a regular fixed interval. The thread accumulates samples from different **DDSDataWriter** (p. 1321) instances and generates data on the wire only once per **DDS\_FlowControllerTokenBucketProperty\_t::period** (p. 915).

In contrast, the **DDS\_ON\_DEMAND\_FLOW\_CONTROLLER\_NAME** (p. 123) flow controller permits flow only when **DDSFlowController::trigger\_flow** (p. 1470) is called. The data is still sent in the context of the **DDSPublisher** (p. 1550) asynchronous publishing thread. The thread accumulates samples from different **DDSDataWriter** (p. 1321) instances (across any **DDSPublisher** (p. 1550)) and sends all data since the previous trigger.

The properties of the built-in **DDSFlowController** (p. 1468) instances can be adjusted.

- **Set up participant** (p. 202)

- **Lookup built-in flow controller**

```

DDSFlowController *controller = NULL;
controller = participant->lookup_flowcontroller(
    DDS_DEFAULT_FLOW_CONTROLLER_NAME);
/* This should never happen, built-in flow controllers are always created */
if (controller == NULL) {
    printf("***Error: failed to lookup flow controller\n");
}

```

- **Change property of built-in flow controller, if desired**

```

DDS_ReturnCode_t retcode;
DDS_FlowControllerProperty_t property;
/* Get the property of the flow controller */
retcode = controller->get_property(property);
if (retcode != DDS_RETCODE_OK) {
    printf("***Error: failed to get flow controller property\n");
}
/* Change the property value as desired */
property.token_bucket.period.sec = 2;
property.token_bucket.period.nanosec = 0;
/* Update the flow controller property */
retcode = controller->set_property(property);
if (retcode != DDS_RETCODE_OK) {
    printf("***Error: failed to set flow controller property\n");
}

```

- **Create a data writer using the correct flow controller name** (p. 204)

### 7.53.4 Shaping the network traffic for a particular transport

- **Set up participant** (p. 202)
- **Create the transports** (p. 216)
- **Create a separate flow controller for each transport** (p. 204)
- Configure **DDSDataWriter** (p. 1321) instances to only use a single transport
- **Associate all data writers using the same transport to the corresponding flow controller** (p. 204)
- For each transport, the corresponding flow controller limits the network traffic based on the token bucket properties

### 7.53.5 Coalescing multiple samples in a single network packet

- **Set up participant** (p. 202)
- **Create a flow controller with a desired token bucket period** (p. 204)
- **Associate the data writer with the flow controller** (p. 204)
- Multiple samples written within the specified period will be coalesced into a single network packet (provided that `tokens_added_per_period` and `bytes_per_token` permit).

## 7.54 Publisher Use Cases

Working with publishers.

Working with publishers.

### 7.54.1 Setting up a publisher

- **Set up participant** (p. 202)
- **Create a DDSPublisher** (p. 1550)
 

```
DDS_PublisherQos publisher_qos;
// MyPublisherListener is user defined and
// extends DDSPublisherListener
DDSPublisherListener* publisher_listener =
    = new MyPublisherListener(); // or = NULL
participant->get_default_publisher_qos(publisher_qos);
DDSPublisher* publisher = participant->create_publisher(publisher_qos,
    publisher_listener,
    DDS_STATUS_MASK_ALL);

if (publisher == NULL) {
    // ... error
};
```

### 7.54.2 Tearing down a publisher

- **Delete DDSPublisher** (p. 1550):
 

```
DDS_ReturnCode_t retcode;
retcode = participant->delete_publisher(publisher);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

## 7.55 DataWriter Use Cases

Working with data writers.

Working with data writers.

### 7.55.1 Setting up a data writer

- **Set up publisher** (p. 206)
- **Set up a topic** (p. 203)
- **Create a data writer, `FooDataWriter`** (p. 1676), of user data type `Foo` (p. 1648) :

```
DDS_DataWriterQos writer_qos;
DDS_ReturnCode_t retcode;
// MyWriterListener is user defined and
// extends DDSDataWriterListener
MyWriterListener* writer_listener = new MyWriterListener(); // or = NULL
retcode = publisher->get_default_datawriter_qos(writer_qos);
if (retcode != DDS_RETCODE_OK) {
    // ... error
}
FooDataWriter* writer = publisher->create_datawriter(topic,
                                                    writer_qos,
                                                    writer_listener,
                                                    DDS_STATUS_MASK_ALL);

if (writer == NULL) {
    // ... error
};
```

### 7.55.2 Managing instances

- **Getting an instance "key" value of user data type `Foo`** (p. 1648)

```
Foo* data = ...; // user data
retcode = writer->get_key_value(*data, instance_handle);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

- **Registering an instance of type `Foo`** (p. 1648)

```
DDS_InstanceHandle_t instance_handle = DDS_HANDLE_NIL;
instance_handle = writer->register_instance(data);
```

- **Unregistering an instance of type `Foo`** (p. 1648)

```
retcode = writer->unregister_instance(data, instance_handle);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

- **Disposing of an instance of type `Foo`** (p. 1648)

```
retcode = writer->dispose(data, instance_handle);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

### 7.55.3 Sending data

- **Set up data writer** (p. 207)
- **Register instance** (p. 207)
- **Write instance of type Foo** (p. 1648)

```

Foo* data; // user data
DDS_InstanceHandle_t instance_handle =
    DDS_HANDLE_NIL; // or a valid registered handle
DDS_ReturnCode_t retcode;
retcode = writer->write(data, instance_handle);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}

```

### 7.55.4 Tearing down a data writer

- **Delete DDSDataWriter** (p. 1321):

```

DDS_ReturnCode_t retcode;
retcode = publisher->delete_datawriter(writer);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}

```

## 7.56 Subscriber Use Cases

Working with subscribers.

Working with subscribers.

### 7.56.1 Setting up a subscriber

- **Set up participant** (p. 202)
- **Create a DDSSubscriber** (p. 1592)

```

DDS_SubscriberQos subscriber_qos;
DDS_ReturnCode_t retcode;
// MySubscriberListener is user defined and
// extends DDSSubscriberListener
DDSSubscriberListener* subscriber_listener =
    new MySubscriberListener(); // or = NULL
retcode = participant->get_default_subscriber_qos(subscriber_qos);
if (retcode != DDS_RETCODE_OK) {
    // ... error
};
DDSSubscriber* subscriber =
    participant->create_subscriber(subscriber_qos,
    subscriber_listener,
    DDS_STATUS_MASK_ALL);

if (subscriber == NULL) {
    // ... error
};

```

## 7.56.2 Set up subscriber to access received data

- **Set up subscriber** (p. 208)
- Set up to handle the `DDS_DATA_ON_READERS_STATUS` status, in one or both of the following two ways.
- **Enable `DDS_DATA_ON_READERS_STATUS` for the `DDSSubscriberListener` associated with the subscriber** (p. 214)
  - The processing to handle the status change is done in the `DDSSubscriberListener::on_data_on_readers()` (p. 1614) method of the attached listener.
  - Typical processing will **access the received data** (p. 209), either in arbitrary order or in a **coherent and ordered manner** (p. 210).
- **Enable `DDS_DATA_ON_READERS_STATUS` for the `DDSStatusCondition` associated with the subscriber** (p. 214)
  - The processing to handle the status change is done **when the subscriber's attached status condition is triggered** (p. 216) and the `DDS_DATA_ON_READERS_STATUS` status on the subscriber is changed.
  - Typical processing will **access the received data** (p. 209), either in an arbitrary order or in a **coherent and ordered manner** (p. 210).

## 7.56.3 Access received data via a subscriber

- **Ensure subscriber is set up to access received data** (p. 209)
- **Get the list of readers that have data samples available:**

```

DDSDataReaderSeq reader_seq; // holder for list/set of readers
DDS_SampleStateMask sample_state_mask = DDS_NOT_READ_SAMPLE_STATE;
DDS_ViewStateMask view_state_mask = DDS_ANY_VIEW_STATE;
DDS_InstanceStateMask instance_state_mask = DDS_ANY_INSTANCE_STATE;
DDS_ReturnCode_t retcode;
// get_datareadersX is not supported yet.
retcode = subscriber->get_datareaders(reader_seq,
                                     sample_state_mask,
                                     view_state_mask,
                                     instance_state_mask);

if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}

```
- Upon successfully getting the list of readers with data, process the data readers to either:
  - **Read the data in each reader** (p. 212), **OR**
  - **Take the data in each reader** (p. 211)

If the intent is to access the data **coherently or in order** (p. 210), the list of data readers *must* be processed in the order returned:

```

for(int i = 0; i < reader_seq.length(); ++i) {

    TDataReader* reader = reader_seq[i];
    // Take the data from reader,
    // OR
    // Read the data from reader
}

```

- **Alternatively,** call `DDSSubscriber::notify_datareaders` (p. 1608) to invoke the `DDSDataReaderListener` (p. 1315) for each of the data readers.
 

```

retcode = subscriber->notify_datareaders();
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}

```

### 7.56.4 Access received data coherently and/or in order

To access the received data coherently and/or in an ordered manner, according to the settings of the `DDS_↔PresentationQosPolicy` (p. 996) attached to a `DDSSubscriber` (p. 1592):

- **Ensure subscriber is set up to access received data** (p. 209)

- Indicate that data will be accessed via the subscriber:

```
retcode = subscriber->begin_access();
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

- **Access received data via the subscriber, making sure that the data readers are processed in the order returned.** (p. 209)

- Indicate that the data access via the subscriber is done:

```
retcode = subscriber->end_access();
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

### 7.56.5 Tearing down a subscriber

- **Delete DDSSubscriber** (p. 1592):

```
DDS_ReturnCode_t retcode;
retcode = participant->delete_subscriber(subscriber);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

## 7.57 DataReader Use Cases

Working with data readers.

Working with data readers.

### 7.57.1 Setting up a data reader

- **Set up subscriber** (p. 208)

- **Set up a topic** (p. 203)

- **Create a data reader, FooDataReader** (p. 1649), of user data type **Foo** (p. 1648) :

```
DDS_DataReaderQos reader_qos;
DDS_ReturnCode_t retcode;
// MyReaderListener is user defined and
// extends DDSDataReaderListener
DDSDataReaderListener* reader_listener =
    new MyReaderListener(); // or = NULL
retcode = subscriber->get_default_datareader_qos(reader_qos);
if (retcode != DDS_RETCODE_OK) {
    // ... error
};
FooDataReader* reader = subscriber->create_datareader(topic,
                                                    reader_qos,
                                                    reader_listener,
                                                    DDS_STATUS_MASK_ALL);

if (reader == NULL) {
    // ... error
};
```



## 7.57.2 Managing instances

- Given a data reader

```
FooDataReader* reader = ...;
```
- Getting an instance "key" value of user data type `Foo` (p. 1648)

```
Foo data; // user data of type Foo
// ...
retcode = reader->get_key_value(data, instance_handle);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

## 7.57.3 Set up reader to access received data

- **Set up data reader** (p. 210)
- Set up to handle the `DDS_DATA_AVAILABLE_STATUS` status, in one or both of the following two ways.
- **Enable `DDS_DATA_AVAILABLE_STATUS` for the `DDSDataReaderListener` associated with the data reader** (p. 214)
  - The processing to handle the status change is done in the `DDSDataReaderListener::on_data_available` (p. 1317) method of the attached listener.
  - Typical processing will **access the received data** (p. 211).
- **Enable `DDS_DATA_AVAILABLE_STATUS` for the `DDSStatusCondition` associated with the data reader** (p. 214)
  - The processing to handle the status change is done **when the data reader's attached status condition is triggered** (p. 216) and the `DDS_DATA_AVAILABLE_STATUS` status on the data reader is changed.
  - Typical processing will **access the received data** (p. 211).

## 7.57.4 Access received data via a reader

- **Ensure reader is set up to access received data** (p. 211)
- Access the received data, by either:
  - **Taking the received data in the reader** (p. 211), **OR**
  - **Reading the received data in the reader** (p. 212)

## 7.57.5 Taking data

- **Ensure reader is set up to access received data** (p. 211)

- Take samples of user data type T. The samples are removed from the Service. The caller is responsible for deallocating the buffers.

```

FooSeq          data_seq; // holder for sequence of user data type Foo
DDS_SampleInfoSeq info_seq; // holder for sequence of DDS_SampleInfo
long            max_samples = DDS_LENGTH_UNLIMITED;
DDS_SampleStateMask sample_state_mask = DDS_ANY_SAMPLE_STATE;
DDS_ViewStateMask  view_state_mask = DDS_ANY_VIEW_STATE;
DDS_InstanceStateMask instance_state_mask = DDS_ANY_INSTANCE_STATE;
DDS_ReturnCode_t  retcode;
retcode = reader->take(data_seq, info_seq,
                      max_samples,
                      sample_state_mask,
                      view_state_mask,
                      instance_state_mask);
if (retcode == DDS_RETCODE_NO_DATA) {
    return;
} else if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}

```

- Use the received data

```

// Use the received data samples 'data_seq' and associated information 'info_seq'
for(int i = 0; i < data_seq.length(); ++i) {
    // use... data_seq[i] ...
    // use... info_seq[i] ...
}

```

- Return the data samples and the information buffers back to the middleware. *IMPORTANT*: Once this call returns, you must not retain any pointers to any part of any sample or sample info object.

```

retcode = reader->return_loan(data_seq, info_seq);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}

```

## 7.57.6 Reading data

- Ensure reader is set up to access received data (p.211)

- Read samples of user data type **Foo** (p.1648). The samples are not removed from the Service. It remains responsible for deallocating the buffers.

```

FooSeq          data_seq; // holder for sequence of user data type Foo
DDS_SampleInfoSeq info_seq; // holder for sequence of DDS_SampleInfo
long            max_samples = DDS_LENGTH_UNLIMITED;
DDS_SampleStateMask sample_state_mask = DDS_NOT_READ_SAMPLE_STATE;
DDS_ViewStateMask  view_state_mask = DDS_ANY_VIEW_STATE;
DDS_InstanceStateMask instance_state_mask = DDS_ANY_INSTANCE_STATE;
DDS_ReturnCode_t  retcode;
retcode = reader->read(data_seq, info_seq,
                      max_samples,
                      sample_state_mask,
                      view_state_mask,
                      instance_state_mask);
if (retcode == DDS_RETCODE_NO_DATA) {
    return;
} else if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}

```

- Use the received data

```

// Use the received data samples 'data_seq' and associated
// information 'info_seq'
for(int i = 0; i < data_seq.length(); ++i) {
    // use... data_seq[i] ...
    // use... info_seq[i] ...
}

```

- Return the data samples and the information buffers back to the middleware

```

retcode = reader->return_loan(data_seq, info_seq);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}

```

### 7.57.7 Tearing down a data reader

- Delete **DDSDataReader** (p. 1288):
 

```
DDS_ReturnCode_t retcode;
retcode = subscriber->delete_datareader(reader);
if (retcode != DDS_RETCODE_OK) {
    // ... check for cause of failure
}
```

## 7.58 Entity Use Cases

Working with entities.

Working with entities.

### 7.58.1 Enabling an entity

- To enable an **DDSEntity** (p. 1463)
 

```
if (entity->enable() != DDS_RETCODE_OK) {
    printf("***Error: failed to enable entity\n");
}
```

### 7.58.2 Checking if a status changed on an entity.

- Given an **DDSEntity** (p. 1463) and a **DDS\_StatusKind** (p. 342) to check for, get the list of statuses that have changed since the last time they were respectively cleared.
 

```
DDS_StatusMask status_changes_mask = entity->get_status_changes();
```
- Check if `status_kind` was changed since the last time it was cleared. A plain communication status change is cleared when the status is read using the entity's `get_<plain communication status>()` method. A read communication status change is cleared when the data is taken from the middleware via a `TDataReader_←take()` call [see **Changes in Status** (p. 339) for details].
 

```
if (status_changes_mask & status_kind) {
    return true;
} else {
    /* ... YES, status_kind changed ... */
    return false; /* ... NO, status_kind did NOT change ... */
}
```

### 7.58.3 Changing the QoS for an entity

The QoS for an entity can be specified at the entity creation time. Once an entity has been created, its QoS can be manipulated as follows.

- Get an entity's QoS settings using **get\_qos (abstract)** (p. 1465)
 

```
if (entity->get_qos(qos) != DDS_RETCODE_OK) {
    printf("***Error: failed to get qos\n");
}
```
- Change the desired qos policy fields
 

```
/* Change the desired qos policies */
/* qos.policy.field = ... */
```

- Set the qos using **set\_qos (abstract)** (p. 1464).

```
switch (entity->set_qos(qos)) {
    case DDS_RETCODE_OK: { /* success */
        } break;
    case DDS_RETCODE_IMMUTABLE_POLICY: {
        printf("***Error: tried changing a policy that can only be"
              "          set at entity creation time\n");
        } break;
    case DDS_RETCODE_INCONSISTENT_POLICY: {
        printf("***Error: tried changing a policy to a value inconsistent"
              "          with other policy settings\n");
        } break;
    default: {
        printf("***Error: some other failure\n");
        }
}
```

#### 7.58.4 Changing the listener and enabling/disabling statuses associated with it

The listener for an entity can be specified at the entity creation time. By default the listener is *enabled* for all the statuses supported by the entity.

Once an entity has been created, its listener and/or the statuses for which it is enabled can be manipulated as follows.

- User defines entity listener methods

```
/* ... methods defined by EntityListener ... */
public class MyEntityListener implements DDSListener {
    // ... methods defined by EntityListener ...
}
```

- Get an entity's listener using **get\_listener (abstract)** (p. 1466)

```
entity_listener = entity->get_listener();
```

- Enable `status_kind` for the listener

```
enabled_status_list |= status_kind;
```

- Disable `status_kind` for the listener

```
enabled_status_list &= ~status_kind;
```

- Set an entity's listener to `entity_listener` using **set\_listener (abstract)** (p. 1465). Only enable the listener for the statuses specified by the `enabled_status_list`.

```
if (entity->set_listener(entity_listener, enabled_status_list)
    != DDS_RETCODE_OK) {
    printf("***Error: setting entity listener\n");
}
```

#### 7.58.5 Enabling/Disabling statuses associated with a status condition

Upon entity creation, by default, all the statuses are *enabled* for the `DDS_StatusCondition` associated with the entity.

Once an entity has been created, the list of statuses for which the `DDS_StatusCondition` is triggered can be manipulated as follows.

- Given an entity, a `status_kind`, and the associated `status_condition`:

```
statuscondition = entity->get_statuscondition();
```

- Get the list of statuses enabled for the `status_condition`

```
enabled_status_list = statuscondition->get_enabled_statuses();
```

- Check if the given `status_kind` is enabled for the `status_condition`

```
if (enabled_status_list & status_kind) {
    /*... YES, status_kind is enabled ... */
} else {
    /* ... NO, status_kind is NOT enabled ... */
}
```

- Enable `status_kind` for the `status_condition`

```
if (statuscondition->set_enabled_statuses(enabled_status_list | status_kind)
    != DDS_RETCODE_OK) {
    /* ... check for cause of failure */
}
```

- Disable `status_kind` for the `status_condition`

```
if (statuscondition->set_enabled_statuses(enabled_status_list & ~status_kind)
    != DDS_RETCODE_OK) {
    /* ... check for cause of failure */
}
```

## 7.59 Waitset Use Cases

Using wait-sets and conditions.

Using wait-sets and conditions.

### 7.59.1 Setting up a wait-set

- Create a wait-set

```
DDSWaitSet* waitset = new DDSWaitSet();
```

- Attach conditions

```
DDSCondition* cond1 = ...;
DDSCondition* cond2 = entity->get_statuscondition();
DDSCondition* cond3 = reader->create_readcondition(DDS_NOT_READ_SAMPLE_STATE,
                                                  DDS_ANY_VIEW_STATE,
                                                  DDS_ANY_INSTANCE_STATE);
DDSCondition* cond4 = new DDSGuardCondition();
DDSCondition* cond5 = ...;
DDS_ReturnCode_t retcode;
retcode = waitset->attach_condition(cond1);
if (retcode != DDS_RETCODE_OK) {
    // ... error
}
retcode = waitset->attach_condition(cond2);
if (retcode != DDS_RETCODE_OK) {
    // ... error
}
retcode = waitset->attach_condition(cond3);
if (retcode != DDS_RETCODE_OK) {
    // ... error
}
retcode = waitset->attach_condition(cond4);
if (retcode != DDS_RETCODE_OK) {
    // ... error
}
retcode = waitset->attach_condition(cond5);
if (retcode != DDS_RETCODE_OK) {
    // ... error
}
}
```

## 7.59.2 Waiting for condition(s) to trigger

- Set up a wait-set (p. 215)
- Wait for a condition to trigger or timeout, whichever occurs first

```

DDS_Duration_t timeout = { 0, 1000000 }; // 1ms
DDSConditionSeq active_conditions; // holder for active conditions
bool is_cond1_triggered = false;
bool is_cond2_triggered = false;
DDS_ReturnCode_t retcode;
retcode = waitset->wait(active_conditions, timeout);
if (retcode != DDS_RETCODE_OK) {
    if (retcode == DDS_RETCODE_TIMEOUT) {
        // Timeout
    } else {
        // Failure
    } else {
        // success, check if "cond1" or "cond2" are triggered:
        for(int i = 0; i < active_conditions.length(); ++i) {
            if (active_conditions[i] == cond1) {
                printf("Cond1 was triggered!");
                is_cond1_triggered = true;
            }
            if (active_conditions[i] == cond2) {
                printf("Cond2 was triggered!");
                is_cond2_triggered = true;
            }
            if (is_cond1_triggered && is_cond2_triggered) {
                break;
            }
        }
    }
    if (is_cond1_triggered) {
        // ... do something because "cond1" was triggered ...
    }
    if (is_cond2_triggered) {
        // ... do something because "cond2" was triggered ...
    }
    return retcode;
}

```

## 7.59.3 Tearing down a wait-set

- Delete the wait-set

```

delete waitset;
waitset = NULL;

```

## 7.60 Transport Use Cases

Working with pluggable transports.

Working with pluggable transports.

### 7.60.1 Changing the automatically registered built-in transports

- The `DDS_TRANSPORTBUILTIN_MASK_DEFAULT` (p. 444) specifies the transport plugins that will be automatically registered with a newly created `DDSDomainParticipant` (p. 1351) by default.
- This default can be changed by changing the value of the value of `TRANSPORT_BUILTIN` (p. 443) Qos Policy on the `DDSDomainParticipant` (p. 1351)
- To change the `DDS_DomainParticipantQos::transport_builtin` (p. 744) Qos Policy:

```

DDS_DomainParticipantQos participant_qos;

factory->get_default_participant_qos(participant_qos);

participant_qos.transport_builtin.mask = DDS_TRANSPORTBUILTIN_SHMEM |
DDS_TRANSPORTBUILTIN_UDPv4;

```

## 7.60.2 Changing the properties of the automatically registered builtin transports

The behavior of the automatically registered builtin transports can be altered by changing their properties.

- Tell the **DDSDomainParticipantFactory** (p. 1426) to create the participants disabled, as described in **Turning off auto-enable of newly created participant(s)** (p. 202)

- Get the property of the desired builtin transport plugin, say **::UDPv4 Transport** (p. 266)

```
struct NDDS_Transport_UDPv4_Property_t property = NDDS_TRANSPORT_UDPv4_PROPERTY_DEFAULT;

if (NDDSTransportSupport::get_builtin_transport_property(
    participant,
    DDS_TRANSPORTBUILTIN_UDPv4,
    (struct NDDS_Transport_Property_t&)property)
    != DDS_RETCODE_OK) {
    printf("***Error: get builtin transport property\n");
}
```

- Change the property fields as desired. Note that the properties should be changed carefully, as inappropriate values may prevent communications. For example, the **::UDPv4 Transport** (p. 266) properties can be changed to support **large messages** (assuming the underlying operating system's UDPv4 stack supports the large message size). Note: if `message_size_max` is increased from the default for any of the built-in transports, then the **DDS↔\_ReceiverPoolQosPolicy::buffer\_size** (p. 1040) on the DomainParticipant should also be changed.

```
/* Decrease the UDPv4 maximum message size to 9K (small messages). */
property.parent.message_size_max = 9216;
property.recv_socket_buffer_size = 9216;
property.send_socket_buffer_size = 9216;
```

- Set the property of the desired builtin transport plugin, say **::UDPv4 Transport** (p. 266)

```
if (NDDSTransportSupport::set_builtin_transport_property(
    participant,
    DDS_TRANSPORTBUILTIN_UDPv4,
    (struct NDDS_Transport_Property_t&)property)
    != DDS_RETCODE_OK) {
    printf("***Error: set builtin transport property\n");
}
```

- **Enable the participant** (p. 213) to turn on communications with other participants in the domain using the new properties for the automatically registered builtin transport plugins.

## 7.60.3 Creating a transport

- A transport plugin is created using methods provided by the supplier of the transport plugin.

- For example to create an instance of the **::UDPv4 Transport** (p. 266)

```
NDDS_Transport_Plugin* transport = NULL;
struct NDDS_Transport_UDPv4_Property_t property = NDDS_TRANSPORT_UDPv4_PROPERTY_DEFAULT;
transport = NDDS_Transport_UDPv4_new(&property);
if (transport == NULL) {
    printf("***Error: creating transport plugin\n");
}
```

## 7.60.4 Deleting a transport

- A transport plugin can only be deleted only after the **DDSDomainParticipant** (p. 1351) with which it is registered is deleted.

- The virtual destructor provided by the abstract transport plugin API can be used to delete a transport plugin.

```
transport->delete_cEA(transport, NULL);
```

### 7.60.5 Registering a transport with a participant

The basic steps for setting up transport plugins for use in an RTI Connex application are described below.

- Tell the **DDSDomainParticipantFactory** (p. 1426) to create the participants disabled, as described in **Turning off auto-enable of newly created participant(s)** (p. 202)

#### Optionally Changing the automatically registered built-in transports (p. 216)

#### Optionally Changing the properties of the automatically registered builtin transports (p. 217)

- Create a disabled **DDSDomainParticipant** (p. 1351), as described in **Setting up a participant** (p. 202)
- Decide on the **network address** (p. 171) for the transport plugin. The network address should be chosen so that the resulting fully qualified address is globally unique (across all transports used in the domain).

```
/* Decide on a network address (96 bits for UDPv4), such that the fully
   qualified unicast address for the transport's interfaces will be
   globally unique. For example, we use the network address:
       1234:1234:1234:0000
   It will be prepended to the unicast addresses of the transport plugin's
   interfaces, to give a fully qualified address that is unique in the
   domain.
*/
NDDS_Transport_Address_t network_address = {{1,2,3,4, 1,2,3,4, 1,2,3,4, 0,0,0,0}};
```

- Decide on the **aliases** (p. 168) for the transport plugin. An alias can refer to one or more transport plugins. The transport class name (see **Builtin Transport Class Names** (p. 470)) are automatically appended to the user-provided aliases. Alias names are useful in creating logical groupings of transports, e.g. all the transports that are configured to support large messages may be given the alias "large\_message".

```
/* Decide aliases, i.e. the names by which this transport plugin will be known */
const char* ALIASES[] = {
    "my",
    "large_message",
};
const DDS_Long ALIASES_LENGTH = sizeof(ALIASES)/sizeof(const char*);

/* Initialize the aliases StringSeq */
DDS_StringSeq aliases;
if (!aliases.from_array(ALIASES, ALIASES_LENGTH)) {
    printf("***Error: creating initializing aliases\n");
}
```

- Register the transport plugin with the **DDSDomainParticipant** (p. 1351). Note that a transport plugin should **NOT be registered with more than one DomainParticipant**. It is the responsibility of the application programmer to ensure that this requirement is not violated.

```
NDDS_Transport_Handle_t handle = NDDS_TRANSPORT_HANDLE_NIL;

handle = NDDSTransportSupport::register_transport(
    participant,          /* Disabled Domain Participant */
    transport,           /* Transport plugin */
    aliases,             /* Transport aliases */
    network_address);    /* Transport network address */
if (NDDS_Transport_Handle_is_nil(&handle)) {
    printf("***Error: registering transport\n");
}
```

#### Optionally Adding receive routes for a transport (p. 219)

#### Optionally Adding send routes for a transport (p. 219)

- **Enable the participant** (p. 213) to turn on communications with other participants in the domain, using the newly registered transport plugins, and automatically registered builtin transport plugins (if any).



### 7.60.6 Adding receive routes for a transport

- Receive routes can be added to restrict address ranges on which incoming messages can be received. Any number of receive routes can be added, but these must be done before the participant is enabled.
- To restrict the address range from which incoming messages can be received by the transport plugin:

```
/* Restrict to receiving messages only on interfaces
   1234:1234:1234:10.10.*.*
*/
NDDS_Transport_Address_t subnet = {{1,2,3,4, 1,2,3,4, 1,2,3,4, 10,10,0,0}};
if (NDDSTransportSupport::add_receive_route(handle, subnet, 112)
    != DDS_RETCODE_OK) {
    printf("***Error: adding receive route\n");
}
```

### 7.60.7 Adding send routes for a transport

- Send routes can be added to restrict the address ranges to which outgoing messages can be sent by the transport plugin. Any number of send routes can be added, but these must be done before the participant is enabled.
- To restrict address ranges to which outgoing messages can be sent by the transport plugin:

```
/* Restrict to sending messages only to addresses (subnets)
   1234:1234:1234:10.10.30.*
*/
NDDS_Transport_Address_t subnet = {{1,2,3,4, 1,2,3,4, 1,2,3,4, 10,10,30,0}};
if (NDDSTransportSupport::add_send_route(handle, subnet, 120)
    != DDS_RETCODE_OK) {
    printf("***Error: adding send route\n");
}
```

## 7.61 Filter Use Cases

Working with data filters.

Working with data filters.

### 7.61.1 Introduction <br>

RTI Connex supports filtering data either during the exchange from **DDSDataWriter** (p.1321) to **DDSDataReader** (p. 1288), or after the data has been stored at the **DDSDataReader** (p. 1288).

Filtering during the exchange process is performed by a **DDSContentFilteredTopic** (p. 1283), which is created by the **DDSDataReader** (p. 1288) as a way of specifying a subset of the data samples that it wishes to receive.

Filtering samples that have already been received by the **DDSDataReader** (p.1288) is performed by creating a **DDSQueryCondition** (p. 1573), which can then used to check for matching samples, be alerted when matching samples arrive, or retrieve matching samples through use of the **FooDataReader::read\_w\_condition** (p. 1657) or **FooDataReader::take\_w\_condition** (p. 1658) functions. (Conditions may also be used with the APIs **FooDataReader::read\_next\_instance\_w\_condition** (p. 1670) and **FooDataReader::take\_next\_instance\_w\_condition** (p. 1671).)

Filtering may be performed on any topic, either keyed or un-keyed, except the **Built-in Topics** (p. 59). Filtering may be performed on any field, subset of fields, or combination of fields, subject only to the limitations of the filter syntax, and some restrictions against filtering some *sparse value types* of the **Dynamic Data** (p. 99) API.

RTI Connex contains built in support for filtering using SQL syntax, described in the **Queries and Filters Syntax** (p. 179) module.

### 7.61.1.1 Overview of ContentFilteredTopic

Each **DDSContentFilteredTopic** (p.1283) is created based on an existing **DDSTopic** (p.1617). The **DDSTopic** (p.1617) specifies the **field\_names** and **field\_types** of the data contained within the topic. The **DDSContentFilteredTopic** (p.1283), by means of its **filter\_expression** and **expression\_parameters**, further specifies the *values* of the data which the **DDSDataReader** (p.1288) wishes to receive.

Custom filters may also be constructed and utilized as described in the **Creating Custom Content Filters** (p.222) module.

Once the **DDSContentFilteredTopic** (p.1283) has been created, a **DDSDataReader** (p.1288) can be created using the filtered topic. The filter's characteristics are exchanged between the **DDSDataReader** (p.1288) and any matching **DDSDataWriter** (p.1321) during the discovery process.

If the **DDSDataWriter** (p.1321) allows (by **DDS\_DataWriterResourceLimitsQosPolicy::max\_remote\_reader\_filters** (p.700)), and the **DDSDataReader** (p.1288) 's **DDS\_TransportMulticastQosPolicy** (p.1151) is empty, then the **DDSDataWriter** (p.1321) will filter out samples that don't meet the filtering criteria.

If disallowed by the **DDSDataWriter** (p.1321), or the **DDSDataReader** (p.1288) has set the **DDS\_TransportMulticastQosPolicy** (p.1151), then the **DDSDataWriter** (p.1321) sends all samples to the **DDSDataReader** (p.1288), and the **DDSDataReader** (p.1288) discards any samples that do not meet the filtering criteria.

The **expression\_parameters** can be modified using **DDSContentFilteredTopic::set\_expression\_parameters** (p.1285). Any changes made to the filtering criteria by means of **DDSContentFilteredTopic::set\_expression\_parameters** (p.1285), will be conveyed to any connected **DDSDataWriter** (p.1321). New samples will be subject to the modified filtering criteria, but samples that have already been accepted or rejected are unaffected. However, if the **DDSDataReader** (p.1288) connects to a **DDSDataWriter** (p.1321) that *re-sends* its data, the re-sent samples will be subjected to the new filtering criteria.

### 7.61.1.2 Overview of QueryCondition

**DDSQueryCondition** (p.1573) combine aspects of the content filtering capabilities of **DDSContentFilteredTopic** (p.1283) with state filtering capabilities of **DDSReadCondition** (p.1574) to create a reconfigurable means of filtering or searching data in the **DDSDataReader** (p.1288) queue.

**DDSQueryCondition** (p.1573) may be created on a disabled **DDSDataReader** (p.1288), or after the **DDSDataReader** (p.1288) has been enabled. If the **DDSDataReader** (p.1288) is enabled, and has already received and stored samples in its queue, then all data samples in the are filtered against the **DDSQueryCondition** (p.1573) filter criteria at the time that the **DDSQueryCondition** (p.1573) is created. (Note that an exclusive lock is held on the **DDSDataReader** (p.1288) sample queue for the duration of the **DDSQueryCondition** (p.1573) creation).

Once created, incoming samples are filtered against all **DDSQueryCondition** (p.1573) filter criteria at the time of their arrival and storage into the **DDSDataReader** (p.1288) queue.

The number of **DDSQueryCondition** (p.1573) filters that an individual **DDSDataReader** (p.1288) may create is set by **DDS\_DataReaderResourceLimitsQosPolicy::max\_query\_condition\_filters** (p.664), to an upper maximum of 32.

## 7.61.2 Filtering with ContentFilteredTopic

- **Set up subscriber** (p. 208)
- **Set up a topic** (p. 203)
- **Create a ContentFilteredTopic, of user data type Foo** (p. 1648) :

```
DDSContentFilteredTopic *cft = NULL;
DDS_StringSeq cft_parameters(2);
const char* cft_param_list[] = {"1", "100"};
cft_parameters.from_array(cft_param_list, 2);
cft = participant->create_contentfilteredtopic("ContentFilteredTopic",
                                           Foo_topic,
                                           "value > %0 AND value < %1",
                                           cft_parameters);

if (cft == NULL) {
    printf("create_contentfilteredtopic error\n");
    subscriber_shutdown(participant);
    return -1;
}
```

- **Create a FooReader using the ContentFilteredTopic:**

```
DDSDataReader *reader = NULL;
reader = subscriber->create_datareader(cft,
                                     datareader_qos, // or DDS_DATAREADER_QOS_DEFAULT
                                     reader_listener, // or NULL
                                     DDS_STATUS_MASK_ALL);

if (reader == NULL) {
    printf("create_datareader error\n");
    subscriber_shutdown(participant);
    return -1;
}
FooDataReader *Foo_reader = FooDataReader::narrow(reader);
if (Foo_reader == NULL) {
    printf("DataReader narrow error\n");
    subscriber_shutdown(participant);
    return -1;
}
```

Once setup, reading samples with a **DDSContentFilteredTopic** (p. 1283) is exactly the same as normal reads or takes, as described in **DataReader Use Cases** (p. 210).

- **Changing filter criteria using set\_expression\_parameters:**

```
cft->get_expression_parameters(cft_parameters);
DDS_String_free(cft_parameters[0]);
DDS_String_free(cft_parameters[1]);
cft_parameters[0] = DDS_String_dup("5");
cft_parameters[1] = DDS_String_dup("9");
retcode = cft->set_expression_parameters(cft_parameters);
if (retcode != DDS_RETCODE_OK) {
    printf("set_expression_parameters error\n");
    subscriber_shutdown(participant);
    return -1;
}
```

## 7.61.3 Filtering with Query Conditions

- **Given a data reader of type Foo** (p. 1648)

```
DDSDataReader *reader = ...;
FooDataReader *Foo_reader = FooDataReader::narrow(reader);
```

- **Creating a QueryCondition**

```
DDSQueryCondition *queryCondition = NULL;
DDS_StringSeq qc_parameters(2);
const char *qc_param_list[] = {"0", "100"};
qc_parameters.from_array(qc_param_list, 2);
queryCondition = reader->create_querycondition(DDS_NOT_READ_SAMPLE_STATE,
                                             DDS_ANY_VIEW_STATE,
                                             DDS_ALIVE_INSTANCE_STATE,
                                             "value > %0 AND value < %1",
                                             qc_parameters);
```

```

if (queryCondition == NULL) {
    printf("create_query_condition error\n");
    goto error_exit;
}

```

- **Reading matching samples with a DDSQueryCondition** (p. 1573)

```

FooSeq data_seq;
DDS_SampleInfoSeq info_seq;
retcode = Foo_reader->read_w_condition(data_seq, info_seq,
                                      DDS_LENGTH_UNLIMITED,
                                      queryCondition);

if (retcode == DDS_RETCODE_NO_DATA) {
    printf("no matching data\n");
} else if (retcode != DDS_RETCODE_OK) {
    printf("read_w_condition error %d\n", retcode);
    subscriber_shutdown(participant);
    return -1;
} else {
    for (i = 0; i < data_seq.length(); ++i) {
        if (info_seq[i].valid_data) {
            /* process your data here */
        }
    }
    retcode = Foo_reader->return_loan(data_seq, info_seq);
    if (retcode != DDS_RETCODE_OK) {
        printf("return loan error %d\n", retcode);
        subscriber_shutdown(participant);
        return -1;
    }
}

```

- **DDSQueryCondition::set\_query\_parameters** (p. 1574) is used similarly to **DDSContentFilteredTopic::set\_expression\_parameters** (p. 1285), and the same coding techniques can be used.
- Any **DDSQueryCondition** (p. 1573) that have been created must be deleted before the **DDSDataReader** (p. 1288) can be deleted. This can be done using **DDSDataReader::delete\_contained\_entities** (p. 1295) or manually as in:

```
retcode = reader->delete_readcondition(queryCondition);
```

#### 7.61.4 Filtering Performance

Although RTI Connex supports filtering on any field or combination of fields using the SQL syntax of the built-in filter, filters for keyed topics that filter solely on the contents of key fields have the potential for much higher performance. This is because for key-only filters, the **DDSDataReader** (p. 1288) caches the results of the filter (pass or not pass) for each instance. When another sample of the same instance is seen at the **DDSDataReader** (p. 1288), the filter results are retrieved from the cache, dispensing with the need to call the filter function.

This optimization applies to all filtering using the built-in SQL filter, performed by the **DDSDataReader** (p. 1288), for either **DDSContentFilteredTopic** (p. 1283) or **DDSQueryCondition** (p. 1573). This does *not* apply to filtering performed for **DDSContentFilteredTopic** (p. 1283) by the **DDSDataWriter** (p. 1321).

## 7.62 Creating Custom Content Filters

Working with custom content filters.

Working with custom content filters.

### 7.62.1 Introduction

By default, RTI Connexx creates content filters with the `DDS_SQL_FILTER`, which implements a superset of the DDS-specified SQL `WHERE` clause. However, in many cases this filter may not be what you want. Some examples are:

- The default filter can only filter based on the content of a sample, not on a computation on the content of a sample. You can use a custom filter that is customized for a specific type and can filter based on a computation of the type members.
- You want to use a different filter language than SQL

This HOWTO explains how to write your own custom filter and is divided into the following sections:

- **The Custom Content Filter API** (p. 223)
- **Example Using C format strings** (p. 224)

### 7.62.2 The Custom Content Filter API

A custom content filter is created by calling the `DDSDomainParticipant::register_contentfilter` (p. 1364) function with a `DDSContentFilter` (p. 1280) that contains a `compile`, an `evaluate` function and a `finalize` function. `DDSContentFilteredTopic` (p. 1283) can be created with `DDSDomainParticipant::create_contentfilteredtopic_←with_filter` (p. 1386) to use this filter.

A custom content filter is used by RTI Connexx at the following times during the life-time of a `DDSContentFilteredTopic` (p. 1283) (the function called is shown in parenthesis).

- When a `DDSContentFilteredTopic` (p. 1283) is created (`compile` (p. 223))
- When the filter parameters are changed on the `DDSContentFilteredTopic` (p. 1283) (`compile` (p. 223)) with `DDSContentFilteredTopic::set_expression_parameters` (p. 1285)
- When a sample is filtered (`evaluate` (p. 223)). This function is called by the RTI Connexx core with a de-serialized sample
- When a `DDSContentFilteredTopic` (p. 1283) is deleted (`finalize` (p. 224))

#### 7.62.2.1 The compile function

The `compile` (p. 224) function is used to `compile` a filter expression and expression parameters. Please note that the term `compile` is intentionally loosely defined. It is up to the user to decide what this function should do and return.

See `DDSContentFilter::compile` (p. 1280) for details.

#### 7.62.2.2 The evaluate function

The `evaluate` (p. 224) function is called each time a sample is received to determine if a sample should be filtered out and discarded.

See `DDSContentFilter::evaluate` (p. 1282) for details.

### 7.62.2.3 The finalize function

The **finalize** (p.224) function is called when an instance of the custom content filter is no longer needed. When this function is called, it is safe to free all resources used by this particular instance of the custom content filter.

See **DDSContentFilter::finalize** (p. 1282) for details.

## 7.62.3 Example Using C format strings

Assume that you have a type **Foo** (p. 1648).

You want to write a custom filter function that will drop all samples where the value of `Foo.x > x` and `x` is a value determined by an expression parameter. The filter will **only** be used to filter samples of type **Foo** (p. 1648).

### 7.62.3.1 Writing the Compile Function

The first thing to note is that we can ignore the filter expression, since we already know what the expression is. The second is that `x` is a parameter that can be changed. By using this information, the compile function is very easy to implement. Simply return the parameter string. This string will then be passed to the evaluate function every time a sample of this type is filtered.

Below is the entire **compile** (p. 223) function.

```
DDS_ReturnCode_t MyContentFilter::compile(
    void** new_compile_data, const char * /* expression */,
    const DDS_StringSeq& parameters, const DDS_TypeCode* /* type_code */,
    const char * /* type_class_name */,
    void * /* old_compile_data */) {
    *new_compile_data = (void*)DDS_String_dup(parameters[0]);
    return DDS_RETCODE_OK;
}
```

### 7.62.3.2 Writing the Evaluate Function

The next step is to implement the **evaluate** function. The evaluate function receives the parameter string with the actual value to test against. Thus the evaluate function must read the actual value from the parameter string before evaluating the expression. Below is the entire **evaluate** (p. 223) function.

```
DDS_Boolean MyContentFilter::evaluate(
    void* compile_data, const void* sample, const struct DDS_FilterSampleInfo * meta_data) {
    char *parameter = (char*)compile_data;
    DDS_Long x;
    Foo *foo_sample = (Foo*)sample;
    sscanf(parameter, "%d", &x);
    return (foo_sample->x > x ? DDS_BOOLEAN_FALSE : DDS_BOOLEAN_TRUE);
}
```

### 7.62.3.3 Writing the Finalize Function

The last function to write is the finalize function. It is safe to free all resources used by this particular instance of the custom content filter that is allocated in **compile**. Below is the entire **finalize** (p. 224) function.

```
void MyContentFilter::finalize(
    void* compile_data) {
    /* free parameter string from compile function */
    DDS_String_free((char *)compile_data);
}
```

### 7.62.3.4 Registering the Filter

Before the custom filter can be used, it must be registered with RTI Connext:

```
DDSDomainParticipant *myParticipant=NULL;
/* myParticipant = .... */
DDSContentFilter *myCustomFilter = new MyContentFilter();
if (myParticipant->register_contentfilter(
    (char*)"MyCustomFilter",
    myCustomFilter) != DDS_RETCODE_OK) {
    printf("Failed to register custom filter\n");
}
}
```

### 7.62.3.5 Unregistering the Filter

When the filter is no longer needed, it can be unregistered from RTI Connext:

```
DDSDomainParticipant *myParticipant = NULL;
/* myParticipant = .... */
DDSContentFilter *myCustomFilter =
    myParticipant->lookup_contentfilter((char*)"MyCustomFilter");
if (myCustomFilter != NULL) {
    if (myParticipant->unregister_contentfilter(
        (char*)"MyCustomFilter") != DDS_RETCODE_OK) {
        printf("Failed to unregister custom filter\n");
    }
    delete myCustomFilter;
}
}
```

## 7.63 Large Data Use Cases

Working with large data types.

Working with large data types.

### 7.63.1 Introduction <br>

RTI Connext supports data types whose size exceeds the maximum message size of the underlying transports. A **DDSDataWriter** (p. 1321) will fragment data samples when required. Fragments are automatically reassembled at the receiving end.

Once all fragments of a sample have been received, the new sample is passed to the **DDSDataReader** (p. 1288) which can then make it available to the user. Note that the new sample is treated as a regular sample at that point and its availability depends on standard QoS settings such as **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055) and **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406).

The large data feature is fully supported by all DDS API's, so its use is mostly transparent. Some additional considerations apply as explained below.

### 7.63.2 Writing Large Data

In order to use the large data feature with the `DDS_RELIABLE_RELIABILITY_QOS` (p. 435) setting, the `DDSDataWriter` (p. 1321) must be configured as an asynchronous writer (`DDS_ASYNCHRONOUS_PUBLISH_MODE_QOS` (p. 431)) with associated `DDSFlowController` (p. 1468).

While the use of an asynchronous writer and flow controller is optional when using the `DDS_BEST_EFFORT_RELIABILITY_QOS` (p. 435) setting, most large data use cases will benefit from the use of a flow controller to prevent flooding the network when fragments are being sent.

- [Set up writer](#) (p. 207)
- [Add flow control](#) (p. 204)

### 7.63.3 Receiving Large Data

Large data is supported by default and in most cases, no further changes are required.

The `DDS_DataReaderResourceLimitsQosPolicy` (p. 654) allows tuning the resources available to the `DDSDataReader` (p. 1288) for reassembling fragmented large data.

- [Set up reader](#) (p. 210)

## 7.64 Request-Reply Examples

Examples on how to use the request-reply API .

Examples on how to use the request-reply API .

Request-Reply code examples.

### 7.64.1 Request-Reply Examples

Requesters and Repliers provide a way to use the Request-Reply communication pattern on top of the DDS entities. An application uses a Requester to send requests to a Replier; another application using a Replier receives a request and can send one or more replies for that request. The Requester that sent the request (and only that one) will receive the reply (or replies).

#### DDS Types

RTI Connex uses DDS data types for sending and receiving requests and replies. Valid types are those generated by the `rtiddsgen` code generator, the DDS built-in types, and `DynamicData`. Refer to the `Core Libraries User's Manual` and the following links for more information:



- Code Generator User's Manual,
- **Using the DDS built-in types** (p. 92),
- **Using DynamicData** (p. 99)

### Set up

- **Create a DomainParticipant** (p. 202)
- **Create a requester** (p. 228)
- **Create a requester with parameters** (p. 228)
- **Create a replier** (p. 232)

### Requester: sending requests and receiving replies

- **Basic Requester example** (p. 228)
- **Taking loaned samples** (p. 229)
- **Taking samples by copy** (p. 229)
- **Correlation between requests and replies** (p. 230)

### Replier: receiving requests and sending replies

- **Basic Replier example** (p. 232)
- **SimpleReplier example** (p. 233)
- **Taking loaned samples** (p. 229)
- **Taking samples by copy** (p. 229)

### Error handling

- **Error handling example** (p. 233)

### Note

To use Request-Reply you need to build and link your application with the additional `rticonnextmsgcpp` library and include `ndds/ndds_requestreply_cpp.h`.

## 7.64.2 Requester Creation

- [Setting up a participant \(p. 202\)](#)

- [Creating a Requester](#)

```
using namespace connex;
// Note: error checking omitted for simplicity
// Create a DomainParticipant
DDS::DomainParticipant * participant =
    DDS::DomainParticipantFactory::get_instance()->create_participant(
        domain_id, DDS::PARTICIPANT_QOS_DEFAULT,
        NULL, DDS::STATUS_MASK_NONE);
// Create a Requester (if creation fails, the constructor throws)
Requester<Foo, Bar> * requester =
    new Requester<Foo, Bar>(participant, "TestService");
```

## 7.64.3 Creating a Requester with optional parameters

- [Setting up a participant \(p. 202\)](#)

- [Creating a Requester with additional parameters](#)

```
using namespace connex;
// Note: error checking omitted for simplicity
// Create a DomainParticipant
DDS::DomainParticipant * participant =
    DDS::DomainParticipantFactory::get_instance()->create_participant(
        domain_id, DDS::PARTICIPANT_QOS_DEFAULT,
        NULL, DDS::STATUS_MASK_NONE);
// Create a Requester with a QoS profile (located for example in
// USER_QOS_PROFILES.xml, in the current working directory)
RequesterParams requester_params(participant);
requester_params.service_name("TestService");
requester_params.qos_profile(
    "RequestReplyExampleProfiles", "RequesterExampleProfile");
Requester<Foo, Bar> * requester = new Requester<Foo, Bar>(requester_params);
```

See also

[Requester Creation \(p. 228\)](#)

[Configuring Request-Reply QoS profiles \(p. 234\)](#)

## 7.64.4 Basic Requester example

- [Requester Creation \(p. 228\)](#)
- [Creating a Requester with optional parameters \(p. 228\)](#)
- [Basic Requester example](#)

```
using namespace connex;
// Send request
WriteSample<Foo> request;
strcpy(request.data().message, "A Request");
requester->send_request(request);
// Create a reply Sample
Sample<Bar> reply;
// Receive reply (wait for it and get the sample)
bool received = requester->receive_reply(reply, MAX_WAIT);
if (received) {
    if(reply.info().valid_data) {
        std::cout << "Received reply: " << reply.data().message << std::endl;
    } else {
        std::cout << "Received invalid reply" << std::endl;
    }
} else {
    std::cout << "Reply not received" << std::endl;
}
```

- Basic Requester example using the **String built-in type** (p. 312)

```
using namespace connext;
// Create a Requester (this time we create it on the stack)
// The template parameter std::string maps to the String DDS built-in type
Requester<std::string, std::string> requester(participant, "TestServiceString");
// Send a request
requester.send_request("A string request");
// Receive reply
LoanedSamples<std::string> replies = requester.receive_replies(MAX_WAIT);
for (LoanedSamples<std::string>::iterator it = replies.begin();
     it != replies.end();
     ++it) {
    if (it->info().valid_data) {
        std::cout << "Received string reply: " << it->data() << std::endl;
    }
}
// When replies go out of scope, the loan is automatically returned
```

See also

**Basic Replier example** (p. 232)

**SimpleReplier example** (p. 233)

### 7.64.5 Taking loaned samples

- **Requester Creation** (p. 228)
- Get iterator to loaned replies (no copies)

```
using namespace connext;
// Get loaned samples
// Unlike receive_replies(), take_replies() doesn't block and returns an
// empty collection if there are no replies at that moment.
// (before that we can call requester->wait_for_replies)
LoanedSamples<Bar> replies = requester->take_replies();
// Iterate through the container of loaned samples.
// If there were no replies, the container is empty
for (LoanedSamples<Bar>::const_iterator it = replies.begin();
     it != replies.end();
     ++it) {
    if (it->info().valid_data) {
        std::cout << "Received reply: " << it->data().message << std::endl;
    }
}
// When replies go out of scope, the loan is automatically returned
```

See also

**Basic Requester example** (p. 228)

**Basic Replier example** (p. 232)

**Taking samples by copy** (p. 229)

### 7.64.6 Taking samples by copy

- **Requester Creation** (p. 228)
- Get copies of the replies:

```
using namespace connext;
// Get loaned samples
LoanedSamples<Bar> replies = requester->take_replies();
// Copy the contents using the STL-compliant iterator in LoanedSamples
std::list<Sample<Bar> > my_list;
std::copy(replies.begin(), replies.end(), std::back_inserter(my_list));
```

```

// We can copy to a container of Bar rather than Sample<Bar>,
// thanks to the implicit conversion from Sample<Bar> to Bar.
// If our application works with instances, we may have received
// invalid data (e.g. disposed instance). We can iterate through valid
// samples only using an iterator adapter.
std::vector<Bar> my_vector;
std::copy(
    make_valid_sample_iterator(replies.begin()),
    make_valid_sample_iterator(replies.end()),
    std::back_inserter(my_vector));
// When replies go out of scope, the loan is automatically returned

```

See also

**Basic Replier example** (p. 232)

**Taking loaned samples** (p. 229)

## 7.64.7 Correlating requests and replies

- **Requester Creation** (p. 228)
- **Example 1) Waiting for a reply to a specific request**

```

using namespace connext;
// Create requests
WriteSample<Foo> request1, request2;
strcpy(request1.data().message, "Request 1");
strcpy(request2.data().message, "Request 2");
// Send requests using WriteSample
requester->send_request(request1);
requester->send_request(request2);
// Wait for a reply to the second request
Sample<Bar> reply;
bool received = requester->wait_for_replies(
    1, MAX_WAIT, request2.identity());
if (!received) {
    std::cout << "Did not receive reply for request 2" << std::endl;
    return;
}
// Take that reply
requester->take_reply(reply, request2.identity());
// This postcondition should always be true
if (reply.related_identity() != request2.identity()) {
    throw std::runtime_error("postcondition failed");
}
if (reply.info().valid_data) {
    std::cout << "Received reply for request 2: "
        << reply.data().message << std::endl;
}
// Wait for a reply to the first request
received = requester->wait_for_replies(1, MAX_WAIT, request1.identity());
if (!received) {
    std::cout << "Did not receive reply for request 1" << std::endl;
    return;
}
// Take that reply
requester->take_reply(reply, request1.identity());
// This postcondition should always be true
if (reply.related_identity() != request1.identity()) {
    throw std::runtime_error("postcondition failed");
}
if (reply.info().valid_data) {
    std::cout << "Received reply for request 1: "
        << reply.data().message << std::endl;
}
}

```

- **Example 2) Correlating a reply after receiving it**

```

using namespace connext;
// Create requests
WriteSample<Foo> request1, request2;
strcpy(request1.data().message, "Request 1");
strcpy(request2.data().message, "Request 2");

```

```

// Send requests using WriteSample
requester->send_request(request1);
requester->send_request(request2);
// Wait for two replies. In this case we don't mind the
// reception order
bool received = requester->wait_for_replies(2, MAX_WAIT);
if (!received) {
    std::cout << "Replies not received" << std::endl;
    return;
}
LoanedSamples<Bar>::iterator it;
// Get all the replies
LoanedSamples<Bar> replies = requester->take_replies();
// Find the reply for request 1.
//
// We search using the STL find_if algorithm. The search range is all
// the elements in the replies container (from beginning to end).
// We use a predicate included in the Connex namespace that evaluates to
// true when a Sample's related_identity equals the identity that
// is passed to the constructor (request1's, in this case)
it = std::find_if(replies.begin(), replies.end(),
                 IsReplyRelatedPredicate<Bar>(request1.identity()));
if (it != replies.end()) {
    std::cout << "Received reply for request 1: "
              << it->data().message << std::endl;
}
// Find the reply for request 2
it = std::find_if(replies.begin(), replies.end(),
                 IsReplyRelatedPredicate<Bar>(request2.identity()));
if (it != replies.end()) {
    std::cout << "Received reply for request 2: "
              << it->data().message << std::endl;
}
// When replies go out of scope, the loan is automatically returned

```

See also

**Basic Requester example** (p. 228)

**Basic Replier example** (p. 232)

### 7.64.8 Basic Requester example using SampleRef

This example is similar to **Basic Requester example** (p. 228) except it uses a `SampleRef` instance instead of a `Sample` instance.

- Assuming the variables you want to use already exist:

```

Foo request_data;
DDS::WriteParams_t request_params;
Bar reply_data;
DDS::SampleInfo reply_info;
// ...

```

- You can use `WriteSampleRef` and `SampleRef`:

```

using namespace connex;
// Create a request WriteSampleRef
WriteSampleRef<Foo> request;
request.set_data(request_data);
request.set_info(request_params);
// Send request
requester->send_request(request);
// Create a reply SampleRef
SampleRef<Bar> reply;
reply.set_data(reply_data);
reply.set_info(reply_info);
// Receive reply
bool received = requester->receive_reply(reply, MAX_WAIT);
if (received) {
    if(reply_info.valid_data) {
        std::cout << "Received reply: " << reply_data.message << std::endl;
    }
}

```

```

    } else {
        std::cout << "Received invalid reply" << std::endl;
    }
} else {
    std::cout << "Reply not received" << std::endl;
}
}

```

See also

**connext::SampleRef** (p. 1920)  
**Basic Requester example** (p. 228)

### 7.64.9 Creating a Replier

- [Setting up a participant](#) (p. 202)
- [Create a Replier](#)

```

using namespace connext;
// Note: error checking omitted for simplicity
// Create a DomainParticipant
DDS::DomainParticipant * participant =
    DDS::DomainParticipantFactory::get_instance()->create_participant(
        domain_id, DDS::PARTICIPANT_QOS_DEFAULT,
        NULL, DDS::STATUS_MASK_NONE);
// Create a Replier (if creation fails, the constructor throws exception)
Replier<Foo, Bar> * replier =
    new Replier<Foo, Bar>(participant, "TestService");

```

### 7.64.10 Basic Replier example

- [Creating a Replier](#) (p. 232)
- [Basic Replier example](#)

```

using namespace connext;
Sample<Foo> request;
// Receive one request
bool received = replier->receive_request(request, MAX_WAIT);
if (!received) {
    std::cout << "Requests not received" << std::endl;
    return false;
}
// A WriteSample automatically initializes and finalizes
// the data using the TypeSupport (in this case BarTypeSupport)
WriteSample<Bar> reply;
if (request.info().valid_data) {
    sprintf(reply.data().message, "Reply for %s", request.data().message);
    // Send a reply for that request
    replier->send_reply(reply, request.identity());
    // Note: a replier can send more than one reply for the same request
}

```

See also

**Basic Requester example** (p. 228)

### 7.64.11 SimpleReplier example

- Implement a listener

```
class MySimpleReplierListener : public SimpleReplierListener<Foo, Bar>
{
public:
    Bar * on_request_available(SampleRef<Foo> request)
    {
        if (!request.info().valid_data) {
            // In this example we don't reply to invalid data samples.
            // In other cases, it could make sense to reply
            // to a disposed instance, for example.
            return NULL;
        }
        sprintf(_reply.data().message, "Simple reply for %s",
            request.data().message);
        return &_reply.data();
    }
    void return_loan(Bar * reply)
    {
        // nothing to do
    }
private:
    // By using a WriteSample (instead of just Bar), the sample is
    // automatically initialized and released.
    WriteSample<Bar> _reply;
};
```

- And create a SimpleReplier with the listener

```
using namespace connex;
// Note: error checking omitted for simplicity
MySimpleReplierListener * listener = new MySimpleReplierListener();
SimpleReplier<Foo, Bar> * replier = new SimpleReplier<Foo, Bar>(
    participant, "TestService", *listener);
// After creation the SimpleReplier is already active and may call
// the listener
```

- This next example shows how to implement a listener for a SimpleReplier using the std::string type

```
class MyStringSimpleReplierListener :
public SimpleReplierListener<std::string, std::string>
{
public:
    // Note that the actual received type is const char*,
    // because internally, the middleware uses char*
    std::string * on_request_available(SampleRef<const char*> request)
    {
        if (!request.info().valid_data) {
            return NULL;
        }
        _reply = std::string("Simple string reply for ") + request.data();
        return &_reply;
    }
    void return_loan(std::string * reply)
    {
        // nothing to do
    }
private:
    std::string _reply;
};
```

See also

**Basic Requester example** (p. 228)

### 7.64.12 Error handling example

- Catching an exception from the request-reply API

```
using namespace connex;
// All the operations in the request-reply API
// throw exceptions in case of error.
// You can also set the verbosity level to warning for
// additional information
NDDSConfigLogger::get_instance()->set_verbosity(
```

```

    NDDS_CONFIG_LOG_VERBOSITY_WARNING);
//
// For example, this replier is sending a reply for a nonexistent request
//
WriteSample<Bar> reply;
DDS::SampleIdentity_t invalid_request_id;
try {
    replier->send_reply(reply, invalid_request_id);
} catch (const BadParameterException& ex) {
    std::cout << "Exception while sending reply: "
              << ex.what() << std::endl;
}
// Exceptions inherit from std::runtime_error or std::logic_error,
// so you can have a more general catch statement:
//
// This piece of code produces the same result as the previous one:
//
try {
    replier->send_reply(reply, invalid_request_id);
} catch (const std::exception& ex) {
    std::cout << "Exception while sending request: "
              << ex.what() << std::endl;
}
}

```

### 7.64.13 Configuring Request-Reply QoS profiles

If you do not specify your own QoS parameters (in `connext::RequesterParams` (p. 1907) and `connext::ReplierParams` (p. 1881)), a `connext::Requester` (p. 1886) and `connext::Replier` (p. 1868) are created using a default configuration.

That configuration is equivalent to the one in the following QoS profile called "default":

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<!--
```

```
Description
```

```
XML QoS Profile for HelloWorld
```

```
(c) Copyright, Real-Time Innovations, 2012. All rights reserved.
RTI grants Licensee a license to use, modify, compile, and create derivative
works of the software solely for use with RTI Connext DDS. Licensee may
redistribute copies of the software provided that all such copies are
subject to this license. The software is provided "as is", with no warranty
of any type, including any warranty for fitness for any purpose. RTI is
under no obligation to maintain or support the software. RTI shall not be
liable for any incidental or consequential damages arising out of the use
or inability to use the software.
```

```
The QoS configuration of the DDS entities in the generated example is loaded
from this file.
```

```
This file is used only when it is in the current working directory or when the
environment variable NDDS_QOS_PROFILES is defined and points to this file.
```

```
The profile in this file inherits from the builtin QoS profile
BuiltinQosLib::Generic.StrictReliable. That profile, along with all of the
other built-in QoS profiles can be found in the
BuiltinProfiles.documentationONLY.xml file located in the
$NDDSHOME/resource/xml/ directory.
```

```
You may use any of these QoS configurations in your application simply by
referring to them by the name shown in the
BuiltinProfiles.documentationONLY.xml file.
```

```
Also, following the QoS Profile composition pattern you can use QoS Snippets
to easily create your final QoS Profile. For further information visit:
https://community.rti.com/best-practices/qos-profile-inheritance-and-composition-guidance
```

```
There is a QoS Snippet library that contains a collection of
QoS Snippets that set some specific features or configurations. You can find
them in the BuiltinProfiles.documentationONLY.xml file as well.
```

```
You should not edit the file BuiltinProfiles.documentationONLY.xml directly.
However, if you wish to modify any of the values in a built-in profile, the
recommendation is to create a profile of your own and inherit from the built-in
profile you wish to modify. The NDDS_QOS_PROFILES.example.xml file (contained in
the same directory as the BuiltinProfiles.documentationONLY.xml file) shows how
to inherit from the built-in profiles.
```



For more information about XML QoS Profiles see the "Configuring QoS with XML" chapter in the RTI Connext DDS Core Libraries User's Manual.

```
-->
<dds xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

  xsi:noNamespaceSchemaLocation="file:///rti/jenkins/workspace/connextdds_htmldocs_release_connextdds_7.3.0/build/nddsgen.2
  <!-- QoS Library containing the QoS profile used in the generated example.

  A QoS library is a named set of QoS profiles.
-->
<qos_library name="HelloWorld_Library">
  <!-- QoS profile used to configure reliable communication between the DataWriter
  and DataReader created in the example code.

  A QoS profile groups a set of related QoS.
-->
<qos_profile name="HelloWorld_Profile" base_name="BuiltinQoSLib::Generic.StrictReliable"
is_default_qos="true">
  <!-- QoS used to configure the data writer created in the example code -->
  <datawriter_qos>
    <publication_name>
      <name>HelloWorldDataWriter</name>
    </publication_name>
  </datawriter_qos>
  <!-- QoS used to configure the data reader created in the example code -->
  <datareader_qos>
    <subscription_name>
      <name>HelloWorldDataReader</name>
    </subscription_name>
  </datareader_qos>
  <domain_participant_qos>
    <!--
    The participant name, if it is set, will be displayed in the
    RTI tools, making it easier for you to tell one
    application from another when you're debugging.
    -->
    <participant_name>
      <name>HelloWorldParticipant</name>
      <role_name>HelloWorldParticipantRole</role_name>
    </participant_name>
  </domain_participant_qos>
</qos_profile>
</qos_library>
</dds>
```

You can use the profile called "RequesterExampleProfile", which modifies some parameters from the default. The example **Creating a Requester with optional parameters** (p. 228) shows how to create a `connext::Requester` (p. 1886) using this profile.

See also

**Creating a Requester with optional parameters** (p. 228)

**Configuring QoS Profiles with XML** (p. 197)

## 7.65 Documentation Roadmap

This section contains a roadmap for the new user with pointers on what to read first.

If you are new to RTI Connext, we recommend starting in the following order:

- See the *Getting Started Guide*. This document provides download and installation instructions. It also lays out the core value and concepts behind the product and takes you step-by-step through the creation of a simple example application.
- The *User's Manual* describes the features of the product and how to use them. It is organized around the structure of the DDS APIs and certain common high-level tasks.

- The documentation in the **RTI Connext DDS API Reference** (p. 239) provides an overview of API classes and modules for the DDS data-centric publish-subscribe (DCPS) package from a programmer's perspective. Start by reading the documentation on the main page.
- After reading the high level module documentation, look at the **Publication Example** (p. 199) and **Subscription Example** (p. 200) for step-by-step examples of creating a publication and subscription. These are hyperlinked code snippets to the full API documentation, and provide a good place to begin learning the APIs.
- Next, work through your own application using the example code files generated by `rtiddsgen`. See the `Code Generator User's Manual`.
- To integrate similar code into your own application and build system, you will likely need to refer to the `Platform Notes`.

## 7.66 Conventions

This section describes the conventions used in the API documentation.

### 7.66.1 Unsupported Features

**[Not supported (optional)]** This note means that the optional feature from the DDS specification is not supported in the current release.

### 7.66.2 API Naming Conventions

#### 7.66.2.1 Structure & Class Names

RTI Data Distribution Service 4 makes a distinction between *value types* and *interface types*. Value types are types such as primitives, enumerations, strings, and structures whose identity and equality are determined solely by explicit state. Interface types are those abstract opaque data types that conceptually have an identity apart from their explicit state. Examples include all of the **DDSEntity** (p. 1463) subtypes, the **DDSCondition** (p. 1276) subtypes, and **DDSWaitSet** (p. 1629). Instances of value types are frequently transitory and are declared on the stack. Instances of interface types typically have longer lifecycles, are accessible by pointer only, and may be managed by a factory object.

Value and interface types are distinguished by their names: value types have names beginning with "DDS\_" (i.e. with an underscore); interface types have names beginning with "DDS" (i.e. with no underscore). Another way to think of it: C-style types – structures, enumerations, etc. – have names beginning with "DDS\_"; C++ classes have names beginning with "DDS."

### 7.66.3 API Documentation Terms

In the API documentation, the term module refers to a logical grouping of documentation and elements in the API.

At this time, typedefs that occur in the API, such as **DDS\_ReturnCode\_t** (p. 336) do not show up in the compound list or indices. This is a known limitation in the generated HTML.

## 7.66.4 Stereotypes

Commonly used stereotypes in the API documentation include the following.

### 7.66.4.1 Extensions

- `<<extension>>` (p. 237)
  - An RTI Connex product extension to the DDS standard specification.
  - The extension APIs complement the standard APIs specified by the OMG DDS specification. They are provided to improve product usability and enable access to product-specific features such as pluggable transports.

### 7.66.4.2 Experimental

- `<<experimental>>` (p. 237)
  - RTI Connex experimental features are used to evaluate new features and get user feedback.
  - These features are not guaranteed to be fully supported and might be implemented only of some of the programming languages supported bt RTI Connex
  - The functional APIs corresponding to experimental features can be distinguished from other APIs by the suffix '\_exp'.
  - Experimental features may or may not appear in future product releases.
  - The name of the experimental features APIs will change if they become officially supported. At the very least the suffix '\_exp' will be removed.
  - Experimental features should not be used in production.

### 7.66.4.3 Types

- `<<interface>>` (p. 237)
  - Pure interface type with *no state*.
  - Languages such as Java natively support the concept of an *interface* type, which is a collection of method signatures devoid of any dynamic state.
  - In C++, this is achieved via a class with all *pure virtual* methods and devoid of any instance variables (ie no dynamic state).
  - Interfaces are generally organized into a type hierarchy. Static typecasting along the interface type hierarchy is "safe" for valid objects.
- `<<generic>>` (p. 237)
  - A *generic* type is a *skeleton* class written in terms of generic parameters. Type-specific instantiations of such types are conventionally referred to in this documentation in terms of the hypothetical type "Foo"; for example: **FooSeq** (p. 1697), **FooDataType**, **FooDataWriter** (p. 1676), and **FooDataReader** (p. 1649).

- For portability and efficiency, we implement generics using C preprocessor macros, rather than using C++ templates.
  - A *generic* type interface is declared via a `#define` macro.
  - Concrete types are generated from the generic type statically at compile time. The implementation of the concrete types is provided via the generic macros which can then be compiled as normal C or C++ code.
- `<<singleton>>` (p. 238)
    - Singleton class. There is a single instance of the class.
    - Generally accessed via a `get_instance()` static method.

#### 7.66.4.4 Method Parameters

- `<<in>>` (p. 238)
  - An *input* parameter.
- `<<out>>` (p. 238)
  - An *output* parameter.
- `<<inout>>` (p. 238)
  - An *input* and *output* parameter.

## 7.67 Using DDS:: Namespace

This section describes the C++ namespace support in the DDS API.

### 7.67.1 DDS Namespace Support

In this documentation, all C++ classes, value types, interface types and constants have names beginning with either `"DDS_"` or `"DDS"`. Alternatively, `DDS` namespace can also be used to refer to all these classes, types or constant.

All the C++ API that begins with either `"DDS_"` or `"DDS"` can be replaced with its namespace equivalent. For example, `DDSDomainParticipant` (p. 1351) has a namespace equivalent of `DDS::DomainParticipant`, and `DDS_DomainParticipantQos` (p. 741) has a namespace equivalent of `DDS::DomainParticipantQos`.

In order to use the `DDS` namespace, an additional header file, `ndds_namespace_cpp.h`, will need to be included in your source file:

```
#include "ndds/ndds_cpp.h"
#include "ndds/ndds_namespace_cpp.h"
DDS::DomainParticipant *participant = NULL;
DDS::DomainParticipantQos participant_qos;
DDS::DomainParticipantListener *listener = NULL;
DDS::StatusKind status_kind = DDS::INCONSISTENT_TOPIC_STATUS;
DDS::Long counter = 0L;
```

If the namespace header file is not included in the source file, `DDS` namespace cannot be used in the RTI Connext API.

## 7.67.2 DDS Namespace and Primitive Types

By default, **DDS** namespace support for primitive types are included. With **DDS** namespace support, the difference between **DDS** types and native types can just be the capitalization in some cases:

```
#include "ndds/ndds_cpp.h"
#include "ndds/ndds_namespace_cpp.h"
using namespace DDS;
Long ddsCounter = 0L;
long nativeCounter = 0L;
```

If you want to exclude the **DDS** namespace support for primitive types, you can define **NDDS\_EXCLUDE\_PRIMITIVE\_TYPES\_FROM\_NAMESPACE** in your application before including the namespace header file. **DDS** namespace support for primitive types will then be excluded:

```
#include "ndds/ndds_cpp.h"
#define NDDS_EXCLUDE_PRIMITIVE_TYPES_FROM_NAMESPACE
#include "ndds/ndds_namespace_cpp.h"
using namespace DDS;
DDS_Long ddsCounter = 0;
long nativeCounter = 0;
```

For the rest of the documentation, the **DDS** prefix is used for all class /types/constants names. However, all the API with the **DDS** prefix can be replaced with **DDS** namespace instead if the namespace header file is included.

## 7.68 RTI Connex DDS API Reference

RTI Connex modules following the DDS module definitions.

### Modules

- **Domain Module**

Contains the **DDSDomainParticipant** (p. 1351) class that acts as an entrypoint of RTI Connex and acts as a factory for many of the classes. The **DDSDomainParticipant** (p. 1351) also acts as a container for the other objects that make up RTI Connex.

- **Topic Module**

Contains the **DDSTopic** (p. 1617), **DDSContentFilteredTopic** (p. 1283), and **DDSMultiTopic** (p. 1529) classes, the **DDSTopicListener** (p. 1626) interface, and more generally, all that is needed by an application to define **DDSTopic** (p. 1617) objects and attach QoS policies to them.

- **Publication Module**

Contains the **DDSFlowController** (p. 1468), **DDSPublisher** (p. 1550), and **DDSDataWriter** (p. 1321) classes as well as the **DDSPublisherListener** (p. 1571) and **DDSDataWriterListener** (p. 1344) interfaces, and more generally, all that is needed on the publication side.

- **Subscription Module**

Contains the **DDSSubscriber** (p. 1592), **DDSDataReader** (p. 1288), **DDSReadCondition** (p. 1574), **DDSQueryCondition** (p. 1573), and **DDSTopicQuery** (p. 1627) classes, as well as the **DDSSubscriberListener** (p. 1613) and **DDSDataReaderListener** (p. 1315) interfaces, and more generally, all that is needed on the subscription side.

- **Infrastructure Module**

Defines the abstract classes and the interfaces that are refined by the other modules. Contains common definitions such as return codes, status values, and QoS policies.

- **Transports**

APIs related to RTI Connex pluggable transports.

- **Queries and Filters Syntax**

- **Logging and Version**

*APIs of troubleshooting utilities and APIs designed to configure the overall behavior of RTI Connext.*

- **General Utilities and Compliance Configuration**  
*API of general utilities used in the RTI Connext distribution.*
- **Observability**  
*API of RTI Connext Observability Framework.*
- **Durability and Persistence**  
*APIs related to RTI Connext Durability and Persistence.*
- **System Properties**  
*System Properties.*
- **Configuring QoS Profiles with XML**  
*APIs related to XML QoS Profiles.*
- **Additional RTI Connext Communication Patterns**  
*Extensions to the RTI Connext publish-subscribe functionality.*

### 7.68.1 Detailed Description

RTI Connext modules following the DDS module definitions.

### 7.68.2 Overview

Information flows with the aid of the following constructs: **DDSPublisher** (p. 1550) and **DDSDataWriter** (p. 1321) on the sending side, **DDSSubscriber** (p. 1592) and **DDSDataReader** (p. 1288) on the receiving side.

- A **DDSPublisher** (p. 1550) is an object responsible for data distribution. It may publish data of different data types. A **TDataWriter** acts as a *typed* (i.e. each **DDSDataWriter** (p. 1321) object is dedicated to one application data type) accessor to a publisher. A **DDSDataWriter** (p. 1321) is the object the application must use to communicate to a publisher the existence and value of data objects of a given type. When data object values have been communicated to the publisher through the appropriate data-writer, it is the publisher's responsibility to perform the distribution (the publisher will do this according to its own QoS, or the QoS attached to the corresponding data-writer). A *publication* is defined by the association of a data-writer to a publisher. This association expresses the intent of the application to publish the data described by the data-writer in the context provided by the publisher.
- A **DDSSubscriber** (p. 1592) is an object responsible for receiving published data and making it available (according to the Subscriber's QoS) to the receiving application. It may receive and dispatch data of different specified types. To access the received data, the application must use a *typed* **TDataReader** attached to the subscriber. Thus, a *subscription* is defined by the association of a data-reader with a subscriber. This association expresses the intent of the application to subscribe to the data described by the data-reader in the context provided by the subscriber.

**DDSTopic** (p. 1617) objects conceptually fit between publications and subscriptions. Publications must be known in such a way that subscriptions can refer to them unambiguously. A **DDSTopic** (p. 1617) is meant to fulfill that purpose: it associates a name (unique in the domain i.e. the set of applications that are communicating with each other), a data type, and QoS related to the data itself. In addition to the topic QoS, the QoS of the **DDSDataWriter** (p. 1321) associated with that Topic and the QoS of the **DDSPublisher** (p. 1550) associated to the **DDSDataWriter** (p. 1321) control the behavior on the publisher's side, while the corresponding **DDSTopic** (p. 1617), **DDSDataReader** (p. 1288) and **DDSSubscriber** (p. 1592) QoS control the behavior on the subscriber's side.

When an application wishes to publish data of a given type, it must create a **DDSPublisher** (p. 1550) (or reuse an already created one) and a **DDSDataWriter** (p. 1321) with all the characteristics of the desired publication. Similarly, when an application wishes to receive data, it must create a **DDSSubscriber** (p. 1592) (or reuse an already created one) and a **DDSDataReader** (p. 1288) to define the subscription.

### 7.68.3 Conceptual Model

The overall conceptual model is shown below.

Notice that all the main communication objects (the specializations of Entity) follow unified patterns of:

- Supporting QoS (made up of several QoSPolicy); QoS provides a generic mechanism for the application to control the behavior of the Service and tailor it to its needs. Each **DDSEntity** (p. 1463) supports its own specialized kind of QoS policies (see **QoS Policies** (p. 353)).
- Accepting a **DDSListener** (p. 1526); listeners provide a generic mechanism for the middleware to notify the application of relevant asynchronous events, such as arrival of data corresponding to a subscription, violation of a QoS setting, etc. Each **DDSEntity** (p. 1463) supports its own specialized kind of listener. Listeners are related to changes in status conditions (see **Status Kinds** (p. 337)).

Note that only one Listener per entity is allowed (instead of a list of them). The reason for that choice is that this allows a much simpler (and, thus, more efficient) implementation as far as the middleware is concerned. Moreover, if it were required, the application could easily implement a listener that, when triggered, triggers in return attached 'sub-listeners'.

- Accepting a **DDSStatusCondition** (p.1578) (and a set of **DDSReadCondition** (p.1574) objects for the **DDSDataReader** (p.1288)); conditions (in conjunction with **DDSWaitSet** (p.1629) objects) provide support for an alternate communication style between the middleware and the application (i.e., wait-based rather than notification-based).

All DCPS entities are attached to a **DDSDomainParticipant** (p. 1351). A domain participant represents the local membership of the application in a domain. A *domain* is a distributed concept that links all the applications able to communicate with each other. It represents a communication plane: only the publishers and the subscribers attached to the same domain may interact.

**DDSDomainEntity** (p. 1350) is an intermediate object whose only purpose is to state that a DomainParticipant cannot contain other domain participants.

At the DCPS level, data types represent information that is sent atomically. For performance reasons, only plain data structures are handled by this level.

By default, each data modification is propagated individually, independently, and uncorrelated with other modifications. However, an application may request that several modifications be sent as a whole and interpreted as such at the recipient side. This functionality is offered on a Publisher/Subscriber basis. That is, these relationships can only be specified among **DDSDataWriter** (p. 1321) objects attached to the same **DDSPublisher** (p. 1550) and retrieved among **DDSDataReader** (p. 1288) objects attached to the same **DDSSubscriber** (p. 1592).

By definition, a **DDSTopic** (p. 1617) corresponds to a single data type. However, several topics may refer to the same data type. Therefore, a **DDSTopic** (p. 1617) identifies data of a single type, ranging from one single instance to a whole collection of instances of that given type. This is shown below for the hypothetical data type **Foo** (p. 1648).

In case a set of instances is gathered under the same topic, different instances must be distinguishable. This is achieved by means of the values of some data fields that form the **key** to that data set. The *key description* (i.e., the list of data fields whose value forms the key) has to be indicated to the middleware. The rule is simple: *different data samples with the same key value represent successive values for the same instance, while different data samples with different key values represent different instances*. If no key is provided, the data set associated with the **DDSTopic** (p. 1617) is restricted to a *single instance*.

Topics need to be known by the middleware and potentially propagated. Topic objects are created using the create operations provided by **DDSDomainParticipant** (p. 1351).

The interaction style is straightforward on the publisher's side: when the application decides that it wants to make data available for publication, it calls the appropriate operation on the related **DDSDataWriter** (p. 1321) (this, in turn, will trigger its **DDSPublisher** (p. 1550)).

On the subscriber's side however, there are more choices: relevant information may arrive when the application is busy doing something else or when the application is just waiting for that information. Therefore, depending on the way the application is designed, asynchronous notifications or synchronous access may be more appropriate. Both interaction modes are allowed, a **DDSListener** (p. 1526) is used to provide a callback for synchronous access and a **DDSWaitSet** (p. 1629) associated with one or several **DDSCondition** (p. 1276) objects provides asynchronous data access.

The same synchronous and asynchronous interaction modes can also be used to access changes that affect the middleware communication status (see **Status Kinds** (p. 337)). For instance, this may occur when the middleware asynchronously detects an inconsistency. In addition, other middleware information that may be relevant to the application (such as the list of the existing topics) is made available by means of **built-in topics** (p. 59) that the application can access as plain application data, using built-in data-readers.

#### 7.68.4 Modules

DCPS consists of five modules:

- **Infrastructure module** (p. 162) defines the abstract classes and the interfaces that are refined by the other modules. It also provides support for the two interaction styles (notification-based and wait-based) with the middleware.
- **Domain module** (p. 39) contains the **DDSDomainParticipant** (p. 1351) class that acts as an entrypoint of the Service and acts as a factory for many of the classes. The **DDSDomainParticipant** (p. 1351) also acts as a container for the other objects that make up the Service.
- **Topic module** (p. 61) contains the **DDSTopic** (p. 1617) class, the **DDSTopicListener** (p. 1626) interface, and more generally, all that is needed by the application to define **DDSTopic** (p. 1617) objects and attach QoS policies to them.
- **Publication module** (p. 103) contains the **DDSPublisher** (p. 1550) and **DDSDataWriter** (p. 1321) classes as well as the **DDSPublisherListener** (p. 1571) and **DDSDataWriterListener** (p. 1344) interfaces, and more generally, all that is needed on the publication side.
- **Subscription module** (p. 124) contains the **DDSSubscriber** (p. 1592), **DDSDataReader** (p. 1288), **DDSReadCondition** (p. 1574), and **DDSQueryCondition** (p. 1573) classes, as well as the **DDSSubscriberListener** (p. 1613) and **DDSDataReaderListener** (p. 1315) interfaces, and more generally, all that is needed on the subscription side.

### 7.69 Additional RTI Connex Communication Patterns

Extensions to the RTI Connex publish-subscribe functionality.



## Modules

- **Request-Reply Pattern**  
*Support for the request-reply communication pattern.*
- **Infrastructure**  
*Infrastructure types for RTI Connex Messaging.*
- **Utilities**  
*Utilities for the RTI Connex Messaging module.*

### 7.69.1 Detailed Description

Extensions to the RTI Connex publish-subscribe functionality.

This section includes the **Request-Reply API** (p. 186).

## 7.70 Programming How-To's

These "How To"s illustrate how to apply RTI Connex APIs to common use cases.

## Modules

- **Publication Example**  
*A data publication example.*
- **Subscription Example**  
*A data subscription example.*
- **Participant Use Cases**  
*Working with domain participants.*
- **Topic Use Cases**  
*Working with topics.*
- **FlowController Use Cases**  
*Working with flow controllers.*
- **Publisher Use Cases**  
*Working with publishers.*
- **DataWriter Use Cases**  
*Working with data writers.*
- **Subscriber Use Cases**  
*Working with subscribers.*
- **DataReader Use Cases**  
*Working with data readers.*
- **Entity Use Cases**  
*Working with entities.*

- **Waitset Use Cases**  
*Using wait-sets and conditions.*
- **Transport Use Cases**  
*Working with pluggable transports.*
- **Filter Use Cases**  
*Working with data filters.*
- **Creating Custom Content Filters**  
*Working with custom content filters.*
- **Large Data Use Cases**  
*Working with large data types.*
- **Request-Reply Examples**  
*Examples on how to use the request-reply API .*

### 7.70.1 Detailed Description

These "How To"s illustrate how to apply RTI Connex API to common use cases.

These are a good starting point to familiarize yourself with DDS. You can use these code fragments as "templates" for writing your own code.

## 7.71 Interface

Abstraction of a Transport Plugin network interface.

### Classes

- struct **NDDS\_Transport\_Interface\_t**  
*Storage for the description of a network interface used by a Transport Plugin.*

### Enumerations

- enum **NDDS\_Transport\_Interface\_Status\_t** {  
  **NDDS\_TRANSPORT\_INTERFACE\_OFF** = 0 ,  
  **NDDS\_TRANSPORT\_INTERFACE\_ON** = 1 }  
*Interface status.*

### 7.71.1 Detailed Description

Abstraction of a Transport Plugin network interface.

A Transport Plugin may be able to use several logical or physical network interfaces in a single node (machine). For example, there may be multiple NICs for IP networks or multiple serial ports for serial networks.

An instance of a Transport Plugin is a conduit to one or more network interfaces associated with the transport.

Instances of a Transport Plugin must assign a unique unicast address to each of the network interfaces that it can use to send and receive messages. The unicast address should be within the range of addresses that are addressable by the Transport Plugin (as defined by the plugin itself).

Then, when RTI Connext sends a message to an unicast destination address, the destination address will be made of two parts. The network address and an interface address. The network address portion will be used by RTI Connext to select the Transport Plugin instance that will send the message. The interface address portion is passed to the Transport Plugin instance as the destination interface to which the message should be sent.

See also

**NDDS\_Transport\_Address\_t** (p. 1774) **NDDS\_Transport\_ClassId\_t** (p. 252)

### 7.71.2 Enumeration Type Documentation

#### 7.71.2.1 NDDS\_Transport\_Interface\_Status\_t

enum **NDDS\_Transport\_Interface\_Status\_t**

Interface status.

Enumerator

NDDS_TRANSPORT_INTERFACE_OFF	The transport interface is OFF.
NDDS_TRANSPORT_INTERFACE_ON	The transport interface is ON.

## 7.72 Transport Plugins Configuration

Transport plugins configuration with RTI Connext.

### Classes

- struct **NDDS\_Transport\_UUID**

*Univocally identifies a transport plugin instance.*

- struct **TransportAllocationSettings\_t**  
*Allocation settings used by various internal buffers.*
- struct **NDDS\_Transport\_Property\_t**  
*Base configuration structure that must be inherited by derived Transport Plugin classes.*

## Macros

- #define **NDDS\_TRANSPORT\_PORT\_INVALID** (( NDDS\_Transport\_Port\_t) 0)  
*Port 0 is considered to be invalid.*
- #define **NDDS\_TRANSPORT\_UUID\_SIZE** 12  
*Size of a NDDS\_Transport\_UUID (p. 1817).*
- #define **NDDS\_TRANSPORT\_LENGTH\_UNLIMITED** -1  
*Represent an unlimited length.*
- #define **NDDS\_TRANSPORT\_INTERFACE\_RANK\_UNKNOWN** 0  
*Rank interface as unknown or not yet set.*
- #define **NDDS\_TRANSPORT\_UUID\_UNKNOWN** {{0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}}
- #define **NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_MAX\_COUNT\_UNLIMITED** (-1)  
*The constant used as 'unlimited' for the 'max\_count' field of the structure **TransportAllocationSettings\_t** (p. 1947).*
- #define **NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_INCREMENTAL\_COUNT\_AUTOMATIC** (-1)  
*The constant used as 'automatic' for the 'incremental\_count' field of the structure **TransportAllocationSettings\_t** (p. 1947).*
- #define **NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_DEFAULT**  
*The constant used as default value for the struct **TransportAllocationSettings\_t** (p. 1947).*
- #define **NDDS\_TRANSPORT\_CLASSID\_INVALID** (-1)  
*Invalid Transport Class ID.*
- #define **NDDS\_TRANSPORT\_CLASSID\_UDPv4** (1)  
*Builtin IPv4 UDP/IP Transport Plugin class ID.*
- #define **NDDS\_TRANSPORT\_CLASSID\_SHMEM** (0x01000000)  
*Builtin Shared-Memory Transport Plugin class ID.*
- #define **NDDS\_TRANSPORT\_CLASSID\_SHMEM\_510** (2)  
*Builtin Shared-Memory Transport Plugin class ID for Connex 5.1.0 and earlier.*
- #define **NDDS\_TRANSPORT\_CLASSID\_UDPv6** (2)  
*Builtin IPv6 UDP/IP Transport Plugin class ID.*
- #define **NDDS\_TRANSPORT\_CLASSID\_UDPv6\_510** (5)  
*Builtin IPv6 UDP/IP Transport Plugin class ID for Connex 5.1.0 and earlier.*
- #define **NDDS\_TRANSPORT\_CLASSID\_TCPV4\_LAN** (8)  
*IPv4 TCP/IP Transport Plugin class ID for LAN case.*
- #define **NDDS\_TRANSPORT\_CLASSID\_TCPV4\_WAN** (9)  
*IPv4 TCP/IP Transport Plugin class ID for WAN case.*
- #define **NDDS\_TRANSPORT\_CLASSNAME\_TCPV4\_WAN** "tcpv4\_wan"  
*IPv4 TCP/IP Transport Plugin class name for WAN case.*
- #define **NDDS\_TRANSPORT\_CLASSID\_TLSV4\_LAN** (10)  
*IPv4 TCP/IP Transport Plugin class ID for LAN case with TLS enabled.*
- #define **NDDS\_TRANSPORT\_CLASSID\_TLSV4\_WAN** (11)

*IPv4 TCP/IP Transport Plugin class ID for WAN case with TLS enabled.*

- `#define NDDS_TRANSPORT_CLASSID_UDPv4_WAN (0x01000001)`

*Builtin IPv4 UDP/IP Asymmetric Transport Plugin class ID.*

- `#define NDDS_TRANSPORT_CLASSID_RESERVED_RANGE (1000)`

*Transport Plugin class IDs below this are reserved by RTI.*

- `#define NDDS_TRANSPORT_PROPERTY_BIT_BUFFER_ALWAYS_LOANED (0x2)`

*Specified zero-copy behavior of transport.*

- `#define NDDS_TRANSPORT_PROPERTY_GATHER_SEND_BUFFER_COUNT_MIN (3)`

*Minimum number of gather-send buffers that must be supported by a Transport Plugin implementation.*

## Typedefs

- `typedef RTI_UINT32 NDDS_Transport_Port_t`  
*Type for storing RTI Connex RTPS ports.*
- `typedef RTI_INT32 NDDS_Transport_Classid_t`  
*Type for storing RTI Connex Transport Plugin class IDs.*

### 7.72.1 Detailed Description

Transport plugins configuration with RTI Connex.

Transport plugins are configured using properties. Each transport plugin must derive its property from a base configuration structure `NDDS_Transport_Property_t` (p. 1776).

To see how to configure the Built-in Transport Plugins, see [Built-in Transport Plugins](#) (p. 177).

See also

[Built-in Transport Plugins](#) (p. 177)

### 7.72.2 Macro Definition Documentation

#### 7.72.2.1 NDDS\_TRANSPORT\_PORT\_INVALID

```
#define NDDS_TRANSPORT_PORT_INVALID (( NDDS_Transport_Port_t) 0)
```

Port 0 is considered to be invalid.

### 7.72.2.2 NDDS\_TRANSPORT\_UUID\_SIZE

```
#define NDDS_TRANSPORT_UUID_SIZE 12
```

Size of a **NDDS\_Transport\_UUID** (p. 1817).

### 7.72.2.3 NDDS\_TRANSPORT\_LENGTH\_UNLIMITED

```
#define NDDS_TRANSPORT_LENGTH_UNLIMITED -1
```

Represent an unlimited length.

### 7.72.2.4 NDDS\_TRANSPORT\_INTERFACE\_RANK\_UNKNOWN

```
#define NDDS_TRANSPORT_INTERFACE_RANK_UNKNOWN 0
```

Rank interface as unknown or not yet set.

### 7.72.2.5 NDDS\_TRANSPORT\_UUID\_UNKNOWN

```
#define NDDS_TRANSPORT_UUID_UNKNOWN {{0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}}
```

Value for UUIDs that have no known value. Used as default.

### 7.72.2.6 NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_MAX\_COUNT\_UNLIMITED

```
#define NDDS_TRANSPORT_ALLOCATION_SETTINGS_MAX_COUNT_UNLIMITED (-1)
```

The constant used as 'unlimited' for the 'max\_count' field of the structure **TransportAllocationSettings\_t** (p. 1947).

### 7.72.2.7 NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_INCREMENTAL\_COUNT\_AUTOMATIC

```
#define NDDS_TRANSPORT_ALLOCATION_SETTINGS_INCREMENTAL_COUNT_AUTOMATIC (-1)
```

The constant used as 'automatic' for the 'incremental\_count' field of the structure **TransportAllocationSettings\_t** (p. 1947).

Automatic means the buffer size will double at every reallocation.

### 7.72.2.8 NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_DEFAULT

```
#define NDDS_TRANSPORT_ALLOCATION_SETTINGS_DEFAULT
```

**Value:**

```
{
    2L, /* initial_count */
    NDDS_TRANSPORT_ALLOCATION_SETTINGS_MAX_COUNT_UNLIMITED, /* max_count */
    NDDS_TRANSPORT_ALLOCATION_SETTINGS_INCREMENTAL_COUNT_AUTOMATIC /* incremental_count */
}
```

The constant used as default value for the struct **TransportAllocationSettings\_t** (p. 1947).

The default value defined in this constant, sets the buffer to have:

- initial\_count = 2 elements
- max\_count = **NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_MAX\_COUNT\_UNLIMITED** (p. 248)
- incremental\_count = **NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_INCREMENTAL\_COUNT\_AUTOMATIC**

### 7.72.2.9 NDDS\_TRANSPORT\_CLASSID\_INVALID

```
#define NDDS_TRANSPORT_CLASSID_INVALID (-1)
```

Invalid Transport Class ID.

Transport-Plugins implementations should set their class ID to a value different than this.

### 7.72.2.10 NDDS\_TRANSPORT\_CLASSID\_UDPv4

```
#define NDDS_TRANSPORT_CLASSID_UDPv4 (1)
```

Builtin IPv4 UDP/IP Transport Plugin class ID.

### 7.72.2.11 NDDS\_TRANSPORT\_CLASSID\_SHMEM

```
#define NDDS_TRANSPORT_CLASSID_SHMEM (0x01000000)
```

Builtin Shared-Memory Transport Plugin class ID.

### 7.72.2.12 NDDS\_TRANSPORT\_CLASSID\_SHMEM\_510

```
#define NDDS_TRANSPORT_CLASSID_SHMEM_510 (2)
```

Builtin Shared-Memory Transport Plugin class ID for Connex 5.1.0 and earlier.

### 7.72.2.13 NDDS\_TRANSPORT\_CLASSID\_UDPv6

```
#define NDDS_TRANSPORT_CLASSID_UDPv6 (2)
```

Builtin IPv6 UDP/IP Transport Plugin class ID.

### 7.72.2.14 NDDS\_TRANSPORT\_CLASSID\_UDPv6\_510

```
#define NDDS_TRANSPORT_CLASSID_UDPv6_510 (5)
```

Builtin IPv6 UDP/IP Transport Plugin class ID for Connex 5.1.0 and earlier.

### 7.72.2.15 NDDS\_TRANSPORT\_CLASSID\_TCPV4\_LAN

```
#define NDDS_TRANSPORT_CLASSID_TCPV4_LAN (8)
```

IPv4 TCP/IP Transport Plugin class ID for LAN case.

### 7.72.2.16 NDDS\_TRANSPORT\_CLASSID\_TCPV4\_WAN

```
#define NDDS_TRANSPORT_CLASSID_TCPV4_WAN (9)
```

IPv4 TCP/IP Transport Plugin class ID for WAN case.

### 7.72.2.17 NDDS\_TRANSPORT\_CLASSNAME\_TCPV4\_WAN

```
#define NDDS_TRANSPORT_CLASSNAME_TCPV4_WAN "tcpv4_wan"
```

IPv4 TCP/IP Transport Plugin class name for WAN case.



### 7.72.2.18 NDDS\_TRANSPORT\_CLASSID\_TLsv4\_LAN

```
#define NDDS_TRANSPORT_CLASSID_TLsv4_LAN (10)
```

IPv4 TCP/IP Transport Plugin class ID for LAN case with TLS enabled.

### 7.72.2.19 NDDS\_TRANSPORT\_CLASSID\_TLsv4\_WAN

```
#define NDDS_TRANSPORT_CLASSID_TLsv4_WAN (11)
```

IPv4 TCP/IP Transport Plugin class ID for WAN case with TLS enabled.

### 7.72.2.20 NDDS\_TRANSPORT\_CLASSID\_UDPv4\_WAN

```
#define NDDS_TRANSPORT_CLASSID_UDPv4_WAN (0x01000001)
```

Builtin IPv4 UDP/IP Asymmetric Transport Plugin class ID.

### 7.72.2.21 NDDS\_TRANSPORT\_CLASSID\_RESERVED\_RANGE

```
#define NDDS_TRANSPORT_CLASSID_RESERVED_RANGE (1000)
```

Transport Plugin class IDs below this are reserved by RTI.

User-defined Transport-Plugins should use a class ID greater than this number.

### 7.72.2.22 NDDS\_TRANSPORT\_PROPERTY\_BIT\_BUFFER\_ALWAYS\_LOANED

```
#define NDDS_TRANSPORT_PROPERTY_BIT_BUFFER_ALWAYS_LOANED (0x2)
```

Specified zero-copy behavior of transport.

A Transport Plugin may commit to one of three behaviors for zero copy receives:

1. Always does zero copy.
2. Sometimes does zero copy, up to the transport discretion.
3. Never does zero copy.

This bit should be set only if the Transport Plugin commits to always doing a zero copy receive, or more specifically, always loaning a buffer through its `receive_rEA()` call.

In that case, RTI Connex will not need to allocate storage for a message that it retrieves with the `receive_rEA()` call.

### 7.72.2.23 NDDS\_TRANSPORT\_PROPERTY\_GATHER\_SEND\_BUFFER\_COUNT\_MIN

```
#define NDDS_TRANSPORT_PROPERTY_GATHER_SEND_BUFFER_COUNT_MIN (3)
```

Minimum number of gather-send buffers that must be supported by a Transport Plugin implementation.

For the `NDDS_Transport_Property_t` (p. 1776) structure to be valid, the value of `NDDS_Transport_Property_t::gather_send_buffer_count_max` (p. 1779) must be greater than or equal to this value.

## 7.72.3 Typedef Documentation

### 7.72.3.1 NDDS\_Transport\_Port\_t

```
typedef RTI_UINT32 NDDS_Transport_Port_t
```

Type for storing RTI Connex RTPS ports.

Unlike IPv4 Socket API ports, which are 2 bytes long, the RTI Connex representation of an RTPS port is 4 bytes.

### 7.72.3.2 NDDS\_Transport\_ClassId\_t

```
typedef RTI_INT32 NDDS_Transport_ClassId_t
```

Type for storing RTI Connex Transport Plugin class IDs.

Each implementation of a Transport Plugin must have a unique ID. For example, a UDP/IP Transport Plugin implementation must have a different ID than a Shared Memory Transport Plugin.

User-implemented Transport Plugins must have an ID higher than `NDDS_TRANSPORT_CLASSID_RESERVED_RANGE` (p. 251).

## 7.73 Transport Address

Transport-independent addressing scheme using IPv6 presentation strings and numerically stored in network-ordered format.

### Classes

- struct `NDDS_Transport_Address_t`

*Addresses are stored individually as network-ordered bytes.*

## Macros

- `#define NDDS_TRANSPORT_ADDRESS_INVALID_INITIALIZER {{0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}}`  
*An invalid transport address. Used as an initializer.*
- `#define NDDS_TRANSPORT_ADDRESS_STRING_BUFFER_SIZE (72)`  
*The minimum size of the buffer that should be passed to `NDDS_Transport_Address_to_string` (p. 255).*

## Functions

- `RTI_INT32 NDDS_Transport_Address_to_string (const NDDS_Transport_Address_t *self, char *buffer_↔ inout, RTI_INT32 buffer_length_in)`  
*Converts a numerical address to a printable string representation.*
- `RTIBool NDDS_Transport_Address_to_string_with_protocol_family_format (const NDDS_Transport_↔ Address_t *me, char *buffer, RTI_INT32 buffer_length_in, RTIOSapiSocketAFKind family)`  
*Converts a numerical address to a printable string representation with IPv4 dotted notation or IPv6 presentation string depending on the provided protocol family.*
- `RTI_INT32 NDDS_Transport_Address_from_string (NDDS_Transport_Address_t *address_out, const char *address_in)`  
*Converts an address (IPv4 dotted notation or IPv6 presentation string) into a numerical address.*
- `void NDDS_Transport_Address_print (const NDDS_Transport_Address_t *address_in, const char *desc_in, RTI_INT32 indent_in)`  
*Prints an address to standard out.*
- `RTI_INT32 NDDS_Transport_Address_is_ipv4 (const NDDS_Transport_Address_t *address_in)`  
*Checks if an address is an IPv4 address.*
- `RTI_INT32 NDDS_Transport_Address_is_multicast (const NDDS_Transport_Address_t *address_in)`  
*Checks if an address is an IPv4 or IPv6 multicast address.*

## Variables

- `const NDDS_Transport_Address_t NDDS_TRANSPORT_ADDRESS_INVALID`  
*An invalid transport address.*

### 7.73.1 Detailed Description

Transport-independent addressing scheme using IPv6 presentation strings and numerically stored in network-ordered format.

The APIs of RTI Connex uses IPv6 address notation for all transports.

Transport Plugin implementations that are not IP-based are required to map whatever addressing scheme natively used by the physical transport (if any) to an address in IPv6 notation and vice versa.

IPv6 addresses are numerically stored in 16 bytes. An IPv6 address can be presented In string notation in a variety of ways. For example,

```
"00AF:0000:0037:FE01:0000:0000:034B:0089"  
"AF:0:37:FE01:0:0:34B:89"  
"AF:0:37:FE01::34B:89"
```

are all valid IPv6 presentation of the same address.

IPv4 address in dot notation can be used to specify the last 4 bytes of the address. For example,

```
"0000:0000:0000:0000:0000:192.168.0.1"
"0:0:0:0:0:192.168.0.1"
"::192.168.0.1"
```

are all valid IPv6 presentation of the same address.

For a complete description of valid IPv6 address notation, consult the IPv6 Addressing Architecture (RFC 2373).

Addresses are divided into unicast addresses and multicast addresses.

Multicast addresses are defined as

- Addresses that start with 0xFF. That is `FFxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx`.

or an IPv4 multicast address

- Address in the range `::224.0.0.0, ::239.255.255.255]`

Multicast addresses do not refer to any specific destination (network interface). Instead, they usually refer to a group of network interfaces, often called a "multicast group".

Unicast addresses always refer to a specific network interface.

## 7.73.2 Macro Definition Documentation

### 7.73.2.1 NDDS\_TRANSPORT\_ADDRESS\_INVALID\_INITIALIZER

```
#define NDDS_TRANSPORT_ADDRESS_INVALID_INITIALIZER {{0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}}
```

An invalid transport address. Used as an initializer.

For example: `NDDS_Transport_Address_t` (p.1774) `address = NDDS_TRANSPORT_ADDRESS_INVALID_INITIALIZER;`

### 7.73.2.2 NDDS\_TRANSPORT\_ADDRESS\_STRING\_BUFFER\_SIZE

```
#define NDDS_TRANSPORT_ADDRESS_STRING_BUFFER_SIZE (72)
```

The minimum size of the buffer that should be passed to `NDDS_Transport_Address_to_string` (p.255).

For regular addresses, the string size needs to be at least 40 to include space for 8 tuples of 4 characters each plus 7 delimiting colons plus a terminating NULL.

To support UDPv4\_WAN strings, it has been adjusted to 72 to fit the following representation (plus NULL terminator): `f=XXXXRBPU,u={FF,FF,FF,FF,FF,FF,FF,FF,FF},p=255.255.255.255:65555:65555`

### 7.73.3 Function Documentation

#### 7.73.3.1 NDDS\_Transport\_Address\_to\_string()

```
RTI_INT32 NDDS_Transport_Address_to_string (
    const NDDS_Transport_Address_t * self,
    char * buffer_inout,
    RTI_INT32 buffer_length_in )
```

Converts a numerical address to a printable string representation.

#### Precondition

The *buffer\_inout* provided must be at least **NDDS\_TRANSPORT\_ADDRESS\_STRING\_BUFFER\_SIZE** (p. 254) characters long.

#### Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) The address to be converted.
<i>buffer_inout</i>	<< <i>inout</i> >> (p. 238) Storage passed in which to return the string corresponding to the address.
<i>buffer_length_in</i>	<< <i>in</i> >> (p. 238) The length of the storage buffer. Must be >=
<i>_in</i>	<b>NDDS_TRANSPORT_ADDRESS_STRING_BUFFER_SIZE</b> (p. 254)

#### Returns

1 upon success; 0 upon failure (not enough space in the provided buffer)

#### 7.73.3.2 NDDS\_Transport\_Address\_to\_string\_with\_protocol\_family\_format()

```
RTIBool NDDS_Transport_Address_to_string_with_protocol_family_format (
    const NDDS_Transport_Address_t * me,
    char * buffer,
    RTI_INT32 buffer_length_in,
    RTIOsapiSocketAFKind family )
```

Converts a numerical address to a printable string representation with IPv4 dotted notation or IPv6 presentation string depending on the provided protocol family.

#### Precondition

The *buffer\_inout* provided must be at least **NDDS\_TRANSPORT\_ADDRESS\_STRING\_BUFFER\_SIZE** (p. 254) characters long.

## Parameters

<i>me</i>	<< <i>in</i> >> (p. 238) The address to be converted.
<i>buffer</i>	<< <i>inout</i> >> (p. 238) Storage passed in which to return the string corresponding to the address.
<i>buffer_length</i> <i>_in</i>	<< <i>in</i> >> (p. 238) The length of the storage buffer. Must be >= <b>NDDS_TRANSPORT_ADDRESS_STRING_BUFFER_SIZE</b> (p. 254)
<i>family</i>	<< <i>in</i> >> (p. 238) The protocol family RTI_OSAPI_SOCKET_AF_INET or RTI_OSAPI_SOCKET_AF_INET6

## Returns

RTI\_TRUE upon success; 0 upon failure (not enough space in the provided buffer)

## 7.73.3.3 NDDS\_Transport\_Address\_from\_string()

```
RTI_INT32 NDDS_Transport_Address_from_string (
    NDDS_Transport_Address_t * address_out,
    const char * address_in )
```

Converts an address (IPv4 dotted notation or IPv6 presentation string) into a numerical address.

The address string must be in IPv4 dotted notation (X.X.X.X) or IPv6 presentation notation. The string cannot be a hostname since this function does not perform a hostname lookup.

## Parameters

<i>address_out</i>	<< <i>out</i> >> (p. 238) Numerical value of the address.
<i>address_in</i>	<< <i>in</i> >> (p. 238) String representation of an address.

## Returns

1 if *address\_out* contains a valid address  
0 if it was not able to convert the string into an address.

## 7.73.3.4 NDDS\_Transport\_Address\_print()

```
void NDDS_Transport_Address_print (
    const NDDS_Transport_Address_t * address_in,
    const char * desc_in,
    RTI_INT32 indent_in )
```

Prints an address to standard out.

## Parameters

<i>address_in</i>	<< <i>in</i> >> (p. 238) Address to be printed.
<i>desc_in</i>	<< <i>in</i> >> (p. 238) A prefix to be printed before the address.
<i>indent_in</i>	<< <i>in</i> >> (p. 238) Indentation level for the printout.

## 7.73.3.5 NDDS\_Transport\_Address\_is\_ipv4()

```
RTI_INT32 NDDS_Transport_Address_is_ipv4 (
    const NDDS_Transport_Address_t * address_in )
```

Checks if an address is an IPv4 address.

## Parameters

<i>address_in</i>	<< <i>in</i> >> (p. 238) Address to be tested.
-------------------	--

## Note

May be implemented as a macro for efficiency.

## Returns

1 if address is an IPv4 address

0 otherwise.

## 7.73.3.6 NDDS\_Transport\_Address\_is\_multicast()

```
RTI_INT32 NDDS_Transport_Address_is_multicast (
    const NDDS_Transport_Address_t * address_in )
```

Checks if an address is an IPv4 or IPv6 multicast address.

## Parameters

<i>address_in</i>	<< <i>in</i> >> (p. 238) Address to be tested.
-------------------	--

May be implemented as a macro for efficiency.

#### Returns

- 1 if address is a multicast address
- 0 otherwise.

### 7.73.4 Variable Documentation

#### 7.73.4.1 NDDS\_TRANSPORT\_ADDRESS\_INVALID

```
const NDDS_Transport_Address_t NDDS_TRANSPORT_ADDRESS_INVALID
```

An invalid transport address.

## 7.74 UDP Transport Plugin definitions

UDP Transport Plugin definitions.

### Classes

- struct **NDDS\_Transport\_UDP\_WAN\_CommPortsMappingInfo**  
*Type for storing UDP WAN communication ports.*

### Macros

- #define **NDDS\_TRANSPORT\_UDP\_PROPERTIES\_BITMAP\_DEFAULT** (0)  
*Default value of `NDDS_Transport_Property_t::properties_bitmap` (p. 1778).*
- #define **NDDS\_TRANSPORT\_UDP\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT** (16)  
*Default value of `NDDS_Transport_Property_t::gather_send_buffer_count_max` (p. 1779).*
- #define **NDDS\_TRANSPORT\_UDP\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT** (-1)  
*Used to specify that os default be used to specify socket buffer size.*
- #define **NDDS\_TRANSPORT\_UDP\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT** (131072)  
*Default value of `send_socket_buffer_size`.*
- #define **NDDS\_TRANSPORT\_UDP\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT** (131072)  
*Default value of `recv_socket_buffer_size`.*
- #define **NDDS\_TRANSPORT\_UDP\_MULTICAST\_TTL\_DEFAULT** (1)  
*Default value of `multicast_ttl`.*



## Typedefs

- typedef RTI\_UINT16 **NDDS\_Transport\_UDP\_Port**  
*UDP port.*

### 7.74.1 Detailed Description

UDP Transport Plugin definitions.

### 7.74.2 Macro Definition Documentation

#### 7.74.2.1 NDDS\_TRANSPORT\_UDP\_PROPERTIES\_BITMAP\_DEFAULT

```
#define NDDS_TRANSPORT_UDP_PROPERTIES_BITMAP_DEFAULT (0)
```

Default value of **NDDS\_Transport\_Property\_t::properties\_bitmap** (p. 1778).

#### 7.74.2.2 NDDS\_TRANSPORT\_UDP\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT

```
#define NDDS_TRANSPORT_UDP_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT (16)
```

Default value of **NDDS\_Transport\_Property\_t::gather\_send\_buffer\_count\_max** (p. 1779).

This is also the maximum value that can be used when instantiating the udp transport.

16 is sufficient for RTI Connex, but more may improve discovery and reliable performance. Porting note: find out what the maximum gather buffer count is on your OS!

#### 7.74.2.3 NDDS\_TRANSPORT\_UDP\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT

```
#define NDDS_TRANSPORT_UDP_SOCKET_BUFFER_SIZE_OS_DEFAULT (-1)
```

Used to specify that os default be used to specify socket buffer size.

#### 7.74.2.4 NDDS\_TRANSPORT\_UDP\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT

```
#define NDDS_TRANSPORT_UDP_SEND_SOCKET_BUFFER_SIZE_DEFAULT (131072)
```

Default value of `send_socket_buffer_size`.

#### 7.74.2.5 NDDS\_TRANSPORT\_UDP\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT

```
#define NDDS_TRANSPORT_UDP_RECV_SOCKET_BUFFER_SIZE_DEFAULT (131072)
```

Default value of `recv_socket_buffer_size`.

#### 7.74.2.6 NDDS\_TRANSPORT\_UDP\_MULTICAST\_TTL\_DEFAULT

```
#define NDDS_TRANSPORT_UDP_MULTICAST_TTL_DEFAULT (1)
```

Default value of `multicast_ttl`.

### 7.74.3 Typedef Documentation

#### 7.74.3.1 NDDS\_Transport\_UDP\_Port

```
typedef RTI_UINT16 NDDS_Transport_UDP_Port
```

UDP port.

## 7.75 Shared Memory Transport

Built-in transport plug-in for inter-process communications using shared memory ([NDDS\\_TRANSPORT\\_CLASSID\\_SHMEM](#) (p. 249)).

### Classes

- struct **NDDS\_Transport\_Shmem\_Property\_t**

*Subclass of [NDDS\\_Transport\\_Property\\_t](#) (p. 1776) allowing specification of parameters that are specific to the shared-memory transport.*

## Macros

- #define **NDDS\_TRANSPORT\_SHMEM\_ADDRESS\_BIT\_COUNT** (-96)  
*Default value of `NDDS_Transport_Property_t::address_bit_count` (p. 1778).*
- #define **NDDS\_TRANSPORT\_SHMEM\_PROPERTIES\_BITMAP\_DEFAULT** ( `NDDS_TRANSPORT_PROPERTY_BIT_BUFFER_ALWAYS_LOADED` )  
*Default value of `NDDS_Transport_Property_t::properties_bitmap` (p. 1778).*
- #define **NDDS\_TRANSPORT\_SHMEM\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT** (1024)  
*Default value of `NDDS_Transport_Property_t::gather_send_buffer_count_max` (p. 1779).*
- #define **NDDS\_TRANSPORT\_SHMEM\_MESSAGE\_SIZE\_MAX\_DEFAULT** (65536)  
*Default value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).*
- #define **NDDS\_TRANSPORT\_SHMEM\_RECEIVED\_MESSAGE\_COUNT\_MAX\_DEFAULT** (64)  
*Default value of `NDDS_Transport_Shmem_Property_t::received_message_count_max` (p. 1785).*
- #define **NDDS\_TRANSPORT\_SHMEM\_RECEIVE\_BUFFER\_SIZE\_DEFAULT**  
*Default value of `NDDS_Transport_Shmem_Property_t::receive_buffer_size` (p. 1785).*
- #define **NDDS\_TRANSPORT\_SHMEM\_MAJOR\_AFTER\_BUG\_14240\_FIX** (2)  
*Major version for the transport plugin after fixing bug 14240 (RTI-28)*
- #define **NDDS\_TRANSPORT\_SHMEM\_PROPERTY\_DEFAULT**  
*Use this to initialize stack variable.*

## Functions

- `NDDS_Transport_Plugin * NDDS_Transport_Shmem_new` (const struct `NDDS_Transport_Shmem_Property_t *property_in`)  
*Create a new shmem process transport.*
- `NDDS_Transport_Plugin * NDDS_Transport_Shmem_create` ( `NDDS_Transport_Address_t *default_network_address_out`, const struct `DDS_PropertyQosPolicy *property_in`, const struct `DDS_Product_Version_t *minimum_compatibility_version` )  
*Create a new shmem process transport, using PropertyQosPolicy.*

### 7.75.1 Detailed Description

Built-in transport plug-in for inter-process communications using shared memory (`NDDS_TRANSPORT_CLASSID_SHMEM` (p. 249)) .

This transport plugin uses System Shared Memory to send messages between processes on the same node. This transport is installed as a built-in transport plugin with the alias `DDS_TRANSPORTBUILTIN_SHMEM_ALIAS` (p. 446).

### 7.75.2 Compatibility of Sender and Receiver Transports

Opening a receiver "port" on shared memory corresponds to creating a shared memory segment using a name based on the port number. The transport plugin's properties are embedded in the shared memory segment.

When a sender tries to send to the shared memory port, it verifies that properties of the receiver's shared memory transport are compatible with those specified in its transport plugin. If not, the sender will fail to attach to the port and will output messages such as below (with numbers appropriate to the properties of the transport plugins involved).

```
NDDS_Transport_Shmem_attachShmem:failed to initialize incompatible properties
NDDS_Transport_Shmem_attachShmem:countMax 0 > -19417345 or max size -19416188 > 2147482624
```

In this scenario, the properties of the sender or receiver transport plugin instances should be adjusted, so that they are compatible.

### 7.75.3 Crashing and Restarting Programs

If a process using shared memory crashes (say because the user typed in  $\wedge C$ ), resources associated with its shared memory ports may not be properly cleaned up. Later, if another RTI Connex process needs to open the same ports (say, the crashed program is restarted), it will attempt to reuse the shared memory segment left behind by the crashed process.

The reuse is allowed iff the properties of transport plugin are compatible with those embedded in the shared memory segment (i.e., of the original creator). Otherwise, the process will fail to open the ports, and will output messages such as below (with numbers appropriate to the properties of the transport plugins involved).

```
NDDS_Transport_Shmem_create_recvresource_rrEA:failed to initialize shared
memory resource Cannot recycle existing shmem: size not compatible for key 0x1234
```

In this scenario, the shared memory segments must be cleaned up using appropriate platform specific commands. For details, please refer to the `Platform Notes`.

### 7.75.4 Shared Resource Keys

The transport uses the **shared memory segment keys**, given by the formula below.

```
0x400000 + port
```

The transport also uses signaling **shared semaphore** keys given by the formula below.

```
0x800000 + port
```

The transport also uses mutex **shared semaphore keys** given by the formula below.

```
0xb00000 + port
```

where the `port` is a function of the `domain_id` and the `participant_id`, as described in [DDS\\_WireProtocolQosPolicy::participant\\_id](#) (p. 1247)

See also

[DDS\\_WireProtocolQosPolicy::participant\\_id](#) (p. 1247)

[NDDSTransportSupport::set\\_builtin\\_transport\\_property\(\)](#) (p. 1838)

### 7.75.5 Creating and Registering Shared Memory Transport Plugin

RTI Connex can implicitly create this plugin and register with the [DDSDomainParticipant](#) (p. 1351) if this transport is specified in [DDS\\_TransportBuiltinQosPolicy](#) (p. 1144).

To specify the properties of the builtin shared memory transport that is implicitly registered, you can either:

- call [NDDSTransportSupport::set\\_builtin\\_transport\\_property](#) (p. 1838) or
- specify the pre-defined property names in [DDS\\_PropertyQosPolicy](#) (p. 1007) associated with the [DDSDomainParticipant](#) (p. 1351). (see [Shared Memory Transport Property Names in Property QoS Policy of Domain Participant](#) (p. 263)).

Builtin transport plugin properties specified in [DDS\\_PropertyQosPolicy](#) (p. 1007) always overwrite the ones specified through [NDDSTransportSupport::set\\_builtin\\_transport\\_property\(\)](#) (p. 1838). The default value is assumed on any unspecified property. Note that all properties should be set before the transport is implicitly created and registered by RTI Connex. See [Builtin Transport Plugins](#) (p. 177) for details on when a builtin transport is registered.

To explicitly create an instance of this plugin, [NDDS\\_Transport\\_Shmem\\_new\(\)](#) (p. 265) should be called. The instance should be registered with RTI Connex, see [NDDSTransportSupport::register\\_transport](#) (p. 1834). In some configurations, you may have to disable the builtin shared memory transport plugin instance ([DDS\\_TransportBuiltinQosPolicy](#) (p. 1144), [DDS\\_TRANSPORTBUILTIN\\_SHMEM](#) (p. 446)), to avoid port conflicts with the newly created plugin instance.

### 7.75.6 Shared Memory Transport Property Names in Property QoS Policy of Domain Participant

The following table lists the predefined property names that can be set in the `DDS_DomainParticipantQos::property` (p. 745) to configure the builtin shared memory transport plugin.

**Table 7.90 Property Strings for Shared Memory Transport**

Name	Descriptions
<code>dds.transport.shmem.builtin.parent.address_bit_count</code>	See <code>NDDS_Transport_Property_t::address_bit_count</code> (p. 1778)
<code>dds.transport.shmem.builtin.parent.properties_bitmap</code>	See <code>NDDS_Transport_Property_t::properties_bitmap</code> (p. 1778)
<code>dds.transport.shmem.builtin.parent.gather_send_buffer_count_max</code>	See <code>NDDS_Transport_Property_t::gather_send_buffer_count_max</code> (p. 1779)
<code>dds.transport.shmem.builtin.parent.message_size_max</code>	See <code>NDDS_Transport_Property_t::message_size_max</code> (p. 1779)
<code>dds.transport.shmem.builtin.parent.allow_interfaces</code>	See <code>NDDS_Transport_Property_t::allow_interfaces_list</code> (p. 1779) and <code>NDDS_Transport_Property_t::allow_interfaces_list_length</code> (p. 1780). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: <code>127.0.0.1,eth0</code>
<code>dds.transport.shmem.builtin.parent.deny_interfaces</code>	See <code>NDDS_Transport_Property_t::deny_interfaces_list</code> (p. 1780) and <code>NDDS_Transport_Property_t::deny_interfaces_list_length</code> (p. 1781). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: <code>127.0.0.1,eth0</code>
<code>dds.transport.shmem.builtin.parent.allow_multicast_interfaces</code>	See <code>NDDS_Transport_Property_t::allow_multicast_interfaces_list</code> (p. 1781) and <code>NDDS_Transport_Property_t::allow_multicast_interfaces_list_length</code> (p. 1782). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: <code>127.0.0.1,eth0</code>
<code>dds.transport.shmem.builtin.parent.deny_multicast_interfaces</code>	See <code>NDDS_Transport_Property_t::deny_multicast_interfaces_list</code> (p. 1782) and <code>NDDS_Transport_Property_t::deny_multicast_interfaces_list_length</code> (p. 1782). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: <code>127.0.0.1,eth0</code>
<code>dds.transport.shmem.builtin.parent.max_interface_count</code>	See <code>NDDS_Transport_Property_t::max_interface_count</code> (p. 1783)
<code>dds.transport.shmem.builtin.parent.thread_name_prefix</code>	See <code>NDDS_Transport_Property_t::thread_name_prefix</code> (p. 1783)
<code>dds.transport.shmem.builtin.received_message_count_max</code>	See <code>NDDS_Transport_Shmem_Property_t::received_message_count_max</code> (p. 1785)

Name	Descriptions
dds.transport.shmem.builtin.receive_buffer_size	See <code>NDDS_Transport_Shmem_Property_t::receive_buffer_size</code> (p. 1785)
dds.transport.shmem.builtin.enable_udp_debugging	See <code>NDDS_Transport_Shmem_Property_t::enable_udp_debugging</code> (p. 1786)
dds.transport.shmem.builtin.udp_debugging_address	See <code>NDDS_Transport_Shmem_Property_t::udp_debugging_address</code> (p. 1786)
dds.transport.shmem.builtin.udp_debugging_port	See <code>NDDS_Transport_Shmem_Property_t::udp_debugging_port</code> (p. 1787)

## 7.75.7 Macro Definition Documentation

### 7.75.7.1 NDDS\_TRANSPORT\_SHMEM\_ADDRESS\_BIT\_COUNT

```
#define NDDS_TRANSPORT_SHMEM_ADDRESS_BIT_COUNT (-96)
```

Default value of `NDDS_Transport_Property_t::address_bit_count` (p. 1778).

### 7.75.7.2 NDDS\_TRANSPORT\_SHMEM\_PROPERTIES\_BITMAP\_DEFAULT

```
#define NDDS_TRANSPORT_SHMEM_PROPERTIES_BITMAP_DEFAULT ( NDDS_TRANSPORT_PROPERTY_BIT_BUFFER_↔  
ALWAYS_LOANED )
```

Default value of `NDDS_Transport_Property_t::properties_bitmap` (p. 1778).

### 7.75.7.3 NDDS\_TRANSPORT\_SHMEM\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT

```
#define NDDS_TRANSPORT_SHMEM_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT (1024)
```

Default value of `NDDS_Transport_Property_t::gather_send_buffer_count_max` (p. 1779).

**7.75.7.4 NDDS\_TRANSPORT\_SHMEM\_MESSAGE\_SIZE\_MAX\_DEFAULT**

```
#define NDDS_TRANSPORT_SHMEM_MESSAGE_SIZE_MAX_DEFAULT (65536)
```

Default value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).

**7.75.7.5 NDDS\_TRANSPORT\_SHMEM\_RECEIVED\_MESSAGE\_COUNT\_MAX\_DEFAULT**

```
#define NDDS_TRANSPORT_SHMEM_RECEIVED_MESSAGE_COUNT_MAX_DEFAULT (64)
```

Default value of `NDDS_Transport_Shmem_Property_t::received_message_count_max` (p. 1785).

**7.75.7.6 NDDS\_TRANSPORT\_SHMEM\_RECEIVE\_BUFFER\_SIZE\_DEFAULT**

```
#define NDDS_TRANSPORT_SHMEM_RECEIVE_BUFFER_SIZE_DEFAULT
```

**Value:**

```
(NDDS_TRANSPORT_SHMEM_RECEIVED_MESSAGE_COUNT_MAX_DEFAULT * \
 NDDS_TRANSPORT_SHMEM_MESSAGE_SIZE_MAX_DEFAULT / 4)
```

Default value of `NDDS_Transport_Shmem_Property_t::receive_buffer_size` (p. 1785).

**7.75.7.7 NDDS\_TRANSPORT\_SHMEM\_MAJOR\_AFTER\_BUG\_14240\_FIX**

```
#define NDDS_TRANSPORT_SHMEM_MAJOR_AFTER_BUG_14240_FIX (2)
```

Major version for the transport plugin after fixing bug 14240 (RTI-28)

**7.75.7.8 NDDS\_TRANSPORT\_SHMEM\_PROPERTY\_DEFAULT**

```
#define NDDS_TRANSPORT_SHMEM_PROPERTY_DEFAULT
```

Use this to initialize stack variable.

**7.75.8 Function Documentation****7.75.8.1 NDDS\_Transport\_Shmem\_new()**

```
NDDS_Transport_Plugin * NDDS_Transport_Shmem_new (
    const struct NDDS_Transport_Shmem_Property_t * property_in )
```

Create a new shmем process transport.

An application may create multiple transports, possibly for use in different domains.

## Parameters

<i>property_in</i>	<< <i>in</i> >> (p. 238) Desired behavior of this transport. May be NULL for default property. The transport plugin can only support one unicast receive interface; therefore the interface selection lists are ignored.
--------------------	--

## Returns

handle to a Shmem inter-process Transport Plugin on success  
 NULL on failure.

## 7.75.8.2 NDDS\_Transport\_Shmem\_create()

```
NDDS_Transport_Plugin * NDDS_Transport_Shmem_create (
    NDDS_Transport_Address_t * default_network_address_out,
    const struct DDS_PropertyQosPolicy * property_in,
    const struct DDS_ProductVersion_t * minimum_compatibility_version )
```

Create a new shmem process transport, using PropertyQosPolicy.

An application may create multiple transports, possibly for use in different domains.

## Parameters

<i>default_network_address_out</i>	<< <i>out</i> >> (p. 238) Network address to be used when registering the transport.
<i>property_in</i>	<< <i>in</i> >> (p. 238) Desired behavior of this transport. May be NULL for default property. The transport plugin can only support one unicast receive interface; therefore the interface selection lists are ignored.
<i>minimum_compatibility_version</i>	<< <i>in</i> >> (p. 238) Desired product version for the shared memory transport. If NULL, the default shared memory transport is used (no additional compatibility restrictions for the transport version). Please refer to the <i>minimum_compatibility_version</i> property for more information.

## Returns

handle to a Shmem inter-process Transport Plugin on success  
 NULL on failure.

## 7.76 UDPv4 Transport

Transport plug-in using UDP/IPv4 (**NDDS\_TRANSPORT\_CLASSID\_UDPv4** (p. 249)) .



## Classes

- struct **NDDS\_Transport\_UDPv4\_Property\_t**  
*Configurable IPv4/UDP Transport-Plugin properties.*

## Macros

- #define **NDDS\_TRANSPORT\_UDPv4\_ADDRESS\_BIT\_COUNT** (32)  
*Default value of `NDDS_Transport_Property_t::address_bit_count` (p. 1778).*
- #define **NDDS\_TRANSPORT\_UDPv4\_WAN\_ADDRESS\_BIT\_COUNT** (128)  
*Default value of `NDDS_Transport_Property_t::address_bit_count` (p. 1778) for UDPv4 asymmetric transport.*
- #define **NDDS\_TRANSPORT\_UDPv4\_PROPERTIES\_BITMAP\_DEFAULT** **NDDS\_TRANSPORT\_UDP\_↔  
PROPERTIES\_BITMAP\_DEFAULT**  
*Default value of `NDDS_Transport_Property_t::properties_bitmap` (p. 1778).*
- #define **NDDS\_TRANSPORT\_UDPv4\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT** **NDDS\_↔  
TRANSPORT\_UDP\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT**  
*Default value of `NDDS_Transport_Property_t::gather_send_buffer_count_max` (p. 1779).*
- #define **NDDS\_TRANSPORT\_UDPv4\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT** **NDDS\_TRANSPORT\_↔  
UDP\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT**  
*Used to specify that os default be used to specify socket buffer size.*
- #define **NDDS\_TRANSPORT\_UDPv4\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT** **NDDS\_TRANSPORT\_↔  
UDP\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT**  
*Default value for `NDDS_Transport_UDPv4_Property_t::send_socket_buffer_size` (p. 1790) and `NDDS_Transport_↔  
UDPv4_WAN_Property_t::send_socket_buffer_size` (p. 1799).*
- #define **NDDS\_TRANSPORT\_UDPv4\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT** **NDDS\_TRANSPORT\_↔  
UDP\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT**  
*Default value for `NDDS_Transport_UDPv4_Property_t::recv_socket_buffer_size` (p. 1790) and `NDDS_Transport_↔  
UDPv4_WAN_Property_t::recv_socket_buffer_size` (p. 1800).*
- #define **NDDS\_TRANSPORT\_UDPv4\_PAYLOAD\_SIZE\_MAX** (65507)  
*Maximum value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).*
- #define **NDDS\_TRANSPORT\_UDPv4\_MESSAGE\_SIZE\_MAX\_DEFAULT** **NDDS\_TRANSPORT\_UDPv4\_↔  
PAYLOAD\_SIZE\_MAX**  
*Maximum value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).*
- #define **NDDS\_TRANSPORT\_UDPv4\_MULTICAST\_TTL\_DEFAULT** **NDDS\_TRANSPORT\_UDP\_↔  
MULTICAST\_TTL\_DEFAULT**  
*Default value of `NDDS_Transport_UDPv4_Property_t::multicast_ttl` (p. 1791).*
- #define **NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_NEVER**  
*Value for `NDDS_Transport_UDPv4_Property_t::send_blocking` (p. 1793) to specify non-blocking sockets.*
- #define **NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_ALWAYS**  
*[default] Value for `NDDS_Transport_UDPv4_Property_t::send_blocking` (p. 1793) to specify blocking sockets.*
- #define **NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_DEFAULT** **NDDS\_TRANSPORT\_UDP\_BLOCKING\_↔  
DEFAULT**  
*Default value for `NDDS_Transport_UDPv4_Property_t::send_blocking` (p. 1793) to specify blocking sockets.*
- #define **NDDS\_TRANSPORT\_UDPv4\_PROPERTY\_DEFAULT**  
*Use this to initialize a `NDDS_Transport_UDPv4_Property_t` (p. 1788) structure.*
- #define **NDDS\_Transport\_UDPv4\_string\_to\_address\_cEA** **NDDS\_Transport\_UDP\_string\_to\_address\_cEA**  
*Realization of `NDDS_Transport_String_To_Address_Fcn_cEA` for IP transports.*

## Functions

- `NDDS_Transport_Plugin * NDDS_Transport_UDPv4_new` (const struct `NDDS_Transport_UDPv4_Property_t *property_in`)  
*Create an instance of a UDPv4 Transport Plugin.*
- `NDDS_Transport_Plugin * NDDS_Transport_UDPv4_create` ( `NDDS_Transport_Address_t *default_network_address_out`, const struct `DDS_PropertyQosPolicy *property_in`)  
*Create an instance of a UDPv4 Transport Plugin, using the PropertyQosPolicy.*
- `NDDS_Transport_Plugin * NDDS_Transport_UDPv4_create_from_properties_with_prefix` ( `NDDS_Transport_Address_t *default_network_address_out`, const struct `DDS_PropertyQosPolicy *property_in`, const char `*propertyPrefix`)  
*Create an instance of a UDPv4 Transport Plugin, using the PropertyQosPolicy. Same as `NDDS_Transport_UDPv4_create` but with a prefix for the input properties. It is used to create pluggable transports that use an underlying UDP transport.*

### 7.76.1 Detailed Description

Transport plug-in using UDP/IPv4 (`NDDS_TRANSPORT_CLASSID_UDPv4` (p. 249)) .

This transport plugin uses UDPv4 sockets to send and receive messages. It supports both unicast and multicast communications in a single instance of the plugin. By default, this plugin will use all interfaces that it finds enabled and "UP" at instantiation time to send and receive messages. This transport is installed as a built-in transport plugin with the alias `DDS_TRANSPORTBUILTIN_UDPv4_ALIAS` (p. 446).

You can configure an instance of this plugin to only use unicast or only use multicast, see `NDDS_Transport_UDPv4_Property_t::unicast_enabled` (p. 1790) and `NDDS_Transport_UDPv4_Property_t::multicast_enabled` (p. 1791).

In addition, you can configure an instance of this plugin to selectively use the network interfaces of a node (and restrict a plugin from sending multicast messages on specific interfaces) by specifying the `NDDS_Transport_Property_t::max_interface_count` (p. 1783) and the "white" and "black" lists in the base property's fields (`NDDS_Transport_Property_t::allow_interfaces_list` (p. 1779), `NDDS_Transport_Property_t::deny_interfaces_list` (p. 1780), `NDDS_Transport_Property_t::allow_multicast_interfaces_list` (p. 1781), `NDDS_Transport_Property_t::deny_multicast_interfaces_list` (p. 1782)).

RTI Connexant can implicitly create this plugin and register with the `DDSDomainParticipant` (p. 1351) if this transport is specified in `DDS_TransportBuiltinQosPolicy` (p. 1144).

To specify the properties of the builtin UDPv4 transport that is implicitly registered, you can either:

- call `NDDSTransportSupport::set_builtin_transport_property` (p. 1838) or
- specify the predefined property names in `DDS_PropertyQosPolicy` (p. 1007) associated with the `DDSDomainParticipant` (p. 1351). (see `UDPv4 Transport Property Names in Property QoS Policy of Domain Participant` (p. 269)). Builtin transport plugin properties specified in `DDS_PropertyQosPolicy` (p. 1007) always overwrite the ones specified through `NDDSTransportSupport::set_builtin_transport_property()` (p. 1838). The default value is assumed on any unspecified property.

Note that all properties should be set before the transport is implicitly created and registered by RTI Connexant. Any properties set after the builtin transport is registered will be ignored. See `Built-in Transport Plugins` (p. 177) for details on when a builtin transport is registered. To explicitly create an instance of this plugin, `NDDS_Transport_UDPv4_new()` (p. 274) should be called. The instance should be registered with RTI Connexant, see `NDDSTransportSupport::register_transport` (p. 1834). In some configurations one may have to disable the builtin UDPv4 transport plugin instance (`DDS_TransportBuiltinQosPolicy` (p. 1144), `DDS_TRANSPORTBUILTIN_UDPv4` (p. 446)), to avoid port conflicts with the newly created plugin instance.

## 7.76.2 UDPv4 Transport Property Names in Property QoS Policy of Domain Participant

The following table lists the predefined property names that can be set in the `DDS_DomainParticipantQos::property` (p. 745) to configure the builtin UDPv4 transport plugin.

**Table 7.93 Property Names for UDPv4 Transport Plugin**

Property Name	Description
<code>dds.transport.UDPv4.builtin.parent.classid</code>	See <code>NDDS_Transport_Property_t::classid</code> (p. 1777) Should be set to " <code>NDDS_TRANSPORT_CLASSID_↔ UDPv6</code> (p. 249)"
<code>dds.transport.UDPv4.builtin.parent.address_bit_count</code>	See <code>NDDS_Transport_Property_t::address_bit_↔ count</code> (p. 1778)
<code>dds.transport.UDPv4.builtin.parent.properties_bitmap</code>	See <code>NDDS_Transport_Property_t::properties_↔ bitmap</code> (p. 1778)
<code>dds.transport.UDPv4.builtin.parent.gather_send_↔ buffer_count_max</code>	See <code>NDDS_Transport_Property_t::gather_send_↔ buffer_count_max</code> (p. 1779)
<code>dds.transport.UDPv4.builtin.parent.message_size_max</code>	See <code>NDDS_Transport_Property_t::message_size_↔ max</code> (p. 1779)
<code>dds.transport.UDPv4.builtin.parent.allow_interfaces</code>	See <code>NDDS_Transport_Property_t::allow_↔ interfaces_list</code> (p. 1779) and <code>NDDS_Transport_↔ Property_t::allow_interfaces_list_length</code> (p. 1780). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example, <code>127.0.0.1,eth0</code>
<code>dds.transport.UDPv4.builtin.parent.deny_interfaces</code>	See <code>NDDS_Transport_Property_t::deny_interfaces_↔ _list</code> (p. 1780) and <code>NDDS_Transport_Property_t_↔ ::deny_interfaces_list_length</code> (p. 1781). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: <code>127.0.0.1,eth0</code>
<code>dds.transport.UDPv4.builtin.parent.allow_multicast_↔ interfaces</code>	See <code>NDDS_Transport_Property_t::allow_multicast_↔ _interfaces_list</code> (p. 1781) and <code>NDDS_Transport_↔ Property_t::allow_multicast_interfaces_list_length</code> (p. 1782). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: <code>127.0.0.1,eth0</code>
<code>dds.transport.UDPv4.builtin.parent.deny_multicast_↔ interfaces</code>	See <code>NDDS_Transport_Property_t::deny_multicast_↔ _interfaces_list</code> (p. 1782) and <code>NDDS_Transport_↔ Property_t::deny_multicast_interfaces_list_length</code> (p. 1782). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: <code>127.0.0.1,eth0</code>
<code>dds.transport.UDPv4.builtin.parent.max_interface_count</code>	See <code>NDDS_Transport_Property_t::max_interface_↔ count</code> (p. 1783)
<code>dds.transport.UDPv4.builtin.parent.thread_name_prefix</code>	See <code>NDDS_Transport_Property_t::thread_name_↔ prefix</code> (p. 1783)
<code>dds.transport.UDPv4.builtin.send_socket_buffer_size</code>	See <code>NDDS_Transport_UDPv4_Property_t::send_↔ socket_buffer_size</code> (p. 1790)
<code>dds.transport.UDPv4.builtin.recv_socket_buffer_size</code>	See <code>NDDS_Transport_UDPv4_Property_t::recv_↔ socket_buffer_size</code> (p. 1790)

Property Name	Description
dds.transport.UDPv4.builtin.unicast_enabled	See <code>NDDS_Transport_UDPv4_Property_t::unicast_enabled</code> (p. 1790)
dds.transport.UDPv4.builtin.multicast_enabled	See <code>NDDS_Transport_UDPv4_Property_t::multicast_enabled</code> (p. 1791)
dds.transport.UDPv4.builtin.multicast_ttl	See <code>NDDS_Transport_UDPv4_Property_t::multicast_ttl</code> (p. 1791)
dds.transport.UDPv4.builtin.multicast_loopback_disabled	See <code>NDDS_Transport_UDPv4_Property_t::multicast_loopback_disabled</code> (p. 1791)
dds.transport.UDPv4.builtin.ignore_loopback_interface	See <code>NDDS_Transport_UDPv4_Property_t::ignore_loopback_interface</code> (p. 1791)
dds.transport.UDPv4.builtin.ignore_nonrunning_interfaces	See <code>NDDS_Transport_UDPv4_Property_t::ignore_nonrunning_interfaces</code> (p. 1792)
dds.transport.UDPv4.builtin.ignore_nonup_interfaces	<b>[DEPRECATED]</b> See <code>NDDS_Transport_UDPv4_Property_t::ignore_nonup_interfaces</code> (p. 1792)
dds.transport.UDPv4.builtin.no_zero_copy	<b>[DEPRECATED]</b> See <code>NDDS_Transport_UDPv4_Property_t::no_zero_copy</code> (p. 1793)
dds.transport.UDPv4.builtin.send_blocking	See <code>NDDS_Transport_UDPv4_Property_t::send_blocking</code> (p. 1793)
dds.transport.UDPv4.builtin.transport_priority_mask	See <code>NDDS_Transport_UDPv4_Property_t::transport_priority_mask</code> (p. 1794)
dds.transport.UDPv4.builtin.transport_priority_mapping_low	See <code>NDDS_Transport_UDPv4_Property_t::transport_priority_mapping_low</code> (p. 1794)
dds.transport.UDPv4.builtin.transport_priority_mapping_high	See <code>NDDS_Transport_UDPv4_Property_t::transport_priority_mapping_high</code> (p. 1794)
dds.transport.UDPv4.builtin.send_ping	See <code>NDDS_Transport_UDPv4_Property_t::send_ping</code> (p. 1795)
dds.transport.UDPv4.builtin.force_interface_poll_detection	See <code>NDDS_Transport_UDPv4_Property_t::force_interface_poll_detection</code> (p. 1795)
dds.transport.UDPv4.builtin.interface_poll_period	See <code>NDDS_Transport_UDPv4_Property_t::interface_poll_period</code> (p. 1795)
dds.transport.UDPv4.builtin.reuse_multicast_receive_resource	See <code>NDDS_Transport_UDPv4_Property_t::reuse_multicast_receive_resource</code> (p. 1795)
dds.transport.UDPv4.builtin.protocol_overhead_max	See <code>NDDS_Transport_UDPv4_Property_t::protocol_overhead_max</code> (p. 1796)
dds.transport.UDPv4.builtin.disable_interface_tracking	See <code>NDDS_Transport_UDPv4_Property_t::disable_interface_tracking</code> (p. 1796)
dds.transport.UDPv4.builtin.public_address	See <code>NDDS_Transport_UDPv4_Property_t::public_address</code> (p. 1797)
dds.transport.UDPv4.builtin.join_multicast_group_timeout	See <code>NDDS_Transport_UDPv4_Property_t::join_multicast_group_timeout</code> (p. 1796)
dds.transport.UDPv4.builtin.port_offset	See <code>NDDS_Transport_UDPv4_Property_t::port_offset</code> (p. 1797)

See also

`NDDSTransportSupport::set_builtin_transport_property()` (p. 1838)

### 7.76.3 Macro Definition Documentation

#### 7.76.3.1 NDDS\_TRANSPORT\_UDPV4\_ADDRESS\_BIT\_COUNT

```
#define NDDS_TRANSPORT_UDPV4_ADDRESS_BIT_COUNT (32)
```

Default value of **NDDS\_Transport\_Property\_t::address\_bit\_count** (p. 1778).

#### 7.76.3.2 NDDS\_TRANSPORT\_UDPV4\_WAN\_ADDRESS\_BIT\_COUNT

```
#define NDDS_TRANSPORT_UDPV4_WAN_ADDRESS_BIT_COUNT (128)
```

Default value of **NDDS\_Transport\_Property\_t::address\_bit\_count** (p. 1778) for UDPv4 asymmetric transport.

#### 7.76.3.3 NDDS\_TRANSPORT\_UDPV4\_PROPERTIES\_BITMAP\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV4_PROPERTIES_BITMAP_DEFAULT NDDS_TRANSPORT_UDP_PROPERTIES_BITMAP_↔  
DEFAULT
```

Default value of **NDDS\_Transport\_Property\_t::properties\_bitmap** (p. 1778).

#### 7.76.3.4 NDDS\_TRANSPORT\_UDPV4\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV4_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT NDDS_TRANSPORT_UDP_GATHER_↔  
SEND_BUFFER_COUNT_MAX_DEFAULT
```

Default value of **NDDS\_Transport\_Property\_t::gather\_send\_buffer\_count\_max** (p. 1779).

This is also the maximum value that can be used when instantiating the UDP transport.

16 is sufficient for RTI Connex, but more may improve discovery and reliable performance. Porting note: find out what the maximum gather buffer count is on your OS!

### 7.76.3.5 NDDS\_TRANSPORT\_UDPV4\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV4_SOCKET_BUFFER_SIZE_OS_DEFAULT NDDS_TRANSPORT_UDP_SOCKET_BUFFER_SIZE_OS_DEFAULT
```

Used to specify that os default be used to specify socket buffer size.

### 7.76.3.6 NDDS\_TRANSPORT\_UDPV4\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV4_SEND_SOCKET_BUFFER_SIZE_DEFAULT NDDS_TRANSPORT_UDP_SEND_SOCKET_BUFFER_SIZE_DEFAULT
```

Default value for `NDDS_Transport_UDPv4_Property_t::send_socket_buffer_size` (p. 1790) and `NDDS_Transport_UDPv4_WAN_Property_t::send_socket_buffer_size` (p. 1799).

### 7.76.3.7 NDDS\_TRANSPORT\_UDPV4\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV4_RECV_SOCKET_BUFFER_SIZE_DEFAULT NDDS_TRANSPORT_UDP_RECV_SOCKET_BUFFER_SIZE_DEFAULT
```

Default value for `NDDS_Transport_UDPv4_Property_t::recv_socket_buffer_size` (p. 1790) and `NDDS_Transport_UDPv4_WAN_Property_t::recv_socket_buffer_size` (p. 1800).

### 7.76.3.8 NDDS\_TRANSPORT\_UDPV4\_PAYLOAD\_SIZE\_MAX

```
#define NDDS_TRANSPORT_UDPV4_PAYLOAD_SIZE_MAX (65507)
```

Maximum value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).

### 7.76.3.9 NDDS\_TRANSPORT\_UDPV4\_MESSAGE\_SIZE\_MAX\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV4_MESSAGE_SIZE_MAX_DEFAULT NDDS_TRANSPORT_UDPV4_PAYLOAD_SIZE_MAX
```

Maximum value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).

### 7.76.3.10 NDDS\_TRANSPORT\_UDPv4\_MULTICAST\_TTL\_DEFAULT

```
#define NDDS_TRANSPORT_UDPv4_MULTICAST_TTL_DEFAULT NDDS_TRANSPORT_UDP_MULTICAST_TTL_DEFAULT
```

Default value of **NDDS\_Transport\_UDPv4\_Property\_t::multicast\_ttl** (p. 1791).

### 7.76.3.11 NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_NEVER

```
#define NDDS_TRANSPORT_UDPv4_BLOCKING_NEVER
```

Value for **NDDS\_Transport\_UDPv4\_Property\_t::send\_blocking** (p. 1793) to specify non-blocking sockets.

### 7.76.3.12 NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_ALWAYS

```
#define NDDS_TRANSPORT_UDPv4_BLOCKING_ALWAYS
```

**[default]** Value for **NDDS\_Transport\_UDPv4\_Property\_t::send\_blocking** (p. 1793) to specify blocking sockets.

### 7.76.3.13 NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_DEFAULT

```
#define NDDS_TRANSPORT_UDPv4_BLOCKING_DEFAULT NDDS_TRANSPORT_UDP_BLOCKING_DEFAULT
```

Default value for **NDDS\_Transport\_UDPv4\_Property\_t::send\_blocking** (p. 1793) to specify blocking sockets.

### 7.76.3.14 NDDS\_TRANSPORT\_UDPv4\_PROPERTY\_DEFAULT

```
#define NDDS_TRANSPORT_UDPv4_PROPERTY_DEFAULT
```

Use this to initialize a **NDDS\_Transport\_UDPv4\_Property\_t** (p. 1788) structure.

### 7.76.3.15 NDDS\_Transport\_UDPv4\_string\_to\_address\_cEA

```
#define NDDS_Transport_UDPv4_string_to_address_cEA NDDS_Transport_UDP_string_to_address_cEA
```

Realization of **NDDS\_Transport\_String\_To\_Address\_Fcn\_cEA** for IP transports.

Converts a host name string to a IPv4 address.

## Parameters

<i>self</i>	NOT USED. May be NULL.
<i>address_out</i>	<< <i>out</i> >> (p. 238) The corresponding numerical value in IPv4 format.
<i>address_in</i>	<< <i>in</i> >> (p. 238) The name of the IPv4 address. It can be a dot notation name or a host name. If NULL, then the IP address of the localhost will be returned.

## See also

NDDS\_Transport\_String\_To\_Address\_Fcn\_cEA for complete documentation.

## 7.76.4 Function Documentation

### 7.76.4.1 NDDS\_Transport\_UDPv4\_new()

```
NDDS_Transport_Plugin * NDDS_Transport_UDPv4_new (
    const struct NDDS_Transport_UDPv4_Property_t * property_in )
```

Create an instance of a UDPv4 Transport Plugin.

An application may create and register multiple instances of this Transport Plugin with RTI Connex. Multiple instances of the plugin may be useful for partitioning the network interfaces across multiple RTI Connex domains. However, note that the underlying transport, the operating system's IP layer, is still a "singleton." For example, if a unicast transport has already bound to a port, and another unicast transport tries to bind to the same port, the second attempt will fail.

The transport plugin honors the interface/multicast "white" and "black" lists specified in the NDDS\_Transport\_UDP\_↔ Property\_t::parent:

- **NDDS\_Transport\_Property\_t::allow\_interfaces\_list** (p. 1779),
- **NDDS\_Transport\_Property\_t::deny\_interfaces\_list** (p. 1780),
- **NDDS\_Transport\_Property\_t::allow\_multicast\_interfaces\_list** (p. 1781),
- **NDDS\_Transport\_Property\_t::deny\_multicast\_interfaces\_list** (p. 1782)

The format of a string in these lists is assumed to be in standard IPv4 dot notation, possibly containing wildcards. For example:

- 10.10.30.232
- 10.10.\*.\*
- 192.168.1.\*
- etc. Strings not in the correct format will be ignored.



## Parameters

<i>property_in</i>	<< <i>in</i> >> (p. 238) Desired behavior of this transport. May be NULL for default property.
--------------------	--

## Returns

A UDPv4 Transport Plugin instance on success; or NULL on failure.

## 7.76.4.2 NDDS\_Transport\_UDPv4\_create()

```
NDDS_Transport_Plugin * NDDS_Transport_UDPv4_create (
    NDDS_Transport_Address_t * default_network_address_out,
    const struct DDS_PropertyQosPolicy * property_in )
```

Create an instance of a UDPv4 Transport Plugin, using the PropertyQosPolicy.

An application may create and register multiple instances of this Transport Plugin with RTI Connex. Multiple instances of the plugin may be useful for partitioning the network interfaces across multiple RTI Connex domains. However, note that the underlying transport, the operating system's IP layer, is still a "singleton." For example, if a unicast transport has already bound to a port, and another unicast transport tries to bind to the same port, the second attempt will fail.

The transport plugin honors the interface/multicast "white" and "black" lists specified in the **NDDS\_Transport\_UDPv4\_Property\_t::parent** (p. 1790):

- **NDDS\_Transport\_Property\_t::allow\_interfaces\_list** (p. 1779),
- **NDDS\_Transport\_Property\_t::deny\_interfaces\_list** (p. 1780),
- **NDDS\_Transport\_Property\_t::allow\_multicast\_interfaces\_list** (p. 1781),
- **NDDS\_Transport\_Property\_t::deny\_multicast\_interfaces\_list** (p. 1782)

The format of a string in these lists is assumed to be in standard IPv4 dot notation, possibly containing wildcards. For example:

- 10.10.30.232
- 10.10.\*.\*
- 192.168.1.\*
- etc. Strings not in the correct format will be ignored.

## Parameters

<i>default_network_address_out</i>	<< <i>out</i> >> (p. 238) Network address to be used when registering the transport.
<i>property_in</i>	<< <i>in</i> >> (p. 238) Desired behavior of this transport as defined in the <b>DDS_DomainParticipantQos::property</b> (p. 745).

**Returns**

A UDPv4 Transport Plugin instance on success; or NULL on failure.

**7.76.4.3 NDDS\_Transport\_UDPv4\_create\_from\_properties\_with\_prefix()**

```
NDDS_Transport_Plugin * NDDS_Transport_UDPv4_create_from_properties_with_prefix (
    NDDS_Transport_Address_t * default_network_address_out,
    const struct DDS_PropertyQosPolicy * property_in,
    const char * propertyPrefix )
```

Create an instance of a UDPv4 Transport Plugin, using the PropertyQosPolicy. Same as NDDS\_Transport\_UDPv4\_create but with a prefix for the input properties. It is used to create pluggable transports that use an underlying UDP transport.

**Parameters**

<i>default_network_address_out</i>	<< <i>out</i> >> (p. 238) Network address to be used when registering the transport.
<i>property_in</i>	<< <i>in</i> >> (p. 238) Desired behavior of this transport as defined in the <b>DDS_DomainParticipantQos::property</b> (p. 745).
<i>propertyPrefix</i>	a prefix for the properties. Expected UDP properties have the form prefix.property_name

**7.77 Real-Time WAN Transport**

Transport plug-in using UDP/IPv4 for WAN communications. (**NDDS\_TRANSPORT\_CLASSID\_UDPv4\_WAN** (p. 251))

**Classes**

- struct **NDDS\_Transport\_UDPv4\_WAN\_Property\_t**  
*Configurable IPv4/UDP WAN Transport-Plugin properties.*

**Macros**

- #define **NDDS\_TRANSPORT\_UDPv4\_WAN\_PROPERTY\_DEFAULT**  
*Use this to initialize a **NDDS\_Transport\_UDPv4\_WAN\_Property\_t** (p. 1798) structure.*

## Functions

- `NDDS_Transport_Plugin * NDDS_Transport_UDPv4_WAN_new` (const struct `NDDS_Transport_UDPv4_WAN_Property_t` \*property\_in)  
*Create an instance of a UDPv4\_WAN Transport Plugin.*
- `NDDS_Transport_Plugin * NDDS_Transport_UDPv4_WAN_create` ( `NDDS_Transport_Address_t` \*default\_network\_address\_out, const struct `DDS_PropertyQosPolicy` \*property\_in)  
*Create an instance of a UDPv4\_WAN Transport Plugin, using the PropertyQosPolicy.*
- `NDDS_Transport_Plugin * NDDS_Transport_UDPv4_WAN_create_from_properties_with_prefix` ( `NDDS_Transport_Address_t` \*default\_network\_address\_out, const struct `DDS_PropertyQosPolicy` \*property\_in, const char \*propertyPrefix)  
*Create an instance of a UDPv4\_WAN Transport Plugin, using the PropertyQosPolicy. Same as NDDS\_Transport\_UDPv4\_WAN\_create but with a prefix for the input properties. It is used to create pluggable transports that use an underlying UDP transport.*

### 7.77.1 Detailed Description

Transport plug-in using UDP/IPv4 for WAN communications. (`NDDS_TRANSPORT_CLASSID_UDPv4_WAN` (p. 251))

RTI Real-Time WAN Transport (RWT) is a transport that enables secure, scalable, and high-performance communication over wide area networks (WANs), including public networks.

It extends RTI Connex capabilities to WAN environments. Real-Time WAN Transport uses UDPv4 as the underlying IP transport-layer protocol to better anticipate and adapt to the challenges of diverse network conditions, device mobility, and the dynamic nature of WAN system architectures.

Real-Time WAN Transport, in combination with RTI Cloud Discovery Service (CDS), provides a complete, seamless solution out of the box for WAN connectivity.

**This transport is not installed as part of an RTI Connex package; it must be downloaded and installed separately.**

Real-Time WAN Transport replaces the transport capabilities of the Secure WAN Transport optionally available with previous RTI Connex releases (prior to 7.0.0), and provides the following capabilities:

- NAT (Network Address Translator) traversal: Ability to communicate between DomainParticipants running in a Local Area Network (LAN) that is behind a NAT-enabled router, and DomainParticipants on the outside of the NAT across a WAN. This functionality is provided in combination with Cloud Discovery Service.
- IP mobility: Support for network transitions and changes in IP addresses in any of the DomainParticipants participating in the communication.
- Security: Secure communications between DomainParticipants using Security Plugins.

Real-Time WAN Transport does not require third-party components, such as STUN servers, or protocols like SIP to handle session establishment. Using a single API and security model, you can leverage the extensive capabilities of the RTI Connex framework and ecosystem, including tools and infrastructure services, even for real-time connectivity from edge to cloud and back in highly distributed systems that communicate across wide area networks.

This transport plugin uses UDPv4 sockets to send and receive messages. It supports unicast communications in a single instance of the plugin. By default, this plugin will use all interfaces that it finds enabled and "UP" at instantiation time to send and receive messages. This transport is installed as a built-in transport plugin with the alias **DDS\_TRANSPORTBUILTIN\_UDPv4\_WAN\_ALIAS** (p. 446).

In addition, you can configure an instance of this plugin to selectively use the network interfaces of a node by specifying the **NDDS\_Transport\_Property\_t::max\_interface\_count** (p. 1783) and the "white" and "black" lists in the base property's fields (**NDDS\_Transport\_Property\_t::allow\_interfaces\_list** (p. 1779), **NDDS\_Transport\_Property\_t::deny\_interfaces\_list** (p. 1780)).

RTI Connex can implicitly create this plugin and register with the **DDSDomainParticipant** (p. 1351) if this transport is specified in **DDS\_TransportBuiltinQosPolicy** (p. 1144).

To specify the properties of the Real-Time WAN Transport that is implicitly registered, you can either:

- call **NDDSTransportSupport::set\_builtin\_transport\_property** (p. 1838) or
- specify the predefined property names in **DDS\_PropertyQosPolicy** (p. 1007) associated with the **DDSDomainParticipant** (p. 1351). (see **Real-Time WAN Transport Property** (p. 278)). Builtin transport plugin properties specified in **DDS\_PropertyQosPolicy** (p. 1007) always overwrite the ones specified through **NDDSTransportSupport::set\_builtin\_transport\_property()** (p. 1838). The default value is assumed on any unspecified property.

Note that all properties should be set before the transport is implicitly created and registered by RTI Connex. Any properties set after the builtin transport is registered will be ignored. See **Built-in Transport Plugins** (p. 177) for details on when a builtin transport is registered. To explicitly create an instance of this plugin, **NDDS\_Transport\_UDPv4\_WAN\_new()** (p. 280) should be called. The instance should be registered with RTI Connex, see **NDDSTransportSupport::register\_transport** (p. 1834). In some configurations one may have to disable the builtin UDPv4 transport plugin instance (**DDS\_TransportBuiltinQosPolicy** (p. 1144), **DDS\_TRANSPORTBUILTIN\_UDPv4\_WAN** (p. 446)), to avoid port conflicts with the newly created plugin instance.

**For additional details on how to configure and use the Real-Time WAN Transport, see the Core Libraries User's Manual.**

## 7.77.2 Real-Time WAN Transport Property

Names in Property QoS Policy of Domain Participant

The following table lists the predefined property names that can be set in the **DDS\_DomainParticipantQos::property** (p. 745) to configure the Real-Time WAN Transport plugin.

Table 7.98 Property Names for Real-Time WAN Transport Plugin

Property Name	Description
dds.transport.UDPv4_WAN.builtin.parent.classid	See <b>NDDS_Transport_Property_t::classid</b> (p. 1777) Should be set to "NDDS_TRANSPORT_CLASSID_↔ UDPv4_WAN (p. 251)"
dds.transport.UDPv4_WAN.builtin.parent.address_bit↔ _count	See <b>NDDS_Transport_Property_t::address_bit_↔ count</b> (p. 1778)
dds.transport.UDPv4_WAN.builtin.parent.properties_↔ bitmap	See <b>NDDS_Transport_Property_t::properties_↔ bitmap</b> (p. 1778)
dds.transport.UDPv4_WAN.builtin.parent.gather_↔ send_buffer_count_max	See <b>NDDS_Transport_Property_t::gather_send_↔ buffer_count_max</b> (p. 1779)
dds.transport.UDPv4_WAN.builtin.parent.message_↔ size_max	See <b>NDDS_Transport_Property_t::message_size_↔ max</b> (p. 1779)
dds.transport.UDPv4_WAN.builtin.parent.allow_↔ interfaces	See <b>NDDS_Transport_Property_t::allow_↔ interfaces_list</b> (p. 1779) and <b>NDDS_Transport_↔ Property_t::allow_interfaces_list_length</b> (p. 1780). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example, 127.0.0.1,eth0
dds.transport.UDPv4_WAN.builtin.parent.deny_↔ interfaces	See <b>NDDS_Transport_Property_t::deny_interfaces_↔ _list</b> (p. 1780) and <b>NDDS_Transport_Property_t_↔ ::deny_interfaces_list_length</b> (p. 1781). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: 127.0.0.1,eth0
dds.transport.UDPv4_WAN.builtin.parent.max_↔ interface_count	See <b>NDDS_Transport_Property_t::max_interface_↔ count</b> (p. 1783)
dds.transport.UDPv4_WAN.builtin.parent.thread_↔ name_prefix	See <b>NDDS_Transport_Property_t::thread_name_↔ prefix</b> (p. 1783)
dds.transport.UDPv4_WAN.builtin.send_socket_↔ buffer_size	See <b>NDDS_Transport_UDPv4_WAN_Property_t_↔ ::send_socket_buffer_size</b> (p. 1799)
dds.transport.UDPv4_WAN.builtin.recv_socket_buffer↔ _size	See <b>NDDS_Transport_UDPv4_WAN_Property_t_↔ ::recv_socket_buffer_size</b> (p. 1800)
dds.transport.UDPv4_WAN.builtin.ignore_loopback_↔ interface	See <b>NDDS_Transport_UDPv4_WAN_Property_t_↔ ::ignore_loopback_interface</b> (p. 1800)
dds.transport.UDPv4_WAN.builtin.ignore_nonrunning↔ _interfaces	See <b>NDDS_Transport_UDPv4_WAN_Property_t_↔ ::ignore_nonrunning_interfaces</b> (p. 1801)
dds.transport.UDPv4_WAN.builtin.ignore_nonup_↔ interfaces	<b>[DEPRECATED]</b> See <b>NDDS_Transport_UDPv4_↔ WAN_Property_t::ignore_nonup_interfaces</b> (p. 1800)
dds.transport.UDPv4_WAN.builtin.no_zero_copy	<b>[DEPRECATED]</b> See <b>NDDS_Transport_UDPv4_↔ WAN_Property_t::no_zero_copy</b> (p. 1801)
dds.transport.UDPv4_WAN.builtin.send_blocking	See <b>NDDS_Transport_UDPv4_WAN_Property_t_↔ ::send_blocking</b> (p. 1802)
dds.transport.UDPv4_WAN.builtin.transport_priority_↔ mask	See <b>NDDS_Transport_UDPv4_WAN_Property_t_↔ ::transport_priority_mask</b> (p. 1802)
dds.transport.UDPv4_WAN.builtin.transport_priority_↔ mapping_low	See <b>NDDS_Transport_UDPv4_WAN_Property_t_↔ ::transport_priority_mapping_low</b> (p. 1803)
dds.transport.UDPv4_WAN.builtin.transport_priority_↔ mapping_high	See <b>NDDS_Transport_UDPv4_WAN_Property_t_↔ ::transport_priority_mapping_high</b> (p. 1803)

Property Name	Description
dds.transport.UDPv4_WAN.builtin.send_ping	See <a href="#">NDDS_Transport_UDPv4_WAN_Property_t::send_ping</a> (p. 1803)
dds.transport.UDPv4_WAN.builtin.force_interface_poll_detection	See <a href="#">NDDS_Transport_UDPv4_WAN_Property_t::force_interface_poll_detection</a> (p. 1804)
dds.transport.UDPv4_WAN.builtin.interface_poll_period	See <a href="#">NDDS_Transport_UDPv4_WAN_Property_t::interface_poll_period</a> (p. 1804)
dds.transport.UDPv4_WAN.builtin.protocol_overhead_max	See <a href="#">NDDS_Transport_UDPv4_WAN_Property_t::protocol_overhead_max</a> (p. 1804)
dds.transport.UDPv4_WAN.builtin.disable_interface_tracking	See <a href="#">NDDS_Transport_UDPv4_WAN_Property_t::disable_interface_tracking</a> (p. 1804)
dds.transport.UDPv4_WAN.builtin.public_address	See <a href="#">NDDS_Transport_UDPv4_WAN_Property_t::public_address</a> (p. 1805)
dds.transport.UDPv4_WAN.builtin.comm_ports	See <a href="#">NDDS_Transport_UDPv4_WAN_Property_t::comm_ports_list</a> (p. 1805)
dds.transport.UDPv4_WAN.builtin.port_offset	See <a href="#">NDDS_Transport_UDPv4_WAN_Property_t::port_offset</a> (p. 1807)
dds.transport.UDPv4_WAN.builtin.binding_ping_period	See <a href="#">NDDS_Transport_UDPv4_WAN_Property_t::binding_ping_period</a> (p. 1807)

See also

[NDDSTransportSupport::set\\_builtin\\_transport\\_property\(\)](#) (p. 1838)

### 7.77.3 Macro Definition Documentation

#### 7.77.3.1 NDDS\_TRANSPORT\_UDPv4\_WAN\_PROPERTY\_DEFAULT

```
#define NDDS_TRANSPORT_UDPv4_WAN_PROPERTY_DEFAULT
```

Use this to initialize a [NDDS\\_Transport\\_UDPv4\\_WAN\\_Property\\_t](#) (p. 1798) structure.

### 7.77.4 Function Documentation

### 7.77.4.1 NDDS\_Transport\_UDPv4\_WAN\_new()

```
NDDS_Transport_Plugin * NDDS_Transport_UDPv4_WAN_new (
    const struct NDDS_Transport_UDPv4_WAN_Property_t * property_in )
```

Create an instance of a UDPv4\_WAN Transport Plugin.

An application may create and register multiple instances of this Transport Plugin with RTI Connex. Multiple instances of the plugin may be useful for partitioning the network interfaces across multiple RTI Connex domains. However, note that the underlying transport, the operating system's IP layer, is still a "singleton." For example, if a unicast transport has already bound to a port, and another unicast transport tries to bind to the same port, the second attempt will fail.

The transport plugin honors the interface "white" and "black" lists specified in the NDDS\_Transport\_UDP\_Property\_t↔::parent:

- **NDDS\_Transport\_Property\_t::allow\_interfaces\_list** (p. 1779),
- **NDDS\_Transport\_Property\_t::deny\_interfaces\_list** (p. 1780),

The format of a string in these lists is assumed to be in standard IPv4 dot notation, possibly containing wildcards. For example:

- 10.10.30.232
- 10.10.\*.\*
- 192.168.1.\*
- etc. Strings not in the correct format will be ignored.

#### Parameters

<i>property↔_in</i>	<< <i>in</i> >> (p. 238) Desired behavior of this transport. May be NULL for default property.
---------------------	--

#### Returns

A UDPv4\_WAN Transport Plugin instance on success; or NULL on failure.

### 7.77.4.2 NDDS\_Transport\_UDPv4\_WAN\_create()

```
NDDS_Transport_Plugin * NDDS_Transport_UDPv4_WAN_create (
    NDDS_Transport_Address_t * default_network_address_out,
    const struct DDS_PropertyQosPolicy * property_in )
```

Create an instance of a UDPv4\_WAN Transport Plugin, using the PropertyQosPolicy.

An application may create and register multiple instances of this Transport Plugin with RTI Connex. Multiple instances of the plugin may be useful for partitioning the network interfaces across multiple RTI Connex domains. However, note that the underlying transport, the operating system's IP layer, is still a "singleton." For example, if a unicast transport has already bound to a port, and another unicast transport tries to bind to the same port, the second attempt will fail.

The transport plugin honors the interface "white" and "black" lists specified in the **NDDS\_Transport\_UDPv4\_WAN\_↔Property\_t::parent** (p. 1799):

- **NDDS\_Transport\_Property\_t::allow\_interfaces\_list** (p. 1779),
- **NDDS\_Transport\_Property\_t::deny\_interfaces\_list** (p. 1780),

The format of a string in these lists is assumed to be in standard IPv4 dot notation, possibly containing wildcards. For example:

- 10.10.30.232
- 10.10.\*.\*
- 192.168.1.\*
- etc. Strings not in the correct format will be ignored.

#### Parameters

<i>default_network_address_out</i>	<< <b>out</b> >> (p. 238) Network address to be used when registering the transport.
<i>property_in</i>	<< <b>in</b> >> (p. 238) Desired behavior of this transport as defined in the <b>DDS_DomainParticipantQos::property</b> (p. 745).

#### Returns

A UDPv4\_WAN Transport Plugin instance on success; or NULL on failure.

#### 7.77.4.3 NDDS\_Transport\_UDPv4\_WAN\_create\_from\_properties\_with\_prefix()

```
NDDS_Transport_Plugin * NDDS_Transport_UDPv4_WAN_create_from_properties_with_prefix (
    NDDS_Transport_Address_t * default_network_address_out,
    const struct DDS_PropertyQosPolicy * property_in,
    const char * propertyPrefix )
```

Create an instance of a UDPv4\_WAN Transport Plugin, using the PropertyQosPolicy. Same as NDDS\_Transport\_↔UDPv4\_WAN\_create but with a prefix for the input properties. It is used to create pluggable transports that use an underlying UDP transport.

#### Parameters

<i>default_network_address_out</i>	<< <b>out</b> >> (p. 238) Network address to be used when registering the transport.
<i>property_in</i>	<< <b>in</b> >> (p. 238) Desired behavior of this transport as defined in the <b>DDS_DomainParticipantQos::property</b> (p. 745). <span style="float: right;">Generated by Doxygen</span>
<i>propertyPrefix</i>	Prefix for the properties. Expected UDP properties have the form prefix.property_name



## 7.78 UDPv6 Transport

Transport plug-in using UDP/IPv6 (`NDDS_TRANSPORT_CLASSID_UDPv6` (p. 250)) .

### Classes

- struct `NDDS_Transport_UDPv6_Property_t`  
*Configurable IPv6/UDP Transport-Plugin properties.*

### Macros

- #define `NDDS_TRANSPORT_UDPv6_ADDRESS_BIT_COUNT` (128)  
*Default value of `NDDS_Transport_Property_t::address_bit_count` (p. 1778).*
- #define `NDDS_TRANSPORT_UDPv6_PROPERTIES_BITMAP_DEFAULT` `NDDS_TRANSPORT_UDP_PROPERTIES_BITMAP_DEFAULT`  
*Default value of `NDDS_Transport_Property_t::properties_bitmap` (p. 1778).*
- #define `NDDS_TRANSPORT_UDPv6_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT` `NDDS_TRANSPORT_UDP_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT`  
*Default value of `NDDS_Transport_Property_t::gather_send_buffer_count_max` (p. 1779).*
- #define `NDDS_TRANSPORT_UDPv6_SOCKET_BUFFER_SIZE_OS_DEFAULT` `NDDS_TRANSPORT_UDP_SOCKET_BUFFER_SIZE_OS_DEFAULT`  
*Used to specify that os default be used to specify socket buffer size.*
- #define `NDDS_TRANSPORT_UDPv6_SEND_SOCKET_BUFFER_SIZE_DEFAULT` `NDDS_TRANSPORT_UDP_SEND_SOCKET_BUFFER_SIZE_DEFAULT`  
*Default value for `NDDS_Transport_UDPv6_Property_t::send_socket_buffer_size` (p. 1809).*
- #define `NDDS_TRANSPORT_UDPv6_RECV_SOCKET_BUFFER_SIZE_DEFAULT` `NDDS_TRANSPORT_UDP_RECV_SOCKET_BUFFER_SIZE_DEFAULT`  
*Default value for `NDDS_Transport_UDPv6_Property_t::recv_socket_buffer_size` (p. 1809).*
- #define `NDDS_TRANSPORT_UDPv6_PAYLOAD_SIZE_MAX` (65487)  
*Maximum value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).*
- #define `NDDS_TRANSPORT_UDPv6_MESSAGE_SIZE_MAX_DEFAULT` `NDDS_TRANSPORT_UDPv6_PAYLOAD_SIZE_MAX`  
*Default value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).*
- #define `NDDS_TRANSPORT_UDPv6_MULTICAST_TTL_DEFAULT` `NDDS_TRANSPORT_UDP_MULTICAST_TTL_DEFAULT`  
*Default value of `NDDS_Transport_UDPv6_Property_t::multicast_ttl` (p. 1810).*
- #define `NDDS_TRANSPORT_UDPv6_BLOCKING_NEVER`  
*Value for `NDDS_Transport_UDPv6_Property_t::send_blocking` (p. 1812) to specify non-blocking sockets.*
- #define `NDDS_TRANSPORT_UDPv6_BLOCKING_ALWAYS`  
*[default] Value for `NDDS_Transport_UDPv6_Property_t::send_blocking` (p. 1812) to specify blocking sockets.*
- #define `NDDS_TRANSPORT_UDPv6_PROPERTY_DEFAULT`  
*Use this to initialize a `NDDS_Transport_UDPv6_Property_t` (p. 1808) structure.*
- #define `NDDS_Transport_UDPv6_string_to_address_cEA` `NDDS_Transport_UDP_string_to_address_cEA`  
*Realization of `NDDS_Transport_String_To_Address_Fcn_cEA` for IP transports.*

## Functions

- `NDDS_Transport_Plugin * NDDS_Transport_UDPv6_new` (const struct `NDDS_Transport_UDPv6_Property_t *property_in`)  
*Create an instance of a UDPv6 Transport Plugin.*
- `NDDS_Transport_Plugin * NDDS_Transport_UDPv6_create` ( `NDDS_Transport_Address_t *default_network_address_out`, const struct `DDS_PropertyQosPolicy *property_in`)  
*Create an instance of a UDPv6 Transport Plugin, using the PropertyQoSPolicy.*
- `NDDS_Transport_Plugin * NDDS_Transport_UDPv6_create_from_properties_with_prefix` ( `NDDS_Transport_Address_t *default_network_address_out`, const struct `DDS_PropertyQosPolicy *property_in`, const char `*propertyPrefix`)  
*Create an instance of a UDPv6 Transport Plugin, using the PropertyQoSPolicy. Same as `NDDS_Transport_UDPv6_create` but with a prefix for the input properties. It is used to create pluggable transports that use an underlying UDP transport.*

### 7.78.1 Detailed Description

Transport plug-in using UDP/IPv6 (`NDDS_TRANSPORT_CLASSID_UDPv6` (p. 250)) .

This transport plugin uses UDPv6 sockets to send and receive messages. It supports both unicast and multicast communications in a single instance of the plugin. By default, this plugin will use all interfaces that it finds enabled and "UP" at instantiation time to send and receive messages. This transport is installed as a built-in transport plugin with the alias `DDS_TRANSPORTBUILTIN_UDPv6_ALIAS` (p. 446).

You can configure an instance of this plugin to only use unicast or only use multicast, see `NDDS_Transport_UDPv6_Property_t::unicast_enabled` (p. 1810) and `NDDS_Transport_UDPv6_Property_t::multicast_enabled` (p. 1810).

In addition, you can configure an instance of this plugin to selectively use the network interfaces of a node (and restrict a plugin from sending multicast messages on specific interfaces) by specifying the `NDDS_Transport_Property_t::max_interface_count` (p. 1783) and the "white" and "black" lists in the base property's fields (`NDDS_Transport_Property_t::allow_interfaces_list` (p. 1779), `NDDS_Transport_Property_t::deny_interfaces_list` (p. 1780), `NDDS_Transport_Property_t::allow_multicast_interfaces_list` (p. 1781), `NDDS_Transport_Property_t::deny_multicast_interfaces_list` (p. 1782)).

RTI Connexant can implicitly create this plugin and register it with the `DDSDomainParticipant` (p. 1351) if this transport is specified in the `DDS_TransportBuiltinQoSPolicy` (p. 1144).

To specify the properties of the builtin UDPv6 transport that is implicitly registered, you can either:

- call `NDDSTransportSupport::set_builtin_transport_property` (p. 1838) or
- specify the predefined property names in `DDS_PropertyQoSPolicy` (p. 1007) associated with the `DDSDomainParticipant` (p. 1351). (see [UDPv6 Transport Property Names in Property QoS Policy of Domain Participant](#) (p. 285)). Builtin transport plugin properties specified in `DDS_PropertyQoSPolicy` (p. 1007) always overwrite the ones specified through `NDDSTransportSupport::set_builtin_transport_property()` (p. 1838). The default value is assumed on any unspecified property.

Note that all properties should be set before the transport is implicitly created and registered by RTI Connexant. Any properties that are set after the builtin transport is registered will be ignored. See [Built-in Transport Plugins](#) (p. 177) for details on when a builtin transport is registered.

To explicitly create an instance of this plugin, `NDDS_Transport_UDPv6_new()` (p. 290) should be called. The instance should be registered with RTI Connexant, see `NDDSTransportSupport::register_transport` (p. 1834). In some configurations, you may have to disable the builtin UDPv6 transport plugin instance (`DDS_TransportBuiltinQoSPolicy` (p. 1144), `DDS_TRANSPORTBUILTIN_UDPv6` (p. 446)), to avoid port conflicts with the newly created plugin instance.

## 7.78.2 UDPv6 Transport Property Names in Property QoS Policy of Domain Participant

The following table lists the predefined property names that can be set in **DDS\_PropertyQosPolicy** (p. 1007) of a **DDSDomainParticipant** (p. 1351) to configure the builtin UDPv6 transport plugin.

**Table 7.102 Property Names for UDPv6 Transport Plugin**

Property Name	Description
dds.transport.UDPv6.builtin.parent.address_bit_count	See <b>NDDS_Transport_Property_t::address_bit_count</b> (p. 1778)
dds.transport.UDPv6.builtin.parent.properties_bitmap	See <b>NDDS_Transport_Property_t::properties_bitmap</b> (p. 1778)
dds.transport.UDPv6.builtin.parent.gather_send_buffer_count_max	See <b>NDDS_Transport_Property_t::gather_send_buffer_count_max</b> (p. 1779)
dds.transport.UDPv6.builtin.parent.message_size_max	See <b>NDDS_Transport_Property_t::message_size_max</b> (p. 1779)
dds.transport.UDPv6.builtin.parent.allow_interfaces	See <b>NDDS_Transport_Property_t::allow_interfaces_list</b> (p. 1779) and <b>NDDS_Transport_Property_t::allow_interfaces_list_length</b> (p. 1780). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: 127.0.0.1,eth0
dds.transport.UDPv6.builtin.parent.deny_interfaces	See <b>NDDS_Transport_Property_t::deny_interfaces_list</b> (p. 1780) and <b>NDDS_Transport_Property_t::deny_interfaces_list_length</b> (p. 1781). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: 127.0.0.1,eth0
dds.transport.UDPv6.builtin.parent.allow_multicast_interfaces	See <b>NDDS_Transport_Property_t::allow_multicast_interfaces_list</b> (p. 1781) and <b>NDDS_Transport_Property_t::allow_multicast_interfaces_list_length</b> (p. 1782). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: 127.0.0.1,eth0
dds.transport.UDPv6.builtin.parent.deny_multicast_interfaces	See <b>NDDS_Transport_Property_t::deny_multicast_interfaces_list</b> (p. 1782) and <b>NDDS_Transport_Property_t::deny_multicast_interfaces_list_length</b> (p. 1782). Interfaces should be specified as comma-separated strings, with each comma delimiting an interface. For example: 127.0.0.1,eth0
dds.transport.UDPv6.builtin.parent.max_interface_count	See <b>NDDS_Transport_Property_t::max_interface_count</b> (p. 1783)
dds.transport.UDPv6.builtin.parent.thread_name_prefix	See <b>NDDS_Transport_Property_t::thread_name_prefix</b> (p. 1783)
dds.transport.UDPv6.builtin.send_socket_buffer_size	See <b>NDDS_Transport_UDPv6_Property_t::send_socket_buffer_size</b> (p. 1809)
dds.transport.UDPv6.builtin.recv_socket_buffer_size	See <b>NDDS_Transport_UDPv6_Property_t::recv_socket_buffer_size</b> (p. 1809)
dds.transport.UDPv6.builtin.unicast_enabled	See <b>NDDS_Transport_UDPv6_Property_t::unicast_enabled</b> (p. 1810)

Property Name	Description
dds.transport.UDPv6.builtin.multicast_enabled	See <a href="#">NDDS_Transport_UDPv6_Property_t::multicast_enabled</a> (p. 1810)
dds.transport.UDPv6.builtin.multicast_ttl	See <a href="#">NDDS_Transport_UDPv6_Property_t::multicast_ttl</a> (p. 1810)
dds.transport.UDPv6.builtin.multicast_loopback_↔ disabled	See <a href="#">NDDS_Transport_UDPv6_Property_t::multicast_loopback_disabled</a> (p. 1810)
dds.transport.UDPv6.builtin.ignore_loopback_interface	See <a href="#">NDDS_Transport_UDPv6_Property_t::ignore_loopback_interface</a> (p. 1811)
dds.transport.UDPv6.builtin.ignore_nonrunning_↔ interfaces	See <a href="#">NDDS_Transport_UDPv6_Property_t::ignore_nonrunning_interfaces</a> (p. 1811)
dds.transport.UDPv6.builtin.no_zero_copy	[DEPRECATED] See <a href="#">NDDS_Transport_UDPv6_Property_t::no_zero_copy</a> (p. 1812)
dds.transport.UDPv6.builtin.send_blocking	See <a href="#">NDDS_Transport_UDPv6_Property_t::send_blocking</a> (p. 1812)
dds.transport.UDPv6.builtin.enable_v4mapped	See <a href="#">NDDS_Transport_UDPv6_Property_t::enable_v4mapped</a> (p. 1812)
dds.transport.UDPv6.builtin.transport_priority_mask	See <a href="#">NDDS_Transport_UDPv6_Property_t::transport_priority_mask</a> (p. 1813)
dds.transport.UDPv6.builtin.transport_priority_↔ mapping_low	See <a href="#">NDDS_Transport_UDPv6_Property_t::transport_priority_mapping_low</a> (p. 1813)
dds.transport.UDPv6.builtin.transport_priority_↔ mapping_high	See <a href="#">NDDS_Transport_UDPv6_Property_t::transport_priority_mapping_high</a> (p. 1813)
dds.transport.UDPv6.builtin.send_ping	See <a href="#">NDDS_Transport_UDPv6_Property_t::send_ping</a> (p. 1814) <a href="#">interface_poll_detection_kind</a>
dds.transport.UDPv6.builtin.force_interface_poll_↔ detection	See <a href="#">NDDS_Transport_UDPv6_Property_t::force_interface_poll_detection</a> (p. 1814)
dds.transport.UDPv6.builtin.interface_poll_period	See <a href="#">NDDS_Transport_UDPv6_Property_t::interface_poll_period</a> (p. 1814)
dds.transport.UDPv6.builtin.reuse_multicast_receive_↔ resource	See <a href="#">NDDS_Transport_UDPv6_Property_t::reuse_multicast_receive_resource</a> (p. 1814)
dds.transport.UDPv6.builtin.protocol_overhead_max	See <a href="#">NDDS_Transport_UDPv6_Property_t::protocol_overhead_max</a> (p. 1815)
dds.transport.UDPv6.builtin.disable_interface_tracking	See <a href="#">NDDS_Transport_UDPv6_Property_t::disable_interface_tracking</a> (p. 1815)
dds.transport.UDPv6.builtin.public_address	See <a href="#">NDDS_Transport_UDPv6_Property_t::public_address</a> (p. 1816)
dds.transport.UDPv6.builtin.join_multicast_group_↔ timeout	See <a href="#">NDDS_Transport_UDPv6_Property_t::join_multicast_group_timeout</a> (p. 1815)
dds.transport.UDPv6.builtin.port_offset	See <a href="#">NDDS_Transport_UDPv6_Property_t::port_offset</a> (p. 1816)

See also

[NDDSTransportSupport::set\\_builtin\\_transport\\_property\(\)](#) (p. 1838)

### 7.78.3 Macro Definition Documentation

#### 7.78.3.1 NDDS\_TRANSPORT\_UDPV6\_ADDRESS\_BIT\_COUNT

```
#define NDDS_TRANSPORT_UDPV6_ADDRESS_BIT_COUNT (128)
```

Default value of `NDDS_Transport_Property_t::address_bit_count` (p. 1778).

#### 7.78.3.2 NDDS\_TRANSPORT\_UDPV6\_PROPERTIES\_BITMAP\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV6_PROPERTIES_BITMAP_DEFAULT NDDS_TRANSPORT_UDP_PROPERTIES_BITMAP_↔  
DEFAULT
```

Default value of `NDDS_Transport_Property_t::properties_bitmap` (p. 1778).

#### 7.78.3.3 NDDS\_TRANSPORT\_UDPV6\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV6_GATHER_SEND_BUFFER_COUNT_MAX_DEFAULT NDDS_TRANSPORT_UDP_GATHER_↔  
SEND_BUFFER_COUNT_MAX_DEFAULT
```

Default value of `NDDS_Transport_Property_t::gather_send_buffer_count_max` (p. 1779).

This is also the maximum value that can be used when instantiating the UDP transport.

16 is sufficient for NDDS, but more may improve discovery and reliable performance. Porting note: find out what the maximum gather buffer count is on your OS!

#### 7.78.3.4 NDDS\_TRANSPORT\_UDPV6\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV6_SOCKET_BUFFER_SIZE_OS_DEFAULT NDDS_TRANSPORT_UDP_SOCKET_BUFFER_↔  
SIZE_OS_DEFAULT
```

Used to specify that os default be used to specify socket buffer size.

### 7.78.3.5 NDDS\_TRANSPORT\_UDPV6\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV6_SEND_SOCKET_BUFFER_SIZE_DEFAULT  NDDS_TRANSPORT_UDP_SEND_SOCKET_↵  
BUFFER_SIZE_DEFAULT
```

Default value for `NDDS_Transport_UDPv6_Property_t::send_socket_buffer_size` (p. 1809).

### 7.78.3.6 NDDS\_TRANSPORT\_UDPV6\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV6_RECV_SOCKET_BUFFER_SIZE_DEFAULT  NDDS_TRANSPORT_UDP_RECV_SOCKET_↵  
BUFFER_SIZE_DEFAULT
```

Default value for `NDDS_Transport_UDPv6_Property_t::recv_socket_buffer_size` (p. 1809).

### 7.78.3.7 NDDS\_TRANSPORT\_UDPV6\_PAYLOAD\_SIZE\_MAX

```
#define NDDS_TRANSPORT_UDPV6_PAYLOAD_SIZE_MAX  (65487)
```

Maximum value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).

### 7.78.3.8 NDDS\_TRANSPORT\_UDPV6\_MESSAGE\_SIZE\_MAX\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV6_MESSAGE_SIZE_MAX_DEFAULT  NDDS_TRANSPORT_UDPV6_PAYLOAD_SIZE_MAX
```

Default value of `NDDS_Transport_Property_t::message_size_max` (p. 1779).

### 7.78.3.9 NDDS\_TRANSPORT\_UDPV6\_MULTICAST\_TTL\_DEFAULT

```
#define NDDS_TRANSPORT_UDPV6_MULTICAST_TTL_DEFAULT  NDDS_TRANSPORT_UDP_MULTICAST_TTL_DEFAULT
```

Default value of `NDDS_Transport_UDPv6_Property_t::multicast_ttl` (p. 1810).

**7.78.3.10 NDDS\_TRANSPORT\_UDPv6\_BLOCKING\_NEVER**

```
#define NDDS_TRANSPORT_UDPv6_BLOCKING_NEVER
```

Value for **NDDS\_Transport\_UDPv6\_Property\_t::send\_blocking** (p. 1812) to specify non-blocking sockets.

**7.78.3.11 NDDS\_TRANSPORT\_UDPv6\_BLOCKING\_ALWAYS**

```
#define NDDS_TRANSPORT_UDPv6_BLOCKING_ALWAYS
```

**[default]** Value for **NDDS\_Transport\_UDPv6\_Property\_t::send\_blocking** (p. 1812) to specify blocking sockets.

**7.78.3.12 NDDS\_TRANSPORT\_UDPv6\_PROPERTY\_DEFAULT**

```
#define NDDS_TRANSPORT_UDPv6_PROPERTY_DEFAULT
```

Use this to initialize a **NDDS\_Transport\_UDPv6\_Property\_t** (p. 1808) structure.

**7.78.3.13 NDDS\_Transport\_UDPv6\_string\_to\_address\_cEA**

```
#define NDDS_Transport_UDPv6_string_to_address_cEA NDDS_Transport_UDP_string_to_address_cEA
```

Realization of **NDDS\_Transport\_String\_To\_Address\_Fcn\_cEA** for IP transports.

Converts a host name string to a IPv6 address.

**Parameters**

<i>self</i>	NOT USED. May be NULL.
<i>address_out</i>	<< <b>out</b> >> (p. 238) The corresponding numerical value in IPv6 format.
<i>address_in</i>	<< <b>in</b> >> (p. 238) The name of the IPv6 address. It can be a dot notation name or a host name. If NULL, then the IP address of the localhost will be returned.

See also

`NDDS_Transport_String_To_Address_Fcn_cEA` for complete documentation.

## 7.78.4 Function Documentation

### 7.78.4.1 `NDDS_Transport_UDPv6_new()`

```
NDDS_Transport_Plugin * NDDS_Transport_UDPv6_new (
    const struct NDDS_Transport_UDPv6_Property_t * property_in )
```

Create an instance of a UDPv6 Transport Plugin.

An application may create and register multiple instances of this Transport Plugin with RTI Connex. Multiple instances of the plugin may be useful for partitioning the network interfaces across multiple RTI Connex domains. However, note that the underlying transport, the operating system's IP layer, is still a "singleton." For example, if a unicast transport has already bound to a port, and another unicast transport tries to bind to the same port, the second attempt will fail.

The transport plugin honors the interface/multicast "white" and "black" lists specified in the `NDDS_Transport_UDPv6_Property_t::parent` (p. 1809):

- `NDDS_Transport_Property_t::allow_interfaces_list` (p. 1779),
- `NDDS_Transport_Property_t::deny_interfaces_list` (p. 1780),
- `NDDS_Transport_Property_t::allow_multicast_interfaces_list` (p. 1781),
- `NDDS_Transport_Property_t::deny_multicast_interfaces_list` (p. 1782)

The format of a string in these lists is assumed to be in standard IPv6 dot notation, possibly containing wildcards. For example:

- 10.10.30.232
- 10.10.\*.\*
- 192.168.1.\*
- etc. Strings not in the correct format will be ignored.

#### Parameters

<code><i>property_in</i></code>	<< <i>in</i> >> (p. 238) Desired behavior of this transport. May be NULL for default property.
---------------------------------	--



## Returns

A UDPv6 Transport Plugin instance on success; or NULL on failure.

## 7.78.4.2 NDDS\_Transport\_UDPv6\_create()

```
NDDS_Transport_Plugin * NDDS_Transport_UDPv6_create (
    NDDS_Transport_Address_t * default_network_address_out,
    const struct DDS_PropertyQosPolicy * property_in )
```

Create an instance of a UDPv6 Transport Plugin, using the PropertyQosPolicy.

An application may create and register multiple instances of this Transport Plugin with RTI Connex. Multiple instances of the plugin may be useful for partitioning the network interfaces across multiple RTI Connex domains. However, note that the underlying transport, the operating system's IP layer, is still a "singleton." For example, if a unicast transport has already bound to a port, and another unicast transport tries to bind to the same port, the second attempt will fail.

The transport plugin honors the interface/multicast "white" and "black" lists specified in the **NDDS\_Transport\_UDPv6\_Property\_t::parent** (p. 1809):

- **NDDS\_Transport\_Property\_t::allow\_interfaces\_list** (p. 1779),
- **NDDS\_Transport\_Property\_t::deny\_interfaces\_list** (p. 1780),
- **NDDS\_Transport\_Property\_t::allow\_multicast\_interfaces\_list** (p. 1781),
- **NDDS\_Transport\_Property\_t::deny\_multicast\_interfaces\_list** (p. 1782)

The format of a string in these lists is assumed to be in standard IPv6 dot notation, possibly containing wildcards. For example:

- `*:*:*:*:*:*`
- `FE80:aBc::202:*:`
- `*:aBC::2::2*`
- etc. Strings not in the correct format will be ignored.

## Parameters

<i>default_network_address_out</i>	<< <b>out</b> >> (p. 238) Network address to be used when registering the transport.
<i>property_in</i>	<< <b>in</b> >> (p. 238) Desired behavior of this transport as defined in the <b>DDS_DomainParticipantQos::property</b> (p. 745).

## Returns

A UDPv6 Transport Plugin instance on success; or NULL on failure.

### 7.78.4.3 NDDS\_Transport\_UDPv6\_create\_from\_properties\_with\_prefix()

```
NDDS_Transport_Plugin * NDDS_Transport_UDPv6_create_from_properties_with_prefix (
    NDDS_Transport_Address_t * default_network_address_out,
    const struct DDS_PropertyQosPolicy * property_in,
    const char * propertyPrefix )
```

Create an instance of a UDPv6 Transport Plugin, using the PropertyQosPolicy. Same as NDDS\_Transport\_UDPv6\_↔ create but with a prefix for the input properties. It is used to create pluggable transports that use an underlying UDP transport.

#### Parameters

<i>default_network_address_out</i>	<< <b>out</b> >> (p. 238) Network address to be used when registering the transport.
<i>property_in</i>	<< <b>in</b> >> (p. 238) Desired behavior of this transport as defined in the <b>DDS_DomainParticipantQos::property</b> (p. 745).
<i>propertyPrefix</i>	a prefix for the properties. Expected UDP properties have the form prefix.property_name

## 7.79 AsyncWaitSet

<<**extension**>> (p. 237) A specialization of **DDSWaitSet** (p. 1629) that provides a mechanism to perform the wait asynchronously and uses a thread pool to dispatch the attached active **DDSCondition** (p. 1276).

### Classes

- struct **DDS\_AsyncWaitSetProperty\_t**  
Specifies the **DDSAsyncWaitSet** (p. 1259) behavior.
- class **DDSAsyncWaitSetListener**  
<<**interface**>> (p. 237) Listener for receiving event notifications related to the thread pool of the **DDSAsyncWaitSet** (p. 1259).
- class **DDSAsyncWaitSetCompletionToken**  
<<**interface**>> (p. 237) Implementation of the completion token role element of the asynchronous completion token pattern that is part of the **DDSAsyncWaitSet** (p. 1259) behavior.
- class **DDSAsyncWaitSet**  
A class for dispatching **DDSCondition** (p. 1276) objects using separate threads of execution. You can see this class as an extension of a **DDSWaitSet** (p. 1629) that allows asynchronously waiting for the attached **DDSCondition** (p. 1276) objects to trigger and provide a notification by calling **DDSCondition::dispatch** (p. 1278).
- class **DDSDataReaderStatusConditionHandler**  
<<**interface**>> (p. 237) Realization of a **DDSConditionHandler** (p. 1278) that handles the status of a **DDSDataReader** (p. 1288).

## Variables

- const struct **DDS\_AsyncWaitSetProperty\_t** **DDS\_ASYNC\_WAITSET\_PROPERTY\_DEFAULT**  
Constant that defines the default property for a **DDSAsyncWaitSet** (p. 1259).
- static **DDSAsyncWaitSetCompletionToken** \*const **DDSAsyncWaitSet::COMPLETION\_TOKEN\_USE\_IMPLICIT\_AND\_WAIT**  
For the operations that allow an **DDSAsyncWaitSetCompletionToken** (p. 1273), this sentinel can be provided to indicate an **DDSAsyncWaitSet** (p. 1259) to use the implicit completion token and wait on it for request completion.
- static **DDSAsyncWaitSetCompletionToken** \*const **DDSAsyncWaitSet::COMPLETION\_TOKEN\_IGNORE**  
For the operations that allow an **DDSAsyncWaitSetCompletionToken** (p. 1273), this sentinel can be provided to indicate an **DDSAsyncWaitSet** (p. 1259) to perform the action associating a 'null' completion token.

### 7.79.1 Detailed Description

<<**extension**>> (p. 237) A specialization of **DDSWaitSet** (p. 1629) that provides a mechanism to perform the wait asynchronously and uses a thread pool to dispatch the attached active **DDSCondition** (p. 1276).

This class is a realization of the **Proactor** pattern applied to WaitSets and Conditions that provide a powerful component for your application process events leveraging concurrency.

### 7.79.2 Variable Documentation

#### 7.79.2.1 DDS\_ASYNC\_WAITSET\_PROPERTY\_DEFAULT

```
const struct DDS_AsyncWaitSetProperty_t DDS_ASYNC_WAITSET_PROPERTY_DEFAULT
```

Constant that defines the default property for a **DDSAsyncWaitSet** (p. 1259).

Value: `wait_set_property = DDS_WaitSetProperty_t_INITIALIZER (p.472), thread_pool_size = 1, thread_settings DDS_THREAD_SETTINGS_DEFAULT, thread_base_name = NULL wait_timeout = DDS_DURATION_INFINITE (p.326) level = 1`

#### 7.79.2.2 COMPLETION\_TOKEN\_USE\_IMPLICIT\_AND\_WAIT

```
DDSAsyncWaitSetCompletionToken* const DDSAsyncWaitSet::COMPLETION_TOKEN_USE_IMPLICIT_AND_WAIT  
[static]
```

For the operations that allow an **DDSAsyncWaitSetCompletionToken** (p. 1273), this sentinel can be provided to indicate an **DDSAsyncWaitSet** (p. 1259) to use the implicit completion token and wait on it for request completion.

If this sentinel is used, the **DDSAsyncWaitSet** (p. 1259) will use the completion token associated with the calling thread and will wait with an infinite timeout until the request completes successfully.

### 7.79.2.3 COMPLETION\_TOKEN\_IGNORE

```
DDSAsyncWaitSetCompletionToken* const DDSAsyncWaitSet::COMPLETION_TOKEN_IGNORE [static]
```

For the operations that allow an **DDSAsyncWaitSetCompletionToken** (p. 1273), this sentinel can be provided to indicate an **DDSAsyncWaitSet** (p. 1259) to perform the action associating a 'null' completion token.

This sentinel is a realization of the null object pattern of an **DDSAsyncWaitSetCompletionToken** (p. 1273). If this object is provided to a **DDSAsyncWaitSet** (p. 1259) operation, the resulting operation request will be associated with a 'null' completion token that behaves as no-op.

When 'nul' completion token is provided, the **DDSAsyncWaitSet** (p. 1259) operation returns immediately after it issues the internal request, and there is no mean for your application to wait for the request to complete.

You can use this sentinel when your application can operate on an **DDSAsyncWaitSet** (p. 1259) without needing to know when operation requests complete or your application uses other strategies to synchronize resources.

This sentinel is also useful when you need to perform operations on **DDSAsyncWaitSet** (p. 1259) from within one of the threads from its thread pool, where waiting on a valid **DDSAsyncWaitSetCompletionToken** (p. 1273) is forbidden.

## 7.80 Participant Built-in Topics

Builtin topic for accessing information about the DomainParticipants discovered by RTI Connex.

### Classes

- struct **DDS\_ParticipantBuiltinTopicData**  
*Entry created when a DomainParticipant object is discovered.*
- struct **DDS\_ParticipantBuiltinTopicDataSeq**  
*Instantiates `FooSeq` (p. 1697) < `DDS_ParticipantBuiltinTopicData` (p. 979) > .*
- class **DDSParticipantBuiltinTopicDataTypeSupport**  
*Instantiates `TypeSupport` < `DDS_ParticipantBuiltinTopicData` (p. 979) > .*
- class **DDSParticipantBuiltinTopicDataDataReader**  
*Instantiates `DataReader` < `DDS_ParticipantBuiltinTopicData` (p. 979) > .*

### Typedefs

- typedef struct **DDS\_ParticipantBuiltinTopicData DDS\_ParticipantBuiltinTopicData**  
*Entry created when a DomainParticipant object is discovered.*

### Variables

- const char \* **DDS\_PARTICIPANT\_TOPIC\_NAME**  
*Participant topic name.*

### 7.80.1 Detailed Description

Builtin topic for accessing information about the DomainParticipants discovered by RTI Connex.

### 7.80.2 Typedef Documentation

#### 7.80.2.1 DDS\_ParticipantBuiltinTopicData

```
typedef struct DDS_ParticipantBuiltinTopicData DDS_ParticipantBuiltinTopicData
```

Entry created when a DomainParticipant object is discovered.

Data associated with the built-in topic **DDS\_PARTICIPANT\_TOPIC\_NAME** (p. 295). It contains QoS policies and additional information that apply to the remote **DDSDomainParticipant** (p. 1351).

See also

**DDS\_PARTICIPANT\_TOPIC\_NAME** (p. 295)

**DDSParticipantBuiltinTopicDataDataReader** (p. 1548)

### 7.80.3 Variable Documentation

#### 7.80.3.1 DDS\_PARTICIPANT\_TOPIC\_NAME

```
const char* DDS_PARTICIPANT_TOPIC_NAME [extern]
```

Participant topic name.

Topic name of **DDSParticipantBuiltinTopicDataDataReader** (p. 1548)

See also

**DDS\_ParticipantBuiltinTopicData** (p. 979)

**DDSParticipantBuiltinTopicDataDataReader** (p. 1548)

## 7.81 Topic Built-in Topics

Builtin topic for accessing information about the Topics discovered by RTI Connex.

## Classes

- struct **DDS\_TopicBuiltinTopicData**  
*Entry created when a Topic object discovered.*
- struct **DDS\_TopicBuiltinTopicDataSeq**  
*Instantiates `FooSeq` (p. 1697) < `DDS_TopicBuiltinTopicData` (p. 1128) > .*
- class **DDSTopicBuiltinTopicDataTypeSupport**  
*Instantiates `TypeSupport` < `DDS_TopicBuiltinTopicData` (p. 1128) > .*
- class **DDSTopicBuiltinTopicDataDataReader**  
*Instantiates `DataReader` < `DDS_TopicBuiltinTopicData` (p. 1128) > .*

## Typedefs

- typedef struct **DDS\_TopicBuiltinTopicData DDS\_TopicBuiltinTopicData**  
*Entry created when a Topic object discovered.*

## Variables

- const char \* **DDS\_TOPIC\_TOPIC\_NAME**  
*Topic topic name.*

### 7.81.1 Detailed Description

Builtin topic for accessing information about the Topics discovered by RTI Connxt.

### 7.81.2 Typedef Documentation

#### 7.81.2.1 DDS\_TopicBuiltinTopicData

```
typedef struct DDS_TopicBuiltinTopicData DDS_TopicBuiltinTopicData
```

Entry created when a Topic object discovered.

Data associated with the built-in topic **DDS\_TOPIC\_TOPIC\_NAME** (p. 297). It contains QoS policies and additional information that apply to the remote **DDSTopic** (p. 1617).

Note: The **DDS\_TopicBuiltinTopicData** (p. 1128) built-in topic is meant to convey information about discovered Topics. This Topic's samples are not propagated in a separate packet on the wire. Instead, the data is sent as part of the information carried by other built-in topics (**DDS\_PublicationBuiltinTopicData** (p. 1010) and **DDS\_SubscriptionBuiltinTopicData** (p. 1108)). Therefore TopicBuiltinTopicData DataReaders will not receive any data.

See also

- DDS\_TOPIC\_TOPIC\_NAME** (p. 297)
- DDSTopicBuiltinTopicDataDataReader** (p. 1622)

### 7.81.3 Variable Documentation

#### 7.81.3.1 DDS\_TOPIC\_TOPIC\_NAME

```
const char* DDS_TOPIC_TOPIC_NAME [extern]
```

Topic topic name.

Topic name of `DDSTopicBuiltinTopicDataDataReader` (p. 1622)

See also

`DDS_TopicBuiltinTopicData` (p. 1128)

`DDSTopicBuiltinTopicDataDataReader` (p. 1622)

## 7.82 Publication Built-in Topics

Builtin topic for accessing information about the Publications discovered by RTI Connext.

### Classes

- struct `DDS_PublicationBuiltinTopicData`  
*Entry created when a `DDSDataWriter` (p. 1321) is discovered in association with its Publisher.*
- struct `DDS_PublicationBuiltinTopicDataSeq`  
*Instantiates `FooSeq` (p. 1697) < `DDS_PublicationBuiltinTopicData` (p. 1010) > .*
- class `DDSPublicationBuiltinTopicDataTypeSupport`  
*Instantiates `TypeSupport` < `DDS_PublicationBuiltinTopicData` (p. 1010) > .*
- class `DDSPublicationBuiltinTopicDataDataReader`  
*Instantiates `DataReader` < `DDS_PublicationBuiltinTopicData` (p. 1010) > .*

### Typedefs

- typedef struct `DDS_PublicationBuiltinTopicData DDS_PublicationBuiltinTopicData`  
*Entry created when a `DDSDataWriter` (p. 1321) is discovered in association with its Publisher.*

### Variables

- const char \* `DDS_PUBLICATION_TOPIC_NAME`  
*Publication topic name.*

## 7.82.1 Detailed Description

Builtin topic for accessing information about the Publications discovered by RTI Connex.

## 7.82.2 Typedef Documentation

### 7.82.2.1 DDS\_PublicationBuiltinTopicData

```
typedef struct DDS_PublicationBuiltinTopicData DDS_PublicationBuiltinTopicData
```

Entry created when a **DDSDataWriter** (p. 1321) is discovered in association with its Publisher.

Data associated with the built-in topic **DDS\_PUBLICATION\_TOPIC\_NAME** (p. 298). It contains QoS policies and additional information that apply to the remote **DDSDataWriter** (p. 1321) the related **DDSPublisher** (p. 1550).

See also

**DDS\_PUBLICATION\_TOPIC\_NAME** (p. 298)

**DDSPublicationBuiltinTopicDataDataReader** (p. 1549)

## 7.82.3 Variable Documentation

### 7.82.3.1 DDS\_PUBLICATION\_TOPIC\_NAME

```
const char* DDS_PUBLICATION_TOPIC_NAME [extern]
```

Publication topic name.

Topic name of **DDSPublicationBuiltinTopicDataDataReader** (p. 1549)

See also

**DDS\_PublicationBuiltinTopicData** (p. 1010)

**DDSPublicationBuiltinTopicDataDataReader** (p. 1549)

## 7.83 Subscription Built-in Topics

Builtin topic for accessing information about the Subscriptions discovered by RTI Connex.



## Classes

- struct **DDS\_SubscriptionBuiltinTopicData**  
*Entry created when a **DDSDataReader** (p. 1288) is discovered in association with its Subscriber.*
- struct **DDS\_SubscriptionBuiltinTopicDataSeq**  
*Instantiates **FooSeq** (p. 1697) < **DDS\_SubscriptionBuiltinTopicData** (p. 1108) > .*
- class **DDSSubscriptionBuiltinTopicDataTypeSupport**  
*Instantiates **TypeSupport** < **DDS\_SubscriptionBuiltinTopicData** (p. 1108) > .*
- class **DDSSubscriptionBuiltinTopicDataDataReader**  
*Instantiates **DataReader** < **DDS\_SubscriptionBuiltinTopicData** (p. 1108) > .*

## Typedefs

- typedef struct **DDS\_SubscriptionBuiltinTopicData** **DDS\_SubscriptionBuiltinTopicData**  
*Entry created when a **DDSDataReader** (p. 1288) is discovered in association with its Subscriber.*

## Variables

- const char \* **DDS\_SUBSCRIPTION\_TOPIC\_NAME**  
*Subscription topic name.*

### 7.83.1 Detailed Description

Builtin topic for accessing information about the Subscriptions discovered by RTI Connext.

### 7.83.2 Typedef Documentation

#### 7.83.2.1 DDS\_SubscriptionBuiltinTopicData

```
typedef struct DDS_SubscriptionBuiltinTopicData DDS_SubscriptionBuiltinTopicData
```

Entry created when a **DDSDataReader** (p. 1288) is discovered in association with its Subscriber.

Data associated with the built-in topic **DDS\_SUBSCRIPTION\_TOPIC\_NAME** (p. 300). It contains QoS policies and additional information that apply to the remote **DDSDataReader** (p. 1288) the related **DDSSubscriber** (p. 1592).

See also

- DDS\_SUBSCRIPTION\_TOPIC\_NAME** (p. 300)
- DDSSubscriptionBuiltinTopicDataDataReader** (p. 1614)

### 7.83.3 Variable Documentation

#### 7.83.3.1 DDS\_SUBSCRIPTION\_TOPIC\_NAME

```
const char* DDS_SUBSCRIPTION_TOPIC_NAME [extern]
```

Subscription topic name.

Topic name of **DDSSubscriptionBuiltinTopicDataDataReader** (p. 1614)

See also

**DDS\_SubscriptionBuiltinTopicData** (p. 1108)

**DDSSubscriptionBuiltinTopicDataDataReader** (p. 1614)

## 7.84 ServiceRequest Built-in Topic

Builtin topic for accessing requests from different services within RTI Connex.

### Classes

- struct **DDS\_ServiceRequest**  
*A request coming from one of the built-in services.*
- struct **DDS\_ServiceRequestSeq**  
*Instantiates `FooSeq` (p. 1697) < `DDS_ServiceRequest` (p. 1097) > .*
- class **DDSServiceRequestTypeSupport**  
*Instantiates `TypeSupport` < `DDS_ServiceRequest` (p. 1097) > .*
- class **DDSServiceRequestDataReader**  
*Instantiates `DataReader` < `DDS_ServiceRequest` (p. 1097) > .*

### Typedefs

- typedef struct **DDS\_ServiceRequest DDS\_ServiceRequest**  
*A request coming from one of the built-in services.*

## Variables

- const **DDS\_Long DDS\_UNKNOWN\_SERVICE\_REQUEST\_ID**  
*An invalid Service Id.*
- const **DDS\_Long DDS\_TOPIC\_QUERY\_SERVICE\_REQUEST\_ID**  
*Service Id for the **DDSTopicQuery** (p. 1627) Service.*
- const **DDS\_Long DDS\_LOCATOR\_REACHABILITY\_SERVICE\_REQUEST\_ID**  
*Service Id for the Locator Reachability Service.*
- const **DDS\_Long DDS\_INSTANCE\_STATE\_SERVICE\_REQUEST\_ID**  
*Service Id for the Instance State Request service.*
- const **DDS\_Long DDS\_MONITORING\_LIBRARY\_COMMAND\_SERVICE\_REQUEST\_ID**  
*Service Id for RTI Monitoring Library 2.0 Command Service Request.*
- const **DDS\_Long DDS\_MONITORING\_LIBRARY\_REPLY\_SERVICE\_REQUEST\_ID**  
*Service Id for RTI Monitoring Library 2.0 Reply Service Requests.*
- const char \* **DDS\_SERVICE\_REQUEST\_TOPIC\_NAME**  
*Service Request topic name.*

### 7.84.1 Detailed Description

Builtin topic for accessing requests from different services within RTI Connex.

Currently, the **DDSTopicQuery** (p. 1627), Locator Reachability Instance State Consistency and Controlability (part of Observability) all rely on this topic.

See also

**Topic Queries** (p. 151) for an explanation of how TopicQueries use ServiceRequests and how you can access the ServiceRequests for debugging purposes in the section **The Built-in ServiceRequest DataReader** (p. 153).

### 7.84.2 Typedef Documentation

#### 7.84.2.1 DDS\_ServiceRequest

```
typedef struct DDS_ServiceRequest DDS_ServiceRequest
```

A request coming from one of the built-in services.

Data associated with the built-in topic **DDS\_SERVICE\_REQUEST\_TOPIC\_NAME** (p. 303). It contains service-specific information.

See also

**DDS\_SERVICE\_REQUEST\_TOPIC\_NAME** (p. 303)

**DDSParticipantBuiltinTopicDataDataReader** (p. 1548)

### 7.84.3 Variable Documentation

#### 7.84.3.1 DDS\_UNKNOWN\_SERVICE\_REQUEST\_ID

```
const DDS_Long DDS_UNKNOWN_SERVICE_REQUEST_ID [extern]
```

An invalid Service Id.

#### 7.84.3.2 DDS\_TOPIC\_QUERY\_SERVICE\_REQUEST\_ID

```
const DDS_Long DDS_TOPIC_QUERY_SERVICE_REQUEST_ID [extern]
```

Service Id for the **DDSTopicQuery** (p. 1627) Service.

#### 7.84.3.3 DDS\_LOCATOR\_REACHABILITY\_SERVICE\_REQUEST\_ID

```
const DDS_Long DDS_LOCATOR_REACHABILITY_SERVICE_REQUEST_ID [extern]
```

Service Id for the Locator Reachability Service.

#### 7.84.3.4 DDS\_INSTANCE\_STATE\_SERVICE\_REQUEST\_ID

```
const DDS_Long DDS_INSTANCE_STATE_SERVICE_REQUEST_ID [extern]
```

Service Id for the Instance State Request service.

#### 7.84.3.5 DDS\_MONITORING\_LIBRARY\_COMMAND\_SERVICE\_REQUEST\_ID

```
const DDS_Long DDS_MONITORING_LIBRARY_COMMAND_SERVICE_REQUEST_ID [extern]
```

Service Id for RTI Monitoring Library 2.0 Command Service Request.

RTI Monitoring Library 2.0 remote commands are sent using this service.

### 7.84.3.6 DDS\_MONITORING\_LIBRARY\_REPLY\_SERVICE\_REQUEST\_ID

```
const DDS_Long DDS_MONITORING_LIBRARY_REPLY_SERVICE_REQUEST_ID [extern]
```

Service Id for RTI Monitoring Library 2.0 Reply Service Requests.

Replies to RTI Monitoring Library 2.0 remote commands are sent using this service.

### 7.84.3.7 DDS\_SERVICE\_REQUEST\_TOPIC\_NAME

```
const char* DDS_SERVICE_REQUEST_TOPIC_NAME [extern]
```

Service Request topic name.

Topic name of the `DDSServiceRequestDataReader` (p. 1577)

See also

`DDS_ServiceRequest` (p. 1097)

`DDSServiceRequestDataReader` (p. 1577)

## 7.85 Common types and functions

Types and functions related to the built-in topics.

### Classes

- struct `DDS_Locator_t`
  - <<*extension*>> (p. 237) Type used to represent the addressing information needed to send a message to an RTPS Endpoint using one of the supported transports.
- struct `DDS_LocatorSeq`
  - Declares IDL sequence < `DDS_Locator_t` (p. 939) >
- struct `DDS_ProtocolVersion_t`
  - <<*extension*>> (p. 237) Type used to represent the version of the RTPS protocol.
- struct `DDS_VendorId_t`
  - <<*extension*>> (p. 237) Type used to represent the vendor of the service implementing the RTPS protocol.
- struct `DDS_ProductVersion_t`
  - <<*extension*>> (p. 237) Type used to represent the current version of RTI Connex.
- struct `DDS_TransportInfo_t`
  - Contains the `class_id` and `message_size_max` of an installed transport.
- struct `DDS_TransportInfoSeq`
  - Instantiates `FooSeq` (p. 1697) < `DDS_TransportInfo_t` (p. 1145) > .
- struct `DDS_BuiltinTopicKey_t`
  - The key type of the built-in topic types.
- struct `DDS_ContentFilterProperty_t`
  - <<*extension*>> (p. 237) Type used to provide all the required information to enable content filtering.

## Macros

- **#define DDS\_LOCATOR\_ADDRESS\_LENGTH\_MAX** 16  
*Declares length of address field in locator.*
- **#define DDS\_PROTOCOLVERSION\_1\_0** { 1, 0 }  
*The protocol version 1.0.*
- **#define DDS\_PROTOCOLVERSION\_1\_1** { 1, 1 }  
*The protocol version 1.1.*
- **#define DDS\_PROTOCOLVERSION\_1\_2** { 1, 2 }  
*The protocol version 1.2.*
- **#define DDS\_PROTOCOLVERSION\_2\_0** { 2, 0 }  
*The protocol version 2.0.*
- **#define DDS\_PROTOCOLVERSION\_2\_1** { 2, 1 }  
*The protocol version 2.1.*
- **#define DDS\_PROTOCOLVERSION** { 2, 1 }  
*The most recent protocol version. Currently 2.1.*
- **#define DDS\_VENDOR\_ID\_LENGTH\_MAX** 2  
*Length of vendor id.*
- **#define DDS\_PRODUCTVERSION\_UNKNOWN**  
*The value used when the product version is unknown.*

## Typedefs

- typedef struct **DDS\_Locator\_t** **DDS\_Locator\_t**  
*<<extension>> (p. 237) Type used to represent the addressing information needed to send a message to an RTPS Endpoint using one of the supported transports.*
- typedef struct **DDS\_ProtocolVersion\_t** **DDS\_ProtocolVersion\_t**  
*<<extension>> (p. 237) Type used to represent the version of the RTPS protocol.*
- typedef struct **DDS\_BuiltinTopicKey\_t** **DDS\_BuiltinTopicKey\_t**  
*The key type of the built-in topic types.*

## Functions

- **DDS\_Boolean DDS\_BuiltinTopicKey\_equals** (const **DDS\_BuiltinTopicKey\_t** \*self, const **DDS\_BuiltinTopicKey\_t** \*other)  
*Compares this Key with another Key for equality.*
- void **DDS\_BuiltinTopicKey\_copy** ( **DDS\_BuiltinTopicKey\_t** \*dst, const **DDS\_BuiltinTopicKey\_t** \*src)  
*Copies another Key into this Key.*
- void **DDS\_BuiltinTopicKey\_to\_guid** (const **DDS\_BuiltinTopicKey\_t** \*self, **DDS\_GUID\_t** \*dst)  
*Converts this Key into a GUID.*
- void **DDS\_BuiltinTopicKey\_from\_guid** ( **DDS\_BuiltinTopicKey\_t** \*self, const **DDS\_GUID\_t** \*src)  
*Initializes this Key from the input GUID.*
- **DDS\_Boolean DDS\_BuiltinTopicKey\_to\_instance\_handle** (const **DDS\_BuiltinTopicKey\_t** \*self, **DDS\_InstanceHandle\_t** \*dst)  
*Converts this Key into an InstanceHandle.*
- **DDS\_Boolean DDS\_BuiltinTopicKey\_from\_instance\_handle** ( **DDS\_BuiltinTopicKey\_t** \*self, const **DDS\_InstanceHandle\_t** \*src)  
*Initializes this Key from the input InstanceHandle.*

## Variables

- const struct **DDS\_Locator\_t DDS\_LOCATOR\_INVALID**  
*An invalid locator.*
- const **DDS\_Long DDS\_LOCATOR\_KIND\_INVALID**  
*Locator of this kind is invalid.*
- const **DDS\_UnsignedLong DDS\_LOCATOR\_PORT\_INVALID**  
*An invalid port.*
- const **DDS\_Octet DDS\_LOCATOR\_ADDRESS\_INVALID [ DDS\_LOCATOR\_ADDRESS\_LENGTH\_MAX]**  
*An invalid address.*
- const **DDS\_Long DDS\_LOCATOR\_KIND\_UDPv4**  
*A locator for a UDPv4 address.*
- const **DDS\_Long DDS\_LOCATOR\_KIND\_UDPv4\_WAN**  
*A locator for a UDPv4 asymmetric transport address.*
- const **DDS\_Long DDS\_LOCATOR\_KIND\_SHMEM**  
*A locator for an address accessed via shared memory.*
- const **DDS\_Long DDS\_LOCATOR\_KIND\_SHMEM\_510**  
*A locator for an address accessed via shared memory for RTI Connex 5.1.0 and earlier.*
- const **DDS\_Long DDS\_LOCATOR\_KIND\_UDPv6**  
*A locator for a UDPv6 address.*
- const **DDS\_Long DDS\_LOCATOR\_KIND\_UDPv6\_510**  
*A locator for a UDPv6 address for RTI Connex 5.1.0 and earlier.*
- const **DDS\_Long DDS\_LOCATOR\_KIND\_RESERVED**  
*Locator of this kind is reserved.*

### 7.85.1 Detailed Description

Types and functions related to the built-in topics.

### 7.85.2 Macro Definition Documentation

#### 7.85.2.1 DDS\_LOCATOR\_ADDRESS\_LENGTH\_MAX

```
#define DDS_LOCATOR_ADDRESS_LENGTH_MAX 16
```

Declares length of address field in locator.

### 7.85.2.2 DDS\_PROTOCOLVERSION\_1\_0

```
#define DDS_PROTOCOLVERSION_1_0 { 1, 0 }
```

The protocol version 1.0.

### 7.85.2.3 DDS\_PROTOCOLVERSION\_1\_1

```
#define DDS_PROTOCOLVERSION_1_1 { 1, 1 }
```

The protocol version 1.1.

### 7.85.2.4 DDS\_PROTOCOLVERSION\_1\_2

```
#define DDS_PROTOCOLVERSION_1_2 { 1, 2 }
```

The protocol version 1.2.

### 7.85.2.5 DDS\_PROTOCOLVERSION\_2\_0

```
#define DDS_PROTOCOLVERSION_2_0 { 2, 0 }
```

The protocol version 2.0.

### 7.85.2.6 DDS\_PROTOCOLVERSION\_2\_1

```
#define DDS_PROTOCOLVERSION_2_1 { 2, 1 }
```

The protocol version 2.1.

### 7.85.2.7 DDS\_PROTOCOLVERSION

```
#define DDS_PROTOCOLVERSION { 2, 1 }
```

The most recent protocol version. Currently 2.1.



### 7.85.2.8 DDS\_VENDOR\_ID\_LENGTH\_MAX

```
#define DDS_VENDOR_ID_LENGTH_MAX 2
```

Length of vendor id.

### 7.85.2.9 DDS\_PRODUCTVERSION\_UNKNOWN

```
#define DDS_PRODUCTVERSION_UNKNOWN
```

**Value:**

```
{ \
  DDS_PRODUCTVERSION_MAJOR_UNKNOWN, \
  DDS_PRODUCTVERSION_MINOR_UNKNOWN, \
  DDS_PRODUCTVERSION_RELEASE_UNKNOWN, \
  DDS_PRODUCTVERSION_REVISION_UNKNOWN \
}
```

The value used when the product version is unknown.

## 7.85.3 Typedef Documentation

### 7.85.3.1 DDS\_Locator\_t

```
typedef struct DDS_Locator_t DDS_Locator_t
```

<<*extension*>> (p. 237) Type used to represent the addressing information needed to send a message to an RTPS Endpoint using one of the supported transports.

### 7.85.3.2 DDS\_ProtocolVersion\_t

```
typedef struct DDS_ProtocolVersion_t DDS_ProtocolVersion_t
```

<<*extension*>> (p. 237) Type used to represent the version of the RTPS protocol.

### 7.85.3.3 DDS\_BuiltinTopicKey\_t

```
typedef struct DDS_BuiltinTopicKey_t DDS_BuiltinTopicKey_t
```

The key type of the built-in topic types.

Each remote **DDSEntity** (p. 1463) to be discovered can be uniquely identified by this key. This is the key of all the built-in topic data types.

See also

**DDS\_ParticipantBuiltinTopicData** (p. 979)

**DDS\_TopicBuiltinTopicData** (p. 1128)

**DDS\_PublicationBuiltinTopicData** (p. 1010)

**DDS\_SubscriptionBuiltinTopicData** (p. 1108)

## 7.85.4 Function Documentation

### 7.85.4.1 DDS\_BuiltinTopicKey\_equals()

```
DDS_Boolean DDS_BuiltinTopicKey_equals (
    const DDS_BuiltinTopicKey_t * self,
    const DDS_BuiltinTopicKey_t * other )
```

Compares this Key with another Key for equality.

Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This Key. Cannot be NULL.
<i>other</i>	<< <i>in</i> >> (p. 238) The other Key to be compared with this Key. Cannot be NULL.

Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two Keys have equal values, or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

### 7.85.4.2 DDS\_BuiltinTopicKey\_copy()

```
void DDS_BuiltinTopicKey_copy (
    DDS_BuiltinTopicKey_t * dst,
    const DDS_BuiltinTopicKey_t * src )
```

Copies another Key into this Key.

## Parameters

<i>dst</i>	<< <b>out</b> >> (p. 238) This Key. Cannot be NULL.
<i>src</i>	<< <b>in</b> >> (p. 238) The other Key to be copied. Cannot be NULL.

**7.85.4.3 DDS\_BuiltinTopicKey\_to\_guid()**

```
void DDS_BuiltinTopicKey_to_guid (
    const DDS_BuiltinTopicKey_t * self,
    DDS_GUID_t * dst )
```

Converts this Key into a GUID.

## Parameters

<i>self</i>	<< <b>in</b> >> (p. 238) This Key. Cannot be NULL.
<i>dst</i>	<< <b>out</b> >> (p. 238) The destination GUID. Cannot be NULL.

**7.85.4.4 DDS\_BuiltinTopicKey\_from\_guid()**

```
void DDS_BuiltinTopicKey_from_guid (
    DDS_BuiltinTopicKey_t * self,
    const DDS_GUID_t * src )
```

Initializes this Key from the input GUID.

## Parameters

<i>self</i>	<< <b>out</b> >> (p. 238) This Key. Cannot be NULL.
<i>src</i>	<< <b>in</b> >> (p. 238) The GUID to be used to initialize this Key. Cannot be NULL.

**7.85.4.5 DDS\_BuiltinTopicKey\_to\_instance\_handle()**

```
DDS_Boolean DDS_BuiltinTopicKey_to_instance_handle (
    const DDS_BuiltinTopicKey_t * self,
    DDS_InstanceHandle_t * dst )
```

Converts this Key into an InstanceHandle.

## Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This Key. Cannot be NULL.
<i>dst</i>	<< <i>out</i> >> (p. 238) The destination InstanceHandle. Cannot be NULL.

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) on success or **DDS\_BOOLEAN\_FALSE** (p. 317) on failure

## 7.85.4.6 DDS\_BuiltinTopicKey\_from\_instance\_handle()

```
DDS_Boolean DDS_BuiltinTopicKey_from_instance_handle (
    DDS_BuiltinTopicKey_t * self,
    const DDS_InstanceHandle_t * src )
```

Initializes this Key from the input InstanceHandle.

## Parameters

<i>self</i>	<< <i>out</i> >> (p. 238) This Key. Cannot be NULL.
<i>src</i>	<< <i>in</i> >> (p. 238) The InstanceHandle to be used to initialize this Key. Cannot be NULL.

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) on success or **DDS\_BOOLEAN\_FALSE** (p. 317) on failure

## 7.85.5 Variable Documentation

## 7.85.5.1 DDS\_LOCATOR\_INVALID

```
const struct DDS_Locator_t DDS_LOCATOR_INVALID [extern]
```

An invalid locator.

## 7.85.5.2 DDS\_LOCATOR\_KIND\_INVALID

```
const DDS_Long DDS_LOCATOR_KIND_INVALID [extern]
```

Locator of this kind is invalid.

### 7.85.5.3 DDS\_LOCATOR\_PORT\_INVALID

```
const DDS_UnsignedLong DDS_LOCATOR_PORT_INVALID [extern]
```

An invalid port.

### 7.85.5.4 DDS\_LOCATOR\_ADDRESS\_INVALID

```
const DDS_Octet DDS_LOCATOR_ADDRESS_INVALID[ DDS_LOCATOR_ADDRESS_LENGTH_MAX] [extern]
```

An invalid address.

### 7.85.5.5 DDS\_LOCATOR\_KIND\_UDPv4

```
const DDS_Long DDS_LOCATOR_KIND_UDPv4 [extern]
```

A locator for a UDPv4 address.

### 7.85.5.6 DDS\_LOCATOR\_KIND\_UDPv4\_WAN

```
const DDS_Long DDS_LOCATOR_KIND_UDPv4_WAN [extern]
```

A locator for a UDPv4 asymmetric transport address.

### 7.85.5.7 DDS\_LOCATOR\_KIND\_SHMEM

```
const DDS_Long DDS_LOCATOR_KIND_SHMEM [extern]
```

A locator for an address accessed via shared memory.

### 7.85.5.8 DDS\_LOCATOR\_KIND\_SHMEM\_510

```
const DDS_Long DDS_LOCATOR_KIND_SHMEM_510 [extern]
```

A locator for an address accessed via shared memory for RTI Connex 5.1.0 and earlier.

### 7.85.5.9 DDS\_LOCATOR\_KIND\_UDPv6

```
const DDS_Long DDS_LOCATOR_KIND_UDPv6 [extern]
```

A locator for a UDPv6 address.

### 7.85.5.10 DDS\_LOCATOR\_KIND\_UDPv6\_510

```
const DDS_Long DDS_LOCATOR_KIND_UDPv6_510 [extern]
```

A locator for a UDPv6 address for RTI Connex 5.1.0 and earlier.

### 7.85.5.11 DDS\_LOCATOR\_KIND\_RESERVED

```
const DDS_Long DDS_LOCATOR_KIND_RESERVED [extern]
```

Locator of this kind is reserved.

## 7.86 String Built-in Type

Built-in type consisting of a single character string.

### Classes

- class **DDSStringTypeSupport**  
    <<*interface*>> (p. 237) *String type support.*
- class **DDSStringDataReader**  
    <<*interface*>> (p. 237) *Instantiates DataReader < char\* >.*
- class **DDSStringDataWriter**  
    <<*interface*>> (p. 237) *Instantiates DataWriter < char\* >.*

### 7.86.1 Detailed Description

Built-in type consisting of a single character string.

## 7.87 KeyedString Built-in Type

Built-in type consisting of a string payload and a second string that is the key.

## Classes

- struct **DDS\_KeyedString**  
*Keyed string built-in type.*
- struct **DDS\_KeyedStringSeq**  
*Instantiates `FooSeq` (p. 1697) < `DDS_KeyedString` (p. 927) > .*
- class **DDSKeyedStringTypeSupport**  
*<<interface>> (p. 237) Keyed string type support.*
- class **DDSKeyedStringDataReader**  
*<<interface>> (p. 237) Instantiates `DataReader` < `DDS_KeyedString` (p. 927) > .*
- class **DDSKeyedStringDataWriter**  
*<<interface>> (p. 237) Instantiates `DataWriter` < `DDS_KeyedString` (p. 927) > .*

## Typedefs

- typedef struct **DDS\_KeyedString DDS\_KeyedString**  
*Keyed string built-in type.*

### 7.87.1 Detailed Description

Built-in type consisting of a string payload and a second string that is the key.

### 7.87.2 Typedef Documentation

#### 7.87.2.1 DDS\_KeyedString

```
typedef struct DDS_KeyedString DDS_KeyedString
```

Keyed string built-in type.

## 7.88 Octets Built-in Type

Built-in type consisting of a variable-length array of opaque bytes.

## Classes

- struct **DDS\_Octets**  
*Built-in type consisting of a variable-length array of opaque bytes.*
- struct **DDS\_OctetsSeq**  
*Instantiates `FooSeq` (p. 1697) < `DDS_Octets` (p. 967) > .*
- class **DDSOctetsTypeSupport**  
*<<interface>> (p. 237) `DDS_Octets` (p. 967) type support.*
- class **DDSOctetsDataReader**  
*<<interface>> (p. 237) Instantiates `DataReader` < `DDS_Octets` (p. 967) > .*
- class **DDSOctetsDataWriter**  
*<<interface>> (p. 237) Instantiates `DataWriter` < `DDS_Octets` (p. 967) > .*

## Typedefs

- typedef struct **DDS\_Octets DDS\_Octets**  
*Built-in type consisting of a variable-length array of opaque bytes.*

### 7.88.1 Detailed Description

Built-in type consisting of a variable-length array of opaque bytes.

### 7.88.2 Typedef Documentation

#### 7.88.2.1 DDS\_Octets

```
typedef struct DDS_Octets DDS_Octets
```

Built-in type consisting of a variable-length array of opaque bytes.

## 7.89 KeyedOctets Built-in Type

Built-in type consisting of a variable-length array of opaque bytes and a string that is the key.



## Classes

- struct **DDS\_KeyedOctets**  
*Built-in type consisting of a variable-length array of opaque bytes and a string that is the key.*
- struct **DDS\_KeyedOctetsSeq**  
*Instantiates `FooSeq` (p. 1697) < **DDS\_KeyedOctets** (p. 924) >.*
- class **DDSKeyedOctetsTypeSupport**  
*<<interface>> (p. 237) **DDS\_KeyedOctets** (p. 924) type support.*
- class **DDSKeyedOctetsDataReader**  
*<<interface>> (p. 237) Instantiates `DataReader` < **DDS\_KeyedOctets** (p. 924) >.*
- class **DDSKeyedOctetsDataWriter**  
*<<interface>> (p. 237) Instantiates `DataWriter` < **DDS\_KeyedOctets** (p. 924) >.*

## Typedefs

- typedef struct **DDS\_KeyedOctets DDS\_KeyedOctets**  
*Built-in type consisting of a variable-length array of opaque bytes and a string that is the key.*

### 7.89.1 Detailed Description

Built-in type consisting of a variable-length array of opaque bytes and a string that is the key.

### 7.89.2 Typedef Documentation

#### 7.89.2.1 DDS\_KeyedOctets

```
typedef struct DDS_KeyedOctets DDS_KeyedOctets
```

Built-in type consisting of a variable-length array of opaque bytes and a string that is the key.

## 7.90 DDS-Specific Primitive Types

Basic DDS value types for use in user data types.

## Macros

- #define **DDS\_BOOLEAN\_TRUE**  
*Defines "true" value of **DDS\_Boolean** (p. 320) data type.*
- #define **DDS\_BOOLEAN\_FALSE**  
*Defines "false" value of **DDS\_Boolean** (p. 320) data type.*

## Typedefs

- typedef RTICdrChar **DDS\_Char**  
*Defines a character data type, equivalent to IDL/CDR char.*
- typedef RTICdrWchar **DDS\_Wchar**  
*Defines a wide character data type, equivalent to IDL/CDR wchar.*
- typedef RTICdrOctet **DDS\_Octet**  
*Defines an opaque byte data type, equivalent to IDL/CDR octet.*
- typedef RTICdrOctet **DDS\_UInt8**  
*Defines a data type, equivalent to IDL/CDR uint8.*
- typedef RTICdrInt8 **DDS\_Int8**  
*Defines a data type, equivalent to IDL/CDR int8.*
- typedef RTICdrShort **DDS\_Short**  
*Defines a short integer data type, equivalent to IDL/CDR short.*
- typedef RTICdrUnsignedShort **DDS\_UnsignedShort**  
*Defines an unsigned short integer data type, equivalent to IDL/CDR unsigned short.*
- typedef RTICdrLong **DDS\_Long**  
*Defines a long integer data type, equivalent to IDL/CDR long.*
- typedef RTICdrUnsignedLong **DDS\_UnsignedLong**  
*Defines an unsigned long integer data type, equivalent to IDL/CDR unsigned long.*
- typedef RTICdrLongLong **DDS\_LongLong**  
*Defines an extra-long integer data type, equivalent to IDL/CDR long long.*
- typedef RTICdrUnsignedLongLong **DDS\_UnsignedLongLong**  
*Defines an unsigned extra-long data type, equivalent to IDL/CDR unsigned long long.*
- typedef RTICdrFloat **DDS\_Float**  
*Defines a single-precision floating-point data type, equivalent to IDL/CDR float.*
- typedef RTICdrDouble **DDS\_Double**  
*Defines a double-precision floating-point data type, equivalent to IDL/CDR double.*
- typedef RTICdrLongDouble **DDS\_LongDouble**  
*Defines an extra-precision floating-point data type, equivalent to IDL/CDR long double.*
- typedef RTICdrBoolean **DDS\_Boolean**  
*Defines a Boolean data type, equivalent to IDL/CDR boolean.*
- typedef RTICdrEnum **DDS\_Enum**  
*Defines an enumerated data type.*

### 7.90.1 Detailed Description

Basic DDS value types for use in user data types.

As part of the finalization of the DDS standard, a number of DDS-specific primitive types will be introduced. By using these types, you will ensure that your data is serialized consistently across platforms even if the C/C++ built-in types have different sizes on those platforms.

In this version of RTI Connex, the DDS primitive types are defined using the OMG's Common Data Representation (CDR) standard. In a future version of RTI Connex, you will be given the choice of whether to use these CDR-based types or C/C++ built-in types through a flag provided to the rttiddsgen tool.

Typedef's that begin with RTICdr are defined in `<NDDSHOME>/include/ndds/cdr/cdr_type.h`, which uses types that are further defined in `<NDDSHOME>/include/ndds/osapi/osapi_type.h`.

## 7.90.2 Macro Definition Documentation

### 7.90.2.1 DDS\_BOOLEAN\_TRUE

```
#define DDS_BOOLEAN_TRUE
```

Defines "true" value of **DDS\_Boolean** (p. 320) data type.

#### Examples

**HelloWorld.cxx.**

### 7.90.2.2 DDS\_BOOLEAN\_FALSE

```
#define DDS_BOOLEAN_FALSE
```

Defines "false" value of **DDS\_Boolean** (p. 320) data type.

#### Examples

**HelloWorld.cxx.**

## 7.90.3 Typedef Documentation

### 7.90.3.1 DDS\_Char

```
typedef RTICdrChar DDS_Char
```

Defines a character data type, equivalent to IDL/CDR `char`.

An 8-bit quantity that encodes a single byte character from any byte-oriented code set.

### 7.90.3.2 DDS\_Wchar

```
typedef RTICdrWchar DDS_Wchar
```

Defines a wide character data type, equivalent to IDL/CDR `wchar`.

A 16-bit quantity that contains a wide character encoded in UTF-16.

### 7.90.3.3 DDS\_Octet

```
typedef RTICdrOctet  DDS_Octet
```

Defines an opaque byte data type, equivalent to IDL/CDR `octet`.

An 8-bit quantity that is guaranteed not to undergo any conversion when transmitted by the middleware.

### 7.90.3.4 DDS\_UInt8

```
typedef RTICdrOctet  DDS_UInt8
```

Defines a data type, equivalent to IDL/CDR `uint8`.

An 8-bit quantity that is guaranteed not to undergo any conversion when transmitted by the middleware.

### 7.90.3.5 DDS\_Int8

```
typedef RTICdrInt8   DDS_Int8
```

Defines a data type, equivalent to IDL/CDR `int8`.

An 8-bit quantity that is guaranteed not to undergo any conversion when transmitted by the middleware.

### 7.90.3.6 DDS\_Short

```
typedef RTICdrShort  DDS_Short
```

Defines a short integer data type, equivalent to IDL/CDR `short`.

A 16-bit signed short integer value.

### 7.90.3.7 DDS\_UnsignedShort

```
typedef RTICdrUnsignedShort  DDS_UnsignedShort
```

Defines an unsigned short integer data type, equivalent to IDL/CDR `unsigned short`.

A 16-bit unsigned short integer value.

### 7.90.3.8 DDS\_Long

```
typedef RTICdrLong   DDS_Long
```

Defines a long integer data type, equivalent to IDL/CDR `long`.

A 32-bit signed long integer value.

### 7.90.3.9 DDS\_UnsignedLong

```
typedef RTICdrUnsignedLong DDS_UnsignedLong
```

Defines an unsigned long integer data type, equivalent to IDL/CDR `unsigned long`.

A 32-bit unsigned long integer value.

### 7.90.3.10 DDS\_LongLong

```
typedef RTICdrLongLong DDS_LongLong
```

Defines an extra-long integer data type, equivalent to IDL/CDR `long long`.

A 64-bit signed long long integer value.

### 7.90.3.11 DDS\_UnsignedLongLong

```
typedef RTICdrUnsignedLongLong DDS_UnsignedLongLong
```

Defines an unsigned extra-long data type, equivalent to IDL/CDR `unsigned long long`.

A 64-bit unsigned long long integer value.

### 7.90.3.12 DDS\_Float

```
typedef RTICdrFloat DDS_Float
```

Defines a single-precision floating-point data type, equivalent to IDL/CDR `float`.

A 32-bit floating-point value.

### 7.90.3.13 DDS\_Double

```
typedef RTICdrDouble DDS_Double
```

Defines a double-precision floating-point data type, equivalent to IDL/CDR `double`.

A 64-bit floating-point value.

### 7.90.3.14 DDS\_LongDouble

```
typedef RTICdrLongDouble DDS_LongDouble
```

Defines an extra-precision floating-point data type, equivalent to IDL/CDR `long double`.

A 128-bit floating-point value.

Since some architectures do not support long double, RTI has defined character arrays that match the expected size of this type. On systems that do have native long double, you have to define `RTI_CDR_SIZEOF_LONG_DOUBLE` as 16 to map them to native types.

### 7.90.3.15 DDS\_Boolean

```
typedef RTICdrBoolean DDS_Boolean
```

Defines a Boolean data type, equivalent to IDL/CDR `boolean`.

An 8-bit Boolean value that is used to denote a data item that can only take one of the values `DDS_BOOLEAN_TRUE` (p. 317) (1) or `DDS_BOOLEAN_FALSE` (p. 317) (0).

#### Examples

**HelloWorld.cxx.**

### 7.90.3.16 DDS\_Enum

```
typedef RTICdrEnum DDS_Enum
```

Defines an enumerated data type.

Encoded as a signed 32-bit integer value. By default, the first enum identifier has the numeric value zero (0) (unless the value is provided explicitly). Successive enum identifiers take ascending numeric values, in order of declaration from left to right.

## 7.91 Time Support

Time and duration types and defines.

### Classes

- struct **DDS\_Duration\_t**  
*Type for duration representation.*
- struct **DDS\_Time\_t**  
*Type for time representation.*

## Macros

- **#define DDS\_TIME\_ZERO**  
*The default instant in time: zero seconds and zero nanoseconds.*

## Functions

- static **DDS\_Duration\_t DDS\_Duration\_t::from\_micros** ( **DDS\_UnsignedLongLong** microseconds)  
*Creates a new duration object from a duration expressed in microseconds.*
- static **DDS\_Duration\_t DDS\_Duration\_t::from\_millis** ( **DDS\_UnsignedLongLong** milliseconds)  
*Creates a new duration object from a duration expressed in milliseconds.*
- static **DDS\_Duration\_t DDS\_Duration\_t::from\_nanos** ( **DDS\_UnsignedLongLong** nanoseconds)  
*Creates a new duration object from a duration expressed in nanoseconds.*
- static **DDS\_Duration\_t DDS\_Duration\_t::from\_seconds** ( **DDS\_UnsignedLong** seconds)  
*Creates a new duration object from a duration expressed in seconds.*
- static **DDS\_Time\_t DDS\_Time\_t::from\_micros** ( **DDS\_UnsignedLongLong** microseconds)  
*Creates a new time object from a time expressed in microseconds.*
- static **DDS\_Time\_t DDS\_Time\_t::from\_millis** ( **DDS\_UnsignedLongLong** milliseconds)  
*Creates a new time object from a time expressed in milliseconds.*
- static **DDS\_Time\_t DDS\_Time\_t::from\_nanos** ( **DDS\_UnsignedLongLong** nanoseconds)  
*Creates a new time object from a time expressed in nanoseconds.*
- static **DDS\_Time\_t DDS\_Time\_t::from\_seconds** ( **DDS\_UnsignedLongLong** seconds)  
*Creates a new time object from a time expressed in seconds.*
- **DDS\_Boolean DDS\_Time\_is\_zero** (const struct **DDS\_Time\_t** \*time)  
*Check if time is zero.*
- **DDS\_Boolean DDS\_Time\_is\_invalid** (const struct **DDS\_Time\_t** \*time)
- **DDS\_Boolean DDS\_Duration\_is\_infinite** (const struct **DDS\_Duration\_t** \*duration)
- **DDS\_Boolean DDS\_Duration\_is\_auto** (const struct **DDS\_Duration\_t** \*duration)
- **DDS\_Boolean DDS\_Duration\_is\_zero** (const struct **DDS\_Duration\_t** \*duration)

## Variables

- const struct **DDS\_Time\_t DDS\_TIME\_MAX**  
*The maximum value of time.*
- const **DDS\_LongLong DDS\_TIME\_INVALID\_SEC**  
*A sentinel indicating an invalid second of time.*
- const **DDS\_UnsignedLong DDS\_TIME\_INVALID\_NSEC**  
*A sentinel indicating an invalid nano-second of time.*
- const struct **DDS\_Time\_t DDS\_TIME\_INVALID**  
*A sentinel indicating an invalid time.*
- const **DDS\_Long DDS\_DURATION\_INFINITE\_SEC**  
*An infinite second period of time.*
- const **DDS\_UnsignedLong DDS\_DURATION\_INFINITE\_NSEC**  
*An infinite nano-second period of time.*
- const struct **DDS\_Duration\_t DDS\_DURATION\_INFINITE**  
*An infinite period of time.*

- const **DDS\_Long DDS\_DURATION\_AUTO\_SEC**  
*An auto second period of time.*
- const **DDS\_UnsignedLong DDS\_DURATION\_AUTO\_NSEC**  
*An auto nano-second period of time.*
- const struct **DDS\_Duration\_t DDS\_DURATION\_AUTO**  
*Duration is automatically assigned.*
- const **DDS\_Long DDS\_DURATION\_ZERO\_SEC**  
*A zero-length second period of time.*
- const **DDS\_UnsignedLong DDS\_DURATION\_ZERO\_NSEC**  
*A zero-length nano-second period of time.*
- const struct **DDS\_Duration\_t DDS\_DURATION\_ZERO**  
*A zero-length period of time.*

### 7.91.1 Detailed Description

Time and duration types and defines.

### 7.91.2 Macro Definition Documentation

#### 7.91.2.1 DDS\_TIME\_ZERO

```
#define DDS_TIME_ZERO
```

The default instant in time: zero seconds and zero nanoseconds.

### 7.91.3 Function Documentation

#### 7.91.3.1 from\_micros() [1/2]

```
static DDS_Duration_t DDS_Duration_t::from_micros (  
    DDS_UnsignedLongLong microseconds ) [static]
```

Creates a new duration object from a duration expressed in microseconds.

In case of an overflow this function returns **DDS\_DURATION\_INFINITE** (p. 326).



### 7.91.3.2 from\_millis() [1/2]

```
static DDS_Duration_t DDS_Duration_t::from_millis (
    DDS_UnsignedLongLong milliseconds ) [static]
```

Creates a new duration object from a duration expressed in milliseconds.

In case of an overflow this function returns **DDS\_DURATION\_INFINITE** (p. 326).

### 7.91.3.3 from\_nanos() [1/2]

```
static DDS_Duration_t DDS_Duration_t::from_nanos (
    DDS_UnsignedLongLong nanoseconds ) [static]
```

Creates a new duration object from a duration expressed in nanoseconds.

In case of an overflow this function returns **DDS\_DURATION\_INFINITE** (p. 326).

### 7.91.3.4 from\_seconds() [1/2]

```
static DDS_Duration_t DDS_Duration_t::from_seconds (
    DDS_UnsignedLong seconds ) [static]
```

Creates a new duration object from a duration expressed in seconds.

In case of an overflow this function returns **DDS\_DURATION\_INFINITE** (p. 326).

### 7.91.3.5 from\_micros() [2/2]

```
static DDS_Time_t DDS_Time_t::from_micros (
    DDS_UnsignedLongLong microseconds ) [static]
```

Creates a new time object from a time expressed in microseconds.

In case of an overflow this function returns **DDS\_TIME\_MAX** (p. 325).

### 7.91.3.6 from\_millis() [2/2]

```
static DDS_Time_t DDS_Time_t::from_millis (
    DDS_UnsignedLongLong milliseconds ) [static]
```

Creates a new time object from a time expressed in milliseconds.

In case of an overflow this function returns **DDS\_TIME\_MAX** (p. 325).

### 7.91.3.7 from\_nanos() [2/2]

```
static DDS_Time_t DDS_Time_t::from_nanos (
    DDS_UnsignedLongLong nanoseconds ) [static]
```

Creates a new time object from a time expressed in nanoseconds.

In case of an overflow this function returns **DDS\_TIME\_MAX** (p. 325).

### 7.91.3.8 from\_seconds() [2/2]

```
static DDS_Time_t DDS_Time_t::from_seconds (
    DDS_UnsignedLongLong seconds ) [static]
```

Creates a new time object from a time expressed in seconds.

In case of an overflow this function returns **DDS\_TIME\_MAX** (p. 325).

### 7.91.3.9 DDS\_Time\_is\_zero()

```
DDS_Boolean DDS_Time_is_zero (
    const struct DDS_Time_t * time )
```

Check if time is zero.

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the given time is equal to **DDS\_TIME\_ZERO** (p. 322) or **DDS\_BOOLEAN\_↔  
FALSE** (p. 317) otherwise.

### 7.91.3.10 DDS\_Time\_is\_invalid()

```
DDS_Boolean DDS_Time_is_invalid (
    const struct DDS_Time_t * time )
```

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the given time is not valid (i.e. is negative)

### 7.91.3.11 DDS\_Duration\_is\_infinite()

```
DDS_Boolean DDS_Duration_is_infinite (
    const struct DDS_Duration_t * duration )
```

Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the given duration is of infinite length.

### 7.91.3.12 DDS\_Duration\_is\_auto()

```
DDS_Boolean DDS_Duration_is_auto (
    const struct DDS_Duration_t * duration )
```

Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the given duration has auto value.

### 7.91.3.13 DDS\_Duration\_is\_zero()

```
DDS_Boolean DDS_Duration_is_zero (
    const struct DDS_Duration_t * duration )
```

Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the given duration is of zero length.

## 7.91.4 Variable Documentation

### 7.91.4.1 DDS\_TIME\_MAX

```
const struct DDS_Time_t DDS_TIME_MAX [extern]
```

The maximum value of time.

#### 7.91.4.2 DDS\_TIME\_INVALID\_SEC

```
const DDS_LongLong DDS_TIME_INVALID_SEC [extern]
```

A sentinel indicating an invalid second of time.

#### 7.91.4.3 DDS\_TIME\_INVALID\_NSEC

```
const DDS_UnsignedLong DDS_TIME_INVALID_NSEC [extern]
```

A sentinel indicating an invalid nano-second of time.

#### 7.91.4.4 DDS\_TIME\_INVALID

```
const struct DDS_Time_t DDS_TIME_INVALID [extern]
```

A sentinel indicating an invalid time.

#### 7.91.4.5 DDS\_DURATION\_INFINITE\_SEC

```
const DDS_Long DDS_DURATION_INFINITE_SEC [extern]
```

An infinite second period of time.

#### 7.91.4.6 DDS\_DURATION\_INFINITE\_NSEC

```
const DDS_UnsignedLong DDS_DURATION_INFINITE_NSEC [extern]
```

An infinite nano-second period of time.

#### 7.91.4.7 DDS\_DURATION\_INFINITE

```
const struct DDS_Duration_t DDS_DURATION_INFINITE [extern]
```

An infinite period of time.

#### 7.91.4.8 DDS\_DURATION\_AUTO\_SEC

```
const DDS_Long DDS_DURATION_AUTO_SEC [extern]
```

An auto second period of time.

#### 7.91.4.9 DDS\_DURATION\_AUTO\_NSEC

```
const DDS_UnsignedLong DDS_DURATION_AUTO_NSEC [extern]
```

An auto nano-second period of time.

#### 7.91.4.10 DDS\_DURATION\_AUTO

```
const struct DDS_Duration_t DDS_DURATION_AUTO [extern]
```

Duration is automatically assigned.

#### 7.91.4.11 DDS\_DURATION\_ZERO\_SEC

```
const DDS_Long DDS_DURATION_ZERO_SEC [extern]
```

A zero-length second period of time.

#### 7.91.4.12 DDS\_DURATION\_ZERO\_NSEC

```
const DDS_UnsignedLong DDS_DURATION_ZERO_NSEC [extern]
```

A zero-length nano-second period of time.

#### 7.91.4.13 DDS\_DURATION\_ZERO

```
const struct DDS_Duration_t DDS_DURATION_ZERO [extern]
```

A zero-length period of time.

## 7.92 GUID Support

<<*extension*>> (p. 237) GUID type and defines.

### Classes

- struct **DDS\_RTPS\_EntityId\_t**  
*From the DDS-RTPS specification: type used to hold the suffix part of the globally-unique RTPS-entity identifiers.*
- struct **DDS\_RTPS\_GUID\_t**  
*From the DDS-RTPS specification: type used to hold a globally-unique RTPS-entity identifier.*
- struct **DDS\_GUID\_t**  
*Type for GUID (Global Unique Identifier) representation.*

### Typedefs

- typedef **DDS\_Octet DDS\_RTPS\_GuidPrefix\_t**[DDS\_RTPS\_GUID\_PREFIX\_LENGTH]  
*From the DDS-RTPS specification: type used to hold the prefix of the globally-unique RTPS-entity identifiers.*
- typedef struct **DDS\_RTPS\_EntityId\_t DDS\_RTPS\_EntityId\_t**  
*From the DDS-RTPS specification: type used to hold the suffix part of the globally-unique RTPS-entity identifiers.*
- typedef struct **DDS\_RTPS\_GUID\_t DDS\_RTPS\_GUID\_t**  
*From the DDS-RTPS specification: type used to hold a globally-unique RTPS-entity identifier.*
- typedef struct **DDS\_GUID\_t DDS\_GUID\_t**  
*Type for GUID (Global Unique Identifier) representation.*

### Functions

- **DDS\_Boolean DDS\_GUID\_equals** (const struct **DDS\_GUID\_t** \*self, const struct **DDS\_GUID\_t** \*other)  
*Compares this GUID with another GUID for equality.*
- int **DDS\_GUID\_compare** (const struct **DDS\_GUID\_t** \*self, const struct **DDS\_GUID\_t** \*other)  
*Compares two GUIDs.*
- void **DDS\_GUID\_copy** (struct **DDS\_GUID\_t** \*self, const struct **DDS\_GUID\_t** \*other)  
*Copies another GUID into this GUID.*

### Variables

- const struct **DDS\_GUID\_t DDS\_GUID\_AUTO**  
*Indicates that RTI Connexx should choose an appropriate virtual GUID.*
- const struct **DDS\_GUID\_t DDS\_GUID\_UNKNOWN**  
*Unknown GUID.*
- const struct **DDS\_GUID\_t DDS\_GUID\_ZERO**  
*Zero GUID.*

## 7.92.1 Detailed Description

<<*extension*>> (p. 237) GUID type and defines.

## 7.92.2 Typedef Documentation

### 7.92.2.1 DDS\_RTPS\_GuidPrefix\_t

```
typedef DDS_Octet DDS_RTPS_GuidPrefix_t [DDS_RTPS_GUID_PREFIX_LENGTH]
```

From the DDS-RTPS specification: type used to hold the prefix of the globally-unique RTPS-entity identifiers.

From DDS-RTPS Specification, clauses 8.4.2.1 and 9.3.1.

### 7.92.2.2 DDS\_RTPS\_EntityId\_t

```
typedef struct DDS_RTPS_EntityId_t DDS_RTPS_EntityId_t
```

From the DDS-RTPS specification: type used to hold the suffix part of the globally-unique RTPS-entity identifiers.

From DDS-RTPS Specification, clauses 8.4.2.1 and 9.3.1.

### 7.92.2.3 DDS\_RTPS\_GUID\_t

```
typedef struct DDS_RTPS_GUID_t DDS_RTPS_GUID_t
```

From the DDS-RTPS specification: type used to hold a globally-unique RTPS-entity identifier.

From DDS-RTPS Specification, clauses 8.4.2.1 and 9.3.1.

### 7.92.2.4 DDS\_GUID\_t

```
typedef struct DDS_GUID_t DDS_GUID_t
```

Type for *GUID* (Global Unique Identifier) representation.

Represents a 128 bit GUID.

Alternative representation of **DDS\_RTPS\_GUID\_t** (p. 1057). Memory and wire representation for this type is the same as the one for **DDS\_RTPS\_GUID\_t** (p. 1057).

## 7.92.3 Function Documentation

### 7.92.3.1 DDS\_GUID\_equals()

```
DDS_Boolean DDS_GUID_equals (  
    const struct DDS_GUID_t * self,  
    const struct DDS_GUID_t * other )
```

Compares this GUID with another GUID for equality.

## Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This GUID.
<i>other</i>	<< <i>in</i> >> (p. 238) The other GUID to be compared with this GUID.

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the two GUIDs have equal values, or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

## 7.92.3.2 DDS\_GUID\_compare()

```
int DDS_GUID_compare (
    const struct DDS_GUID_t * self,
    const struct DDS_GUID_t * other )
```

Compares two GUIDs.

## Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) GUID to compare.
<i>other</i>	<< <i>in</i> >> (p. 238) GUID to compare.

## Returns

If the two GUIDs are equal or NULL, the function returns 0. If *self* is greater than *other*, the function returns a positive number; otherwise, it returns a negative number. Note that non-NULL is considered greater than NULL.

## 7.92.3.3 DDS\_GUID\_copy()

```
void DDS_GUID_copy (
    struct DDS_GUID_t * self,
    const struct DDS_GUID_t * other )
```

Copies another GUID into this GUID.

## Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This GUID. Cannot be NULL.
<i>other</i>	<< <i>in</i> >> (p. 238) The other GUID to be copied. Cannot be NULL.



## 7.92.4 Variable Documentation

### 7.92.4.1 DDS\_GUID\_AUTO

```
const struct DDS_GUID_t DDS_GUID_AUTO [extern]
```

Indicates that RTI Connexx should choose an appropriate virtual GUID.

If this special value is assigned to **DDS\_DataWriterProtocolQosPolicy::virtual\_guid** (p. 674) or **DDS\_DataReaderProtocolQosPolicy::virtual\_guid** (p. 631), RTI Connexx will assign the virtual GUID automatically based on the RTPS or physical GUID.

### 7.92.4.2 DDS\_GUID\_UNKNOWN

```
const struct DDS_GUID_t DDS_GUID_UNKNOWN [extern]
```

Unknown GUID.

### 7.92.4.3 DDS\_GUID\_ZERO

```
const struct DDS_GUID_t DDS_GUID_ZERO [extern]
```

Zero GUID.

## 7.93 Sequence Number Support

<<*extension*>> (p. 237) Sequence number type and defines.

### Classes

- struct **DDS\_SequenceNumber\_t**  
*Type for sequence number representation.*

### Typedefs

- typedef struct **DDS\_SequenceNumber\_t** **DDS\_SequenceNumber\_t**  
*Type for sequence number representation.*

## Variables

- const struct **DDS\_SequenceNumber\_t DDS\_SEQUENCE\_NUMBER\_UNKNOWN**  
*Unknown sequence number.*
- const struct **DDS\_SequenceNumber\_t DDS\_SEQUENCE\_NUMBER\_ZERO**  
*Zero value for the sequence number.*
- const struct **DDS\_SequenceNumber\_t DDS\_SEQUENCE\_NUMBER\_MAX**  
*Highest, most positive value for the sequence number.*
- const struct **DDS\_SequenceNumber\_t DDS\_AUTO\_SEQUENCE\_NUMBER**  
*The sequence number is internally determined by RTI Connex.*

### 7.93.1 Detailed Description

<<*extension*>> (p. 237) Sequence number type and defines.

### 7.93.2 Typedef Documentation

#### 7.93.2.1 DDS\_SequenceNumber\_t

```
typedef struct DDS_SequenceNumber_t DDS_SequenceNumber_t
```

Type for *sequence* number representation.

Represents a 64-bit sequence number.

### 7.93.3 Variable Documentation

#### 7.93.3.1 DDS\_SEQUENCE\_NUMBER\_UNKNOWN

```
const struct DDS_SequenceNumber_t DDS_SEQUENCE_NUMBER_UNKNOWN [extern]
```

Unknown sequence number.

### 7.93.3.2 DDS\_SEQUENCE\_NUMBER\_ZERO

```
const struct DDS_SequenceNumber_t DDS_SEQUENCE_NUMBER_ZERO [extern]
```

Zero value for the sequence number.

### 7.93.3.3 DDS\_SEQUENCE\_NUMBER\_MAX

```
const struct DDS_SequenceNumber_t DDS_SEQUENCE_NUMBER_MAX [extern]
```

Highest, most positive value for the sequence number.

### 7.93.3.4 DDS\_AUTO\_SEQUENCE\_NUMBER

```
const struct DDS_SequenceNumber_t DDS_AUTO_SEQUENCE_NUMBER [extern]
```

The sequence number is internally determined by RTI Connex.

## 7.94 Exception Codes

<<*extension*>> (p. 237) Exception codes.

### Enumerations

- enum **DDS\_ExceptionCode\_t** {  
    **DDS\_NO\_EXCEPTION\_CODE** ,  
    **DDS\_USER\_EXCEPTION\_CODE** ,  
    **DDS\_SYSTEM\_EXCEPTION\_CODE** ,  
    **DDS\_BAD\_PARAM\_SYSTEM\_EXCEPTION\_CODE** ,  
    **DDS\_NO\_MEMORY\_SYSTEM\_EXCEPTION\_CODE** ,  
    **DDS\_BAD\_TYPECODE\_SYSTEM\_EXCEPTION\_CODE** ,  
    **DDS\_BADKIND\_USER\_EXCEPTION\_CODE** ,  
    **DDS\_BOUNDS\_USER\_EXCEPTION\_CODE** ,  
    **DDS\_IMMUTABLE\_TYPECODE\_SYSTEM\_EXCEPTION\_CODE = 8** ,  
    **DDS\_BAD\_MEMBER\_NAME\_USER\_EXCEPTION\_CODE = 9** ,  
    **DDS\_BAD\_MEMBER\_ID\_USER\_EXCEPTION\_CODE = 10** }

*Error codes used by the DDS\_TypeCode (p. 1164) class.*

## 7.94.1 Detailed Description

<<*extension*>> (p. 237) Exception codes.

These exceptions are used for error handling by the **Type Code Support** (p. 76) API.

## 7.94.2 Enumeration Type Documentation

### 7.94.2.1 DDS\_ExceptionCode\_t

```
enum DDS_ExceptionCode_t
```

Error codes used by the **DDS\_TypeCode** (p. 1164) class.

Exceptions are modeled via a special parameter passed to the operations.

#### Enumerator

DDS_NO_EXCEPTION_CODE	No failure occurred.
DDS_USER_EXCEPTION_CODE	User exception. This class is based on a similar class in CORBA.
DDS_SYSTEM_EXCEPTION_CODE	System exception. This class is based on a similar class in CORBA.
DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE	Exception thrown when a parameter passed to a call is considered illegal.
DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE	Exception thrown when there is not enough memory for a dynamic memory allocation.
DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE	Exception thrown when a malformed type code is found (for example, a type code with an invalid TCKind value).
DDS_BADKIND_USER_EXCEPTION_CODE	The exception BadKind is thrown when an inappropriate operation is invoked on a TypeCode object.
DDS_BOUNDS_USER_EXCEPTION_CODE	A user exception thrown when a parameter is not within the legal bounds.
DDS_IMMUTABLE_TYPECODE_SYSTEM_EXCEPTION_CODE	An attempt was made to modify a <b>DDS_TypeCode</b> (p. 1164) that was received from a remote object. The built-in publication and subscription readers provide access to information about the remote <b>DDSDataWriter</b> (p. 1321) and <b>DDSDataReader</b> (p. 1288) entities in the distributed system. Among other things, the data from these built-in readers contains the <b>DDS_TypeCode</b> (p. 1164) for these entities. Modifying this received <b>DDS_TypeCode</b> (p. 1164) is not permitted.

## Enumerator

<p>DDS_BAD_MEMBER_NAME_USER_EXCEPTION_↔ CODE</p>	<p>The specified <b>DDS_TypeCode</b> (p. 1164) member name is invalid. This failure can occur, for example, when querying a field by name when no such name is defined in the type.</p> <p>See also</p> <p><b>DDS_BAD_MEMBER_ID_USER_EXCEPTION_↔ _CODE</b> (p. 335)</p>
<p>DDS_BAD_MEMBER_ID_USER_EXCEPTION_CODE</p>	<p>The specified <b>DDS_TypeCode</b> (p. 1164) member ID is invalid. This failure can occur, for example, when querying a field by ID when no such ID is defined in the type.</p> <p>See also</p> <p><b>DDS_BAD_MEMBER_NAME_USER_↔ EXCEPTION_CODE</b> (p. 335)</p>

## 7.95 Return Codes

Types of return codes.

### Enumerations

- enum **DDS\_ReturnCode\_t** {
  - DDS\_RETCODE\_OK ,
  - DDS\_RETCODE\_ERROR ,
  - DDS\_RETCODE\_UNSUPPORTED ,
  - DDS\_RETCODE\_BAD\_PARAMETER ,
  - DDS\_RETCODE\_PRECONDITION\_NOT\_MET ,
  - DDS\_RETCODE\_OUT\_OF\_RESOURCES ,
  - DDS\_RETCODE\_NOT\_ENABLED ,
  - DDS\_RETCODE\_IMMUTABLE\_POLICY ,
  - DDS\_RETCODE\_INCONSISTENT\_POLICY ,
  - DDS\_RETCODE\_ALREADY\_DELETED ,
  - DDS\_RETCODE\_TIMEOUT ,
  - DDS\_RETCODE\_NO\_DATA ,
  - DDS\_RETCODE\_ILLEGAL\_OPERATION ,
  - DDS\_RETCODE\_NOT\_ALLOWED\_BY\_SECURITY }

*Type for return codes.*

#### 7.95.1 Detailed Description

Types of return codes.

## 7.95.2 Standard Return Codes

Any operation with return type `DDS_ReturnCode_t` (p. 336) may return `DDS_RETCODE_OK` (p. 336), `DDS_RETCODE_ERROR` (p. 336) or `DDS_RETCODE_ILLEGAL_OPERATION` (p. 337). Any operation that takes one or more input parameters may additionally return `DDS_RETCODE_BAD_PARAMETER` (p. 336). Any operation on an object created from any of the factories may additionally return `DDS_RETCODE_ALREADY_DELETED` (p. 337). Any operation that is stated as optional may additionally return `DDS_RETCODE_UNSUPPORTED` (p. 336).

Thus, the standard return codes are:

- `DDS_RETCODE_ERROR` (p. 336)
- `DDS_RETCODE_ILLEGAL_OPERATION` (p. 337)
- `DDS_RETCODE_ALREADY_DELETED` (p. 337)
- `DDS_RETCODE_BAD_PARAMETER` (p. 336)
- `DDS_RETCODE_UNSUPPORTED` (p. 336)

Operations that may return any of the additional return codes will state so explicitly.

## 7.95.3 Enumeration Type Documentation

### 7.95.3.1 `DDS_ReturnCode_t`

```
enum DDS_ReturnCode_t
```

Type for return codes.

Errors are modeled as operation return codes of this type.

Enumerator

<code>DDS_RETCODE_OK</code>	Successful return.
<code>DDS_RETCODE_ERROR</code>	Generic, unspecified error.
<code>DDS_RETCODE_UNSUPPORTED</code>	Unsupported operation. Only returned by operations that are unsupported.
<code>DDS_RETCODE_BAD_PARAMETER</code>	Illegal parameter value. The value of the parameter that is passed in has illegal value. Things that fall into this category include NULL parameters and parameter values that are out of range.
<code>DDS_RETCODE_PRECONDITION_NOT_MET</code>	A pre-condition for the operation was not met. The system is not in the expected state when the function is called, or the parameter itself is not in the expected state when the function is called.

## Enumerator

DDS_RETCODE_OUT_OF_RESOURCES	RTI Connexant ran out of the resources needed to complete the operation.
DDS_RETCODE_NOT_ENABLED	Operation invoked on a <b>DDSEntity</b> (p. 1463) that is not yet enabled.
DDS_RETCODE_IMMUTABLE_POLICY	Application attempted to modify an immutable QoS policy.
DDS_RETCODE_INCONSISTENT_POLICY	Application specified a set of QoS policies that are not consistent with each other.
DDS_RETCODE_ALREADY_DELETED	The object target of this operation has already been deleted.
DDS_RETCODE_TIMEOUT	The operation timed out.
DDS_RETCODE_NO_DATA	Indicates a transient situation where the operation did not return any data but there is no inherent error.
DDS_RETCODE_ILLEGAL_OPERATION	The operation was called under improper circumstances. An operation was invoked on an inappropriate object or at an inappropriate time. This return code is similar to <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), except that there is no precondition that could be changed to make the operation succeed.
DDS_RETCODE_NOT_ALLOWED_BY_SECURITY	An operation on the DDS API that fails because the security plugins do not allow it. An operation on the DDS API that fails because the security plugins do not allow it. Currently unused because security checks happen during create, not enable, and create doesn't return a ReturnCode (SEC-731).

## 7.96 Status Kinds

Kinds of communication status.

### Macros

- `#define DDS_STATUS_MASK_NONE`  
*No bits are set.*
- `#define DDS_STATUS_MASK_ALL`  
*All bits are set.*

### Typedefs

- typedef **DDS\_UnsignedLong DDS\_StatusMask**  
*A bit-mask (list) of concrete status types, i.e. **DDS\_StatusKind** (p. 342)].*

## Enumerations

- enum `DDS_StatusKind` {
  - `DDS_INCONSISTENT_TOPIC_STATUS`,
  - `DDS_OFFERED_DEADLINE_MISSED_STATUS`,
  - `DDS_REQUESTED_DEADLINE_MISSED_STATUS`,
  - `DDS_OFFERED_INCOMPATIBLE_QOS_STATUS`,
  - `DDS_REQUESTED_INCOMPATIBLE_QOS_STATUS`,
  - `DDS_SAMPLE_LOST_STATUS`,
  - `DDS_SAMPLE_REJECTED_STATUS`,
  - `DDS_DATA_ON_READERS_STATUS`,
  - `DDS_DATA_AVAILABLE_STATUS`,
  - `DDS_LIVELINESS_LOST_STATUS`,
  - `DDS_LIVELINESS_CHANGED_STATUS`,
  - `DDS_PUBLICATION_MATCHED_STATUS`,
  - `DDS_SUBSCRIPTION_MATCHED_STATUS`,
  - `DDS_INVALID_LOCAL_IDENTITY_ADVANCE_NOTICE_STATUS`,
  - `DDS_SERVICE_REQUEST_ACCEPTED_STATUS`,
  - `DDS_DATA_WRITER_APPLICATION_ACKNOWLEDGMENT_STATUS`,
  - `DDS_DATA_WRITER_INSTANCE_REPLACED_STATUS`,
  - `DDS_RELIABLE_WRITER_CACHE_CHANGED_STATUS`,
  - `DDS_RELIABLE_READER_ACTIVITY_CHANGED_STATUS`,
  - `DDS_DATA_WRITER_CACHE_STATUS`,
  - `DDS_DATA_WRITER_PROTOCOL_STATUS`,
  - `DDS_DATA_READER_CACHE_STATUS`,
  - `DDS_DATA_READER_PROTOCOL_STATUS`,
  - `DDS_DATA_WRITER_DESTINATION_UNREACHABLE_STATUS` = 0x00000001U << 30,
  - `DDS_DATA_WRITER_SAMPLE_REMOVED_STATUS` }

*Type for status kinds.*

### 7.96.1 Detailed Description

Kinds of communication status.

Entity:

**DDSEntity** (p. 1463)

QoS:

**QoS Policies** (p. 353)



Listener:

**DDSListener** (p. 1526)

Each concrete **DDSEntity** (p. 1463) is associated with a set of Status objects whose value represents the communication status of that entity. Each status value can be accessed with a corresponding method on the **DDSEntity** (p. 1463).

When these status values change, the corresponding **DDSStatusCondition** (p. 1578) objects are activated and the proper **DDSListener** (p. 1526) objects are invoked to asynchronously inform the application.

An application is notified of communication status by means of the **DDSListener** (p. 1526) or the **DDSWaitSet** (p. 1629) / **DDSCondition** (p. 1276) mechanism. The two mechanisms may be combined in the application (e.g., using **DDSWaitSet** (p. 1629) (s) / **DDSCondition** (p. 1276) (s) to access the data and **DDSListener** (p. 1526) (s) to be warned asynchronously of erroneous communication statuses).

It is likely that the application will choose one or the other mechanism for each particular communication status (not both). However, if both mechanisms are enabled, then the **DDSListener** (p. 1526) mechanism is used first and then the **DDSWaitSet** (p. 1629) objects are signalled.

The statuses may be classified into:

- *read communication statuses*: i.e., those that are related to arrival of data, namely **DDS\_DATA\_ON\_READERS\_STATUS** (p. 345) and **DDS\_DATA\_AVAILABLE\_STATUS** (p. 345).
- *plain communication statuses*: i.e., all the others.

Read communication statuses are treated slightly differently than the others because they don't change independently. In other words, at least two changes will appear at the same time (**DDS\_DATA\_ON\_READERS\_STATUS** (p. 345) and **DDS\_DATA\_AVAILABLE\_STATUS** (p. 345)) and even several of the last kind may be part of the set. This 'grouping' has to be communicated to the application.

For each plain communication status, there is a corresponding structure to hold the status value. These values contain the information related to the change of status, as well as information related to the statuses themselves (e.g., contains cumulative counts).

"Status Values"

## 7.96.2 Changes in Status

Associated with each one of an **DDSEntity** (p. 1463)'s communication status is a logical `StatusChangedFlag`. This flag indicates whether that particular communication status has changed since the last time the status was read by the application. The way the status changes is slightly different for the Plain Communication Status and the Read Communication status.

"\p StatusChangedFlag indicates if status has changed"

### 7.96.2.1 Changes in plain communication status

For the plain communication status, the `StatusChangedFlag` flag is initially set to `FALSE`. It becomes `TRUE` whenever the plain communication status changes and it is reset to `DDS_BOOLEAN_FALSE` (p. 317) each time the application accesses the plain communication status via the proper `get_<plain communication status>()` operation on the `DDSEntity` (p. 1463).

The communication status is also reset to `FALSE` whenever the associated listener operation is called as the listener implicitly accesses the status which is passed as a parameter to the operation. The fact that the status is reset prior to calling the listener means that if the application calls the `get_<plain communication status>` from inside the listener it will see the status already reset.

An exception to this rule is when the associated listener is the 'nil' listener. The 'nil' listener is treated as a NOOP and the act of calling the 'nil' listener does not reset the communication status.

For example, the value of the `StatusChangedFlag` associated with the `DDS_REQUESTED_DEADLINE_MISSED_STATUS` (p. 344) will become `TRUE` each time new deadline occurs (which increases `DDS_RequestedDeadlineMissedStatus::total_count` (p. 1050)). The value changes to `FALSE` when the application accesses the status via the corresponding `DDSDataReader::get_requested_deadline_missed_status` (p. 1303) method on the proper Entity

"Changes in \p StatusChangedFlag for plain communication status"

### 7.96.2.2 Changes in read communication status

For the read communication status, the `StatusChangedFlag` flag is initially set to `FALSE`. The `StatusChangedFlag` becomes `TRUE` when either a data-sample arrives or else the `DDS_ViewStateKind` (p. 158), `DDS_SampleStateKind` (p. 156), or `DDS_InstanceStateKind` (p. 160) of any existing sample changes for any reason other than a call to `FooDataReader::read` (p. 1651), `FooDataReader::take` (p. 1652) or their variants. Specifically any of the following events will cause the `StatusChangedFlag` to become `TRUE`:

- The arrival of new data.
- A change in the `DDS_InstanceStateKind` (p. 160) of a contained instance. This can be caused by either:
  - The arrival of the notification that an instance has been disposed by:
    - \* the `DDSDataWriter` (p. 1321) that owns it if `OWNERSHIP` (p. 414) QoS kind= `DDS_EXCLUSIVE_OWNERSHIP_QOS` (p. 415)
    - \* or by any `DDSDataWriter` (p. 1321) if `OWNERSHIP` (p. 414) QoS kind= `DDS_SHARED_OWNERSHIP_QOS` (p. 415)
  - The loss of liveness of the `DDSDataWriter` (p. 1321) of an instance for which there is no other `DDSDataWriter` (p. 1321).
  - The arrival of the notification that an instance has been unregistered by the only `DDSDataWriter` (p. 1321) that is known to be writing the instance.

Depending on the kind of `StatusChangedFlag`, the flag transitions to `FALSE` again as follows:

- The `DDS_DATA_AVAILABLE_STATUS` (p. 345) `StatusChangedFlag` becomes `FALSE` when either the corresponding listener operation (`on_data_available`) is called or the read or take operation (or their variants) is called on the associated `DDSDataReader` (p. 1288).

- The **DDS\_DATA\_ON\_READERS\_STATUS** (p. 345) `StatusChangedFlag` becomes `FALSE` when any of the following events occurs:
  - The corresponding listener operation (`on_data_on_readers`) is called.
  - The `on_data_available` listener operation is called on any **DDSDataReader** (p. 1288) belonging to the **DDSSubscriber** (p. 1592).
  - The read or take operation (or their variants) is called on any **DDSDataReader** (p. 1288) belonging to the **DDSSubscriber** (p. 1592).

"Changes in \p `StatusChangedFlag` for read communication status"

See also

**DDSListener** (p. 1526)

**DDSWaitSet** (p. 1629), **DDSCondition** (p. 1276)

### 7.96.3 Macro Definition Documentation

#### 7.96.3.1 DDS\_STATUS\_MASK\_NONE

```
#define DDS_STATUS_MASK_NONE
```

No bits are set.

Examples

**HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.

#### 7.96.3.2 DDS\_STATUS\_MASK\_ALL

```
#define DDS_STATUS_MASK_ALL
```

All bits are set.

### 7.96.4 Typedef Documentation

### 7.96.4.1 DDS\_StatusMask

```
typedef DDS_UnsignedLong DDS_StatusMask
```

A bit-mask (list) of concrete status types, i.e. **DDS\_StatusKind** (p. 342)[].

The bit-mask is an efficient and compact representation of a fixed-length list of **DDS\_StatusKind** (p. 342) values.

Bits in the mask correspond to different statuses. You can choose which changes in status will trigger a callback by setting the corresponding status bits in this bit-mask and installing callbacks for each of those statuses.

The bits that are true indicate that the listener will be called back for changes in the corresponding status.

For example:

```
DDS_StatusMask mask = DDS_REQUESTED_DEADLINE_MISSED_STATUS |
                    DDS_DATA_AVAILABLE_STATUS;
datareader->set_listener(listener, mask);
```

Or

```
DDS_StatusMask mask = DDS_REQUESTED_DEADLINE_MISSED_STATUS |
                    DDS_DATA_AVAILABLE_STATUS;
datareader = subscriber->create_datareader(topic,
                                         DDS_DATAREADER_QOS_DEFAULT,
                                         listener, mask);
```

## 7.96.5 Enumeration Type Documentation

### 7.96.5.1 DDS\_StatusKind

```
enum DDS_StatusKind
```

Type for *status* kinds.

Each concrete **DDSEntity** (p. 1463) is associated with a set of *\*Status* objects whose values represent the communication status of that **DDSEntity** (p. 1463).

The communication statuses whose changes can be communicated to the application depend on the **DDSEntity** (p. 1463).

Each status value can be accessed with a corresponding method on the **DDSEntity** (p. 1463). The changes on these status values cause activation of the corresponding **DDSStatusCondition** (p. 1578) objects and trigger invocation of the proper **DDSListener** (p. 1526) objects to asynchronously inform the application. Note that not all statuses will activate the **DDSStatusCondition** (p. 1578) or have a corresponding listener callback. Refer to the documentation of the individual statuses for that information.

See also

**DDSEntity** (p. 1463), **DDSStatusCondition** (p. 1578), **DDSListener** (p. 1526)

## Enumerator

DDS_INCONSISTENT_TOPIC_STATUS	<p>Another topic exists with the same name but different characteristics.</p> <p><b>Entity:</b></p> <p><b>DDSTopic</b> (p. 1617)</p> <p><b>Status:</b></p> <p><b>DDS_InconsistentTopicStatus</b> (p. 921)</p> <p><b>Listener:</b></p> <p><b>DDSTopicListener</b> (p. 1626)</p>
DDS_OFFERED_DEADLINE_MISSED_STATUS	<p>The deadline that the <b>DDSDataWriter</b> (p. 1321) has committed through its <b>DDS_DeadlineQosPolicy</b> (p. 707) was not respected for a specific instance.</p> <p><b>Entity:</b></p> <p><b>DDSDataWriter</b> (p. 1321)</p> <p><b>QoS:</b></p> <p><b>DEADLINE</b> (p. 385)</p> <p><b>Status:</b></p> <p><b>DDS_OfferedDeadlineMissedStatus</b> (p. 970)</p> <p><b>Listener:</b></p> <p><b>DDSDataWriterListener</b> (p. 1344)</p>

## Enumerator

DDS_REQUESTED_DEADLINE_MISSED_STATUS	<p>The deadline that the <b>DDSDataReader</b> (p. 1288) was expecting through its <b>DDS_DeadlineQoSPolicy</b> (p. 707) was not respected for a specific instance.</p> <p><b>Entity:</b></p> <p><b>DDSDataReader</b> (p. 1288)</p> <p><b>QoS:</b></p> <p><b>DEADLINE</b> (p. 385)</p> <p><b>Status:</b></p> <p><b>DDS_RequestedDeadlineMissedStatus</b> (p. 1050)</p> <p><b>Listener:</b></p> <p><b>DDSDataReaderListener</b> (p. 1315)</p>
DDS_OFFERED_INCOMPATIBLE_QOS_STATUS	<p>A QoSPolicy value was incompatible with what was requested.</p> <p><b>Entity:</b></p> <p><b>DDSDataWriter</b> (p. 1321)</p> <p><b>Status:</b></p> <p><b>DDS_OfferedIncompatibleQosStatus</b> (p. 971)</p> <p><b>Listener:</b></p> <p><b>DDSDataWriterListener</b> (p. 1344)</p>
DDS_REQUESTED_INCOMPATIBLE_QOS_STATUS	<p>A QoSPolicy value was incompatible with what is offered.</p> <p><b>Entity:</b></p> <p><b>DDSDataReader</b> (p. 1288)</p> <p><b>Status:</b></p> <p><b>DDS_RequestedIncompatibleQosStatus</b> (p. 1051)</p> <p><b>Listener:</b></p> <p><b>DDSDataReaderListener</b> (p. 1315)</p>

## Enumerator

<p style="text-align: center;">DDS_SAMPLE_LOST_STATUS</p>	<p>A sample has been lost (i.e., was never received).</p> <p><b>Entity:</b></p> <p style="padding-left: 40px;"><b>DDSDataReader</b> (p. 1288)</p> <p><b>Status:</b></p> <p style="padding-left: 40px;"><b>DDS_SampleLostStatus</b> (p. 1093)</p> <p><b>Listener:</b></p> <p style="padding-left: 40px;"><b>DDSDataReaderListener</b> (p. 1315)</p>
<p style="text-align: center;">DDS_SAMPLE_REJECTED_STATUS</p>	<p>A (received) sample has been rejected.</p> <p><b>Entity:</b></p> <p style="padding-left: 40px;"><b>DDSDataReader</b> (p. 1288)</p> <p><b>QoS:</b></p> <p style="padding-left: 40px;"><b>RESOURCE_LIMITS</b> (p. 437)</p> <p><b>Status:</b></p> <p style="padding-left: 40px;"><b>DDS_SampleRejectedStatus</b> (p. 1094)</p> <p><b>Listener:</b></p> <p style="padding-left: 40px;"><b>DDSDataReaderListener</b> (p. 1315)</p>
<p style="text-align: center;">DDS_DATA_ON_READERS_STATUS</p>	<p>New data is available.</p> <p><b>Entity:</b></p> <p style="padding-left: 40px;"><b>DDSSubscriber</b> (p. 1592)</p> <p><b>Listener:</b></p> <p style="padding-left: 40px;"><b>DDSSubscriberListener</b> (p. 1613)</p>
<p style="text-align: center;">DDS_DATA_AVAILABLE_STATUS</p>	<p>One or more new data samples have been received.</p> <p><b>Entity:</b></p> <p style="padding-left: 40px;"><b>DDSDataReader</b> (p. 1288)</p> <p><b>Listener:</b></p> <p style="padding-left: 40px;"><b>DDSDataReaderListener</b> (p. 1315)</p>

## Enumerator

<p>DDS_LIVELINESS_LOST_STATUS</p>	<p>The liveliness that the <b>DDSDataWriter</b> (p. 1321) has committed to through its <b>DDS_LivelinessQosPolicy</b> (p. 936) was not respected, thus <b>DDSDataReader</b> (p. 1288) entities will consider the <b>DDSDataWriter</b> (p. 1321) as no longer alive.</p> <p><b>Entity:</b></p> <p><b>DDSDataWriter</b> (p. 1321)</p> <p><b>QoS:</b></p> <p><b>LIVELINESS</b> (p. 409)</p> <p><b>Status:</b></p> <p><b>DDS_LivelinessLostStatus</b> (p. 934)</p> <p><b>Listener:</b></p> <p><b>DDSDataWriterListener</b> (p. 1344)</p>
<p>DDS_LIVELINESS_CHANGED_STATUS</p>	<p>The liveliness of one or more <b>DDSDataWriter</b> (p. 1321) that were writing instances read through the <b>DDSDataReader</b> (p. 1288) has changed. Some <b>DDSDataWriter</b> (p. 1321) have become alive or not_alive.</p> <p><b>Entity:</b></p> <p><b>DDSDataReader</b> (p. 1288)</p> <p><b>QoS:</b></p> <p><b>LIVELINESS</b> (p. 409)</p> <p><b>Status:</b></p> <p><b>DDS_LivelinessChangedStatus</b> (p. 932)</p> <p><b>Listener:</b></p> <p><b>DDSDataReaderListener</b> (p. 1315)</p>



## Enumerator

DDS_PUBLICATION_MATCHED_STATUS	<p>The <b>DDSDataWriter</b> (p. 1321) has found <b>DDSDataReader</b> (p. 1288) that matches the <b>DDSTopic</b> (p. 1617) and has compatible QoS.</p> <p>Entity:</p> <p style="padding-left: 40px;"><b>DDSDataWriter</b> (p. 1321)</p> <p>Status:</p> <p style="padding-left: 40px;"><b>DDS_PublicationMatchedStatus</b> (p. 1020)</p> <p>Listener:</p> <p style="padding-left: 40px;"><b>DDSDataWriterListener</b> (p. 1344)</p>
DDS_SUBSCRIPTION_MATCHED_STATUS	<p>The <b>DDSDataReader</b> (p. 1288) has found <b>DDSDataWriter</b> (p. 1321) that matches the <b>DDSTopic</b> (p. 1617) and has compatible QoS.</p> <p>Entity:</p> <p style="padding-left: 40px;"><b>DDSDataReader</b> (p. 1288)</p> <p>Status:</p> <p style="padding-left: 40px;"><b>DDS_SubscriptionMatchedStatus</b> (p. 1117)</p> <p>Listener:</p> <p style="padding-left: 40px;"><b>DDSDataReaderListener</b> (p. 1315)</p>
DDS_INVALID_LOCAL_IDENTITY_ADVANCE_↔ NOTICE_STATUS	<p>&lt;&lt;<i>extension</i>&gt;&gt; (p. 237) The local <b>DDSDomainParticipant</b> (p. 1351) has or is about to have an invalid identity credential. Enables a <b>DDSDomainParticipant</b> (p. 1351) callback that is called when the local <b>DDSDomainParticipant</b> (p. 1351) has or is about to have an invalid identity credential. Currently, this status is only triggered when enabling the RTI Security Plugins. Please refer to the <code>RTI Security Plugins User's Manual</code> for more information.</p> <p>Entity:</p> <p style="padding-left: 40px;"><b>DDSDomainParticipant</b> (p. 1351)</p> <p>Listener:</p> <p style="padding-left: 40px;"><b>DDSDomainParticipantListener</b> (p. 1454)</p>

## Enumerator

<p>DDS_SERVICE_REQUEST_ACCEPTED_STATUS</p>	<p>&lt;&lt;<i>extension</i>&gt;&gt; (p. 237) A <b>DDSDataWriter</b> (p. 1321) has been issued a <b>DDS_ServiceRequest</b> (p. 1097) Enables a <b>DDSDataWriter</b> (p. 1321) callback that is called when a <b>DDS_ServiceRequest</b> (p. 1097) has been accepted and dispatched to the DataWriter.</p> <p>Entity:</p> <p style="padding-left: 40px;"><b>DDSDataWriter</b> (p. 1321)</p> <p>Listener:</p> <p style="padding-left: 40px;"><b>DDSDataWriterListener</b> (p. 1344)</p>
<p>DDS_DATA_WRITER_APPLICATION_↔ ACKNOWLEDGMENT_STATUS</p>	<p>&lt;&lt;<i>extension</i>&gt;&gt; (p. 237) A <b>DDSDataWriter</b> (p. 1321) has received an application-level acknowledgment for a sample Enables a <b>DDSDataWriter</b> (p. 1321) callback that is called when an application-level acknowledgment from a <b>DDSDataReader</b> (p. 1288) is received. The callback is called for each sample that is application-level acknowledged. Changes to this status do not trigger a <b>DDSStatusCondition</b> (p. 1578).</p> <p>Entity:</p> <p style="padding-left: 40px;"><b>DDSDataWriter</b> (p. 1321)</p> <p>Listener:</p> <p style="padding-left: 40px;"><b>DDSDataWriterListener</b> (p. 1344)</p>
<p>DDS_DATA_WRITER_INSTANCE_REPLACED_↔ STATUS</p>	<p>&lt;&lt;<i>extension</i>&gt;&gt; (p. 237) A <b>DDSDataWriter</b> (p. 1321) instance has been replaced Enables a <b>DDSDataWriter</b> (p. 1321) callback that is called when an instance in the writer queue is replaced.</p> <p>Entity:</p> <p style="padding-left: 40px;"><b>DDSDataWriter</b> (p. 1321)</p> <p>Listener:</p> <p style="padding-left: 40px;"><b>DDSDataWriterListener</b> (p. 1344)</p>

## Enumerator

<p>DDS_RELIABLE_WRITER_CACHE_CHANGED_↔ STATUS</p>	<p>&lt;&lt;<i>extension</i>&gt;&gt; (p. 237) The number of unacknowledged samples in a reliable writer's cache has changed such that it has reached a pre-defined trigger point. This status is considered changed at the following times: the cache is empty (i.e., contains no unacknowledged samples), the cache is full (i.e., the sample count has reached the value specified in <b>DDS_ResourceLimitsQosPolicy::max_samples</b> (p. 1055)), or the number of samples has reached a high (see <b>DDS_RtpsReliableWriterProtocol_t::high_↔ watermark</b> (p. 1063)) or low (see <b>DDS_RtpsReliableWriterProtocol_t::low_watermark</b> (p. 1063)) watermark.</p> <p>Entity:</p> <p><b>DDSDataWriter</b> (p. 1321)</p> <p>Status:</p> <p><b>DDS_ReliableWriterCacheChangedStatus</b> (p. 1046)</p> <p>Listener:</p> <p><b>DDSDataWriterListener</b> (p. 1344)</p>
<p>DDS_RELIABLE_READER_ACTIVITY_CHANGED_↔ STATUS</p>	<p>&lt;&lt;<i>extension</i>&gt;&gt; (p. 237) One or more reliable readers has become active or inactive. A reliable reader is considered active by a reliable writer with which it is matched if that reader acknowledges the samples it has been sent in a timely fashion. For the definition of "timely" in this case, see <b>DDS_RtpsReliableWriterProtocol_t</b> (p. 1061) and <b>DDS_ReliableReaderActivityChangedStatus</b> (p. 1044).</p> <p>See also</p> <p><b>DDS_RtpsReliableWriterProtocol_t</b> (p. 1061)</p> <p><b>DDS_ReliableReaderActivityChangedStatus</b> (p. 1044)</p>
<p>DDS_DATA_WRITER_CACHE_STATUS</p>	<p>&lt;&lt;<i>extension</i>&gt;&gt; (p. 237) The status of the writer's cache. Changes to this status do not trigger a <b>DDSStatusCondition</b> (p. 1578).</p>
<p>DDS_DATA_WRITER_PROTOCOL_STATUS</p>	<p>&lt;&lt;<i>extension</i>&gt;&gt; (p. 237) The status of a writer's internal protocol related metrics The status of a writer's internal protocol-related metrics, such as the number of samples pushed, pulled, and filtered and the status of wire protocol traffic. Changes to this status information do not trigger a <b>DDSStatusCondition</b> (p. 1578).</p>

## Enumerator

DDS_DATA_READER_CACHE_STATUS	<< <i>extension</i> >> (p. 237) The status of the reader's cache. Changes to this status do not trigger a <b>DDSStatusCondition</b> (p. 1578).
DDS_DATA_READER_PROTOCOL_STATUS	<< <i>extension</i> >> (p. 237) The status of a reader's internal protocol related metrics The status of a reader's internal protocol related metrics, like the number of samples received, filtered, rejected; and status of wire protocol traffic. Changes to this status do not trigger a <b>DDSStatusCondition</b> (p. 1578).
DDS_DATA_WRITER_SAMPLE_REMOVED_STATUS	<< <i>extension</i> >> (p. 237) A <b>DDSDataWriter</b> (p. 1321) has removed a sample from its queue. Enables a <b>DDSDataWriter</b> (p. 1321) callback that is called when a sample is removed from its queue.  Entity:  <b>DDSDataWriter</b> (p. 1321)  Listener:  <b>DDSDataWriterListener</b> (p. 1344)

## 7.97 Thread Settings

The properties of a thread of execution. Consult `Platform Notes` for additional platform specific details.

### Classes

- struct **DDS\_ThreadSettings\_t**  
*The properties of a thread of execution.*

### Macros

- #define **DDS\_THREAD\_SETTINGS\_KIND\_MASK\_DEFAULT**  
*The mask of default thread options.*

### Typedefs

- typedef **DDS\_UnsignedLong DDS\_ThreadSettingsKindMask**  
*A mask of which each bit is taken from **DDS\_ThreadSettingsKind** (p. 352).*

## Enumerations

- enum `DDS_ThreadSettingsKind` {  
    `DDS_THREAD_SETTINGS_FLOATING_POINT` ,  
    `DDS_THREAD_SETTINGS_STUDIO` ,  
    `DDS_THREAD_SETTINGS_REALTIME_PRIORITY` ,  
    `DDS_THREAD_SETTINGS_PRIORITY_ENFORCE` ,  
    `DDS_THREAD_SETTINGS_CANCEL_ASYNCHRONOUS` }

*A collection of flags used to configure threads of execution.*

- enum `DDS_ThreadSettingsCpuRotationKind` {  
    `DDS_THREAD_SETTINGS_CPU_NO_ROTATION` ,  
    `DDS_THREAD_SETTINGS_CPU_RR_ROTATION` }

*Determines how `DDS_ThreadSettings_t::cpu_list` (p. 1124) affects processor affinity for thread-related QoS policies that apply to multiple threads.*

### 7.97.1 Detailed Description

The properties of a thread of execution. Consult `Platform Notes` for additional platform specific details.

### 7.97.2 Macro Definition Documentation

#### 7.97.2.1 `DDS_THREAD_SETTINGS_KIND_MASK_DEFAULT`

```
#define DDS_THREAD_SETTINGS_KIND_MASK_DEFAULT
```

The mask of default thread options.

### 7.97.3 Typedef Documentation

#### 7.97.3.1 `DDS_ThreadSettingsKindMask`

```
typedef DDS_UnsignedLong DDS_ThreadSettingsKindMask
```

A mask of which each bit is taken from `DDS_ThreadSettingsKind` (p. 352).

See also

`DDS_ThreadSettings_t` (p. 1123)

## 7.97.4 Enumeration Type Documentation

### 7.97.4.1 DDS\_ThreadSettingsKind

enum `DDS_ThreadSettingsKind`

A collection of flags used to configure threads of execution.

Not all of these options may be relevant for all operating systems. Consult `Platform Notes` for additional details.

See also

`DDS_ThreadSettingsKindMask` (p. 351)

Enumerator

<code>DDS_THREAD_SETTINGS_FLOATING_POINT</code>	Code executed within the thread may perform floating point operations. Currently applicable only for VxWorks platforms, where user callbacks use floating-point operations.
<code>DDS_THREAD_SETTINGS_STDIO</code>	Code executed within the thread may access standard I/O. Currently applicable only for VxWorks platforms, where user callbacks do standard I/O operations.
<code>DDS_THREAD_SETTINGS_REALTIME_PRIORITY</code>	The thread will be scheduled on a FIFO basis.
<code>DDS_THREAD_SETTINGS_PRIORITY_ENFORCE</code>	Strictly enforce this thread's priority.
<code>DDS_THREAD_SETTINGS_CANCEL_↔ ASYNCHRONOUS</code>	Allows the thread to be cancelled without first reaching a cancellable state or cancellation point.

### 7.97.4.2 DDS\_ThreadSettingsCpuRotationKind

enum `DDS_ThreadSettingsCpuRotationKind`

Determines how `DDS_ThreadSettings_t::cpu_list` (p. 1124) affects processor affinity for thread-related QoS policies that apply to multiple threads.

## 7.97.5 Controlling CPU Core Affinity for RTI Threads

Most thread-related QoS settings apply to a single thread (such as for the `DDS_EventQoSPolicy` (p. 908), `DDS_↔DatabaseQoSPolicy` (p. 619), and `DDS_AsynchronousPublisherQoSPolicy` (p. 590)). However, the thread settings in the `DDS_ReceiverPoolQoSPolicy` (p. 1038) control every receive thread created. In this case, there are several schemes to map M threads to N processors; the rotation kind controls which scheme is used.

Controlling CPU Core Affinity is only relevant to the **DDS\_ReceiverPoolQoSPolicy** (p. 1038). It is ignored within other QoS policies that include **DDS\_ThreadSettings\_t** (p. 1123).

If **DDS\_ThreadSettings\_t::cpu\_list** (p. 1124) is empty, the rotation is irrelevant since no affinity adjustment will occur. Suppose instead that **DDS\_ThreadSettings\_t::cpu\_list** (p. 1124) = {0, 1} and that the middleware creates three receive threads: {A, B, C}. If **DDS\_ThreadSettings\_t::cpu\_rotation** (p. 1124) is **DDS\_THREAD\_SETTINGS\_CPU\_↔NO\_ROTATION** (p. 353), threads A, B and C will have the same processor affinities (0-1), and the OS will control thread scheduling within this bound. It is common to denote CPU affinities as a bitmask, where set bits represent allowed processors to run on. This mask is printed in hex, so a CPU core affinity of 0-1 can be represented by the mask 0x3.

If **DDS\_ThreadSettings\_t::cpu\_rotation** (p. 1124) is **DDS\_THREAD\_SETTINGS\_CPU\_RR\_ROTATION** (p. 353), each thread will be assigned in round-robin fashion to one of the processors in **DDS\_ThreadSettings\_t::cpu\_list** (p. 1124); perhaps thread A to 0, B to 1, and C to 0. Note that the order in which internal middleware threads spawn is unspecified.

Not all of these options may be relevant for all operating systems. Refer to the Platform Notes for further information.

#### Enumerator

DDS_THREAD_SETTINGS_CPU_NO_ROTATION	Any thread controlled by this QoS can run on any listed processor, as determined by OS scheduling.
DDS_THREAD_SETTINGS_CPU_RR_ROTATION	Threads controlled by this QoS will be assigned one processor from the list in round-robin order.

## 7.98 QoS Policies

Quality of Service (QoS) policies.

### Modules

- **ASYNCHRONOUS\_PUBLISHER**  
 <<extension>> (p. 237) Specifies the asynchronous publishing settings of the **DDSPublisher** (p. 1550) instances.
- **AVAILABILITY**  
 <<extension>> (p. 237) Configures the availability of data.
- **BATCH**  
 <<extension>> (p. 237) Batch QoS policy used to enable batching in **DDSDataWriter** (p. 1321) instances.
- **DATABASE**  
 <<extension>> (p. 237) Various threads and resource limits settings used by RTI Connext to control its internal database.
- **DATA\_READER\_PROTOCOL**  
 <<extension>> (p. 237) Specifies the DataReader-specific protocol QoS.
- **DATA\_READER\_RESOURCE\_LIMITS**  
 <<extension>> (p. 237) Various settings that configure how DataReaders allocate and use physical memory for internal resources.
- **DATA\_REPRESENTATION**  
 A list of data representations and compression methods supported by a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288).

- **DATA\_TAG**  
Stores (name, value) pairs that can be used to determine access permissions.
- **DATA\_WRITER\_PROTOCOL**  
<<extension>> (p. 237) Along with **DDS\_WireProtocolQoSPolicy** (p. 1244) and **DDS\_DataReaderProtocolQoSPolicy** (p. 630), this QoS policy configures the DDS on-the-network protocol (RTPS).
- **DATA\_WRITER\_RESOURCE\_LIMITS**  
<<extension>> (p. 237) Various settings that configure how a **DDSDataWriter** (p. 1321) allocates and uses physical memory for internal resources.
- **DATA\_WRITER\_TRANSFER\_MODE**  
<<extension>> (p. 237) Specifies the DataWriter transfer mode QoS.
- **DEADLINE**  
Expresses the maximum duration (deadline) within which an instance is expected to be updated.
- **DESTINATION\_ORDER**  
Controls the criteria used to determine the logical order among changes made by **DDSPublisher** (p. 1550) entities to the same instance of data (i.e., matching **DDSTopic** (p. 1617) and key).
- **DISCOVERY**  
<<extension>> (p. 237) Specifies the attributes required to discover participants in the domain.
- **DISCOVERY\_CONFIG**  
<<extension>> (p. 237) Specifies the discovery configuration QoS.
- **DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS**  
<<extension>> (p. 237) Various settings that configure how a **DDSDomainParticipant** (p. 1351) allocates and uses physical memory for internal resources, including the maximum sizes of various properties.
- **DURABILITY**  
This QoS policy specifies whether or not RTI Connext will store and deliver previously published data samples to new **DDSDataReader** (p. 1288) entities that join the network later.
- **DURABILITY\_SERVICE**  
Various settings to configure the external RTI Persistence Service used by RTI Connext for DataWriters with a **DDS\_DurabilityQoSPolicy** (p. 767) setting of **DDS\_PERSISTENT\_DURABILITY\_QOS** (p. 401) or **DDS\_TRANSIENT\_DURABILITY\_QOS** (p. 401).
- **ENTITY\_FACTORY**  
A QoS policy for all **DDSEntity** (p. 1463) types that can act as factories for one or more other **DDSEntity** (p. 1463) types.
- **ENTITY\_NAME**  
<<extension>> (p. 237) Assigns a name to a **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592), **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288). Except for **DDSPublisher** (p. 1550) and **DDSSubscriber** (p. 1592), these names are visible during the discovery process and in RTI tools to help you visualize and debug your system.
- **EVENT**  
<<extension>> (p. 237) Configures the internal thread in a DomainParticipant that handles timed events.
- **HISTORY**  
Specifies the behavior of RTI Connext in the case where the value of an instance changes (one or more times) before it can be successfully communicated to one or more existing subscribers.
- **GROUP\_DATA**  
Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.
- **LATENCY\_BUDGET**  
Provides a hint as to the maximum acceptable delay from the time the data is written to the time it is received by the subscribing applications.
- **LIFESPAN**  
Specifies how long the data written by the **DDSDataWriter** (p. 1321) is considered valid.
- **LIVELINESS**



Specifies and configures the mechanism that allows **DDSDataReader** (p. 1288) entities to detect when **DDSDataWriter** (p. 1321) entities become disconnected or "dead".

- **LOCATORFILTER**

<<extension>> (p. 237) The QoS policy used to report the configuration of a MultiChannel DataWriter as part of **DDS↔\_PublicationBuiltinTopicData** (p. 1010).

- **LOGGING**

<<extension>> (p. 237) Configures the RTI Connex logging facility.

- **MONITORING**

Configures the use of RTI Monitoring Library 2.0 to collect and distribute RTI Connex telemetry data.

- **MULTICHANNEL**

<<extension>> (p. 237) Configures the ability of a DataWriter to send data on different multicast groups (addresses) based on the value of the data.

- **OWNERSHIP**

Specifies whether it is allowed for multiple **DDSDataWriter** (p. 1321) (s) to write the same instance of the data and if so, how these modifications should be arbitrated.

- **OWNERSHIP\_STRENGTH**

Specifies the value of the strength used to arbitrate among multiple **DDSDataWriter** (p. 1321) objects that attempt to modify the same instance of a data type (identified by **DDSTopic** (p. 1617) + key).

- **PARTITION**

Set of strings that introduces logical partitions in **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), or **DDSSubscriber** (p. 1592) entities.

- **PRESENTATION**

Specifies how the samples representing changes to data instances are presented to a subscribing application.

- **PROFILE**

<<extension>> (p. 237) Configures the way that XML documents containing QoS profiles are loaded by RTI Connex.

- **PROPERTY**

<<extension>> (p. 237) Stores (name, value) pairs that can be used to configure certain parameters of RTI Connex that are not exposed through formal QoS policies. Can also be used to store and propagate application-specific name/value pairs that can be retrieved by user code during discovery.

- **PUBLISH\_MODE**

<<extension>> (p. 237) Specifies how RTI Connex sends application data on the network. This QoS policy can be used to tell RTI Connex to use its own thread to send data, instead of the user thread.

- **READER\_DATA\_LIFECYCLE**

Controls how a DataReader manages the lifecycle of the data that it has received.

- **RECEIVER\_POOL**

<<extension>> (p. 237) Configures threads used by RTI Connex to receive and process data from transports (for example, UDP sockets).

- **RELIABILITY**

Indicates the level of reliability offered/requested by RTI Connex.

- **RESOURCE\_LIMITS**

Controls the amount of physical memory allocated for DDS entities, if dynamic allocations are allowed, and how they occur. Also controls memory usage among different instance values for keyed topics.

- **SERVICE**

<<extension>> (p. 237) Service QoS policy is used to indicate what kind of service is associated with the DDS entity.

- **SYSTEM\_RESOURCE\_LIMITS**

<<extension>> (p. 237) Configures DomainParticipant-independent resources used by RTI Connex.

- **TIME\_BASED\_FILTER**

Filter that allows a **DDSDataReader** (p. 1288) to specify that it is interested only in (potentially) a subset of the values of the data.

- **TOPIC\_DATA**

- Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.*
- **TOPIC\_QUERY\_DISPATCH**
  - Configures the ability of a **DDSDataWriter** (p. 1321) to publish historical samples.*
- **TRANSPORT\_BUILTIN**
  - <<extension>> (p. 237) Specifies which built-in transports are used.*
- **TRANSPORT\_MULTICAST**
  - <<extension>> (p. 237) Specifies the multicast address on which a **DDSDataReader** (p. 1288) wants to receive its data. It can also specify a port number, as well as a subset of the available (at the **DDSDomainParticipant** (p. 1351) level) transports with which to receive the multicast data.*
- **TRANSPORT\_MULTICAST\_MAPPING**
  - <<extension>> (p. 237) Specifies a list of topic expressions and addresses that can be used by an Entity with a specific topic name to receive data.*
- **TRANSPORT\_PRIORITY**
  - This QoS policy allows the application to take advantage of transport that are capable of sending messages with different priorities.*
- **TRANSPORT\_SELECTION**
  - <<extension>> (p. 237) Specifies the physical transports that a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288) may use to send or receive data.*
- **TRANSPORT\_UNICAST**
  - <<extension>> (p. 237) Specifies a subset of transports and a port number that can be used by an Entity to receive data.*
- **TYPE\_CONSISTENCY\_ENFORCEMENT**
  - Defines the rules for determining whether the type used to publish a given topic is consistent with that used to subscribe to it.*
- **TYPESUPPORT**
  - <<extension>> (p. 237) Allows you to attach application-specific values to a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288), which are passed to the serialization or deserialization routine of the associated data type and choose whether to set padding bytes to zero during serialization.*
- **USER\_DATA**
  - Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.*
- **WRITER\_DATA\_LIFECYCLE**
  - Controls how a DataWriter handles the lifecycle of the instances (keys) that it is registered to manage.*
- **WIRE\_PROTOCOL**
  - <<extension>> (p. 237) Specifies the wire protocol related attributes for the **DDSDomainParticipant** (p. 1351).*
- **Extended QoS Support**
  - <<extension>> (p. 237) Types and defines used in extended QoS policies.*

## Classes

- struct **DDS\_QoSPrintFormat**
  - A collection of attributes used to configure how a QoS appears when printed.*
- struct **DDS\_QoSPolicyCount**
  - Type to hold a counter for a **DDS\_QoSPolicyId\_t** (p. 360).*
- struct **DDS\_QoSPolicyCountSeq**
  - Declares IDL sequence < **DDS\_QoSPolicyCount** (p. 1029) >*

## Macros

- #define **DDS\_QosPrintFormat\_INITIALIZER**  
*Static initializer for **DDS\_QosPrintFormat** (p. 1031).*
- #define **DDS\_QOS\_POLICY\_COUNT**  
*Number of QoS policies in **DDS\_QosPolicyId\_t** (p. 360).*

## Enumerations

- enum **DDS\_QosPolicyId\_t** {  
**DDS\_INVALID\_QOS\_POLICY\_ID** ,  
**DDS\_USERDATA\_QOS\_POLICY\_ID** ,  
**DDS\_DURABILITY\_QOS\_POLICY\_ID** ,  
**DDS\_PRESENTATION\_QOS\_POLICY\_ID** ,  
**DDS\_DEADLINE\_QOS\_POLICY\_ID** ,  
**DDS\_LATENCYBUDGET\_QOS\_POLICY\_ID** ,  
**DDS\_OWNERSHIP\_QOS\_POLICY\_ID** ,  
**DDS\_OWNERSHIPSTRENGTH\_QOS\_POLICY\_ID** ,  
**DDS\_LIVELINESS\_QOS\_POLICY\_ID** ,  
**DDS\_TIMEBASEDFILTER\_QOS\_POLICY\_ID** ,  
**DDS\_PARTITION\_QOS\_POLICY\_ID** ,  
**DDS\_RELIABILITY\_QOS\_POLICY\_ID** ,  
**DDS\_DESTINATIONORDER\_QOS\_POLICY\_ID** ,  
**DDS\_HISTORY\_QOS\_POLICY\_ID** ,  
**DDS\_RESOURCELIMITS\_QOS\_POLICY\_ID** ,  
**DDS\_ENTITYFACTORY\_QOS\_POLICY\_ID** ,  
**DDS\_WRITERDATALIFECYCLE\_QOS\_POLICY\_ID** ,  
**DDS\_READERDATALIFECYCLE\_QOS\_POLICY\_ID** ,  
**DDS\_TOPICDATA\_QOS\_POLICY\_ID** ,  
**DDS\_GROUPDATA\_QOS\_POLICY\_ID** ,  
**DDS\_TRANSPORTPRIORITY\_QOS\_POLICY\_ID** ,  
**DDS\_LIFESPAN\_QOS\_POLICY\_ID** ,  
**DDS\_DURABILITYSERVICE\_QOS\_POLICY\_ID** ,  
**DDS\_DATA\_REPRESENTATION\_QOS\_POLICY\_ID** ,  
**DDS\_TYPE\_CONSISTENCY\_ENFORCEMENT\_QOS\_POLICY\_ID** ,  
**DDS\_DATATAG\_QOS\_POLICY\_ID** ,  
**DDS\_WIREPROTOCOL\_QOS\_POLICY\_ID** ,  
**DDS\_DISCOVERY\_QOS\_POLICY\_ID** ,  
**DDS\_DATAREADERRESOURCELIMITS\_QOS\_POLICY\_ID** ,  
**DDS\_DATAWRITERRESOURCELIMITS\_QOS\_POLICY\_ID** ,  
**DDS\_DATAREADERPROTOCOL\_QOS\_POLICY\_ID** ,  
**DDS\_DATAWRITERPROTOCOL\_QOS\_POLICY\_ID** ,  
**DDS\_DOMAINPARTICIPANTRESOURCELIMITS\_QOS\_POLICY\_ID** ,  
**DDS\_EVENT\_QOS\_POLICY\_ID** ,  
**DDS\_DATABASE\_QOS\_POLICY\_ID** ,  
**DDS\_RECEIVERPOOL\_QOS\_POLICY\_ID** ,  
**DDS\_DISCOVERYCONFIG\_QOS\_POLICY\_ID** ,  
**DDS\_EXCLUSIVEAREA\_QOS\_POLICY\_ID** = 1012 ,  
**DDS\_USEROBJECT\_QOS\_POLICY\_ID** = 1013 ,  
**DDS\_SYSTEMRESOURCELIMITS\_QOS\_POLICY\_ID** ,  
**DDS\_TRANSPORTSELECTION\_QOS\_POLICY\_ID** ,  
**DDS\_TRANSPORTUNICAST\_QOS\_POLICY\_ID** ,

```

DDS_TRANSPORTMULTICAST_QOS_POLICY_ID ,
DDS_TRANSPORTBUILTIN_QOS_POLICY_ID ,
DDS_TYPESUPPORT_QOS_POLICY_ID ,
DDS_PROPERTY_QOS_POLICY_ID ,
DDS_PUBLISHMODE_QOS_POLICY_ID ,
DDS_ASYNCHRONOUSPUBLISHER_QOS_POLICY_ID ,
DDS_ENTITYNAME_QOS_POLICY_ID ,
DDS_SERVICE_QOS_POLICY_ID = 1025 ,
DDS_BATCH_QOS_POLICY_ID ,
DDS_PROFILE_QOS_POLICY_ID ,
DDS_LOCATORFILTER_QOS_POLICY_ID ,
DDS_MULTICHANNEL_QOS_POLICY_ID ,
DDS_TRANSPORTENCAPSULATION_QOS_POLICY_ID = 1030 ,
DDS_PUBLISHERPROTOCOL_QOS_POLICY_ID = 1031 ,
DDS_SUBSCRIBERPROTOCOL_QOS_POLICY_ID = 1032 ,
DDS_TOPICPROTOCOL_QOS_POLICY_ID = 1033 ,
DDS_DOMAINPARTICIPANTPROTOCOL_QOS_POLICY_ID = 1034 ,
DDS_AVAILABILITY_QOS_POLICY_ID ,
DDS_TRANSPORTMULTICASTMAPPING_QOS_POLICY_ID ,
DDS_LOGGING_QOS_POLICY_ID ,
DDS_TOPICQUERYDISPATCH_QOS_POLICY_ID ,
DDS_DATAWRITERTRANSFERMODE_QOS_POLICY_ID ,
DDS_MONITORING_QOS_POLICY_ID }

```

*Type to identify QoS Policies.*

### 7.98.1 Detailed Description

Quality of Service (QoS) policies.

Data Distribution Service (DDS) relies on the use of QoS. A QoS is a set of characteristics that controls some aspect of the behavior of DDS. A QoS is comprised of individual QoS policies (objects conceptually deriving from an *abstract QoSPolicy* class).

"Supported QoS policies"

The QoSPolicy provides the basic mechanism for an application to specify quality of service parameters. It has an attribute name that is used to uniquely identify each QoSPolicy.

QoSPolicy implementation is comprised of a name, an ID, and a type. The type of a QoSPolicy value may be atomic, such as an integer or float, or compound (a structure). Compound types are used whenever multiple parameters must be set coherently to define a consistent value for a QoSPolicy.

QoS (i.e., a list of QoSPolicy objects) may be associated with all **DDSEntity** (p. 1463) objects in the system such as **DDSTopic** (p. 1617), **DDSDataWriter** (p. 1321), **DDSDataReader** (p. 1288), **DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592), and **DDSDomainParticipant** (p. 1351).

## 7.98.2 Specifying QoS on entities

QoS Policies can be set programmatically when an **DDSEntity** (p. 1463) is created, or modified with the **DDSEntity** (p. 1463)'s **set\_qos (abstract)** (p. 1464) method.

QoS Policies can also be configured from XML resources (files, strings). With this approach, you can change the QoS without recompiling the application. For more information, see **Configuring QoS Profiles with XML** (p. 197).

To customize a **DDSEntity** (p. 1463)'s QoS before creating the entity, the correct pattern is:

- First, initialize a QoS object with the appropriate **INITIALIZER** constructor.
- Call the relevant **get\_<entity>\_default\_qos()** method.
- Modify the QoS values as desired.
- Finally, create the entity.

Each **QoSPolicy** is treated independently from the others. This approach has the advantage of being very extensible. However, there may be cases where several policies are in conflict. Consistency checking is performed each time the policies are modified via the **set\_qos (abstract)** (p. 1464) operation, or when the **DDSEntity** (p. 1463) is created.

When a policy is changed after being set to a given value, it is not required that the new value be applied instantaneously; RTI Connext is allowed to apply it after a transition phase. In addition, some **QoSPolicy** have immutable semantics, meaning that they can only be specified either at **DDSEntity** (p. 1463) creation time or else prior to calling the **DDSEntity::enable** (p. 1466) operation on the entity.

Each **DDSEntity** (p. 1463) can be configured with a list of **QoSPolicy** objects. However, not all QoS Policies are supported by each **DDSEntity** (p. 1463). For instance, a **DDSDomainParticipant** (p. 1351) supports a different set of QoS Policies than a **DDSTopic** (p. 1617) or a **DDSPublisher** (p. 1550).

Additional properties that are not exposed through the formal QoS policies can also be set for an **DDSEntity** (p. 1463) via the **DDS\_PropertyQoSPolicy** (p. 1007). These properties are described in the *Property Reference Guide*.

## 7.98.3 QoS compatibility

In several cases, for communications to occur properly (or efficiently), a **QoSPolicy** on the publisher side must be compatible with a corresponding policy on the subscriber side. For example, if a **DDSSubscriber** (p. 1592) requests to receive data reliably while the corresponding **DDSPublisher** (p. 1550) defines a best-effort policy, communication will not happen as requested.

To address this issue and maintain the desirable decoupling of publication and subscription as much as possible, the **QoSPolicy** specification follows the **subscriber-requested, publisher-offered pattern**.

In this pattern, the subscriber side can specify a "requested" value for a particular **QoSPolicy**. The publisher side specifies an "offered" value for that **QoSPolicy**. RTI Connext will then determine whether the value requested by the subscriber side is compatible with what is offered by the publisher side. If the two policies are compatible, then communication will be established. If the two policies are not compatible, RTI Connext will not establish communications between the two **DDSEntity** (p. 1463) objects and will record this fact by means of the **DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) on the publisher end and **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) on the subscriber end. The application can detect this fact by means of a **DDSListener** (p. 1526) or a **DDSCondition** (p. 1276).

The following **properties** are defined on a **QoSPolicy**.

- **RxO (p. 360) property**

The QoSPolicy objects that need to be set in a compatible manner between the **publisher** and **subscriber** end are indicated by the setting of the **RxO** (p. 360) property:

- **RxO** (p. 360) = **YES**

indicates that the policy can be set both at the publishing and subscribing ends and the values must be set in a compatible manner. In this case the compatible values are explicitly defined.

- **RxO** (p. 360) = **NO**

indicates that the policy can be set both at the publishing and subscribing ends but the two settings are independent. That is, all combinations of values are compatible.

- **RxO** (p. 360) = **N/A**

indicates that the policy can only be specified at either the publishing or the subscribing end, but not at both ends. So compatibility does not apply.

- **Changeable (p. 360)property**

Determines whether a QoSPolicy can be changed.

- **NO** (p. 360) -- policy can only be specified at **DDSEntity** (p. 1463) creation time.

- **UNTIL ENABLE** (p. 360) -- policy can only be changed before the **DDSEntity** (p. 1463) is enabled.

- **YES** (p. 360) -- policy can be changed at any time.

## 7.98.4 Macro Definition Documentation

### 7.98.4.1 DDS\_QoSPrintFormat\_INITIALIZER

```
#define DDS_QoSPrintFormat_INITIALIZER
```

Static initializer for **DDS\_QoSPrintFormat** (p. 1031).

Use this initializer to ensure that new objects do not have uninitialized contents.

```
struct DDS_QoSPrintFormat format = DDS_QoSPrintFormat_INITIALIZER;
```

See also

**DDS\_QoSPrintFormat** (p. 1031)

### 7.98.4.2 DDS\_QOS\_POLICY\_COUNT

```
#define DDS_QOS_POLICY_COUNT
```

Number of QoS policies in **DDS\_QoSPolicyId\_t** (p. 360).

## 7.98.5 Enumeration Type Documentation

### 7.98.5.1 DDS\_QoSPolicyId\_t

```
enum DDS_QoSPolicyId_t
```

Type to identify QoS Policies.

## Enumerator

DDS_INVALID_QOS_POLICY_ID	Identifier for an invalid QoS policy.
DDS_USERDATA_QOS_POLICY_ID	Identifier for <b>DDS_UserDataQosPolicy</b> (p. 1237).
DDS_DURABILITY_QOS_POLICY_ID	Identifier for <b>DDS_DurabilityQosPolicy</b> (p. 767).
DDS_PRESENTATION_QOS_POLICY_ID	Identifier for <b>DDS_PresentationQosPolicy</b> (p. 996).
DDS_DEADLINE_QOS_POLICY_ID	Identifier for <b>DDS_DeadlineQosPolicy</b> (p. 707).
DDS_LATENCYBUDGET_QOS_POLICY_ID	Identifier for <b>DDS_LatencyBudgetQosPolicy</b> (p. 929).
DDS_OWNERSHIP_QOS_POLICY_ID	Identifier for <b>DDS_OwnershipQosPolicy</b> (p. 973).
DDS_OWNERSHIPSTRENGTH_QOS_POLICY_ID	Identifier for <b>DDS_OwnershipStrengthQosPolicy</b> (p. 978).
DDS_LIVELINESS_QOS_POLICY_ID	Identifier for <b>DDS_LivelinessQosPolicy</b> (p. 936).
DDS_TIMEBASEDFILTER_QOS_POLICY_ID	Identifier for <b>DDS_TimeBasedFilterQosPolicy</b> (p. 1126).
DDS_PARTITION_QOS_POLICY_ID	Identifier for <b>DDS_PartitionQosPolicy</b> (p. 989).
DDS_RELIABILITY_QOS_POLICY_ID	Identifier for <b>DDS_ReliabilityQosPolicy</b> (p. 1041).
DDS_DESTINATIONORDER_QOS_POLICY_ID	Identifier for <b>DDS_DestinationOrderQosPolicy</b> (p. 709).
DDS_HISTORY_QOS_POLICY_ID	Identifier for <b>DDS_HistoryQosPolicy</b> (p. 919).
DDS_RESOURCELIMITS_QOS_POLICY_ID	Identifier for <b>DDS_ResourceLimitsQosPolicy</b> (p. 1052).
DDS_ENTITYFACTORY_QOS_POLICY_ID	Identifier for <b>DDS_EntityFactoryQosPolicy</b> (p. 903).
DDS_WRITERDATALIFECYCLE_QOS_POLICY_ID	Identifier for <b>DDS_WriterDataLifecycleQosPolicy</b> (p. 1256).
DDS_READERDATALIFECYCLE_QOS_POLICY_ID	Identifier for <b>DDS_ReaderDataLifecycleQosPolicy</b> (p. 1035).
DDS_TOPICDATA_QOS_POLICY_ID	Identifier for <b>DDS_TopicDataQosPolicy</b> (p. 1133).
DDS_GROUPDATA_QOS_POLICY_ID	Identifier for <b>DDS_GroupDataQosPolicy</b> (p. 916).
DDS_TRANSPORTPRIORITY_QOS_POLICY_ID	Identifier for <b>DDS_TransportPriorityQosPolicy</b> (p. 1155).
DDS_LIFESPAN_QOS_POLICY_ID	Identifier for <b>DDS_LifespanQosPolicy</b> (p. 931).
DDS_DURABILITYSERVICE_QOS_POLICY_ID	Identifier for <b>DDS_DurabilityServiceQosPolicy</b> (p. 771).
DDS_DATA_REPRESENTATION_QOS_POLICY_ID	Identifier for <b>DDS_DataRepresentationQosPolicy</b> (p. 668).
DDS_TYPE_CONSISTENCY_ENFORCEMENT_QOS_POLICY_ID	Identifier for <b>DDS_TypeConsistencyEnforcementQosPolicy</b> (p. 1228).
DDS_DATATAG_QOS_POLICY_ID	Identifier for <b>DDS_DataTagQosPolicy</b> (p. 377).
DDS_WIREPROTOCOL_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_WireProtocolQosPolicy</b> (p. 1244)
DDS_DISCOVERY_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_DiscoveryQosPolicy</b> (p. 731)
DDS_DATAREADERRESOURCELIMITS_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_DataReaderResourceLimitsQosPolicy</b> (p. 654)
DDS_DATAWRITERRESOURCELIMITS_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_DataWriterResourceLimitsQosPolicy</b> (p. 698)

## Enumerator

DDS_DATAREADERPROTOCOL_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_DataReaderProtocolQosPolicy</b> (p. 630)
DDS_DATAWRITERPROTOCOL_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_DataWriterProtocolQosPolicy</b> (p. 673)
DDS_DOMAINPARTICIPANTRESOURCELIMITS_↔ QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_DomainParticipantResourceLimitsQosPolicy</b> (p. 746)
DDS_EVENT_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_EventQosPolicy</b> (p. 908)
DDS_DATABASE_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_DatabaseQosPolicy</b> (p. 619)
DDS_RECEIVERPOOL_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_ReceiverPoolQosPolicy</b> (p. 1038)
DDS_DISCOVERYCONFIG_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_DiscoveryConfigQosPolicy</b> (p. 712)
DDS_SYSTEMRESOURCELIMITS_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_SystemResourceLimitsQosPolicy</b> (p. 1120)
DDS_TRANSPORTSELECTION_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_TransportSelectionQosPolicy</b> (p. 1157)
DDS_TRANSPORTUNICAST_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_TransportUnicastQosPolicy</b> (p. 1158)
DDS_TRANSPORTMULTICAST_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_TransportMulticastQosPolicy</b> (p. 1151)
DDS_TRANSPORTBUILTIN_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_TransportBuiltinQosPolicy</b> (p. 1144)
DDS_TYPESUPPORT_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_TypeSupportQosPolicy</b> (p. 1232)
DDS_PROPERTY_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_PropertyQosPolicy</b> (p. 1007)
DDS_PUBLISHMODE_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_PublishModeQosPolicy</b> (p. 1025)
DDS_ASYNCHRONOUSPUBLISHER_QOS_↔ POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_AsynchronousPublisherQosPolicy</b> (p. 590)
DDS_ENTITYNAME_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_EntityNameQosPolicy</b> (p. 905)
DDS_BATCH_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_BatchQosPolicy</b> (p. 600)
DDS_PROFILE_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_ProfileQosPolicy</b> (p. 1004)
DDS_LOCATORFILTER_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_LocatorFilterQosPolicy</b> (p. 941)
DDS_MULTICHANNEL_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_MultiChannelQosPolicy</b> (p. 964)
DDS_AVAILABILITY_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_AvailabilityQosPolicy</b> (p. 596)
DDS_TRANSPORTMULTICASTMAPPING_QOS_↔ POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_TransportMulticastMappingQosPolicy</b> (p. 1149)



## Enumerator

DDS_LOGGING_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_LoggingQosPolicy</b> (p. 943)
DDS_TOPICQUERYDISPATCH_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_TopicQueryDispatchQosPolicy</b> (p. 1141)
DDS_DATAWRITERTRANSFERMODE_QOS_POLICY_ID ↔	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_DataWriterTransferModeQosPolicy</b> (p. 706)
DDS_MONITORING_QOS_POLICY_ID	<< <i>extension</i> >> (p. 237) Identifier for <b>DDS_MonitoringQosPolicy</b> (p. 962)

## 7.99 ASYNCHRONOUS\_PUBLISHER

<<*extension*>> (p. 237) Specifies the asynchronous publishing settings of the **DDSPublisher** (p. 1550) instances.

### Classes

- struct **DDS\_AsynchronousPublisherQosPolicy**  
*Configures the mechanism that sends user data in an external middleware thread.*

### Variables

- const char \*const **DDS\_ASYNCHRONOUSPUBLISHER\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_AsynchronousPublisherQosPolicy** (p. 590).*

#### 7.99.1 Detailed Description

<<*extension*>> (p. 237) Specifies the asynchronous publishing settings of the **DDSPublisher** (p. 1550) instances.

#### 7.99.2 Variable Documentation

##### 7.99.2.1 DDS\_ASYNCHRONOUSPUBLISHER\_QOS\_POLICY\_NAME

```
const char* const DDS_ASYNCHRONOUSPUBLISHER_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_AsynchronousPublisherQosPolicy** (p. 590).

## 7.100 AVAILABILITY

<<*extension*>> (p. 237) Configures the availability of data.

### Classes

- struct **DDS\_EndpointGroup\_t**  
*Specifies a group of endpoints that can be collectively identified by a name and satisfied by a quorum.*
- struct **DDS\_EndpointGroupSeq**  
*A sequence of **DDS\_EndpointGroup\_t** (p. 900).*
- struct **DDS\_AvailabilityQosPolicy**  
*Configures the availability of data.*

### Variables

- const char \*const **DDS\_AVAILABILITY\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_AvailabilityQosPolicy** (p. 596).*

#### 7.100.1 Detailed Description

<<*extension*>> (p. 237) Configures the availability of data.

#### 7.100.2 Variable Documentation

##### 7.100.2.1 DDS\_AVAILABILITY\_QOS\_POLICY\_NAME

```
const char* const DDS_AVAILABILITY_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_AvailabilityQosPolicy** (p. 596).

## 7.101 BATCH

<<*extension*>> (p. 237) Batch QoS policy used to enable batching in **DDSDataWriter** (p. 1321) instances.

### Classes

- struct **DDS\_BatchQosPolicy**  
*Used to configure batching of multiple samples into a single network packet in order to increase throughput for small samples.*

## Variables

- const char \*const **DDS\_BATCH\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_BatchQosPolicy** (p. 600).*

### 7.101.1 Detailed Description

<<**extension**>> (p. 237) Batch QoS policy used to enable batching in **DDSDataWriter** (p. 1321) instances.

### 7.101.2 Variable Documentation

#### 7.101.2.1 DDS\_BATCH\_QOS\_POLICY\_NAME

```
const char* const DDS_BATCH_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_BatchQosPolicy** (p. 600).

## 7.102 DATABASE

<<**extension**>> (p. 237) Various threads and resource limits settings used by RTI Connex to control its internal database.

## Classes

- struct **DDS\_DatabaseQosPolicy**  
*Various threads and resource limits settings used by RTI Connex to control its internal database.*

## Variables

- const char \*const **DDS\_DATABASE\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_DatabaseQosPolicy** (p. 619).*

### 7.102.1 Detailed Description

<<**extension**>> (p. 237) Various threads and resource limits settings used by RTI Connex to control its internal database.

## 7.102.2 Variable Documentation

### 7.102.2.1 DDS\_DATABASE\_QOS\_POLICY\_NAME

```
const char* const DDS_DATABASE_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DatabaseQosPolicy** (p. 619).

## 7.103 DATA\_READER\_PROTOCOL

<<**extension**>> (p. 237) Specifies the DataReader-specific protocol QoS.

### Classes

- struct **DDS\_DataReaderProtocolQosPolicy**

*Along with **DDS\_WireProtocolQosPolicy** (p. 1244) and **DDS\_DataWriterProtocolQosPolicy** (p. 673), this QoS policy configures the DDS on-the-network protocol (RTPS).*

### Variables

- const char \*const **DDS\_DATAREADERPROTOCOL\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_DataReaderProtocolQosPolicy** (p. 630).*

### 7.103.1 Detailed Description

<<**extension**>> (p. 237) Specifies the DataReader-specific protocol QoS.

### 7.103.2 Variable Documentation

#### 7.103.2.1 DDS\_DATAREADERPROTOCOL\_QOS\_POLICY\_NAME

```
const char* const DDS_DATAREADERPROTOCOL_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DataReaderProtocolQosPolicy** (p. 630).

## 7.104 DATA\_READER\_RESOURCE\_LIMITS

<<**extension**>> (p. 237) Various settings that configure how DataReaders allocate and use physical memory for internal resources.

### Classes

- struct **DDS\_DataReaderResourceLimitsInstanceReplacementSettings**  
*Instance replacement kind applied to each instance state.*
- struct **DDS\_DataReaderResourceLimitsQosPolicy**  
*Various settings that configure how a **DDSDataReader** (p. 1288) allocates and uses physical memory for internal resources.*

### Enumerations

- enum **DDS\_DataReaderInstanceRemovalKind** {  
**DDS\_NO\_INSTANCE\_REMOVAL** = PRES\_NO\_INSTANCE\_REMOVAL ,  
**DDS\_EMPTY\_INSTANCE\_REMOVAL** = PRES\_EMPTY\_INSTANCE\_REMOVAL ,  
**DDS\_FULLY\_PROCESSED\_INSTANCE\_REMOVAL** = PRES\_FULLY\_PROCESSED\_INSTANCE\_REMOVAL ,  
**DDS\_ANY\_INSTANCE\_REMOVAL** = PRES\_ANY\_INSTANCE\_REMOVAL }  
*Sets the kinds of instances that can be replaced when instance resource limits (**DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055)) are reached.*

### Variables

- const char \*const **DDS\_DATAREADERRESOURCELIMITS\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_DataReaderResourceLimitsQosPolicy** (p. 654).*
- const **DDS\_Long DDS\_AUTO\_MAX\_TOTAL\_INSTANCES**  
<<**extension**>> (p. 237) *This value is used to make **DDS\_DataReaderResourceLimitsQosPolicy::max\_total\_instances** (p. 661) equal to **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055).*

#### 7.104.1 Detailed Description

<<**extension**>> (p. 237) Various settings that configure how DataReaders allocate and use physical memory for internal resources.

#### 7.104.2 Enumeration Type Documentation

##### 7.104.2.1 DDS\_DataReaderInstanceRemovalKind

```
enum DDS_DataReaderInstanceRemovalKind
```

Sets the kinds of instances that can be replaced when instance resource limits (**DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055)) are reached.

See also

**DDS\_DataReaderResourceLimitsQosPolicy::instance\_replacement** (p. 666)

## Enumerator

DDS_NO_INSTANCE_REMOVAL	<p>No instance can be removed. If an instance resource is required because <b>DDS_ResourceLimitsQosPolicy::max_instances</b> (p. 1055) is reached, this setting will disallow instances from being replaced. Samples for new instances will be dropped and reported as lost with reason <b>DDS_LOST_BY_INSTANCES_LIMIT</b> (p. 136).</p>
DDS_EMPTY_INSTANCE_REMOVAL	<p>Only empty instances can be removed. Instances can be replaced only if they are empty. An instance is considered empty when all samples have been taken or removed from the DataReader queue due to the <b>DDS_LifespanQosPolicy</b> (p. 931) or sample purging due to the <b>DDS_ReaderDataLifecycleQosPolicy</b> (p. 1035), and there are no outstanding loans on any of the instance's samples.</p>
DDS_FULLY_PROCESSED_INSTANCE_REMOVAL	<p>Only fully-processed instances can be removed. An instance is considered fully processed if every sample for the instance has been processed by the application. A sample is considered processed by the application depending on the <b>DDS_ReliabilityQosPolicy::kind</b> (p. 1043):</p> <ul style="list-style-type: none"> <li>• <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435) (depends on the <b>DDS_ReliabilityQosPolicy</b>↔ <b>AcknowledgmentModeKind</b> (p. 435)):       <ul style="list-style-type: none"> <li>– <b>DDS_PROTOCOL</b>↔ <b>ACKNOWLEDGMENT_MODE</b> (p. 435) or <b>DDS_APPLICATION_AUTO</b>↔ <b>ACKNOWLEDGMENT_MODE</b> (p. 435): The sample is considered processed when it has been read or taken by the application and <code>return_loan</code> has been called.</li> <li>– <b>DDS_APPLICATION_EXPLICIT</b>↔ <b>ACKNOWLEDGMENT_MODE</b> (p. 436): The sample is considered processed when the subscribing application has explicitly acknowledged the DDS sample, the <code>AppAckConf</code> has been received, and the application has called <code>return_loan</code>.</li> </ul> </li> <li>• <b>DDS_BEST_EFFORT_RELIABILITY_QOS</b> (p. 435): All samples are considered processed when they have been read or taken by the application and <code>return_loan</code> has been called.</li> </ul>
DDS_ANY_INSTANCE_REMOVAL	<p>Any instance can be removed. Instances can be replaced regardless of whether the subscribing application has processed all of the samples. Samples that have not been processed will be removed.</p>

### 7.104.3 Variable Documentation

#### 7.104.3.1 DDS\_DATAREADERRESOURCELIMITS\_QOS\_POLICY\_NAME

```
const char* const DDS_DATAREADERRESOURCELIMITS_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DataReaderResourceLimitsQosPolicy** (p. 654).

#### 7.104.3.2 DDS\_AUTO\_MAX\_TOTAL\_INSTANCES

```
const DDS_Long DDS_AUTO_MAX_TOTAL_INSTANCES [extern]
```

<<**extension**>> (p. 237) This value is used to make **DDS\_DataReaderResourceLimitsQosPolicy::max\_total\_instances** (p. 661) equal to **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055).

## 7.105 DATA\_REPRESENTATION

A list of data representations and compression methods supported by a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288).

### Modules

- **Compression Settings**

<<**extension**>> (p. 237) *Compression settings that can be applied to data that is sent and received by DataWriters and DataReaders.*

### Classes

- struct **DDS\_DataRepresentationIdSeq**

*Declares IDL sequence < DDS\_DataRepresentationId\_t (p. 370) >*

- struct **DDS\_DataRepresentationQosPolicy**

*This QoS policy contains a list of representation identifiers and compression settings used by DDSDataWriter (p. 1321) and DDSDataReader (p. 1288) entities to negotiate which data representation and compression settings to use.*

### Typedefs

- typedef **DDS\_Short DDS\_DataRepresentationId\_t**

*A two-byte signed integer that identifies a data representation.*

## Variables

- const **DDS\_DataRepresentationId\_t DDS\_XCDR\_DATA\_REPRESENTATION**  
*Corresponds to the Extended Common Data Representation encoding version 1.*
- const **DDS\_DataRepresentationId\_t DDS\_XML\_DATA\_REPRESENTATION**  
*Corresponds to the XML Data Representation (unsupported).*
- const **DDS\_DataRepresentationId\_t DDS\_XCDR2\_DATA\_REPRESENTATION**  
*Corresponds to the Extended Common Data Representation encoding version 2.*
- const **DDS\_DataRepresentationId\_t DDS\_AUTO\_DATA\_REPRESENTATION**  
*Representation is automatically chosen based on the type.*
- const char \*const **DDS\_DATA\_REPRESENTATION\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_DataRepresentationQosPolicy** (p. 668).*

### 7.105.1 Detailed Description

A list of data representations and compression methods supported by a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288).

### 7.105.2 Typedef Documentation

#### 7.105.2.1 DDS\_DataRepresentationId\_t

```
typedef DDS_Short DDS_DataRepresentationId_t
```

A two-byte signed integer that identifies a data representation.

### 7.105.3 Variable Documentation

#### 7.105.3.1 DDS\_XCDR\_DATA\_REPRESENTATION

```
const DDS_DataRepresentationId_t DDS_XCDR_DATA_REPRESENTATION [extern]
```

Corresponds to the Extended Common Data Representation encoding version 1.



### 7.105.3.2 DDS\_XML\_DATA\_REPRESENTATION

```
const DDS_DataRepresentationId_t DDS_XML_DATA_REPRESENTATION [extern]
```

Corresponds to the XML Data Representation (unsupported).

#### Note

This value is currently not supported.

### 7.105.3.3 DDS\_XCDR2\_DATA\_REPRESENTATION

```
const DDS_DataRepresentationId_t DDS_XCDR2_DATA_REPRESENTATION [extern]
```

Corresponds to the Extended Common Data Representation encoding version 2.

### 7.105.3.4 DDS\_AUTO\_DATA\_REPRESENTATION

```
const DDS_DataRepresentationId_t DDS_AUTO_DATA_REPRESENTATION [extern]
```

Representation is automatically chosen based on the type.

For plain language binding, if the `allowed_data_representation` annotation is not specified or if it contains the value XCDR, RTI Connexx translates this field to **DDS\_XCDR\_DATA\_REPRESENTATION** (p.370). Otherwise, it translates this field to **DDS\_XCDR2\_DATA\_REPRESENTATION** (p.371).

For the **FlatData language binding** (p.568), RTI Connexx translates this field to **DDS\_XCDR2\_DATA\_↔ REPRESENTATION** (p.371).

#### Examples

```
HelloWorldPlugin.cxx.
```

### 7.105.3.5 DDS\_DATA\_REPRESENTATION\_QOS\_POLICY\_NAME

```
const char* const DDS_DATA_REPRESENTATION_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DataRepresentationQosPolicy** (p.668).

## 7.106 Compression Settings

<<*extension*>> (p. 237) Compression settings that can be applied to data that is sent and received by DataWriters and DataReaders.

### Classes

- struct **DDS\_CompressionSettings\_t**  
<<*extension*>> (p. 237) Settings related to compressing user data.

### Macros

- #define **DDS\_COMPRESSION\_ID\_MASK\_NONE** (( **DDS\_CompressionIdMask**) (0))  
<<*extension*>> (p. 237) **DDS\_CompressionIdMask** (p. 375) used to disable user-data compression for an endpoint.
- #define **DDS\_COMPRESSION\_ID\_MASK\_ALL**  
<<*extension*>> (p. 237) **DDS\_CompressionIdMask** (p. 375) mask with all the supported built-in compression algorithms enabled.
- #define **DDS\_COMPRESSION\_LEVEL\_BEST\_COMPRESSION** (10)  
<<*extension*>> (p. 237) The best compression ratio possible for a compression algorithm.
- #define **DDS\_COMPRESSION\_LEVEL\_BEST\_SPEED** (1)  
<<*extension*>> (p. 237) The best compression speed possible for a compression algorithm.
- #define **DDS\_COMPRESSION\_LEVEL\_DEFAULT DDS\_COMPRESSION\_LEVEL\_BEST\_COMPRESSION**  
<<*extension*>> (p. 237) Default level of compression.
- #define **DDS\_COMPRESSION\_THRESHOLD\_DEFAULT** 8192  
<<*extension*>> (p. 237) Default threshold from which a serialized sample will be eligible to be compressed.
- #define **DDS\_COMPRESSION\_ID\_MASK\_PUBLICATION\_DEFAULT DDS\_COMPRESSION\_ID\_MASK\_↔ NONE**  
<<*extension*>> (p. 237) **DDS\_CompressionIdMask** (p. 375) mask with the default value for publication.
- #define **DDS\_COMPRESSION\_ID\_MASK\_SUBSCRIPTION\_DEFAULT**  
<<*extension*>> (p. 237) **DDS\_CompressionIdMask** (p. 375) mask with the default value for subscription.

### Typedefs

- typedef **DDS\_UnsignedLong DDS\_CompressionId\_t**  
<<*extension*>> (p. 237) A four-byte signed integer that identifies a single compression algorithm.
- typedef **DDS\_UnsignedLong DDS\_CompressionIdMask**  
<<*extension*>> (p. 237) A four-byte signed integer that identifies a mask of the compression IDs that the algorithms enabled.

### Variables

- const **DDS\_CompressionId\_t DDS\_COMPRESSION\_ID\_ZLIB**  
<<*extension*>> (p. 237) Corresponds to the ID of the compression algorithm ZLIB. This is the only built-in compression algorithm that is supported when batching is enabled.
- const **DDS\_CompressionId\_t DDS\_COMPRESSION\_ID\_BZIP2**  
<<*extension*>> (p. 237) Corresponds to the ID of the compression algorithm BZIP2.
- const **DDS\_CompressionId\_t DDS\_COMPRESSION\_ID\_LZ4**  
<<*extension*>> (p. 237) Corresponds to the ID of the compression algorithm LZ4.

## 7.106.1 Detailed Description

<<*extension*>> (p. 237) Compression settings that can be applied to data that is sent and received by DataWriters and DataReaders.

## 7.106.2 Macro Definition Documentation

### 7.106.2.1 DDS\_COMPRESSION\_ID\_MASK\_NONE

```
#define DDS_COMPRESSION_ID_MASK_NONE (( DDS_CompressionIdMask) (0))
```

<<*extension*>> (p. 237) **DDS\_CompressionIdMask** (p. 375) used to disable user-data compression for an endpoint.

### 7.106.2.2 DDS\_COMPRESSION\_ID\_MASK\_ALL

```
#define DDS_COMPRESSION_ID_MASK_ALL
```

**Value:**

```
((DDS_CompressionIdMask) \  
 (DDS_COMPRESSION_ID_ZLIB_BIT | DDS_COMPRESSION_ID_BZIP2_BIT \  
 | DDS_COMPRESSION_ID_LZ4_BIT))
```

<<*extension*>> (p. 237) **DDS\_CompressionIdMask** (p. 375) mask with all the supported built-in compression algorithms enabled.

### 7.106.2.3 DDS\_COMPRESSION\_LEVEL\_BEST\_COMPRESSION

```
#define DDS_COMPRESSION_LEVEL_BEST_COMPRESSION (10)
```

<<*extension*>> (p. 237) The best compression ratio possible for a compression algorithm.

**See also**

**DDS\_CompressionSettings\_t::writer\_compression\_level** (p. 615)

#### 7.106.2.4 DDS\_COMPRESSION\_LEVEL\_BEST\_SPEED

```
#define DDS_COMPRESSION_LEVEL_BEST_SPEED (1)
```

<<*extension*>> (p. 237) The best compression speed possible for a compression algorithm.

See also

**DDS\_CompressionSettings\_t::writer\_compression\_level** (p. 615)

#### 7.106.2.5 DDS\_COMPRESSION\_LEVEL\_DEFAULT

```
#define DDS_COMPRESSION_LEVEL_DEFAULT DDS_COMPRESSION_LEVEL_BEST_COMPRESSION
```

<<*extension*>> (p. 237) Default level of compression.

See also

**DDS\_CompressionSettings\_t::writer\_compression\_level** (p. 615)

#### 7.106.2.6 DDS\_COMPRESSION\_THRESHOLD\_DEFAULT

```
#define DDS_COMPRESSION_THRESHOLD_DEFAULT 8192
```

<<*extension*>> (p. 237) Default threshold from which a serialized sample will be eligible to be compressed.

See also

**DDS\_CompressionSettings\_t::writer\_compression\_threshold** (p. 616)

This value has been decided after some performance tests, it's a prudent value that will ensure, in most cases with all of the algorithms, that we are going to compress the sample.

#### 7.106.2.7 DDS\_COMPRESSION\_ID\_MASK\_PUBLICATION\_DEFAULT

```
#define DDS_COMPRESSION_ID_MASK_PUBLICATION_DEFAULT DDS_COMPRESSION_ID_MASK_NONE
```

<<*extension*>> (p. 237) **DDS\_CompressionIdMask** (p. 375) mask with the default value for publication.

See also

**DDS\_CompressionSettings\_t::compression\_ids** (p. 615)

**DDS\_COMPRESSION\_ID\_MASK\_SUBSCRIPTION\_DEFAULT** (p. 374)

### 7.106.2.8 DDS\_COMPRESSION\_ID\_MASK\_SUBSCRIPTION\_DEFAULT

```
#define DDS_COMPRESSION_ID_MASK_SUBSCRIPTION_DEFAULT
```

**Value:**

```
(DDS_COMPRESSION_ID_ZLIB_BIT | DDS_COMPRESSION_ID_BZIP2_BIT \  
 | DDS_COMPRESSION_ID_LZ4_BIT)
```

<<*extension*>> (p. 237) **DDS\_CompressionIdMask** (p. 375) mask with the default value for subscription.

See also

**DDS\_CompressionSettings\_t::compression\_ids** (p. 615)

**DDS\_COMPRESSION\_ID\_MASK\_PUBLICATION\_DEFAULT** (p. 374)

## 7.106.3 Typedef Documentation

### 7.106.3.1 DDS\_CompressionId\_t

```
typedef DDS_UnsignedLong DDS_CompressionId_t
```

<<*extension*>> (p. 237) A four-byte signed integer that identifies a single compression algorithm.

### 7.106.3.2 DDS\_CompressionIdMask

```
typedef DDS_UnsignedLong DDS_CompressionIdMask
```

<<*extension*>> (p. 237) A four-byte signed integer that identifies a mask of the compression IDs that the algorithms enabled.

## 7.106.4 Variable Documentation

### 7.106.4.1 DDS\_COMPRESSION\_ID\_ZLIB

```
const DDS_CompressionId_t DDS_COMPRESSION_ID_ZLIB [extern]
```

<<*extension*>> (p. 237) Corresponds to the ID of the compression algorithm ZLIB. This is the only built-in compression algorithm that is supported when batching is enabled.

### 7.106.4.2 DDS\_COMPRESSION\_ID\_BZIP2

```
const DDS_CompressionId_t DDS_COMPRESSION_ID_BZIP2 [extern]
```

<<*extension*>> (p. 237) Corresponds to the ID of the compression algorithm BZIP2.

### 7.106.4.3 DDS\_COMPRESSION\_ID\_LZ4

```
const DDS_CompressionId_t DDS_COMPRESSION_ID_LZ4 [extern]
```

<<*extension*>> (p. 237) Corresponds to the ID of the compression algorithm LZ4.

## 7.107 DATA\_TAG

Stores (name, value) pairs that can be used to determine access permissions.

### Classes

- struct **DDS\_Tag**  
*Tags are name/value pair objects.*
- struct **DDS\_TagSeq**  
*Declares IDL sequence < DDS\_Tag (p. 1122) >*
- struct **DDS\_DataTags**  
*Definition of DDS\_DataTagQosPolicy (p. 377).*
- class **DDSDataTagQosPolicyHelper**  
*Policy helpers that facilitate management of the data tags in the input policy.*

### Typedefs

- typedef struct **DDS\_DataTags DDS\_DataTagQosPolicy**  
*Stores (name, value) pairs that can be used to determine access permissions.*

### Functions

- static **DDS\_Long DDSDataTagQosPolicyHelper::get\_number\_of\_tags** ( **DDS\_DataTagQosPolicy** &policy)  
*Gets the number of data tags in the input policy.*
- static **DDS\_ReturnCode\_t DDSDataTagQosPolicyHelper::assert\_tag** ( **DDS\_DataTagQosPolicy** &policy, const char \*name, const char \*value)  
*Asserts the tag identified by name in the input policy.*
- static **DDS\_ReturnCode\_t DDSDataTagQosPolicyHelper::add\_tag** ( **DDS\_DataTagQosPolicy** &policy, const char \*name, const char \*value)  
*Adds a new tag to the input policy.*
- static struct **DDS\_Tag \* DDSDataTagQosPolicyHelper::lookup\_tag** ( **DDS\_DataTagQosPolicy** &policy, const char \*name)  
*Searches by tag name for a tag in the input policy.*
- static **DDS\_ReturnCode\_t DDSDataTagQosPolicyHelper::remove\_tag** ( **DDS\_DataTagQosPolicy** &policy, const char \*name)  
*Removes a tag from the input policy.*

## Variables

- const char \*const **DDS\_DATATAG\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_DataTagQosPolicy** (p. 377).*

### 7.107.1 Detailed Description

Stores (name, value) pairs that can be used to determine access permissions.

The **DDS\_DataTagQosPolicy** (p. 377) can be used to associate a set of tags in the form of (name, value) pairs with a **DDSDataReader** (p. 1288) or **DDSDataWriter** (p. 1321). This is similar to the **DDS\_PropertyQosPolicy** (p. 1007), except you cannot select whether or not a particular pair should be propagated (included in the built-in topic). Data tags are always propagated. The Access Control plugin may use the tags to determine publish and subscribe permissions.

### 7.107.2 Typedef Documentation

#### 7.107.2.1 DDS\_DataTagQosPolicy

```
typedef struct DDS_DataTags DDS_DataTagQosPolicy
```

Stores (name, value) pairs that can be used to determine access permissions.

Entity:

**DDSDataReader** (p. 1288) **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A;

**Changeable** (p. 360) = **NO** (p. 360)

### 7.107.3 Usage

The DATA\_TAG QoS policy can be used to associate a set of tags in the form of (name, value) pairs with a **DDSDataReader** (p. 1288) or **DDSDataWriter** (p. 1321). This is similar to the **DDS\_PropertyQosPolicy** (p. 1007), except for the following differences:

- Data tags are always propagated. You cannot select whether or not a particular pair should be propagated.
- Data tags are not exposed to API functions, such as **DDSDataWriter::get\_matched\_subscription\_data** (p. 1332), that receive **DDS\_PublicationBuiltinTopicData** (p. 1010) or **DDS\_SubscriptionBuiltinTopicData** (p. 1108) as a parameter.
- Connex passes data tags to the Access Control Security Plugin, which may use them to decide whether to allow or deny the corresponding entities.

There are helper functions to facilitate working with data tags. See the **DATA\_TAG** (p. 376) page.

## 7.107.4 Function Documentation

### 7.107.4.1 `get_number_of_tags()`

```
static DDS_Long DDSDataTagQosPolicyHelper::get_number_of_tags (
    DDS_DataTagQosPolicy & policy ) [static]
```

Gets the number of data tags in the input policy.

#### Precondition

policy cannot be NULL.

#### Parameters

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
---------------	--

#### Returns

Number of data tags.

### 7.107.4.2 `assert_tag()`

```
static DDS_ReturnCode_t DDSDataTagQosPolicyHelper::assert_tag (
    DDS_DataTagQosPolicy & policy,
    const char * name,
    const char * value ) [static]
```

Asserts the tag identified by name in the input policy.

If the tag already exists, this function replaces its current value with the new one.

If the tag identified by name does not exist, this function adds it to the tag set.

This function increases the maximum number of elements of the policy sequence by 10 when this number is not enough to store the new tag.

#### Precondition

policy, name and value cannot be NULL.



## Parameters

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
<i>name</i>	<< <i>in</i> >> (p. 238) Tag name.
<i>value</i>	<< <i>in</i> >> (p. 238) Tag value.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## 7.107.4.3 add\_tag()

```
static DDS_ReturnCode_t DDSDataTagQosPolicyHelper::add_tag (
    DDS_DataTagQosPolicy & policy,
    const char * name,
    const char * value ) [static]
```

Adds a new tag to the input policy.

This function will allocate memory to store the (name, value) pair. The memory allocated is owned by RTI Connex.

If the maximum number of elements of the policy sequence is not enough to store the new tag, this function will increase it by 10.

If the tag already exists, the function will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

## Precondition

policy, name and value cannot be NULL.

The tag is not in the policy.

## Parameters

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
<i>name</i>	<< <i>in</i> >> (p. 238) Tag name.
<i>value</i>	<< <i>in</i> >> (p. 238) Tag value.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

#### 7.107.4.4 lookup\_tag()

```
static struct DDS_Tag * DDSDataTagQosPolicyHelper::lookup_tag (
    DDS_DataTagQosPolicy & policy,
    const char * name ) [static]
```

Searches by tag name for a tag in the input policy.

##### Precondition

policy, name and value cannot be NULL.

##### Parameters

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
<i>name</i>	<< <i>in</i> >> (p. 238) Tag name.

##### Returns

The function returns the first tag with the given name. If such a tag does not exist, the function returns NULL.

#### 7.107.4.5 remove\_tag()

```
static DDS_ReturnCode_t DDSDataTagQosPolicyHelper::remove_tag (
    DDS_DataTagQosPolicy & policy,
    const char * name ) [static]
```

Removes a tag from the input policy.

If the tag does not exist, the function fails with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

##### Precondition

policy and name cannot be NULL.

The tag is in the policy.

##### Parameters

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
<i>name</i>	<< <i>in</i> >> (p. 238) Tag name.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
------------	--

## 7.107.5 Variable Documentation

### 7.107.5.1 DDS\_DATATAG\_QOS\_POLICY\_NAME

```
const char* const DDS_DATATAG_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DataTagQosPolicy** (p. 377).

## 7.108 DATA\_WRITER\_PROTOCOL

<<*extension*>> (p. 237) Along with **DDS\_WireProtocolQosPolicy** (p. 1244) and **DDS\_DataReaderProtocolQosPolicy** (p. 630), this QoS policy configures the DDS on-the-network protocol (RTPS).

### Classes

- struct **DDS\_DataWriterProtocolQosPolicy**  
*Protocol that applies only to **DDSDataWriter** (p. 1321) instances.*

### Variables

- const char \*const **DDS\_DATAWRITERPROTOCOL\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_DataWriterProtocolQosPolicy** (p. 673).*

### 7.108.1 Detailed Description

<<*extension*>> (p. 237) Along with **DDS\_WireProtocolQosPolicy** (p. 1244) and **DDS\_DataReaderProtocolQosPolicy** (p. 630), this QoS policy configures the DDS on-the-network protocol (RTPS).

### 7.108.2 Variable Documentation

### 7.108.2.1 DDS\_DATAWRITERPROTOCOL\_QOS\_POLICY\_NAME

```
const char* const DDS_DATAWRITERPROTOCOL_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DataWriterProtocolQosPolicy** (p. 673).

## 7.109 DATA\_WRITER\_RESOURCE\_LIMITS

<<**extension**>> (p. 237) Various settings that configure how a **DDSDataWriter** (p. 1321) allocates and uses physical memory for internal resources.

### Classes

- struct **DDS\_DataWriterResourceLimitsQosPolicy**

*Various settings that configure how a **DDSDataWriter** (p. 1321) allocates and uses physical memory for internal resources.*

### Enumerations

- enum **DDS\_DataWriterResourceLimitsInstanceReplacementKind** {  
**DDS\_UNREGISTERED\_INSTANCE\_REPLACEMENT** ,  
**DDS\_ALIVE\_INSTANCE\_REPLACEMENT** ,  
**DDS\_DISPOSED\_INSTANCE\_REPLACEMENT** ,  
**DDS\_ALIVE\_THEN\_DISPOSED\_INSTANCE\_REPLACEMENT** ,  
**DDS\_DISPOSED\_THEN\_ALIVE\_INSTANCE\_REPLACEMENT** ,  
**DDS\_ALIVE\_OR\_DISPOSED\_INSTANCE\_REPLACEMENT** }

*Sets the kinds of instances that can be replaced when instance resource limits are reached.*

### Variables

- const char \*const **DDS\_DATAWRITERRESOURCELIMITS\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_DataWriterResourceLimitsQosPolicy** (p. 698).*

### 7.109.1 Detailed Description

<<**extension**>> (p. 237) Various settings that configure how a **DDSDataWriter** (p. 1321) allocates and uses physical memory for internal resources.

### 7.109.2 Enumeration Type Documentation

## 7.109.2.1 DDS\_DataWriterResourceLimitsInstanceReplacementKind

```
enum DDS_DataWriterResourceLimitsInstanceReplacementKind
```

Sets the kinds of instances that can be replaced when instance resource limits are reached.

When **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055) is reached, a **DDSDataWriter** (p. 1321) will try to make room for a new instance by attempting to reclaim an existing instance based on the instance replacement kind specified by **DDS\_DataWriterResourceLimitsQosPolicy::instance\_replacement** (p. 701).

Only instances whose states match the specified kinds are eligible to be replaced. In addition, an instance must have had all of its samples fully acknowledged for it to be considered replaceable.

For all kinds, a **DDSDataWriter** (p. 1321) will replace the oldest instance satisfying that kind. For example, when the kind is **DDS\_UNREGISTERED\_INSTANCE\_REPLACEMENT** (p. 383), a **DDSDataWriter** (p. 1321) will remove the oldest, fully acknowledged, unregistered instance, if such an instance exists.

If no replaceable instance exists, the invoked function will either return with an appropriate out-of-resources return code, or in the case of a write, it may first block to wait for an instance to be acknowledged. Otherwise, the **DDSDataWriter** (p. 1321) will replace the old instance with the new instance, and invoke, if available, the **DDSDataWriterListener::on\_instance\_replaced** (p. 1349) to notify the user about an instance being replaced.

A **DDSDataWriter** (p. 1321) checks for replaceable instances in the following order, stopping once a replaceable instance is found:

- If **DDS\_DataWriterResourceLimitsQosPolicy::replace\_empty\_instances** (p. 701) is **DDS\_BOOLEAN\_TRUE** (p. 317), a **DDSDataWriter** (p. 1321) first tries replacing instances that have no samples. These empty instances can be unregistered, disposed, or alive.
- Next, a **DDSDataWriter** (p. 1321) tries replacing unregistered instances. Since an unregistered instance indicates that the **DDSDataWriter** (p. 1321) is done modifying it, unregistered instances are replaced before instances of any other state (alive, disposed). This is the same as the **DDS\_UNREGISTERED\_INSTANCE\_REPLACEMENT** (p. 383) kind.
- Then, a **DDSDataWriter** (p. 1321) tries replacing what is specified by **DDS\_DataWriterResourceLimitsQosPolicy::instance\_replacement** (p. 701). With unregistered instances already checked, this leaves alive and disposed instances. When both alive and disposed instances may be replaced, the kind specifies whether the particular order matters (e.g., **DISPOSED\_THEN\_ALIVE**, **ALIVE\_THEN\_DISPOSED**) or not (**ALIVE\_OR\_DISPOSED**).

QoS:

**DDS\_DataWriterResourceLimitsQosPolicy** (p. 698)

Enumerator

DDS_UNREGISTERED_INSTANCE_REPLACEMENT	Allows a <b>DDSDataWriter</b> (p. 1321) to reclaim unregistered acknowledged instances. By default, all instance replacement kinds first attempt to reclaim an unregistered, acknowledged instance. Used in <b>DDS_DataWriterResourceLimitsQosPolicy::instance_replacement</b> (p. 701) [default]
---------------------------------------	---

## Enumerator

DDS_ALIVE_INSTANCE_REPLACEMENT	Allows a <b>DDSDataWriter</b> (p. 1321) to reclaim alive, acknowledged instances. When an unregistered, acknowledged instance is not available to reclaim, this kind allows a <b>DDSDataWriter</b> (p. 1321) to reclaim an alive, acknowledged instance, where an alive instance is a registered, non-disposed instance. The least recently registered or written alive instance will be reclaimed.
DDS_DISPOSED_INSTANCE_REPLACEMENT	Allows a <b>DDSDataWriter</b> (p. 1321) to reclaim disposed acknowledged instances. When an unregistered, acknowledged instance is not available to reclaim, this kind allows a <b>DDSDataWriter</b> (p. 1321) to reclaim a disposed, acknowledged instance. The least recently disposed instance will be reclaimed.
DDS_ALIVE_THEN_DISPOSED_INSTANCE_REPLACEMENT ↔	Allows a <b>DDSDataWriter</b> (p. 1321) first to reclaim an alive, acknowledged instance, and then, if necessary, a disposed, acknowledged instance. When an unregistered, acknowledged instance is not available to reclaim, this kind allows a <b>DDSDataWriter</b> (p. 1321) to first try reclaiming an alive, acknowledged instance. If no instance is reclaimable, then it tries reclaiming a disposed, acknowledged instance. The least recently used (i.e., registered, written, or disposed) instance will be reclaimed.
DDS_DISPOSED_THEN_ALIVE_INSTANCE_REPLACEMENT ↔	Allows a <b>DDSDataWriter</b> (p. 1321) first to reclaim a disposed, acknowledged instance, and then, if necessary, an alive, acknowledged instance. When an unregistered, acknowledged instance is not available to reclaim, this kind allows a <b>DDSDataWriter</b> (p. 1321) to first try reclaiming a disposed, acknowledged instance. If no instance is reclaimable, then it tries reclaiming an alive, acknowledged instance. The least recently used (i.e., disposed, registered, or written) instance will be reclaimed.
DDS_ALIVE_OR_DISPOSED_INSTANCE_REPLACEMENT ↔	Allows a <b>DDSDataWriter</b> (p. 1321) to reclaim either an alive acknowledged instance or a disposed acknowledged instance. When an unregistered acknowledged instance is not available to reclaim, this kind allows a <b>DDSDataWriter</b> (p. 1321) to reclaim either an alive, acknowledged instance or a disposed, acknowledged instance. If both instance kinds are available to reclaim, the <b>DDSDataWriter</b> (p. 1321) will reclaim the least recently used (i.e. disposed, registered, or written) instance.

## 7.109.3 Variable Documentation

### 7.109.3.1 DDS\_DATAWRITERRESOURCELIMITS\_QOS\_POLICY\_NAME

```
const char* const DDS_DATAWRITERRESOURCELIMITS_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DataWriterResourceLimitsQosPolicy** (p. 698).

## 7.110 DATA\_WRITER\_TRANSFER\_MODE

<<*extension*>> (p. 237) Specifies the DataWriter transfer mode QoS.

### Classes

- struct **DDS\_DataWriterShmemRefTransferModeSettings**  
*Settings related to transferring data using shared memory references.*
- struct **DDS\_DataWriterTransferModeQosPolicy**  
<<*extension*>> (p. 237) *Qos related to transferring data*

### Variables

- const char \*const **DDS\_DATAWRITERTRANSFERMODE\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_DataWriterTransferModeQosPolicy** (p. 706).*

### 7.110.1 Detailed Description

<<*extension*>> (p. 237) Specifies the DataWriter transfer mode QoS.

### 7.110.2 Variable Documentation

#### 7.110.2.1 DDS\_DATAWRITERTRANSFERMODE\_QOS\_POLICY\_NAME

```
const char* const DDS_DATAWRITERTRANSFERMODE_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DataWriterTransferModeQosPolicy** (p. 706).

## 7.111 DEADLINE

Expresses the maximum duration (deadline) within which an instance is expected to be updated.

## Classes

- struct **DDS\_DeadlineQosPolicy**  
*Expresses the maximum duration (deadline) within which an instance is expected to be updated.*

## Variables

- const char \*const **DDS\_DEADLINE\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_DeadlineQosPolicy** (p. 707).*

### 7.111.1 Detailed Description

Expresses the maximum duration (deadline) within which an instance is expected to be updated.

### 7.111.2 Variable Documentation

#### 7.111.2.1 DDS\_DEADLINE\_QOS\_POLICY\_NAME

```
const char* const DDS_DEADLINE_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DeadlineQosPolicy** (p. 707).

## 7.112 DESTINATION\_ORDER

Controls the criteria used to determine the logical order among changes made by **DDSPublisher** (p. 1550) entities to the same instance of data (i.e., matching **DDSTopic** (p. 1617) and key).

## Classes

- struct **DDS\_DestinationOrderQosPolicy**  
*Controls how the middleware will deal with data sent by multiple **DDSDataWriter** (p. 1321) entities for the same instance of data (i.e., same **DDSTopic** (p. 1617) and key).*

## Enumerations

- enum **DDS\_DestinationOrderQosPolicyKind** {  
**DDS\_BY\_RECEPTION\_TIMESTAMP\_DESTINATIONORDER\_QOS** ,  
**DDS\_BY\_SOURCE\_TIMESTAMP\_DESTINATIONORDER\_QOS** }  
*Kinds of destination order.*
- enum **DDS\_DestinationOrderQosPolicyScopeKind** {  
**DDS\_INSTANCE\_SCOPE\_DESTINATIONORDER\_QOS** ,  
**DDS\_TOPIC\_SCOPE\_DESTINATIONORDER\_QOS** }  
*Scope of source destination order.*



## Variables

- const char \*const **DDS\_DESTINATIONORDER\_QOS\_POLICY\_NAME**  
Stringified human-readable name for **DDS\_DestinationOrderQosPolicy** (p. 709).

### 7.112.1 Detailed Description

Controls the criteria used to determine the logical order among changes made by **DDSPublisher** (p. 1550) entities to the same instance of data (i.e., matching **DDSTopic** (p. 1617) and key).

### 7.112.2 Enumeration Type Documentation

#### 7.112.2.1 DDS\_DestinationOrderQosPolicyKind

enum **DDS\_DestinationOrderQosPolicyKind**

Kinds of destination order.

QoS:

**DDS\_DestinationOrderQosPolicy** (p. 709)

Enumerator

<p>DDS_BY_RECEPTION_TIMESTAMP_↔ DESTINATIONORDER_QOS</p>	<p><b>[default]</b> Indicates that data is ordered based on the reception time at each <b>DDSSubscriber</b> (p. 1592). Since each subscriber may receive the data at different times there is no guarantee that the changes will be seen in the same order. Consequently, it is possible for each subscriber to end up with a different final value for the data.</p>
<p>DDS_BY_SOURCE_TIMESTAMP_↔ DESTINATIONORDER_QOS</p>	<p>Indicates that data is ordered based on a time-stamp placed at the source (by RTI Connex or by the application). In any case this guarantees a consistent final value for the data in all subscribers.</p> <p>Note: If Batching is needed along with <b>DDS_BY_↔ SOURCE_TIMESTAMP_DESTINATIONORDER_QOS</b> (p. 387) and <b>DDS_INSTANCE_SCOPE_↔ DESTINATIONORDER_QOS</b> (p. 388), then the <b>DDS_BatchQosPolicy::source_timestamp_↔ resolution</b> (p. 602) and <b>DDS_BatchQosPolicy::thread_safe_write</b> (p. 603) setting of <b>DDS_BatchQosPolicy</b> (p. 600) should be set to <b>DDS_DURATION_ZERO</b> (p. 327) and <b>DDS_BOOLEAN_TRUE</b> (p. 317) respectively.</p>

### 7.112.2.2 DDS\_DestinationOrderQosPolicyScopeKind

enum **DDS\_DestinationOrderQosPolicyScopeKind**

Scope of source destination order.

QoS:

**DDS\_DestinationOrderQosPolicy** (p. 709)

Enumerator

DDS_INSTANCE_SCOPE_DESTINATIONORDER_↔ QOS	<b>[default]</b> Indicates that data is ordered on a per instance basis if used along with <b>DDS_BY_SOURCE_↔ _TIMESTAMP_DESTINATIONORDER_QOS</b> (p. 387). The source timestamp of the current sample is compared to the source timestamp of the previously received sample for the same instance. The tolerance check is also applied per instance.
DDS_TOPIC_SCOPE_DESTINATIONORDER_QOS	Indicates that data is ordered on a per topic basis if used along with <b>DDS_BY_SOURCE_TIMESTAMP_↔ DESTINATIONORDER_QOS</b> (p. 387). The source timestamp of the current sample is compared to the source timestamp of the previously received sample for the same topic. The tolerance check is also applied per topic.

### 7.112.3 Variable Documentation

#### 7.112.3.1 DDS\_DESTINATIONORDER\_QOS\_POLICY\_NAME

const char\* const DDS\_DESTINATIONORDER\_QOS\_POLICY\_NAME [extern]

Stringified human-readable name for **DDS\_DestinationOrderQosPolicy** (p. 709).

## 7.113 DISCOVERY

<<*extension*>> (p. 237) Specifies the attributes required to discover participants in the domain.

## Modules

- **NDDS\_DISCOVERY\_PEERS**

Environment variable or a file that specifies the default values of **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732) and **DDS\_DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733) contained in the **DDS\_DomainParticipantQos::discovery** (p. 744) qos policy.

## Classes

- struct **DDS\_DiscoveryQosPolicy**

<<**extension**>> (p. 237) Configures the mechanism used by the middleware to automatically discover and connect with new remote applications.

## Variables

- const char \*const **DDS\_DISCOVERY\_QOS\_POLICY\_NAME**

Stringified human-readable name for **DDS\_DiscoveryQosPolicy** (p. 731).

### 7.113.1 Detailed Description

<<**extension**>> (p. 237) Specifies the attributes required to discover participants in the domain.

### 7.113.2 Variable Documentation

#### 7.113.2.1 DDS\_DISCOVERY\_QOS\_POLICY\_NAME

```
const char* const DDS_DISCOVERY_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DiscoveryQosPolicy** (p. 731).

## 7.114 DISCOVERY\_CONFIG

<<**extension**>> (p. 237) Specifies the discovery configuration QoS.

## Classes

- struct **DDS\_BuiltinTopicReaderResourceLimits\_t**

Built-in topic reader's resource limits.

- struct **DDS\_DiscoveryConfigQosPolicy**

Settings for discovery configuration.

## Macros

- **#define DDS\_DISCOVERYCONFIG\_BUILTIN\_PLUGIN\_MASK\_NONE**  
*No bits are set.*
- **#define DDS\_DISCOVERYCONFIG\_BUILTIN\_PLUGIN\_MASK\_DEFAULT**  
*The default value of `DDS_DiscoveryConfigQosPolicy::builtin_discovery_plugins` (p. 721).*
- **#define DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_NONE**  
*No bits are set, indicating that all channels that can be disabled, are disabled. Not all builtin channels can be disabled by the user. Only builtin channels represented by `DDS_DiscoveryConfigBuiltinChannelKind` (p. 394) are able to be enabled or disabled by the user.*
- **#define DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_DEFAULT** (( `DDS_DiscoveryConfigBuiltinChannelKindMask`) `DDS_DISCOVERYCONFIG_SERVICE_REQUEST_CHANNEL`)  
*The default value of `DDS_DiscoveryConfigQosPolicy::enabled_builtin_channels` (p. 721).*
- **#define DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_ALL**  
*All bits are set, indicating that all channels are enabled.*

## Typedefs

- **typedef DDS\_Long DDS\_DiscoveryConfigBuiltinPluginKindMask**  
*A bit-mask (list) of built-in discovery plugins.*
- **typedef DDS\_UnsignedLong DDS\_DiscoveryConfigBuiltinChannelKindMask**  
*A bit-mask (list) of built-in channels.*

## Enumerations

- **enum DDS\_DiscoveryConfigBuiltinPluginKind** {  
`DDS_DISCOVERYCONFIG_BUILTIN_SPDP` ,  
`DDS_DISCOVERYCONFIG_BUILTIN_SEDP` ,  
`DDS_DISCOVERYCONFIG_BUILTIN_SDP` ,  
`DDS_DISCOVERYCONFIG_BUILTIN_EDS = 0x0001 << 2` ,  
`DDS_DISCOVERYCONFIG_BUILTIN_DPSE` ,  
`DDS_DISCOVERYCONFIG_BUILTIN_SPDP2` ,  
`DDS_DISCOVERYCONFIG_BUILTIN_SDP2` }  
*Built-in discovery plugins that can be used.*
- **enum DDS\_DiscoveryConfigBuiltinChannelKind** { `DDS_DISCOVERYCONFIG_SERVICE_REQUEST_CHANNEL` }  
*Built-in channels that can be enabled.*
- **enum DDS\_RemoteParticipantPurgeKind** {  
`DDS_LIVELINESS_BASED_REMOTE_PARTICIPANT_PURGE` ,  
`DDS_NO_REMOTE_PARTICIPANT_PURGE` }  
*Available behaviors for halting communication with remote participants (and their contained entities) with which discovery communication has been lost.*

## Variables

- **const char \*const DDS\_DISCOVERYCONFIG\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for `DDS_DiscoveryConfigQosPolicy` (p. 712).*

## 7.114.1 Detailed Description

<<*extension*>> (p. 237) Specifies the discovery configuration QoS.

## 7.114.2 Macro Definition Documentation

### 7.114.2.1 DDS\_DISCOVERYCONFIG\_BUILTIN\_PLUGIN\_MASK\_NONE

```
#define DDS_DISCOVERYCONFIG_BUILTIN_PLUGIN_MASK_NONE
```

No bits are set.

See also

**DDS\_DiscoveryConfigBuiltinPluginKindMask** (p. 392)

### 7.114.2.2 DDS\_DISCOVERYCONFIG\_BUILTIN\_PLUGIN\_MASK\_DEFAULT

```
#define DDS_DISCOVERYCONFIG_BUILTIN_PLUGIN_MASK_DEFAULT
```

The default value of **DDS\_DiscoveryConfigQosPolicy::builtin\_discovery\_plugins** (p. 721).

See also

**DDS\_DiscoveryConfigBuiltinPluginKindMask** (p. 392)

### 7.114.2.3 DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_NONE

```
#define DDS_DISCOVERYCONFIG_BUILTIN_CHANNEL_MASK_NONE
```

No bits are set, indicating that all channels that can be disabled, are disabled. Not all builtin channels can be disabled by the user. Only builtin channels represented by **DDS\_DiscoveryConfigBuiltinChannelKind** (p. 394) are able to be enabled or disabled by the user.

See also

**DDS\_DiscoveryConfigBuiltinChannelKindMask** (p. 392)

#### 7.114.2.4 DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_DEFAULT

```
#define DDS_DISCOVERYCONFIG_BUILTIN_CHANNEL_MASK_DEFAULT (( DDS_DiscoveryConfigBuiltinChannelKindMask) DDS_DISCOVERYCONFIG_SERVICE_REQUEST_CHANNEL)
```

The default value of `DDS_DiscoveryConfigQosPolicy::enabled_builtin_channels` (p. 721).

See also

[DDS\\_DiscoveryConfigBuiltinChannelKindMask](#) (p. 392)

#### 7.114.2.5 DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_ALL

```
#define DDS_DISCOVERYCONFIG_BUILTIN_CHANNEL_MASK_ALL
```

All bits are set, indicating that all channels are enabled.

See also

[DDS\\_DiscoveryConfigBuiltinChannelKindMask](#) (p. 392)

### 7.114.3 Typedef Documentation

#### 7.114.3.1 DDS\_DiscoveryConfigBuiltinPluginKindMask

```
typedef DDS_Long DDS_DiscoveryConfigBuiltinPluginKindMask
```

A bit-mask (list) of built-in discovery plugins.

The bit-mask is an efficient and compact representation of a fixed-length list of `DDS_DiscoveryConfigBuiltinPluginKind` (p. 393) values.

QoS:

[DDS\\_DiscoveryConfigQosPolicy](#) (p. 712)

### 7.114.3.2 DDS\_DiscoveryConfigBuiltinChannelKindMask

```
typedef DDS_UnsignedLong DDS_DiscoveryConfigBuiltinChannelKindMask
```

A bit-mask (list) of built-in channels.

The bit-mask is an efficient and compact representation of a fixed-length list of **DDS\_DiscoveryConfigBuiltinChannelKind** (p. 394) values.

QoS:

**DDS\_DiscoveryConfigQosPolicy** (p. 712)

## 7.114.4 Enumeration Type Documentation

### 7.114.4.1 DDS\_DiscoveryConfigBuiltinPluginKind

```
enum DDS_DiscoveryConfigBuiltinPluginKind
```

Built-in discovery plugins that can be used.

See also

**DDS\_DiscoveryConfigBuiltinPluginKindMask** (p. 392)

Enumerator

DDS_DISCOVERYCONFIG_BUILTIN_SPDP	Simple Participant Discovery Protocol. Enables the first phase of the Simple Discovery Protocol (SDP), in which DomainParticipant's details are communicated to all other DomainParticipants in the same DDS domain by sending participant declaration messages, also known as participant DATA submessages or participant announcements.
DDS_DISCOVERYCONFIG_BUILTIN_SEDP	Simple Endpoint Discovery Protocol. Enables the second phase of the Simple Discovery Protocol (SDP), in which the information (GUID, QoS, etc.) about your application's DataReaders and DataWriters is exchanged by sending publication/subscription declarations in DATA messages, also known as publication DATAs and subscription DATAs.
DDS_DISCOVERYCONFIG_BUILTIN_SDP	<b>[default]</b> Simple discovery plugin. It is equivalent to SPDP + SEDP.

## Enumerator

DDS_DISCOVERYCONFIG_BUILTIN_DPSE	Dynamic Participant discovery, Static Endpoint discovery. Enables static endpoint discovery for a DomainParticipant. In this type of discovery, information from remote endpoints is extracted from a local DDS-XML file instead of being received over the network, reducing the number of exchanged packets and consequently reducing bandwidth consumption used for discovery. Using this value in <b>DDS_DiscoveryConfigBuiltinPluginKindMask</b> (p. 392) requires the 'librtlibedisc' library (included in the RTI Connex Professional bundles) to be reachable (PATH, LD_LIBRARY_PATH or DYLD_LIBRARY_PATH).
DDS_DISCOVERYCONFIG_BUILTIN_SPDP2	Simple Participant Discovery Protocol 2.0 (SPDP2) Enables the Simple Participant Discovery Protocol 2.0, in which a DomainParticipant's details are communicated to all other DomainParticipants in the same DDS domain by sending participant bootstrap messages. These bootstrap messages contain only a subset of the information in the Simple Participant Discovery Protocol (SPDP) participant announcements that is required to match two participants and bootstrap the system. The DomainParticipant's full configuration is then sent reliably with participant configuration announcements. Two DomainParticipants that use SPDP2 will maintain liveliness using liveliness participant messages.
DDS_DISCOVERYCONFIG_BUILTIN_SDP2	Simple discovery plugin 2.0. It is equivalent to SPDP2 + SEDP.

## 7.114.4.2 DDS\_DiscoveryConfigBuiltinChannelKind

enum **DDS\_DiscoveryConfigBuiltinChannelKind**

Built-in channels that can be enabled.

See also

**DDS\_DiscoveryConfigBuiltinChannelKindMask** (p. 392)

## Enumerator

DDS_DISCOVERYCONFIG_SERVICE_REQUEST_CHANNEL	<b>[default]</b> Built-in ServiceRequest channel. Enables the ServiceRequest channel, which is required by the TopicQuery and locator reachability features. Disabling the ServiceRequest channel reduces resource consumption including network bandwidth, CPU utilization, and memory.
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### 7.114.4.3 DDS\_RemoteParticipantPurgeKind

enum **DDS\_RemoteParticipantPurgeKind**

Available behaviors for halting communication with remote participants (and their contained entities) with which discovery communication has been lost.

When discovery communication with a remote participant has been lost, the local participant must make a decision about whether to continue attempting to communicate with that participant and its contained entities. This "kind" is used to select the desired behavior.

This "kind" does not pertain to the situation in which a remote participant has been gracefully deleted and notification of that deletion have been successfully received by its peers. In that case, the local participant will immediately stop attempting to communicate with those entities and will remove the associated remote entity records from its internal database.

See also

**DDS\_DiscoveryConfigQosPolicy::remote\_participant\_purge\_kind** (p. 715)

Enumerator

<p>DDS_LIVELINESS_BASED_REMOTE_↔ PARTICIPANT_PURGE</p>	<p><b>[default]</b> Maintain knowledge of the remote participant for as long as it maintains its liveliness contract. A participant will continue attempting communication with its peers, even if discovery communication with them is lost, as long as the remote participants maintain their liveliness. If both discovery communication and participant liveliness are lost, however, the local participant will remove all records of the remote participant and its contained endpoints, and no further data communication with them will occur until and unless they are rediscovered.</p> <p>The liveliness contract a participant promises to its peers – its "liveliness lease duration" – is specified in its <b>DDS_DiscoveryConfigQosPolicy::participant_↔ liveliness_lease_duration</b> (p. 714) QoS field. It maintains that contract by writing data to those other participants with a writer that has a <b>DDS_LivelinessQosPolicyKind</b> (p. 409) of <b>DDS_AUTOMATIC_LIVELINESS_QOS</b> (p. 410) or <b>DDS_MANUAL_BY_PARTICIPANT_LIVELINESS_↔ QOS</b> (p. 410) and by asserting itself (at the <b>DDS_DiscoveryConfigQosPolicy::participant_↔ liveliness_assert_period</b> (p. 715)) over the Simple Discovery Protocol.</p>
--	---

## Enumerator

DDS_NO_REMOTE_PARTICIPANT_PURGE	<p>Never "forget" a remote participant with which discovery communication has been lost. If a participant with this behavior loses discovery communication with a remote participant, it will nevertheless remember that remote participant and its endpoints and continue attempting to communicate with them indefinitely.</p> <p>This value has consequences for a participant's resource usage. If discovery communication with a remote participant is lost, but the same participant is later rediscovered, any relevant records that remain in the database will be reused. However, if it is not rediscovered, the records will continue to take up space in the database for as long as the local participant remains in existence.</p>
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## 7.114.5 Variable Documentation

### 7.114.5.1 DDS\_DISCOVERYCONFIG\_QOS\_POLICY\_NAME

```
const char* const DDS_DISCOVERYCONFIG_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DiscoveryConfigQosPolicy** (p. 712).

## 7.115 DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS

<<*extension*>> (p. 237) Various settings that configure how a **DDSDomainParticipant** (p. 1351) allocates and uses physical memory for internal resources, including the maximum sizes of various properties.

### Classes

- struct **DDS\_AllocationSettings\_t**  
*Resource allocation settings.*
- struct **DDS\_DomainParticipantResourceLimitsQosPolicy**  
*Various settings that configure how a **DDSDomainParticipant** (p. 1351) allocates and uses physical memory for internal resources, including the maximum sizes of various properties.*

### Enumerations

- enum **DDS\_DomainParticipantResourceLimitsIgnoredEntityReplacementKind** {  
**DDS\_NO\_REPLACEMENT\_IGNORED\_ENTITY\_REPLACEMENT** ,  
**DDS\_NOT\_ALIVE\_FIRST\_IGNORED\_ENTITY\_REPLACEMENT** }  
*Available replacement policies for the ignored entities.*

## Variables

- const **DDS\_Long DDS\_AUTO\_COUNT**  
*A special value indicating a quantity that is derived from another QoS value.*
- const char \*const **DDS\_DOMAINPARTICIPANTRESOURCELIMITS\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_DomainParticipantResourceLimitsQosPolicy** (p. 746).*

### 7.115.1 Detailed Description

<<*extension*>> (p. 237) Various settings that configure how a **DDSDomainParticipant** (p. 1351) allocates and uses physical memory for internal resources, including the maximum sizes of various properties.

### 7.115.2 Enumeration Type Documentation

#### 7.115.2.1 DDS\_DomainParticipantResourceLimitsIgnoredEntityReplacementKind

```
enum DDS_DomainParticipantResourceLimitsIgnoredEntityReplacementKind
```

Available replacement policies for the ignored entities.

QoS:

**DDS\_DomainParticipantResourceLimitsQosPolicy** (p. 746)

Enumerator

DDS_NO_REPLACEMENT_IGNORED_ENTITY_↔ REPLACEMENT	Default value for ignored_entity_replacement_kind, no replacement is done, the ignore will fail if the ignored_entity table is full.
DDS_NOT_ALIVE_FIRST_IGNORED_ENTITY_↔ REPLACEMENT	If the ignored_entity table is full and if there is at least one ignored participant in the table, the participant record that has been not updated for the longest time will be replaced. Note that if the table is full and there are no participant records to replace, the ignore will fail.

### 7.115.3 Variable Documentation

### 7.115.3.1 DDS\_AUTO\_COUNT

```
const DDS_Long DDS_AUTO_COUNT [extern]
```

A special value indicating a quantity that is derived from another QoS value.

### 7.115.3.2 DDS\_DOMAINPARTICIPANTRESOURCELIMITS\_QOS\_POLICY\_NAME

```
const char* const DDS_DOMAINPARTICIPANTRESOURCELIMITS_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DomainParticipantResourceLimitsQosPolicy** (p. 746).

## 7.116 DURABILITY

This QoS policy specifies whether or not RTI Connext will store and deliver previously published data samples to new **DDSDataReader** (p. 1288) entities that join the network later.

### Classes

- struct **DDS\_PersistentStorageSettings**  
*Configures durable writer history and durable reader state.*
- struct **DDS\_DurabilityQosPolicy**  
*This QoS policy specifies whether or not RTI Connext will store and deliver previously published data samples to new **DDSDataReader** (p. 1288) entities that join the network later.*

### Enumerations

- enum **DDS\_PersistentJournalKind** {  
**DDS\_DELETE\_PERSISTENT\_JOURNAL** ,  
**DDS\_TRUNCATE\_PERSISTENT\_JOURNAL** ,  
**DDS\_PERSIST\_PERSISTENT\_JOURNAL** ,  
**DDS\_MEMORY\_PERSISTENT\_JOURNAL** ,  
**DDS\_WAL\_PERSISTENT\_JOURNAL** ,  
**DDS\_OFF\_PERSISTENT\_JOURNAL** }  
*Sets the journal mode of the persistent storage.*
- enum **DDS\_PersistentSynchronizationKind** {  
**DDS\_NORMAL\_PERSISTENT\_SYNCHRONIZATION** ,  
**DDS\_FULL\_PERSISTENT\_SYNCHRONIZATION** ,  
**DDS\_OFF\_PERSISTENT\_SYNCHRONIZATION** }  
*Determines the level of synchronization with the physical disk.*
- enum **DDS\_DurabilityQosPolicyKind** {  
**DDS\_VOLATILE\_DURABILITY\_QOS** ,  
**DDS\_TRANSIENT\_LOCAL\_DURABILITY\_QOS** ,  
**DDS\_TRANSIENT\_DURABILITY\_QOS** ,  
**DDS\_PERSISTENT\_DURABILITY\_QOS** }  
*Kinds of durability.*

## Variables

- const char \*const **DDS\_DURABILITY\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_DurabilityQosPolicy** (p. 767).*
- const **DDS\_Long DDS\_AUTO\_WRITER\_DEPTH**  
*A special value used as the default value for **DDS\_DurabilityQosPolicy::writer\_depth** (p. 770).*

### 7.116.1 Detailed Description

This QoS policy specifies whether or not RTI Connexx will store and deliver previously published data samples to new **DDSDataReader** (p. 1288) entities that join the network later.

### 7.116.2 Enumeration Type Documentation

#### 7.116.2.1 DDS\_PersistentJournalKind

enum **DDS\_PersistentJournalKind**

Sets the journal mode of the persistent storage.

The rollback journal is used in SQLite to store the state of the persistent storage before a transaction is committed.

QoS:

**DDS\_DurabilityQosPolicy** (p. 767)

Enumerator

DDS_DELETE_PERSISTENT_JOURNAL	Deletes the rollback journal at the conclusion of each transaction.
DDS_TRUNCATE_PERSISTENT_JOURNAL	Commits transactions by truncating the rollback journal to zero-length instead of deleting it.
DDS_PERSIST_PERSISTENT_JOURNAL	Prevents the rollback journal from being deleted at the end of each transaction. Instead, the header of the journal is overwritten with zeros.
DDS_MEMORY_PERSISTENT_JOURNAL	Stores the rollback journal in volatile RAM. This saves disk I/O.
DDS_WAL_PERSISTENT_JOURNAL	Uses a write-ahead log instead of a rollback journal to implement transactions.
DDS_OFF_PERSISTENT_JOURNAL	Completely disables the rollback journal. If the application crashes in the middle of a transaction when the OFF journaling mode is set, the persistent storage will very likely be corrupted.

### 7.116.2.2 DDS\_PersistentSynchronizationKind

enum `DDS_PersistentSynchronizationKind`

Determines the level of synchronization with the physical disk.

QoS:

**DDS\_DurabilityQosPolicy** (p. 767)

Enumerator

DDS_NORMAL_PERSISTENT_SYNCHRONIZATION	Data (e.g., new sample) is written to disk at critical moments.
DDS_FULL_PERSISTENT_SYNCHRONIZATION	Data (e.g., new sample) is written to physical disk immediately.
DDS_OFF_PERSISTENT_SYNCHRONIZATION	No synchronization is enforced. Data will be written to physical disk when the operating system flushes its buffers.

### 7.116.2.3 DDS\_DurabilityQosPolicyKind

enum `DDS_DurabilityQosPolicyKind`

Kinds of durability.

QoS:

**DDS\_DurabilityQosPolicy** (p. 767)

Enumerator

DDS_VOLATILE_DURABILITY_QOS	<p><b>[default]</b> RTI Connexx does not need to keep any samples of data instances on behalf of any <b>DDSDataReader</b> (p. 1288) that is unknown by the <b>DDSDataWriter</b> (p. 1321) at the time the instance is written. In other words, RTI Connexx will only attempt to provide the data to existing subscribers.</p> <p>This option does not require RTI Persistence Service.</p>
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## Enumerator

DDS_TRANSIENT_LOCAL_DURABILITY_QOS	<p>RTI Connex will attempt to keep some samples so that they can be delivered to any potential late-joining <b>DDSDataReader</b> (p. 1288). Which particular samples are kept depends on other QoS such as <b>DDS_HistoryQosPolicy</b> (p. 919) and <b>DDS_ResourceLimitsQosPolicy</b> (p. 1052). RTI Connex is only required to keep the data in memory of the <b>DDSDataWriter</b> (p. 1321) that wrote the data. Data is not required to survive the <b>DDSDataWriter</b> (p. 1321).</p> <p>For this setting to be effective, you must also set the <b>DDS_ReliabilityQosPolicy::kind</b> (p. 1043) to <b>DDS_RELIABLE_RELIABILITY_QOS</b> (p. 435). This option does not require RTI Persistence Service.</p>
DDS_TRANSIENT_DURABILITY_QOS	<p>RTI Connex will attempt to keep some samples so that they can be delivered to any potential late-joining <b>DDSDataReader</b> (p. 1288). Which particular samples are kept depends on other QoS such as <b>DDS_HistoryQosPolicy</b> (p. 919) and <b>DDS_ResourceLimitsQosPolicy</b> (p. 1052). RTI Connex is only required to keep the data in memory and not in permanent storage. Data is not tied to the lifecycle of the <b>DDSDataWriter</b> (p. 1321). Data will survive the <b>DDSDataWriter</b> (p. 1321).</p> <p>This option requires RTI Persistence Service.</p>
DDS_PERSISTENT_DURABILITY_QOS	<p>Data is kept on permanent storage, so that they can outlive a system session. This option requires RTI Persistence Service.</p>

### 7.116.3 Variable Documentation

#### 7.116.3.1 DDS\_DURABILITY\_QOS\_POLICY\_NAME

```
const char* const DDS_DURABILITY_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DurabilityQosPolicy** (p. 767).

#### 7.116.3.2 DDS\_AUTO\_WRITER\_DEPTH

```
const DDS_Long DDS_AUTO_WRITER_DEPTH [extern]
```

A special value used as the default value for **DDS\_DurabilityQosPolicy::writer\_depth** (p. 770).

This values resolves to the following:

- **DDS\_HistoryQosPolicy::depth** (p. 921) if the history kind is **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406).
- **DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance** (p. 1055) in the **DDS\_ResourceLimitsQosPolicy** (p. 1052) if the history kind is **DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406).

## 7.117 DURABILITY\_SERVICE

Various settings to configure the external *RTI Persistence Service* used by RTI Connex for DataWriters with a **DDS↔\_DurabilityQosPolicy** (p. 767) setting of **DDS\_PERSISTENT\_DURABILITY\_QOS** (p. 401) or **DDS\_TRANSIENT↔\_DURABILITY\_QOS** (p. 401).

### Classes

- struct **DDS\_DurabilityServiceQosPolicy**

*Various settings to configure the external RTI Persistence Service used by RTI Connex for DataWriters with a **DDS↔\_DurabilityQosPolicy** (p. 767) setting of **DDS\_PERSISTENT\_DURABILITY\_QOS** (p. 401) or **DDS\_TRANSIENT↔\_DURABILITY\_QOS** (p. 401).*

### Variables

- const char \*const **DDS\_DURABILITYSERVICE\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_DurabilityServiceQosPolicy** (p. 771).*

#### 7.117.1 Detailed Description

Various settings to configure the external *RTI Persistence Service* used by RTI Connex for DataWriters with a **DDS↔\_DurabilityQosPolicy** (p. 767) setting of **DDS\_PERSISTENT\_DURABILITY\_QOS** (p. 401) or **DDS\_TRANSIENT↔\_DURABILITY\_QOS** (p. 401).

#### 7.117.2 Variable Documentation

##### 7.117.2.1 DDS\_DURABILITYSERVICE\_QOS\_POLICY\_NAME

```
const char* const DDS_DURABILITYSERVICE_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_DurabilityServiceQosPolicy** (p. 771).

## 7.118 ENTITY\_FACTORY

A QoS policy for all **DDSEntity** (p. 1463) types that can act as factories for one or more other **DDSEntity** (p. 1463) types.

### Classes

- struct **DDS\_EntityFactoryQosPolicy**

*A QoS policy for all **DDSEntity** (p. 1463) types that can act as factories for one or more other **DDSEntity** (p. 1463) types.*



## Variables

- const char \*const **DDS\_ENTITYFACTORY\_QOS\_POLICY\_NAME**  
Stringified human-readable name for *DDS\_EntityFactoryQosPolicy* (p. 903).

### 7.118.1 Detailed Description

A QoS policy for all **DDSEntity** (p. 1463) types that can act as factories for one or more other **DDSEntity** (p. 1463) types.

### 7.118.2 Variable Documentation

#### 7.118.2.1 DDS\_ENTITYFACTORY\_QOS\_POLICY\_NAME

```
const char* const DDS_ENTITYFACTORY_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_EntityFactoryQosPolicy** (p. 903).

## 7.119 ENTITY\_NAME

<<*extension*>> (p. 237) Assigns a name to a **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592), **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288). Except for **DDSPublisher** (p. 1550) and **DDSSubscriber** (p. 1592), these names are visible during the discovery process and in RTI tools to help you visualize and debug your system.

## Classes

- struct **DDS\_EntityNameQosPolicy**  
*Assigns a name and a role name to a **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592), **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288). Except for **DDSPublisher** (p. 1550) and **DDSSubscriber** (p. 1592), these names will be visible during the discovery process and in RTI tools to help you visualize and debug your system.*

## Variables

- const char \*const **DDS\_ENTITYNAME\_QOS\_POLICY\_NAME**  
Stringified human-readable name for *DDS\_EntityNameQosPolicy* (p. 905).

### 7.119.1 Detailed Description

<<*extension*>> (p. 237) Assigns a name to a **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592), **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288). Except for **DDSPublisher** (p. 1550) and **DDSSubscriber** (p. 1592), these names are visible during the discovery process and in RTI tools to help you visualize and debug your system.

### 7.119.2 Variable Documentation

#### 7.119.2.1 DDS\_ENTITYNAME\_QOS\_POLICY\_NAME

```
const char* const DDS_ENTITYNAME_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_EntityNameQosPolicy** (p. 905).

## 7.120 EVENT

<<*extension*>> (p. 237) Configures the internal thread in a DomainParticipant that handles timed events.

### Classes

- struct **DDS\_EventQosPolicy**  
*Settings for event.*

### Variables

- const char \*const **DDS\_EVENT\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_EventQosPolicy** (p. 908).*

### 7.120.1 Detailed Description

<<*extension*>> (p. 237) Configures the internal thread in a DomainParticipant that handles timed events.

### 7.120.2 Variable Documentation

### 7.120.2.1 DDS\_EVENT\_QOS\_POLICY\_NAME

```
const char* const DDS_EVENT_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_EventQosPolicy** (p. 908).

## 7.121 HISTORY

Specifies the behavior of RTI Connex in the case where the value of an instance changes (one or more times) before it can be successfully communicated to one or more existing subscribers.

### Classes

- struct **DDS\_HistoryQosPolicy**

*Specifies the behavior of RTI Connex in the case where the value of a sample changes (one or more times) before it can be successfully communicated to one or more existing subscribers.*

### Enumerations

- enum **DDS\_HistoryQosPolicyKind** {  
    **DDS\_KEEP\_LAST\_HISTORY\_QOS** ,  
    **DDS\_KEEP\_ALL\_HISTORY\_QOS** }

*Kinds of history.*

### Variables

- const char \*const **DDS\_HISTORY\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_HistoryQosPolicy** (p. 919).*

### 7.121.1 Detailed Description

Specifies the behavior of RTI Connex in the case where the value of an instance changes (one or more times) before it can be successfully communicated to one or more existing subscribers.

### 7.121.2 Enumeration Type Documentation

#### 7.121.2.1 DDS\_HistoryQosPolicyKind

```
enum DDS_HistoryQosPolicyKind
```

Kinds of history.

QoS:

**DDS\_HistoryQosPolicy** (p. 919)

## Enumerator

DDS_KEEP_LAST_HISTORY_QOS	<p><b>[default]</b> Keep the last <code>depth</code> samples. On the publishing side, RTI Connexx will only attempt to keep the most recent <code>depth</code> samples of each instance of data (identified by its key) managed by the <b>DDSDataWriter</b> (p. 1321). Invalid samples representing a disposal or unregistration of an instance count towards the depth and may replace other DDS samples currently in the DataWriter queue for the same instance.</p> <p>On the subscribing side, the <b>DDSDataReader</b> (p. 1288) will only attempt to keep the most recent <code>depth</code> samples received for each instance (identified by its key) until the application takes them via the <b>DDSDataReader</b> (p. 1288) 's <b>take()</b> operation.</p> <p>Invalid samples representing a disposal or unregistration of an instance do not count towards the history depth and will not replace other DDS samples currently in the DataReader queue for the same instance.</p>
DDS_KEEP_ALL_HISTORY_QOS	<p>Keep <i>all</i> the samples. On the publishing side, RTI Connexx will attempt to keep all samples (representing each value written) of each instance of data (identified by its key) managed by the <b>DDSDataWriter</b> (p. 1321) until they can be delivered to all subscribers.</p> <p>On the subscribing side, RTI Connexx will attempt to keep all samples of each instance of data (identified by its key) managed by the <b>DDSDataReader</b> (p. 1288). These samples are kept until the application takes them from RTI Connexx via the <b>take()</b> operation.</p>

### 7.121.3 Variable Documentation

#### 7.121.3.1 DDS\_HISTORY\_QOS\_POLICY\_NAME

```
const char* const DDS_HISTORY_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_HistoryQosPolicy** (p. 919).

## 7.122 GROUP\_DATA

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

### Classes

- struct **DDS\_GroupDataQosPolicy**

*Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.*

## Variables

- const char \*const **DDS\_GROUPDATA\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_GroupDataQosPolicy** (p. 916).*

### 7.122.1 Detailed Description

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

### 7.122.2 Variable Documentation

#### 7.122.2.1 DDS\_GROUPDATA\_QOS\_POLICY\_NAME

```
const char* const DDS_GROUPDATA_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_GroupDataQosPolicy** (p. 916).

## 7.123 LATENCY\_BUDGET

Provides a hint as to the maximum acceptable delay from the time the data is written to the time it is received by the subscribing applications.

## Classes

- struct **DDS\_LatencyBudgetQosPolicy**  
*Provides a hint as to the maximum acceptable delay from the time the data is written to the time it is received by the subscribing applications.*

## Variables

- const char \*const **DDS\_LATENCYBUDGET\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_LatencyBudgetQosPolicy** (p. 929).*

### 7.123.1 Detailed Description

Provides a hint as to the maximum acceptable delay from the time the data is written to the time it is received by the subscribing applications.

## 7.123.2 Variable Documentation

### 7.123.2.1 DDS\_LATENCYBUDGET\_QOS\_POLICY\_NAME

```
const char* const DDS_LATENCYBUDGET_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_LatencyBudgetQosPolicy** (p. 929).

## 7.124 LIFESPAN

Specifies how long the data written by the **DDSDataWriter** (p. 1321) is considered valid.

### Classes

- struct **DDS\_LifespanQosPolicy**  
*Specifies how long the data written by the **DDSDataWriter** (p. 1321) is considered valid.*

### Variables

- const char \*const **DDS\_LIFESPAN\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_LifespanQosPolicy** (p. 931).*

## 7.124.1 Detailed Description

Specifies how long the data written by the **DDSDataWriter** (p. 1321) is considered valid.

## 7.124.2 Variable Documentation

### 7.124.2.1 DDS\_LIFESPAN\_QOS\_POLICY\_NAME

```
const char* const DDS_LIFESPAN_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_LifespanQosPolicy** (p. 931).

## 7.125 LIVELINESS

Specifies and configures the mechanism that allows **DDSDataReader** (p. 1288) entities to detect when **DDSDataWriter** (p. 1321) entities become disconnected or "dead."

### Classes

- struct **DDS\_LivelinessQosPolicy**

*Specifies and configures the mechanism that allows **DDSDataReader** (p. 1288) entities to detect when **DDSDataWriter** (p. 1321) entities become disconnected or "dead."*

### Enumerations

- enum **DDS\_LivelinessQosPolicyKind** {  
    **DDS\_AUTOMATIC\_LIVELINESS\_QOS** ,  
    **DDS\_MANUAL\_BY\_PARTICIPANT\_LIVELINESS\_QOS** ,  
    **DDS\_MANUAL\_BY\_TOPIC\_LIVELINESS\_QOS** }

*Kinds of liveliness.*

### Variables

- const char \*const **DDS\_LIVELINESS\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_LivelinessQosPolicy** (p. 936).*

### 7.125.1 Detailed Description

Specifies and configures the mechanism that allows **DDSDataReader** (p. 1288) entities to detect when **DDSDataWriter** (p. 1321) entities become disconnected or "dead."

### 7.125.2 Enumeration Type Documentation

#### 7.125.2.1 DDS\_LivelinessQosPolicyKind

```
enum DDS_LivelinessQosPolicyKind
```

*Kinds of liveliness.*

QoS:

**DDS\_LivelinessQosPolicy** (p. 936)

## Enumerator

DDS_AUTOMATIC_LIVELINESS_QOS	<b>[default]</b> The infrastructure will automatically signal liveliness for the <b>DDSDataWriter</b> (p. 1321) (s) at least as often as required by the <b>DDSDataWriter</b> (p. 1321) (S) <code>lease_duration</code> . A <b>DDSDataWriter</b> (p. 1321) with this setting does not need to take any specific action in order to be considered 'alive.' The <b>DDSDataWriter</b> (p. 1321) is only 'not alive' when the participant to which it belongs terminates (gracefully or not), or when there is a network problem that prevents the current participant from contacting that remote participant.
DDS_MANUAL_BY_PARTICIPANT_LIVELINESS_QOS	RTI Connext will assume that as long as at least one <b>DDSDataWriter</b> (p. 1321) belonging to the <b>DDSDomainParticipant</b> (p. 1351) (or the <b>DDSDomainParticipant</b> (p. 1351) itself) has asserted its liveliness, then the other DataWriters belonging to that same <b>DDSDomainParticipant</b> (p. 1351) are also alive. The user application takes responsibility to signal liveliness to RTI Connext either by calling <b>DDSDomainParticipant::assert_liveliness</b> (p. 1399), or by calling <b>DDSDataWriter::assert_liveliness</b> (p. 1329), or <b>FooDataWriter::write</b> (p. 1683) on any <b>DDSDataWriter</b> (p. 1321) belonging to the <b>DDSDomainParticipant</b> (p. 1351).
DDS_MANUAL_BY_TOPIC_LIVELINESS_QOS	RTI Connext will only assume liveliness of the <b>DDSDataWriter</b> (p. 1321) if the application has asserted liveliness of that <b>DDSDataWriter</b> (p. 1321) itself. The user application takes responsibility to signal liveliness to RTI Connext using the <b>DDSDataWriter::assert_liveliness</b> (p. 1329) method, or by writing some data.

### 7.125.3 Variable Documentation

#### 7.125.3.1 DDS\_LIVELINESS\_QOS\_POLICY\_NAME

```
const char* const DDS_LIVELINESS_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_LivelinessQosPolicy** (p. 936).

## 7.126 LOCATORFILTER

<<*extension*>> (p. 237) The QoS policy used to report the configuration of a MultiChannel DataWriter as part of **DDS\_PublicationBuiltinTopicData** (p. 1010).



## Classes

- struct **DDS\_LocatorFilter\_t**  
*Specifies the configuration of an individual channel within a MultiChannel DataWriter.*
- struct **DDS\_LocatorFilterSeq**  
*Declares IDL `sequence< DDS_LocatorFilter_t` (p. 940) >.*
- struct **DDS\_LocatorFilterQosPolicy**  
*The QoS policy used to report the configuration of a MultiChannel DataWriter as part of **DDS\_PublicationBuiltinTopicData** (p. 1010).*

## Variables

- const char \*const **DDS\_LOCATORFILTER\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_LocatorFilterQosPolicy** (p. 941).*

### 7.126.1 Detailed Description

<<*extension*>> (p. 237) The QoS policy used to report the configuration of a MultiChannel DataWriter as part of **DDS\_PublicationBuiltinTopicData** (p. 1010).

### 7.126.2 Variable Documentation

#### 7.126.2.1 DDS\_LOCATORFILTER\_QOS\_POLICY\_NAME

```
const char* const DDS_LOCATORFILTER_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_LocatorFilterQosPolicy** (p. 941).

## 7.127 LOGGING

<<*extension*>> (p. 237) Configures the RTI Connex logging facility.

## Classes

- struct **DDS\_LoggingQosPolicy**  
*Configures the RTI Connex logging facility.*

### 7.127.1 Detailed Description

<<*extension*>> (p. 237) Configures the RTI Connex logging facility.

## 7.128 MONITORING

Configures the use of RTI Monitoring Library 2.0 to collect and distribute RTI Connex telemetry data.

### Classes

- struct **DDS\_MonitoringDedicatedParticipantSettings**  
*Configures the use of a dedicated **DDSDomainParticipant** (p. 1351) to distribute the RTI Connex application telemetry data.*
- struct **DDS\_MonitoringEventDistributionSettings**  
*Configures the distribution of event metrics.*
- struct **DDS\_MonitoringPeriodicDistributionSettings**  
*Configures the distribution of periodic metrics.*
- struct **DDS\_MonitoringLoggingDistributionSettings**  
*Configures the distribution of log messages.*
- struct **DDS\_MonitoringDistributionSettings**  
*Configures the distribution of telemetry data.*
- struct **DDS\_MonitoringMetricSelection**  
*This data structure is used to configure event and periodic metrics collection and distribution for a specific set of observable resources.*
- struct **DDS\_MonitoringMetricSelectionSeq**  
*Declares IDL *sequence* < **DDS\_MonitoringMetricSelection** (p. 958) >*
- struct **DDS\_MonitoringLoggingForwardingSettings**  
*Configures the forwarding levels of log messages for the different **NDDS\_Config\_LogFacility** (p. 528).*
- struct **DDS\_MonitoringTelemetryData**  
*Configures the telemetry data that will be distributed.*
- struct **DDS\_MonitoringQosPolicy**  
*Configures the use of RTI Monitoring Library 2.0 to collect and distribute RTI Connex telemetry data.*

### Variables

- const char \*const **DDS\_MONITORING\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_MonitoringQosPolicy** (p. 962).*

### 7.128.1 Detailed Description

Configures the use of RTI Monitoring Library 2.0 to collect and distribute RTI Connex telemetry data.

## 7.128.2 Variable Documentation

### 7.128.2.1 DDS\_MONITORING\_QOS\_POLICY\_NAME

```
const char* const DDS_MONITORING_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_MonitoringQosPolicy** (p. 962).

## 7.129 MULTICHANNEL

<<**extension**>> (p. 237) Configures the ability of a DataWriter to send data on different multicast groups (addresses) based on the value of the data.

### Classes

- struct **DDS\_ChannelSettings\_t**  
*Type used to configure the properties of a channel.*
- struct **DDS\_ChannelSettingsSeq**  
*Declares IDL sequence< DDS\_ChannelSettings\_t (p. 610) >*
- struct **DDS\_MultiChannelQosPolicy**  
*Configures the ability of a DataWriter to send data on different multicast groups (addresses) based on the value of the data.*

### Variables

- const char \*const **DDS\_MULTICHANNEL\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_MultiChannelQosPolicy** (p. 964).*

### 7.129.1 Detailed Description

<<**extension**>> (p. 237) Configures the ability of a DataWriter to send data on different multicast groups (addresses) based on the value of the data.

### 7.129.2 Variable Documentation

### 7.129.2.1 DDS\_MULTICHANNEL\_QOS\_POLICY\_NAME

```
const char* const DDS_MULTICHANNEL_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_MultiChannelQosPolicy** (p. 964).

## 7.130 OWNERSHIP

Specifies whether it is allowed for multiple **DDSDataWriter** (p. 1321) (s) to write the same instance of the data and if so, how these modifications should be arbitrated.

### Classes

- struct **DDS\_OwnershipQosPolicy**

*Specifies whether it is allowed for multiple **DDSDataWriter** (p. 1321) (s) to write the same instance of the data and if so, how these modifications should be arbitrated.*

### Enumerations

- enum **DDS\_OwnershipQosPolicyKind** {  
**DDS\_SHARED\_OWNERSHIP\_QOS** ,  
**DDS\_EXCLUSIVE\_OWNERSHIP\_QOS** }

*Kinds of ownership.*

### Variables

- const char \*const **DDS\_OWNERSHIP\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_OwnershipQosPolicy** (p. 973).*

### 7.130.1 Detailed Description

Specifies whether it is allowed for multiple **DDSDataWriter** (p. 1321) (s) to write the same instance of the data and if so, how these modifications should be arbitrated.

### 7.130.2 Enumeration Type Documentation

#### 7.130.2.1 DDS\_OwnershipQosPolicyKind

```
enum DDS_OwnershipQosPolicyKind
```

Kinds of ownership.

QoS:

**DDS\_OwnershipQosPolicy** (p. 973)

## Enumerator

DDS_SHARED_OWNERSHIP_QOS	<b>[default]</b> Indicates shared ownership for each instance. Multiple writers are allowed to update the same instance and all the updates are made available to the readers. In other words there is no concept of an owner for the instances. This is the <b>default</b> behavior if the <b>OWNERSHIP</b> (p. 414) policy is not specified or supported.
DDS_EXCLUSIVE_OWNERSHIP_QOS	Indicates each instance can only be owned by one <b>DDSDataWriter</b> (p. 1321), but the owner of an instance can change dynamically. The selection of the owner is controlled by the setting of the <b>OWNERSHIP_STRENGTH</b> (p. 415) policy. The owner is always set to be the highest-strength <b>DDSDataWriter</b> (p. 1321) object among the ones currently active (as determined by the <b>LIVELINESS</b> (p. 409)).

### 7.130.3 Variable Documentation

#### 7.130.3.1 DDS\_OWNERSHIP\_QOS\_POLICY\_NAME

```
const char* const DDS_OWNERSHIP_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_OwnershipQosPolicy** (p. 973).

## 7.131 OWNERSHIP\_STRENGTH

Specifies the value of the strength used to arbitrate among multiple **DDSDataWriter** (p. 1321) objects that attempt to modify the same instance of a data type (identified by **DDSTopic** (p. 1617) + key).

### Classes

- struct **DDS\_OwnershipStrengthQosPolicy**

*Specifies the value of the strength used to arbitrate among multiple **DDSDataWriter** (p. 1321) objects that attempt to modify the same instance of a data type (identified by **DDSTopic** (p. 1617) + key).*

### Variables

- const char \*const **DDS\_OWNERSHIPSTRENGTH\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_OwnershipStrengthQosPolicy** (p. 978).*

### 7.131.1 Detailed Description

Specifies the value of the strength used to arbitrate among multiple **DDSDataWriter** (p. 1321) objects that attempt to modify the same instance of a data type (identified by **DDSTopic** (p. 1617) + key).

### 7.131.2 Variable Documentation

#### 7.131.2.1 DDS\_OWNERSHIPSTRENGTH\_QOS\_POLICY\_NAME

```
const char* const DDS_OWNERSHIPSTRENGTH_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_OwnershipStrengthQosPolicy** (p. 978).

## 7.132 PARTITION

Set of strings that introduces logical partitions in **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), or **DDSSubscriber** (p. 1592) entities.

### Classes

- struct **DDS\_PartitionQosPolicy**

*Set of strings that introduces logical partitions in **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), or **DDSSubscriber** (p. 1592) entities.*

### Variables

- const char \*const **DDS\_PARTITION\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_PartitionQosPolicy** (p. 989).*

### 7.132.1 Detailed Description

Set of strings that introduces logical partitions in **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), or **DDSSubscriber** (p. 1592) entities.

### 7.132.2 Variable Documentation

### 7.132.2.1 DDS\_PARTITION\_QOS\_POLICY\_NAME

```
const char* const DDS_PARTITION_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_PartitionQosPolicy** (p. 989).

## 7.133 PRESENTATION

Specifies how the samples representing changes to data instances are presented to a subscribing application.

### Classes

- struct **DDS\_PresentationQosPolicy**

*Specifies how the samples representing changes to data instances are presented to a subscribing application.*

### Enumerations

- enum **DDS\_PresentationQosPolicyAccessScopeKind** {  
**DDS\_INSTANCE\_PRESENTATION\_QOS** ,  
**DDS\_TOPIC\_PRESENTATION\_QOS** ,  
**DDS\_GROUP\_PRESENTATION\_QOS** ,  
**DDS\_HIGHEST\_OFFERED\_PRESENTATION\_QOS** }

*Kinds of presentation "access scope".*

### Variables

- const char \*const **DDS\_PRESENTATION\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_PresentationQosPolicy** (p. 996).*

### 7.133.1 Detailed Description

Specifies how the samples representing changes to data instances are presented to a subscribing application.

### 7.133.2 Enumeration Type Documentation

#### 7.133.2.1 DDS\_PresentationQosPolicyAccessScopeKind

```
enum DDS_PresentationQosPolicyAccessScopeKind
```

Kinds of presentation "access scope".

Access scope determines the largest scope spanning the entities for which the order and coherency of changes can be preserved.

QoS:

**DDS\_PresentationQosPolicy** (p. 996)

## Enumerator

DDS_INSTANCE_PRESENTATION_QOS	<b>[default]</b> Scope spans only a single instance. Indicates that changes to one instance need not be coherent nor ordered with respect to changes to any other instance. In other words, order and coherent changes apply to each instance separately.
DDS_TOPIC_PRESENTATION_QOS	Scope spans all instances within the same <b>DDSDataWriter</b> (p. 1321), but not across instances in different <b>DDSDataWriter</b> (p. 1321) entities.
DDS_GROUP_PRESENTATION_QOS	Scope spans all instances belonging to <b>DDSDataWriter</b> (p. 1321) entities within the same <b>DDSPublisher</b> (p. 1550).
DDS_HIGHEST_OFFERED_PRESENTATION_QOS	This value only applies to a <b>DDSSubscriber</b> (p. 1592). The <b>DDSSubscriber</b> (p. 1592) will use the access scope specified by each remote <b>DDSPublisher</b> (p. 1550).

### 7.133.3 Variable Documentation

#### 7.133.3.1 DDS\_PRESENTATION\_QOS\_POLICY\_NAME

```
const char* const DDS_PRESENTATION_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_PresentationQosPolicy** (p. 996).

## 7.134 PROFILE

<<*extension*>> (p. 237) Configures the way that XML documents containing QoS profiles are loaded by RTI Connxt.

### Classes

- struct **DDS\_ProfileQosPolicy**

*Configures the way that XML documents containing QoS profiles are loaded by RTI Connxt.*

### Variables

- const char \*const **DDS\_PROFILE\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_ProfileQosPolicy** (p. 1004).*



### 7.134.1 Detailed Description

<<*extension*>> (p. 237) Configures the way that XML documents containing QoS profiles are loaded by RTI Connex.

### 7.134.2 Variable Documentation

#### 7.134.2.1 DDS\_PROFILE\_QOS\_POLICY\_NAME

```
const char* const DDS_PROFILE_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_ProfileQosPolicy** (p. 1004).

## 7.135 PROPERTY

<<*extension*>> (p. 237) Stores (name, value) pairs that can be used to configure certain parameters of RTI Connex that are not exposed through formal QoS policies. Can also be used to store and propagate application-specific name/value pairs that can be retrieved by user code during discovery.

### Classes

- struct **DDS\_Property\_t**  
*Properties are name/value pairs objects.*
- struct **DDS\_PropertySeq**  
*Declares IDL sequence < DDS\_Property\_t (p. 1006) >*
- struct **DDS\_PropertyQosPolicy**  
*Stores name/value(string) pairs that can be used to configure certain parameters of RTI Connex that are not exposed through formal QoS policies. Can also be used to store and propagate application-specific name/value pairs that can be retrieved by user code during discovery.*
- class **DDSPROPERTYQOSPOLICYHELPER**  
*Policy helpers that facilitate management of the properties in the input policy.*

### Typedefs

- typedef struct **DDS\_PropertyQosPolicy DDS\_PropertyQosPolicy**  
*Stores name/value(string) pairs that can be used to configure certain parameters of RTI Connex that are not exposed through formal QoS policies. Can also be used to store and propagate application-specific name/value pairs that can be retrieved by user code during discovery.*
- typedef enum **DDS\_PropertyQosPolicyMutability DDS\_PropertyQosPolicyMutability**  
*Determines if, and when, the value of a property can change.*

## Enumerations

- enum **DDS\_PropertyQosPolicyMutability** {  
**DDS\_PROPERTY\_QOS\_MUTABLE** ,  
**DDS\_PROPERTY\_QOS\_MUTABLE\_UNTIL\_ENABLE** ,  
**DDS\_PROPERTY\_QOS\_IMMUTABLE** }

*Determines if, and when, the value of a property can change.*

## Functions

- **DDS\_PropertyQosPolicyMutability** **DDS\_PropertyQosPolicyHelper\_get\_property\_mutability** (const char \*name, const struct **DDS\_PropertyQosPolicy** \*policy)  
*Returns the mutability type of a property.*
- static **DDS\_Long** **DDSPROPERTYQOSPolicyHelper::get\_number\_of\_properties** ( **DDS\_PropertyQosPolicy** &policy)  
*Gets the number of properties in the input policy.*
- static **DDS\_ReturnCode\_t** **DDSPROPERTYQOSPolicyHelper::assert\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name, const char \*value, **DDS\_Boolean** propagate)  
*Asserts the property identified by name in the input policy.*
- static **DDS\_ReturnCode\_t** **DDSPROPERTYQOSPolicyHelper::add\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name, const char \*value, **DDS\_Boolean** propagate)  
*Adds a new property to the input policy.*
- static **DDS\_ReturnCode\_t** **DDSPROPERTYQOSPolicyHelper::assert\_pointer\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name, const void \*pointer)  
*Asserts the property identified by name in the input policy. Used when the property to store is a pointer.*
- static **DDS\_ReturnCode\_t** **DDSPROPERTYQOSPolicyHelper::add\_pointer\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name, const void \*pointer)  
*Adds a new property to the input policy. Used when the property to store is a pointer.*
- static struct **DDS\_Property\_t**\* **DDSPROPERTYQOSPolicyHelper::lookup\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name)  
*Searches for a property in the input policy given its name.*
- static **DDS\_ReturnCode\_t** **DDSPROPERTYQOSPolicyHelper::remove\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name)  
*Removes a property from the input policy.*
- static **DDS\_ReturnCode\_t** **DDSPROPERTYQOSPolicyHelper::get\_properties** ( **DDS\_PropertyQosPolicy** &policy, struct **DDS\_PropertySeq** &properties, const char \*name\_prefix)  
*Retrieves a list of properties whose names match the input prefix.*

## Variables

- const char \*const **DDS\_PROPERTY\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_PropertyQosPolicy** (p. 1007).*

### 7.135.1 Detailed Description

<<**extension**>> (p. 237) Stores (name, value) pairs that can be used to configure certain parameters of RTI Connex that are not exposed through formal QoS policies. Can also be used to store and propagate application-specific name/value pairs that can be retrieved by user code during discovery.

RTI Connex will automatically set some system properties in the **DDS\_PropertyQosPolicy** (p. 1007) associated with a **DDS\_DomainParticipantQos** (p. 741). See **System Properties** (p. 196) for additional details.

## 7.135.2 Typedef Documentation

### 7.135.2.1 DDS\_PropertyQoSPolicy

```
typedef struct DDS_PropertyQoSPolicy DDS_PropertyQoSPolicy
```

Stores name/value(string) pairs that can be used to configure certain parameters of RTI Connex that are not exposed through formal QoS policies. Can also be used to store and propagate application-specific name/value pairs that can be retrieved by user code during discovery.

Entity:

**DDSDomainParticipant** (p. 1351) **DDSDataReader** (p. 1288) **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A;  
**Changeable** (p. 360) = **YES** (p. 360)

See also

**DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

## 7.135.3 Usage

The PROPERTY QoS policy can be used to associate a set of properties in the form of (name, value) pairs with a **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321), or **DDSDomainParticipant** (p. 1351). This is similar to the **DDS\_UserDataQoSPolicy** (p. 1237), except this policy uses (name, value) pairs, and you can select whether or not a particular pair should be propagated (included in the builtin topic).

You can find a complete list of predefined properties in the [Property Reference Guide](#).

This QoS policy may be used to configure:

- Durable Writer History, see **Configuring Durable Writer History** (p. 193)
- Durable Reader State, see **Configuring Durable Reader State** (p. 195)
- Builtin Transport Plugins, see **UDPv4 Transport Property Names in Property QoS Policy of Domain Participant** (p. 269), **UDPv6 Transport Property Names in Property QoS Policy of Domain Participant** (p. 285), and **Shared Memory Transport Property Names in Property QoS Policy of Domain Participant** (p. 263)
- Extension Transport Plugins, see **Loading Transport Plugins through Property QoS Policy of Domain Participant** (p. 173)
- **Clock Selection** (p. 38)

In addition, you may add your own name/value pairs to the Property QoS policy of an Entity. Via this QoS policy, you can direct RTI Connex to propagate these name/value pairs with the discovery information for the Entity. Applications that discover the Entity can then access the user-specific name/value pairs in the discovery information of the remote Entity. This allows you to add meta-information about an Entity for application-specific use, for example, authentication/authorization certificates (which can also be done using the **DDS\_UserDataQoSPolicy** (p. 1237) or **DDS\_Group↔DataQoSPolicy** (p. 916)).

### 7.135.3.1 Reasons for Using the PropertyQoSPolicy

- Supports dynamic loading of extension transports
- Supports multiple instances of the builtin transports
- Allows full pluggable transport configuration for non-C/C++ language bindings (Java, .NET, etc.)
- Avoids the process of creating entities disabled, changing their QoS settings, then enabling them
- Allows selection of clock

Some of the RTI Connexx capabilities configurable via the Property QoS policy can also be configured in code via APIs. However, the Property QoS policy allows you to configure those parameters via XML files. In addition, some of the configuration APIs will only work if the Entity was created in a disabled state and then enabled after the configuration change was applied. By configuring those parameters using the Property QoS policy during entity creation, you avoid the additional work of first creating a disabled entity and then enabling it afterwards.

There are helper functions to facilitate working with properties, see the **PROPERTY** (p. 419) page.

### 7.135.3.2 DDS\_PropertyQoSPolicyMutability

```
typedef enum DDS_PropertyQoSPolicyMutability DDS_PropertyQoSPolicyMutability
```

Determines if, and when, the value of a property can change.

## 7.135.4 Enumeration Type Documentation

### 7.135.4.1 DDS\_PropertyQoSPolicyMutability

```
enum DDS_PropertyQoSPolicyMutability
```

Determines if, and when, the value of a property can change.

#### Enumerator

DDS_PROPERTY_QOS_MUTABLE	The property is mutable: it can be changed at any time.
DDS_PROPERTY_QOS_MUTABLE_UNTIL_ENABLE	The property can only be changed before enabling the entity.
DDS_PROPERTY_QOS_IMMUTABLE	The property is immutable: it can only be specified when creating the entity.

## 7.135.5 Function Documentation

### 7.135.5.1 DDS\_PropertyQosPolicyHelper\_get\_property\_mutability()

```
DDS_PropertyQosPolicyMutability DDS_PropertyQosPolicyHelper_get_property_mutability (
    const char * name,
    const struct DDS_PropertyQosPolicy * policy )
```

Returns the mutability type of a property.

If the property does not exist, **DDS\_PROPERTY\_QOS\_MUTABLE** (p. 422) is returned. Otherwise, it returns the mutability type of the specified property. See **DDS\_PropertyQosPolicyMutability** (p. 422) for more information of the different mutability types.

#### Parameters

<i>name</i>	<< <i>in</i> >> (p. 238). The name of the property for which we want to know the mutability type.
<i>policy</i>	<< <i>in</i> >> (p. 238). These are the properties in which we are going to look for the property with the provided name.

#### Returns

The mutability type of the input property.

### 7.135.5.2 get\_number\_of\_properties()

```
static DDS_Long DDSPropertyQosPolicyHelper::get_number_of_properties (
    DDS_PropertyQosPolicy & policy ) [static]
```

Gets the number of properties in the input policy.

#### Precondition

policy cannot be NULL.

#### Parameters

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
---------------	--

**Returns**

Number of properties.

**7.135.5.3 assert\_property()**

```
static DDS_ReturnCode_t DDSPropertyQosPolicyHelper::assert_property (
    DDS_PropertyQosPolicy & policy,
    const char * name,
    const char * value,
    DDS_Boolean propagate ) [static]
```

Asserts the property identified by name in the input policy.

If the property already exists, this function replaces its current value with the new one.

If the property identified by name does not exist, this function adds it to the property set.

This function increases the maximum number of elements of the policy sequence when this number is not enough to store the new property.

**Precondition**

policy, name and value cannot be NULL.

**Parameters**

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
<i>name</i>	<< <i>in</i> >> (p. 238) Property name.
<i>value</i>	<< <i>in</i> >> (p. 238) Property value.
<i>propagate</i>	<< <i>in</i> >> (p. 238) Indicates if the property will be propagated on discovery.

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

**7.135.5.4 add\_property()**

```
static DDS_ReturnCode_t DDSPropertyQosPolicyHelper::add_property (
    DDS_PropertyQosPolicy & policy,
    const char * name,
```

```
const char * value,
    DDS_Boolean propagate ) [static]
```

Adds a new property to the input policy.

This function will allocate memory to store the (name, value) pair. The memory allocated is owned by RTI Connex.

If the maximum number of elements of the policy sequence is not enough to store the new property, this function will increase it.

If the property already exists the function fails with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

#### Precondition

policy, name and value cannot be NULL.

The property is not in the policy.

#### Parameters

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
<i>name</i>	<< <i>in</i> >> (p. 238) Property name.
<i>value</i>	<< <i>in</i> >> (p. 238) Property value.
<i>propagate</i>	<< <i>in</i> >> (p. 238) Indicates if the property will be propagated on discovery.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

#### 7.135.5.5 assert\_pointer\_property()

```
static DDS_ReturnCode_t DDSPropertyQosPolicyHelper::assert_pointer_property (
    DDS_PropertyQosPolicy & policy,
    const char * name,
    const void * pointer ) [static]
```

Asserts the property identified by name in the input policy. Used when the property to store is a pointer.

This is a function similar to **DDSPropertyQosPolicyHelper::assert\_property** (p. 424). However, instead of passing a stringified version of the pointer, this function receives a pointer as the value.

If the property already exists, this function replaces its current value with the new one.

If the property identified by name does not exist, this function adds it to the property set.

This function increases the maximum number of elements of the policy sequence when this number is not enough to store the new property.

The properties asserted by this function will not be propagated on discovery.

**Precondition**

policy and name cannot be NULL.

**Parameters**

<i>policy</i>	<< <b><i>in</i></b> >> (p. 238) Input policy.
<i>name</i>	<< <b><i>in</i></b> >> (p. 238) Property name.
<i>pointer</i>	<< <b><i>in</i></b> >> (p. 238) The pointer to store in the property.

**Returns**

One of the **Standard Return Codes** (p. 336) or **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

**7.135.5.6 add\_pointer\_property()**

```
static DDS_ReturnCode_t DDSPropertyQosPolicyHelper::add_pointer_property (
    DDS_PropertyQosPolicy & policy,
    const char * name,
    const void * pointer ) [static]
```

Adds a new property to the input policy. Used when the property to store is a pointer.

This is a function similar to **DDSPropertyQosPolicyHelper::add\_property** (p. 424). However, instead of passing a stringified version of the pointer, this function receives a pointer as the value.

This function will allocate memory to store the (name, value) pair. The memory allocated is owned by RTI Connex.

If the maximum number of elements of the policy sequence is not enough to store the new property, this function will increase it.

If the property already exists the function fails with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

The properties added by this function will not be propagated on discovery.

**Precondition**

policy and name cannot be NULL.

The property is not in the policy.

**Parameters**

<i>policy</i>	<< <b><i>in</i></b> >> (p. 238) Input policy.
<i>name</i>	<< <b><i>in</i></b> >> (p. 238) Property name.
<i>pointer</i>	<< <b><i>in</i></b> >> (p. 238) The pointer to store in the property.



**Returns**

One of the **Standard Return Codes** (p. 336) or **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337) or **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336)

**7.135.5.7 lookup\_property()**

```
static struct DDS_Property_t * DDSPropertyQosPolicyHelper::lookup_property (
    DDS_PropertyQosPolicy & policy,
    const char * name ) [static]
```

Searches for a property in the input policy given its name.

**Precondition**

*policy*, *name* and *value* cannot be NULL.

**Parameters**

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
<i>name</i>	<< <i>in</i> >> (p. 238) Property name.

**Returns**

The function returns the first property with the given name. If such a property does not exist, the function returns NULL.

**7.135.5.8 remove\_property()**

```
static DDS_ReturnCode_t DDSPropertyQosPolicyHelper::remove_property (
    DDS_PropertyQosPolicy & policy,
    const char * name ) [static]
```

Removes a property from the input policy.

If the property does not exist, the function fails with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

**Precondition**

*policy* and *name* cannot be NULL.

The property is in the policy.

## Parameters

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
<i>name</i>	<< <i>in</i> >> (p. 238) Property name.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
------------	--

7.135.5.9 `get_properties()`

```
static DDS_ReturnCode_t DDSPropertyQosPolicyHelper::get_properties (
    DDS_PropertyQosPolicy & policy,
    struct DDS_PropertySeq & properties,
    const char * name_prefix ) [static]
```

Retrieves a list of properties whose names match the input prefix.

If the properties sequence doesn't own its buffer, and its maximum is less than the total number of properties matching the input prefix, it will be filled up to its maximum and fail with an error of **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

## Precondition

`policy`, `properties` and `name_prefix` cannot be NULL.

## Parameters

<i>policy</i>	<< <i>in</i> >> (p. 238) Input policy.
<i>properties</i>	<< <i>inout</i> >> (p. 238) A <b>DDS_PropertySeq</b> (p. 1009) object where the set or list of properties will be returned.
<i>name_prefix</i>	Name prefix.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
------------	--

## 7.135.6 Variable Documentation

### 7.135.6.1 DDS\_PROPERTY\_QOS\_POLICY\_NAME

```
const char* const DDS_PROPERTY_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_PropertyQosPolicy** (p. 1007).

## 7.136 PUBLISH\_MODE

<<**extension**>> (p. 237) Specifies how RTI Connex sends application data on the network. This QoS policy can be used to tell RTI Connex to use its *own* thread to send data, instead of the user thread.

### Classes

- struct **DDS\_PublishModeQosPolicy**

*Specifies how RTI Connex sends application data on the network. This QoS policy can be used to tell RTI Connex to use its own thread to send data, instead of the user thread.*

### Macros

- #define **DDS\_PUBLICATION\_PRIORITY\_UNDEFINED**

*Initializer value for **DDS\_PublishModeQosPolicy::priority** (p. 1028) and/or **DDS\_ChannelSettings\_t::priority** (p. 611).*

- #define **DDS\_PUBLICATION\_PRIORITY\_AUTOMATIC**

*Constant value for **DDS\_PublishModeQosPolicy::priority** (p. 1028) and/or **DDS\_ChannelSettings\_t::priority** (p. 611).*

### Enumerations

- enum **DDS\_PublishModeQosPolicyKind** {  
**DDS\_SYNCHRONOUS\_PUBLISH\_MODE\_QOS** ,  
**DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** }

*Kinds of publishing mode.*

### Variables

- const char \*const **DDS\_PUBLISHMODE\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_PublishModeQosPolicy** (p. 1025).*

### 7.136.1 Detailed Description

<<**extension**>> (p. 237) Specifies how RTI Connex sends application data on the network. This QoS policy can be used to tell RTI Connex to use its *own* thread to send data, instead of the user thread.

## 7.136.2 Macro Definition Documentation

### 7.136.2.1 DDS\_PUBLICATION\_PRIORITY\_UNDEFINED

```
#define DDS_PUBLICATION_PRIORITY_UNDEFINED
```

Initializer value for **DDS\_PublishModeQosPolicy::priority** (p. 1028) and/or **DDS\_ChannelSettings\_t::priority** (p. 611).

When assigned this value, the publication priority of the data writer, or channel of a multi-channel data writer, will be set to the lowest possible value. For multi-channel data writers, if either the data writer or channel priority is NOT set to this value, then the publication priority of the entity will be set to the defined value.

### 7.136.2.2 DDS\_PUBLICATION\_PRIORITY\_AUTOMATIC

```
#define DDS_PUBLICATION_PRIORITY_AUTOMATIC
```

Constant value for **DDS\_PublishModeQosPolicy::priority** (p. 1028) and/or **DDS\_ChannelSettings\_t::priority** (p. 611).

When assigned this value, the publication priority of the data writer, or channel of a multi-channel data writer, will be set to the largest priority value of any sample currently queued for publication by the data writer or data writer channel.

## 7.136.3 Enumeration Type Documentation

### 7.136.3.1 DDS\_PublishModeQosPolicyKind

```
enum DDS_PublishModeQosPolicyKind
```

Kinds of publishing mode.

QoS:

**DDS\_PublishModeQosPolicy** (p. 1025)

## Enumerator

DDS_SYNCHRONOUS_PUBLISH_MODE_QOS	<p>Indicates to send data synchronously. If <b>DDS_DataWriterProtocolQosPolicy::push_on_write</b> (p. 675) is <b>DDS_BOOLEAN_TRUE</b> (p. 317), data is sent immediately in the context of <b>FooDataWriter::write</b> (p. 1683).</p> <p>As data is sent immediately in the context of the user thread, no flow control is applied.</p> <p>See also</p> <p><b>DDS_DataWriterProtocolQosPolicy::push_on_write</b> (p. 675)</p> <p><b>[default]</b> for <b>DDSDataWriter</b> (p. 1321)</p>
DDS_ASYNCHRONOUS_PUBLISH_MODE_QOS	<p>Indicates to send data asynchronously. Configures the <b>DDSDataWriter</b> (p. 1321) to delegate the task of data transmission to a separate publishing thread. The <b>FooDataWriter::write</b> (p. 1683) call does not send the data, but instead schedules the data to be sent later by its associated <b>DDSPublisher</b> (p. 1550).</p> <p>Each <b>DDSPublisher</b> (p. 1550) uses its dedicated publishing thread (<b>DDS_PublisherQos::asynchronous_publisher</b> (p. 1025)) to send data for all its asynchronous DataWriters. For each asynchronous DataWriter, the associated <b>DDSFlowController</b> (p. 1468) determines when the publishing thread is allowed to send the data.</p> <p><b>DDSDataWriter::wait_for_asynchronous_publishing</b> (p. 1335) and <b>DDSPublisher::wait_for_asynchronous_publishing</b> (p. 1567) enable you to determine when the data has actually been sent.</p> <p>See also</p> <p><b>DDSFlowController</b> (p. 1468)</p> <p><b>DDS_HistoryQosPolicy</b> (p. 919)</p> <p><b>DDSDataWriter::wait_for_asynchronous_publishing</b> (p. 1335)</p> <p><b>DDSPublisher::wait_for_asynchronous_publishing</b> (p. 1567)</p> <p><b>NDDS_Transport_Property_t::gather_send_buffer_count_max</b> (p. 1779)</p>

## 7.136.4 Variable Documentation

### 7.136.4.1 DDS\_PUBLISHMODE\_QOS\_POLICY\_NAME

```
const char* const DDS_PUBLISHMODE_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_PublishModeQosPolicy** (p. 1025).

## 7.137 READER\_DATA\_LIFECYCLE

Controls how a DataReader manages the lifecycle of the data that it has received.

### Classes

- struct **DDS\_ReaderDataLifecycleQosPolicy**  
*Controls how a DataReader manages the lifecycle of the data that it has received.*

### Variables

- const char \*const **DDS\_READERDATALIFECYCLE\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_ReaderDataLifecycleQosPolicy** (p. 1035).*

### 7.137.1 Detailed Description

Controls how a DataReader manages the lifecycle of the data that it has received.

### 7.137.2 Variable Documentation

#### 7.137.2.1 DDS\_READERDATALIFECYCLE\_QOS\_POLICY\_NAME

```
const char* const DDS_READERDATALIFECYCLE_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_ReaderDataLifecycleQosPolicy** (p. 1035).

## 7.138 RECEIVER\_POOL

<<**extension**>> (p. 237) Configures threads used by RTI Connext to receive and process data from transports (for example, UDP sockets).

## Classes

- struct **DDS\_ReceiverPoolQosPolicy**

*Configures threads used by RTI Connex to receive and process data from transports (for example, UDP sockets).*

## Variables

- const char \*const **DDS\_RECEIVERPOOL\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_ReceiverPoolQosPolicy** (p. 1038).*
- const **DDS\_Long** **DDS\_LENGTH\_AUTO**  
*A special value indicating that the actual value will be automatically resolved.*

### 7.138.1 Detailed Description

<<**extension**>> (p. 237) Configures threads used by RTI Connex to receive and process data from transports (for example, UDP sockets).

### 7.138.2 Variable Documentation

#### 7.138.2.1 DDS\_RECEIVERPOOL\_QOS\_POLICY\_NAME

```
const char* const DDS_RECEIVERPOOL_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_ReceiverPoolQosPolicy** (p. 1038).

#### 7.138.2.2 DDS\_LENGTH\_AUTO

```
const DDS_Long DDS_LENGTH_AUTO [extern]
```

A special value indicating that the actual value will be automatically resolved.

## 7.139 RELIABILITY

Indicates the level of reliability offered/requested by RTI Connex.

## Classes

- struct **DDS\_ReliabilityQosPolicy**  
*Indicates the level of reliability offered/requested by RTI Connex.*

## Enumerations

- enum **DDS\_ReliabilityQosPolicyKind** {  
  **DDS\_BEST\_EFFORT\_RELIABILITY\_QOS** ,  
  **DDS\_RELIABLE\_RELIABILITY\_QOS** }
- Kinds of reliability.*
- enum **DDS\_ReliabilityQosPolicyAcknowledgmentModeKind** {  
  **DDS\_PROTOCOL\_ACKNOWLEDGMENT\_MODE** ,  
  **DDS\_APPLICATION\_AUTO\_ACKNOWLEDGMENT\_MODE** ,  
  **DDS\_APPLICATION\_ORDERED\_ACKNOWLEDGMENT\_MODE** ,  
  **DDS\_APPLICATION\_EXPLICIT\_ACKNOWLEDGMENT\_MODE** }
- <<*extension*>> (p. 237) *Kinds of acknowledgment.*
- enum **DDS\_InstanceStateConsistencyKind** {  
  **DDS\_NO\_RECOVER\_INSTANCE\_STATE\_CONSISTENCY** ,  
  **DDS\_RECOVER\_INSTANCE\_STATE\_CONSISTENCY** }
- <<*extension*>> (p. 237) *Whether instance state consistency is enabled.*

## Variables

- const char \*const **DDS\_RELIABILITY\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_ReliabilityQosPolicy** (p. 1041).*

### 7.139.1 Detailed Description

Indicates the level of reliability offered/requested by RTI Connex.

### 7.139.2 Enumeration Type Documentation

#### 7.139.2.1 DDS\_ReliabilityQosPolicyKind

```
enum DDS_ReliabilityQosPolicyKind
```

Kinds of reliability.

QoS:

**DDS\_ReliabilityQosPolicy** (p. 1041)



## Enumerator

DDS_BEST_EFFORT_RELIABILITY_QOS	<p>Indicates that it is acceptable to not retry propagation of any samples. Presumably new values for the samples are generated often enough that it is not necessary to re-send or acknowledge any samples.</p> <p><b>[default]</b> for <b>DDSDataReader</b> (p. 1288) and <b>DDSTopic</b> (p. 1617)</p>
DDS_RELIABLE_RELIABILITY_QOS	<p>Specifies RTI Connexx will attempt to deliver all samples in its history. Missed samples may be retried. In steady-state (no modifications communicated via the <b>DDSDataWriter</b> (p. 1321)), RTI Connexx guarantees that all samples in the <b>DDSDataWriter</b> (p. 1321) history will eventually be delivered to all the <b>DDSDataReader</b> (p. 1288) objects (subject to timeouts that indicate loss of communication with a particular <b>DDSSubscriber</b> (p. 1592)). Outside steady state, the <b>HISTORY</b> (p. 405) and <b>RESOURCE_LIMITS</b> (p. 437) policies will determine how samples become part of the history and whether samples can be discarded from it.</p> <p><b>[default]</b> for <b>DDSDataWriter</b> (p. 1321)</p>

## 7.139.2.2 DDS\_ReliabilityQosPolicyAcknowledgmentModeKind

```
enum DDS_ReliabilityQosPolicyAcknowledgmentModeKind
```

<<*extension*>> (p. 237) Kinds of acknowledgment.

QoS:

**DDS\_ReliabilityQosPolicy** (p. 1041)

## Enumerator

DDS_PROTOCOL_ACKNOWLEDGMENT_MODE	<p>Samples are acknowledged by RTPS protocol. Samples are acknowledged according to the Real-Time Publish-Subscribe (RTPS) interoperability protocol.</p>
DDS_APPLICATION_AUTO_ACKNOWLEDGMENT_↔ MODE	<p>Samples are acknowledged automatically after a subscribing application has accessed them. A sample received by a <b>FooDataReader</b> (p. 1649) is acknowledged after the subscribing application accesses it, either through calling <b>FooDataReader::take</b> (p. 1652) or <b>FooDataReader::read</b> (p. 1651) on the DDS sample. If the read or take operation loans the samples, the acknowledgment is done after <b>FooDataReader::return_loan</b> (p. 1672) is called. Otherwise, for read or take operations that make a copy, acknowledgment is done after the read or take operations are executed.</p>

## Enumerator

DDS_APPLICATION_EXPLICIT_↔ ACKNOWLEDGMENT_MODE	Samples are acknowledged after the subscribing application explicitly calls <code>acknowledge</code> on the samples. Samples received by a <b>DDSDataReader</b> (p. 1288) are explicitly acknowledged by the subscribing application, after it calls either <b>DDSDataReader::acknowledge_all</b> (p. 1297) or <b>DDSDataReader::acknowledge_sample</b> (p. 1296).
---	--

## 7.139.2.3 DDS\_InstanceStateConsistencyKind

enum **DDS\_InstanceStateConsistencyKind**

<<**extension**>> (p. 237) Whether instance state consistency is enabled.

QoS:

**DDS\_ReliabilityQoSPolicy** (p. 1041)

## Enumerator

DDS_NO_RECOVER_INSTANCE_STATE_↔ CONSISTENCY	Instance state is not restored on a DataReader after reconnecting with a DataWriter until the DataWriter sends a new sample. When DataReaders rediscover DataWriters, they will not request updated instance state data. DataWriters always provide instance state data alongside each sample update regardless of this setting.
DDS_RECOVER_INSTANCE_STATE_↔ CONSISTENCY	Instance state is restored on the DataReader after it reconnects with a DataWriter that has regained liveliness, even before the DataWriter sends a new sample. When DataReaders rediscover DataWriters, they will request updated instance state data. DataWriters will respond to requests for updated instance state data and publish updates on the ServiceRequest channel. DataWriters still provide instance state data alongside each sample update regardless of this setting.  The following limitation applies to using <code>RECOVER_INSTANCE_STATE_↔CONSISTENCY</code> : If the <b>DDS_DestinationOrderQoSPolicyKind</b> (p. 387) is set to <b>DDS_BY_SOURCE_TIMESTAMP_↔DESTINATIONORDER_QOS</b> (p. 387), <code>RECOVER_INSTANCE_STATE_↔CONSISTENCY</code> can only be used if scope is set to <code>idref_DestinationOrderQoSPolicyScopeKind_↔INSTANCE_SCOPE_DESTINATIONORDER_QOS</code> (the default).

### 7.139.3 Variable Documentation

#### 7.139.3.1 DDS\_RELIABILITY\_QOS\_POLICY\_NAME

```
const char* const DDS_RELIABILITY_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_ReliabilityQosPolicy** (p. 1041).

## 7.140 RESOURCE\_LIMITS

Controls the amount of physical memory allocated for DDS entities, if dynamic allocations are allowed, and how they occur. Also controls memory usage among different instance values for keyed topics.

### Classes

- struct **DDS\_ResourceLimitsQosPolicy**

*Controls the amount of physical memory allocated for DDS entities, if dynamic allocations are allowed, and how they occur. Also controls memory usage among different instance values for keyed topics.*

### Variables

- const char \*const **DDS\_RESOURCELIMITS\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_ResourceLimitsQosPolicy** (p. 1052).*
- const **DDS\_Long** **DDS\_LENGTH\_UNLIMITED**  
*A special value indicating an unlimited quantity.*

#### 7.140.1 Detailed Description

Controls the amount of physical memory allocated for DDS entities, if dynamic allocations are allowed, and how they occur. Also controls memory usage among different instance values for keyed topics.

#### 7.140.2 Variable Documentation

### 7.140.2.1 DDS\_RESOURCELIMITS\_QOS\_POLICY\_NAME

```
const char* const DDS_RESOURCELIMITS_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_ResourceLimitsQosPolicy** (p. 1052).

### 7.140.2.2 DDS\_LENGTH\_UNLIMITED

```
const DDS_Long DDS_LENGTH_UNLIMITED [extern]
```

A special value indicating an unlimited quantity.

#### Examples

**HelloWorld\_subscriber.cxx.**

Referenced by `connext::Requester< TReq, TRep >::read_replies()`, and `connext::Requester< TReq, TRep >::take_replies()`.

## 7.141 SERVICE

<<*extension*>> (p. 237) Service QoS policy is used to indicate what kind of service is associated with the DDS entity.

### Classes

- struct **DDS\_ServiceQosPolicy**  
*Service associated with a DDS entity.*

### Enumerations

- enum **DDS\_ServiceQosPolicyKind** {  
**DDS\_NO\_SERVICE\_QOS** ,  
**DDS\_PERSISTENCE\_SERVICE\_QOS** ,  
**DDS\_QUEUING\_SERVICE\_QOS** ,  
**DDS\_ROUTING\_SERVICE\_QOS** ,  
**DDS\_RECORDING\_SERVICE\_QOS** ,  
**DDS\_REPLAY\_SERVICE\_QOS** ,  
**DDS\_DATABASE\_INTEGRATION\_SERVICE\_QOS** ,  
**DDS\_WEB\_INTEGRATION\_SERVICE\_QOS** ,  
**DDS\_OBSERVABILITY\_COLLECTOR\_SERVICE\_QOS** }  
*Kinds of service.*

## Variables

- const char \*const **DDS\_SERVICE\_QOS\_POLICY\_NAME**  
Stringified human-readable name for *DDS\_ServiceQosPolicy* (p. 1096).

### 7.141.1 Detailed Description

<<*extension*>> (p. 237) Service QoS policy is used to indicate what kind of service is associated with the DDS entity.

### 7.141.2 Enumeration Type Documentation

#### 7.141.2.1 DDS\_ServiceQosPolicyKind

enum **DDS\_ServiceQosPolicyKind**

Kinds of service.

QoS:

**DDS\_ServiceQosPolicy** (p. 1096)

Enumerator

DDS_NO_SERVICE_QOS	There is no service associated with the entity.
DDS_PERSISTENCE_SERVICE_QOS	The entity is an entity created by RTI Persistence Service.
DDS_QUEUING_SERVICE_QOS	The entity is an entity created by RTI Queuing Service.
DDS_ROUTING_SERVICE_QOS	The entity is an entity created by RTI Routing Service.
DDS_RECORDING_SERVICE_QOS	The entity is an entity created by RTI Recording Service.
DDS_REPLAY_SERVICE_QOS	The entity is an entity created by RTI Replay Service.
DDS_DATABASE_INTEGRATION_SERVICE_QOS	The entity is an entity created by RTI Database Integration Service.
DDS_WEB_INTEGRATION_SERVICE_QOS	The entity is an entity created by RTI Web Integration Service.
DDS_OBSERVABILITY_COLLECTOR_SERVICE_QOS	The entity is an entity created by RTI Observability Collector Service.

### 7.141.3 Variable Documentation

### 7.141.3.1 DDS\_SERVICE\_QOS\_POLICY\_NAME

```
const char* const DDS_SERVICE_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_ServiceQosPolicy** (p. 1096).

## 7.142 SYSTEM\_RESOURCE\_LIMITS

<<*extension*>> (p. 237) Configures DomainParticipant-independent resources used by RTI Connex.

### Classes

- struct **DDS\_SystemResourceLimitsQosPolicy**  
 <<*extension*>> (p. 237) Configures **DDSDomainParticipant** (p. 1351)-independent resources used by RTI Connex. Mainly used to change the maximum number of **DDSDomainParticipant** (p. 1351) entities that can be created within a single process (address space).

### Variables

- const char \*const **DDS\_SYSTEMRESOURCELIMITS\_QOS\_POLICY\_NAME**  
 Stringified human-readable name for **DDS\_SystemResourceLimitsQosPolicy** (p. 1120).

### 7.142.1 Detailed Description

<<*extension*>> (p. 237) Configures DomainParticipant-independent resources used by RTI Connex.

### 7.142.2 Variable Documentation

#### 7.142.2.1 DDS\_SYSTEMRESOURCELIMITS\_QOS\_POLICY\_NAME

```
const char* const DDS_SYSTEMRESOURCELIMITS_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_SystemResourceLimitsQosPolicy** (p. 1120).

## 7.143 TIME\_BASED\_FILTER

Filter that allows a **DDSDataReader** (p. 1288) to specify that it is interested only in (potentially) a subset of the values of the data.

## Classes

- struct **DDS\_TimeBasedFilterQosPolicy**

*Filter that allows a **DDSDataReader** (p. 1288) to specify that it is interested only in (potentially) a subset of the values of the data.*

## Variables

- const char \*const **DDS\_TIMEBASEDFILTER\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_TimeBasedFilterQosPolicy** (p. 1126).*

### 7.143.1 Detailed Description

Filter that allows a **DDSDataReader** (p. 1288) to specify that it is interested only in (potentially) a subset of the values of the data.

### 7.143.2 Variable Documentation

#### 7.143.2.1 DDS\_TIMEBASEDFILTER\_QOS\_POLICY\_NAME

```
const char* const DDS_TIMEBASEDFILTER_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_TimeBasedFilterQosPolicy** (p. 1126).

## 7.144 TOPIC\_DATA

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

## Classes

- struct **DDS\_TopicDataQosPolicy**

*Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.*

## Variables

- const char \*const **DDS\_TOPICDATA\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_TopicDataQosPolicy** (p. 1133).*

### 7.144.1 Detailed Description

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

### 7.144.2 Variable Documentation

#### 7.144.2.1 DDS\_TOPICDATA\_QOS\_POLICY\_NAME

```
const char* const DDS_TOPICDATA_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_TopicDataQosPolicy** (p. 1133).

## 7.145 TOPIC\_QUERY\_DISPATCH

Configures the ability of a **DDSDataWriter** (p. 1321) to publish historical samples.

### Classes

- struct **DDS\_TopicQueryDispatchQosPolicy**  
*Configures the ability of a **DDSDataWriter** (p. 1321) to publish samples in response to a **DDSTopicQuery** (p. 1627).*

### Variables

- const char \*const **DDS\_TOPICQUERYDISPATCH\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_TopicQueryDispatchQosPolicy** (p. 1141).*

### 7.145.1 Detailed Description

Configures the ability of a **DDSDataWriter** (p. 1321) to publish historical samples.

### 7.145.2 Variable Documentation



## 7.145.2.1 DDS\_TOPICQUERYDISPATCH\_QOS\_POLICY\_NAME

```
const char* const DDS_TOPICQUERYDISPATCH_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_TopicQueryDispatchQosPolicy** (p. 1141).

## 7.146 TRANSPORT\_BUILTIN

<<*extension*>> (p. 237) Specifies which built-in transports are used.

## Classes

- struct **DDS\_TransportBuiltinQosPolicy**  
*Specifies which built-in transports are used.*

## Macros

- #define **DDS\_TRANSPORTBUILTIN\_MASK\_NONE**  
*None of the built-in transports will be registered automatically when the **DDSDomainParticipant** (p. 1351) is enabled.*
- #define **DDS\_TRANSPORTBUILTIN\_MASK\_DEFAULT**  
*The default value of **DDS\_TransportBuiltinQosPolicy::mask** (p. 1145).*
- #define **DDS\_TRANSPORTBUILTIN\_MASK\_ALL**  
*All the available built-in transports are registered automatically when the **DDSDomainParticipant** (p. 1351) is enabled.*

## Typedefs

- typedef **DDS\_Long DDS\_TransportBuiltinKindMask**  
*A mask of **DDS\_TransportBuiltinKind** (p. 445) bits.*

## Enumerations

- enum **DDS\_TransportBuiltinKind** {  
**DDS\_TRANSPORTBUILTIN\_UDPv4** ,  
**DDS\_TRANSPORTBUILTIN\_SHMEM** ,  
**DDS\_TRANSPORTBUILTIN\_INTRA** = 0x00000001 << 2 ,  
**DDS\_TRANSPORTBUILTIN\_UDPv6** ,  
**DDS\_TRANSPORTBUILTIN\_UDPv4\_WAN** }  
*Built-in transport kind.*

## Variables

- const char \*const **DDS\_TRANSPORTBUILTIN\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_TransportBuiltinQosPolicy** (p. 1144).*
- const char \*const **DDS\_TRANSPORTBUILTIN\_SHMEM\_ALIAS**  
*Alias name for the shared memory built-in transport: "builtin.shmem".*
- const char \*const **DDS\_TRANSPORTBUILTIN\_UDPv4\_ALIAS**  
*Alias name for the UDPv4 built-in transport: "builtin.udpv4".*
- const char \*const **DDS\_TRANSPORTBUILTIN\_UDPv4\_WAN\_ALIAS**  
*Alias name for the UDPv4 asymmetric built-in transport: "builtin.udpv4\_wan".*
- const char \*const **DDS\_TRANSPORTBUILTIN\_UDPv6\_ALIAS**  
*Alias name for the UDPv6 built-in transport: "builtin.udpv6".*

### 7.146.1 Detailed Description

<<**extension**>> (p. 237) Specifies which built-in transports are used.

See also

**Changing the automatically registered built-in transports** (p. 216)

### 7.146.2 Macro Definition Documentation

#### 7.146.2.1 DDS\_TRANSPORTBUILTIN\_MASK\_NONE

```
#define DDS_TRANSPORTBUILTIN_MASK_NONE
```

None of the built-in transports will be registered automatically when the **DDSDomainParticipant** (p. 1351) is enabled.

The user must explicitly register transports using **NDDSTransportSupport::register\_transport** (p. 1834).

See also

**DDS\_TransportBuiltinKindMask** (p. 445)

### 7.146.2.2 DDS\_TRANSPORTBUILTIN\_MASK\_DEFAULT

```
#define DDS_TRANSPORTBUILTIN_MASK_DEFAULT
```

The default value of `DDS_TransportBuiltinQosPolicy::mask` (p. 1145).

The set of builtin transport plugins that will be automatically registered with the participant by default. The user can register additional transports using `NDDSTransportSupport::register_transport` (p. 1834).

**[default]** [UDPv4|Shmem]

See also

`DDS_TransportBuiltinKindMask` (p. 445)

### 7.146.2.3 DDS\_TRANSPORTBUILTIN\_MASK\_ALL

```
#define DDS_TRANSPORTBUILTIN_MASK_ALL
```

All the available built-in transports are registered automatically when the `DDSDomainParticipant` (p. 1351) is enabled.

See also

`DDS_TransportBuiltinKindMask` (p. 445)

## 7.146.3 Typedef Documentation

### 7.146.3.1 DDS\_TransportBuiltinKindMask

```
typedef DDS_Long DDS_TransportBuiltinKindMask
```

A mask of `DDS_TransportBuiltinKind` (p. 445) bits.

QoS:

`DDS_TransportBuiltinQosPolicy` (p. 1144)

## 7.146.4 Enumeration Type Documentation

### 7.146.4.1 DDS\_TransportBuiltinKind

```
enum DDS_TransportBuiltinKind
```

Built-in transport kind.

See also

`DDS_TransportBuiltinKindMask` (p. 445)

## Enumerator

DDS_TRANSPORTBUILTIN_UDPv4	Built-in UDPv4 transport, :: <b>UDPv4 Transport</b> (p. 266).
DDS_TRANSPORTBUILTIN_SHMEM	Built-in shared memory transport, :: <b>Shared Memory Transport</b> (p. 260).
DDS_TRANSPORTBUILTIN_UDPv6	Built-in UDPv6 transport, :: <b>UDPv6 Transport</b> (p. 283).
DDS_TRANSPORTBUILTIN_UDPv4_WAN	Built-in UDPv4 asymmetric transport, :: <b>Real-Time WAN Transport</b> (p. 276).

## 7.146.5 Variable Documentation

### 7.146.5.1 DDS\_TRANSPORTBUILTIN\_QOS\_POLICY\_NAME

```
const char* const DDS_TRANSPORTBUILTIN_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_TransportBuiltinQosPolicy** (p. 1144).

### 7.146.5.2 DDS\_TRANSPORTBUILTIN\_SHMEM\_ALIAS

```
const char* const DDS_TRANSPORTBUILTIN_SHMEM_ALIAS [extern]
```

Alias name for the shared memory built-in transport: "builtin.shmem".

### 7.146.5.3 DDS\_TRANSPORTBUILTIN\_UDPv4\_ALIAS

```
const char* const DDS_TRANSPORTBUILTIN_UDPv4_ALIAS [extern]
```

Alias name for the UDPv4 built-in transport: "builtin.udpv4".

### 7.146.5.4 DDS\_TRANSPORTBUILTIN\_UDPv4\_WAN\_ALIAS

```
const char* const DDS_TRANSPORTBUILTIN_UDPv4_WAN_ALIAS [extern]
```

Alias name for the UDPv4 asymmetric built-in transport: "builtin.udpv4\_wan".

### 7.146.5.5 DDS\_TRANSPORTBUILTIN\_UDPv6\_ALIAS

```
const char* const DDS_TRANSPORTBUILTIN_UDPv6_ALIAS [extern]
```

Alias name for the UDPv6 built-in transport: "builtin.udpv6".

## 7.147 TRANSPORT\_MULTICAST

<<*extension*>> (p. 237) Specifies the multicast address on which a **DDSDataReader** (p. 1288) wants to receive its data. It can also specify a port number, as well as a subset of the available (at the **DDSDomainParticipant** (p. 1351) level) transports with which to receive the multicast data.

### Modules

- **Multicast Settings**  
*Multicast communication settings.*
- **Multicast Mapping**  
*Multicast communication mapping.*

### Classes

- struct **DDS\_TransportMulticastQosPolicy**  
*Specifies the multicast address on which a **DDSDataReader** (p. 1288) wants to receive its data. It can also specify a port number as well as a subset of the available (at the **DDSDomainParticipant** (p. 1351) level) transports with which to receive the multicast data.*

### Enumerations

- enum **DDS\_TransportMulticastQosPolicyKind** {  
**DDS\_AUTOMATIC\_TRANSPORT\_MULTICAST\_QOS** ,  
**DDS\_UNICAST\_ONLY\_TRANSPORT\_MULTICAST\_QOS** }  
*Transport Multicast Policy Kind.*

### Variables

- const char \*const **DDS\_TRANSPORTMULTICAST\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for **DDS\_TransportMulticastQosPolicy** (p. 1151).*

### 7.147.1 Detailed Description

<<*extension*>> (p. 237) Specifies the multicast address on which a **DDSDataReader** (p. 1288) wants to receive its data. It can also specify a port number, as well as a subset of the available (at the **DDSDomainParticipant** (p. 1351) level) transports with which to receive the multicast data.

## 7.147.2 Enumeration Type Documentation

### 7.147.2.1 DDS\_TransportMulticastQosPolicyKind

enum `DDS_TransportMulticastQosPolicyKind`

Transport Multicast Policy Kind.

See also

[DDS\\_TransportMulticastQosPolicy](#) (p. 1151)

Enumerator

DDS_AUTOMATIC_TRANSPORT_MULTICAST_QOS	Selects the multicast address automatically. NOTE: This setting is required when using the <a href="#">DDS_TransportMulticastMappingQosPolicy</a> (p. 1149).
DDS_UNICAST_ONLY_TRANSPORT_MULTICAST_↔ QOS	Selects a unicast-only mode.

## 7.147.3 Variable Documentation

### 7.147.3.1 DDS\_TRANSPORTMULTICAST\_QOS\_POLICY\_NAME

const char\* const `DDS_TRANSPORTMULTICAST_QOS_POLICY_NAME` [extern]

Stringified human-readable name for [DDS\\_TransportMulticastQosPolicy](#) (p. 1151).

## 7.148 TRANSPORT\_MULTICAST\_MAPPING

<<*extension*>> (p. 237) Specifies a list of topic expressions and addresses that can be used by an Entity with a specific topic name to receive data.

### Classes

- struct `DDS_TransportMulticastMappingQosPolicy`

*Specifies a list of topic\_expressions and multicast addresses that can be used by an Entity with a specific topic name to receive data.*

## Variables

- const char \*const **DDS\_TRANSPORTMULTICASTMAPPING\_QOS\_POLICY\_NAME**  
Stringified human-readable name for *DDS\_TransportMulticastMappingQosPolicy* (p. 1149).

### 7.148.1 Detailed Description

<<*extension*>> (p. 237) Specifies a list of topic expressions and addresses that can be used by an Entity with a specific topic name to receive data.

### 7.148.2 Variable Documentation

#### 7.148.2.1 DDS\_TRANSPORTMULTICASTMAPPING\_QOS\_POLICY\_NAME

```
const char* const DDS_TRANSPORTMULTICASTMAPPING_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for *DDS\_TransportMulticastMappingQosPolicy* (p. 1149).

## 7.149 TRANSPORT\_PRIORITY

This QoS policy allows the application to take advantage of transport that are capable of sending messages with different priorities.

## Classes

- struct **DDS\_TransportPriorityQosPolicy**  
*This QoS policy allows the application to take advantage of transports that are capable of sending messages with different priorities.*

## Variables

- const char \*const **DDS\_TRANSPORTPRIORITY\_QOS\_POLICY\_NAME**  
Stringified human-readable name for *DDS\_TransportPriorityQosPolicy* (p. 1155).

### 7.149.1 Detailed Description

This QoS policy allows the application to take advantage of transport that are capable of sending messages with different priorities.

## 7.149.2 Variable Documentation

### 7.149.2.1 DDS\_TRANSPORTPRIORITY\_QOS\_POLICY\_NAME

```
const char* const DDS_TRANSPORTPRIORITY_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_TransportPriorityQosPolicy** (p. 1155).

## 7.150 TRANSPORT\_SELECTION

<<*extension*>> (p. 237) Specifies the physical transports that a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288) may use to send or receive data.

### Classes

- struct **DDS\_TransportSelectionQosPolicy**

*Specifies the physical transports a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288) may use to send or receive data.*

### Variables

- const char \*const **DDS\_TRANSPORTSELECTION\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_TransportSelectionQosPolicy** (p. 1157).*

### 7.150.1 Detailed Description

<<*extension*>> (p. 237) Specifies the physical transports that a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288) may use to send or receive data.

### 7.150.2 Variable Documentation

#### 7.150.2.1 DDS\_TRANSPORTSELECTION\_QOS\_POLICY\_NAME

```
const char* const DDS_TRANSPORTSELECTION_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_TransportSelectionQosPolicy** (p. 1157).



## 7.151 TRANSPORT\_UNICAST

<<*extension*>> (p. 237) Specifies a subset of transports and a port number that can be used by an Entity to receive data.

### Modules

- **Unicast Settings**

*Unicast communication settings.*

### Classes

- struct **DDS\_TransportUnicastQosPolicy**

*Specifies a subset of transports and a port number that can be used by an Entity to receive data.*

### Variables

- const char \*const **DDS\_TRANSPORTUNICAST\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_TransportUnicastQosPolicy** (p. 1158).*

#### 7.151.1 Detailed Description

<<*extension*>> (p. 237) Specifies a subset of transports and a port number that can be used by an Entity to receive data.

#### 7.151.2 Variable Documentation

##### 7.151.2.1 DDS\_TRANSPORTUNICAST\_QOS\_POLICY\_NAME

```
const char* const DDS_TRANSPORTUNICAST_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_TransportUnicastQosPolicy** (p. 1158).

## 7.152 TYPE\_CONSISTENCY\_ENFORCEMENT

Defines the rules for determining whether the type used to publish a given topic is consistent with that used to subscribe to it.

## Classes

- struct **DDS\_TypeConsistencyEnforcementQosPolicy**

*Defines the rules for determining whether the type used to publish a given topic is consistent with that used to subscribe to it.*

## Enumerations

- enum **DDS\_TypeConsistencyKind** {  
    **DDS\_DISALLOW\_TYPE\_COERCION** ,  
    **DDS\_ALLOW\_TYPE\_COERCION** ,  
    **DDS\_AUTO\_TYPE\_COERCION** }

*Kinds of type consistency.*

## Variables

- const char \*const **DDS\_TYPE\_CONSISTENCY\_ENFORCEMENT\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_TypeConsistencyEnforcementQosPolicy** (p. 1228).*

### 7.152.1 Detailed Description

Defines the rules for determining whether the type used to publish a given topic is consistent with that used to subscribe to it.

### 7.152.2 Enumeration Type Documentation

#### 7.152.2.1 DDS\_TypeConsistencyKind

enum **DDS\_TypeConsistencyKind**

Kinds of type consistency.

QoS:

**DDS\_TypeConsistencyEnforcementQosPolicy** (p. 1228)

## Enumerator

DDS_DISALLOW_TYPE_COERCION	The DataWriter and the DataReader must support the same data type in order for them to communicate. This is the degree of type consistency enforcement required by the <a href="#">OMG DDS Specification</a> prior to the <a href="#">OMG Extensible and Dynamic Topic Types for DDS Specification</a> .
DDS_ALLOW_TYPE_COERCION	The DataWriter and the DataReader need not support the same data type in order for them to communicate as long as the DataReader's type is assignable from the DataWriter's type. For example, the following two extensible types will be assignable to each other since MyDerivedType contains all the members of MyBaseType (member_1) plus some additional elements (member_2). <pre>struct MyBaseType {     long member_1; };  struct MyDerivedType: MyBaseType {     long member_2; };</pre> <p>Even if MyDerivedType was not explicitly inheriting from MyBaseType the types would still be assignable. For example:</p> <pre>struct MyBaseType {     long member_1; };  struct MyDerivedType {     long member_1;     long member_2; };</pre> <p>For additional information on type assignability refer to the <a href="#">OMG Extensible and Dynamic Topic Types for DDS Specification</a>.</p>
DDS_AUTO_TYPE_COERCION	This AUTO value will be applied as <b>DDS_DISALLOW_TYPE_COERCION</b> (p. 453) when the data type is annotated with @transfer_mode(SHMEM_REF) and the @language_binding is PLAIN (default) while using C, Traditional C++, or Modern C++ APIs. In all other cases, this AUTO value will be applied as <b>DDS_ALLOW_TYPE_COERCION</b> (p. 453). <b>[default]</b>

### 7.152.3 Variable Documentation

#### 7.152.3.1 DDS\_TYPE\_CONSISTENCY\_ENFORCEMENT\_QOS\_POLICY\_NAME

```
const char* const DDS_TYPE_CONSISTENCY_ENFORCEMENT_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_TypeConsistencyEnforcementQosPolicy** (p. 1228).

## 7.153 TYPESUPPORT

<< **extension** >> (p. 237) Allows you to attach application-specific values to a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288), which are passed to the serialization or deserialization routine of the associated data type and choose whether to set padding bytes to zero during serialization.

## Classes

- struct **DDS\_TypeSupportQosPolicy**

Allows you to attach application-specific values to a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288), which are passed to the serialization or deserialization routine of the associated data type and choose whether to set padding bytes to zero during serialization.

## Enumerations

- enum **DDS\_CdrPaddingKind** {  
**DDS\_ZERO\_CDR\_PADDING** ,  
**DDS\_NOT\_SET\_CDR\_PADDING** ,  
**DDS\_AUTO\_CDR\_PADDING** }

The CDR padding kind determines whether or not the padding bytes will be set to zero during CDR serialization.

## Variables

- const char \*const **DDS\_TYPESUPPORT\_QOS\_POLICY\_NAME**

Stringified human-readable name for **DDS\_TypeSupportQosPolicy** (p. 1232).

### 7.153.1 Detailed Description

<< *extension* >> (p. 237) Allows you to attach application-specific values to a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288), which are passed to the serialization or deserialization routine of the associated data type and choose whether to set padding bytes to zero during serialization.

### 7.153.2 Enumeration Type Documentation

#### 7.153.2.1 DDS\_CdrPaddingKind

enum **DDS\_CdrPaddingKind**

The CDR padding kind determines whether or not the padding bytes will be set to zero during CDR serialization.

#### Enumerator

<b>DDS_ZERO_CDR_PADDING</b>	Padding bytes will be set to zeros during CDR serialization.
<b>DDS_NOT_SET_CDR_PADDING</b>	Padding bytes will not be set to any value during CDR serialization.
<b>DDS_AUTO_CDR_PADDING</b>	When set on a <b>DDSDomainParticipant</b> (p. 1351) the default behavior is <b>DDS_NOT_SET_CDR_PADDING</b> (p. 454). When set on a <b>DDSDataWriter</b> (p. 1321) or <b>DDSDataReader</b> (p. 1288) the behavior is to inherit the value from the <b>DDSDomainParticipant</b> (p. 1351).

### 7.153.3 Variable Documentation

#### 7.153.3.1 DDS\_TYPESUPPORT\_QOS\_POLICY\_NAME

```
const char* const DDS_TYPESUPPORT_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_TypeSupportQosPolicy** (p. 1232).

## 7.154 USER\_DATA

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

### Classes

- struct **DDS\_UserDataQosPolicy**

*Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.*

### Variables

- const char \*const **DDS\_USERDATA\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_UserDataQosPolicy** (p. 1237).*

### 7.154.1 Detailed Description

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

### 7.154.2 Variable Documentation

#### 7.154.2.1 DDS\_USERDATA\_QOS\_POLICY\_NAME

```
const char* const DDS_USERDATA_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_UserDataQosPolicy** (p. 1237).

## 7.155 WRITER\_DATA\_LIFECYCLE

Controls how a DataWriter handles the lifecycle of the instances (keys) that it is registered to manage.

### Classes

- struct **DDS\_WriterDataLifecycleQosPolicy**

*Controls how a **DDSDataWriter** (p. 1321) handles the lifecycle of the instances (keys) that it is registered to manage.*

### Variables

- const char \*const **DDS\_WRITERDATALIFECYCLE\_QOS\_POLICY\_NAME**

*Stringified human-readable name for **DDS\_WriterDataLifecycleQosPolicy** (p. 1256).*

### 7.155.1 Detailed Description

Controls how a DataWriter handles the lifecycle of the instances (keys) that it is registered to manage.

### 7.155.2 Variable Documentation

#### 7.155.2.1 DDS\_WRITERDATALIFECYCLE\_QOS\_POLICY\_NAME

```
const char* const DDS_WRITERDATALIFECYCLE_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_WriterDataLifecycleQosPolicy** (p. 1256).

## 7.156 WIRE\_PROTOCOL

<<*extension*>> (p. 237) Specifies the wire protocol related attributes for the **DDSDomainParticipant** (p. 1351).

### Classes

- struct **DDS\_RtpsWellKnownPorts\_t**

*RTPS well-known port mapping configuration.*

- struct **DDS\_WireProtocolQosPolicy**

*Specifies the wire-protocol-related attributes for the **DDSDomainParticipant** (p. 1351).*

## Macros

- #define **DDS\_RTPS\_RESERVED\_PORT\_MASK\_DEFAULT**  
*The default value of `DDS_WireProtocolQosPolicy::rtps_reserved_port_mask` (p. 1250).*
- #define **DDS\_RTPS\_RESERVED\_PORT\_MASK\_NONE**  
*No bits are set.*
- #define **DDS\_RTPS\_RESERVED\_PORT\_MASK\_ALL**  
*All bits are set.*

## Typedefs

- typedef **DDS\_Long DDS\_RtpsReservedPortKindMask**  
*A mask of `DDS_RtpsReservedPortKind` (p. 459) bits.*

## Enumerations

- enum **DDS\_RtpsReservedPortKind** {  
**DDS\_RTPS\_RESERVED\_PORT\_BUILTIN\_UNICAST** = 0x0001 << 0 ,  
**DDS\_RTPS\_RESERVED\_PORT\_BUILTIN\_MULTICAST** = 0x0001 << 1 ,  
**DDS\_RTPS\_RESERVED\_PORT\_USER\_UNICAST** = 0x0001 << 2 ,  
**DDS\_RTPS\_RESERVED\_PORT\_USER\_MULTICAST** = 0x0001 << 3 }  
*RTPS reserved port kind, used to identify the types of ports that can be reserved on domain participant enable.*
- enum **DDS\_WireProtocolQosPolicyAutoKind** {  
**DDS\_RTPS\_AUTO\_ID\_FROM\_IP** = 0 ,  
**DDS\_RTPS\_AUTO\_ID\_FROM\_MAC** = 1 ,  
**DDS\_RTPS\_AUTO\_ID\_FROM\_UUID** = 2 }  
*Mechanism to automatically calculate the GUID prefix.*

## Variables

- const struct **DDS\_RtpsWellKnownPorts\_t DDS\_RTI\_BACKWARDS\_COMPATIBLE\_RTPS\_WELL\_KNOWN\_PORTS**  
*Assign to use well-known port mappings which are compatible with previous versions of the RTI Connex middleware.*
- const struct **DDS\_RtpsWellKnownPorts\_t DDS\_INTEROPERABLE\_RTPS\_WELL\_KNOWN\_PORTS**  
*Assign to use well-known port mappings which are compliant with OMG's DDS Interoperability Wire Protocol.*
- const char \*const **DDS\_WIREPROTOCOL\_QOS\_POLICY\_NAME**  
*Stringified human-readable name for `DDS_WireProtocolQosPolicy` (p. 1244).*

### 7.156.1 Detailed Description

<<*extension*>> (p. 237) Specifies the wire protocol related attributes for the **DDSDomainParticipant** (p. 1351).

### 7.156.2 Macro Definition Documentation

### 7.156.2.1 DDS\_RTPS\_RESERVED\_PORT\_MASK\_DEFAULT

```
#define DDS_RTPS_RESERVED_PORT_MASK_DEFAULT
```

**Value:**

```
((DDS_RtpsReservedPortKindMask) DDS_RTPS_RESERVED_PORT_BUILTIN_UNICAST \
 | DDS_RTPS_RESERVED_PORT_BUILTIN_MULTICAST | DDS_RTPS_RESERVED_PORT_USER_UNICAST)
```

The default value of **DDS\_WireProtocolQosPolicy::rtps\_reserved\_port\_mask** (p. 1250).

Most of the ports that may be needed by DDS will be reserved by the transport when the participant is enabled. With this value set, failure to allocate a port that is computed based on the **DDS\_RtpsWellKnownPorts\_t** (p. 1076) will be detected at this time and the enable operation will fail.

This setting will avoid reserving the **usertraffic** multicast port, which is not actually used unless there are DataReaders that enable multicast but fail to specify a port.

Automatic participant ID selection will be based on finding a participant index with both the discovery (metatraffic) unicast port and usertraffic unicast port available.

**See also**

**DDS\_RtpsReservedPortKindMask** (p. 459)

### 7.156.2.2 DDS\_RTPS\_RESERVED\_PORT\_MASK\_NONE

```
#define DDS_RTPS_RESERVED_PORT_MASK_NONE
```

No bits are set.

None of the ports that are needed by DDS will be allocated until they are specifically required. With this value set, automatic participant Id selection will be based on selecting a port for discovery (metatraffic) unicast traffic on a single transport.

**See also**

**DDS\_RtpsReservedPortKindMask** (p. 459)



### 7.156.2.3 DDS\_RTPS\_RESERVED\_PORT\_MASK\_ALL

```
#define DDS_RTPS_RESERVED_PORT_MASK_ALL
```

All bits are set.

All of the ports that may be needed by DDS will be reserved when the participant is enabled. With this value set, failure to allocate a port that is computed based on the **DDS\_RtpsWellKnownPorts\_t** (p. 1076) will be detected at this time, and the enable operation will fail.

Note that this will also reserve the **usertraffic** multicast port which is not actually used unless there are DataReaders that enable multicast but fail to specify a port. To avoid unnecessary resource usage for these ports, use **RTPS\_RESERVED\_PORT\_MASK\_DEFAULT**.

Automatic participant ID selection will be based on finding a participant index with both the discovery (metatraffic) unicast port and usertraffic unicast port available.

See also

**DDS\_RtpsReservedPortKindMask** (p. 459)

## 7.156.3 Typedef Documentation

### 7.156.3.1 DDS\_RtpsReservedPortKindMask

```
typedef DDS_Long DDS_RtpsReservedPortKindMask
```

A mask of **DDS\_RtpsReservedPortKind** (p. 459) bits.

QoS:

**DDS\_WireProtocolQosPolicy** (p. 1244)

## 7.156.4 Enumeration Type Documentation

### 7.156.4.1 DDS\_RtpsReservedPortKind

```
enum DDS_RtpsReservedPortKind
```

RTPS reserved port kind, used to identify the types of ports that can be reserved on domain participant enable.

See also

**DDS\_WireProtocolQosPolicy::rtps\_reserved\_port\_mask** (p. 1250)

## Enumerator

DDS_RTPS_RESERVED_PORT_BUILTIN_UNICAST	Select the <b>metatraffic</b> unicast port.
DDS_RTPS_RESERVED_PORT_BUILTIN_MULTICAST	Select the <b>metatraffic</b> multicast port.
DDS_RTPS_RESERVED_PORT_USER_UNICAST	Select the <b>usertraffic</b> unicast port.
DDS_RTPS_RESERVED_PORT_USER_MULTICAST	Select the <b>usertraffic</b> multicast port.

## 7.156.4.2 DDS\_WireProtocolQosPolicyAutoKind

```
enum DDS_WireProtocolQosPolicyAutoKind
```

Mechanism to automatically calculate the GUID prefix.

## See also

**DDS\_WireProtocolQosPolicy::rtps\_auto\_id\_kind** (p. 1250)

## Enumerator

DDS_RTPS_AUTO_ID_FROM_IP	Builds the GUID prefix using the IPv4 address and process ID. Uses the IPv4 address of the first up-and-running interface of the host machine and the process ID to build the GUID prefix.
DDS_RTPS_AUTO_ID_FROM_MAC	Builds the GUID prefix using the MAC address and process ID. Uses the first 32 bits of the MAC address assigned to the first up-and-running interface and the process ID to build the GUID prefix. Note to Android Users: DDS_RTPS_AUTO_ID_FROM_MAC is not supported in recent versions of Android (6.0 and later).
DDS_RTPS_AUTO_ID_FROM_UUID	Builds the GUID prefix by selecting the UUID-based algorithm (default). This method of generating the GUID prefix does not require having a network interface and is friendly to IP mobility scenarios in which an RTI Connex application may start in a node that does not have a physical network interface enabled.

## 7.156.5 Variable Documentation

## 7.156.5.1 DDS\_RTI\_BACKWARDS\_COMPATIBLE\_RTPS\_WELL\_KNOWN\_PORTS

```
const struct DDS_RtpsWellKnownPorts_t DDS_RTI_BACKWARDS_COMPATIBLE_RTPS_WELL_KNOWN_PORTS [extern]
```

Assign to use well-known port mappings which are compatible with previous versions of the RTI Connex middleware.

Assign `DDS_WireProtocolQosPolicy::rtps_well_known_ports` (p. 1249) to this value to remain compatible with previous versions of the RTI Connex middleware that used fixed port mappings.

The following are the `rtps_well_known_ports` values for `DDS_RTI_BACKWARDS_COMPATIBLE_RTPS_WELL_KNOWN_PORTS` (p. 460):

```
port_base = 7400
domain_id_gain = 10
participant_id_gain = 1000
builtin_multicast_port_offset = 2
builtin_unicast_port_offset = 0
user_multicast_port_offset = 1
user_unicast_port_offset = 3
```

These settings are *not* compliant with OMG's DDS Interoperability Wire Protocol. To comply with the specification, please use `DDS_INTEROPERABLE_RTPS_WELL_KNOWN_PORTS` (p. 461).

See also

`DDS_WireProtocolQosPolicy::rtps_well_known_ports` (p. 1249)

`DDS_INTEROPERABLE_RTPS_WELL_KNOWN_PORTS` (p. 461)

### 7.156.5.2 DDS\_INTEROPERABLE\_RTPS\_WELL\_KNOWN\_PORTS

```
const struct DDS_RtpsWellKnownPorts_t DDS_INTEROPERABLE_RTPS_WELL_KNOWN_PORTS [extern]
```

Assign to use well-known port mappings which are compliant with OMG's DDS Interoperability Wire Protocol.

Assign `DDS_WireProtocolQosPolicy::rtps_well_known_ports` (p. 1249) to this value to use well-known port mappings which are compliant with OMG's DDS Interoperability Wire Protocol.

The following are the `rtps_well_known_ports` values for `DDS_INTEROPERABLE_RTPS_WELL_KNOWN_PORTS` (p. 461):

```
port_base = 7400
domain_id_gain = 250
participant_id_gain = 2
builtin_multicast_port_offset = 0
builtin_unicast_port_offset = 10
user_multicast_port_offset = 1
user_unicast_port_offset = 11
```

Assuming a maximum port number of 65535 (UDPv4), the above settings enable the use of about 230 domains with up to 120 Participants per node per domain.

These settings are *not* backwards compatible with previous versions of the RTI Connex middleware that used fixed port mappings. For backwards compability, please use `DDS_RTI_BACKWARDS_COMPATIBLE_RTPS_WELL_KNOWN_PORTS` (p. 460).

See also

`DDS_WireProtocolQosPolicy::rtps_well_known_ports` (p. 1249)

`DDS_RTI_BACKWARDS_COMPATIBLE_RTPS_WELL_KNOWN_PORTS` (p. 460)

### 7.156.5.3 DDS\_WIREPROTOCOL\_QOS\_POLICY\_NAME

```
const char* const DDS_WIREPROTOCOL_QOS_POLICY_NAME [extern]
```

Stringified human-readable name for **DDS\_WireProtocolQosPolicy** (p. 1244).

## 7.157 Extended Qos Support

<<*extension*>> (p. 237) Types and defines used in extended QoS policies.

### Modules

- **Thread Settings**

*The properties of a thread of execution. Consult Platform Notes for additional platform specific details.*

### Classes

- struct **DDS\_RtpsReliableReaderProtocol\_t**

*Qos related to reliable reader protocol defined in RTPS.*

- struct **DDS\_RtpsReliableWriterProtocol\_t**

*QoS related to the reliable writer protocol defined in RTPS.*

### 7.157.1 Detailed Description

<<*extension*>> (p. 237) Types and defines used in extended QoS policies.

## 7.158 Unicast Settings

Unicast communication settings.

### Classes

- struct **DDS\_TransportUnicastSettings\_t**

*Type representing a list of unicast locators.*

- struct **DDS\_TransportUnicastSettingsSeq**

*Declares IDL sequence< DDS\_TransportUnicastSettings\_t (p. 1160) >*

### 7.158.1 Detailed Description

Unicast communication settings.

## 7.159 Multicast Settings

Multicast communication settings.

### Classes

- struct **DDS\_TransportMulticastSettings\_t**  
*Type representing a list of multicast locators.*
- struct **DDS\_TransportMulticastSettingsSeq**  
*Declares IDL `sequence`< **DDS\_TransportMulticastSettings\_t** (p. 1153) >*

### 7.159.1 Detailed Description

Multicast communication settings.

## 7.160 Multicast Mapping

Multicast communication mapping.

### Classes

- struct **DDS\_TransportMulticastMappingFunction\_t**  
*Type representing an external mapping function.*
- struct **DDS\_TransportMulticastMapping\_t**  
*Type representing a list of multicast mapping elements.*
- struct **DDS\_TransportMulticastMappingSeq**  
*Declares IDL `sequence`< **DDS\_TransportMulticastMapping\_t** (p. 1147) >*

### 7.160.1 Detailed Description

Multicast communication mapping.

## 7.161 NDDS\_DISCOVERY\_PEERS

Environment variable or a file that specifies the default values of **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732) and **DDS\_DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733) contained in the **DDS\_DomainParticipantQos**↔**::discovery** (p. 744) qos policy.

Environment variable or a file that specifies the default values of **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732) and **DDS\_DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733) contained in the **DDS\_DomainParticipantQos**↔**::discovery** (p. 744) qos policy.

The default value of the **DDS\_DomainParticipantQos** (p. 741) is obtained by calling **DDSDomainParticipantFactory**↔**::get\_default\_participant\_qos()** (p. 1432).

NDDS\_DISCOVERY\_PEERS specifies the default value of the **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732) and **DDS\_DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733) fields, when the default participant QoS policies have not been explicitly set by the user (i.e., **DDSDomainParticipantFactory::set\_default\_participant\_qos()** (p. 1430) has never been called or was called using **DDS\_PARTICIPANT\_QOS\_DEFAULT** (p. 48)).

If NDDS\_DISCOVERY\_PEERS does *not* contain a multicast address, then the string sequence **DDS\_DiscoveryQos**↔**Policy::multicast\_receive\_addresses** (p. 733) is cleared and the RTI discovery process will not listen for discovery messages via multicast.

If NDDS\_DISCOVERY\_PEERS contains one or more multicast addresses, the addresses will be stored in **DDS**↔**DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733), starting at element 0. They will be stored in the order in which they appear in NDDS\_DISCOVERY\_PEERS.

Note: IPv4 multicast addresses must have a prefix. Therefore, when using the UDPv6 transport: if there are any IPv4 multicast addresses in the peers list, make sure they have "udpv4://" in front of them (such as udpv4://239.255.0.1).

Note: Currently, RTI Connext will only listen for discovery traffic on the first multicast address (element 0) in **DDS**↔**DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733).

NDDS\_DISCOVERY\_PEERS provides a mechanism to dynamically switch the discovery configuration of an RTI Connext application without recompilation. The application programmer is free to not use the default values; instead use values supplied by other means.

NDDS\_DISCOVERY\_PEERS can be specified either in an environment variable as comma (',') separated "peer descriptors" (see **Peer Descriptor Format** (p. 465)) or in a file. These formats are described below.

### 7.161.1 Peer Descriptor Format

A **peer descriptor** string specifies a range of participants at a given `locator`. Peer descriptor strings are used in the `DDS_DiscoveryQosPolicy::initial_peers` (p. 732) field and the `DDSDomainParticipant::add_peer()` (p. 1409) operation.

The anatomy of a `peer` descriptor is illustrated below using a UDPv4 transport and a custom "StarFabric" transport example.

A peer descriptor consists of:

optional **Participant ID Limit**. If a simple integer is specified, it indicates the maximum participant ID to be contacted by the RTI Connex discovery mechanism at the given `locator`. If that integer is enclosed in square brackets (e.g.: [2]) *only* that Participant ID will be used. You can also specify a range in the form of [a-b]: in this case only the Participant IDs in that specific range are contacted. If omitted, a default value of 4 is implied: participant IDs 0,1,2,3, and 4 will be contacted.

- **Locator**. See **Locator Format** (p. 465).

These are separated by the '@' character. The separator may be omitted if a participant ID limit is not explicitly specified.

Note that the "participant ID limit" only applies to unicast locators; it is ignored for multicast locators (and therefore should be omitted for multicast peer descriptors).

#### 7.161.1.1 Locator Format

A **locator** string specifies a transport and an address in string format. Locators are used to form peer descriptors. A locator is equivalent to a peer descriptor with the default maximum participant ID.

A locator consists of:

optional **Transport name** (**alias** or `class`). This identifies the set of transport plugins (**Transport Aliases** (p. 168)) that may be used to parse the `address` portion of the locator. Note that a transport class name is an implicit alias that is used to refer to all the transport plugin instances of that class.

optional **Address**. See **Address Format** (p. 466).

These are separated by the "://" string. The separator is specified if and only if a transport name is specified.

If a transport name is specified, the address may be omitted; in that case, all the unicast addresses (across all transport plugin instances) associated with the transport class are implied. Thus, a locator string may specify several addresses.

If an address is specified, the transport name and the separator string may be omitted; in that case all the available transport plugins (for the **DDSEntity** (p. 1463)) may be used to parse the address string.

### 7.161.1.2 Address Format

An **address** string specifies a transport-independent network address that qualifies a **transport-dependent** address string. Addresses are used to form locators. Addresses are also used in **DDS\_DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733), and **DDS\_TransportMulticastSettings\_t::receive\_address** (p. 1154) fields. An address is equivalent to a locator in which the transport name and separator are omitted.

An address consists of:

optional **Network Address**. An address in IPv4 or IPv6 string notation. If omitted, the network address of the transport is implied (**Transport Network Address** (p. 171)).

optional **Transport Address**. A string that is passed to the transport for processing. The transport maps this string into **NDDS\_Transport\_Property\_t::address\_bit\_count** (p. 1778) bits. If omitted the network address is used as the fully qualified address.

These are separated by the '#' character. If a separator is specified, it must be followed by a non-empty string which is passed to the transport plugin. If the separator is omitted, it is treated as a transport address with an implicit network address (of the transport plugin). The implicit network address is the address used when registering the transport: e.g, the UDPv4 implicit network address is 0.0.0.0.0.0.0.0.0.0.

The bits resulting from the transport address string are combined with the network address. The least or most significant **NDDS\_Transport\_Property\_t::address\_bit\_count** (p. 1778) bits of the network address are ignored and replaced with the transport address. The sign of the **NDDS\_Transport\_Property\_t::address\_bit\_count** (p. 1778) value determines whether the most significant bits (negative sign) or least significant bits (positive sign) are ignored (**Transport Network Address** (p. 171)).

### 7.161.2 NDDS\_DISCOVERY\_PEERS Environment Variable Format

NDDS\_DISCOVERY\_PEERS can be specified via an environment variable of the same name, consisting of a sequence of peer descriptors separated by the comma (',') character.

#### Examples

Multicast (maximum participant ID is irrelevant)

- 239.255.0.1

Default maximum participant ID on localhost

- localhost

Default maximum participant ID on host 192.168.1.1 (IPv4)

- 192.168.1.1



Default maximum participant ID on host FAA0::0 (IPv6)

- FAA0::1

Default maximum participant ID on host himalaya accessed using the "udp4" transport plugin(s) (IPv4)

- udp4://himalaya

Default maximum participant ID on localhost using the "udp4" transport plugin(s) registered at network address FAA0::0

- udp4://FAA0::0#localhost

Default maximum participant ID on host 0/0/R (StarFabric)

- 0/0/R
- #0/0/R

Default maximum participant ID on host 0/0/R (StarFabric) using the "starfabric" (StarFabric) transport plugin(s)

- starfabric://0/0/R
- starfabric://#0/0/R

Default maximum participant ID on host 0/0/R (StarFabric) using the "starfabric" (StarFabric) transport plugin(s) registered at network address FAA0::0

- starfabric://FBB0::0#0/0/R

Default maximum participant ID on all unicast addresses accessed via the "starfabric" (StarFabric) transport plugin(s)

- starfabric://

Default maximum participant ID on all unicast addresses accessed via the "shmem" (shared memory) transport plugin(s) registered at network address FCC0::0

- shmem://FCC0::0

Default maximum participant ID on hosts himalaya and gangotri

- himalaya,gangotri

Maximum participant ID of 1 on hosts himalaya and gangotri

- 1@himalaya,1@gangotri

Combinations of above

- 239.255.0.1,localhost,192.168.1.1,0/0/R
- FAA0::1,FAA0::0#localhost,FBB0::0#0/0/R
- udp4://himalaya,udp4://FAA0::0#localhost,#0/0/R
- starfabric://0/0/R,starfabric://FBB0::0#0/0/R,shmem://
- starfabric://,shmem://FCC0::0,1@himalaya,1@gangotri

### 7.161.3 NDDS\_DISCOVERY\_PEERS File Format

NDDS\_DISCOVERY\_PEERS can be specified via a file of the same name in the program's current working directory. A NDDS\_DISCOVERY\_PEERS file would contain a sequence of peer descriptors separated by whitespace or the comma (',') character. The file may also contain comments starting with a semicolon (;) character till the end of the line.

#### Example:

```
;; NDDS_DISCOVERY_PEERS - Discovery Configuration File

;;

;;

;; NOTE:

;; 1. This file must be in the current working directory, i.e.
;;    in the folder from which the application is launched.

;;

;; 2. This file takes precedence over the environment variable NDDS_DISCOVERY_PEERS

;;

;; Multicast

239.255.0.1           ; The default dds discovery multicast address

;; Unicast

localhost,192.168.1.1 ; A comma can be used a separator

FAA0::1 FAA0::0#localhost ; Whitespace can be used as a separator

1@himalaya           ; Maximum participant ID of 1 on 'himalaya'

1@gangotri

;; UDPv4

udpv4://himalaya     ; 'himalaya' via 'udpv4' transport plugin(s)

udpv4://FAA0::0#localhost ; 'localhost' via 'udpv4' transport
                        ; plugin registered at network address FAA0::0

;; Shared Memory

shmem://             ; All 'shmem' transport plugin(s)

builtin.shmem://     ; The builtin 'shmem' transport plugin

shmem://FCC0::0      ; Shared memory transport plugin registered
                        ;
                        ; at network address FCC0::0

;; StarFabric

0/0/R                ; StarFabric node 0/0/R

starfabric://0/0/R   ; 0/0/R accessed via 'starfabric'
                        ;
                        ; transport plugin(s)
```

```

starfabric://FBB0::0#0/0/R ; StarFabric transport plugin registered
                        ;           at network address FBB0::0
starfabric://           ; All 'starfabric' transport plugin(s)

```

#### 7.161.4 NDDS\_DISCOVERY\_PEERS Precedence

If the current working directory from which the RTI Connex application is launched contains a file called NDDS\_↔DISCOVERY\_PEERS, and an environment variable named NDDS\_DISCOVERY\_PEERS is also defined, the file takes precedence; the environment variable is ignored.

#### 7.161.5 NDDS\_DISCOVERY\_PEERS Default Value

If NDDS\_DISCOVERY\_PEERS is not specified (either as a file in the current working directory, or as an environment variable), it implicitly defaults to the following.

```

;; Multicast (only on platforms which allow UDPv4 multicast out of the box)
;;
;; This allows any dds applications anywhere on the local network to
;; discover each other over UDPv4.
builtin.udpv4://239.255.0.1 ; dds's default discovery multicast address
                        ; This is also the default multicast receive address
;; Unicast - UDPv4 (on all platforms)
;;
;; This allows two dds applications using participant IDs up to the maximum
;; default participant ID on the local host and domain to discover each
;; other over UDP/IPv4.
builtin.udpv4://127.0.0.1
;; Unicast - Shared Memory (only on platforms that support shared memory)
;;
;; This allows two dds applications using participant IDs up to the maximum
;; default participant ID on the local host and domain to discover each
;; other over shared memory.
builtin.shmem://

```

### 7.161.6 Builtin Transport Class Names

The class names for the builtin transport plugins are:

- `shmem` - **::Shared Memory Transport** (p. 260)
- `udpv4` - **::UDpv4 Transport** (p. 266)
- `udpv6` - **::UDpv6 Transport** (p. 283)

These may be used as the transport names in the **Locator Format** (p. 465).

### 7.161.7 NDDS\_DISCOVERY\_PEERS and Local Host Communication

Suppose you want to communicate with other RTI Connex applications on the same host and you are setting `NDDS_DISCOVERY_PEERS` explicitly (generally in order to use unicast discovery with applications on other hosts).

If the local host platform does not support the shared memory transport, then you can include the name of the local host in the `NDDS_DISCOVERY_PEERS` list.

If the local host platform supports the shared memory transport, then you can do one of the following:

- Include `"shmem://"` in the `NDDS_DISCOVERY_PEERS` list. This will cause shared memory to be used for discovery and data traffic for applications on the same host.

or:

- Include the name of the local host in the `NDDS_DISCOVERY_PEERS` list and disable the shared memory transport in the **DDS\_TransportBuiltinQosPolicy** (p. 1144) of the **DDSDomainParticipant** (p. 1351). This will cause UDP loopback to be used for discovery and data traffic for applications on the same host.

(To check if your platform supports shared memory, see the `Platform Notes`.)

See also

- DDS\_DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733)
- DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732)
- DDSDomainParticipant::add\_peer()** (p. 1409)
- DDS\_PARTICIPANT\_QOS\_DEFAULT** (p. 48)
- DDSDomainParticipantFactory::get\_default\_participant\_qos()** (p. 1432)
- Transport Aliases** (p. 168)
- Transport Network Address** (p. 171)
- NDDSTransportSupport::register\_transport()** (p. 1834)

## 7.162 Entity Support

**DDSEntity** (p. 1463), **DDSListener** (p. 1526) and related items.

### Classes

- class **DDSListener**
  - <<*interface*>> (p. 237) *Abstract base class for all Listener interfaces.*
- class **DDSEntity**
  - <<*interface*>> (p. 237) *Abstract base class for all the DDS objects that support QoS policies, a listener, and a status condition.*
- class **DDSDomainEntity**
  - <<*interface*>> (p. 237) *Abstract base class for all DDS entities except for the **DDSDomainParticipant** (p. 1351).*

### 7.162.1 Detailed Description

**DDSEntity** (p. 1463), **DDSListener** (p. 1526) and related items.

**DDSEntity** (p. 1463) subtypes are created and destroyed by factory objects. With the exception of **DDSDomainParticipant** (p. 1351), whose factory is **DDSDomainParticipantFactory** (p. 1426), all **DDSEntity** (p. 1463) factory objects are themselves **DDSEntity** (p. 1463) subtypes as well.

*Important:* all **DDSEntity** (p. 1463) delete operations are inherently thread-unsafe. The user must take extreme care that a given **DDSEntity** (p. 1463) is not destroyed in one thread while being used concurrently (including being deleted concurrently) in another thread. An operation's effect in the presence of the concurrent deletion of the operation's target **DDSEntity** (p. 1463) is undefined.

## 7.163 Conditions and WaitSets

**DDSCondition** (p. 1276) and **DDSWaitSet** (p. 1629) and related items.

### Modules

- **AsyncWaitSet**
  - <<*extension*>> (p. 237) *A specialization of **DDSWaitSet** (p. 1629) that provides a mechanism to perform the wait asynchronously and uses a thread pool to dispatch the attached active **DDSCondition** (p. 1276).*

## Classes

- struct **DDS\_WaitSetProperty\_t**  
 <<*extension*>> (p. 237) Specifies the **DDSWaitSet** (p. 1629) behavior for multiple trigger events.
- struct **DDSConditionSeq**  
 Instantiates **FooSeq** (p. 1697) < **DDSCondition** (p. 1276) >
- class **DDSConditionHandler**  
 <<*extension*>> (p. 237) <<*interface*>> (p. 237) Handler called by the **DDSCondition::dispatch** (p. 1278).
- class **DDSCondition**  
 <<*interface*>> (p. 237) Root class for all the conditions that may be attached to a **DDSWaitSet** (p. 1629).
- class **DDSGuardCondition**  
 <<*interface*>> (p. 237) A specific **DDSCondition** (p. 1276) whose *trigger\_value* is completely under the control of the application.
- class **DDSStatusCondition**  
 <<*interface*>> (p. 237) A specific **DDSCondition** (p. 1276) that is associated with each **DDSEntity** (p. 1463).
- class **DDSWaitSet**  
 <<*interface*>> (p. 237) Allows an application to wait until one or more of the attached **DDSCondition** (p. 1276) objects has a *trigger\_value* of **DDS\_BOOLEAN\_TRUE** (p. 317) or else until the timeout expires.

## Macros

- #define **DDS\_WaitSetProperty\_t\_INITIALIZER**  
 <<*extension*>> (p. 237) Initializer for new property instances.

### 7.163.1 Detailed Description

**DDSCondition** (p. 1276) and **DDSWaitSet** (p. 1629) and related items.

### 7.163.2 Macro Definition Documentation

#### 7.163.2.1 DDS\_WaitSetProperty\_t\_INITIALIZER

```
#define DDS_WaitSetProperty_t_INITIALIZER
```

#### Value:

```
{ \
  1, DDS_DURATION_INFINITE_VALUE \
}
```

<<*extension*>> (p. 237) Initializer for new property instances.

Default property specifies `max_event_count = 1` and `max_event_delay = DDS_DURATION_INFINITE`

## 7.164 Cookie

<<*extension*>> (p. 237) Unique identifier for a written data sample

### Classes

- struct **DDS\_Cookie\_t**  
<<*extension*>> (p. 237) Sequence of bytes.
- struct **DDS\_CookieSeq**  
Declares IDL sequence < *DDS\_Cookie\_t* (p. 618) > .

### Functions

- void \* **DDS\_Cookie\_t::to\_pointer** () const  
Returns the pointer previously stored in the cookie.

#### 7.164.1 Detailed Description

<<*extension*>> (p. 237) Unique identifier for a written data sample

#### 7.164.2 Function Documentation

##### 7.164.2.1 to\_pointer()

```
void * DDS_Cookie_t::to_pointer ( ) const
```

Returns the pointer previously stored in the cookie.

##### Precondition

The cookie's value was filled with a pointer; otherwise, the value returned may not be a valid memory address.

##### Returns

The pointer stored in the cookie.

## 7.165 Sample Flags

<<*extension*>> (p. 237) Flags for samples.

## Typedefs

- typedef enum **DDS\_SampleFlagBits** **DDS\_SampleFlagBits**  
*Type to identify the sample flags reserved by RTI.*
- typedef **DDS\_Long** **DDS\_SampleFlag**  
*A set of flags that can be associated with a sample.*

## Enumerations

- enum **DDS\_SampleFlagBits** {  
**DDS\_REDELIVERED\_SAMPLE** ,  
**DDS\_INTERMEDIATE\_REPLY\_SEQUENCE\_SAMPLE** ,  
**DDS\_REPLICATE\_SAMPLE** ,  
**DDS\_LAST\_SHARED\_READER\_QUEUE\_SAMPLE** ,  
**DDS\_INTERMEDIATE\_TOPIC\_QUERY\_SAMPLE** ,  
**DDS\_WRITER\_REMOVED\_BATCH\_SAMPLE** = PRES\_WRITER\_REMOVED\_BATCH\_SAMPLE ,  
**DDS\_DISCOVERY\_SERVICE\_SAMPLE** = PRES\_DISCOVERY\_SERVICE\_SAMPLE }  
*Type to identify the sample flags reserved by RTI.*

### 7.165.1 Detailed Description

<<*extension*>> (p. 237) Flags for samples.

### 7.165.2 Typedef Documentation

#### 7.165.2.1 DDS\_SampleFlagBits

```
typedef enum DDS_SampleFlagBits DDS_SampleFlagBits
```

Type to identify the sample flags reserved by RTI.

#### 7.165.2.2 DDS\_SampleFlag

```
typedef DDS_Long DDS_SampleFlag
```

A set of flags that can be associated with a sample.

- Least-significant bits [0-7] are reserved by RTI
- Least-significant bits [8-15] are application specific
- Least-significant bits [16-31] are invalid and cannot be used



### 7.165.3 Enumeration Type Documentation

#### 7.165.3.1 DDS\_SampleFlagBits

enum `DDS_SampleFlagBits`

Type to identify the sample flags reserved by RTI.

Enumerator

<code>DDS_REDELIVERED_SAMPLE</code>	Indicates that a sample has been redelivered by RTI Queuing Service.
<code>DDS_INTERMEDIATE_REPLY_SEQUENCE_SAMPLE</code>	Indicates that a response sample is not the last response sample for a given request. This bit is usually set by Connex Repliers sending multiple responses for a request.
<code>DDS_REPLICATE_SAMPLE</code>	Indicates if a sample must be broadcast by one RTI Queuing Service replica to other replicas.
<code>DDS_LAST_SHARED_READER_QUEUE_SAMPLE</code>	Indicates that a sample is the last sample in a SharedReaderQueue for a QueueConsumer DataReader.
<code>DDS_INTERMEDIATE_TOPIC_QUERY_SAMPLE</code>	Indicates that a sample for a TopicQuery will be followed by more samples. This flag only applies to samples that have been published as a response to a <b>DDSTopicQuery</b> (p. 1627). When this bit is not set and <b>DDS_SampleInfo::topic_query_guid</b> (p. 1092) is different from <b>DDS_GUID_UNKNOWN</b> (p. 331), this sample is the last sample for that TopicQuery coming from the DataWriter identified by <b>DDS_SampleInfo::original_publication_virtual_guid</b> (p. 1090).
<code>DDS_WRITER_REMOVED_BATCH_SAMPLE</code>	This flag will be set if the sample was accepted into the DataReader queue even though it was marked by the DataWriter as removed. A sample can be marked as removed by the DataWriter in a batch when it is replaced due to the <b>DDS_KEEP_LAST_HISTORY_QOS</b> (p. 406) <b>DDS_HistoryQosPolicy</b> (p. 919) QoS or because the duration in <b>DDS_LifespanQosPolicy</b> (p. 931) was reached. If the DataReader sets the property "dds.data_reader.accept_writer_removed_batch_samples" to true, the removed sample will be accepted into the DataReader queue and this flag will be set.
<code>DDS_DISCOVERY_SERVICE_SAMPLE</code>	This flag will be set if the sample was sent by Cloud Discovery Service. The samples sent by Cloud Discovery Service are participant announcement samples on the ParticipantBuiltinTopic.

## 7.166 WriteParams

<<*extension*>> (p. 237)

### Classes

- struct **DDS\_SampleIdentity\_t**  
*Type definition for a Sample Identity.*
- struct **DDS\_AckResponseData\_t**  
*Data payload of an application-level acknowledgment.*
- struct **DDS\_WriteParams\_t**  
<<*extension*>> (p. 237) Input parameters for writing with **FooDataWriter::write\_w\_params** (p. 1688), **FooDataWriter::dispose\_w\_params** (p. 1691), **FooDataWriter::register\_instance\_w\_params** (p. 1680), **FooDataWriter::unregister\_instance\_w\_params** (p. 1683)

### Functions

- **DDS\_Boolean DDS\_SampleIdentity\_equals** (const struct **DDS\_SampleIdentity\_t** \*self, const struct **DDS\_SampleIdentity\_t** \*other)  
*Compares this sample identity with another sample identity for equality.*
- void **DDS\_WriteParams\_reset** (struct **DDS\_WriteParams\_t** \*self)  
*Resets all the fields to their default values.*

### Variables

- struct **DDS\_GUID\_t DDS\_SampleIdentity\_t::writer\_guid**  
*16-byte identifier identifying the virtual GUID.*
- struct **DDS\_SequenceNumber\_t DDS\_SampleIdentity\_t::sequence\_number**  
*monotonically increasing 64-bit integer that identifies the sample in the data source.*
- const struct **DDS\_SampleIdentity\_t DDS\_AUTO\_SAMPLE\_IDENTITY**  
*The AUTO sample identity.*
- const struct **DDS\_SampleIdentity\_t DDS\_UNKNOWN\_SAMPLE\_IDENTITY**  
*An invalid or unknown sample identity.*
- const struct **DDS\_WriteParams\_t DDS\_WRITEPARAMS\_DEFAULT**  
*Initializer for **DDS\_WriteParams\_t** (p. 1251).*

#### 7.166.1 Detailed Description

<<*extension*>> (p. 237)

#### 7.166.2 Function Documentation

### 7.166.2.1 DDS\_SampleIdentity\_equals()

```
DDS_Boolean DDS_SampleIdentity_equals (
    const struct DDS_SampleIdentity_t * self,
    const struct DDS_SampleIdentity_t * other )
```

Compares this sample identity with another sample identity for equality.

## Parameters

<i>self</i>	<< <i>in</i> >> (p. 238) This sample identity.
<i>other</i>	<< <i>in</i> >> (p. 238) The other sample identity to be compared with this sample identity.

## Returns

**DDS\_BOOLEAN\_TRUE** (p.317) if the two sample identities have equal values, or **DDS\_BOOLEAN\_FALSE** (p.317) otherwise.

## 7.166.2.2 DDS\_WriteParams\_reset()

```
void DDS_WriteParams_reset (
    struct DDS_WriteParams_t * self )
```

Resets all the fields to their default values.

This operation is useful to reset all the fields to their automatic value when **DDS\_WriteParams\_t::replace\_auto** (p.1251) is enabled and the same params instance is used in multiple calls to **FooDataWriter::write\_w\_params** (p.1688)

## 7.166.3 Variable Documentation

## 7.166.3.1 writer\_guid

```
struct DDS_GUID_t DDS_SampleIdentity_t::writer_guid
```

16-byte identifier identifying the virtual GUID.

## 7.166.3.2 sequence\_number

```
struct DDS_SequenceNumber_t DDS_SampleIdentity_t::sequence_number
```

monotonically increasing 64-bit integer that identifies the sample in the data source.

### 7.166.3.3 DDS\_AUTO\_SAMPLE\_IDENTITY

```
const struct DDS_SampleIdentity_t DDS_AUTO_SAMPLE_IDENTITY [extern]
```

The AUTO sample identity.

Special **DDS\_AUTO\_SAMPLE\_IDENTITY** (p. 478) value {**DDS\_GUID\_AUTO** (p. 331), **DDS\_AUTO\_SEQUENCE\_↔  
NUMBER** (p. 333)}

### 7.166.3.4 DDS\_UNKNOWN\_SAMPLE\_IDENTITY

```
const struct DDS_SampleIdentity_t DDS_UNKNOWN_SAMPLE_IDENTITY [extern]
```

An invalid or unknown sample identity.

Special **DDS\_UNKNOWN\_SAMPLE\_IDENTITY** (p. 479) value {**DDS\_GUID\_UNKNOWN** (p. 331), **DDS\_SEQUENCE\_↔  
\_NUMBER\_UNKNOWN** (p. 332)}

### 7.166.3.5 DDS\_WRITEPARAMS\_DEFAULT

```
const struct DDS_WriteParams_t DDS_WRITEPARAMS_DEFAULT [extern]
```

Initializer for **DDS\_WriteParams\_t** (p. 1251).

## 7.167 Heap Support in C

<<*extension*>> (p. 237) Heap allocation and free routines in C

### Functions

- void \* **DDS\_Heap\_malloc** (size\_t numElem, size\_t size)  
*Performs the logical equivalent of calloc().*
- void \* **DDS\_Heap\_malloc** (size\_t size)  
*Performs the logical equivalent of malloc().*
- void **DDS\_Heap\_free** (void \*ptr)  
*Performs the logical equivalent of free().*

### 7.167.1 Detailed Description

<<*extension*>> (p. 237) Heap allocation and free routines in C

The methods in this class ensure consistent cross-platform implementations for memory allocation (**DDS\_Heap\_↔  
malloc()** (p. 480) and **DDS\_Heap\_malloc()** (p. 480)) and deletion (**DDS\_Heap\_free()** (p. 480)).

Applications need to use these routines to reserve memory that the middleware will release or to free memory that the middleware has allocated.

For example, to allocate an optional member in a sample use **DDS\_Heap\_malloc()** (p. 480)/ **DDS\_Heap\_malloc()** (p. 480); to release an optional member previously reserved by **FooTypeSupport::create\_data()** (p. 1715), use **DDS\_↔  
\_Heap\_free()** (p. 480).

## 7.167.2 Function Documentation

### 7.167.2.1 DDS\_Heap\_calloc()

```
void * DDS_Heap_calloc (
    size_t numElem,
    size_t size )
```

Performs the logical equivalent of calloc().

Allocates unused space for an array with `numElem` elements each of whose size in bytes is `size`. The memory will be initialized to zeros.

#### Parameters

<i>numElem</i>	<< <i>in</i> >> (p. 238) The number of elements in the array to be allocated
<i>size</i>	<< <i>in</i> >> (p. 238) The size in bytes of each element in the array

#### Returns

If insufficient memory is available, this method will return NULL. Otherwise, upon success it returns a pointer to the allocated space.

### 7.167.2.2 DDS\_Heap\_malloc()

```
void * DDS_Heap_malloc (
    size_t size )
```

Performs the logical equivalent of malloc().

Allocates unused space for an object of the specified `size`. The memory will be initialized to zeros.

#### Parameters

<i>size</i>	<< <i>in</i> >> (p. 238) The size in bytes of the object to be allocated
-------------	--

#### Returns

If insufficient memory is available, this method will return NULL. Otherwise, upon success it returns a pointer to the allocated space.

### 7.167.2.3 DDS\_Heap\_free()

```
void DDS_Heap_free (
    void * ptr )
```

Performs the logical equivalent of free().

Deallocates the space pointed to by `ptr` and made available for further allocation.

#### Parameters

<code>ptr</code>	<< <i>in</i> >> (p. 238) A pointer to the space to be deallocated
------------------	---

## 7.168 Builtin Qos Profiles

<<*extension*>> (p. 237) QoS libraries, profiles, and snippets that are automatically built into RTI Connext.

### Variables

- const char \*const **DDS\_BUILTIN\_QOS\_LIB**  
*A library of non-experimental QoS profiles.*
- const char \*const **DDS\_PROFILE\_BASELINE\_ROOT**  
*The root baseline QoS values from which all other Baseline.X.X.X profiles inherit.*
- const char \*const **DDS\_PROFILE\_BASELINE**  
*The most up-to-date QoS default values.*
- const char \*const **DDS\_PROFILE\_BASELINE\_5\_0\_0**  
*The QoS default values for version 5.0.0.*
- const char \*const **DDS\_PROFILE\_BASELINE\_5\_1\_0**  
*The QoS default values for version 5.1.0.*
- const char \*const **DDS\_PROFILE\_BASELINE\_5\_2\_0**  
*The QoS default values for version 5.2.0.*
- const char \*const **DDS\_PROFILE\_BASELINE\_5\_3\_0**  
*The QoS default values for version 5.3.0.*
- const char \*const **DDS\_PROFILE\_BASELINE\_6\_0\_0**  
*The QoS default values for version 6.0.0.*
- const char \*const **DDS\_PROFILE\_BASELINE\_6\_1\_0**  
*The QoS default values for version 6.1.0.*
- const char \*const **DDS\_PROFILE\_BASELINE\_7\_0\_0**  
*The QoS default values for version 7.0.0.*
- const char \*const **DDS\_PROFILE\_BASELINE\_7\_1\_0**  
*The QoS default values for version 7.1.0.*
- const char \*const **DDS\_PROFILE\_GENERIC\_COMMON**  
*A common Participant base profile.*
- const char \*const **DDS\_PROFILE\_GENERIC\_MONITORING\_COMMON**

*Enables RTI Monitoring Library.*

- const char \*const **DDS\_PROFILE\_GENERIC\_CONNEXT\_MICRO\_COMPATIBILITY**  
*Sets the values necessary to communicate with RTI Connext Micro.*
- const char \*const **DDS\_PROFILE\_GENERIC\_CONNEXT\_MICRO\_COMPATIBILITY\_2\_4\_9**  
*Sets the values necessary to communicate with RTI Connext Micro versions 2.4.4 through at least 2.4.9.*
- const char \*const **DDS\_PROFILE\_GENERIC\_CONNEXT\_MICRO\_COMPATIBILITY\_2\_4\_3**  
*Sets the values necessary to communicate with RTI Connext Micro versions 2.4.3 and earlier.*
- const char \*const **DDS\_PROFILE\_GENERIC\_OTHER\_DDS\_VENDOR\_COMPATIBILITY**  
*Sets the values necessary to interoperate with other DDS vendors.*
- const char \*const **DDS\_PROFILE\_GENERIC\_510\_TRANSPORT\_COMPATIBILITY**  
*Sets the values necessary to interoperate with RTI Connext 5.1.0 using the UDPv6 and/or SHMEM transports.*
- const char \*const **DDS\_BUILTIN\_QOS\_LIB\_EXP**  
*A library of experimental QoS profiles.*
- const char \*const **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE**  
*Enables strict reliability.*
- const char \*const **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE**  
*Enables keep-last reliability.*
- const char \*const **DDS\_PROFILE\_GENERIC\_BEST\_EFFORT**  
*Enables best-effort reliability kind.*
- const char \*const **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_HIGH\_THROUGHPUT**  
*A profile that can be used to achieve high throughput.*
- const char \*const **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LOW\_LATENCY**  
*A profile that can be used to achieve low latency.*
- const char \*const **DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA**  
*A common Participant base profile to facilitate sending large data.*
- const char \*const **DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA\_MONITORING**  
*Configures Participants for large data and monitoring.*
- const char \*const **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA**  
*Configures endpoints for sending large data with strict reliability.*
- const char \*const **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA**  
*Configures endpoints for sending large data with keep-last reliability.*
- const char \*const **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA\_FAST\_FLOW**  
*Configures strictly reliable communication for large data with a fast flow controller.*
- const char \*const **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA\_MEDIUM\_FLOW**  
*Configures strictly reliable communication for large data with a medium flow controller.*
- const char \*const **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA\_SLOW\_FLOW**  
*Configures strictly reliable communication for large data with a slow flow controller.*
- const char \*const **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA\_FAST\_FLOW**  
*Configures keep-last reliable communication for large data with a fast flow controller.*
- const char \*const **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA\_MEDIUM\_FLOW**  
*Configures keep-last reliable communication for large data with a medium flow controller.*
- const char \*const **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA\_SLOW\_FLOW**  
*Configures keep-last reliable communication for large data with a slow flow controller.*
- const char \*const **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_TRANSIENT\_LOCAL**  
*Persists the samples of a DataWriter as long as the entity exists.*
- const char \*const **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_TRANSIENT**  
*Persists samples using RTI Persistence Service.*



- const char \*const **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_PERSISTENT**  
*Persists samples in permanent storage, like a disk, using RTI Persistence Service.*
- const char \*const **DDS\_PROFILE\_GENERIC\_AUTO\_TUNING**  
*Enables the Turbo Mode batching and Auto Throttle experimental features.*
- const char \*const **DDS\_PROFILE\_GENERIC\_MINIMAL\_MEMORY\_FOOTPRINT**  
*Uses a set of QoS which reduces the memory footprint of the application.*
- const char \*const **DDS\_PROFILE\_GENERIC\_SECURITY**  
*Loads the DDS Secure builtin plugins.*
- const char \*const **DDS\_PROFILE\_GENERIC\_MONITORING2**  
*The default QoS profile that the DDS entities created by the RTI Monitoring Library 2.0 use.*
- const char \*const **DDS\_PROFILE\_PATTERN\_PERIODIC\_DATA**  
*Used for applications that expect periodic data.*
- const char \*const **DDS\_PROFILE\_PATTERN\_STREAMING**  
*Used for applications that stream data.*
- const char \*const **DDS\_PROFILE\_PATTERN\_RELIABLE\_STREAMING**  
*Used for applications that stream data and require reliable communication.*
- const char \*const **DDS\_PROFILE\_PATTERN\_EVENT**  
*Used for applications that handle events.*
- const char \*const **DDS\_PROFILE\_PATTERN\_ALARM\_EVENT**  
*Used for applications that handle alarm events.*
- const char \*const **DDS\_PROFILE\_PATTERN\_STATUS**  
*Used for applications whose samples represent statuses.*
- const char \*const **DDS\_PROFILE\_PATTERN\_ALARM\_STATUS**  
*Used for applications in which samples represent alarm statuses.*
- const char \*const **DDS\_PROFILE\_PATTERN\_LAST\_VALUE\_CACHE**  
*Used for applications that only need the last published value.*
- const char \*const **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB**  
*A library of QoS Snippets.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_COMMON**  
*QoS Snippet that configures the reliability protocol with a common configuration.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_KEEP\_ALL**  
*QoS Snippet that configures the reliability protocol for KEEP\_ALL.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_KEEP\_LAST**  
*QoS Snippet that configures the reliability protocol for KEEP\_LAST.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_HIGH\_RATE**  
*QoS Snippet that configures the reliability protocol for sending data at a high rate.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_LOW\_LATENCY**  
*QoS Snippet that configures the reliability protocol for sending data at low latency.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_LARGE\_DATA**  
*QoS Snippet that configures the reliability protocol for large data.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_DATACACHE\_LARGE\_DATA\_DYNAMICMEMALLOC**  
*Configures the DataWriter and DataReader caches to use dynamic memory allocation for Large Data samples.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_DISCOVERY\_COMMON**  
*QoS Snippet that optimizes discovery with a common configuration.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_DISCOVERY\_PARTICIPANT\_COMPACT**  
*QoS Snippet that optimizes the Participant QoS to send less discovery information.*
- const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_DISCOVERY\_ENDPOINT\_FAST**

- QoS Snippet that optimizes the Endpoint Discovery to be faster.*

  - const char \*const **DDS\_SNIPPET\_OPTIMIZATION\_TRANSPORT\_LARGE\_BUFFERS**
- QoS Snippet that increases the Participant default buffer that shm and udpv4 use.*

  - const char \*const **DDS\_SNIPPET\_QOS\_POLICY\_RELIABILITY\_RELIABLE**
- QoS Snippet that sets RELIABILITY QoS to RELIABLE.*

  - const char \*const **DDS\_SNIPPET\_QOS\_POLICY\_RELIABILITY\_BEST\_EFFORT**
- QoS Snippet that sets RELIABILITY QoS to BEST\_EFFORT.*

  - const char \*const **DDS\_SNIPPET\_QOS\_POLICY\_HISTORY\_KEEP\_LAST\_1**
- QoS Snippet that sets HISTORY QoS to KEEP\_LAST kind with depth 1.*

  - const char \*const **DDS\_SNIPPET\_QOS\_POLICY\_HISTORY\_KEEP\_ALL**
- QoS Snippet that sets HISTORY QoSPolicy to KEEP\_ALL kind.*

  - const char \*const **DDS\_SNIPPET\_QOS\_POLICY\_PUBLISH\_MODE\_ASYNCHRONOUS**
- QoS Snippet that sets PUBLISH\_MODE QoSPolicy to ASYNCHRONOUS kind.*

  - const char \*const **DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_TRANSIENT\_LOCAL**
- QoS Snippet that sets DURABILITY QoSPolicy to TRANSIENT\_LOCAL kind.*

  - const char \*const **DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_TRANSIENT**
- QoS Snippet that sets DURABILITY QoSPolicy to TRANSIENT kind.*

  - const char \*const **DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_PERSISTENT**
- QoS Snippet that sets DURABILITY QoSPolicy to PERSISTENT kind.*

  - const char \*const **DDS\_SNIPPET\_QOS\_POLICY\_BATCHING\_ENABLE**
- QoS Snippet that sets BATCH QoSPolicy to true.*

  - const char \*const **DDS\_SNIPPET\_FEATURE\_FLOW\_CONTROLLER\_838MBPS**
- QoS Snippet that configures and set a FlowController of 838 Mbps.*

  - const char \*const **DDS\_SNIPPET\_FEATURE\_FLOW\_CONTROLLER\_209MBPS**
- QoS Snippet that configures and sets a FlowController of 209 Mbps.*

  - const char \*const **DDS\_SNIPPET\_FEATURE\_FLOW\_CONTROLLER\_52MBPS**
- QoS Snippet that configures and sets a FlowController of 52 Mbps.*

  - const char \*const **DDS\_SNIPPET\_FEATURE\_AUTO\_TUNING\_ENABLE**
- QoS Snippet that enables auto\_throttle and turbo\_mode to true.*

  - const char \*const **DDS\_SNIPPET\_FEATURE\_MONITORING\_ENABLE**
- QoS Snippet that enables the use of the RTI Monitoring Library.*

  - const char \*const **DDS\_SNIPPET\_FEATURE\_MONITORING2\_ENABLE**
- QoS Snippet that enables the use of the RTI Monitoring Library 2.0.*

  - const char \*const **DDS\_SNIPPET\_FEATURE\_SECURITY\_ENABLE**
- QoS Snippet that enables security using the Builtin Security Plugins.*

  - const char \*const **DDS\_SNIPPET\_FEATURE\_TOPIC\_QUERY\_ENABLE**
- QoS Snippet that enables Topic Query.*

  - const char \*const **DDS\_SNIPPET\_TRANSPORT\_TCP\_LAN\_CLIENT**
- QoS Snippet that configures a TCP LAN Client over DDS.*

  - const char \*const **DDS\_SNIPPET\_TRANSPORT\_TCP\_WAN\_SYMMETRIC\_CLIENT**
- QoS Snippet that configures a symmetric WAN TCP Client over DDS.*

  - const char \*const **DDS\_SNIPPET\_TRANSPORT\_TCP\_WAN\_ASYMMETRIC\_SERVER**
- QoS Snippet that an asymmetric WAN TCP Server over DDS.*

  - const char \*const **DDS\_SNIPPET\_TRANSPORT\_TCP\_WAN\_ASYMMETRIC\_CLIENT**
- QoS Snippet that configures an asymmetric WAN TCP Client over DDS.*

  - const char \*const **DDS\_SNIPPET\_TRANSPORT\_UDP\_AVOID\_IP\_FRAGMENTATION**

*QoS Snippet that configures RTI Connex and the UDP built-in transports (UDPv4, UDPv6, UDPv4\_WAN) to avoid IP fragmentation.*

- const char \*const **DDS\_SNIPPET\_TRANSPORT\_UDP\_WAN**

*QoS Snippet that enables the RTI Real-Time WAN Transport (UDPv4\_WAN).*

- const char \*const **DDS\_SNIPPET\_COMPATIBILITY\_CONNEXT\_MICRO\_VERSION\_2\_4\_3**

*QoS Snippet that configures sets LIVELINESS QoS to be compatible with RTI Connex Micro 2.4.3.*

- const char \*const **DDS\_SNIPPET\_COMPATIBILITY\_OTHER\_DDS\_VENDORS\_ENABLE**

*QoS Snippet that configures RTI Connex to interoperate with other DDS vendors.*

- const char \*const **DDS\_SNIPPET\_5\_1\_0\_TRANSPORT\_ENABLE**

*QoS Snippet that configures RTI Connex to interoperate with RTI Connex 5.1.0 and below for UDPv6 and SHMEM transports.*

### 7.168.1 Detailed Description

<<**extension**>> (p. 237) QoS libraries, profiles, and snippets that are automatically built into RTI Connex.

The built-in profiles can be accessed in QoS XML configuration files and by using any of the APIs that accept library and profiles names by using the constants or string versions as documented on this page.

The built-in profiles are provided as a way to quickly and easily configure RTI Connex applications with a set of QoS values aimed at achieving a specific behavior.

There are three built-in QoS libraries:

- BuiltinQosLib: A library containing built-in QoS Profiles.
- BuiltinQosLibExp: A library containing experimental QoS Profiles. Experimental QoS Profiles are new QoS Profiles that have been tested internally but have not gone through an extensive validation period. Therefore, some of the settings may change in future releases based on customer and internal feedback. After validation, experimental QoS Profiles will be moved into the non-experimental library.
- BuiltinQosSnippetLib: A library containing QoS Snippets that are ready to use as elements for the QoS Profile composition pattern. For further information about this pattern visit the following article: <https://community.rti.com/best-practices/qos-profile-inheritance-and-composition-guidance>

There are three types of profiles:

- Baseline.X.X.X: These profiles represent the QoS defaults for /ndds version X.X.X. To access the defaults for the latest RTI Connex version, use the BuiltinQosLib::Baseline profile.
- Generic.X: These profiles allow you to easily configure different features and communication use-cases with RTI Connex. For example, there is a Generic.StrictReliable profile for use when your application has a requirement for no data loss.
- Pattern.X: These profiles inherit from the Generic.X profiles and allow you to configure various domain-specific communication use cases. For example, there is a Pattern.Alarm profile that can be used to manage the generation and consumption of alarm events.

There are several types of QoS Snippets. These are the current QoS Snippets available:

- **Optimization.X:** these QoS Snippets optimize one or more parameters related to the X QoS Policy or a specific use-case.
- **QoSPolicy.X.Y:** these QoS Snippets set a specific QoS Policy X to the value Y.
- **Feature.X:** these QoS Snippets set all the needed QoS values to enable/modify a specific feature.
- **Transport.X:** these QoS Snippets set a specific transport defined by X. This transport may have specific scenarios that are also specified in the name.
- **Compatibility.X:** these QoS Snippets change the specific QoS policies to ensure compatibility with specific products or versions specified by X.

These QoS Profiles can be used as base profiles in XML configuration, then QoS Snippets can modify specific aspects of this base QoS Profile, and finally files and values can be modified to fit a specific system's needs. For example:

```
<qos_profile name="MyProfile" base_name="BuiltinQoSLib::Generic.Common">
  <domain_participant_qos base_name="BuiltinQoSLib::Generic.Monitoring.Common">
    <base_name>
      <element>BuiltinQoSSnippetLib::Feature.Monitoring.Enable</element>
    </base_name>
    <!-- Override and add values -->
  </domain_participant_qos>
</qos_profile>
```

The QoS Profiles can also be used in any APIs that call for a QoS library and profile name, for example, the `create_*_with_profile()` APIs. To create a **DDSDDataWriter** (p. 1321) configured to send large data:

```
writer = DDS_DomainParticipant_create_datawriter_with_profile(
    participant, topic,
    ::DDS_BUILTIN_QOS_LIB,
    ::DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_FAST_FLOW,
    NULL, ::DDS_STATUS_MASK_NONE);
```

All the built-in QoS Profiles and QoS Snippets are documented in the `BaselineRoot.documentationONLY.xml` and `BuiltinProfiles.documentationONLY.xml` files that are included in the `NDDSHOME/xml` directory of the RTI Connex installation.

- `BaselineRoot.documentationONLY.xml` contains the root baseline QoS profile that corresponds to the default values of RTI Connex 5.0.0.
- `BuiltinProfiles.documentationONLY.xml` contains the rest of the built-in QoS Profiles and QoS Snippets.

## 7.168.2 Variable Documentation

### 7.168.2.1 DDS\_BUILTIN\_QOS\_LIB

```
const char* const DDS_BUILTIN_QOS_LIB [extern]
```

A library of non-experimental QoS profiles.

String-version: "BuiltinQosLib"

### 7.168.2.2 DDS\_PROFILE\_BASELINE\_ROOT

```
const char* const DDS_PROFILE_BASELINE_ROOT [extern]
```

The root baseline QoS values from which all other Baseline.X.X.X profiles inherit.

This profile contains the root baseline QoS values from which all other Baseline.X.X.X profiles inherit. These values correspond to the default values for RTI Connex 5.0.0.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline.Root"

### 7.168.2.3 DDS\_PROFILE\_BASELINE

```
const char* const DDS_PROFILE_BASELINE [extern]
```

The most up-to-date QoS default values.

You can use this profile if you want your application to pick up and use any new QoS default settings each time a new RTI Connex version is released – without changing your application code.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline"

### 7.168.2.4 DDS\_PROFILE\_BASELINE\_5\_0\_0

```
const char* const DDS_PROFILE_BASELINE_5_0_0 [extern]
```

The QoS default values for version 5.0.0.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline.5.0.0"

### 7.168.2.5 DDS\_PROFILE\_BASELINE\_5\_1\_0

```
const char* const DDS_PROFILE_BASELINE_5_1_0 [extern]
```

The QoS default values for version 5.1.0.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline.5.1.0"

### 7.168.2.6 DDS\_PROFILE\_BASELINE\_5\_2\_0

```
const char* const DDS_PROFILE_BASELINE_5_2_0 [extern]
```

The QoS default values for version 5.2.0.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline.5.2.0"

### 7.168.2.7 DDS\_PROFILE\_BASELINE\_5\_3\_0

```
const char* const DDS_PROFILE_BASELINE_5_3_0 [extern]
```

The QoS default values for version 5.3.0.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline.5.3.0"

### 7.168.2.8 DDS\_PROFILE\_BASELINE\_6\_0\_0

```
const char* const DDS_PROFILE_BASELINE_6_0_0 [extern]
```

The QoS default values for version 6.0.0.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline.6.0.0"

### 7.168.2.9 DDS\_PROFILE\_BASELINE\_6\_1\_0

```
const char* const DDS_PROFILE_BASELINE_6_1_0 [extern]
```

The QoS default values for version 6.1.0.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline.6.1.0"

**7.168.2.10 DDS\_PROFILE\_BASELINE\_7\_0\_0**

```
const char* const DDS_PROFILE_BASELINE_7_0_0 [extern]
```

The QoS default values for version 7.0.0.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline.7.0.0"

**7.168.2.11 DDS\_PROFILE\_BASELINE\_7\_1\_0**

```
const char* const DDS_PROFILE_BASELINE_7_1_0 [extern]
```

The QoS default values for version 7.1.0.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Baseline.7.1.0"

**7.168.2.12 DDS\_PROFILE\_GENERIC\_COMMON**

```
const char* const DDS_PROFILE_GENERIC_COMMON [extern]
```

A common Participant base profile.

All Generic.X and Pattern.X profiles inherit from this profile.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Generic.Common"

**7.168.2.13 DDS\_PROFILE\_GENERIC\_MONITORING\_COMMON**

```
const char* const DDS_PROFILE_GENERIC_MONITORING_COMMON [extern]
```

Enables RTI Monitoring Library.

Generic Base participant QoS Profile that enables RTI Monitoring Library.

Use of this QoS Profile is deprecated. It is included for backwards compatibility.

Instead of using the (deprecated) "BuiltinQosLib::Generic.Monitoring.Common", apply the QoS Snippet "BuiltinQos↔ SnippetLib::Feature.Monitoring.Enable" via composition. For example:

```
<qos_profile name="MyProfile">
```

```
  <base_name>
```

```
    <element>BuiltinQosSnippetLib::Feature.Monitoring.Enable</element>
```

```
  </base_name>
```

```
</qos_profile>
```

Legacy applications may use this QoS Profile via inheritance. To do this, create a derived QoS Profile that inherits from this one. For example:

```
<qos_profile name="MyProfile" base_name="BuiltinQosLib::Generic.StrictReliable">
```

```
  <domain_participant_qos base_name="BuiltinQosLib::Generic.Monitoring.Common">
```

```
</qos_profile>
```

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Generic.Monitoring.Common"

#### 7.168.2.14 DDS\_PROFILE\_GENERIC\_CONNEXT\_MICRO\_COMPATIBILITY

```
const char* const DDS_PROFILE_GENERIC_CONNEXT_MICRO_COMPATIBILITY [extern]
```

Sets the values necessary to communicate with RTI Connex Micro.

This profile will always represent the QoS values required for interoperability between the most recent version of RTI Connex Micro at the time of release of the most recent version of RTI Connex.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Generic.ConnexMicroCompatibility"

#### 7.168.2.15 DDS\_PROFILE\_GENERIC\_CONNEXT\_MICRO\_COMPATIBILITY\_2\_4\_9

```
const char* const DDS_PROFILE_GENERIC_CONNEXT_MICRO_COMPATIBILITY_2_4_9 [extern]
```

Sets the values necessary to communicate with RTI Connex Micro versions 2.4.4 through at least 2.4.9.

At the time of the release of RTI Connex 5.3.0 it was not necessary to set any QoS values in order to interoperate with RTI Connex Micro. This applies to RTI Connex Micro versions 2.4.4 and later. The most recent version of RTI Connex Micro at the time of release of RTI Connex 5.3.0 was 2.4.9. There is no guarantee that this profile will interoperate with versions of RTI Connex Micro after 2.4.9.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Generic.ConnexMicroCompatibility.2.4.9"

#### 7.168.2.16 DDS\_PROFILE\_GENERIC\_CONNEXT\_MICRO\_COMPATIBILITY\_2\_4\_3

```
const char* const DDS_PROFILE_GENERIC_CONNEXT_MICRO_COMPATIBILITY_2_4_3 [extern]
```

Sets the values necessary to communicate with RTI Connex Micro versions 2.4.3 and earlier.

RTI Connex Micro versions 2.4.3 and earlier only supported the **DDS\_MANUAL\_BY\_TOPIC\_LIVELINESS\_QOS** (p. 410) LivelinessQos kind. In order to be compatible with these versions of RTI Connex Micro, the **DDSDataReader** (p. 1288) and **DDSDataWriter** (p. 1321) must have their Liveliness kind changed to this value because the default kind in RTI Connex is **DDS\_AUTOMATIC\_LIVELINESS\_QOS** (p. 410).

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Generic.ConnexMicroCompatibility.2.4.3"

#### 7.168.2.17 DDS\_PROFILE\_GENERIC\_OTHER\_DDS\_VENDOR\_COMPATIBILITY

```
const char* const DDS_PROFILE_GENERIC_OTHER_DDS_VENDOR_COMPATIBILITY [extern]
```

Sets the values necessary to interoperate with other DDS vendors.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Generic.OtherDDSVendorCompatibility"



### 7.168.2.18 DDS\_PROFILE\_GENERIC\_510\_TRANSPORT\_COMPATIBILITY

```
const char* const DDS_PROFILE_GENERIC_510_TRANSPORT_COMPATIBILITY [extern]
```

Sets the values necessary to interoperate with RTI Connex 5.1.0 using the UDPv6 and/or SHMEM transports.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Generic.510TransportCompatibility"

### 7.168.2.19 DDS\_BUILTIN\_QOS\_LIB\_EXP

```
const char* const DDS_BUILTIN_QOS_LIB_EXP [extern]
```

A library of experimental QoS profiles.

Experimental profiles are new profiles that have been tested internally but have not gone through an extensive validation period. Therefore some of the settings may change in future releases based on customer and internal feedback. After validation, experimental profiles will be moved into the non-experimental library.

QoS Profiles in this library are deprecated. They have been moved to "BuiltinQosLib". You should use the QoS Profiles from "BuiltinQosLib" instead of the ones in "BuiltinQosLibExp". The experimental profiles are still defined here to avoid backward compatibility issues.

String-version: "BuiltinQosLibExp"

### 7.168.2.20 DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE

```
const char* const DDS_PROFILE_GENERIC_STRICT_RELIABLE [extern]
```

Enables strict reliability.

Configures communication to be "strict reliable" where every sample is reliably delivered.

Combines the use of the **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) for **DDS\_ReliabilityQosPolicy** (p. 1041) with a **DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406) for the **DDS\_HistoryQosPolicyKind** (p. 405).

This QoS Profile also optimizes the reliability protocol setting for this configuration.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.StrictReliable"

### 7.168.2.21 DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE

```
const char* const DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE [extern]
```

Enables keep-last reliability.

Like the Generic.StrictReliable profile, this profile ensures in-order delivery of samples. However, new data can overwrite data that has not yet been acknowledged by the reader, therefore causing possible sample loss.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.KeepLastReliable"

### 7.168.2.22 DDS\_PROFILE\_GENERIC\_BEST\_EFFORT

```
const char* const DDS_PROFILE_GENERIC_BEST_EFFORT [extern]
```

Enables best-effort reliability kind.

This profile enables best-effort communication. No effort or resources are spent to track whether or not sent samples are received. Minimal resources are used. This is the most deterministic method of sending data since there is no indeterministic delay that can be introduced by resending data. Data samples may be lost. This setting is good for periodic data.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.BestEffort"

### 7.168.2.23 DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_HIGH\_THROUGHPUT

```
const char* const DDS_PROFILE_GENERIC_STRICT_RELIABLE_HIGH_THROUGHPUT [extern]
```

A profile that can be used to achieve high throughput.

This QoS Profile extends the **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE** (p. 491) QoS Profile to perform additional, fine-grained performance tuning specific to applications that send continuously streaming data. The parameters specified here add to and/or override the parameters specified in the **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE** (p. 491) QoS Profile..

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.StrictReliable.HighThroughput"

### 7.168.2.24 DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LOW\_LATENCY

```
const char* const DDS_PROFILE_GENERIC_STRICT_RELIABLE_LOW_LATENCY [extern]
```

A profile that can be used to achieve low latency.

This QoS Profile extends the **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE** (p. 491) QoS Profile to perform additional, fine-grained performance tuning specific to applications that send continuously streaming data. The parameters specified here add to and/or override the parameters specified in the **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE** (p. 491) QoS Profile.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.StrictReliable.LowLatency"

### 7.168.2.25 DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA

```
const char* const DDS_PROFILE_GENERIC_PARTICIPANT_LARGE_DATA [extern]
```

A common Participant base profile to facilitate sending large data.

This is a common Participant base QoS Profile that configures 3 different flow controllers: 838, 209, and 52 Mbps that can each be used to throttle application data flow at different rates.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.Participant.LargeData"

### 7.168.2.26 DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA\_MONITORING

```
const char* const DDS_PROFILE_GENERIC_PARTICIPANT_LARGE_DATA_MONITORING [extern]
```

Configures Participants for large data *and* monitoring.

This is a common base Participant QoS Profile to configure Participants to both handle large data and use RTI Monitoring Library.

This QoS Profile is deprecated. It is included for backwards compatibility.

It is recommended that instead of inheriting from this QoS Profile, new applications apply the following QoS Snippets to their application-specific QoS Profiles:

Enable Monitoring

- **DDS\_SNIPPET\_FEATURE\_MONITORING\_ENABLE** (p. 512)

Enable Large Data + optimizations

- **DDS\_SNIPPET\_QOS\_POLICY\_PUBLISH\_MODE\_ASYNCHRONOUS** (p. 508)
- **DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_LARGE\_DATA** (p. 504)
- **DDS\_SNIPPET\_OPTIMIZATION\_DATACACHE\_LARGE\_DATA\_DYNAMICMEMALLOC** (p. 504) In Library↔ : **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.Participant.LargeData.Monitoring"

See also

**DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA** (p. 492)

**DDS\_PROFILE\_GENERIC\_MONITORING\_COMMON** (p. 489)

### 7.168.2.27 DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA

```
const char* const DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA [extern]
```

Configures endpoints for sending large data with strict reliability.

This QoS Profile extends the **DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA** (p. 492) QoS Profile to handle sending large samples. This QoS Profile optimizes memory usage per sample within RTI Connex, but it does not do any flow control. You can use this QoS Profile directly, which enables asynchronous publication with the default flow controller (i.e. no flow control) or you can use one of the three QoS Profiles below (Generic.StrictReliable.LargeData.\*↔Flow), which uses this QoS Profile as a common base QoS Profile. Each of these three QoS Profiles uses one of the three flow controllers defined in **DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA** (p. 492) in order to throttle application data flow.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.StrictReliable.LargeData"

### 7.168.2.28 DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA

```
const char* const DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA [extern]
```

Configures endpoints for sending large data with keep-last reliability.

This QoS Profile is similar to the **DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA** (p. 492) QoS Profile, but also adds QoS Snippets to handle sending large data. You can use this QoS Profile directly, which enables the default flow controller (i.e., no flow control) or you can choose one of the three QoS Profiles below (Generic.KeepLastReliable.↔LargeData.\*Flow) which uses this QoS Profile as a common base QoS Profile. Each of these three QoS Profiles uses one of the three flow controllers defined in **DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA** (p. 492) in order to throttle application data flow.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.KeepLastReliable.LargeData"

### 7.168.2.29 DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA\_FAST\_FLOW

```
const char* const DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_FAST_FLOW [extern]
```

Configures strictly reliable communication for large data with a fast flow controller.

Strictly reliable communication for large data with a 838 Mbps (~ 100 MB/sec) flow controller.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.StrictReliable.LargeData.FastFlow"

**7.168.2.30 DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA\_MEDIUM\_FLOW**

```
const char* const DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_MEDIUM_FLOW [extern]
```

Configures strictly reliable communication for large data with a medium flow controller.

Strictly reliable communication for large data with a 209Mbps (~ 25 MB/sec) flow controller.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.StrictReliable.LargeData.MediumFlow"

**7.168.2.31 DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA\_SLOW\_FLOW**

```
const char* const DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_SLOW_FLOW [extern]
```

Configures strictly reliable communication for large data with a slow flow controller.

Strictly reliable communication for large data with a 52 MB/sec (~ 6.25 MB/sec) flow controller.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.StrictReliable.LargeData.SlowFlow"

**7.168.2.32 DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA\_FAST\_FLOW**

```
const char* const DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA_FAST_FLOW [extern]
```

Configures keep-last reliable communication for large data with a fast flow controller.

Keep-last reliable communication for large data with a 838 Mbps (~ 100 MB/sec) flow controller.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.KeepLastReliable.LargeData.FastFlow"

**7.168.2.33 DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA\_MEDIUM\_FLOW**

```
const char* const DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA_MEDIUM_FLOW [extern]
```

Configures keep-last reliable communication for large data with a medium flow controller.

Keep-last reliable communication for large data with a 209Mbps (~ 25 MB/sec) flow controller.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.KeepLastReliable.LargeData.MediumFlow"

### 7.168.2.34 DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA\_SLOW\_FLOW

```
const char* const DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA_SLOW_FLOW [extern]
```

Configures keep-last reliable communication for large data with a slow flow controller.

Keep-last reliable communication for large data with a 52 MB/sec (~ 6.25 MB/sec) flow controller.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.KeepLastReliable.LargeData.SlowFlow"

### 7.168.2.35 DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_TRANSIENT\_LOCAL

```
const char* const DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_TRANSIENT_LOCAL [extern]
```

Persists the samples of a DataWriter as long as the entity exists.

This profile extends the **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE** (p. 491) profile, but persists the samples of a **DDSDataWriter** (p. 1321) as long as the entity exists in order to deliver them to late-joining DataReaders.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.KeepLastReliable.TransientLocal"

### 7.168.2.36 DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_TRANSIENT

```
const char* const DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_TRANSIENT [extern]
```

Persists samples using RTI Persistence Service.

This profile extends the **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE** (p. 491) profile, but persists samples using Persistence Service in order to deliver them to late-joining DataReaders.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.KeepLastReliable.Transient"

### 7.168.2.37 DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_PERSISTENT

```
const char* const DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_PERSISTENT [extern]
```

Persists samples in permanent storage, like a disk, using RTI Persistence Service.

This profile extends the **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE** (p. 491) profile, but persists samples in permanent storage, such as a disk, using Persistence Service in order to deliver them to late-joining DataReaders.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.KeepLastReliable.Persistent"

**7.168.2.38 DDS\_PROFILE\_GENERIC\_AUTO\_TUNING**

```
const char* const DDS_PROFILE_GENERIC_AUTO_TUNING [extern]
```

Enables the Turbo Mode batching and Auto Throttle experimental features.

Turbo Mode batching adjusts the maximum number of bytes of a batch based on how frequently samples are being written. Auto Throttle auto-adjusts the speed at which a writer will write samples, based on the number of unacknowledged samples in its queue.

These features are designed to auto-adjust the publishing behavior within a system in order to achieve the best possible performance with regards to throughput and latency.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.AutoTuning"

**7.168.2.39 DDS\_PROFILE\_GENERIC\_MINIMAL\_MEMORY\_FOOTPRINT**

```
const char* const DDS_PROFILE_GENERIC_MINIMAL_MEMORY_FOOTPRINT [extern]
```

Uses a set of QoS which reduces the memory footprint of the application.

Uses a set of QoS which reduces the memory footprint of the application.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Generic.MinimalMemoryFootprint"

**7.168.2.40 DDS\_PROFILE\_GENERIC\_SECURITY**

```
const char* const DDS_PROFILE_GENERIC_SECURITY [extern]
```

Loads the DDS Secure builtin plugins.

Generic Base Participant Profile that enables the builtin DDS Security Plugins.

Use of this QoS Profile is deprecated. It is included for backwards compatibility.

Instead of using the (deprecated) "BuiltinQosLib::Generic.Security", apply the QoS Snippet "BuiltinQosSnippetLib::Feature.Security.Enable" via composition. For example:

```
<qos_profile name="MyProfile">
  <base_name>
    <element>BuiltinQosSnippetLib::Feature.Security.Enable</element>
  </base_name>
</qos_profile>
```

Legacy applications may use this QoS Profile via inheritance. To do this, create a derived QoS Profile that inherits from this one. For example:

```
<qos_profile name="MyProfile" base_name="BuiltinQosLib::Generic.StrictReliable">
  <domain_participant_qos base_name="BuiltinQosLib::Generic.Security">
  </domain_participant_qos>
</qos_profile>
```

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486)

String-version: "Generic.Security"

### 7.168.2.41 DDS\_PROFILE\_GENERIC\_MONITORING2

```
const char* const DDS_PROFILE_GENERIC_MONITORING2 [extern]
```

The default QoS profile that the DDS entities created by the RTI Monitoring Library 2.0 use.

This profile inherits from **DDS\_PROFILE\_GENERIC\_MINIMAL\_MEMORY\_FOOTPRINT** (p. 497).

The following DomainParticipant QoS policy of this profile cannot be modified and it is overwritten by the RTI Monitoring Library 2.0:

- Discovery Config Built-in Channel Kind.

The following DataWriter and DataReader QoS policies of this profile cannot be modified and they are overwritten by the RTI Monitoring Library 2.0:

- Reliability Kind.
- Durability Kind.
- History Kind.
- Publish Mode Kind.
- Protocol -> RTPS Reliable Writer -> Max Heartbeat Retries.

This profile uses Topic Filters to select the DataWriter and DataReader QoS depending on the Observability Distribution Topic.

You should be using this profile or a profile inheriting from it when you configure the distribution of telemetry data using the <distribution\_settings> tag under <monitoring> for the <participant\_factory\_qos>.

Note: This profile does not enable the use of the RTI Monitoring Library 2.0. To do that you can use the Snippet **DDS\_SNIPPET\_FEATURE\_MONITORING2\_ENABLE** (p. 513).

String-version: "Generic.Monitoring2"

See also

**RTI\_MONITORING\_PERIODIC\_TOPIC\_NAME** (p. 521)

**RTI\_MONITORING\_EVENT\_TOPIC\_NAME** (p. 521)

**RTI\_MONITORING\_LOGGING\_TOPIC\_NAME** (p. 522)



### 7.168.2.42 DDS\_PROFILE\_PATTERN\_PERIODIC\_DATA

```
const char* const DDS_PROFILE_PATTERN_PERIODIC_DATA [extern]
```

Used for applications that expect periodic data.

This QoS Profile is intended to be used for applications that expect periodic data such as sensor data. The deadline that is set in this profile can be used to detect when DataWriters are not publishing data with the expected periodicity.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Pattern.PeriodicData"

### 7.168.2.43 DDS\_PROFILE\_PATTERN\_STREAMING

```
const char* const DDS_PROFILE_PATTERN_STREAMING [extern]
```

Used for applications that stream data.

The data sent in streaming applications is commonly periodic. Therefore this profile simply inherits from the **DDS\_PROFILE\_PATTERN\_PERIODIC\_DATA** (p. 498) profile. Note: With this QoS Profile, the application may lose data, which may be acceptable in use cases such as video conferencing.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Pattern.Streaming"

### 7.168.2.44 DDS\_PROFILE\_PATTERN\_RELIABLE\_STREAMING

```
const char* const DDS_PROFILE_PATTERN_RELIABLE_STREAMING [extern]
```

Used for applications that stream data *and* require reliable communication.

Sometimes streaming applications require reliable communication while still tolerating some data loss. In this case, we inherit from the **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE** (p. 491) QoS Profile and the following QoS Snippets:

- **DDS\_SNIPPET\_QOS\_POLICY\_RELIABILITY\_RELIABLE** (p. 506)
- **DDS\_SNIPPET\_QOS\_POLICY\_HISTORY\_KEEP\_LAST\_1** (p. 507)
- **DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_KEEP\_LAST** (p. 502)

This QoS Snippet also increases the **DDS\_HistoryQosPolicy::depth** (p. 921) to reduce the probability of losing samples.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Pattern.ReliableStreaming"

### 7.168.2.45 DDS\_PROFILE\_PATTERN\_EVENT

```
const char* const DDS_PROFILE_PATTERN_EVENT [extern]
```

Used for applications that handle events.

This QoS Profile can be used by applications in which samples represent events such as button pushes or alerts. When events are triggered, the system should almost always do something, meaning that you don't want the system to lose the event. This means that the system requires strictly reliable communication. To enable it, use the following QoS Snippets:

- **DDS\_SNIPPET\_QOS\_POLICY\_RELIABILITY\_RELIABLE** (p. 506)
- **DDS\_SNIPPET\_QOS\_POLICY\_HISTORY\_KEEP\_ALL** (p. 508)
- **DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_KEEP\_ALL** (p. 502)

Since events and alerts are critical and non-periodic data, it is important to detect situations in which communication between a **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) is broken. This is why this profile sets the **DDS\_↔\_LivelinessQosPolicy** (p. 936). If the **DDSDataWriter** (p. 1321) does not assert its liveliness in a timely manner, the **DDSDataReader** (p. 1288) will report 'loss of liveliness' to the application.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Pattern.Event"

### 7.168.2.46 DDS\_PROFILE\_PATTERN\_ALARM\_EVENT

```
const char* const DDS_PROFILE_PATTERN_ALARM_EVENT [extern]
```

Used for applications that handle alarm events.

An alarm is a type of event; therefore this profile simply inherits from **DDS\_PROFILE\_PATTERN\_EVENT** (p. 499).

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Pattern.AlarmEvent"

### 7.168.2.47 DDS\_PROFILE\_PATTERN\_STATUS

```
const char* const DDS_PROFILE_PATTERN_STATUS [extern]
```

Used for applications whose samples represent statuses.

This QoS Profile can be used by applications in which samples represent state variables whose values remain valid as long as they don't explicitly change. State variables typically do not change periodically. State variables and their values should also be available to applications that appear after the value originally changed because it is unreasonable to have to wait until the next change of state, which may be indeterminate.

Whether to use this QoS Profile or **DDS\_PROFILE\_PATTERN\_PERIODIC\_DATA** (p. 498) can often be an application choice. For example, if a DataWriter is publishing temperature sensor data, it could use the **DDS\_PROFILE\_↔\_PATTERN\_PERIODIC\_DATA** (p. 498) QoS Profile and publish the data at a fixed rate or it could use the **DDS\_↔\_PROFILE\_PATTERN\_STATUS** (p. 500) QoS Profile and only publish the temperature when it changes more than 1 degree.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Pattern.Status"

### 7.168.2.48 DDS\_PROFILE\_PATTERN\_ALARM\_STATUS

```
const char* const DDS_PROFILE_PATTERN_ALARM_STATUS [extern]
```

Used for applications in which samples represent alarm statuses.

An alarm status is a type of status; therefore this QoS Profile simply inherits from **DDS\_PROFILE\_PATTERN\_STATUS** (p. 500).

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Pattern.AlarmStatus"

### 7.168.2.49 DDS\_PROFILE\_PATTERN\_LAST\_VALUE\_CACHE

```
const char* const DDS_PROFILE_PATTERN_LAST_VALUE_CACHE [extern]
```

Used for applications that only need the last published value.

With this QoS Profile, a **DDSDataWriter** (p. 1321) will keep in its queue the last value that was published for each sample instance. Late-joining DataReaders will get that value when they join the system. This QoS Profile inherits from **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_TRANSIENT\_LOCAL** (p. 496) because the use case requires delivery to late-joiners.

In Library: **DDS\_BUILTIN\_QOS\_LIB** (p. 486) and **DDS\_BUILTIN\_QOS\_LIB\_EXP** (p. 491)

String-version: "Pattern.LastValueCache"

### 7.168.2.50 DDS\_BUILTIN\_QOS\_SNIPPET\_LIB

```
const char* const DDS_BUILTIN_QOS_SNIPPET_LIB [extern]
```

A library of QoS Snippets.

String-version: "BuiltinQosSnippetLib"

### 7.168.2.51 DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_COMMON

```
const char* const DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_COMMON [extern]
```

QoS Snippet that configures the reliability protocol with a common configuration.

The QoS Snippets starting with "Optimization.ReliabilityProtocol." provide alternative configurations of the same QoS Policies. Choose just one QoS Snippet of the alternatives when defining a new QoS Profile or QoS Snippet.

This QoS Snippet defines parameters common to a set of "alternative" QoS Snippets that configure the reliability protocol.

Modified QoS Parameters:

- **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_ResourceLimitsQosPolicy** (p. 1052)
- **DDS\_DataReaderProtocolQosPolicy::rtps\_reliable\_reader** (p. 633)

This QoS Snippet configures the reliability protocol parameters for more aggressive (faster) heartbeats so that sample loss is detected and repaired faster.

This QoS Snippet also sets the **DDS\_RtpsReliableWriterProtocol\_t::max\_heartbeat\_retries** (p. 1066), which works in combination with the heartbeat rate to determine when the **DDSDataWriter** (p. 1321) considers a **DDSDataReader** (p. 1288) non-responsive. This QoS Snippet configures the **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677) parameters so that the **DDSDataWriter** (p. 1321) considers the **DDSDataReader** (p. 1288) to be "inactive" after 500 unresponded heartbeats.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.ReliabilityProtocol.Common"

### 7.168.2.52 DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_KEEP\_ALL

```
const char* const DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_KEEP_ALL [extern]
```

QoS Snippet that configures the reliability protocol for KEEP\_ALL.

The QoS Snippets starting with "Optimization.ReliabilityProtocol." provide alternative configurations of the same QoS Policies. Choose just one QoS Snippet of the alternatives when defining a new QoS Profile or QoS Snippet.

This QoS Snippet optimizes the **DDSDataWriter** (p. 1321) reliable protocol parameters for a reliable **DDSDataWriter** (p. 1321) with **DDS\_HistoryQosPolicyKind** (p. 405) set to **DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406).

Modified QoS Parameters:

- **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_ResourceLimitsQosPolicy** (p. 1052)
- **DDS\_DataReaderProtocolQosPolicy::rtps\_reliable\_reader** (p. 633)

Note that this QoS Snippet does not configure the **DDS\_ReliabilityQosPolicy** (p. 1041) or **DDS\_HistoryQosPolicy** (p. 919) QoS policies. It is intended to be used in combination with other QoS Snippets that configure those policies.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.ReliabilityProtocol.KeepAll"

### 7.168.2.53 DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_KEEP\_LAST

```
const char* const DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_KEEP_LAST [extern]
```

QoS Snippet that configures the reliability protocol for KEEP\_LAST.

The QoS Snippets starting with "Optimization.ReliabilityProtocol." provide alternative configurations of the same QoS Policies. Choose just one QoS Snippet of the alternatives when defining a new QoS Profile or QoS Snippet.

This QoS Snippet optimizes the **DDSDataWriter** (p. 1321) reliable protocol parameters for a reliable **DDSDataWriter** (p. 1321) with **DDS\_HistoryQosPolicyKind** (p. 405) set to **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406).

Modified QoS Parameters:

- **DDS\_DataWriterQos** (p. 689) => **DDS\_ResourceLimitsQosPolicy** (p. 1052)
- **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_ResourceLimitsQosPolicy** (p. 1052)
- **DDS\_DataReaderProtocolQosPolicy::rtps\_reliable\_reader** (p. 633)

Note that this QoS Snippet does not configure the **DDS\_ReliabilityQosPolicy** (p. 1041) or **DDS\_HistoryQosPolicy** (p. 919) QoS policies. It is intended to be used in combination with other QoS Snippets that configure those policies.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.ReliabilityProtocol.KeepLast"

### 7.168.2.54 DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_HIGH\_RATE

```
const char* const DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_HIGH_RATE [extern]
```

QoS Snippet that configures the reliability protocol for sending data at a high rate.

The QoS Snippets starting with "Optimization.ReliabilityProtocol." provide alternative configurations of the same QoS Policies. Choose just one QoS Snippet of the alternatives when defining a new QoS Profile or QoS Snippet.

This QoS Snippet optimizes the **DDSDataWriter** (p. 1321) reliable protocol parameters for a reliable **DDSDataWriter** (p. 1321) that is writing messages at high rates, especially in situations where throughput is favored over latency.

Modified QoS Parameters:

- **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_ResourceLimitsQosPolicy** (p. 1052)
- **DDS\_DataReaderProtocolQosPolicy::rtps\_reliable\_reader** (p. 633)

This QoS Snippet sets a fast rate of heartbeats so that errors are detected and repaired more swiftly.

Note that to get the highest throughput you may need to apply additional changes to the final QoS Profile. See the QoS Profile **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_HIGH\_THROUGHPUT** (p. 492) for further information.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.ReliabilityProtocol.HighRate"

### 7.168.2.55 DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_LOW\_LATENCY

```
const char* const DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_LOW_LATENCY [extern]
```

QoS Snippet that configures the reliability protocol for sending data at low latency.

The QoS Snippets starting with "Optimization.ReliabilityProtocol." provide alternative configurations of the same QoS Policies. Choose just one QoS Snippet of the alternatives when defining a new QoS Profile or QoS Snippet.

This QoS Snippet modifies the Reliable Protocol parameters to accomplish low latency.

Modified QoS Parameters:

- **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_ResourceLimitsQosPolicy** (p. 1052)
- **DDS\_DataReaderProtocolQosPolicy::rtps\_reliable\_reader** (p. 633)

Note that to get the lowest latency you may need to apply additional changes to the final QoS Profile. See the QoS Profile **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LOW\_LATENCY** (p. 492) for further information.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.ReliabilityProtocol.LowLatency"

### 7.168.2.56 DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_LARGE\_DATA

```
const char* const DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_LARGE_DATA [extern]
```

QoS Snippet that configures the reliability protocol for large data.

The QoS Snippets starting with "Optimization.ReliabilityProtocol." provide alternative configurations of the same QoS Policies. Choose just one QoS Snippet of the alternatives when defining a new QoS Profile or QoS Snippet.

Modifies the Reliable Protocol parameters and Resource Limits to work with Large Data.

Modified QoS Parameters:

- **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_ResourceLimitsQosPolicy** (p. 1052)
- **DDS\_DataReaderProtocolQosPolicy::rtps\_reliable\_reader** (p. 633)

Note that to send large data you need to apply additional changes that configure the data caches, asynchronous writing, transport buffers, etc. See, for example, **DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA** (p. 494), and derivatives for fully functional Large Data QoS Profiles.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.ReliabilityProtocol.LargeData"

**7.168.2.57 DDS\_SNIPPET\_OPTIMIZATION\_DATACACHE\_LARGE\_DATA\_DYNAMICMEMALLOC**

```
const char* const DDS_SNIPPET_OPTIMIZATION_DATACACHE_LARGE_DATA_DYNAMICMEMALLOC [extern]
```

Configures the DataWriter and DataReader caches to use dynamic memory allocation for Large Data samples.

Modified QoS Parameters:

- **DDS\_DataWriterQos** (p. 689) => **DDS\_ResourceLimitsQosPolicy** (p. 1052)
- **DDS\_DataWriterQos** (p. 689) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.data\_writer.history.memory↔\_manager.\*"
- **DDS\_DataReaderQos** (p. 644) => **DDS\_ResourceLimitsQosPolicy** (p. 1052)
- **DDS\_DataReaderResourceLimitsQosPolicy** (p. 654)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.data\_reader.history↔\_memory\_manager.\*"

This configuration is needed to handle data that contains unbounded sequences or strings. This QoS Snippet is also recommended if samples can have very different sizes and the bigger samples can be very large.

If dynamic memory allocation is not used for the larger samples, then all samples are allocated to their maximum size which can consume a lot of resources.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.DataCache.LargeData.DynamicMemAlloc"

**7.168.2.58 DDS\_SNIPPET\_OPTIMIZATION\_DISCOVERY\_COMMON**

```
const char* const DDS_SNIPPET_OPTIMIZATION_DISCOVERY_COMMON [extern]
```

QoS Snippet that optimizes discovery with a common configuration.

Optimizes the **DDS\_DomainParticipantQos** (p. 741) to detect faster discovery changes. This QoS Snippet increases the speed moderately so that it fits the normal scenarios.

Modified QoS Parameters:

- **DDS\_DiscoveryConfigQosPolicy::participant\_liveliness\_lease\_duration** (p. 714)
- **DDS\_DiscoveryConfigQosPolicy::participant\_liveliness\_assert\_period** (p. 715)
- **DDS\_DiscoveryConfigQosPolicy::max\_liveliness\_loss\_detection\_period** (p. 716)
- **DDS\_DiscoveryConfigQosPolicy::initial\_participant\_announcements** (p. 716)
- **DDS\_DiscoveryConfigQosPolicy::publication\_writer** (p. 719)
- **DDS\_DiscoveryConfigQosPolicy::subscription\_writer** (p. 720)

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.Discovery.Common"

### 7.168.2.59 DDS\_SNIPPET\_OPTIMIZATION\_DISCOVERY\_PARTICIPANT\_COMPACT

```
const char* const DDS_SNIPPET_OPTIMIZATION_DISCOVERY_PARTICIPANT_COMPACT [extern]
```

QoS Snippet that optimizes the Participant QoS to send less discovery information.

Modified QoS Parameters:

- **DDS\_DomainParticipantQos** (p. 741) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.participant.inter\_↔ participant.\*"
- **DDS\_DomainParticipantQos** (p. 741) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.sys\_info.\*"

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.Discovery.Participant.Compact"

### 7.168.2.60 DDS\_SNIPPET\_OPTIMIZATION\_DISCOVERY\_ENDPOINT\_FAST

```
const char* const DDS_SNIPPET_OPTIMIZATION_DISCOVERY_ENDPOINT_FAST [extern]
```

QoS Snippet that optimizes the Endpoint Discovery to be faster.

This is useful when using security, to prevent a noticeable delay.

Modified QoS Parameters:

- **DDS\_DiscoveryConfigQosPolicy::publication\_writer** (p. 719)
- **DDS\_DiscoveryConfigQosPolicy::subscription\_writer** (p. 720)

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.Discovery.Endpoint.Fast"

### 7.168.2.61 DDS\_SNIPPET\_OPTIMIZATION\_TRANSPORT\_LARGE\_BUFFERS

```
const char* const DDS_SNIPPET_OPTIMIZATION_TRANSPORT_LARGE_BUFFERS [extern]
```

QoS Snippet that increases the Participant default buffer that shm and udpv4 use.

This is useful when using Large Data

Modified QoS Parameters:

- **DDS\_ReceiverPoolQosPolicy** (p. 1038)
- **DDS\_TransportBuiltinQosPolicy** (p. 1144)

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Optimization.Transport.LargeBuffers"



### 7.168.2.62 DDS\_SNIPPET\_QOS\_POLICY\_RELIABILITY\_RELIABLE

```
const char* const DDS_SNIPPET_QOS_POLICY_RELIABILITY_RELIABLE [extern]
```

QoS Snippet that sets RELIABILITY QoS to RELIABLE.

This also configures a blocking time in case the **DDSDataWriter** (p. 1321) writes faster than the DataReaders can accommodate.

Modified QoS Parameters:

- **DDS\_DataWriterQos** (p. 689) => **DDS\_ReliabilityQosPolicy** (p. 1041)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_ReliabilityQosPolicy** (p. 1041)

Note that by itself enabling reliability does not ensure that every sample written is delivered to the DataReaders. This is because the **DDSDataWriter** (p. 1321) and/or **DDSDataReader** (p. 1288) can be configured to override samples in its cache based on the configuration of the **DDS\_HistoryQosPolicy** (p. 919) QoS policy.

To ensure delivery of every sample (at the expense of potentially blocking the **DDSDataWriter** (p. 1321)), use the QoS Profile **DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE** (p. 491) or one of the derived QoS Profiles.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "QoSPolicy.Reliability.Reliable"

### 7.168.2.63 DDS\_SNIPPET\_QOS\_POLICY\_RELIABILITY\_BEST\_EFFORT

```
const char* const DDS_SNIPPET_QOS_POLICY_RELIABILITY_BEST_EFFORT [extern]
```

QoS Snippet that sets RELIABILITY QoS to BEST\_EFFORT.

Modified QoS Parameters:

- **DDS\_DataWriterQos** (p. 689) => **DDS\_ReliabilityQosPolicy** (p. 1041)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_ReliabilityQosPolicy** (p. 1041)

With best-effort, there are no resources spent to confirm delivery of samples nor repairs of any samples that may be lost.

Best-effort communication reduces jitter; therefore, the delay between sending data and receiving it is more deterministic for the samples that are actually received. Best-effort is good for periodic data where it may be better to get the next value than to wait for the previous one to be repaired.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "QoSPolicy.Reliability.BestEffort"

#### 7.168.2.64 DDS\_SNIPPET\_QOS\_POLICY\_HISTORY\_KEEP\_LAST\_1

```
const char* const DDS_SNIPPET_QOS_POLICY_HISTORY_KEEP_LAST_1 [extern]
```

QoS Snippet that sets HISTORY QoS to KEEP\_LAST kind with depth 1.

Modified QoS Parameters:

- **DDS\_DataWriterQos** (p. 689) => **DDS\_HistoryQosPolicy** (p. 919)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_HistoryQosPolicy** (p. 919)

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "QosPolicy.History.KeepLast\_1"

#### 7.168.2.65 DDS\_SNIPPET\_QOS\_POLICY\_HISTORY\_KEEP\_ALL

```
const char* const DDS_SNIPPET_QOS_POLICY_HISTORY_KEEP_ALL [extern]
```

QoS Snippet that sets HISTORY QoSPolicy to KEEP\_ALL kind.

Modified QoS Parameters:

- **DDS\_DataWriterQos** (p. 689) => **DDS\_HistoryQosPolicy** (p. 919)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_HistoryQosPolicy** (p. 919)

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "QosPolicy.History.KeepAll"

#### 7.168.2.66 DDS\_SNIPPET\_QOS\_POLICY\_PUBLISH\_MODE\_ASYNCHRONOUS

```
const char* const DDS_SNIPPET_QOS_POLICY_PUBLISH_MODE_ASYNCHRONOUS [extern]
```

QoS Snippet that sets PUBLISH\_MODE QoSPolicy to ASYNCHRONOUS kind.

Modified QoS Parameters:

- **DDS\_PublishModeQosPolicy** (p. 1025)

Asynchronous Publish mode decouples the application thread that calls the **DDSDataWriter** (p. 1321) "write" operation from the thread used to send the data on the network. See <https://community.rti.com/glossary/asynchronous-writer>

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "QosPolicy.PublishMode.Asynchronous"

### 7.168.2.67 DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_TRANSIENT\_LOCAL

```
const char* const DDS_SNIPPET_QOS_POLICY_DURABILITY_TRANSIENT_LOCAL [extern]
```

QoS Snippet that sets DURABILITY QoSPolicy to TRANSIENT\_LOCAL kind.

Modified QoS Parameters:

- **DDS\_DataWriterQos** (p. 689) => **DDS\_DurabilityQosPolicy** (p. 767)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_DurabilityQosPolicy** (p. 767)

DataWriters will store and send previously published DDS samples for delivery to newly discovered DataReaders as long as the **DDSDataWriter** (p. 1321) still exists. For this setting to be effective, you must also set the **DDS\_ReliabilityQosPolicyKind** (p. 434) to **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) (not Best Effort). Which particular DDS samples are kept depends on other QoS settings such as **DDS\_HistoryQosPolicy** (p. 919) and **DDS\_ResourceLimitsQosPolicy** (p. 1052).

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "QoSPolicy.Durability.TransientLocal"

### 7.168.2.68 DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_TRANSIENT

```
const char* const DDS_SNIPPET_QOS_POLICY_DURABILITY_TRANSIENT [extern]
```

QoS Snippet that sets DURABILITY QoSPolicy to TRANSIENT kind.

Modified QoS Parameters:

- **DDS\_DataWriterQos** (p. 689) => **DDS\_DurabilityQosPolicy** (p. 767)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_DurabilityQosPolicy** (p. 767)

RTI Connext will store previously published DDS samples in memory using Persistence Service, which will send the stored data to newly discovered DataReaders. Which particular DDS samples are kept and sent by Persistence Service depends on the **DDS\_HistoryQosPolicy** (p. 919) and **DDS\_ResourceLimitsQosPolicy** (p. 1052) of the Persistence Service DataWriters. These QoS Policies can be configured in the Persistence Service configuration file or through the **DDS\_DurabilityQosPolicyKind** (p. 400) of the DataWriters configured with **DDS\_TRANSIENT\_DURABILITY\_QOS** (p. 401).

You need a Persistence Service instance running to use this behavior.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "QoSPolicy.Durability.Transient"

### 7.168.2.69 DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_PERSISTENT

```
const char* const DDS_SNIPPET_QOS_POLICY_DURABILITY_PERSISTENT [extern]
```

QoS Snippet that sets DURABILITY QoSPolicy to PERSISTENT kind.

Modified QoS Parameters:

- **DDS\_DataWriterQos** (p. 689) => **DDS\_DurabilityQosPolicy** (p. 767)
- **DDS\_DataReaderQos** (p. 644) => **DDS\_DurabilityQosPolicy** (p. 767)

RTI Connext will store previously published DDS samples in permanent storage, like a disk, using Persistence Service, which will send the stored data to newly discovered DataReaders. Which particular DDS samples are kept and sent by Persistence Service depends on the **DDS\_HistoryQosPolicy** (p. 919) and **DDS\_ResourceLimitsQosPolicy** (p. 1052) in the Persistence Service DataWriters. These QoS Policies can be configured in the Persistence Service configuration file or through the **DDS\_DurabilityQosPolicyKind** (p. 400) of the DataWriters configured with **DDS\_PERSISTENT\_↔ DURABILITY\_QOS** (p. 401).

You need a Persistence Service instance running to use this behavior.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "QoSPolicy.Durability.Persistent"

### 7.168.2.70 DDS\_SNIPPET\_QOS\_POLICY\_BATCHING\_ENABLE

```
const char* const DDS_SNIPPET_QOS_POLICY_BATCHING_ENABLE [extern]
```

QoS Snippet that sets BATCH QoSPolicy to true.

Modified QoS Parameters:

- **DDS\_BatchQosPolicy** (p. 600)

This QoS Snippet specifies and configures the mechanism that allows RTI Connext to collect multiple user data DDS samples to be sent in a single network packet, to take advantage of the efficiency of sending larger packets and thus increase effective throughput.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "QoSPolicy.Batching.Enable"

### 7.168.2.71 DDS\_SNIPPET\_FEATURE\_FLOW\_CONTROLLER\_838MBPS

```
const char* const DDS_SNIPPET_FEATURE_FLOW_CONTROLLER_838MBPS [extern]
```

QoS Snippet that configures and set a FlowController of 838 Mbps.

Defines a **DDSFlowController** (p. 1468) and configures the **DDS\_DataWriterQos** (p. 689) with it.

This is a **DDSFlowController** (p. 1468) of 838 Mbps (~ 100 MB/sec)

Modified QoS Parameters:

- **DDS\_DomainParticipantQos** (p. 741) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.flow\_controller.↔ token\_bucket.\*"
- **DDS\_PublishModeQosPolicy** (p. 1025)

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Feature.FlowController.838Mbps"

### 7.168.2.72 DDS\_SNIPPET\_FEATURE\_FLOW\_CONTROLLER\_209MBPS

```
const char* const DDS_SNIPPET_FEATURE_FLOW_CONTROLLER_209MBPS [extern]
```

QoS Snippet that configures and sets a FlowController of 209 Mbps.

Defines a **DDSFlowController** (p. 1468) and configures the **DDS\_DataWriterQos** (p. 689) with it.

This is a **DDSFlowController** (p. 1468) of 209 Mbps (~ 25 MB/sec)

Modified QoS Parameters:

- **DDS\_DomainParticipantQos** (p. 741) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.flow\_controller.↔ token\_bucket.\*"
- **DDS\_PublishModeQosPolicy** (p. 1025)

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Feature.FlowController.209Mbps"

### 7.168.2.73 DDS\_SNIPPET\_FEATURE\_FLOW\_CONTROLLER\_52MBPS

```
const char* const DDS_SNIPPET_FEATURE_FLOW_CONTROLLER_52MBPS [extern]
```

QoS Snippet that configures and sets a FlowController of 52 Mbps.

Defines a **DDSFlowController** (p. 1468) and configures the **DDS\_DataWriterQos** (p. 689) with it.

This is a **DDSFlowController** (p. 1468) of 52 Mbps (~ 6.25 MB/sec)

Modified QoS Parameters:

- **DDS\_DomainParticipantQos** (p. 741) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.flow\_controller.↔ token\_bucket.\*"
- **DDS\_PublishModeQosPolicy** (p. 1025)

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Feature.FlowController.52Mbps"

### 7.168.2.74 DDS\_SNIPPET\_FEATURE\_AUTO\_TUNING\_ENABLE

```
const char* const DDS_SNIPPET_FEATURE_AUTO_TUNING_ENABLE [extern]
```

QoS Snippet that enables auto\_throttle and turbo\_mode to true.

Sets the **DDS\_DomainParticipantQos** (p. 741) properties to enable auto\_throttle and turbo\_mode to true.

Modified QoS Parameters:

- **DDS\_DomainParticipantQos** (p. 741) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.domain\_↔ participant.auto\_throttle"
- **DDS\_DataWriterQos** (p. 689) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.data\_writer.auto\_throttle.↔ enable"
- **DDS\_DataWriterQos** (p. 689) => **DDS\_PropertyQosPolicy** (p. 1007) named "dds.data\_writer.enable\_turbo\_↔ mode"

The domain\_participant.auto\_throttle configures the **DDSDomainParticipant** (p. 1351) to gather internal measurements (during **DDSDomainParticipant** (p. 1351) creation) that are required for the Auto Throttle feature. This allows Data\_↔ Writers belonging to this **DDSDomainParticipant** (p. 1351) to use the Auto Throttle feature.

The turbo\_mode adjusts the batch max\_data\_bytes based on how frequently the **DDSDataWriter** (p. 1321) writes data.

Data\_writer.auto\_throttle enables automatic throttling in the **DDSDataWriter** (p. 1321) so it can automatically adjust the writing rate and the send window size; this minimizes the need for repairing DDS samples and improves latency.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Feature.AutoTuning.Enable"

**7.168.2.75 DDS\_SNIPPET\_FEATURE\_MONITORING\_ENABLE**

```
const char* const DDS_SNIPPET_FEATURE_MONITORING_ENABLE [extern]
```

QoS Snippet that enables the use of the RTI Monitoring Library.

To enable the use of RTI Monitoring Library apply this QoS Snippet to the QoS Profile used to create your **DDSDomain**↔  
**Participant** (p. 1351). For example:

```
<qos_profile name="MyProfile">
  <base_name>
    <element>BuiltinQosLib::Feature.Monitoring.Enable</element>
  </base_name>
</qos_profile>
```

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Feature.Monitoring.Enable"

**7.168.2.76 DDS\_SNIPPET\_FEATURE\_MONITORING2\_ENABLE**

```
const char* const DDS_SNIPPET_FEATURE_MONITORING2_ENABLE [extern]
```

QoS Snippet that enables the use of the RTI Monitoring Library 2.0.

QoS Snippet to enable the use of the RTI Monitoring Library 2.0 with a dedicated DomainParticipant publishing telemetry data from your application in domain ID 2. All metrics are enabled for all resources in this profile.

To enable the use of RTI Monitoring Library 2.0, apply this QoS Snippet to the QoS Profile used to create your Domain↔  
**ParticipantFactory**. For example:

```
<qos_profile name="MyProfile" is_default_participant_factory_profile="true">
  <base_name>
    <element>BuiltinQosSnippetLib::Feature.Monitoring2.Enable</element>
  </base_name>
</qos_profile>
```

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Feature.Monitoring2.Enable"

**7.168.2.77 DDS\_SNIPPET\_FEATURE\_SECURITY\_ENABLE**

```
const char* const DDS_SNIPPET_FEATURE_SECURITY_ENABLE [extern]
```

QoS Snippet that enables security using the Builtin Security Plugins.

To enable the use of the Builtin DDS Security Library apply this QoS Snippet to the QoS Profile used to create your **DDSDomainParticipant** (p. 1351). For example:

```
<qos_profile name="MyProfile">
  <base_name>
    <element>BuiltinQosLib::Feature.Security.Enable</element>
  </base_name>
</qos_profile>
```

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Feature.Security.Enable"

### 7.168.2.78 DDS\_SNIPPET\_FEATURE\_TOPIC\_QUERY\_ENABLE

```
const char* const DDS_SNIPPET_FEATURE_TOPIC_QUERY_ENABLE [extern]
```

QoS Snippet that enables Topic Query.

To enable the use of the RTI Connex **DDSTopicQuery** (p. 1627) feature, apply this QoS Snippet to the QoS Profile used to create your **DDSDataWriter** (p. 1321). For example:

```
<qos_profile name="MyProfile">
  <base_name>
    <element>BuiltinQosLib::Feature.TopicQuery.Enable</element>
  </base_name>
</qos_profile>
```

For more information on Topic Query see the "Topic Queries" chapter in the `User's Manual`.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Feature.TopicQuery.Enable"

### 7.168.2.79 DDS\_SNIPPET\_TRANSPORT\_TCP\_LAN\_CLIENT

```
const char* const DDS_SNIPPET_TRANSPORT_TCP_LAN_CLIENT [extern]
```

QoS Snippet that configures a TCP LAN Client over DDS.

This QoS Snippet sets all the mandatory properties; however the final QoS Profile requires additional configuration.

The values of the `initial_peers` and the property `dds.transport.TCPv4.tcp1.server_bind_port` are incorrect (just sample strings). Therefore, they must be modified:

- `initial_peers`: should point to the remote client IP and port.
- `server_bind_port`: is the port this application will be using.

This modification should be done in the QoS Profile that will be used to create the **DDSEntity** (p. 1463). These new values will overwrite the current invalid values.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Transport.TCP.LAN.Client"



### 7.168.2.80 DDS\_SNIPPET\_TRANSPORT\_TCP\_WAN\_SYMMETRIC\_CLIENT

```
const char* const DDS_SNIPPET_TRANSPORT_TCP_WAN_SYMMETRIC_CLIENT [extern]
```

QoS Snippet that configures a symmetric WAN TCP Client over DDS.

This QoS Snippet sets all the mandatory properties; however the final QoS Profile requires additional configuration.

The values of the properties `dds.transport.TCPv4.tcp1.public_address` and `dds.transport.TCPv4.tcp1.server_bind_port` are incorrect (just sample strings). Also the `initial_peers` information is not correct. Therefore, the following must be modified:

- `initial_peers`: should point to the remote client IP and port.
- `public_address`: public IP address where this application can be reached.
- `server_bind_port`: port this application will be using.

This modification should be done in the QoS Profile that will be used to create the **DDSEntity** (p. 1463). These new values will overwrite the current invalid values.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Transport.TCP.WAN.Symmetric.Client"

### 7.168.2.81 DDS\_SNIPPET\_TRANSPORT\_TCP\_WAN\_ASYMMETRIC\_SERVER

```
const char* const DDS_SNIPPET_TRANSPORT_TCP_WAN_ASYMMETRIC_SERVER [extern]
```

QoS Snippet that an asymmetric WAN TCP Server over DDS.

This QoS Snippet sets all the mandatory properties; however the final QoS Profile requires additional configuration.

The values of the properties `dds.transport.TCPv4.tcp1.public_address` and `dds.transport.TCPv4.tcp1.server_bind_port` are incorrect (just sample strings). Therefore, they must be modified to the corresponding `public_address` and `port_↔` number. This modification should be done in the QoS Profile that will be used to create the **DDSEntity** (p. 1463). These new values will overwrite the current invalid values.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Transport.TCP.WAN.Asymmetric.Server"

### 7.168.2.82 DDS\_SNIPPET\_TRANSPORT\_TCP\_WAN\_ASYMMETRIC\_CLIENT

```
const char* const DDS_SNIPPET_TRANSPORT_TCP_WAN_ASYMMETRIC_CLIENT [extern]
```

QoS Snippet that configures an asymmetric WAN TCP Client over DDS.

This QoS Snippet sets all the mandatory properties; however the final QoS Profile requires additional configuration.

The value of `discovery.initial_peers` and `public_ip` have to match the values set on the Server side (**DDS\_SNIPPET\_↔TRANSPORT\_TCP\_WAN\_ASYMMETRIC\_SERVER** (p. 515)). This modification should be done in the QoS Profile that will be used to create the **DDSEntity** (p. 1463). This new value will overwrite the current invalid value.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Transport.TCP.WAN.Asymmetric.Client"

### 7.168.2.83 DDS\_SNIPPET\_TRANSPORT\_UDP\_AVOID\_IP\_FRAGMENTATION

```
const char* const DDS_SNIPPET_TRANSPORT_UDP_AVOID_IP_FRAGMENTATION [extern]
```

QoS Snippet that configures RTI Connex and the UDP built-in transports (UDPv4, UDPv6, UDPv4\_WAN) to avoid IP fragmentation.

For WAN communications and, in general, for communications in third party networks, it is not a good idea to rely on IP fragmentation. IP fragmentation causes significant issues in UDP, where there is no integrated support for a path MTU (maximum transmission unit) discovery protocol as there is in TCP.

This snippet provides a way to avoid IP fragmentation in Connex applications using the built-in UDP transports. Instead, Connex will be responsible for fragmentation, which is done at the RTPS level.

Among other changes, this configuration changes the transport MTU (`message_size_max`) to be 1400 bytes. Notice that this change will affect other transports such as SHMEM since Connex chooses the minimum transport MTU across all enabled transports to determine the maximum size of outgoing RTPS messages.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Transport.UDP.AvoidIPFragmentation"

### 7.168.2.84 DDS\_SNIPPET\_TRANSPORT\_UDP\_WAN

```
const char* const DDS_SNIPPET_TRANSPORT_UDP_WAN [extern]
```

QoS Snippet that enables the RTI Real-Time WAN Transport (UDPv4\_WAN).

The snippet disables all the other built-in transports and avoids the use of IP fragmentation.

For WAN communications and, in general, for communications in third-party networks, it is not a good idea to rely on IP fragmentation. IP fragmentation causes significant issues in UDP, where there is no integrated support for a path MTU (maximum transmission unit) discovery protocol as there is in TCP.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Transport.UDP.WAN"

### 7.168.2.85 DDS\_SNIPPET\_COMPATIBILITY\_CONNEXT\_MICRO\_VERSION\_2\_4\_3

```
const char* const DDS_SNIPPET_COMPATIBILITY_CONNEXT_MICRO_VERSION_2_4_3 [extern]
```

QoS Snippet that configures sets LIVELINESS QoS to be compatible with RTI Connex Micro 2.4.3.

QoS Snippet that sets the **DDS\_DataReaderQos** (p. 644) and **DDS\_DataWriterQos** (p. 689) **DDS\_LivelinessQos** ↔ **PolicyKind** (p. 409) to **DDS\_MANUAL\_BY\_TOPIC\_LIVELINESS\_QOS** (p. 410) It also disables the built-in shared memory transport.

Modified QoS Parameters:

- **DDS\_DataReaderQos** (p. 644) => **DDS\_LivelinessQosPolicy** (p. 936)
- **DDS\_DataWriterQos** (p. 689) => **DDS\_LivelinessQosPolicy** (p. 936)
- **DDS\_TransportBuiltinQosPolicy** (p. 1144)

RTI Connex Micro versions 2.4.3 and earlier only supported **DDS\_MANUAL\_BY\_TOPIC\_LIVELINESS\_QOS** (p. 410) **DDS\_LivelinessQosPolicyKind** (p. 409). In order to be compatible with RTI Connex Micro 2.4.3, the **DDSDataReader** (p. 1288) and **DDSDataWriter** (p. 1321) must have their **DDS\_LivelinessQosPolicyKind** (p. 409) changed to this value because the default kind in RTI Connex is **DDS\_AUTOMATIC\_LIVELINESS\_QOS** (p. 410).

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Compatibility.ConnexMicro.Version243"

**7.168.2.86 DDS\_SNIPPET\_COMPATIBILITY\_OTHER\_DDS\_VENDORS\_ENABLE**

```
const char* const DDS_SNIPPET_COMPATIBILITY_OTHER_DDS_VENDORS_ENABLE [extern]
```

QoS Snippet that configures RTI Connex to interoperate with other DDS vendors.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Compatibility.OtherDDSVendor.Enable"

**7.168.2.87 DDS\_SNIPPET\_5\_1\_0\_TRANSPORT\_ENABLE**

```
const char* const DDS_SNIPPET_5_1_0_TRANSPORT_ENABLE [extern]
```

QoS Snippet that configures RTI Connex to interoperate with RTI Connex 5.1.0 and below for UDPv6 and SHMEM transports.

In Library: **DDS\_BUILTIN\_QOS\_SNIPPET\_LIB** (p. 501)

String-version: "Compatibility.510Transport.Enable"

**7.169 DomainParticipantConfigParams**

<<*extension*>> (p. 237) **DDS\_DomainParticipantConfigParams\_t** (p. 734)

**Classes**

- struct **DDS\_DomainParticipantConfigParams\_t**

<<*extension*>> (p. 237) *Input paramaters for creating a participant from configuration. It allows to modify or override some of the properties of the entities defined in the configuration.*

**Macros**

- #define **DDS\_DomainParticipantConfigParams\_t\_INITIALIZER**

<<*extension*>> (p. 237) *Initializer for new DDS\_DomainParticipantConfigParams\_t (p. 734).*

**Variables**

- const int **DDS\_DOMAIN\_ID\_USE\_XML\_CONFIG**

<<*extension*>> (p. 237) *Special value to be used with DDS\_DomainParticipantConfigParams\_t (p. 734) to indicate that a participant is created using the domain ID specified in the participant configuration.*

- const char \* **DDS\_ENTITY\_NAME\_USE\_XML\_CONFIG**

<<*extension*>> (p. 237) *Special value to be used with DDS\_DomainParticipantConfigParams\_t (p. 734) to indicate that a participant created is with an autogenerated entity name.*

- const char \* **DDS\_QOS\_ELEMENT\_NAME\_USE\_XML\_CONFIG**

<<*extension*>> (p. 237) *Special value to be used with DDS\_DomainParticipantConfigParams\_t (p. 734) to indicate that entities are created from the QoS profile specified in the participant configuration.*

### 7.169.1 Detailed Description

<<*extension*>> (p. 237) **DDS\_DomainParticipantConfigParams\_t** (p. 734)

### 7.169.2 Macro Definition Documentation

#### 7.169.2.1 DDS\_DomainParticipantConfigParams\_t\_INITIALIZER

```
#define DDS_DomainParticipantConfigParams_t_INITIALIZER
```

<<*extension*>> (p. 237) Initializer for new **DDS\_DomainParticipantConfigParams\_t** (p. 734).

No memory is allocated. New **DDS\_DomainParticipantConfigParams\_t** (p. 734) instances stored in the stack should be initialized with this value before they are passed to any methods. .

### 7.169.3 Variable Documentation

#### 7.169.3.1 DDS\_DOMAIN\_ID\_USE\_XML\_CONFIG

```
const int DDS_DOMAIN_ID_USE_XML_CONFIG [extern]
```

<<*extension*>> (p. 237) Special value to be used with **DDS\_DomainParticipantConfigParams\_t** (p. 734) to indicate that a participant is created using the domain ID specified in the participant configuration.

This variable contains a constant sentinel value that is compared when creating the entities from configuration.

#### 7.169.3.2 DDS\_ENTITY\_NAME\_USE\_XML\_CONFIG

```
const char* DDS_ENTITY_NAME_USE_XML_CONFIG [extern]
```

<<*extension*>> (p. 237) Special value to be used with **DDS\_DomainParticipantConfigParams\_t** (p. 734) to indicate that a participant created is with an autogenerated entity name.

This variable contains a constant sentinel value that is lexicographically compared when creating the entities from configuration.

### 7.169.3.3 DDS\_QOS\_ELEMENT\_NAME\_USE\_XML\_CONFIG

```
const char* DDS_QOS_ELEMENT_NAME_USE_XML_CONFIG [extern]
```

<<*extension*>> (p. 237) Special value to be used with **DDS\_DomainParticipantConfigParams\_t** (p. 734) to indicate that entities are created from the QoS profile specified in the participant configuration.

This variable contains a constant sentinel value that is lexicographically compared when creating the entities from configuration.

## 7.170 User-managed Threads

User-managed thread infrastructure.

### Classes

- class **DDSThreadFactory**

<<*extension*>> (p. 237) <<*interface*>> (p. 237) Interface for providing the threads needed by the middleware. It consists of operations to create and delete threads. The interface depends on the **DDSThreadFactory\_OnSpawnedFunction** (p. 519) that specifies the operation to run in the new thread.

### Typedefs

- typedef DDS\_ThreadFactory\_OnSpawnedFunction **DDSThreadFactory\_OnSpawnedFunction**

Prototype of the function that must be called on a new thread created by a **DDSThreadFactory** (p. 1615).

### 7.170.1 Detailed Description

User-managed thread infrastructure.

Core feature that allows users to provide the threads to RTI Connext.

"::DDSThreadFactory"

The model follows the abstract factory pattern. A **DDSThreadFactory** (p.1615) instance can be set in the **DDSDomainParticipantFactory** (p.1426) so that **DDSDomainParticipant** (p.1351) will use it for thread creation and deletion.

### 7.170.2 Typedef Documentation

#### 7.170.2.1 DDSThreadFactory\_OnSpawnedFunction

```
typedef DDS_ThreadFactory_OnSpawnedFunction DDSThreadFactory_OnSpawnedFunction
```

Prototype of the function that must be called on a new thread created by a **DDSThreadFactory** (p. 1615).

## Parameters

<code>thread_param</code>	<< <i>in</i> >> (p. 238) Single argument that this operation receives. It is the data this operation needs to perform.
---------------------------	--

## 7.171 Observability Library

RTI Monitoring Library 2.0.

### Functions

- void **RTI\_Monitoring\_initialize** (void)  
*Initializes Monitoring Library 2.0.*

### Variables

- const char \*const **RTI\_MONITORING\_PERIODIC\_TOPIC\_NAME**  
*The name of the Monitoring Topic used for periodic metrics distribution.*
- const char \*const **RTI\_MONITORING\_EVENT\_TOPIC\_NAME**  
*The name of the Monitoring Topic used for event metrics distribution.*
- const char \*const **RTI\_MONITORING\_LOGGING\_TOPIC\_NAME**  
*The name of the Monitoring Topic used for log messages distribution.*

### 7.171.1 Detailed Description

RTI Monitoring Library 2.0.

RTI Monitoring Library 2.0 is one component of the RTI Connex Observability Framework which allows collecting and distributing telemetry data (metrics and logs) associated with the observable resources created by an RTI Connex application.

In this release, the only Observable resources are the following entities: **DDSDataWriter** (p. 1321), **DDSDataReader** (p. 1288), **DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592), **DDSDomainParticipant** (p. 1351), **DDSTopic** (p. 1617) and Application (a process running RTI Connex).

The library also accepts remote commands to change the set of distributed telemetry data at run-time.

The data distributed by RTI Monitoring Library 2.0 is sent to an RTI Observability Collector Service instance, which forwards the data to other RTI Observability Collector Service instances or stores the data in third-party observability backends such as Prometheus or Grafana Loki.

RTI Monitoring Library 2.0 is a separate library (rtimonitoring2), and applications can use it in three different modes:

- **Dynamically loaded:** This is the default mode, and it requires that the `rtmonitoring2` shared library is in the library search path.
- **Dynamic linking:** The application is linked with the `rtmonitoring2` shared library.
- **Static linking:** The application is linked with the `rtmonitoring2` static library.

The last two modes require calling the API **RTI\_Monitoring\_initialize** (p. 521) in your application before any other RTI Connex API.

Dynamic and static linking are only supported in C and C++ applications.

To enable use of RTI Monitoring Library 2.0 and configure its behavior, use the **DDS\_MonitoringQoSPolicy** (p. 962) QoS policy on the **DDSDomainParticipantFactory** (p. 1426). This QoS policy can be configured programmatically or via XML.

## 7.171.2 Function Documentation

### 7.171.2.1 RTI\_Monitoring\_initialize()

```
void RTI_Monitoring_initialize (  
    void )
```

Initializes Monitoring Library 2.0.

This method must be called before calling any other RTI Connex API if the application links with RTI Monitoring Library 2.0 dynamically or statically.

## 7.171.3 Variable Documentation

### 7.171.3.1 RTI\_MONITORING\_PERIODIC\_TOPIC\_NAME

```
const char* const RTI_MONITORING_PERIODIC_TOPIC_NAME
```

The name of the Monitoring Topic used for periodic metrics distribution.

String version: "DCPSPeriodicStatusMonitoring".

This topic is used internally by Monitoring Library 2.0 and RTI Observability Collector Service. You should not publish or subscribe to it.

### 7.171.3.2 RTI\_MONITORING\_EVENT\_TOPIC\_NAME

```
const char* const RTI_MONITORING_EVENT_TOPIC_NAME
```

The name of the Monitoring Topic used for event metrics distribution.

String version: "DCPSEventStatusMonitoring".

This topic is used internally by Monitoring Library 2.0 and RTI Observability Collector Service. You should not publish or subscribe to it.

### 7.171.3.3 RTI\_MONITORING\_LOGGING\_TOPIC\_NAME

```
const char* const RTI_MONITORING_LOGGING_TOPIC_NAME
```

The name of the Monitoring Topic used for log messages distribution.

String version: "DCPSLoggingStatusMonitoring".

This topic is used internally by Monitoring Library 2.0 and RTI Observability Collector Service. You should not publish or subscribe to it.

## 7.172 Version

Retrieve information for the RTI Connex product, the core library, and the C, C++ or Java libraries.

### Classes

- struct **NDDS\_Config\_LibraryVersion\_t**  
*The version of a single library shipped as part of an RTI Connex distribution.*
- class **NDDSConfigVersion**  
<<*interface*>> (p. 237) *The version of an RTI Connex distribution.*

### 7.172.1 Detailed Description

Retrieve information for the RTI Connex product, the core library, and the C, C++ or Java libraries.

There are three ways to obtain version information: looking at the revision files, using Visual Studio or the command line, or programmatically at run time. This HTML documentation includes a reference for consulting the APIs that allow you to get version information programmatically. For more information see the RTI Connex DDS Core Libraries User's Manual.

The version information includes four fields:

- Major product version.
- Minor product version.
- Release letter for product version.
- Revision number of product.



## 7.173 Logging

Configure how much debugging information is reported during runtime and where it is logged.

### Modules

- **Activity Context**

*Add contextual information to log messages.*

### Classes

- struct **NDDS\_Config\_LogMessage**

*Log message.*

- class **NDDSSConfigLoggerDevice**

*<<interface>> (p. 237) Logging device interface. Use for user-defined logging devices.*

- class **NDDSSConfigLogger**

*<<interface>> (p. 237) The singleton type used to configure RTI Connex logging.*

### Enumerations

- enum **NDDS\_Config\_LogVerbosity** {  
**NDDS\_CONFIG\_LOG\_VERBOSITY\_SILENT** ,  
**NDDS\_CONFIG\_LOG\_VERBOSITY\_ERROR** ,  
**NDDS\_CONFIG\_LOG\_VERBOSITY\_WARNING** ,  
**NDDS\_CONFIG\_LOG\_VERBOSITY\_STATUS\_LOCAL** ,  
**NDDS\_CONFIG\_LOG\_VERBOSITY\_STATUS\_REMOTE** ,  
**NDDS\_CONFIG\_LOG\_VERBOSITY\_STATUS\_ALL** }

*The verbositys at which RTI Connex diagnostic information is logged.*

- enum **NDDS\_Config\_LogLevel** {  
**NDDS\_CONFIG\_LOG\_LEVEL\_FATAL\_ERROR** ,  
**NDDS\_CONFIG\_LOG\_LEVEL\_ERROR** ,  
**NDDS\_CONFIG\_LOG\_LEVEL\_WARNING** ,  
**NDDS\_CONFIG\_LOG\_LEVEL\_STATUS\_LOCAL** ,  
**NDDS\_CONFIG\_LOG\_LEVEL\_STATUS\_REMOTE** ,  
**NDDS\_CONFIG\_LOG\_LEVEL\_DEBUG** }

*Level category assigned to RTI Connex log messages returned to an output device.*

- enum **NDDS\_Config\_SyslogLevel** {  
**NDDS\_CONFIG\_SYSLOG\_LEVEL\_EMERGENCY** ,  
**NDDS\_CONFIG\_SYSLOG\_LEVEL\_ALERT** ,  
**NDDS\_CONFIG\_SYSLOG\_LEVEL\_CRITICAL** ,  
**NDDS\_CONFIG\_SYSLOG\_LEVEL\_ERROR** ,  
**NDDS\_CONFIG\_SYSLOG\_LEVEL\_WARNING** ,  
**NDDS\_CONFIG\_SYSLOG\_LEVEL\_NOTICE** ,  
**NDDS\_CONFIG\_SYSLOG\_LEVEL\_INFORMATIONal** ,  
**NDDS\_CONFIG\_SYSLOG\_LEVEL\_DEBUG** }

*Syslog level category assigned to RTI Connex log messages. See *Syslog Level and Verbosity Mapping*, in the *Core Libraries User's Manual*, for more information.*

- enum **NDDS\_Config\_LogCategory** {  
**NDDS\_CONFIG\_LOG\_CATEGORY\_PLATFORM** ,  
**NDDS\_CONFIG\_LOG\_CATEGORY\_COMMUNICATION** ,  
**NDDS\_CONFIG\_LOG\_CATEGORY\_DATABASE** ,  
**NDDS\_CONFIG\_LOG\_CATEGORY\_ENTITIES** ,  
**NDDS\_CONFIG\_LOG\_CATEGORY\_API** ,  
**NDDS\_CONFIG\_LOG\_CATEGORY\_DISCOVERY** ,  
**NDDS\_CONFIG\_LOG\_CATEGORY\_SECURITY** ,  
**NDDS\_CONFIG\_LOG\_CATEGORY\_USER** ,  
**NDDS\_CONFIG\_LOG\_CATEGORY\_ALL** }

*Categories of logged messages.*

- enum **NDDS\_Config\_LogPrintFormat** { }

*The format used to output RTI Connex diagnostic information.*

- enum **NDDS\_Config\_LogFacility** {  
**NDDS\_CONFIG\_LOG\_FACILITY\_USER** ,  
**NDDS\_CONFIG\_LOG\_FACILITY\_SECURITY\_EVENT** ,  
**NDDS\_CONFIG\_LOG\_FACILITY\_SERVICE** ,  
**NDDS\_CONFIG\_LOG\_FACILITY\_MIDDLEWARE** }

*A number that identifies the source of a log message.*

- enum **NDDS\_Config\_SyslogVerbosity** {  
**NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_SILENT** ,  
**NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_EMERGENCY** ,  
**NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_ALERT** ,  
**NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_CRITICAL** ,  
**NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_ERROR** ,  
**NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_WARNING** ,  
**NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_NOTICE** ,  
**NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_INFORMATIONAL** ,  
**NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_DEBUG** }

*The Syslog verbosity levels at which RTI Connex diagnostic information is logged. These Syslog verbosity levels are mapped to **NDDS\_Config\_LogVerbosity** (p. 524). See *Syslog Level and Verbosity Mapping*, in the *Core Libraries User's Manual*, for more information.*

### 7.173.1 Detailed Description

Configure how much debugging information is reported during runtime and where it is logged.

### 7.173.2 Enumeration Type Documentation

#### 7.173.2.1 NDDS\_Config\_LogVerbosity

```
enum NDDS_Config_LogVerbosity
```

The verbosity levels at which RTI Connex diagnostic information is logged.

## Enumerator

NDDS_CONFIG_LOG_VERBOSITY_SILENT	No further output will be logged.
NDDS_CONFIG_LOG_VERBOSITY_ERROR	Only error and fatal error messages will be logged. An error indicates something wrong in the functioning of RTI Connex. The most common cause of errors is incorrect configuration.
NDDS_CONFIG_LOG_VERBOSITY_WARNING	Both error and warning messages will be logged. A warning indicates that RTI Connex is taking an action that may or may not be what you intended. Some configuration information is also logged at this verbosity to aid in debugging.
NDDS_CONFIG_LOG_VERBOSITY_STATUS_LOCAL	Errors, warnings, and verbose information about the lifecycles of local RTI Connex objects will be logged.
NDDS_CONFIG_LOG_VERBOSITY_STATUS_↔ REMOTE	Errors, warnings, and verbose information about the lifecycles of remote RTI Connex objects will be logged.
NDDS_CONFIG_LOG_VERBOSITY_STATUS_ALL	Errors, warnings, verbose information about the lifecycles of local and remote RTI Connex objects, and periodic information about RTI Connex threads will be logged.

## 7.173.2.2 NDDS\_Config\_LogLevel

```
enum NDDS_Config_LogLevel
```

Level category assigned to RTI Connex log messages returned to an output device.

## Enumerator

NDDS_CONFIG_LOG_LEVEL_FATAL_ERROR	The message describes a fatal error. A fatal error indicates an unrecoverable situation in the functioning of RTI Connex. Error messages with this log level usually indicate a violation of an internal invariant or a segfault, and may include the function call stack where the fatal error happened.
NDDS_CONFIG_LOG_LEVEL_ERROR	The message describes an error. An error indicates a non-fatal problem in the functioning of RTI Connex. Errors are usually recoverable and will not stop application execution, although they may prevent some features from working properly. The most common cause of non-fatal errors is incorrect configuration and incorrect arguments.
NDDS_CONFIG_LOG_LEVEL_WARNING	The message describes a warning. A warning indicates that RTI Connex is taking an action that may or may not be what you intended. Some configuration information is also logged at this verbosity to aid in debugging.
NDDS_CONFIG_LOG_LEVEL_STATUS_LOCAL	The message contains information about the lifecycles of local RTI Connex objects will be logged.
NDDS_CONFIG_LOG_LEVEL_STATUS_REMOTE	The message contains information about the lifecycles of remote RTI Connex objects will be logged.
NDDS_CONFIG_LOG_LEVEL_DEBUG	The message contains debug information that might be relevant to your application.

### 7.173.2.3 NDDS\_Config\_SyslogLevel

enum **NDDS\_Config\_SyslogLevel**

Syslog level category assigned to RTI Connex log messages. See `Syslog Level and Verbosity Mapping`, in the Core Libraries User's Manual, for more information.

#### Enumerator

NDDS_CONFIG_SYSLOG_LEVEL_EMERGENCY	System is unusable. Maps to <b>NDDS_CONFIG_LOG_LEVEL_FATAL_ERROR</b> (p. 525).
NDDS_CONFIG_SYSLOG_LEVEL_ALERT	Should be corrected immediately. Maps to <b>NDDS_CONFIG_LOG_LEVEL_ERROR</b> (p. 525).
NDDS_CONFIG_SYSLOG_LEVEL_CRITICAL	Critical conditions. Maps to <b>NDDS_CONFIG_LOG_LEVEL_ERROR</b> (p. 525).
NDDS_CONFIG_SYSLOG_LEVEL_ERROR	Error conditions. Maps to <b>NDDS_CONFIG_LOG_LEVEL_ERROR</b> (p. 525).
NDDS_CONFIG_SYSLOG_LEVEL_WARNING	May indicate that an error will occur if action is not taken. Maps to <b>NDDS_CONFIG_LOG_LEVEL_WARNING</b> (p. 525).
NDDS_CONFIG_SYSLOG_LEVEL_NOTICE	Events that are unusual, but not error conditions. Maps to <b>NDDS_CONFIG_LOG_LEVEL_STATUS_LOCAL</b> (p. 525).
NDDS_CONFIG_SYSLOG_LEVEL_INFORMATIONAL	Normal operational messages that require no action. Maps to <b>NDDS_CONFIG_LOG_LEVEL_STATUS_LOCAL</b> (p. 525).
NDDS_CONFIG_SYSLOG_LEVEL_DEBUG	Information useful to developers for debugging the application. Maps to <b>NDDS_CONFIG_LOG_LEVEL_DEBUG</b> (p. 525).

### 7.173.2.4 NDDS\_Config\_LogCategory

enum **NDDS\_Config\_LogCategory**

Categories of logged messages.

The **NDDSSConfigLogger::get\_verbosity\_by\_category** (p. 1824) and **NDDSSConfigLogger::set\_verbosity\_by\_category** (p. 1825) can be used to specify different verbosity levels for different categories of messages.

## Enumerator

NDDS_CONFIG_LOG_CATEGORY_PLATFORM	Log messages pertaining to the underlying platform (hardware and OS) on which RTI Connex is running are in this category.
NDDS_CONFIG_LOG_CATEGORY_↔ COMMUNICATION	Log messages pertaining to data serialization and deserialization and network traffic are in this category.
NDDS_CONFIG_LOG_CATEGORY_DATABASE	Log messages pertaining to the internal database in which RTI Connex objects are stored are in this category.
NDDS_CONFIG_LOG_CATEGORY_ENTITIES	Log messages pertaining to local and remote entities, and to a subset of the discovery process, are in this category. (To see all discovery-related messages, use the DISCOVERY category.)
NDDS_CONFIG_LOG_CATEGORY_API	Log messages pertaining to the API layer of RTI Connex (such as method argument validation) are in this category.
NDDS_CONFIG_LOG_CATEGORY_DISCOVERY	Log messages pertaining to discovery are in this category.
NDDS_CONFIG_LOG_CATEGORY_SECURITY	Log messages pertaining to security are in this category. These messages include any messages logged by RTI Connex components even if they are not related to the Security Plugins.
NDDS_CONFIG_LOG_CATEGORY_USER	Log messages that are generated by the user using the following log APIs: <b>NDDSConfigLogger::emergency</b> (p. 1827), <b>NDDSConfigLogger::alert</b> (p. 1828), <b>NDDSConfigLogger::critical</b> (p. 1828), <b>NDDSConfigLogger::error</b> (p. 1828), <b>NDDSConfigLogger::warning</b> (p. 1828), <b>NDDSConfigLogger::notice</b> (p. 1828), <b>NDDSConfigLogger::informational</b> (p. 1829), <b>NDDSConfigLogger::debug</b> (p. 1829).
NDDS_CONFIG_LOG_CATEGORY_ALL	Log messages pertaining to all categories in RTI Connex.

## 7.173.2.5 NDDS\_Config\_LogPrintFormat

```
enum NDDS_Config_LogPrintFormat
```

The format used to output RTI Connex diagnostic information.

## Enumerator

NDDS_CONFIG_LOG_PRINT_FORMAT_DEFAULT	(default) Print message, method name, log level, <b>Activity Context</b> (p. 530) (what was happening when the event occurred), and logging category.
NDDS_CONFIG_LOG_PRINT_FORMAT_↔ TIMESTAMPED	Print message, method name, log level, <b>Activity Context</b> (p. 530), logging category, and timestamp.

## Enumerator

NDDS_CONFIG_LOG_PRINT_FORMAT_VERBOSE	Print message with all available context information (includes thread identifier, message location).
NDDS_CONFIG_LOG_PRINT_FORMAT_VERBOSE↔ _TIMESTAMPED	Print message with all available context information, and timestamp.
NDDS_CONFIG_LOG_PRINT_FORMAT_DEBUG	Print a set of fields (including message number and backtrace information) that may be useful for internal debugging.
NDDS_CONFIG_LOG_PRINT_FORMAT_MINIMAL	Print only message number and message location.
NDDS_CONFIG_LOG_PRINT_FORMAT_MAXIMAL	Print all available fields.

## 7.173.2.6 NDDS\_Config\_LogFacility

enum **NDDS\_Config\_LogFacility**

A number that identifies the source of a log message.

In the Syslog Protocol, the Facility is a numerical code that represents the machine process that created a Syslog event. RTI Connex uses the facility to represent the source of a given log message.

## Enumerator

NDDS_CONFIG_LOG_FACILITY_USER	A log message produced by the APIs that log user messages in <b>NDDSConfigLogger</b> (p. 1822) (e.g., <b>NDDSConfigLogger::emergency</b> (p. 1827)). Numerical code: 1
NDDS_CONFIG_LOG_FACILITY_SECURITY_EVENT	A security-related message logged by the RTI Security Plugins Logging Plugin. Numerical code: 10
NDDS_CONFIG_LOG_FACILITY_SERVICE	A log message produced by an Infrastructure Service, such as Routing Service. Infrastructure Services operate using the Core Libraries. The messages that the Core Libraries create are categorized under the MIDDLEWARE facility. Log messages that are directly generated by the Infrastructure Service itself are marked with the SERVICE facility. Numerical code: 22
NDDS_CONFIG_LOG_FACILITY_MIDDLEWARE	A log message produced by RTI Connex Core Libraries. Numerical code: 23

## 7.173.2.7 NDDS\_Config\_SyslogVerbosity

enum **NDDS\_Config\_SyslogVerbosity**

The Syslog verbosity at which RTI Connex diagnostic information is logged. These Syslog verbosity are mapped to **NDDS\_Config\_LogVerbosity** (p. 524). See *Syslog Level and Verbosity Mapping*, in the Core Libraries User's Manual, for more information.

#### Enumerator

NDDS_CONFIG_SYSLOG_VERBOSITY_SILENT	No messages will be logged. (lowest verbosity) Equivalent to <b>NDDS_CONFIG_LOG_VERBOSITY_SILENT</b> (p. 525).
NDDS_CONFIG_SYSLOG_VERBOSITY_↔ EMERGENCY	Emergency, critical, alert, and error messages will be logged. This Syslog verbosity level is translated to <b>NDDS_CONFIG_LOG_VERBOSITY_ERROR</b> (p. 525) when interpreted by RTI Connex. (That's why this level actually logs more than just emergency messages.)
NDDS_CONFIG_SYSLOG_VERBOSITY_ALERT	Emergency, critical, and alert messages will be logged. This Syslog verbosity level is translated to <b>NDDS_CONFIG_LOG_VERBOSITY_ERROR</b> (p. 525) when interpreted by RTI Connex. (That's why this level actually logs more than just emergency, critical and alert messages.)
NDDS_CONFIG_SYSLOG_VERBOSITY_CRITICAL	Emergency, critical, alert, and error messages will be logged. This Syslog verbosity level is translated to <b>NDDS_CONFIG_LOG_VERBOSITY_ERROR</b> (p. 525) when interpreted by RTI Connex. (That's why this level actually logs more than just emergency and critical messages.)
NDDS_CONFIG_SYSLOG_VERBOSITY_ERROR	Emergency, critical, alert, and error messages will be logged. This Syslog verbosity level is translated to <b>NDDS_CONFIG_LOG_VERBOSITY_ERROR</b> (p. 525) when interpreted by RTI Connex.
NDDS_CONFIG_SYSLOG_VERBOSITY_WARNING	Emergency, critical, alert, error, and warning messages will be logged. This Syslog verbosity level is translated to <b>NDDS_CONFIG_LOG_VERBOSITY_WARNING</b> (p. 525) when interpreted by RTI Connex.
NDDS_CONFIG_SYSLOG_VERBOSITY_NOTICE	Emergency, critical, alert, error, warning, notice and informational messages will be logged. This Syslog verbosity level is translated to <b>NDDS_CONFIG_LOG_↔ VERBOSITY_STATUS_REMOTE</b> (p. 525) when interpreted by RTI Connex. (That's why this level actually logs more than just emergency, critical, alert, error, warning and notice messages.)
NDDS_CONFIG_SYSLOG_VERBOSITY_↔ INFORMATIONAL	Emergency, critical, alert, error, warning, notice, and informational messages will be logged. This Syslog verbosity level is translated to <b>NDDS_CONFIG_LOG_↔ VERBOSITY_STATUS_REMOTE</b> (p. 525) when interpreted by RTI Connex.
NDDS_CONFIG_SYSLOG_VERBOSITY_DEBUG	All messages will be logged. This Syslog verbosity level is translated to <b>NDDS_CONFIG_LOG_VERBOSITY_STATUS_ALL</b> (p. 525) when interpreted by RTI Connex.

## 7.174 Activity Context

Add contextual information to log messages.

### Classes

- class **NDDSSConfigActivityContext**

*Activity Context APIs.*

### Macros

- #define **NDDSS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_DEFAULT** RTI\_OSAPI\_ACTIVITY\_↔  
CONTEXT\_ATTRIBUTE\_MASK\_DEFAULT  
*Provide the default attributes of the resource of the Activity Context.*
- #define **NDDSS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_NONE** RTI\_OSAPI\_ACTIVITY\_↔  
CONTEXT\_ATTRIBUTE\_MASK\_NONE  
*Not provide any attribute of the resource of the Activity Context.*
- #define **NDDSS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_ALL** RTI\_OSAPI\_ACTIVITY\_↔  
CONTEXT\_ATTRIBUTE\_MASK\_ALL  
*Provide all the possibles attributes of the resource of the Activity Context.*

### Typedefs

- typedef **DDS\_Long NDDSS\_Config\_ActivityContextAttributeKindMask**  
*The attributes **NDDSS\_Config\_ActivityContextAttributeKind** (p. 532) used in the string representation of the Activity Context can be configured through this mask.*

### Enumerations

- enum **NDDSS\_Config\_ActivityContextAttributeKind** {  
  **NDDSS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_GUID\_PREFIX** ,  
  **NDDSS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_TOPIC** ,  
  **NDDSS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_TYPE** ,  
  **NDDSS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_ENTITY\_KIND** ,  
  **NDDSS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_DOMAIN\_ID** ,  
  **NDDSS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_ENTITY\_NAME** }  
*The resources of the **Activity Context** (p. 530) can have multiple associated attributes. Those attributes provide extra information about the entity such as GUID prefix, Topic, data type, entity kind, entity name and domain ID. They are used to indicate what attributes of the resources are included in the activity context.*

### Functions

- static void **NDDSSConfigActivityContext::set\_attribute\_mask** ( **NDDSS\_Config\_ActivityContextAttribute\_↔  
KindMask** attribute\_format)  
*Set the **NDDSS\_Config\_ActivityContextAttributeKindMask** (p. 532) of the Activity Context.*



### 7.174.1 Detailed Description

Add contextual information to log messages.

The Activity Context is a group of resources and activities associated with an action such as the creation of an entity.

- A resource is a abstraction of an entity. It can contain attributes such as Topic or domain ID.
- An activity is a general task that the resource is doing, such as "Getting QoS".

Logging context is one of the formats RTI Connex logging infrastructure supports. It is used by default in **NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_DEFAULT** (p.527). It provides information about resources and activities. The activity context is used in two places:

- Logging: activity context is one of the **NDDS\_Config\_LogPrintFormat** (p.527) DDS logging infrastructure supports. If that format is set every time RTI Connex logs a message, it will contain the contextual information.
- Heap monitoring: every time memory is allocated and heap monitoring is enabled, the string representation of the activity context will be associated with the allocation. This information will be available when taking the snapshot.

For example, in the creation of a DataWriter, the activity context will provide information about:

- Resource: the Publisher creating the DataWriter. Attributes of the publisher will be GUID, kind, name and domain ID.
- Activity: entity creation. It will have two parameters, the entity kind and the Topic. In the example below, these are "Writer" and "TestTopic".

The string representation of the above activity context would be:

```
[0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000088{Entity=Pu,Name=TestPublisher,Domain=1}|CREATE Writer WITH TOPIC TestTopic]
```

Another example could be when a DataWriter writes a sample. The activity context will provide information about:

- Resource: the DataWriter writing the sample. The attributes of the DataWriter will be GUID, name, kind, Topic, data type, and the domain ID.
- Activity will be "write a sample".

The string representation of the activity context will be:

```
[0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriterName,Entity=DW,Topic=test,Type=Foo,Domain=1}|Write]
```

### 7.174.2 Macro Definition Documentation

### 7.174.2.1 NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_DEFAULT

```
#define NDDS_CONFIG_ACTIVITY_CONTEXT_ATTRIBUTE_MASK_DEFAULT RTI_OSAPI_ACTIVITY_CONTEXT_ATTRIBUTE_↔
_MASK_DEFAULT
```

Provide the default attributes of the resource of the Activity Context.

### 7.174.2.2 NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_NONE

```
#define NDDS_CONFIG_ACTIVITY_CONTEXT_ATTRIBUTE_MASK_NONE RTI_OSAPI_ACTIVITY_CONTEXT_ATTRIBUTE_↔
_MASK_NONE
```

Not provide any attribute of the resource of the Activity Context.

### 7.174.2.3 NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_ALL

```
#define NDDS_CONFIG_ACTIVITY_CONTEXT_ATTRIBUTE_MASK_ALL RTI_OSAPI_ACTIVITY_CONTEXT_ATTRIBUTE_↔
_MASK_ALL
```

Provide all the possibles attributes of the resource of the Activity Context.

## 7.174.3 Typedef Documentation

### 7.174.3.1 NDDS\_Config\_ActivityContextAttributeKindMask

```
typedef DDS_Long NDDS_Config_ActivityContextAttributeKindMask
```

The attributes **NDDS\_Config\_ActivityContextAttributeKind** (p. 532) used in the string representation of the Activity Context can be configured through this mask.

This mask indicates what attributes of the resource are used when RTI Connexxt logs a message or when the Heap Monitoring utility saves statistics for a memory allocation.

## 7.174.4 Enumeration Type Documentation

### 7.174.4.1 NDDS\_Config\_ActivityContextAttributeKind

```
enum NDDS_Config_ActivityContextAttributeKind
```

The resources of the **Activity Context** (p. 530) can have multiple associated attributes. Those attributes provide extra information about the entity such as GUID prefix, Topic, data type, entity kind, entity name and domain ID. They are used to indicate what attributes of the resources are included in the activity context.

## Enumerator

<p>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_GUID_PREFIX</p>	<p>Provide the entity GUID prefix to the resource of the Activity Context. For example:</p> <ul style="list-style-type: none"> <li>For the following string representation of the context: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriterName,Entity=DW,Topic=test,Type=Foo}]</li> <li>The GUID prefix is 0X101A76B,0X79E5D71,0X50EE914. If the bit <b>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_GUID_PREFIX</b> (p. 533) is not set, the string representation will not show the GUID prefix: [:0X80000003{Name=testDataWriterName,Entity=DW,Topic=test,Type=Foo}]</li> </ul>
<p>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_TOPIC</p>	<p>Provide the Topic to the resource of the Activity Context. The topic attribute is specified by "Topic". For example:</p> <ul style="list-style-type: none"> <li>For the following string representation of the context: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriterName,Entity=DW,Topic=test,Type=Foo}]</li> <li>The Topic is "test." If the bit <b>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_TOPIC</b> (p. 533) is not set, the string representation will not show the Topic: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriterName,Entity=DW,Type=Foo}]</li> </ul>
<p>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_TYPE</p>	<p>Provide the data type to the resource of the Activity Context. The type attribute is specified by "Type". For example:</p> <ul style="list-style-type: none"> <li>For the following string representation of the context: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriterName,Entity=DW,Topic=test,Type=Foo}]</li> <li>The data type is "Foo." If the bit <b>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_TYPE</b> (p. 533) is not set, the string representation will not show the data type: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriterName,Entity=DW,Topic=test}]</li> </ul>

## Enumerator

<p>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_ENTITY_KIND</p>	<p>Provide the entity kind to the resource of the Activity Context. The kind attribute is specified by "Entity". For example:</p> <ul style="list-style-type: none"> <li>For the following string representation of the context: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriter}</li> <li>The entity kind is "Writer." If the bit <b>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_ENTITY_KIND</b> (p. 534) is not set, the string representation will not show the entity kind: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriter}</li> </ul>
<p>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_DOMAIN_ID</p>	<p>Provide the domain ID to the resource of the Activity Context. The domain attribute is specified by "Domain". For example:</p> <ul style="list-style-type: none"> <li>For the following string representation of the context: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriter}</li> <li>The domain ID is "1." If the bit <b>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_DOMAIN_ID</b> (p. 534) is not set, the string representation will not show the domain ID: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriter}</li> </ul>
<p>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_ENTITY_NAME</p>	<p>Provide the entity name to the resource of the Activity Context. The name attribute is specified by "Name". For example:</p> <ul style="list-style-type: none"> <li>For the following string representation of the context: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Name=testDataWriter}</li> <li>The entity name is "testDataWriterName." If the bit <b>NDDS_CONFIG_ACTIVITY_CONTEXT_↔ ATTRIBUTE_ENTITY_NAME</b> (p. 534) is not set, the string representation will not show the entity name: [0X101A76B,0X79E5D71,0X50EE914:0X1C1:0X80000003{Entity=DW,Topic=te</li> </ul>

## 7.174.5 Function Documentation

### 7.174.5.1 set\_attribute\_mask()

```
static void NDDSSConfigActivityContext::set_attribute_mask (
    NDDS_Config_ActivityContextAttributeKindMask attribute_format ) [static]
```

Set the `NDDS_Config_ActivityContextAttributeKindMask` (p. 532) of the Activity Context.

## 7.175 Compliance Configuration

APIs to configure compliance with certain standard specifications.

### Classes

- class `NDDSSConfigCompliance`  
*APIs to configure the XTypes compliance mask.*

### Macros

- `#define NDDS_CONFIG_XTYPES_COMPLIANCE_MASK_VENDOR`  
*XTypes vendor compliance mask. This value is fully aligned with the XTypes specification.*
- `#define NDDS_CONFIG_XTYPES_COMPLIANCE_MASK_DEFAULT`  
*Default XTypes compliance mask.*

### Typedefs

- typedef `DDS_UnsignedLong NDDS_Config_XTypesComplianceMask`  
*XTypes compliance mask.*

### Enumerations

- enum `NDDS_Config_XTypesComplianceMaskBits` {  
`NDDS_CONFIG_XTYPES_DHEADER_IN_NON_PRIMITIVE_COLLECTIONS_BIT` ,  
`NDDS_CONFIG_XTYPES_ENUM_AS_PRIMITIVE_IN_COLLECTIONS_BIT` ,  
`NDDS_CONFIG_XTYPES_PARAMETER_LENGTH_WITH_PADDING_BIT` ,  
`NDDS_CONFIG_XTYPES_ENCAPSULATION_OPTIONS_WITH_PADDING_BIT` }  
*The bits for the `NDDS_Config_XTypesComplianceMask` (p. 536) with different aspects of the Extended CDR encoding (XCDR and XCDR2).*

### 7.175.1 Detailed Description

APIs to configure compliance with certain standard specifications.

## 7.175.2 Macro Definition Documentation

### 7.175.2.1 NDDS\_CONFIG\_XTYPES\_COMPLIANCE\_MASK\_VENDOR

```
#define NDDS_CONFIG_XTYPES_COMPLIANCE_MASK_VENDOR
```

XTypes vendor compliance mask. This value is fully aligned with the XTypes specification.

The mask sets the following bits:

- **NDDS\_CONFIG\_XTYPES\_DHEADER\_IN\_NON\_PRIMITIVE\_COLLECTIONS\_BIT** (p. 538)
- **NDDS\_CONFIG\_XTYPES\_ENCAPSULATION\_OPTIONS\_WITH\_PADDING\_BIT** (p. 539)

The HEX value for the mask is: 0x00000009.

### 7.175.2.2 NDDS\_CONFIG\_XTYPES\_COMPLIANCE\_MASK\_DEFAULT

```
#define NDDS_CONFIG_XTYPES_COMPLIANCE_MASK_DEFAULT
```

Default XTypes compliance mask.

The mask sets the following bits:

- **NDDS\_CONFIG\_XTYPES\_PARAMETER\_LENGTH\_WITH\_PADDING\_BIT** (p. 538)
- **NDDS\_CONFIG\_XTYPES\_ENCAPSULATION\_OPTIONS\_WITH\_PADDING\_BIT** (p. 539)

The HEX value for the mask is: 0x0000000C.

## 7.175.3 Typedef Documentation

### 7.175.3.1 NDDS\_Config\_XTypesComplianceMask

```
typedef DDS_UnsignedLong NDDS_Config_XTypesComplianceMask
```

XTypes compliance mask.

The **NDDS\_Config\_XTypesComplianceMask** (p. 536) configures different aspects of the Extended CDR encoding (XCDR and XCDR2).

Applications that don't use the exact same XTypes compliance mask may not be interoperable.

By default, data serialization is not fully compliant with Extended CDR encoding due to bugs when implementing the standard. These bugs do not result in breaking functional correctness. They only affect interoperability with other vendors.

You can change the default compliance mask for an application using any of the following mechanisms:

- Setting the environment variable **NDDS\_XTYPES\_COMPLIANCE\_MASK**
- Calling the function **NDDSConfigCompliance::set\_xtypes\_mask** (p. 1821)

The environment variable will be automatically loaded when a **DDSDomainParticipantFactory** (p. 1426) is created. If you need to load it before that, use the function **NDDSConfigCompliance::load\_compliance\_masks** (p. 1821).

The format of the environment variable is an unsigned integer, which can be in HEX notation. For example: 0x00000001.

The default value is **NDDS\_CONFIG\_XTYPES\_COMPLIANCE\_MASK\_DEFAULT** (p. 536).

To be fully compliant with the XTypes specification, set the mask to **NDDS\_CONFIG\_XTYPES\_COMPLIANCE\_MASK\_VENDOR** (p. 536).

[default] **NDDS\_CONFIG\_XTYPES\_COMPLIANCE\_MASK\_DEFAULT** (p. 536)

## 7.175.4 Enumeration Type Documentation

### 7.175.4.1 NDDS\_Config\_XTypesComplianceMaskBits

```
enum NDDS_Config_XTypesComplianceMaskBits
```

The bits for the **NDDS\_Config\_XTypesComplianceMask** (p. 536) with different aspects of the Extended CDR encoding (XCDR and XCDR2).

See also

**NDDS\_Config\_XTypesComplianceMask<P>** (p. 536)

## Enumerator

<p>NDDS_CONFIG_XTYPES_DHEADER_IN_NON_↔ PRIMITIVE_COLLECTIONS_BIT</p>	<p>When this bit is set, the serialization of sequences and arrays with non-primitive members includes a DHEADER. Value: 0x00000001 To be compatible with the XTypes specification, this bit must be set. This bit only applies to XCDR2 encoding. Limitation: For FlatData, the compliant encoding is applied to arrays and sequences of mutable types, but not final types . The serialization of final types containing arrays of non-primitive types in the FlatData language binding is not compliant with Extended CDR encoding version 2 in any case.</p>
<p>NDDS_CONFIG_XTYPES_ENUM_AS_PRIMITIVE_↔ IN_COLLECTIONS_BIT</p>	<p>When this bit is set, enums are considered primitive types in collection types. Value: 0x00000002 A DHEADER will not be added to collections of enums if <b>NDDS_CONFIG_XTYPES_DHEADER_IN_NON_↔ PRIMITIVE_COLLECTIONS_BIT</b> (p. 538) is set. To be compatible with the XTypes specification, this bit must be unset. This bit only applies to XCDR2 encoding.</p>
<p>NDDS_CONFIG_XTYPES_PARAMETER_LENGTH_↔ _WITH_PADDING_BIT</p>	<p>When this bit is set, the length of a member header in a mutable type or an optional member will include padding bytes to a 4-byte boundary. Value: 0x00000004 To be compatible with the XTypes specification, this bit must be unset. This bit only applies to XCDR encoding.</p>



## Enumerator

<p>NDDS_CONFIG_XTYPES_ENCAPSULATION_OPTIONS_WITH_PADDING_BIT ↔</p>	<p>When this bit is set, RTI Connex will set the padding bits in the options field of the encapsulation header of a serialized payload. Value: 0x00000008</p> <p>When this bit is set RTI Connex will set the least significant two bits in the second byte of the options field to a value that encodes the number of padding bytes needed after the end of the serialized payload in order to reach the next 4-byte aligned offset. Specifically, the least significant two bits shall be set to binary 00 if no padding bits would be needed and binary 01, 10, or 11 if, respectively, there would be one, two, or three bytes of padding needed. These bits in the options field will be interpreted by a DataReader to determine where the serialized data exactly ended.</p> <p>To be compatible with the XTypes specification, this bit must be set.</p> <p>To be compatible with the following Micro versions this bit must be unset because those versions of Micro did not support padding bits and will discard any data with encapsulations options not set to 0.</p> <ul style="list-style-type: none"> <li>• RTI Connex Micro 3.x.y.z</li> <li>• RTI Connex Micro 2.4.15.1</li> <li>• RTI Connex Micro 2.4.14.0 and 2.4.14.1</li> <li>• RTI Connex Micro 2.4.13.1 through 2.4.13.5</li> <li>• RTI Connex Micro 2.4.12.z</li> </ul> <p>This bit applies to both, XCDR and XCDR2 encodings.</p>
--	--

## 7.176 Heap Monitoring

Monitor memory allocations done by the middleware on the native heap.

### Classes

- class **NDDSUtilityHeapMonitoring**  
*Heap Monitoring APIs.*

### Enumerations

- enum **NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_FORMAT** {  
**NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_BIT\_TOPIC** ,  
**NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_BIT\_FUNCTION** ,  
**NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_BIT\_ACTIVITY** ,  
**NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_DEFAULT** ,  
**NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_MINIMAL** }  
*Bitmap used to decide which information of the snapshot will be displayed.*

### 7.176.1 Detailed Description

Monitor memory allocations done by the middleware on the native heap.

RTI Connexx allows you to monitor the memory allocations done by the middleware on the native heap. This feature can be used to analyze and debug unexpected memory growth.

After `NDDUtilityHeapMonitoring::enable` (p. 1843) is called, you may invoke `NDDUtilityHeapMonitoring::take_heap_snapshot` (p. 1844) to save the current heap memory usage to a file. By comparing two snapshots, you can tell if new memory has been allocated and, in many cases, where.

### 7.176.2 Enumeration Type Documentation

#### 7.176.2.1 NDDS\_Utility\_HeapMonitoringSnapshotContentFormat

```
enum NDDS_Utility_HeapMonitoringSnapshotContentFormat
```

Bitmap used to decide which information of the snapshot will be displayed.

Enumerator

<code>NDDS_UTILITY_HEAP_MONITORING_SNAPSHOT_CONTENT_BIT_TOPIC</code>	Add the topic to the snapshot of heap monitoring.
<code>NDDS_UTILITY_HEAP_MONITORING_SNAPSHOT_CONTENT_BIT_FUNCTION</code>	Add the function name to the snapshot of heap monitoring.
<code>NDDS_UTILITY_HEAP_MONITORING_SNAPSHOT_CONTENT_BIT_ACTIVITY</code>	Add the activity context to the snapshot of heap monitoring. The user can select the information that will be part of the activity context by using the API <code>NDDConfigActivityContext::set_attribute_mask</code> (p. 534).
<code>NDDS_UTILITY_HEAP_MONITORING_SNAPSHOT_CONTENT_DEFAULT</code>	Add all the optional attributes to the snapshot of heap monitoring.
<code>NDDS_UTILITY_HEAP_MONITORING_SNAPSHOT_CONTENT_MINIMAL</code>	Not add any optional attribute to the snapshot of heap monitoring.

## 7.177 Network Capture

Save network traffic into a capture file for further analysis.

### Classes

- struct `NDDS_Utility_NetworkCaptureParams_t`

*Input parameters for starting network capture.*

- class **NDDSUtilityNetworkCapture**

*Network Capture APIs.*

## Macros

- #define **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_DEFAULT**  
*Default mask for **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_KIND** (p. 545): do not remove any content.*
- #define **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_NONE**  
*The RTPS frames in the capture file will be saved as they are.*
- #define **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_ALL**  
*The RTPS frames in the capture file will not include user data (either plain or encrypted).*
- #define **NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_DEFAULT**  
*Default mask for **NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_KIND\_MASK** (p. 544).*
- #define **NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_NONE**  
*Do not capture any traffic.*
- #define **NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_ALL**  
*Capture all traffic (both inbound and outbound).*

## Typedefs

- typedef **DDS\_Long NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_KIND\_MASK**  
*Mask that indicates a combination of content types.*
- typedef **DDS\_Long NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_KIND\_MASK**  
*Mask that indicates the traffic direction to capture.*
- typedef struct **NDDS\_UTILITY\_NETWORK\_CAPTURE\_PARAMS\_T NDDS\_UTILITY\_NETWORK\_CAPTURE\_PARAMS\_T**  
*Input parameters for starting network capture.*

## Enumerations

- enum **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_KIND** {  
**NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_USER\_SERIALIZED\_DATA** ,  
**NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_ENCRYPTED\_DATA** }  
*Bitmap used to specify a content type, i.e., a part of the RTPS frame.*
- enum **NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_KIND** {  
**NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_OUT** ,  
**NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_IN** }  
*Bitmap used to specify whether we want to capture inbound or outbound traffic.*

## Variables

- const **NDDS\_UTILITY\_NETWORK\_CAPTURE\_PARAMS\_T NDDS\_UTILITY\_NETWORK\_CAPTURE\_PARAMETERS\_DEFAULT**  
*Default parameters used in Network Capture.*

### 7.177.1 Detailed Description

Save network traffic into a capture file for further analysis.

RTI Connex allows you to capture the network traffic that one or more DomainParticipants send or receive. This feature can be used to analyze and debug communication problems between your DDS applications. When network capture is enabled, each DomainParticipant will generate a pcap-based file that can then be opened by a packet analyzer like Wireshark, provided the right dissectors are installed.

To some extent, network capture can be used as an alternative to existing pcap-based network capture software (such as Wireshark). This will be the case when you are only interested in analyzing the traffic a DomainParticipant sends/receives. In this scenario, network capture will actually have some advantages over using more general pcap-based network capture applications: RTI's network capture includes additional information such as security-related data; it also removes information that is not needed, such as user data, when you want to reduce the capture size. That said, RTI's network capture is not a replacement for other pcap-based network capture applications: it only captures the traffic exchanged by the DomainParticipants, but it does not capture any other traffic exchanged through the system network interfaces.

To capture network traffic `NDDUtilityNetworkCapture::enable` (p.1847) must be invoked before creating any DomainParticipant. Similarly, `NDDUtilityNetworkCapture::disable` (p.1848) must be called after deleting all participants. In between these calls, you may start, stop, pause or resume capturing traffic for one or all participants.

### 7.177.2 Capturing

#### Shared Memory Traffic

Every RTPS frame in network capture has a source and a destination associated with it. In the case of shared memory traffic, a process identifier and a port determine the source and destination endpoints.

Access to the process identifier (PID) of the source for inbound traffic requires changes in the shared memory segments. These changes would break shared memory compatibility with previous versions of RTI Connex. For this reason, by default, network capture will not populate the value of the source PID for inbound shared memory traffic.

If interoperability with previous versions of RTI Connex is not necessary, you can generate capture files containing the source PID for inbound traffic. To do so, configure the value of the `'dds.transport.minimum_compatibility_version'` property to 6.1.0. (See `DDS_PropertyQosPolicy` (p. 1007)).

```
<domain_participant_qos>
  <property>
    <value>
      <element>
        <name>dds.transport.minimum_compatibility_version</name>
        <value>6.1.0</value>
        <propagate>false</propagate>
      </element>
    </value>
  </property>
</domain_participant_qos>
```

This property is never propagated, so it must be consistently configured throughout the whole system.

**Note:** Changing the value of this property affects the type of shared memory segments that RTI Connex uses. For that reason, you may see the following warning, resulting from leftover shared memory segments:

```
[0xC733A001,0xB248F671,0xAEC4A0C1:0x000001C1{Domain=200}|CREATE DP|ENABLE]
  NDDS_Transport_Shmem_is_segment_compatible:incompatible shared memory protocol detected.
```

Current version 4.0 not compatible with 2.0.

The leftover shared memory segments can be removed using the `ipcrm` command. See <https://community.rti.com/kb/what-are-possible-solutions-common-shared-memory-issues> for more information.

## 7.177.3 Macro Definition Documentation

### 7.177.3.1 NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_DEFAULT

```
#define NDDS_UTILITY_NETWORK_CAPTURE_CONTENT_MASK_DEFAULT
```

Default mask for **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_KIND** (p. 545): do not remove any content.

It is equivalent to **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_NONE** (p. 543).

**[default]** Do not remove any content.

### 7.177.3.2 NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_NONE

```
#define NDDS_UTILITY_NETWORK_CAPTURE_CONTENT_MASK_NONE
```

The RTPS frames in the capture file will be saved as they are.

### 7.177.3.3 NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_ALL

```
#define NDDS_UTILITY_NETWORK_CAPTURE_CONTENT_MASK_ALL
```

The RTPS frames in the capture file will not include user data (either plain or encrypted).

Its value is the result of setting the bits for removing user data and removing encrypted data: (**NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_USER\_SERIALIZED\_DATA** (p. 545)) | **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_ENCRYPTED\_DATA** (p. 545))

### 7.177.3.4 NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_DEFAULT

```
#define NDDS_UTILITY_NETWORK_CAPTURE_TRAFFIC_MASK_DEFAULT
```

Default mask for **NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_DEFAULT** (p. 544).

It is equivalent to **NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_ALL** (p. 544).

**[default]** Capture all traffic: inbound and outbound.

### 7.177.3.5 NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_NONE

```
#define NDDS_UTILITY_NETWORK_CAPTURE_TRAFFIC_MASK_NONE
```

Do not capture any traffic.

### 7.177.3.6 NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_ALL

```
#define NDDS_UTILITY_NETWORK_CAPTURE_TRAFFIC_MASK_ALL
```

Capture all traffic (both inbound and outbound).

The value is equal to setting both the input and output bits of the mask: (**NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_IN** (p. 546) | **NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_OUT** (p. 546)).

## 7.177.4 Typedef Documentation

### 7.177.4.1 NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_KIND\_MASK

```
typedef DDS_Long NDDS_UTILITY_NETWORK_CAPTURE_CONTENT_KIND_MASK
```

Mask that indicates a combination of content types.

The masks are based on a combination (or only one) of the **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_KIND** (p. 545) bitmaps.

See also

**NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_KIND** (p. 545)

### 7.177.4.2 NDDS\_Utility\_NetworkCaptureTrafficKindMask

```
typedef DDS_Long NDDS_Utility_NetworkCaptureTrafficKindMask
```

Mask that indicates the traffic direction to capture.

The masks are based on a combination (or only one) of the **NDDS\_Utility\_NetworkCaptureTrafficKind** (p.545) bitmaps.

See also

**NDDS\_Utility\_NetworkCaptureTrafficKind** (p. 545)

### 7.177.4.3 NDDS\_Utility\_NetworkCaptureParams\_t

```
typedef struct NDDS_Utility_NetworkCaptureParams_t NDDS_Utility_NetworkCaptureParams_t
```

Input parameters for starting network capture.

## 7.177.5 Enumeration Type Documentation

### 7.177.5.1 NDDS\_Utility\_NetworkCaptureContentKind

```
enum NDDS_Utility_NetworkCaptureContentKind
```

Bitmap used to specify a content type, i.e., a part of the RTPS frame.

Several values can be combined. Read **NDDS\_Utility\_NetworkCaptureContentKindMask** (p.544) for typical combinations.

Enumerator

NDDS_UTILITY_NETWORK_CAPTURE_CONTENT_USER_↔ SERIALIZED_DATA	The serialized data coming from a user.
NDDS_UTILITY_NETWORK_CAPTURE_CONTENT_ENCRYPTED_↔ DATA	The encrypted user data.

### 7.177.5.2 NDDS\_Utility\_NetworkCaptureTrafficKind

enum `NDDS_Utility_NetworkCaptureTrafficKind`

Bitmap used to specify whether we want to capture inbound or outbound traffic.

Several values can be combined. Read `NDDS_Utility_NetworkCaptureTrafficKindMask` (p. 544) for typical combinations.

Enumerator

<code>NDDS_UTILITY_NETWORK_CAPTURE_TRAFFIC_OUT</code>	Do not capture outbound traffic.
<code>NDDS_UTILITY_NETWORK_CAPTURE_TRAFFIC_IN</code>	Do not capture inbound traffic.

## 7.177.6 Variable Documentation

### 7.177.6.1 NDDS\_UTILITY\_NETWORK\_CAPTURE\_PARAMETERS\_DEFAULT

```
const NDDS_Utility_NetworkCaptureParams_t NDDS_UTILITY_NETWORK_CAPTURE_PARAMETERS_DEFAULT [extern]
```

Default parameters used in Network Capture.

The default parameters can be used as initializers to ensure that new objects do not have uninitialized contents.

Initialization of a `NDDS_Utility_NetworkCaptureParams_t` (p. 1817) type can be done either by assigning to the default parameters:

```
struct NDDS_Utility_NetworkCaptureParams_t params = NDDS_UTILITY_NETWORK_CAPTURE_PARAMETERS_DEFAULT;
```

Or equivalently, by using its initializer method:

```
struct NDDS_Utility_NetworkCaptureParams_t params;
```

```
NDDS_Utility_NetworkCaptureParams_t_initialize(&params);
```

In either case, do not forget to finalize the parameters when you don't need them any more:

```
NDDS_Utility_NetworkCaptureParams_t_finalize(&params);
```

The values that are used by default for the parameters can be found in the description of each of the members in `NDDS_Utility_NetworkCaptureParams_t` (p. 1817).

## 7.178 Other Utilities

Other Utilities, such as `NDDSUtility::spin` (p. 1840).



## Classes

- class **NDDSLM**  
*Other Utilities APIs.*
- class **NDDSUtility**  
*Other Utilities APIs.*

### 7.178.1 Detailed Description

Other Utilities, such as **NDDSUtility::spin** (p. 1840).

## 7.179 Octet Buffer Support

<<*extension*>> (p. 237) Octet buffer creation, cloning, and deletion.

### Functions

- unsigned char \* **DDS\_OctetBuffer\_alloc** (unsigned int size)  
*Create a new empty OctetBuffer that can hold up to `size` octets.*
- unsigned char \* **DDS\_OctetBuffer\_dup** (const unsigned char \*buffer, unsigned int size)  
*Clone an OctetBuffer.*
- void **DDS\_OctetBuffer\_free** (unsigned char \*buffer)  
*Delete an OctetBuffer.*

### 7.179.1 Detailed Description

<<*extension*>> (p. 237) Octet buffer creation, cloning, and deletion.

The methods in this class ensure consistent cross-platform implementations for OctetBuffer creation (**DDS\_OctetBuffer\_alloc()** (p. 548)), deletion (**DDS\_OctetBuffer\_free()** (p. 549)), and cloning (**DDS\_OctetBuffer\_dup()** (p. 549)) that preserve the mutable value type semantics. These are to be viewed as methods that define an `OctetBuffer` class whose data is represented by a `'unsigned char*'`.

## 7.179.2 Conventions

The following conventions govern the memory management of OctetBuffers in RTI Connex.

- The DDS implementation ensures that when value types containing OctetBuffers are passed back and forth to the DDS APIs, the OctetBuffers are created/deleted/cloned using the `OctetBuffer` class methods.
  - Value types containing OctetBuffers have ownership of the contained OctetBuffer. Thus, when a value type is deleted, the contained octet buffer field is also deleted.
- The user must ensure that when value types containing OctetBuffers are passed back and forth to the DDS APIs, the OctetBuffers are created/deleted/cloned using the `OctetBuffer` class methods.

The representation of an OctetBuffer in C/C++ unfortunately does not allow programs to detect how much memory has been allocated for a OctetBuffer. RTI Connex must therefore make some assumptions when a user requests that a OctetBuffer be copied into. The following rules apply when RTI Connex is copying into an OctetBuffer.

- If the 'unsigned char\*' is NULL, RTI Connex will allocate a new OctetBuffer on behalf of the user. *To avoid leaking memory, you must ensure that the OctetBuffer will be freed (see **Usage** (p. 548) below) in C. For C++, the destructor of the valuetype containing the OctetBuffer will free it automatically.*
- If the 'unsigned char\*' is not NULL, RTI Connex will assume that you are managing the OctetBuffer's memory yourself and have allocated enough memory to store the OctetBuffer to be copied. *RTI Connex will copy into your memory; to avoid memory corruption, be sure to allocate enough of it. Also, do not pass structures containing junk pointers into RTI Connex; you are likely to crash.*

## 7.179.3 Usage

This requirement can generally be assured by adhering to the following *idiom* for manipulating OctetBuffers.

Always use  
`DDS_OctetBuffer_alloc()` to create,  
`DDS_OctetBuffer_dup()` to clone,  
`DDS_OctetBuffer_free()` to delete  
 a 'unsigned char\*' that is passed back and forth between  
 user code and the DDS C/C++ APIs.

Not adhering to this idiom can result in bad pointers, and incorrect memory being freed.

In addition, the user code should be vigilant to avoid memory leaks. It is good practice to:

- Balance occurrences of `DDS_OctetBuffer_alloc()` (p. 548), with matching occurrences of `DDS_OctetBuffer_↵free()` (p. 549) in the code.
- Finalize value types containing OctetBuffer. In C++ the destructor accomplishes this automatically. in C, explicit "destructor" functions are provided.

## 7.179.4 Function Documentation

### 7.179.4.1 DDS\_OctetBuffer\_alloc()

```
unsigned char * DDS_OctetBuffer_alloc (
    unsigned int size )
```

Create a new empty OctetBuffer that can hold up to `size` octets.

An OctetBuffer created by this method must be deleted using **DDS\_OctetBuffer\_free()** (p. 549).

This function will allocate enough memory to hold an OctetBuffer of `size` octets.

#### Parameters

<i>size</i>	<< <i>in</i> >> (p. 238) Size of the buffer.
-------------	--

#### Returns

A newly created non-NULL OctetBuffer upon success or NULL upon failure.

Referenced by **DDS\_KeyedOctets::DDS\_KeyedOctets()**, and **DDS\_Octets::DDS\_Octets()**.

### 7.179.4.2 DDS\_OctetBuffer\_dup()

```
unsigned char * DDS_OctetBuffer_dup (
    const unsigned char * buffer,
    unsigned int size )
```

Clone an OctetBuffer.

An OctetBuffer created by this method must be deleted using `DDS_OctetBuffer_free()`

#### Parameters

<i>buffer</i>	<< <i>in</i> >> (p. 238) The OctetBuffer to duplicate.
<i>size</i>	<< <i>in</i> >> (p. 238) Size of the OctetBuffer to duplicate.

#### Returns

If `src == NULL` or `size < 0`, this method always returns NULL. Otherwise, upon success it returns a newly created OctetBuffer whose value is `src`; upon failure it returns NULL.

### 7.179.4.3 DDS\_OctetBuffer\_free()

```
void DDS_OctetBuffer_free (
    unsigned char * buffer )
```

Delete an OctetBuffer.

#### Precondition

`buffer` must be either NULL, or must have been created using **DDS\_OctetBuffer\_alloc()** (p. 548), **DDS\_OctetBuffer\_dup()** (p. 549)

#### Parameters

<code>buffer</code>	<< <i>in</i> >> (p. 238) The buffer to delete.
---------------------	--

Referenced by **DDS\_KeyedOctets::~~DDS\_KeyedOctets()**, and **DDS\_Octets::~~DDS\_Octets()**.

## 7.180 SampleProcessor

<<*experimental*>> (p. 237) <<*extension*>> (p. 237) Utility to concurrently read and process the data samples received by **DDSDataReader** (p. 1288).

<<*experimental*>> (p. 237) <<*extension*>> (p. 237) Utility to concurrently read and process the data samples received by **DDSDataReader** (p. 1288).

## 7.181 Sequence Support

The **FooSeq** (p. 1697) interface allows you to work with variable-length collections of homogeneous data.

### Modules

- **Built-in Sequences**

*Defines sequences of primitive data type. .*

### Classes

- struct **FooSeq**

<<*interface*>> (p. 237) <<*generic*>> (p. 237) A type-safe, ordered collection of elements. The type of these elements is referred to in this documentation as **Foo** (p. 1648).

### 7.181.1 Detailed Description

The **FooSeq** (p. 1697) interface allows you to work with variable-length collections of homogeneous data.

This interface is instantiated for each concrete element type in order to provide compile-time type safety to applications. The **Built-in Sequences** (p. 164) are pre-defined instantiations for the primitive data types.

When you use the `rtiddsgen` code generation tool, it will automatically generate concrete sequence instantiations for each of your own custom types.

## 7.182 String Support

<<*extension*>> (p. 237) String creation, cloning, assignment, and deletion.

### Functions

- `char * DDS_String_alloc (size_t length)`  
*Create a new empty string that can hold up to `length` characters.*
- `char * DDS_String_dup (const char *str)`  
*Clone a string. Creates a new string that duplicates the value of `string`.*
- `char * DDS_String_replace (char **string_ptr, const char *new_value)`  
*Assign a new value to a string. Replaces the string pointed to by `string_ptr`, with a string whose value is `new_value`.*
- `void DDS_String_free (char *str)`  
*Delete a string.*
- `DDS_Wchar * DDS_Wstring_alloc ( DDS_UnsignedLong length)`  
*Create a new empty string that can hold up to `length` wide characters.*
- `DDS_UnsignedLong DDS_Wstring_length (const DDS_Wchar *str)`  
*Get the number of wide characters in the given string.*
- `DDS_Wchar * DDS_Wstring_copy ( DDS_Wchar *dst, const DDS_Wchar *src)`  
*Copy the source string over the destination string reallocating the space if it's necessary.*
- `DDS_Wchar * DDS_Wstring_copy_and_widen ( DDS_Wchar *dst, const char *src)`  
*Copy the source string over the destination string, widening each character.*
- `DDS_Wchar * DDS_Wstring_dup (const DDS_Wchar *str)`  
*Clone a string of wide characters. Creates a new string that duplicates the value of `string`.*
- `DDS_Wchar * DDS_Wstring_dup_and_widen (const char *str)`  
*Clone a string of characters as a string of wide characters.*
- `void DDS_Wstring_free ( DDS_Wchar *str)`  
*Delete a string.*

### 7.182.1 Detailed Description

<<*extension*>> (p. 237) String creation, cloning, assignment, and deletion.

The methods in this class ensure consistent cross-platform implementations for string creation (**DDS\_String\_alloc()** (p. 553)), deletion (**DDS\_String\_free()** (p. 554)), and cloning (**DDS\_String\_dup()** (p. 553)) that preserve the mutable value type semantics. These are to be viewed as methods that define a `string` class whose data is represented by a `'char*'`.

### 7.182.2 String Conventions

The following conventions govern the memory management of strings in RTI Connex.

- The DDS implementation ensures that when value types containing strings are passed back and forth to the DDS APIs, the strings are created/deleted/assigned/cloned using the `string` class methods.
  - Value types containing strings have ownership of the contained string. Thus, when a value type is deleted, the contained string field is also deleted.
  - **DDS\_StringSeq** (p. 1102) is a value type that contains strings; it owns the memory for the contained strings. When a **DDS\_StringSeq** (p. 1102) is assigned or deleted, the contained strings are also assigned or deleted respectively.
- The user must ensure that when value types containing strings are passed back and forth to the DDS APIs, the strings are created/deleted/assigned/cloned using the `String` class methods.

The representation of a string in C/C++ unfortunately does not allow programs to detect how much memory has been allocated for a string. RTI Connex must therefore make some assumptions when a user requests that a string be copied into. The following rules apply when RTI Connex is copying into a string or string sequence:

- If the 'char\*' is NULL, RTI Connex will log a warning and allocate a new string on behalf of the user. *To avoid leaking memory, you must ensure that the string will be freed (see **Usage** (p. 552) below).*
- If the 'char\*' is not NULL, RTI Connex will assume that you are managing the string's memory yourself and have allocated enough memory to store the string to be copied. *RTI Connex will copy into your memory; to avoid memory corruption, be sure to allocate enough of it. Also, do not pass structures containing junk pointers into RTI Connex; you are likely to crash.*

### 7.182.3 Usage

This requirement can generally be assured by adhering to the following *idiom* for manipulating strings.

Always use  
`DDS_String_alloc()` to create,  
`DDS_String_dup()` to clone,  
`DDS_String_free()` to delete  
 a string 'char\*' that is passed back and forth between  
 user code and the DDS C/C++ APIs.

Not adhering to this idiom can result in bad pointers, and incorrect memory being freed.

In addition, the user code should be vigilant to avoid memory leaks. It is good practice to:

- Balance occurrences of **DDS\_String\_alloc()** (p. 553), **DDS\_String\_dup()** (p. 553), with matching occurrences of **DDS\_String\_free()** (p. 554) in the code.
- Finalize value types containing strings. In C++ the destructor accomplishes this automatically. In C, explicit "destructor" functions are provided; these functions are typically called "finalize."

#### Note

When dealing with the **DDS\_PublishModeQosPolicy::flow\_controller\_name** (p. 1027) and **DDS\_MultiChannelQosPolicy::filter\_name** (p. 966) fields, we advise taking a look at the sample code for how to properly assign new values and free the old ones.

#### See also

**DDS\_StringSeq** (p. 1102)

## 7.182.4 Function Documentation

### 7.182.4.1 DDS\_String\_alloc()

```
char * DDS_String_alloc (
    size_t length )
```

Create a new empty string that can hold up to `length` characters.

A string created by this method must be deleted using **DDS\_String\_free()** (p. 554).

This function will allocate enough memory to hold a string of `length` characters, **plus** one additional byte to hold the NULL terminating character.

#### Parameters

<code>length</code>	<< <i>in</i> >> (p. 238) Capacity of the string.
---------------------	--

#### Returns

A newly created non-NULL string upon success or NULL upon failure.

#### Examples

**HelloWorld.cxx.**

Referenced by **DDS\_KeyedOctets::DDS\_KeyedOctets()**, and **DDS\_KeyedString::DDS\_KeyedString()**.

### 7.182.4.2 DDS\_String\_dup()

```
char * DDS_String_dup (
    const char * str )
```

Clone a string. Creates a new string that duplicates the value of `string`.

A string created by this method must be deleted using **DDS\_String\_free()** (p. 554)

#### Parameters

<code>str</code>	<< <i>in</i> >> (p. 238) The string to duplicate.
------------------	---

**Returns**

If `string == NULL`, this method always returns `NULL`. Otherwise, upon success it returns a newly created string whose value is `string`; upon failure it returns `NULL`.

**7.182.4.3 DDS\_String\_replace()**

```
char * DDS_String_replace (
    char ** string_ptr,
    const char * new_value )
```

Assign a new value to a string. Replaces the string pointed to by `string_ptr`, with a string whose value is `new_value`.

A string created by this method must be deleted using **DDS\_String\_free()** (p. 554).

This function is most commonly used when manipulating string sequences, **DDS\_StringSeq** (p. 1102).

**Precondition**

`string_ptr` be a non-NULL pointer. `*string_ptr` must be either `NULL`, or a string created using **DDS\_String\_alloc()** (p. 553) or **DDS\_String\_dup()** (p. 553), or **DDS\_String\_replace()** (p. 554).

**Parameters**

<code>string_ptr</code>	<< <i>inout</i> >> (p. 238) Pointer to the string to replace.
<code>new_value</code>	<< <i>in</i> >> (p. 238) The value of the replacement string.

**Returns**

If `new_value = NULL`, this method always returns `NULL`. Otherwise, upon success it returns `*string_ptr` whose value is `new_value`; upon failure it returns `NULL`.

**Postcondition**

If `new_value = NULL`, `*string_ptr == NULL`. Otherwise, upon success `string_ptr` contains a pointer to a string whose value is `new_value`; upon failure, `string_ptr` is left unchanged.

**7.182.4.4 DDS\_String\_free()**

```
void DDS_String_free (
    char * str )
```

Delete a string.



**Precondition**

`string` must be either NULL, or must have been created using `DDS_String_alloc()` (p. 553), `DDS_String_dup()` (p. 553)

**Parameters**

<code>str</code>	<< <i>in</i> >> (p. 238) The string to delete.
------------------	--

**Examples**

**HelloWorld.cxx.**

Referenced by `DDS_KeyedOctets::DDS_KeyedOctets()`, `DDS_KeyedString::DDS_KeyedString()`, `DDS_KeyedOctets::~~DDS_KeyedOctets()`, and `DDS_KeyedString::~~DDS_KeyedString()`.

**7.182.4.5 DDS\_Wstring\_alloc()**

```
DDS_Wchar * DDS_Wstring_alloc (
    DDS_UnsignedLong length )
```

Create a new empty string that can hold up to `length` wide characters.

A string created by this method must be deleted using `DDS_Wstring_free()` (p. 557)

This function will allocate enough memory to hold a string of `length` characters, **plus** one additional wide character to hold the NULL terminator.

**Parameters**

<code>length</code>	<< <i>in</i> >> (p. 238) Capacity of the string.
---------------------	--

**Returns**

A newly created non-NULL string upon success or NULL upon failure.

**7.182.4.6 DDS\_Wstring\_length()**

```
DDS_UnsignedLong DDS_Wstring_length (
    const DDS_Wchar * str )
```

Get the number of wide characters in the given string.

The result does not count the terminating zero character.

## Parameters

<i>str</i>	<< <i>in</i> >> (p. 238) A non-NULL string.
------------	---

## Returns

The number of wide characters in the string.

## 7.182.4.7 DDS\_Wstring\_copy()

```
DDS_Wchar * DDS_Wstring_copy (
    DDS_Wchar * dst,
    const DDS_Wchar * src )
```

Copy the source string over the destination string reallocating the space if it's necessary.

## Parameters

<i>dst</i>	
<i>src</i>	

## Returns

*dst*

## 7.182.4.8 DDS\_Wstring\_copy\_and\_widen()

```
DDS_Wchar * DDS_Wstring_copy_and_widen (
    DDS_Wchar * dst,
    const char * src )
```

Copy the source string over the destination string, widening each character.

## Parameters

<i>dst</i>	<< <i>in</i> >> (p. 238) A non-NULL string to be overwritten by <i>src</i> .
<i>src</i>	<< <i>in</i> >> (p. 238) A non-NULL string to be copied over <i>dst</i> .

**Returns**

`dst`

**7.182.4.9 DDS\_Wstring\_dup()**

```
DDS_wchar * DDS_Wstring_dup (
    const DDS_wchar * str )
```

Clone a string of wide characters. Creates a new string that duplicates the value of `string`.

A string created by this method must be deleted using **DDS\_Wstring\_free()** (p. 557).

**Parameters**

<code>str</code>	<< <i>in</i> >> (p. 238) The string to duplicate.
------------------	---

**Returns**

If `string == NULL`, this method always returns `NULL`. Otherwise, upon success it returns a newly created string whose value is `string`; upon failure it returns `NULL`.

**7.182.4.10 DDS\_Wstring\_dup\_and\_widen()**

```
DDS_wchar * DDS_Wstring_dup_and_widen (
    const char * str )
```

Clone a string of characters as a string of wide characters.

A string created by this method must be deleted using **DDS\_Wstring\_free()** (p. 557)

**Parameters**

<code>str</code>	<< <i>in</i> >> (p. 238) The string to duplicate.
------------------	---

**Returns**

If `string == NULL`, this method always returns `NULL`. Otherwise, upon success it returns a newly created string whose value is `string`; upon failure it returns `NULL`.

### 7.182.4.11 DDS\_Wstring\_free()

```
void DDS_Wstring_free (
    DDS_Wchar * str )
```

Delete a string.

#### Precondition

`string` must either NULL, or must have been created using `DDS_Wstring_alloc()` (p. 555), `DDS_Wstring_↔dup()` (p. 557), or `DDS_Wstring_replace()`

#### Parameters

<code>str</code>	<< <i>in</i> >> (p. 238) The string to delete.
------------------	--

## 7.183 FlatData Builders

A Builder allows creating and initializing variable-size data.

### Classes

- class **rti::flat::AggregationBuilder**  
*Base class of struct and union builders.*
- class **rti::flat::UnionBuilder< Discriminator >**  
*Base class of builders for user-defined mutable unions.*
- class **MyFlatMutableBuilder**  
*Represents the Builder for an arbitrary user-defined mutable type.*
- class **MyFlatUnionBuilder**  
*Represents the Builder for an arbitrary user-defined mutable IDL union.*
- class **rti::flat::AbstractBuilder**  
*Base class of all Builders (p. 558).*
- class **rti::flat::AbstractListBuilder< DHeaderGen >**  
*Base class of all array and sequence builders.*
- class **rti::flat::MutableArrayBuilder< ElementBuilder, N >**  
*Builds an array member of variable-size elements.*
- class **rti::flat::AbstractSequenceBuilder< DHeaderGen >**  
*Base class of Builders for sequence members.*
- class **rti::flat::MutableSequenceBuilder< ElementBuilder >**  
*Builds a sequence member of variable-size elements.*
- class **rti::flat::FinalSequenceBuilder< ElementOffset >**  
*Builds a sequence member of fixed-size elements.*
- class **rti::flat::PrimitiveSequenceBuilder< T >**  
*Builds a sequence of primitive members.*
- class **rti::flat::StringBuilder**  
*Builds a string.*

## Functions

- `template<typename TopicType >`  
`rti::flat::flat_type_traits< TopicType >::builder rti::flat::build_data (typename TopicType::DataWriter *writer)`  
*Begins building a new sample.*
- `template<typename BuilderType >`  
`void rti::flat::discard_builder (typename rti::flat::flat_type_traits< BuilderType >::flat_type::DataWriter *writer, BuilderType &builder)`  
*Discards a sample builder.*

### 7.183.1 Detailed Description

A Builder allows creating and initializing variable-size data.

Builders allow creating variable-size **FlatData samples** (p. 561), as described in **Publishing FlatData** (p. 570).

There are the following Builder types:

Category	Builder type
User types	For example: <ul style="list-style-type: none"> <li>• <b>MyFlatMutableBuilder</b> (p. 1750), a mutable struct</li> <li>• <b>MyFlatUnionBuilder</b> (p. 1764), a union</li> <li>• Final structs are fixed-size and do not have a Builder (see for example <b>MyFlatMutableBuilder::add_my_final()</b> (p. 1755)).</li> </ul>
Arrays	<ul style="list-style-type: none"> <li>• <b>rti::flat::MutableArrayBuilder</b> (p. 1740)</li> <li>• Arrays of final elements are fixed-size and do not have a Builder (see for example <b>MyFlatMutableBuilder::add_my_final_array()</b> (p. 1755)).</li> </ul>
Sequences	<ul style="list-style-type: none"> <li>• <b>rti::flat::MutableSequenceBuilder</b> (p. 1744) for sequences of mutable elements</li> <li>• <b>rti::flat::FinalSequenceBuilder</b> (p. 1645) for sequences of final elements</li> <li>• <b>rti::flat::PrimitiveSequenceBuilder</b> (p. 1864) for sequences of primitive elements</li> <li>• <b>rti::flat::StringBuilder</b> (p. 1943)</li> </ul>
Primitive types	<ul style="list-style-type: none"> <li>• Primitive members are added using one of the member functions of the Builder of the type that contains them. See for example <b>MyFlatMutableBuilder::add_my_primitive()</b> (p. 1754).</li> </ul>

Builder for user types, such as **MyFlatMutableBuilder** (p. 1750), can behave as **sample builders**, when they build a sample, or **member builders** when they build a member for another Builder (such as the Builder returned by **MyFlatMutableBuilder::build\_my\_mutable()** (p. 1756)). All the other Builder types (sequences, arrays) are always member builders (such as the Builder returned by **MyFlatMutableBuilder::build\_my\_final\_seq()** (p. 1755)).

Builders are **move-only** types. They cannot be copied, only moved. When you assign a Builder as the return value of a function, this happens automatically.

```
// the return value of 'build_data' is moved into 'builder'
MyFlatMutableBuilder builder = rti::flat::build_data(writer);
```

To explicitly move a Builder variable in the Traditional C++ API, call its **move ()** (p. 190) member function

### 7.183.2 Builder Error Management

The Traditional C++ API reports Builder errors by setting a flag that can be checked with the member function **check\_↔\_failure()** (p. 581). After each Builder operation, `check_failure()` must be called to check (and clear) the error flag.

In addition, in case of error, operations that return another Builder, such as **MyFlatMutableBuilder::build\_my\_↔\_mutable()** (p. 1756), return an invalid Builder (**is\_valid()** (p. 580) is `false`). Operations that return an Offset, such as **MyFlatMutableBuilder::add\_my\_final()** (p. 1755) return a "null" Offset when they fail (see **Offset Error Management** (p. 566)).

See also

**MyFlatMutableBuilder** (p. 1750) for more information specific to builders for user types.

### 7.183.3 Function Documentation

#### 7.183.3.1 build\_data()

```
template<typename TopicType >
rti::flat::flat_type_traits< TopicType >::builder rti::flat::build_data (
    typename TopicType::DataWriter * writer )
```

Begins building a new sample.

#### Template Parameters

<i>TopicType</i>	A FlatData mutable type that corresponds to the type of the DataWriter argument.
------------------	--

#### Parameters

<i>writer</i>	The writer that will be used to write this sample.
---------------	--

#### Returns

The Builder to build the sample. For example if `TopicType` is **MyFlatMutable** (p. 562), this function returns a **MyFlatMutableBuilder** (p. 1750). In case of error, this function returns an **invalid Builder** (p. 580)

Once you have completed the sample, call `finish_sample()` (p. 1753) to obtain a `MyFlatMutable` (p. 562) sample that can be written with `writer`.

If the building of this sample needs to be aborted before calling `finish_sample()`, use `rti::flat::discard_builder()` (p. 561). If, after obtaining a sample with `finish_sample()`, this sample is not written, then discard it with `FooDataWriter::discard_loan()` (p. 1696).

#### See also

`FooDataWriter::get_loan` (p. 1695), the function that `build_data()` (p. 560) uses to obtain the memory required to build the sample.

`Publishing FlatData` (p. 570)

References `DDS_BOOLEAN_TRUE`, and `DDS_RETCODE_OK`.

### 7.183.3.2 discard\_builder()

```
template<typename BuilderType >
void rti::flat::discard_builder (
    typename rti::flat::flat_type_traits< BuilderType >::flat_type::DataWriter * writer,
    BuilderType & builder )
```

Discards a sample builder.

#### Template Parameters

<i>TopicType</i>	An IDL-defined FlatData type that corresponds to the type of the DataWriter argument.
------------------	---

This function invalidates and discards a builder before it is `finished()` and before the sample it would have created was written.

#### Parameters

<i>writer</i>	The writer that was used to create the builder
<i>builder</i>	The builder, created with <code>rti::flat::build_data(writer)</code> ;

## 7.184 FlatData Samples

A Sample represents an instance of the IDL topic-type and contains the data in serialized format.

### Classes

- class `rti::flat::Sample< OffsetType >`

*The generic definition of FlatData topic-types.*

- struct **rti::flat::flat\_type\_traits**< T >

*Given a **Sample** (p. 1916), an **Offset** or a **Builder**, it allows obtaining the other types.*

## Typedefs

- typedef **rti::flat::Sample**< **MyFlatFinalOffset** > **MyFlatFinal**  
*Represents an arbitrary user-defined FlatData final IDL struct.*
- typedef **rti::flat::Sample**< **MyFlatMutableOffset** > **MyFlatMutable**  
*Represents an arbitrary user-defined flat mutable IDL struct.*
- typedef **rti::flat::Sample**< **MyFlatUnionOffset** > **MyFlatUnion**  
*Represents an arbitrary user-defined flat mutable IDL union.*

### 7.184.1 Detailed Description

A **Sample** represents an instance of the IDL topic-type and contains the data in serialized format.

All FlatData topic-types are instantiations of **rti::flat::Sample** (p. 1916). This documentation uses the following three example types to illustrate the different ways FlatData IDL types map to C++:

- **MyFlatFinal** (p. 562), the type generated for a final IDL struct
- **MyFlatMutable** (p. 562), the type generated for a mutable IDL struct
- **MyFlatUnion** (p. 563), the type generated for an IDL union

### 7.184.2 Typedef Documentation

#### 7.184.2.1 MyFlatFinal

```
typedef rti::flat::Sample< MyFlatFinalOffset> MyFlatFinal
```

Represents an arbitrary user-defined FlatData final IDL struct.

This documentation uses the following example IDL definition of MyFlatFinal:

```
@language_binding(FLAT_DATA)
@final
struct MyFlatFinal {
    long my_primitive;
    FlatFinalBar my_complex; // Another arbitrary final FlatData type
    long my_primitive_array[10];
    FlatFinalBar my_complex_array[10];
};
```

For this type, **rtiddsgen** generates:

- **MyFlatFinal** (this instantiation of **Sample**),
- **MyFlatFinalOffset** (p. 1746).

Note that, as a final FlatData type, **MyFlatFinal** can only contain fixed-size types, such as primitives, other final FlatData structs, and arrays of fixed-size types.

Samples of **MyFlatFinal** are created with **FooDataWriter::get\_loan** (p. 1695). After creating a final **Sample**, modify its values using the **MyFlatFinalOffset** (p. 1746) returned by **root()** (p. 1918).



### 7.184.2.2 MyFlatMutable

```
typedef rti::flat::Sample< MyFlatMutableOffset> MyFlatMutable
```

Represents an arbitrary user-defined flat mutable IDL struct.

This documentation uses the following example IDL definition of MyFlatMutable:

```
@language_binding(FLAT_DATA)
@mutable
struct MyFlatMutable {
    long my_primitive;
    @optional long my_optional_primitive;
    long my_primitive_array[10];
    sequence<long, 10> my_primitive_seq;
    MyFlatFinal my_final;
    MyFlatFinal my_final_array[10];
    sequence<MyFlatFinal, 10> my_final_seq;
    FlatMutableBar my_mutable;
    FlatMutableBar my_mutable_array[10];
    sequence<FlatMutableBar, 10> my_mutable_seq;
    string<255> my_string;
    sequence<string<255>, 10> my_string_seq;
};
```

For this type, **rtiddsgen** generates:

- MyFlatMutable (this instantiation of Sample),
- **MyFlatMutableOffset** (p. 1757),
- **MyFlatMutableBuilder** (p. 1750).

As a mutable FlatData type, MyFlatMutable is not restricted to fixed-size members. Samples of MyFlatMutable are created with **rti::flat::build\_data()** (p. 560), which returns a **MyFlatMutableBuilder** (p. 1750). Once built, a mutable Sample can't change in size, but the value of members that already exist can be changed using the **MyFlatMutableOffset** (p. 1757) returned by **root()** (p. 1918).

### 7.184.2.3 MyFlatUnion

```
typedef rti::flat::Sample< MyFlatUnionOffset> MyFlatUnion
```

Represents an arbitrary user-defined flat mutable IDL union.

This documentation uses the following example IDL definition of MyFlatUnion:

```
@language_binding(FLAT_DATA)
@mutable
union MyFlatUnion switch (long) {
    case 0:
        long my_primitive;
    case 1:
    case 2:
        MyFlatMutable my_mutable;
    case 3:
        MyFlatFinal my_final;
};
```

#### Note

FlatData unions can only be **mutable** since unions are, by definition, variable-size types.

For this type, **rtiddsgen** generates:

- MyFlatUnion (this instantiation of Sample),
- **MyFlatUnionOffset** (p. 1767),
- **MyFlatUnionBuilder** (p. 1764).

## 7.185 FlatData Offsets

Offsets provide access to the members of a FlatData Sample.

### Classes

- class **MyFlatFinalOffset**  
*Represents the Offset to an arbitrary user-defined FlatData final IDL struct.*
- class **MyFlatMutableOffset**  
*Represents the Offset to an arbitrary user-defined FlatData mutable IDL struct.*
- class **MyFlatUnionOffset**  
*Represents the Offset to an arbitrary user-defined FlatData mutable IDL union.*
- class **rti::flat::OffsetBase**  
*Base class of all Offset types.*
- class **rti::flat::FinalOffset**< T >  
*The base class of all Offsets to a final struct type.*
- class **rti::flat::MutableOffset**  
*The base class of all Offsets to a final struct type.*
- struct **rti::flat::PrimitiveConstOffset**< T >  
*A const Offset to an optional primitive member.*
- struct **rti::flat::PrimitiveOffset**< T >  
*An Offset to an optional primitive member.*
- class **rti::flat::Sequenceliterator**< E, OffsetKind >  
*Iterator for collections of Offsets.*
- class **rti::flat::AbstractPrimitiveList**< T >  
*Base class for Offsets to sequences and arrays of primitive types.*
- class **rti::flat::PrimitiveSequenceOffset**< T >  
*Offset to a sequence of primitive elements.*
- class **rti::flat::PrimitiveArrayOffset**< T, N >  
*Offset to an array of primitive elements.*
- class **rti::flat::StringOffset**  
*Offset to a string.*
- class **rti::flat::AbstractAlignedList**< ElementOffset >  
*Base class of Offsets to sequences and arrays of non-primitive members.*
- class **rti::flat::SequenceOffset**< ElementOffset >  
*Offset to a sequence of non-primitive elements.*
- class **rti::flat::MutableArrayOffset**< ElementOffset, N >  
*Offset to an array of variable-size elements.*
- class **rti::flat::FinalArrayOffset**< ElementOffset, N >  
*Offset to an array of final elements.*
- class **rti::flat::FinalAlignedArrayOffset**< ElementOffset, N >  
*Offset to an array of final elements.*

## Functions

- `template<typename OffsetType >`  
**flat\_type\_traits**< OffsetType >::plain\_type \* **rti::flat::plain\_cast** (OffsetType &offset)  
*Casts into an equivalent plain C++ type.*
- `template<typename OffsetType >`  
const **flat\_type\_traits**< OffsetType >::plain\_type \* **rti::flat::plain\_cast** (const OffsetType &offset)  
*Const version of plain\_cast.*

### 7.185.1 Detailed Description

Offsets provide access to the members of a FlatData Sample.

An Offset represents a position within a **FlatData Sample** (p. 561) that allows accessing a member of that Sample, or the Sample's **root** (p. 1918).

Offsets can be described as **iterators**. They represent a position in a buffer, not the value itself. As such, they're lightweight objects that can be copied to point to the same data.

There are the following Offset types to access the different IDL types:

Category	Offset type
User types	For example: <ul style="list-style-type: none"> <li>• <b>MyFlatFinalOffset</b> (p. 1746), an Offset to a final struct</li> <li>• <b>MyFlatMutableOffset</b> (p. 1757), an Offset to a mutable struct</li> <li>• <b>MyFlatUnionOffset</b> (p. 1767), an Offset to a union</li> </ul>
Arrays	<ul style="list-style-type: none"> <li>• <b>rti::flat::PrimitiveArrayOffset</b> (p. 1861)</li> <li>• <b>rti::flat::FinalArrayOffset</b> (p. 1643) (array of final elements in a final type)</li> <li>• <b>rti::flat::FinalAlignedArrayOffset</b> (p. 1641) (array of final elements in a mutable type)</li> <li>• <b>rti::flat::MutableArrayOffset</b> (p. 1742)</li> </ul>
Sequences	<ul style="list-style-type: none"> <li>• <b>rti::flat::PrimitiveSequenceOffset</b> (p. 1867)</li> <li>• <b>rti::flat::SequenceOffset</b> (p. 1934)</li> </ul>
Primitive types	<ul style="list-style-type: none"> <li>• The type itself, such as <code>double</code></li> <li>• <b>rti::flat::PrimitiveOffset</b> (p. 1863) (when the member is optional)</li> </ul>

Offsets for user types are generated by **rtiddsgen** and provide methods to access the type's members by their names. Offsets for arrays and sequences provide methods to access each element.

Some offsets allow accessing the data through a pointer to the equivalent plain C++ type, which generally provides better performance. See `rti::flat::plain_cast()` (p. 566).

## 7.185.2 Offset Error Management

Functions that return an Offset may return a "null" Offset (one such that `is_null()` (p. 1857) returns `true`).

An Offset may be null if a member doesn't exist in the **Sample** (p. 561). For example, if the member 'my\_final' in **MyFlatMutable** (p. 562) doesn't exist (because it wasn't added while building the Sample, or because it wasn't received in the subscribing application), `MyFlatMutableOffset::my_final()` (p. 1762) returns a null Offset. Note that a **member in a final type** (for example, `MyFlatFinalOffset::my_complex()` (p. 1749)) always exists, except in the case of an error.

In addition to that, a function may return a null Offset for any error condition.

## 7.185.3 Function Documentation

### 7.185.3.1 `plain_cast()` [1/2]

```
template<typename OffsetType >
flat_type_traits< OffsetType >::plain_type * rti::flat::plain_cast (
    OffsetType & offset )
```

Casts into an equivalent plain C++ type.

Some FlatData types can be cast to their equivalent **plain** definition as a regular non-FlatData C++ type. This is a more efficient way to access the data. This function casts, if possible, the member pointed to by the offset argument to an equivalent plain C++ type. Any changes made through the plain type are reflected in the FlatData sample.

#### Template Parameters

<code>OffsetType</code>	The Offset type
-------------------------	-----------------

#### Precondition

`plain_cast` requires the type to meet the following restrictions:

- The type must be a final struct, or an array or sequence of members of a type that meets these restrictions (including primitive types)
- The type must be defined in a way such that the packing of the plain C++ type doesn't differ from the padding in XCDR2.
- The type may not inherit from another type.
- In addition, the sample must be serialized in the native endianness. For example, if a subscribing application on a little-endian platform receives a sample published from a big-endian system, it is not possible to `plain_cast` the sample or any of its members, except if the member is a primitive array or sequence of 1-byte elements.

**offset.is\_cpp\_compatible()** (p. 1857) indicates if the member meets the requirements. If the type doesn't, this function returns NULL.

#### Parameters

<i>offset</i>	The offset to the member to cast.
---------------	-----------------------------------

#### Returns

The data that *offset* referred to, cast as a plain C++ type with the same definition. If *offset* is an array or sequence member, the returned pointer represents a C++ array with the same number of elements.

The following table summarizes the possible parameters to this function (assuming that they meet the previous requirements), and the return type in each case:

OffsetType	return type
Offset to a final struct, such as <b>MyFlatFinalOffset</b> (p.1746)	MyFlatFinalPlainHelper* (pointer to a single element). This is a type with the same IDL definition, but without @language_binding (FLAT_DATA).
Offset to an array of final structs, such as <b>FinalArrayOffset</b> (p.1643) <MyFlatFinalOffset (p.1746), N>	MyFlatFinalPlainHelper* (array of N elements)
Offset to a sequence of final structs, such as <b>SequenceOffset</b> (p.1934) <MyFlatFinalOffset (p.1746)>	MyFlatFinalPlainHelper* (array of offset.element_count() elements)
Offset to an array of primitive types, such as <b>PrimitiveArrayOffset</b> (p.1861) <int32_t, N>	int32_t* (array of N elements)
Offset to a sequence of primitive types, such as <b>PrimitiveSequenceOffset</b> (p.1867) <int32_t>	int32_t* (array of offset.element_count() elements)

Due to the performance advantages that `plain_cast` offers, it is recommended to define FlatData types in a way that their largest member(s) can be `plain_cast`.

The following example shows how to use `plain_cast` to cast a **MyFlatFinalOffset** (p. 1746) into the type with the same IDL definition as **MyFlatFinal** (p. 562), but without the `@language_binding (FLAT_DATA)` annotation:

```
MyFlatMutable *my_sample = ...;
auto my_root = my_sample->root();
auto my_final = my_root.my_final();
// Get the plain C++ type and modify an array
auto my_final_plain = rti::flat::plain_cast(my_final);
my_final_plain->my_primitive(3); // this is using the plain C++ setter
my_final_plain->my_complex_array()[1].x(20); // this is a std::array
// The change to my_complex_array is reflected in the FlatData sample
std::cout << my_final.my_primitive() << std::endl; // 3
std::cout << my_final.my_complex_array().get_element(1).x() << std::endl; // 20
```

This example shows how to use `plain_cast` to efficiently build a sequence of final elements and a sequence of integers, both members of a mutable type:

```
MyFlatMutableBuilder builder = rti::flat::build_data(writer);
// 1)
//
// Build a sequence of 5 elements with add_n() instead of 5 calls to
// add_next()
```

```

rti::flat::FinalSequenceBuilder<MyFlatFinalOffset> seq_builder =
    builder.build_my_final_seq();
seq_builder.add_n(5);
// Finish the member, getting the offset to the member
rti::flat::SequenceOffset<MyFlatFinalOffset> seq_offset = seq_builder.finish();
// Cast it to an array of plain C++ type and initialize it.
// This way to initialize it is more efficient than add_next().
auto seq_elements = rti::flat::plain_cast(seq_offset);
for (int i = 0; i < 5; i++) {
    seq_elements[i].my_primitive(i);
    // ...
}
// 2)
//
// Build a sequence of 1000 integers
auto seq_builder = builder.build_my_primitive_seq();
// make space for 1000 elements, but leave them uninitialized
seq_builder.add_n(1000);
auto seq_offset = seq_builder.finish();
// Initialize the elements:
int32_t *elements = rti::flat::plain_cast(seq_offset);
for (int i = 0; i < 1000; i++) {
    elements[i] = ...;
}
// ... continue building the sample using 'builder'

```

### 7.185.3.2 plain\_cast() [2/2]

```

template<typename OffsetType >
const flat_type_traits< OffsetType >::plain_type * rti::flat::plain_cast (
    const OffsetType & offset )

```

Const version of plain\_cast.

## 7.186 FlatData Topic-Types

<<*extension*>> (p. 237) FlatData Language Binding for IDL topic-types

### Modules

- **FlatData Builders**  
*A Builder allows creating and initializing variable-size data.*
- **FlatData Samples**  
*A Sample represents an instance of the IDL topic-type and contains the data in serialized format.*
- **FlatData Offsets**  
*Offsets provide access to the members of a FlatData Sample.*

## 7.186.1 Detailed Description

<<**extension**>> (p. 237) FlatData Language Binding for IDL topic-types

### Note

For a complete description of the FlatData language binding and its benefits, and a tutorial, see the "Sending Large Data" chapter in the **RTI Connex User's Manual**.

For buildable **code examples**, see <https://community.rti.com/kb/flatdata-and-zero-copy-examples>.

The FlatData language binding is available in the Traditional C++ API and in the Modern C++ API.

RTI FlatData™ is a language binding for IDL types in which the in-memory representation of a sample matches the wire representation. Therefore, the cost of serialization/deserialization is zero.

To select FlatData as the language binding of a type, annotate it with `@language_binding(FLAT_DATA)` in IDL or apply the attribute `languageBinding="flat_data"` in XML.

There are some restrictions regarding the kinds of types to which the FlatData language binding can be applied.

- For final types, the FlatData language binding can be applied only to fixed-size types. A fixed-size type is a type whose wire representation always has the same size. This includes primitive types, arrays of fixed-size types, and structs containing only members of fixed-size types. Unions are not fixed-size types.
- For mutable types, any member is permitted.
- Extensible types cannot be marked as FlatData.

Final types are more efficient, but more restrictive. In general, a good compromise is to define mutable top-level types, but making sure their largest data members are final.

When a type is marked with the FlatData language binding, its mapping into C++ is different than that of a regular type (plain language binding). Rather than a single C++ class with direct access to its members, for a FlatData type **rtiddsgen** generates the following:

- A **Sample** (p. 561), the data in serialized format
- An **Offset** (p. 564), which allows reading the data members of that type inside a Sample, and modifying them without changing the size
- A **Builder** (p. 558), if the type is mutable, which allows creating a variable-size Sample

For example, for the IDL types **MyFlatFinal** (p. 562) and **MyFlatMutable** (p. 562) **rtiddsgen** generates the following C++ types:

- The Sample types **MyFlatFinal** (p. 562) and **MyFlatMutable** (p. 562)
- The Offset types **MyFlatFinalOffset** (p. 1746) and **MyFlatMutableOffset** (p. 1757).
- The Builder type **MyFlatMutableBuilder** (p. 1750).

## 7.186.2 Publishing FlatData

The typical way to publish FlatData samples includes the following steps:

- Create a **FooDataWriter** (p. 1676) as you would for a non-FlatData (plain) topic-type (see **Setting up a data writer** (p. 207)).

(For final topic-types such as **MyFlatFinal** (p. 562))

- Obtain a FlatData sample with **FooDataWriter::get\_loan** (p. 1695).  

```
MyFlatFinal *foo_sample = writer.get_loan();
```
- Initialize the sample, starting from the **root()** (p. 1918) offset.  

```
MyFlatFinalOffset foo_root = foo_sample->root();
foo_root.my_primitive(3);
auto my_complex_offset = foo_root.my_complex();
// ... initialize my_complex_offset
```

(For mutable topic-types such as **MyFlatMutable** (p. 562))

- Obtain a **Builder** (p. 558) to create a variable-size sample with **rti::flat::build\_data()** (p. 560).  

```
MyFlatMutableBuilder foo_builder = rti::flat::build_data(writer);
```
- Use this builder (and possibly nested member builders) to initialize the members.  

```
foo_builder.add_my_primitive(3);
auto my_mutable_builder = foo_builder.build_my_mutable();
// ... build 'my_mutable' (a member with a mutable type)
my_mutable_builder.finish(); // completes a member
auto my_final_offset = foo_builder.add_my_final();
// ... initialize 'my_final' (a member with a final type)
```
- Obtain the completed sample with **MyFlatMutableBuilder::finish\_sample()** (p. 1753). After that, the builder is no longer usable, and the sample size cannot change.  

```
MyFlatMutable *foo_sample = foo_builder.finish_sample();
```
- Optionally, it is possible to change the values of the sample accessing its **root()**, as long as the size doesn't change. For example, if the sample was built with a sequence member with two elements, it is possible to modify any of those elements, but it's not possible to add a third element.

(For both final and mutable topic-types)

- Write the sample with **FooDataWriter::write** (p. 1683).  

```
writer.write(*foo_sample);
```

After write, the DataWriter owns the FlatData sample. This allows avoiding additional copies, the main goal of the Flat↔Data language binding. This means that the sample cannot be reused. The DataWriter will return it to the sample pool when appropriate, as described in **FooDataWriter::get\_loan** (p. 1695).

## 7.186.3 Subscribing to FlatData

To subscribe to a topic using a FlatData topic-type:

- Create a **FooDataReader** (p. 1649) normally (see **Setting up a data reader** (p. 210)).
- Read or take the samples using a loaning operation, such as **FooDataReader::take** (p. 1652) (copying read/take operations cannot be used with FlatData types).
- Access the **root()** (p. 1918) offset, and any of the sample's members from there.

Note that the language binding is a local concept. It is possible to publish with a FlatData topic-type and subscribe to it with a **plain** topic-type with the same (or assignable) definition. It is also possible to use a plain topic-type on the publisher side and subscribe to it using FlatData. The DataWriter or DataReader of the plain topic-type has to use **DDS\_XCDR2\_DATA\_REPRESENTATION** (p. 371) in **DDS\_DataRepresentationQosPolicy** (p. 668).



## Chapter 8

# Namespace Documentation

### 8.1 connext Namespace Reference

Namespace for Connex.

#### Classes

- class **AlreadyDeletedException**  
*The object target of this operation has already been deleted.*
- class **BadParameterException**  
*Illegal parameter value.*
- class **IllegalOperationException**  
*The operation was called under improper circumstances.*
- class **ImmutablePolicyException**  
*Application attempted to modify an immutable QoS policy.*
- class **InconsistentPolicyException**  
*Application specified a set of QoS policies that are not consistent with each other.*
- class **IsInvalidSamplePredicate**  
*Predicate-class to determine if a sample contains invalid data.*
- class **IsReplyRelatedPredicate**  
*Predicate-class to match replies by their related request.*
- class **IsValidSamplePredicate**  
*Predicate-class to determine if a sample contains valid data.*
- class **LoanedSamples**  
*Provides access to a collection of middleware-loaned samples.*
- class **LogicException**  
*Base class of all RTI Connex exceptions caused by a logic error.*
- class **MessagingLibraryVersion**  
*The Connex Messaging Library version.*
- class **MessagingVersion**  
*The Connex Messaging version.*

- class **NotEnabledException**  
*Operation invoked on a **DDSEntity** (p. 1463) that is not yet enabled.*
- class **OutOfResourcesException**  
*RTI Connex ran out of the resources needed to complete the operation.*
- class **PreconditionNotMetException**  
*A pre-condition for the operation was not met.*
- class **Replier**  
*Allows receiving requests and sending replies.*
- class **ReplierListener**  
*Called when a **connex::Replier** (p. 1868) has new available requests.*
- class **ReplierParams**  
*Contains the parameters for creating a **connex::Replier** (p. 1868).*
- class **Requester**  
*Allows sending requests and receiving replies.*
- class **RequesterParams**  
*Contains the parameters for creating a **connex::Requester** (p. 1886).*
- class **RuntimeException**  
*Generic, unspecified error.*
- class **Sample**  
*A data sample and related info received from the middleware.*
- class **SampleIterator**  
*STL-compliant random-access iterator for **SampleRef**<T>*
- class **SampleRef**  
*A data sample and related information received from the middleware.*
- class **SimpleReplier**  
*A callback-based replier.*
- class **SimpleReplierListener**  
*The listener called by a **SimpleReplier** (p. 1935).*
- class **SimpleReplierParams**  
*Contains the parameters for creating a **connex::SimpleReplier** (p. 1935).*
- class **TimeoutException**  
*The operation timed out (does not apply to wait or receive operations)*
- class **UnsupportedException**  
*Unsupported operation.*
- class **WriteSample**  
*A sample for writing data.*
- class **WriteSampleRef**  
*A reference to a data sample for writing.*

## Functions

- `template<typename T, bool IsConst>`  
`ValidSampleIterator< T, IsConst > make_valid_sample_iterator ( SampleIterator< T, IsConst > related_↔  
iterator)`  
*Creates an iterator that only returns valid samples.*
- `template<typename T >`  
`LoanedSamples< T > move ( LoanedSamples< T > &ls) throw ()`  
*Creates a new **LoanedSamples** (p. 1727) instance by moving the contents of an existing one.*

### 8.1.1 Detailed Description

Namespace for Connex.

## 8.2 rti Namespace Reference

The RTI namespace.

### Namespaces

- namespace **flat**  
<<*extension*>> (p. 237) Support for **FlatData Topic-Types** (p. 568)

### 8.2.1 Detailed Description

The RTI namespace.

## 8.3 rti::flat Namespace Reference

<<*extension*>> (p. 237) Support for **FlatData Topic-Types** (p. 568)

### Classes

- class **AbstractAlignedList**  
*Base class of Offsets to sequences and arrays of non-primitive members.*
- class **AbstractBuilder**  
*Base class of all Builders (p. 558).*
- class **AbstractListBuilder**  
*Base class of all array and sequence builders.*
- class **AbstractPrimitiveList**  
*Base class for Offsets to sequences and arrays of primitive types.*
- class **AbstractSequenceBuilder**  
*Base class of Builders for sequence members.*
- class **AggregationBuilder**  
*Base class of struct and union builders.*
- class **FinalAlignedArrayOffset**  
*Offset to an array of final elements.*
- class **FinalArrayOffset**  
*Offset to an array of final elements.*
- class **FinalOffset**  
*The base class of all Offsets to a final struct type.*

- class **FinalSequenceBuilder**  
*Builds a sequence member of fixed-size elements.*
- struct **flat\_type\_traits**  
*Given a **Sample** (p. 1916), an **Offset** or a **Builder**, it allows obtaining the other types.*
- class **MutableArrayBuilder**  
*Builds an array member of variable-size elements.*
- class **MutableArrayOffset**  
*Offset to an array of variable-size elements.*
- class **MutableOffset**  
*The base class of all Offsets to a final struct type.*
- class **MutableSequenceBuilder**  
*Builds a sequence member of variable-size elements.*
- class **OffsetBase**  
*Base class of all Offset types.*
- class **PrimitiveArrayOffset**  
*Offset to an array of primitive elements.*
- struct **PrimitiveConstOffset**  
*A const Offset to an optional primitive member.*
- struct **PrimitiveOffset**  
*An Offset to an optional primitive member.*
- class **PrimitiveSequenceBuilder**  
*Builds a sequence of primitive members.*
- class **PrimitiveSequenceOffset**  
*Offset to a sequence of primitive elements.*
- class **Sample**  
*The generic definition of FlatData topic-types.*
- class **SequencerIterator**  
*Iterator for collections of Offsets.*
- class **SequenceOffset**  
*Offset to a sequence of non-primitive elements.*
- class **StringBuilder**  
*Builds a string.*
- class **StringOffset**  
*Offset to a string.*
- class **UnionBuilder**  
*Base class of builders for user-defined mutable unions.*

## Functions

- template<typename OffsetType >  
**flat\_type\_traits**< OffsetType >::plain\_type \* **plain\_cast** (OffsetType &offset)  
*Casts into an equivalent plain C++ type.*
- template<typename OffsetType >  
const **flat\_type\_traits**< OffsetType >::plain\_type \* **plain\_cast** (const OffsetType &offset)  
*Const version of plain\_cast.*
- template<typename TopicType >  
**rti::flat::flat\_type\_traits**< TopicType >::builder **build\_data** (typename TopicType::DataWriter \*writer)

*Begins building a new sample.*

- `template<typename BuilderType >`  
`void discard_builder (typename rti::flat::flat_type_traits< BuilderType >::flat_type::DataWriter *writer,`  
`BuilderType &builder)`

*Discards a sample builder.*

### 8.3.1 Detailed Description

<<*extension*>> (p. 237) Support for **FlatData Topic-Types** (p. 568)



## Chapter 9

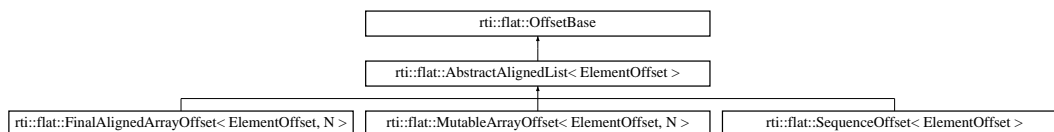
# Class Documentation

### 9.1 rti::flat::AbstractAlignedList< ElementOffset > Class Template Reference

Base class of Offsets to sequences and arrays of non-primitive members.

```
#include <SequenceOffsets.hpp>
```

Inheritance diagram for rti::flat::AbstractAlignedList< ElementOffset >:



#### Public Types

- typedef **Sequenceliterator**< ElementOffset, typename ElementOffset::offset\_kind > **iterator**  
*The iterator type, **Sequenceliterator** (p. 1926).*

#### Public Member Functions

- **iterator begin** ()  
*Gets an iterator to the first Offset.*
- **iterator end** ()  
*Gets an iterator to the past-the-end element.*

#### 9.1.1 Detailed Description

```
template<typename ElementOffset>
class rti::flat::AbstractAlignedList< ElementOffset >
```

Base class of Offsets to sequences and arrays of non-primitive members.

## Template Parameters

<i>ElementOffset</i>	The Offset type of the elements
----------------------	---------------------------------

## 9.1.2 Member Typedef Documentation

### 9.1.2.1 iterator

```
template<typename ElementOffset >
typedef SequenceIterator<ElementOffset, typename ElementOffset::offset_kind> rti::flat::↔
AbstractAlignedList< ElementOffset >::iterator
```

The iterator type, **SequenceIterator** (p. 1926).

## 9.1.3 Member Function Documentation

### 9.1.3.1 begin()

```
template<typename ElementOffset >
iterator rti::flat::AbstractAlignedList< ElementOffset >::begin ( ) [inline]
```

Gets an iterator to the first Offset.

**begin()** (p. 578) and **end()** (p. 578) enable the use of range-for loops, for example:

```
SequenceOffset<MyFlatMutableOffset> sequence_offset = my_type_offset.my_sequence();
for (auto element : sequence_offset) {
    std::cout << element.x() << std::endl;
}
```

References **rti::flat::OffsetBase::get\_buffer\_size()**.

### 9.1.3.2 end()

```
template<typename ElementOffset >
iterator rti::flat::AbstractAlignedList< ElementOffset >::end ( ) [inline]
```

Gets an iterator to the past-the-end element.

References **rti::flat::OffsetBase::get\_buffer\_size()**.

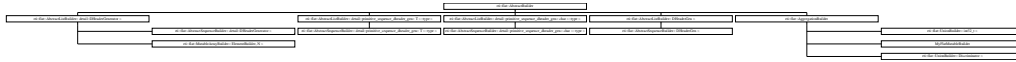


## 9.2 rti::flat::AbstractBuilder Class Reference

Base class of all **Builders** (p. 558).

```
#include <Builder.hpp>
```

Inheritance diagram for rti::flat::AbstractBuilder:



### Public Member Functions

- void **discard** ()  
*Discards a member in process of being built.*
- bool **is\_nested** () const  
*Returns whether this is a member Builder.*
- bool **is\_valid** () const  
*Whether this Builder is valid.*
- rti::xcdr::length\_t **capacity** () const  
*Returns the total capacity in bytes.*
- bool **check\_failure** ()  
*Checks if the previous operation failed and resets the failure flag.*

### Protected Member Functions

- virtual **~AbstractBuilder** ()  
*If this is a member Builder, it calls finish().*

### 9.2.1 Detailed Description

Base class of all **Builders** (p. 558).

### 9.2.2 Constructor & Destructor Documentation

#### 9.2.2.1 ~AbstractBuilder()

```
virtual rti::flat::AbstractBuilder::~~AbstractBuilder ( ) [inline], [protected], [virtual]
```

If this is a member Builder, it calls finish().

If this Builder is building a member (that is, **is\_nested()** (p. 580) is true), and the object goes out of scope before finish() has been called, its destructor calls finish(). Note, however, that it won't report any error.

If this Builder is building a sample (is\_nested()), its destructor doesn't do anything.

## 9.2.3 Member Function Documentation

### 9.2.3.1 discard()

```
void rti::flat::AbstractBuilder::discard ( ) [inline]
```

Discards a member in process of being built.

This function ends the creation of a member, returning the Builder of the type that contains the member to its previous state, as if this member had never been built.

#### Precondition

This object must be a member Builder, not a sample Builder.

This method is useful when during the building of a member an error occurs and the application wants to roll back, instead of finishing an incomplete member.

### 9.2.3.2 is\_nested()

```
bool rti::flat::AbstractBuilder::is_nested ( ) const [inline]
```

Returns whether this is a member Builder.

A member Builder is a Builder that has been created by calling a "build\_<member>" function on another Builder (for example, **MyFlatMutableBuilder::build\_my\_mutable()** (p. 1756)).

#### Returns

True if this is a member Builder, or false if this is a sample Builder.

### 9.2.3.3 is\_valid()

```
bool rti::flat::AbstractBuilder::is_valid ( ) const [inline]
```

Whether this Builder is valid.

A Builder is not valid when it is default-constructed, or after any of these functions is called: `finish()`, `finish_sample()`, **discard()** (p. 580).

Since the Traditional C++ API doesn't use exceptions, certain function failures due to the Builder running out resources are also reported by invalidating the Builder.

### 9.2.3.4 capacity()

```
rti::xcdr::length_t rti::flat::AbstractBuilder::capacity ( ) const [inline]
```

Returns the total capacity in bytes.

The capacity is the total number of bytes this Builder can contain. For a sample Builder (that is, one such that `is_nested()` (p. 580) returns false), `rti::flat::build_data` (p. 560) reserves enough bytes to accommodate any sample of a given type.

### 9.2.3.5 check\_failure()

```
bool rti::flat::AbstractBuilder::check_failure ( ) [inline]
```

Checks if the previous operation failed and resets the failure flag.

This function must be called after each Builder operation to check if it succeeded. Note that after calling `check_failure()` (p. 581) the error flag is reset, so a subsequent call will always return false.

#### Returns

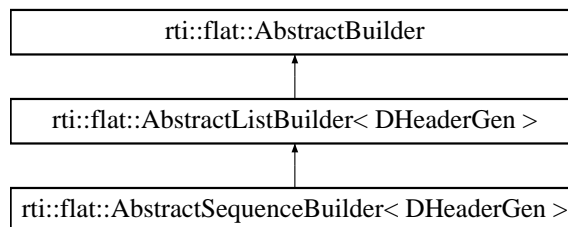
True if there was a failure in the previous operation, false if there was no failure since the last call to `check_failure`.

## 9.3 rti::flat::AbstractListBuilder< DHeaderGen > Class Template Reference

Base class of all array and sequence builders.

```
#include <SequenceBuilders.hpp>
```

Inheritance diagram for `rti::flat::AbstractListBuilder< DHeaderGen >`:



### Protected Member Functions

- unsigned int `element_count () const`  
*Returns the current number of elements that have been added.*

## Additional Inherited Members

### 9.3.1 Detailed Description

```
template<typename DHeaderGen>
class rti::flat::AbstractListBuilder< DHeaderGen >
```

Base class of all array and sequence builders.

### 9.3.2 Member Function Documentation

#### 9.3.2.1 element\_count()

```
template<typename DHeaderGen >
unsigned int rti::flat::AbstractListBuilder< DHeaderGen >::element_count ( ) const [inline],
[protected]
```

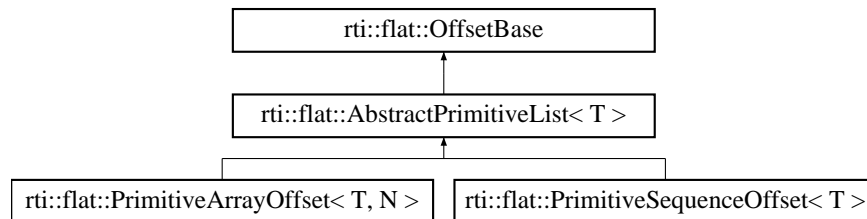
Returns the current number of elements that have been added.

## 9.4 rti::flat::AbstractPrimitiveList< T > Class Template Reference

Base class for Offsets to sequences and arrays of primitive types.

```
#include <SequenceOffsets.hpp>
```

Inheritance diagram for rti::flat::AbstractPrimitiveList< T >:



### Public Member Functions

- T **get\_element** (unsigned int i) const  
*Returns an element by index.*
- bool **set\_element** (unsigned int i, T value)  
*Sets an element by index.*

#### 9.4.1 Detailed Description

```
template<typename T>
class rti::flat::AbstractPrimitiveList< T >
```

Base class for Offsets to sequences and arrays of primitive types.

## Template Parameters

<i>T</i>	The primitive type
----------	--------------------

## 9.4.2 Member Function Documentation

## 9.4.2.1 get\_element()

```
template<typename T >
T rti::flat::AbstractPrimitiveList< T >::get_element (
    unsigned int i ) const [inline]
```

Returns an element by index.

## Parameters

<i>i</i>	The zero-based index of the element
----------	-------------------------------------

## See also

[rti::flat::plain\\_cast\(\)](#) (p. 566) for a method to access all the elements at once

## 9.4.2.2 set\_element()

```
template<typename T >
bool rti::flat::AbstractPrimitiveList< T >::set_element (
    unsigned int i,
    T value ) [inline]
```

Sets an element by index.

## Parameters

<i>i</i>	The zero-based index of the element to set
<i>value</i>	The value to set

## Returns

true if it was possible to set the element, or false if this collection has less than  $i - 1$  elements.

See also

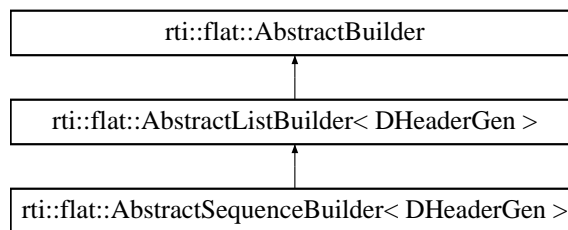
`rti::flat::plain_cast()` (p. 566) for a method to access all the elements at once

## 9.5 `rti::flat::AbstractSequenceBuilder< DHeaderGen >` Class Template Reference

Base class of Builders for sequence members.

```
#include <SequenceBuilders.hpp>
```

Inheritance diagram for `rti::flat::AbstractSequenceBuilder< DHeaderGen >`:



### Public Member Functions

- unsigned int `element_count ()` const  
*Returns the current number of elements that have been added.*

### Additional Inherited Members

#### 9.5.1 Detailed Description

```
template<typename DHeaderGen>
class rti::flat::AbstractSequenceBuilder< DHeaderGen >
```

Base class of Builders for sequence members.

This class contains only implementation details and doesn't add any public function to **AbstractListBuilder** (p. 581).

#### 9.5.2 Member Function Documentation

### 9.5.2.1 element\_count()

```
template<typename DHeaderGen >
unsigned int rti::flat::AbstractListBuilder< DHeaderGen >::element_count ( ) const [inline]
```

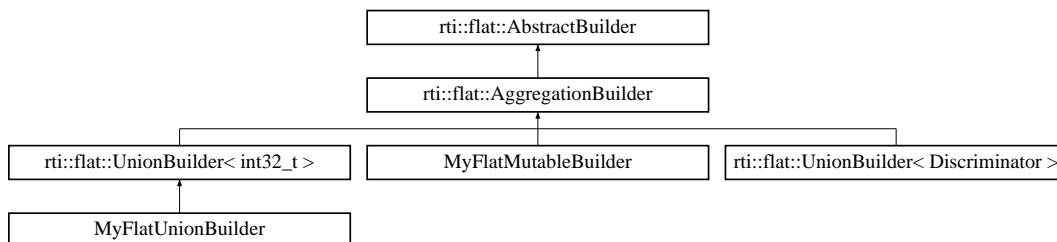
Returns the current number of elements that have been added.

## 9.6 rti::flat::AggregationBuilder Class Reference

Base class of struct and union builders.

```
#include <AggregationBuilders.hpp>
```

Inheritance diagram for rti::flat::AggregationBuilder:



### Additional Inherited Members

#### 9.6.1 Detailed Description

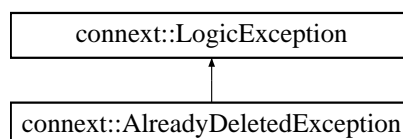
Base class of struct and union builders.

This class contains implementation details and doesn't add any public function to **AbstractBuilder** (p. 579). See **MyFlatMutableBuilder** (p. 1750) for a concrete example of a struct builder.

## 9.7 connext::AlreadyDeletedException Class Reference

The object target of this operation has already been deleted.

Inheritance diagram for connext::AlreadyDeletedException:



### 9.7.1 Detailed Description

The object target of this operation has already been deleted.

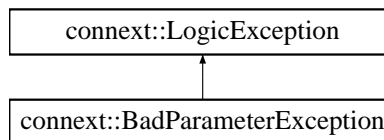
See also

**DDS\_RETCODE\_ALREADY\_DELETED** (p. 337)

## 9.8 connext::BadParameterException Class Reference

Illegal parameter value.

Inheritance diagram for connext::BadParameterException:



### 9.8.1 Detailed Description

Illegal parameter value.

See also

**DDS\_RETCODE\_BAD\_PARAMETER** (p. 336)

## 9.9 DDS\_AcknowledgmentInfo Struct Reference

Information about an application-level acknowledged sample.

### Public Attributes

- **DDS\_InstanceHandle\_t subscription\_handle**  
*Subscription handle of the acknowledging DDSDataReader (p. 1288).*
- struct **DDS\_SampleIdentity\_t sample\_identity**  
*Identity of the sample being acknowledged.*
- **DDS\_Boolean valid\_response\_data**  
*Flag indicating validity of the user response data in the acknowledgment.*
- struct **DDS\_AckResponseData\_t response\_data**  
*User data payload of application-level acknowledgment message.*



## 9.9.1 Detailed Description

Information about an application-level acknowledged sample.

When acknowledging a sample, the reader provides the writer with information about the sample being acknowledged. The AcknowledgmentInfo structure provides the identity and cookie of the sample being acknowledged, as well as user data payload provided by the reader.

## 9.9.2 Member Data Documentation

### 9.9.2.1 subscription\_handle

```
DDS_InstanceHandle_t DDS_AcknowledgmentInfo::subscription_handle
```

Subscription handle of the acknowledging **DDSDataReader** (p. 1288).

### 9.9.2.2 sample\_identity

```
struct DDS_SampleIdentity_t DDS_AcknowledgmentInfo::sample_identity
```

Identity of the sample being acknowledged.

See also

**DDS\_SampleIdentity\_t** (p. 1081)

### 9.9.2.3 valid\_response\_data

```
DDS_Boolean DDS_AcknowledgmentInfo::valid_response_data
```

Flag indicating validity of the user response data in the acknowledgment.

This flag is true when the **DDS\_RtpsReliableReaderProtocol\_t::min\_app\_ack\_response\_keep\_duration** (p. 1060) has not yet elapsed for the acknowledgment's response data.

The flag is false when that duration has elapsed for the response data.

### 9.9.2.4 response\_data

```
struct DDS_AckResponseData_t DDS_AcknowledgmentInfo::response_data
```

User data payload of application-level acknowledgment message.

Response data set by **DDSDataReader** (p. 1288) when sample was acknowledged.

## 9.10 DDS\_AckResponseData\_t Struct Reference

Data payload of an application-level acknowledgment.

### Public Attributes

- struct **DDS\_OctetSeq** value  
*a sequence of octets*

### 9.10.1 Detailed Description

Data payload of an application-level acknowledgment.

### 9.10.2 Member Data Documentation

#### 9.10.2.1 value

```
struct DDS_OctetSeq DDS_AckResponseData_t::value
```

a sequence of octets

**[default]** empty (zero-length)

**[range]** Octet sequence of length [0, **DDS\_DataReaderResourceLimitsQosPolicy::max\_app\_ack\_response\_length** (p. 664)],

## 9.11 DDS\_AllocationSettings\_t Struct Reference

Resource allocation settings.

## Public Attributes

- **DDS\_Long initial\_count**  
*The initial count of resources.*
- **DDS\_Long max\_count**  
*The maximum count of resources.*
- **DDS\_Long incremental\_count**  
*The incremental count of resources.*

### 9.11.1 Detailed Description

Resource allocation settings.

QoS:

**DDS\_DomainParticipantResourceLimitsQosPolicy** (p. 746)

### 9.11.2 Member Data Documentation

#### 9.11.2.1 initial\_count

**DDS\_Long** DDS\_AllocationSettings\_t::initial\_count

The initial count of resources.

The initial resources to be allocated.

**[default]** It depends on the case.

**[range]** [0, 1 million], < max\_count, (or = max\_count only if increment\_count == 0)

#### 9.11.2.2 max\_count

**DDS\_Long** DDS\_AllocationSettings\_t::max\_count

The maximum count of resources.

The maximum resources to be allocated.

**[default]** Depends on the case.

**[range]** [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438), > initial\_count (or = initial\_count only if increment\_count == 0)

### 9.11.2.3 incremental\_count

**DDS\_Long** DDS\_AllocationSettings\_t::incremental\_count

The incremental count of resources.

The resource to be allocated when more resources are needed.

**[default]** Depends on the case.

**[range]** -1 (Double the amount of extra memory allocated each time memory is needed) or [1,1 million] (or = 0 only if initial\_count == max\_count)

## 9.12 DDS\_AnnotationParameterValue Struct Reference

Annotation parameter value.

### 9.12.1 Detailed Description

Annotation parameter value.

This structure is use to represent an annotation parameter value. For example, the value of the annotation **[default]** for an aggregation type member.

## 9.13 DDS\_AsynchronousPublisherQosPolicy Struct Reference

Configures the mechanism that sends user data in an external middleware thread.

### Public Attributes

- **DDS\_Boolean disable\_asynchronous\_write**  
*Disable asynchronous publishing.*
- struct **DDS\_ThreadSettings\_t thread**  
*Settings of the publishing thread.*
- **DDS\_Boolean disable\_asynchronous\_batch**  
*Disable asynchronous batch flushing.*
- struct **DDS\_ThreadSettings\_t asynchronous\_batch\_thread**  
*Settings of the batch flushing thread.*
- **DDS\_Boolean disable\_topic\_query\_publication**  
*Disable topic query publication.*
- struct **DDS\_ThreadSettings\_t topic\_query\_publication\_thread**  
*Settings of the **DDSTopicQuery** (p. 1627) publication thread.*

### 9.13.1 Detailed Description

Configures the mechanism that sends user data in an external middleware thread.

Specifies the asynchronous publishing and asynchronous batch flushing settings of the **DDSPublisher** (p. 1550) instances.

The QoS policy specifies whether asynchronous publishing and asynchronous batch flushing are enabled for the **DDSDataWriter** (p. 1321) entities belonging to this **DDSPublisher** (p. 1550). If so, the publisher will spawn up to two threads, one for asynchronous publishing and one for asynchronous batch flushing.

This policy also configures the settings of the **DDSTopicQuery** (p. 1627) publication thread. The publisher will spawn this thread only if one or more DataWriters enable TopicQueries.

See also

**DDS\_BatchQosPolicy** (p. 600).

**DDS\_PublishModeQosPolicy** (p. 1025).

Entity:

**DDSPublisher** (p. 1550)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.13.2 Usage

You can use this QoS policy to reduce the amount of time your application thread spends sending data.

You can also use it, along with **DDS\_PublishModeQosPolicy** (p. 1025) and a **DDSFlowController** (p. 1468), to send large data reliably. "Large" in this context means that the data that cannot be sent as a single packet by a network transport. For example, to send data larger than 63K reliably using UDP/IP, you must configure RTI Connex to fragment the data and send it asynchronously.

The asynchronous *publisher* thread is shared by all **DDS\_ASYNCRONOUS\_PUBLISH\_MODE\_QOS** (p. 431) **DDSDataWriter** (p. 1321) instances that belong to this publisher and handles their data transmission chores.

The asynchronous *batch flushing* thread is shared by all **DDSDataWriter** (p. 1321) instances with batching enabled that belong to this publisher.

This QoS policy also allows you to adjust the settings of the asynchronous publishing and the asynchronous batch flushing threads. To use different threads for two different **DDSDataWriter** (p. 1321) entities, the instances must belong to different **DDSPublisher** (p. 1550) instances.

A **DDSPublisher** (p. 1550) must have asynchronous publishing enabled for its **DDSDataWriter** (p. 1321) instances to write asynchronously.

A **DDSPublisher** (p. 1550) must have asynchronous batch flushing enabled in order to flush the batches of its **DDSDataWriter** (p. 1321) instances asynchronously. However, no asynchronous batch flushing thread will be started until the first **DDSDataWriter** (p. 1321) instance with batching enabled is created from this **DDSPublisher** (p. 1550).

### 9.13.3 Member Data Documentation

#### 9.13.3.1 `disable_asynchronous_write`

```
DDS_Boolean DDS_AsymynchronousPublisherQosPolicy::disable_asynchronous_write
```

Disable asynchronous publishing.

If set to **DDS\_BOOLEAN\_TRUE** (p. 317), any **DDSDataWriter** (p. 1321) created with **DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431) will fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337).

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

#### 9.13.3.2 `thread`

```
struct DDS_ThreadSettings_t DDS_AsymynchronousPublisherQosPolicy::thread
```

Settings of the publishing thread.

There is only one asynchronous publishing thread per **DDSPublisher** (p. 1550).

**[default]** priority below normal.

The actual value depends on your architecture:

For Windows: -2

For Linux: OS default priority

For a complete list of platform specific values, please refer to `Platform Notes`.

**[default]** The actual value depends on your architecture:

For Windows: OS default stack size

For Linux: OS default stack size

For a complete list of platform specific values, please refer to `Platform Notes`.

**[default]** mask = **DDS\_THREAD\_SETTINGS\_KIND\_MASK\_DEFAULT** (p. 351)

#### 9.13.3.3 `disable_asynchronous_batch`

```
DDS_Boolean DDS_AsymynchronousPublisherQosPolicy::disable_asynchronous_batch
```

Disable asynchronous batch flushing.

If set to **DDS\_BOOLEAN\_TRUE** (p. 317), any **DDSDataWriter** (p. 1321) created with batching enabled will fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337).

If **DDS\_BatchQosPolicy::max\_flush\_delay** (p. 602) is different than **DDS\_DURATION\_INFINITE** (p. 326), **DDS\_AsymynchronousPublisherQosPolicy::disable\_asynchronous\_batch** (p. 592) must be set **DDS\_BOOLEAN\_FALSE** (p. 317).

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.13.3.4 asynchronous\_batch\_thread

```
struct DDS_ThreadSettings_t DDS_AsyncronousPublisherQosPolicy::asynchronous_batch_thread
```

Settings of the batch flushing thread.

There is only one asynchronous batch flushing thread per **DDSPublisher** (p. 1550).

**[default]** priority below normal.

The actual value depends on your architecture:

For Windows: -2

For Linux: OS default priority

For a complete list of platform specific values, please refer to `Platform Notes`. **[default]** The actual value depends on your architecture:

For Windows: OS default stack size

For Linux: OS default stack size

For a complete list of platform specific values, please refer to `Platform Notes`.

**[default]** mask = `DDS_THREAD_SETTINGS_KIND_MASK_DEFAULT` (p. 351)

### 9.13.3.5 disable\_topic\_query\_publication

```
DDS_Boolean DDS_AsyncronousPublisherQosPolicy::disable_topic_query_publication
```

Disable topic query publication.

If set to `DDS_BOOLEAN_TRUE` (p. 317), any `DDSDataWriter` (p. 1321) created with `DDS_TopicQueryDispatch`↔  
`QosPolicy::enable` (p. 1142) set to `DDS_BOOLEAN_TRUE` (p. 317) will fail with `DDS_RETCODE_INCONSISTENT`↔  
`_POLICY` (p. 337).

**[default]** `DDS_BOOLEAN_FALSE` (p. 317)

### 9.13.3.6 topic\_query\_publication\_thread

```
struct DDS_ThreadSettings_t DDS_AsyncronousPublisherQosPolicy::topic_query_publication_thread
```

Settings of the `DDSTopicQuery` (p. 1627) publication thread.

There is only one TopicQuery publication thread per **DDSPublisher** (p. 1550). This thread will exist as long as one or more `DDSDataWriter` (p. 1321) enables TopicQueries (via `DDS_DataWriterQos::topic_query_dispatch` (p. 697)).

**[default]** priority below normal.

The actual value depends on your architecture:

For Windows: -2

For Linux: OS default priority

For a complete list of platform specific values, please refer to `Platform Notes`. **[default]** The actual value depends on your architecture:

For Windows: OS default stack size

For Linux: OS default stack size

For a complete list of platform specific values, please refer to `Platform Notes`.

**[default]** mask = `DDS_THREAD_SETTINGS_KIND_MASK_DEFAULT` (p. 351)

## 9.14 DDS\_AsyncWaitSetProperty\_t Struct Reference

Specifies the **DDSAsyncWaitSet** (p. 1259) behavior.

### Public Attributes

- struct **DDS\_WaitSetProperty\_t** **waitset\_property**  
*Specifies the behavior of the asynchronous wait behavior, which is equivalent to the wait mechanism of a **DDSWaitSet** (p. 1629).*
- **DDS\_UnsignedLong** **thread\_pool\_size**  
*Number of threads that conform the thread pool of the **DDSAsyncWaitSet** (p. 1259).*
- struct **DDS\_ThreadSettings\_t** **thread\_settings**  
***DDS\_ThreadSettings\_t** (p. 1123) for each thread conforming the thread pool of the **DDSAsyncWaitSet** (p. 1259).*
- char \* **thread\_name\_prefix**  
*Prefix used to composed the name of each thread that conforms the thread pool the **DDSAsyncWaitSet** (p. 1259).*
- struct **DDS\_Duration\_t** **wait\_timeout**  
*Asynchronous wait timeout.*
- **DDS\_Long** **level**  
*Specifies the level of an **DDSAsyncWaitSet** (p. 1259).*

### 9.14.1 Detailed Description

Specifies the **DDSAsyncWaitSet** (p. 1259) behavior.

This property allows configuring the behavior of the asynchronous wait and the **DDSDispatch** (p. 1276) dispatch, as well as the parameters of the thread pool.

See also

**DDS\_WaitSetProperty\_t** (p. 1242)

**DDS\_ThreadSettings\_t** (p. 1123)

### 9.14.2 Member Data Documentation

#### 9.14.2.1 waitset\_property

```
struct DDS_WaitSetProperty_t DDS_AsyncWaitSetProperty_t::waitset_property
```

Specifies the behavior of the asynchronous wait behavior, which is equivalent to the wait mechanism of a **DDSWaitSet** (p. 1629).

See also

**DDS\_WaitSetProperty\_t** (p. 1242)



### 9.14.2.2 thread\_pool\_size

```
DDS_UnsignedLong DDS_AsyncWaitSetProperty_t::thread_pool_size
```

Number of threads that conform the thread pool of the **DDSAsyncWaitSet** (p. 1259).

Size must be equal or greater than one.

**[default]** 1

### 9.14.2.3 thread\_settings

```
struct DDS_ThreadSettings_t DDS_AsyncWaitSetProperty_t::thread_settings
```

**DDS\_ThreadSettings\_t** (p. 1123) for each thread conforming the thread pool of the **DDSAsyncWaitSet** (p. 1259).

Each thread within the pool is created with the same settings.

**[default]** Default thread settings values.

See also

**DDS\_ThreadSettings\_t** (p. 1123)

### 9.14.2.4 thread\_name\_prefix

```
char* DDS_AsyncWaitSetProperty_t::thread_name_prefix
```

Prefix used to composed the name of each thread that conforms the thread pool the **DDSAsyncWaitSet** (p. 1259).

The composed name has the form:

`thread_name_prefix##[index]AWs` where [index] is an integer that identifies the thread relative to the **DDSAsyncWaitSet** (p. 1259).

If NULL, the default prefix will be used.

**[default]** NULL (use default prefix)

### 9.14.2.5 wait\_timeout

```
struct DDS_Duration_t DDS_AsyncWaitSetProperty_t::wait_timeout
```

Asynchronous wait timeout.

Specifies the maximum amount of time the leader thread of the **DDSAsyncWaitSet** (p. 1259) waits for an attached **DDSCondition** (p. 1276) to trigger before it wakes up.

Duration must be a value greater than zero.

See also

**DDSWaitSet::wait** (p. 1634)

[default] **DDS\_DURATION\_INFINITE** (p. 326)

### 9.14.2.6 level

```
DDS_Long DDS_AsyncWaitSetProperty_t::level
```

Specifies the level of an **DDSAsyncWaitSet** (p. 1259).

The level prevents an application to deadlock when it uses multiple **DDSAsyncWaitSet** (p. 1259) instances that call operations on each other from the context of one of their thread pool's thread.

Inside the context of one of these threads, the application can synchronize only with other **DDSAsyncWaitSet** (p. 1259) of bigger level.

[default] 1

## 9.15 DDS\_AvailabilityQosPolicy Struct Reference

Configures the availability of data.

### Public Attributes

- **DDS\_Boolean enable\_required\_subscriptions**  
*Enables support for required subscriptions in a **DDSDataWriter** (p. 1321).*
- struct **DDS\_Duration\_t max\_data\_availability\_waiting\_time**  
*Defines how much time to wait before delivering a sample to the application without having received some of the previous samples.*
- struct **DDS\_Duration\_t max\_endpoint\_availability\_waiting\_time**  
*Defines how much time to wait to discover DataWriters providing samples for the same data source (virtual GUID).*
- struct **DDS\_EndpointGroupSeq required\_matched\_endpoint\_groups**  
*A sequence of endpoint groups.*

### 9.15.1 Detailed Description

Configures the availability of data.

Entity:

**DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p.360) = **YES** (p.360) (only on a **DDSDataWriter** (p.1321) except for the member **DDS\_↔ AvailabilityQosPolicy::enable\_required\_subscriptions** (p. 599))

### 9.15.2 Usage

This QoS policy is used in the context of two features:

- Collaborative DataWriters
- Required Subscriptions

#### Collaborative DataWriters

The Collaborative DataWriters feature allows having multiple DataWriters publishing samples from a common logical data source. The DataReaders will combine the samples coming from the DataWriters in order to reconstruct the correct order at the source.

This QoS policy allows you to configure the ordering and combination process in the DataReader and can be used to support two different use cases:

- **Ordered delivery of samples in high-availability scenarios** One example of this is RTI Persistence Service. When a late-joining DataReader configured with **DDS\_DurabilityQosPolicy** (p. 767) set to **DDS\_PERSISTENT\_↔ \_DURABILITY\_QOS** (p. 401) or **DDS\_TRANSIENT\_DURABILITY\_QOS** (p. 401) joins a DDS domain, it will start receiving historical samples from multiple DataWriters. For example, if the original DataWriter is still alive, the newly created DataReader will receive samples from the original DataWriter and one or more RTI Persistence Service DataWriters (PRSTDataWriters). This policy can be used to configure the sample ordering process on the DataReader.
- **Ordered delivery of samples in load-balanced scenarios** Multiple instances of the same application can work together to process and deliver samples. When the samples arrive through different data-paths out of order, the DataReader will be able to reconstruct the order at the destination. An example of this is when multiple instances of RTI Persistence Service are used to persist the data. Persisting data to a database on disk can be a bottleneck for throughput. You can improve scalability and performance by dividing the workload across different instances of RTI Persistence Service that use different databases. For example, samples larger than 10 are persisted by Persistence Service 1, samples less than or equal to 10 are persisted by Persistence Service 2.

- **Ordered delivery of samples with Group Ordered Access** This policy can also be used to configure the sample ordering process when the Subscriber is configured with **DDS\_PresentationQosPolicy** (p.996) `access_scope` set to **DDS\_GROUP\_PRESENTATION\_QOS** (p.418). In this case, the Subscriber must deliver in order the samples published by a group of DataWriters that belong to the same Publisher and have `access_scope` set to **DDS\_GROUP\_PRESENTATION\_QOS** (p.418).

Each sample published in a DDS domain for a given logical data source is uniquely identified by a pair (virtual GUID, virtual sequence number). Samples from the same data source (same virtual GUID) can be published by different DataWriters. A DataReader will deliver a sample (VGUIDn, VSNm) to the application if one of the following conditions is satisfied:

- (VGUIDn, VSNm-1) has already been delivered to the application.
- All the known DataWriters publishing VGUIDn have announced that they do not have (VGUIDn, VSNm-1).
- None of the known DataWriters publishing VGUIDn have announced potential availability of (VGUIDn, VSNm-1) and both timeouts in this QoS policy have expired.

A DataWriter announces potential availability of samples by using virtual heartbeats (HBs).

When **DDS\_PresentationQosPolicy::access\_scope** (p.1000) is set to **DDS\_TOPIC\_PRESENTATION\_QOS** (p.418) or **DDS\_INSTANCE\_PRESENTATION\_QOS** (p.418), the virtual HB contains information about the samples contained in the **DDSDataWriter** (p.1321) history.

When **DDS\_PresentationQosPolicy::access\_scope** (p.1000) is set to **DDS\_GROUP\_PRESENTATION\_QOS** (p.418), the virtual HB contains information about all DataWriters in the **DDSPublisher** (p.1550).

The frequency at which virtual HBs are sent is controlled by the protocol parameters **DDS\_RtpsReliableWriterProtocol\_t::virtual\_heartbeat\_period** (p.1066) and **DDS\_RtpsReliableWriterProtocol\_t::samples\_per\_virtual\_heartbeat** (p.1066).

### Required Subscriptions

In the context of Required Subscriptions, this QoS policy can be used to configure a set of Required Subscriptions on a **DDSDataWriter** (p.1321).

Required subscriptions are preconfigured, named subscriptions that may leave and subsequently rejoin the network from time to time, at the same or different physical locations. Any time a required subscription is disconnected, any samples that would have been delivered to it are stored for delivery if and when the subscription rejoins the network.

### 9.15.3 Consistency

For a DataWriter, the setting of **AVAILABILITY** (p.364) must be set consistently with that of the **RELIABILITY** (p.433) and **DURABILITY** (p.398).

If **DDS\_AvailabilityQosPolicy::enable\_required\_subscriptions** (p.599) is set to **DDS\_BOOLEAN\_TRUE** (p.317), **DDS\_ReliabilityQosPolicy::kind** (p.1043) must be set to **DDS\_RELIABLE\_RELIABILITY\_QOS** (p.435), **DDS\_DurabilityQosPolicy** (p.767) must be set to a value different than **DDS\_VOLATILE\_DURABILITY\_QOS** (p.400), and **DDS\_DurabilityQosPolicy::writer\_depth** (p.770) must be set to either **DDS\_AUTO\_WRITER\_DEPTH** (p.401) or **DDS\_LENGTH\_UNLIMITED** (p.438).

## 9.15.4 Member Data Documentation

### 9.15.4.1 enable\_required\_subscriptions

```
DDS_Boolean DDS_AvailabilityQosPolicy::enable_required_subscriptions
```

Enables support for required subscriptions in a **DDSDataWriter** (p. 1321).

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.15.4.2 max\_data\_availability\_waiting\_time

```
struct DDS_Duration_t DDS_AvailabilityQosPolicy::max_data_availability_waiting_time
```

Defines how much time to wait before delivering a sample to the application without having received some of the previous samples.

#### Collaborative DataWriters

A sample identified by (VGUIDn, VSNm) will be delivered to the application if this timeout expires for the sample and the following two conditions are satisfied:

- None of the known DataWriters publishing VGUIDn have announced potential availability of (VGUIDn, VSNm-1).
- The DataWriters for all the endpoint groups specified in **required\_matched\_endpoint\_groups** (p. 599) have been discovered or **max\_endpoint\_availability\_waiting\_time** (p. 599) has expired.

#### Required Subscriptions

This field is not applicable to Required Subscriptions.

**[default]** **DDS\_DURATION\_AUTO** (p. 327) (**DDS\_DURATION\_INFINITE** (p. 326) for **DDS\_GROUP\_PRESENTATION\_↔\_QOS** (p. 418)). Otherwise, 0 seconds

**[range]** [0, **DDS\_DURATION\_INFINITE** (p. 326)], **DDS\_DURATION\_AUTO** (p. 327)

### 9.15.4.3 max\_endpoint\_availability\_waiting\_time

```
struct DDS_Duration_t DDS_AvailabilityQosPolicy::max_endpoint_availability_waiting_time
```

Defines how much time to wait to discover DataWriters providing samples for the same data source (virtual GUID).

#### Collaborative DataWriters

The set of endpoint groups that are required to provide samples for a data source can be configured using **required\_↔\_matched\_endpoint\_groups** (p. 599).

A non-consecutive sample identified by (VGUIDn, VSNm) cannot be delivered to the application unless DataWriters for all the endpoint groups in **required\_matched\_endpoint\_groups** (p. 599) are discovered or this timeout expires.

#### Required Subscriptions

This field is not applicable to Required Subscriptions.

**[default]** **DDS\_DURATION\_AUTO** (p. 327) (**DDS\_DURATION\_INFINITE** (p. 326) for **DDS\_GROUP\_PRESENTATION\_↔\_QOS** (p. 418)). Otherwise, 0 seconds

**[range]** [0, **DDS\_DURATION\_INFINITE** (p. 326)], **DDS\_DURATION\_AUTO** (p. 327)

#### 9.15.4.4 required\_matched\_endpoint\_groups

```
struct DDS_EndpointGroupSeq DDS_AvailabilityQosPolicy::required_matched_endpoint_groups
```

A sequence of endpoint groups.

##### Collaborative DataWriters

In the context of Collaborative DataWriters, it specifies the set of endpoint groups that are expected to provide samples for the same data source.

The quorum count in a group represents the number of DataWriters that must be discovered for that group before the DataReader is allowed to provide non consecutive samples to the application.

A DataWriter becomes a member of an endpoint group by configuring the role\_name in **DDS\_DataWriterQos**↔::**publication\_name** (p. 697).

##### Required Subscriptions

In the context of Required Subscriptions, it specifies the set of Required Subscriptions on a **DDSDataWriter** (p. 1321).

Each Required Subscription is specified by a name and a quorum count.

The quorum count represents the number of DataReaders that have to acknowledge the sample before it can be considered fully acknowledged for that Required Subscription.

A DataReader is associated with a Required Subscription by configuring the role\_name in **DDS\_DataReaderQos**↔::**subscription\_name** (p. 652).

**[default]** Empty sequence

## 9.16 DDS\_BatchQosPolicy Struct Reference

Used to configure batching of multiple samples into a single network packet in order to increase throughput for small samples.

### Public Attributes

- **DDS\_Boolean enable**  
*Specifies whether or not batching is enabled.*
- **DDS\_Long max\_data\_bytes**  
*The maximum cumulative length of all serialized samples in a batch.*
- **DDS\_Long max\_samples**  
*The maximum number of samples in a batch.*
- struct **DDS\_Duration\_t max\_flush\_delay**  
*The maximum flush delay.*
- struct **DDS\_Duration\_t source\_timestamp\_resolution**  
*Batch source timestamp resolution.*
- **DDS\_Boolean thread\_safe\_write**  
*Determines whether or not the write operation is thread safe.*

### 9.16.1 Detailed Description

Used to configure batching of multiple samples into a single network packet in order to increase throughput for small samples.

This QoS policy configures the ability of the middleware to collect multiple user data samples to be sent in a single network packet, to take advantage of the efficiency of sending larger packets and thus increase effective throughput.

This QoS policy can be used to dramatically increase effective throughput for small data samples. Usually, throughput for small samples (size < 2048 bytes) is limited by CPU capacity and not by network bandwidth. Batching many smaller samples to be sent in a single large packet will increase network utilization, and thus throughput, in terms of samples per second.

Entity:

**DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

### 9.16.2 Member Data Documentation

#### 9.16.2.1 enable

**DDS\_Boolean** DDS\_BatchQoSPolicy::enable

Specifies whether or not batching is enabled.

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

#### 9.16.2.2 max\_data\_bytes

**DDS\_Long** DDS\_BatchQoSPolicy::max\_data\_bytes

The maximum cumulative length of all serialized samples in a batch.

A batch is flushed automatically when this maximum is reached.

max\_data\_bytes does not include the meta data associated with the batch samples. Each sample has at least 8 bytes of meta data containing information such as the timestamp and sequence number. The meta data can be as large as 52 bytes for keyed topics and 20 bytes for unkeyed topics.

Note: Batches must contain whole samples. If a new batch is started and its initial sample causes the serialized size to exceed max\_data\_bytes, RTI Connext will send the sample in a single batch.

**[default]** 1024

**[range]** [1, **DDS\_LENGTH\_UNLIMITED** (p. 438)]

### 9.16.3 Consistency

The setting of `DDS_BatchQosPolicy::max_data_bytes` (p.601) must be consistent with `DDS_BatchQosPolicy::max_samples` (p.602). For these two values to be consistent, they cannot be both `DDS_LENGTH_UNLIMITED` (p.438).

#### 9.16.3.1 max\_samples

```
DDS_Long DDS_BatchQosPolicy::max_samples
```

The maximum number of samples in a batch.

A batch is flushed automatically when this maximum is reached.

[default] `DDS_LENGTH_UNLIMITED` (p.438)

[range] [1, `DDS_LENGTH_UNLIMITED` (p.438)]

### 9.16.4 Consistency

The setting of `DDS_BatchQosPolicy::max_samples` (p.602) must be consistent with `DDS_BatchQosPolicy::max_data_bytes` (p.601). For these two values to be consistent, they cannot be both `DDS_LENGTH_UNLIMITED` (p.438).

#### 9.16.4.1 max\_flush\_delay

```
struct DDS_Duration_t DDS_BatchQosPolicy::max_flush_delay
```

The maximum flush delay.

A batch is flushed automatically after the delay specified by this parameter.

The delay is measured from the time the first sample in the batch is written by the application.

[default] `DDS_DURATION_INFINITE` (p.326)

[range] [0, `DDS_DURATION_INFINITE` (p.326)]

### 9.16.5 Consistency

The setting of `DDS_BatchQosPolicy::max_flush_delay` (p.602) must be consistent with `DDS_AsymynchronousPublisherQosPolicy::disable_asynchronous_batch` (p.592) and `DDS_BatchQosPolicy::thread_safe_write` (p.603). If the delay is different than `DDS_DURATION_INFINITE` (p.326), `DDS_AsymynchronousPublisherQosPolicy::disable_asynchronous_batch` (p.592) must be set to `DDS_BOOLEAN_FALSE` (p.317) and `DDS_BatchQosPolicy::thread_safe_write` (p.603) must be set to `DDS_BOOLEAN_TRUE` (p.317).



### 9.16.5.1 source\_timestamp\_resolution

```
struct DDS_Duration_t DDS_BatchQosPolicy::source_timestamp_resolution
```

Batch source timestamp resolution.

The value of this field determines how the source timestamp is associated with the samples in a batch.

A sample written with timestamp 't' inherits the source timestamp 't2' associated with the previous sample unless ('t' - 't2') > source\_timestamp\_resolution.

If source\_timestamp\_resolution is set to **DDS\_DURATION\_INFINITE** (p. 326), every sample in the batch will share the source timestamp associated with the first sample.

If source\_timestamp\_resolution is set to zero, every sample in the batch will contain its own source timestamp corresponding to the moment when the sample was written.

The performance of the batching process is better when source\_timestamp\_resolution is set to **DDS\_DURATION\_↔INFINITE** (p. 326).

**[default]** **DDS\_DURATION\_INFINITE** (p. 326)

**[range]** [0, **DDS\_DURATION\_INFINITE** (p. 326)]

## 9.16.6 Consistency

The setting of **DDS\_BatchQosPolicy::source\_timestamp\_resolution** (p. 602) must be consistent with **DDS\_Batch↔QosPolicy::thread\_safe\_write** (p. 603). If **DDS\_BatchQosPolicy::thread\_safe\_write** (p. 603) is set to **DDS\_↔BOOLEAN\_FALSE** (p. 317), **DDS\_BatchQosPolicy::source\_timestamp\_resolution** (p. 602) must be set to **DDS\_↔\_DURATION\_INFINITE** (p. 326).

### 9.16.6.1 thread\_safe\_write

```
DDS_Boolean DDS_BatchQosPolicy::thread_safe_write
```

Determines whether or not the write operation is thread safe.

If this parameter is set to **DDS\_BOOLEAN\_TRUE** (p. 317), multiple threads can call write on the **DDSDataWriter** (p. 1321) concurrently.

**[default]** **DDS\_BOOLEAN\_TRUE** (p. 317)

## 9.16.7 Consistency

The setting of **DDS\_BatchQosPolicy::thread\_safe\_write** (p. 603) must be consistent with **DDS\_BatchQosPolicy↔::source\_timestamp\_resolution** (p. 602). If **DDS\_BatchQosPolicy::thread\_safe\_write** (p. 603) is set to **DDS\_↔BOOLEAN\_FALSE** (p. 317), **DDS\_BatchQosPolicy::source\_timestamp\_resolution** (p. 602) must be set to **DDS\_↔\_DURATION\_INFINITE** (p. 326).

## 9.17 DDS\_BooleanSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_Boolean** (p. 320) >

### 9.17.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_Boolean** (p. 320) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_Boolean** (p. 320)

**FooSeq** (p. 1697)

## 9.18 DDS\_BuiltinTopicKey\_t Struct Reference

The key type of the built-in topic types.

### Public Attributes

- **DDS\_BUILTIN\_TOPIC\_KEY\_TYPE\_NATIVE** **value** [DDS\_BUILTIN\_TOPIC\_KEY\_TYPE\_NATIVE\_LENGTH]  
*An array of four integers that uniquely represents a remote **DDSEntity** (p. 1463).*

### 9.18.1 Detailed Description

The key type of the built-in topic types.

Each remote **DDSEntity** (p. 1463) to be discovered can be uniquely identified by this key. This is the key of all the built-in topic data types.

See also

**DDS\_ParticipantBuiltinTopicData** (p. 979)

**DDS\_TopicBuiltinTopicData** (p. 1128)

**DDS\_PublicationBuiltinTopicData** (p. 1010)

**DDS\_SubscriptionBuiltinTopicData** (p. 1108)

## 9.18.2 Member Data Documentation

### 9.18.2.1 value

```
DDS_BUILTIN_TOPIC_KEY_TYPE_NATIVE DDS_BuiltinTopicKey_t::value[DDS_BUILTIN_TOPIC_KEY_TYPE_NATIVE↔
_LENGTH]
```

An array of four integers that uniquely represents a remote **DDSEntity** (p. 1463).

## 9.19 DDS\_BuiltinTopicReaderResourceLimits\_t Struct Reference

Built-in topic reader's resource limits.

### Public Attributes

- **DDS\_Long initial\_samples**  
*Initial number of samples.*
- **DDS\_Long max\_samples**  
*Maximum number of samples.*
- **DDS\_Long initial\_infos**  
*Initial number of sample infos.*
- **DDS\_Long max\_infos**  
*Maximum number of sample infos.*
- **DDS\_Long initial\_outstanding\_reads**  
*The initial number of outstanding reads that have not called finish yet on the same built-in topic **DDSDataReader** (p. 1288).*
- **DDS\_Long max\_outstanding\_reads**  
*The maximum number of outstanding reads that have not called finish yet on the same built-in topic **DDSDataReader** (p. 1288).*
- **DDS\_Long max\_samples\_per\_read**  
*Maximum number of samples that can be read/taken on a same built-in topic **DDSDataReader** (p. 1288).*
- **DDS\_Boolean disable\_fragmentation\_support**  
*Determines whether the built-in topic **DDSDataReader** (p. 1288) can receive fragmented samples.*
- **DDS\_Long max\_fragmented\_samples**  
*The maximum number of samples for which the built-in topic **DDSDataReader** (p. 1288) may store fragments at a given point in time.*
- **DDS\_Long initial\_fragmented\_samples**  
*The initial number of samples for which a built-in topic **DDSDataReader** (p. 1288) may store fragments.*
- **DDS\_Long max\_fragmented\_samples\_per\_remote\_writer**  
*The maximum number of samples per remote writer for which a built-in topic **DDSDataReader** (p. 1288) may store fragments.*
- **DDS\_Long max\_fragments\_per\_sample**  
*Maximum number of fragments for a single sample.*
- **DDS\_Boolean dynamically\_allocate\_fragmented\_samples**  
*Determines whether the built-in topic **DDSDataReader** (p. 1288) pre-allocates storage for storing fragmented samples.*

### 9.19.1 Detailed Description

Built-in topic reader's resource limits.

Defines the resources that can be used for a built-in-topic data reader.

A built-in topic data reader subscribes reliably to built-in topics containing declarations of new entities or updates to existing entities in the domain. Keys are used to differentiate among entities of the same type. RTI Connext assigns a unique key to each entity in a domain.

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

QoS:

**DDS\_DiscoveryConfigQosPolicy** (p. 712)

### 9.19.2 Member Data Documentation

#### 9.19.2.1 initial\_samples

**DDS\_Long** `DDS_BuiltinTopicReaderResourceLimits_t::initial_samples`

Initial number of samples.

This should be a value between 1 and initial number of instance of the built-in-topic reader, depending on how many instances are sending data concurrently.

**[default]** 64

**[range]** [1, 1 million], <= max\_samples

#### 9.19.2.2 max\_samples

**DDS\_Long** `DDS_BuiltinTopicReaderResourceLimits_t::max_samples`

Maximum number of samples.

This should be a value between 1 and max number of instance of the built-in-topic reader, depending on how many instances are sending data concurrently. Also, it should not be less than initial\_samples.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438), >= initial\_samples

### 9.19.2.3 initial\_infos

**DDS\_Long** DDS\_BuiltinTopicReaderResourceLimits\_t::initial\_infos

Initial number of sample infos.

The initial number of info units that a built-in topic **DDSDataReader** (p. 1288) can have. Info units are used to store **DDS\_SampleInfo** (p. 1082).

**[default]** 64

**[range]** [1, 1 million] <= max\_infos

### 9.19.2.4 max\_infos

**DDS\_Long** DDS\_BuiltinTopicReaderResourceLimits\_t::max\_infos

Maximum number of sample infos.

The maximum number of info units that a built-in topic **DDSDataReader** (p. 1288) can use to store **DDS\_SampleInfo** (p. 1082).

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438), >= initial\_infos

### 9.19.2.5 initial\_outstanding\_reads

**DDS\_Long** DDS\_BuiltinTopicReaderResourceLimits\_t::initial\_outstanding\_reads

The initial number of outstanding reads that have not called finish yet on the same built-in topic **DDSDataReader** (p. 1288).

Must be less than or equal to max\_outstanding\_reads.

**[default]** 2

**[range]** [1, 1024]

### 9.19.2.6 max\_outstanding\_reads

**DDS\_Long** DDS\_BuiltinTopicReaderResourceLimits\_t::max\_outstanding\_reads

The maximum number of outstanding reads that have not called finish yet on the same built-in topic **DDSDataReader** (p. 1288).

Must be greater than or equal to initial\_outstanding\_reads.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1024] or **DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.19.2.7 max\_samples\_per\_read

**DDS\_Long** DDS\_BuiltinTopicReaderResourceLimits\_t::max\_samples\_per\_read

Maximum number of samples that can be read/taken on a same built-in topic **DDSDataReader** (p. 1288).

**[default]** 1024

**[range]** [1, 65536]

### 9.19.2.8 disable\_fragmentation\_support

**DDS\_Boolean** DDS\_BuiltinTopicReaderResourceLimits\_t::disable\_fragmentation\_support

Determines whether the built-in topic **DDSDataReader** (p. 1288) can receive fragmented samples.

When fragmentation support is not needed, disabling fragmentation support will save some memory resources.

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.19.2.9 max\_fragmented\_samples

**DDS\_Long** DDS\_BuiltinTopicReaderResourceLimits\_t::max\_fragmented\_samples

The maximum number of samples for which the built-in topic **DDSDataReader** (p. 1288) may store fragments at a given point in time.

At any given time, a built-in topic **DDSDataReader** (p. 1288) may store fragments for up to `max_fragmented_↔ samples` samples while waiting for the remaining fragments. These samples need not have consecutive sequence numbers and may have been sent by different built-in topic **DDSDataWriter** (p. 1321) instances.

Once all fragments of a sample have been received, the sample is treated as a regular sample and becomes subject to standard QoS settings such as **DDS\_BuiltinTopicReaderResourceLimits\_t::max\_samples** (p. 606).

The middleware will drop fragments if the `max_fragmented_samples` limit has been reached. For best-effort communication, the middleware will accept a fragment for a new sample, but drop the oldest fragmented sample from the same remote writer. For reliable communication, the middleware will drop fragments for any new samples until all fragments for at least one older sample from that writer have been received.

Only applies if **DDS\_BuiltinTopicReaderResourceLimits\_t::disable\_fragmentation\_support** (p. 608) is **DDS\_↔ BOOLEAN\_FALSE** (p. 317).

**[default]** 1024

**[range]** [1, 1 million]

### 9.19.2.10 initial\_fragmented\_samples

**DDS\_Long** DDS\_BuiltinTopicReaderResourceLimits\_t::initial\_fragmented\_samples

The initial number of samples for which a built-in topic **DDSDataReader** (p. 1288) may store fragments.

Only applies if **DDS\_BuiltinTopicReaderResourceLimits\_t::disable\_fragmentation\_support** (p. 608) is **DDS\_↔  
BOOLEAN\_FALSE** (p. 317).

**[default]** 4

**[range]** [1,1024], <= max\_fragmented\_samples

### 9.19.2.11 max\_fragmented\_samples\_per\_remote\_writer

**DDS\_Long** DDS\_BuiltinTopicReaderResourceLimits\_t::max\_fragmented\_samples\_per\_remote\_writer

The maximum number of samples per remote writer for which a built-in topic **DDSDataReader** (p. 1288) may store fragments.

Logical limit so a single remote writer cannot consume all available resources.

Only applies if **DDS\_BuiltinTopicReaderResourceLimits\_t::disable\_fragmentation\_support** (p. 608) is **DDS\_↔  
BOOLEAN\_FALSE** (p. 317).

**[default]** 256

**[range]** [1, 1 million], <= max\_fragmented\_samples

### 9.19.2.12 max\_fragments\_per\_sample

**DDS\_Long** DDS\_BuiltinTopicReaderResourceLimits\_t::max\_fragments\_per\_sample

Maximum number of fragments for a single sample.

Only applies if **DDS\_BuiltinTopicReaderResourceLimits\_t::disable\_fragmentation\_support** (p. 608) is **DDS\_↔  
BOOLEAN\_FALSE** (p. 317).

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.19.2.13 dynamically\_allocate\_fragmented\_samples

`DDS_Boolean DDS_BuiltinTopicReaderResourceLimits_t::dynamically_allocate_fragmented_samples`

Determines whether the built-in topic **DDSDataReader** (p. 1288) pre-allocates storage for storing fragmented samples.

By default, the middleware does not allocate memory upfront, but instead allocates memory from the heap upon receiving the first fragment of a new sample. The amount of memory allocated equals the amount of memory needed to store all fragments in the sample. Once all fragments of a sample have been received, the sample is deserialized and stored in the regular receive queue. At that time, the dynamically allocated memory is freed again.

This QoS setting is useful for large, but variable-sized data types where upfront memory allocation for multiple samples based on the maximum possible sample size may be expensive. The main disadvantage of not pre-allocating memory is that one can no longer guarantee the middleware will have sufficient resources at runtime.

If `dynamically_allocate_fragmented_samples` is set to **DDS\_BOOLEAN\_FALSE** (p. 317), the middleware will allocate memory upfront for storing fragments for up to **DDS\_DataReaderResourceLimitsQoSPolicy::initial\_fragmented\_samples** (p. 660) samples. This memory may grow up to **DDS\_DataReaderResourceLimitsQoSPolicy::max\_fragmented\_samples** (p. 659) if needed.

Only applies if **DDS\_DataReaderResourceLimitsQoSPolicy::disable\_fragmentation\_support** (p. 659) is **DDS\_BOOLEAN\_FALSE** (p. 317).

[default] **DDS\_BOOLEAN\_TRUE** (p. 317)

## 9.20 DDS\_ChannelSettings\_t Struct Reference

Type used to configure the properties of a channel.

### Public Attributes

- struct **DDS\_TransportMulticastSettingsSeq multicast\_settings**  
*A sequence of **DDS\_TransportMulticastSettings\_t** (p. 1153) used to configure the multicast addresses associated with a channel.*
- char \* **filter\_expression**  
*A logical expression used to determine the data that will be published in the channel.*
- **DDS\_Long priority**  
*Publication priority.*

### 9.20.1 Detailed Description

Type used to configure the properties of a channel.

QoS:

**DDS\_MultiChannelQoSPolicy** (p. 964)



## 9.20.2 Member Data Documentation

### 9.20.2.1 multicast\_settings

```
struct DDS_TransportMulticastSettingsSeq DDS_ChannelSettings_t::multicast_settings
```

A sequence of **DDS\_TransportMulticastSettings\_t** (p. 1153) used to configure the multicast addresses associated with a channel.

The sequence cannot be empty.

The maximum number of multicast locators in a channel is limited to 16 (a locator is defined by a transport alias, a multicast address and a port). Note that this is a hard limit that cannot be increased. However, this limit can be decreased by configuring the 'dds.domain\_participant.max\_announced\_locator\_list\_size' property in the **DDS\_PropertyQosPolicy** (p. 1007) associated with the **DDS\_DomainParticipantQos** (p. 741).

**[default]** Empty sequence (invalid value)

### 9.20.2.2 filter\_expression

```
char* DDS_ChannelSettings_t::filter_expression
```

A logical expression used to determine the data that will be published in the channel.

If the expression evaluates to TRUE, a sample will be published on the channel.

An empty string always evaluates the expression to TRUE.

A NULL value is not allowed.

The syntax of the expression will depend on the value of **DDS\_MultiChannelQosPolicy::filter\_name** (p. 966)

*Important:* This value must be an allocated string with **DDS\_String\_alloc** (p. 553) or **DDS\_String\_dup** (p. 553). It should not be assigned to a string constant.

The filter expression length (including NULL-terminated character) cannot be greater than **DDS\_DomainParticipantResourceLimitsQosPolicy::channel\_filter\_expression\_max\_length** (p. 762).

See also

**Queries and Filters Syntax** (p. 179)

**[default]** NULL (invalid value)

### 9.20.2.3 priority

`DDS_Long DDS_ChannelSettings_t::priority`

Publication priority.

A positive integer value designating the relative priority of the channel, used to determine the transmission order of pending writes.

Use of publication priorities requires the asynchronous publisher (`DDS_ASYNCHRONOUS_PUBLISH_MODE`↔`_QOS` (p. 431)) with `DDS_FlowControllerProperty_t::scheduling_policy` (p. 913) set to `DDS_HPF_FLOW`↔`CONTROLLER_SCHED_POLICY` (p. 121).

Larger numbers have higher priority.

If the publication priority of the channel is any value other than `DDS_PUBLICATION_PRIORITY_UNDEFINED` (p. 430), then the channel's priority will take precedence over the data writer's priority.

If the publication priority of the channel is set to `DDS_PUBLICATION_PRIORITY_UNDEFINED` (p. 430), then the channel's priority will be set to the value of the data writer's priority.

If the publication priority of both the data writer and the channel are `DDS_PUBLICATION_PRIORITY_UNDEFINED` (p. 430), the channel will be assigned the lowest priority value.

If the publication priority of the channel is `DDS_PUBLICATION_PRIORITY_AUTOMATIC` (p. 430), then the channel will be assigned the priority of the largest publication priority of all samples in the channel. The publication priority of each sample can be set in the `DDS_WriteParams_t` (p. 1251) of the `FooDataWriter::write_w_params` (p. 1688) function.

[default] `DDS_PUBLICATION_PRIORITY_UNDEFINED` (p. 430)

## 9.21 DDS\_ChannelSettingsSeq Struct Reference

Declares IDL `sequence< DDS_ChannelSettings_t` (p. 610) >

### 9.21.1 Detailed Description

Declares IDL `sequence< DDS_ChannelSettings_t` (p. 610) >

A sequence of `DDS_ChannelSettings_t` (p. 610) used to configure the channels' properties. If the length of the sequence is zero, the `DDS_MultiChannelQosPolicy` (p. 964) has no effect.

Instantiates:

<<*generic*>> (p. 237) `FooSeq` (p. 1697)

See also

`DDS_ChannelSettings_t` (p. 610)

## 9.22 DDS\_CharSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_Char** (p. 317) >

### 9.22.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_Char** (p. 317) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_Char** (p. 317)

**FooSeq** (p. 1697)

## 9.23 DDS\_CoherentSetInfo\_t Struct Reference

<<*extension*>> (p. 237) Type definition for a coherent set info.

### Public Attributes

- **DDS\_GUID\_t group\_guid**  
*The coherent set group GUID.*
- **DDS\_SequenceNumber\_t coherent\_set\_sequence\_number**  
*Sequence number that identifies a sample as part of a **DDSDataWriter** (p. 1321) coherent set.*
- **DDS\_SequenceNumber\_t group\_coherent\_set\_sequence\_number**  
*Sequence number that identifies a sample as part of a group coherent set.*
- **DDS\_Boolean incomplete\_coherent\_set**  
*Indicates if a sample is part of an incomplete coherent set.*

### 9.23.1 Detailed Description

<<*extension*>> (p. 237) Type definition for a coherent set info.

A CoherentSetInfo provides information about the coherent set associated with a sample.

### 9.23.2 Member Data Documentation

### 9.23.2.1 group\_guid

```
DDS_GUID_t DDS_CoherentSetInfo_t::group_guid
```

The coherent set group GUID.

This GUID identifies the **DDSDataWriter** (p. 1321) or the group of DataWriters publishing the coherent set, depending on the value of **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) in the **DDSSubscriber** (p. 1592).

### 9.23.2.2 coherent\_set\_sequence\_number

```
DDS_SequenceNumber_t DDS_CoherentSetInfo_t::coherent_set_sequence_number
```

Sequence number that identifies a sample as part of a **DDSDataWriter** (p. 1321) coherent set.

When **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) in the **DDSSubscriber** (p. 1592) is set to **DDS\_↔INSTANCE\_PRESENTATION\_QOS** (p. 418) or **DDS\_TOPIC\_PRESENTATION\_QOS** (p. 418), the coherent set associated with a sample is identified by the pair (group\_guid, coherent\_set\_sequence\_number).

### 9.23.2.3 group\_coherent\_set\_sequence\_number

```
DDS_SequenceNumber_t DDS_CoherentSetInfo_t::group_coherent_set_sequence_number
```

Sequence number that identifies a sample as part of a group coherent set.

When **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) in the **DDSSubscriber** (p. 1592) is set to **DDS\_↔GROUP\_PRESENTATION\_QOS** (p. 418), the coherent set associated with a sample is identified by the pair (group\_↔guid, group\_coherent\_set\_sequence\_number).

### 9.23.2.4 incomplete\_coherent\_set

```
DDS_Boolean DDS_CoherentSetInfo_t::incomplete_coherent_set
```

Indicates if a sample is part of an incomplete coherent set.

## 9.24 DDS\_CompressionSettings\_t Struct Reference

<<*extension*>> (p. 237) Settings related to compressing user data.

### Public Attributes

- **DDS\_CompressionIdMask compression\_ids**  
<<*extension*>> (p. 237) Mask that represents the compression algorithms enabled.
- **DDS\_UnsignedLong writer\_compression\_level**  
<<*extension*>> (p. 237) The level of compression to use when compressing data.
- **DDS\_Long writer\_compression\_threshold**  
<<*extension*>> (p. 237) The threshold, in bytes, above which a serialized sample will be eligible to be compressed.

## 9.24.1 Detailed Description

<<*extension*>> (p. 237) Settings related to compressing user data.

QoS:

**DDS\_DataRepresentationQosPolicy** (p. 668)

## 9.24.2 Member Data Documentation

### 9.24.2.1 compression\_ids

**DDS\_CompressionIdMask** DDS\_CompressionSettings\_t::compression\_ids

<<*extension*>> (p. 237) Mask that represents the compression algorithms enabled.

A bitmap that represents the compression algorithm IDs (**DDS\_CompressionIdMask** (p. 375)) that are supported by the endpoint. The **DDSDataWriter** (p. 1321) creation will fail if more than one algorithm is provided.

If a **DDSDataWriter** (p. 1321) inherits multiple compression IDs from a **DDSTopic** (p. 1617), only the least significant bit enabled will be inherited. This forces the following order of preference: **DDS\_COMPRESSION\_ID\_ZLIB** (p. 375), **DDS\_COMPRESSION\_ID\_BZIP2** (p. 375), **DDS\_COMPRESSION\_ID\_LZ4** (p. 376).

Interactions with Security and Batching: Currently, the only algorithm that is supported when compression and batching are enabled on the same **DDSDataWriter** (p. 1321) is **DDS\_COMPRESSION\_ID\_ZLIB** (p. 375).

The combination of compression, batching, and data protection is supported. First, compression is applied to the entire batch. Then, data protection is applied to the compressed batch.

Note: When **DDS\_DataWriterProtocolQosPolicy::serialize\_key\_with\_dispose** (p. 676) is enabled and a dispose message is sent, the serialized key is not compressed.

**[default]** For **DDSTopic** (p. 1617), **DDSDataWriter** (p. 1321) a **DDS\_CompressionIdMask** (p. 375) mask set to **DDS\_←\_COMPRESSION\_ID\_MASK\_NONE** (p. 373)

**[default]** For **DDSDataReader** (p. 1288) a **DDS\_CompressionIdMask** (p. 375) mask set to **DDS\_←\_COMPRESSION\_ID\_MASK\_ALL** (p. 373).

### 9.24.2.2 writer\_compression\_level

**DDS\_UnsignedLong** DDS\_CompressionSettings\_t::writer\_compression\_level

<<**extension**>> (p. 237) The level of compression to use when compressing data.

Compression algorithms typically allow you to choose a level with which to compress the data. Each level has trade-offs between the resulting compression ratio and the speed of compression.

**[range]** [0, 10]

The value 1 represents the fastest compression time and the lowest compression ratio. The value 10 represents the slowest compression time but the highest compression ratio.

A value of 0 disables compression.

**[default]** DDS\_COMPRESSION\_LEVEL\_BEST\_COMPRESSION (p. 373)

#### Note

Only available for a **DDSDataWriter** (p. 1321) and **DDSTopic** (p. 1617).

### 9.24.2.3 writer\_compression\_threshold

**DDS\_Long** DDS\_CompressionSettings\_t::writer\_compression\_threshold

<<**extension**>> (p. 237) The threshold, in bytes, above which a serialized sample will be eligible to be compressed.

Any sample with a serialized size greater than or equal to the threshold will be eligible to be compressed. All samples with an eligible serialized size will be compressed. Only if the compressed size is smaller than the serialized size will the sample be stored and sent compressed on the wire.

For batching we check the maximum serialized size of the batch, calculated as `serialized_sample_max_size * DDS_↔ BatchQosPolicy::max_samples` (p. 602)

**[range]** [0, 2147483647] or **DDS\_LENGTH\_UNLIMITED** (p. 438)

Setting the threshold to **DDS\_LENGTH\_UNLIMITED** (p. 438) disables the compression.

**[default]** DDS\_COMPRESSION\_THRESHOLD\_DEFAULT (p. 374) (8192)

#### Note

Only available for a **DDSDataWriter** (p. 1321) and **DDSTopic** (p. 1617).

## 9.25 DDS\_ContentFilterProperty\_t Struct Reference

<<**extension**>> (p. 237) Type used to provide all the required information to enable content filtering.

## Public Attributes

- char \* **content\_filter\_topic\_name**  
*Name of the Content-filtered Topic associated with the Reader.*
- char \* **related\_topic\_name**  
*Name of the Topic related to the Content-filtered Topic.*
- char \* **filter\_class\_name**  
*Identifies the filter class this filter belongs to. RTPS can support multiple filter classes (SQL, regular expressions, custom filters, etc).*
- char \* **filter\_expression**  
*The actual filter expression. Must be a valid expression for the filter class specified using filterClassName.*
- struct **DDS\_StringSeq expression\_parameters**  
*Defines the value for each parameter in the filter expression.*

### 9.25.1 Detailed Description

<<*extension*>> (p. 237) Type used to provide all the required information to enable content filtering.

### 9.25.2 Member Data Documentation

#### 9.25.2.1 content\_filter\_topic\_name

```
char* DDS_ContentFilterProperty_t::content_filter_topic_name
```

Name of the Content-filtered Topic associated with the Reader.

#### 9.25.2.2 related\_topic\_name

```
char* DDS_ContentFilterProperty_t::related_topic_name
```

Name of the Topic related to the Content-filtered Topic.

#### 9.25.2.3 filter\_class\_name

```
char* DDS_ContentFilterProperty_t::filter_class_name
```

Identifies the filter class this filter belongs to. RTPS can support multiple filter classes (SQL, regular expressions, custom filters, etc).

### 9.25.2.4 filter\_expression

```
char* DDS_ContentFilterProperty_t::filter_expression
```

The actual filter expression. Must be a valid expression for the filter class specified using filterClassName.

### 9.25.2.5 expression\_parameters

```
struct DDS_StringSeq DDS_ContentFilterProperty_t::expression_parameters
```

Defines the value for each parameter in the filter expression.

## 9.26 DDS\_Cookie\_t Struct Reference

<<*extension*>> (p. 237) Sequence of bytes.

### Public Member Functions

- void \* **to\_pointer** () const  
*Returns the pointer previously stored in the cookie.*

### Public Attributes

- struct **DDS\_OctetSeq** **value**  
*a sequence of octets*

### 9.26.1 Detailed Description

<<*extension*>> (p. 237) Sequence of bytes.

### 9.26.2 Member Data Documentation

#### 9.26.2.1 value

```
struct DDS_OctetSeq DDS_Cookie_t::value
```

a sequence of octets

**[default]** Empty (zero-sized)



## 9.27 DDS\_CookieSeq Struct Reference

Declares IDL sequence < DDS\_Cookie\_t (p. 618) > .

### 9.27.1 Detailed Description

Declares IDL sequence < DDS\_Cookie\_t (p. 618) > .

See also

**FooSeq** (p. 1697)

## 9.28 DDS\_DatabaseQosPolicy Struct Reference

Various threads and resource limits settings used by RTI Connex to control its internal database.

### Public Attributes

- struct **DDS\_ThreadSettings\_t thread**  
*Database thread settings.*
- struct **DDS\_Duration\_t shutdown\_timeout**  
*The maximum wait time during a shutdown.*
- struct **DDS\_Duration\_t cleanup\_period**  
*The period at which the database thread wakes up to remove deleted records.*
- struct **DDS\_Duration\_t shutdown\_cleanup\_period**  
*The clean-up period used during database shut-down.*
- **DDS\_Long initial\_records**  
*The initial number of total records.*
- **DDS\_Long max\_skiplist\_level**  
*The maximum level of the skiplist.*
- **DDS\_Long max\_weak\_references**  
*The maximum number of weak references.*
- **DDS\_Long initial\_weak\_references**  
*The initial number of weak references.*

### 9.28.1 Detailed Description

Various threads and resource limits settings used by RTI Connex to control its internal database.

RTI uses an internal in-memory "database" to store information about entities created locally as well as remote entities found during the discovery process. This database uses a background thread to garbage-collect records related to deleted entities. When the **DDSDomainParticipant** (p. 1351) that maintains this database is deleted, it shuts down this thread.

The Database QoS policy is used to configure how RTI Connex manages its database, including how often it cleans up, the priority of the database thread, and limits on resources that may be allocated by the database.

You may be interested in modifying the **DDS\_DatabaseQosPolicy::shutdown\_timeout** (p. 620) and **DDS\_DatabaseQosPolicy::shutdown\_cleanup\_period** (p. 621) parameters to decrease the time it takes to delete a **DDSDomainParticipant** (p. 1351) when your application is shutting down.

The **DDS\_DomainParticipantResourceLimitsQosPolicy** (p. 746) controls the memory allocation for elements stored in the database.

This QoS policy is an extension to the DDS standard.

Entity:

**DDSDomainParticipant** (p. 1351)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) **NO** (p. 360)

### 9.28.2 Member Data Documentation

#### 9.28.2.1 thread

```
struct DDS_ThreadSettings_t DDS_DatabaseQosPolicy::thread
```

Database thread settings.

There is only one database thread: the clean-up thread.

**[default]** Priority: LOW.

The actual value depends on your architecture:

For Windows: -3

For Linux: OS default priority

For a complete list of platform specific values, please refer to [Platform Notes](#).

**[default]** Stack Size: The actual value depends on your architecture:

For Windows: OS default stack size

For Linux: OS default stack size

For a complete list of platform specific values, please refer to [Platform Notes](#).

**[default]** Mask: **DDS\_THREAD\_SETTINGS\_STUDIO** (p. 352)

### 9.28.2.2 shutdown\_timeout

```
struct DDS_Duration_t DDS_DatabaseQosPolicy::shutdown_timeout
```

The maximum wait time during a shutdown.

The domain participant will exit after the timeout, even if the database has not been fully cleaned up.

**[default]** 15 seconds

**[range]** [0,DDS\_DURATION\_INFINITE (p. 326)]

### 9.28.2.3 cleanup\_period

```
struct DDS_Duration_t DDS_DatabaseQosPolicy::cleanup_period
```

The period at which the database thread wakes up to remove deleted records.

**[default]** 61 seconds

**[range]** [0,1 year]

### 9.28.2.4 shutdown\_cleanup\_period

```
struct DDS_Duration_t DDS_DatabaseQosPolicy::shutdown_cleanup_period
```

The clean-up period used during database shut-down.

If you would like to shorten the time taken for a DomainParticipant to shutdown, you can decrease this value.

It is recommended to set this value to something other than 0 if running in an RTOS environment, to avoid CPU starvation.

**[default]** 10 milliseconds

**[range]** [0,1 year]

### 9.28.2.5 initial\_records

```
DDS_Long DDS_DatabaseQosPolicy::initial_records
```

The initial number of total records.

**[default]** 1024

**[range]** [1,10 million]

### 9.28.2.6 max\_skiplist\_level

**DDS\_Long** DDS\_DatabaseQosPolicy::max\_skiplist\_level

The maximum level of the skiplist.

The skiplist is used to keep records in the database. Usually, the search time is  $\log_2(N)$ , where  $N$  is the total number of records in one skiplist. However, once  $N$  exceeds  $2^n$ , where  $n$  is the maximum skiplist level, the search time will become more and more linear. Therefore, the maximum level should be set such that  $2^n$  is larger than the maximum( $N$  among all skiplists). Usually, the maximum  $N$  is the maximum number of remote and local writers or readers.

**[default]** 7

**[range]** [1,31]

### 9.28.2.7 max\_weak\_references

**DDS\_Long** DDS\_DatabaseQosPolicy::max\_weak\_references

The maximum number of weak references.

A weak reference is an internal data structure that refers to a record within RTI Connex't internal database. This field configures the maximum number of such references that RTI Connex't may create.

The actual number of weak references is permitted to grow from an initial value (indicated by **DDS\_DatabaseQosPolicy::initial\_weak\_references** (p. 622)) to this maximum. To prevent RTI Connex't from allocating any weak references after the system has reached a steady state, set the initial and maximum values equal to one another. To indicate that the number of weak references should continue to grow as needed indefinitely, set this field to **DDS\_LENGTH\_UNLIMITED** (p. 438). Be aware that although a single weak reference occupies very little memory, allocating a very large number of them can have a significant impact on your overall memory usage.

Tuning this value precisely is difficult without intimate knowledge of the structure of RTI Connex't database; doing so is an advanced feature not required by most applications. The default value has been chosen to be sufficient for reasonably large systems. If you believe you may need to modify this value, please consult with RTI support personnel for assistance.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 100 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\geq$  initial\_weak\_references

See also

**DDS\_DatabaseQosPolicy::initial\_weak\_references** (p. 622)

### 9.28.2.8 initial\_weak\_references

`DDS_Long DDS_DatabaseQosPolicy::initial_weak_references`

The initial number of weak references.

See `DDS_DatabaseQosPolicy::max_weak_references` (p. 622) for more information about what a weak reference is.

If the QoS set contains an `initial_weak_references` value that is too small to ever grow to `DDS_DatabaseQosPolicy::max_weak_references` (p. 622) using RTI ConnexT's internal algorithm, this value will be adjusted upwards as necessary. Subsequent accesses of this value will reveal the actual initial value used.

Changing the value of this field is an advanced feature; it is recommended that you consult with RTI support personnel before doing so.

**[default]** 2049, which is the minimum initial value imposed by REDA when the maximum is unlimited. If a lower value is specified, it will simply be increased to 2049 automatically.

**[range]** [1, 100 million], <= max\_weak\_references

See also

`DDS_DatabaseQosPolicy::max_weak_references` (p. 622)

## 9.29 DDS\_DataReaderCacheStatus Struct Reference

<<*extension*>> (p. 237) The status of the reader's cache.

### Public Attributes

- **DDS\_LongLong sample\_count\_peak**  
*The highest number of samples in the reader's queue over the lifetime of the reader.*
- **DDS\_LongLong sample\_count**  
*The number of samples in the reader's queue.*
- **DDS\_LongLong old\_source\_timestamp\_dropped\_sample\_count**  
*The number of samples dropped as a result of receiving a sample older than the last one, using `DDS_BY_SOURCE_TIMESTAMP_DESTINATIONORDER_QOS` (p. 387).*
- **DDS\_LongLong tolerance\_source\_timestamp\_dropped\_sample\_count**  
*The number of samples dropped as a result of receiving a sample in the future, using `DDS_BY_SOURCE_TIMESTAMP_DESTINATIONORDER_QOS` (p. 387).*
- **DDS\_LongLong ownership\_dropped\_sample\_count**  
*The number of samples dropped as a result of receiving a sample from a DataWriter with a lower strength, using Exclusive Ownership.*
- **DDS\_LongLong content\_filter\_dropped\_sample\_count**  
*The number of user samples filtered by the DataReader due to Content-Filtered Topics.*
- **DDS\_LongLong time\_based\_filter\_dropped\_sample\_count**  
*The number of user samples filtered by the DataReader due to `DDS_TimeBasedFilterQosPolicy` (p. 1126).*
- **DDS\_LongLong expired\_dropped\_sample\_count**

The number of samples expired by the `DataReader` due to **DDS\_LifespanQosPolicy** (p. 931) or the autopurge sample delays.

- **DDS\_LongLong virtual\_duplicate\_dropped\_sample\_count**

The number of virtual duplicate samples dropped by the `DataReader`. A sample is a virtual duplicate if it has the same identity (Virtual Writer GUID and Virtual Sequence Number) as a previously received sample.

- **DDS\_LongLong replaced\_dropped\_sample\_count**

The number of samples replaced by the `DataReader` due to **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406) replacement.

- **DDS\_LongLong writer\_removed\_batch\_sample\_dropped\_sample\_count**

The number of batch samples received by the `DataReader` that were marked as removed by the `DataWriter`.

- **DDS\_LongLong total\_samples\_dropped\_by\_instance\_replacement**

The number of samples with sample state **DDS\_NOT\_READ\_SAMPLE\_STATE** (p. 157) that were dropped when removing an instance due to instance replacement. See **DDS\_DataReaderResourceLimitsQosPolicy::instance\_replacement** (p. 666) for more details about when instances are replaced.

- **DDS\_LongLong alive\_instance\_count**

The number of instances in the `DataReader`'s queue with an instance state equal to **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161).

- **DDS\_LongLong alive\_instance\_count\_peak**

The highest value of **DDS\_DataReaderCacheStatus::alive\_instance\_count** (p. 627) over the lifetime of the `DataReader`.

- **DDS\_LongLong no\_writers\_instance\_count**

The number of instances in the `DataReader`'s queue with an instance state equal to **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161).

- **DDS\_LongLong no\_writers\_instance\_count\_peak**

The highest value of **DDS\_DataReaderCacheStatus::no\_writers\_instance\_count** (p. 628) over the lifetime of the `DataReader`.

- **DDS\_LongLong disposed\_instance\_count**

The number of instances in the `DataReader`'s queue with an instance state equal to **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161).

- **DDS\_LongLong disposed\_instance\_count\_peak**

The highest value of **DDS\_DataReaderCacheStatus::disposed\_instance\_count** (p. 628) over the lifetime of the `DataReader`.

- **DDS\_LongLong detached\_instance\_count**

The number of minimal instance states currently being maintained in the `DataReader`'s queue.

- **DDS\_LongLong detached\_instance\_count\_peak**

The highest value of **DDS\_DataReaderCacheStatus::detached\_instance\_count** (p. 629) over the lifetime of the `DataReader`.

- **DDS\_LongLong compressed\_sample\_count**

The number of received samples compressed by a `DataWriter`.

### 9.29.1 Detailed Description

<<**extension**>> (p. 237) The status of the reader's cache.

Entity:

**DDSDataReader** (p. 1288)

### 9.29.2 Member Data Documentation

### 9.29.2.1 sample\_count\_peak

`DDS_LongLong DDS_DataReaderCacheStatus::sample_count_peak`

The highest number of samples in the reader's queue over the lifetime of the reader.

### 9.29.2.2 sample\_count

`DDS_LongLong DDS_DataReaderCacheStatus::sample_count`

The number of samples in the reader's queue.

includes samples that may not yet be available to be read or taken by the user, due to samples being received out of order or **PRESENTATION** (p. 417)

### 9.29.2.3 old\_source\_timestamp\_dropped\_sample\_count

`DDS_LongLong DDS_DataReaderCacheStatus::old_source_timestamp_dropped_sample_count`

The number of samples dropped as a result of receiving a sample older than the last one, using **DDS\_BY\_SOURCE\_TIMESTAMP\_DESTINATIONORDER\_QOS** (p. 387).

When the DataReader is using **DDS\_BY\_SOURCE\_TIMESTAMP\_DESTINATIONORDER\_QOS** (p. 387):

- If the DataReader receives a sample for an instance with a source timestamp that is older than the last source timestamp received for the instance, the sample is dropped.
- If the DataReader receives a sample for an instance with a source timestamp that is equal to the last source timestamp received for the instance and the writer has a higher virtual GUID, the sample is dropped.

### 9.29.2.4 tolerance\_source\_timestamp\_dropped\_sample\_count

`DDS_LongLong DDS_DataReaderCacheStatus::tolerance_source_timestamp_dropped_sample_count`

The number of samples dropped as a result of receiving a sample in the future, using **DDS\_BY\_SOURCE\_TIMESTAMP\_DESTINATIONORDER\_QOS** (p. 387).

When the DataReader is using **DDS\_BY\_SOURCE\_TIMESTAMP\_DESTINATIONORDER\_QOS** (p. 387): the DataReader will accept a sample only if the source timestamp is no farther in the future from the reception timestamp than the `source_timestamp_tolerance`. Otherwise, the sample is dropped.

### 9.29.2.5 ownership\_dropped\_sample\_count

`DDS_LongLong DDS_DataReaderCacheStatus::ownership_dropped_sample_count`

The number of samples dropped as a result of receiving a sample from a DataWriter with a lower strength, using Exclusive Ownership.

When using Exclusive Ownership, the DataReader receives data from multiple DataWriters. Each instance can only be owned by one DataWriter.

If other DataWriters write samples on this instance, the samples will be dropped.

### 9.29.2.6 content\_filter\_dropped\_sample\_count

`DDS_LongLong DDS_DataReaderCacheStatus::content_filter_dropped_sample_count`

The number of user samples filtered by the DataReader due to Content-Filtered Topics.

When using a content filter on the DataReader side, if the sample received by the DataReader does not pass the filter, it will be dropped.

### 9.29.2.7 time\_based\_filter\_dropped\_sample\_count

`DDS_LongLong DDS_DataReaderCacheStatus::time_based_filter_dropped_sample_count`

The number of user samples filtered by the DataReader due to **DDS\_TimeBasedFilterQosPolicy** (p. 1126).

When using **TIME\_BASED\_FILTER** (p. 440) on the DataReader side, if the sample received by the DataReader does not pass the minimum\_separation filter, it will be dropped.

### 9.29.2.8 expired\_dropped\_sample\_count

`DDS_LongLong DDS_DataReaderCacheStatus::expired_dropped_sample_count`

The number of samples expired by the DataReader due to **DDS\_LifespanQosPolicy** (p. 931) or the autopurge sample delays.

- **DDS\_LifespanQosPolicy** (p. 931)  
When a sample expires due to **DDS\_LifespanQosPolicy** (p. 931), the data is removed from the DataReader caches. This sample will be considered dropped if its **DDS\_SampleStateKind** (p. 156) was **DDS\_NOT\_READ**↔  
**\_SAMPLE\_STATE** (p. 157).
- **DDS\_ReaderDataLifecycleQosPolicy::autopurge\_nowriter\_samples\_delay** (p. 1037)  
When a sample expires due to **DDS\_ReaderDataLifecycleQosPolicy::autopurge\_nowriter\_samples\_delay** (p. 1037), this sample will be considered dropped if its **DDS\_SampleStateKind** (p. 156) was **DDS\_NOT\_READ**↔  
**\_SAMPLE\_STATE** (p. 157).
- **DDS\_ReaderDataLifecycleQosPolicy::autopurge\_disposed\_samples\_delay** (p. 1037)  
When a sample expires due to **DDS\_ReaderDataLifecycleQosPolicy::autopurge\_disposed\_samples\_delay** (p. 1037), this sample will be considered dropped if its **DDS\_SampleStateKind** (p. 156) was **DDS\_NOT\_READ**↔  
**\_SAMPLE\_STATE** (p. 157).



### 9.29.2.9 virtual\_duplicate\_dropped\_sample\_count

**DDS\_LongLong** DDS\_DataReaderCacheStatus::virtual\_duplicate\_dropped\_sample\_count

The number of virtual duplicate samples dropped by the DataReader. A sample is a virtual duplicate if it has the same identity (Virtual Writer GUID and Virtual Sequence Number) as a previously received sample.

When two DataWriters with the same logical data source publish a sample with the same sequence\_number, one sample will be dropped and the other will be received by the DataReader.

This can happen when multiple writers are writing on behalf of the same original DataWriter: for example, in systems with redundant Routing Services or when a DataReader is receiving samples both directly from the original DataWriter and from an instance of Persistence Service.

### 9.29.2.10 replaced\_dropped\_sample\_count

**DDS\_LongLong** DDS\_DataReaderCacheStatus::replaced\_dropped\_sample\_count

The number of samples replaced by the DataReader due to **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406) replacement.

When the number of samples for an instance in the queue reaches the **DDS\_HistoryQosPolicy::depth** (p. 921) value, a new sample for the instance will replace the oldest sample for the instance in the queue.

The new sample will be accepted and the old sample will be dropped.

This counter will only be updated if the replaced sample's **DDS\_SampleStateKind** (p. 156) was **DDS\_NOT\_READ\_SAMPLE\_STATE** (p. 157).

### 9.29.2.11 writer\_removed\_batch\_sample\_dropped\_sample\_count

**DDS\_LongLong** DDS\_DataReaderCacheStatus::writer\_removed\_batch\_sample\_dropped\_sample\_count

The number of batch samples received by the DataReader that were marked as removed by the DataWriter.

When the DataReader receives a batch, the batch can contain samples marked as removed by the DataWriter. Examples of removed samples in a batch could be because of sample replacement due to **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406) **DDS\_HistoryQosPolicy** (p. 919) QoS on the DataWriter or because the duration in **DDS\_LifespanQosPolicy** (p. 931) was reached. By default, any sample marked as removed from a batch is dropped (unless you set the `dds.data_reader.accept_writer_removed_batch_samples` property in the **DDS\_PropertyQosPolicy** (p. 1007) to true). Note: Historical data with removed batch samples written before the DataReader joined the DDS domain will also be included in the count.

### 9.29.2.12 total\_samples\_dropped\_by\_instance\_replacement

**DDS\_LongLong** DDS\_DataReaderCacheStatus::total\_samples\_dropped\_by\_instance\_replacement

The number of samples with sample state **DDS\_NOT\_READ\_SAMPLE\_STATE** (p. 157) that were dropped when removing an instance due to instance replacement. See **DDS\_DataReaderResourceLimitsQosPolicy::instance\_replacement** (p. 666) for more details about when instances are replaced.

### 9.29.2.13 `alive_instance_count`

**DDS\_LongLong** `DDS_DataReaderCacheStatus::alive_instance_count`

The number of instances in the DataReader's queue with an instance state equal to **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161).

### 9.29.2.14 `alive_instance_count_peak`

**DDS\_LongLong** `DDS_DataReaderCacheStatus::alive_instance_count_peak`

The highest value of **DDS\_DataReaderCacheStatus::alive\_instance\_count** (p. 627) over the lifetime of the DataReader.

See also

**DDS\_DataReaderCacheStatus::alive\_instance\_count** (p. 627)

### 9.29.2.15 `no_writers_instance_count`

**DDS\_LongLong** `DDS_DataReaderCacheStatus::no_writers_instance_count`

The number of instances in the DataReader's queue with an instance state equal to **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161).

### 9.29.2.16 `no_writers_instance_count_peak`

**DDS\_LongLong** `DDS_DataReaderCacheStatus::no_writers_instance_count_peak`

The highest value of **DDS\_DataReaderCacheStatus::no\_writers\_instance\_count** (p. 628) over the lifetime of the DataReader.

See also

**DDS\_DataReaderCacheStatus::no\_writers\_instance\_count** (p. 628)

### 9.29.2.17 disposed\_instance\_count

**DDS\_LongLong** DDS\_DataReaderCacheStatus::disposed\_instance\_count

The number of instances in the DataReader's queue with an instance state equal to **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161).

### 9.29.2.18 disposed\_instance\_count\_peak

**DDS\_LongLong** DDS\_DataReaderCacheStatus::disposed\_instance\_count\_peak

The highest value of **DDS\_DataReaderCacheStatus::disposed\_instance\_count** (p. 628) over the lifetime of the DataReader.

See also

**DDS\_DataReaderCacheStatus::disposed\_instance\_count** (p. 628)

### 9.29.2.19 detached\_instance\_count

**DDS\_LongLong** DDS\_DataReaderCacheStatus::detached\_instance\_count

The number of minimal instance states currently being maintained in the DataReader's queue.

If **DDS\_DataReaderResourceLimitsQosPolicy::keep\_minimum\_state\_for\_instances** (p. 664) is true, the DataReader will keep up to a maximum of **DDS\_DataReaderResourceLimitsQosPolicy::max\_total\_instances** (p. 661) detached instances in its queue. For a more in-depth description of detached instances, refer to **DDS\_DataReaderResourceLimitsQosPolicy::max\_total\_instances** (p. 661).

### 9.29.2.20 detached\_instance\_count\_peak

**DDS\_LongLong** DDS\_DataReaderCacheStatus::detached\_instance\_count\_peak

The highest value of **DDS\_DataReaderCacheStatus::detached\_instance\_count** (p. 629) over the lifetime of the DataReader.

See also

**DDS\_DataReaderCacheStatus::detached\_instance\_count** (p. 629)

### 9.29.2.21 compressed\_sample\_count

`DDS_LongLong DDS_DataReaderCacheStatus::compressed_sample_count`

The number of received samples compressed by a DataWriter.

These include data, dispose, and unregister samples sent by a DataWriter.

## 9.30 DDS\_DataReaderProtocolQosPolicy Struct Reference

Along with [DDS\\_WireProtocolQosPolicy](#) (p. 1244) and [DDS\\_DataWriterProtocolQosPolicy](#) (p. 673), this QoS policy configures the DDS on-the-network protocol (RTPS).

### Public Attributes

- struct **DDS\_GUID\_t virtual\_guid**  
*The virtual GUID (Global Unique Identifier).*
- **DDS\_UnsignedLong rtps\_object\_id**  
*The RTPS Object ID.*
- **DDS\_Boolean expects\_inline\_qos**  
*Specifies whether this DataReader expects inline QoS with every sample.*
- **DDS\_Boolean disable\_positive\_acks**  
*Whether the reader sends positive acknowledgements to writers.*
- **DDS\_Boolean propagate\_dispose\_of\_unregister\_instances**  
*Indicates whether or not an instance can move to the **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) state without being in the **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161) state.*
- **DDS\_Boolean propagate\_unregister\_of\_disposed\_instances**  
*Indicates whether or not an instance can move to the **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) state directly from the **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161).*
- struct **DDS\_RtpsReliableReaderProtocol\_t rtps\_reliable\_reader**  
*RTPS protocol-related configuration settings for the RTPS reliable reader associated with a **DDSDataReader** (p. 1288). This parameter only has effect if the reader is configured with **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) **DDS\_↔ReliabilityQosPolicyKind** (p. 434).*

### 9.30.1 Detailed Description

Along with [DDS\\_WireProtocolQosPolicy](#) (p. 1244) and [DDS\\_DataWriterProtocolQosPolicy](#) (p. 673), this QoS policy configures the DDS on-the-network protocol (RTPS).

DDS has a standard protocol for packet (user and meta data) exchange between applications using DDS for communications. This QoS policy and [DDS\\_DataReaderProtocolQosPolicy](#) (p. 630) give you control over configurable portions of the protocol, including the configuration of the reliable data delivery mechanism of the protocol on a per DataWriter or DataReader basis.

These configuration parameters control timing, timeouts, and give you the ability to tradeoff between speed of data loss detection and repair versus network and CPU bandwidth used to maintain reliability.

It is important to tune the reliability protocol (on a per **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) basis) to meet the requirements of the end-user application so that data can be sent between DataWriters and DataReaders in an efficient and optimal manner in the presence of data loss.

You can also use this QoS policy to control how RTI Connexx responds to "slow" reliable DataReaders or ones that disconnect or are otherwise lost. See **DDS\_ReliabilityQoSPolicy** (p. 1041) for more information on the per-DataReader/↔ DataWriter reliability configuration. **DDS\_HistoryQoSPolicy** (p. 919) and **DDS\_ResourceLimitsQoSPolicy** (p. 1052) also play an important role in the DDS reliable protocol.

This QoS policy is an extension to the DDS standard.

Entity:

**DDSDataReader** (p. 1288)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

## 9.30.2 Member Data Documentation

### 9.30.2.1 virtual\_guid

```
struct DDS_GUID_t DDS_DataReaderProtocolQosPolicy::virtual_guid
```

The virtual GUID (Global Unique Identifier).

The virtual GUID is used to uniquely identify different incarnations of the same **DDSDataReader** (p. 1288).

The association between a **DDSDataReader** (p. 1288) and its persisted state is done using the virtual GUID.

**[default] DDS\_GUID\_AUTO** (p. 331)

### 9.30.2.2 rtps\_object\_id

```
DDS_UnsignedLong DDS_DataReaderProtocolQosPolicy::rtps_object_id
```

The RTPS Object ID.

This value is used to determine the RTPS object ID of a data reader according to the DDS-RTPS Interoperability Wire Protocol.

Only the last 3 bytes are used; the most significant byte is ignored.

If the default value is specified, RTI Connexx will automatically assign the object ID based on a counter value (per participant) starting at 0x00800000. That value is incremented for each new data reader.

A `rtps_object_id` value in the interval [0x00800000,0x00ffffff] may collide with the automatic values assigned by RTI Connexx. In those cases, the recommendation is not to use automatic object ID assignment.

**[default] DDS\_RTPS\_AUTO\_ID** (p. ??)

**[range]** [0,0x00ffffff]

### 9.30.2.3 expects\_inline\_qos

```
DDS_Boolean DDS_DataReaderProtocolQosPolicy::expects_inline_qos
```

Specifies whether this DataReader expects inline QoS with every sample.

RTI Connex DataWriters do not match with DataReaders that set this field to **DDS\_BOOLEAN\_TRUE** (p. 317) (because RTI Connex DataWriters do not support sending inline QoS), but here is how the field is meant to be used:

In RTI Connex, a **DDSDataReader** (p. 1288) nominally relies on Discovery to propagate QoS on a matched **DDSDataWriter** (p. 1321).

Alternatively, a **DDSDataReader** (p. 1288) may get information on a matched **DDSDataWriter** (p. 1321) through QoS sent inline with a sample.

Asserting **DDS\_DataReaderProtocolQosPolicy::expects\_inline\_qos** (p. 631) indicates to a matching **DDSDataWriter** (p. 1321) that this **DDSDataReader** (p. 1288) expects to receive inline QoS with every sample. The complete set of inline QoS that a **DDSDataWriter** (p. 1321) may send inline is specified by the Real-Time Publish-Subscribe (RTPS) Wire Interoperability Protocol.

Because RTI Connex **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) cache Discovery information, inline QoS are largely redundant and thus unnecessary. Only for other stateless implementations whose **DDSDataReader** (p. 1288) does not cache Discovery information is inline QoS necessary.

Also note that inline QoS are additional wire-payload that consume additional bandwidth and serialization and deserialization time.

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.30.2.4 disable\_positive\_acks

```
DDS_Boolean DDS_DataReaderProtocolQosPolicy::disable_positive_acks
```

Whether the reader sends positive acknowledgements to writers.

If set to **DDS\_BOOLEAN\_TRUE** (p. 317), the reader does not send positive acknowledgments (ACKs) in response to Heartbeat messages. The reader will send negative acknowledgements (NACKs) when a Heartbeat advertises samples that it has not received.

Otherwise, if set to **DDS\_BOOLEAN\_FALSE** (p. 317) (the default), the reader will send ACKs to writers that expect ACKs (**DDS\_DataWriterProtocolQosPolicy::disable\_positive\_acks** (p. 675) = **DDS\_BOOLEAN\_FALSE** (p. 317)) and it will not send ACKs to writers that disable ACKs (**DDS\_DataWriterProtocolQosPolicy::disable\_positive\_acks** (p. 675) = **DDS\_BOOLEAN\_TRUE** (p. 317))

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.30.2.5 propagate\_dispose\_of\_unregistered\_instances

**DDS\_Boolean** DDS\_DataReaderProtocolQosPolicy::propagate\_dispose\_of\_unregistered\_instances

Indicates whether or not an instance can move to the **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) state without being in the **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161) state.

This field only applies to keyed readers.

When the field is set to **DDS\_BOOLEAN\_TRUE** (p. 317), the DataReader will receive dispose notifications even if the instance is not alive.

To guarantee the key availability through the usage of the API **FooDataReader::get\_key\_value** (p. 1673), this option should be used in combination with setting **DDS\_DataWriterProtocolQosPolicy::serialize\_key\_with\_dispose** (p. 676) on the DataWriter to **DDS\_BOOLEAN\_TRUE** (p. 317).

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.30.2.6 propagate\_unregister\_of\_disposed\_instances

**DDS\_Boolean** DDS\_DataReaderProtocolQosPolicy::propagate\_unregister\_of\_disposed\_instances

Indicates whether or not an instance can move to the **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) state directly from the **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161).

This field only applies to keyed readers.

When the field is set to **DDS\_BOOLEAN\_TRUE** (p. 317), the DataReader will receive unregister notifications even if the instance is not alive.

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.30.2.7 rtps\_reliable\_reader

**struct DDS\_RtpsReliableReaderProtocol\_t** DDS\_DataReaderProtocolQosPolicy::rtps\_reliable\_reader

RTPS protocol-related configuration settings for the RTPS reliable reader associated with a **DDSDataReader** (p. 1288). This parameter only has effect if the reader is configured with **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) **DDS\_↔ ReliabilityQosPolicyKind** (p. 434).

For details, refer to the **DDS\_RtpsReliableReaderProtocol\_t** (p. 1057)

[default] See **DDS\_RtpsReliableReaderProtocol\_t** (p. 1057)

## 9.31 DDS\_DataReaderProtocolStatus Struct Reference

<<**extension**>> (p. 237) The status of a reader's internal protocol related metrics, like the number of samples received, filtered, rejected; and status of wire protocol traffic.

## Public Attributes

- **DDS\_LongLong received\_sample\_count**  
*The number of samples received by a DataReader.*
- **DDS\_LongLong received\_sample\_count\_change**  
*The change in `DDS_DataReaderProtocolStatus::received_sample_count` (p. 636) since the last time the status was read.*
- **DDS\_LongLong received\_sample\_bytes**  
*The number of bytes received by a DataReader.*
- **DDS\_LongLong received\_sample\_bytes\_change**  
*The change in `DDS_DataReaderProtocolStatus::received_sample_bytes` (p. 637) since the last time the status was read.*
- **DDS\_LongLong duplicate\_sample\_count**  
*The number of samples from a remote DataWriter received, not for the first time, by a local DataReader.*
- **DDS\_LongLong duplicate\_sample\_count\_change**  
*The change in `DDS_DataReaderProtocolStatus::duplicate_sample_count` (p. 637) since the last time the status was read.*
- **DDS\_LongLong duplicate\_sample\_bytes**  
*The number of bytes of samples from a remote DataWriter received, not for the first time, by a local DataReader.*
- **DDS\_LongLong duplicate\_sample\_bytes\_change**  
*The change in `DDS_DataReaderProtocolStatus::duplicate_sample_bytes` (p. 638) since the last time the status was read.*
- **DDS\_LongLong filtered\_sample\_count**  
*[DEPRECATED]. See: `DDS_DataReaderCacheStatus::time_based_filter_dropped_sample_count` (p. 626) `DDS_↔`  
`DataReaderCacheStatus::content_filter_dropped_sample_count` (p. 626)*
- **DDS\_LongLong filtered\_sample\_count\_change**  
*[DEPRECATED]. See: `DDS_DataReaderCacheStatus::time_based_filter_dropped_sample_count` (p. 626) `DDS_↔`  
`DataReaderCacheStatus::content_filter_dropped_sample_count` (p. 626)*
- **DDS\_LongLong filtered\_sample\_bytes**  
*[DEPRECATED]. See: `DDS_DataReaderCacheStatus::time_based_filter_dropped_sample_count` (p. 626) `DDS_↔`  
`DataReaderCacheStatus::content_filter_dropped_sample_count` (p. 626)*
- **DDS\_LongLong filtered\_sample\_bytes\_change**  
*[DEPRECATED]. See: `DDS_DataReaderCacheStatus::time_based_filter_dropped_sample_count` (p. 626) `DDS_↔`  
`DataReaderCacheStatus::content_filter_dropped_sample_count` (p. 626)*
- **DDS\_LongLong received\_heartbeat\_count**  
*The number of Heartbeats from a remote DataWriter received by a local DataReader.*
- **DDS\_LongLong received\_heartbeat\_count\_change**  
*The change in `DDS_DataReaderProtocolStatus::received_heartbeat_count` (p. 639) since the last time the status was read.*
- **DDS\_LongLong received\_heartbeat\_bytes**  
*The number of bytes of Heartbeats from a remote DataWriter received by a local DataReader.*
- **DDS\_LongLong received\_heartbeat\_bytes\_change**  
*The change in `DDS_DataReaderProtocolStatus::received_heartbeat_bytes` (p. 639) since the last time the status was read.*
- **DDS\_LongLong sent\_ack\_count**  
*The number of ACKs sent from a local DataReader to a matching remote DataWriter.*
- **DDS\_LongLong sent\_ack\_count\_change**  
*The change in `DDS_DataReaderProtocolStatus::sent_ack_count` (p. 640) since the last time the status was read.*
- **DDS\_LongLong sent\_ack\_bytes**



- The number of bytes of ACKs sent from a local DataReader to a matching remote DataWriter.*

  - **DDS\_LongLong sent\_ack\_bytes\_change**

*The change in `DDS_DataReaderProtocolStatus::sent_ack_bytes` (p. 640) since the last time the status was read.*
  - **DDS\_LongLong sent\_nack\_count**

*The number of NACKs sent from a local DataReader to a matching remote DataWriter.*
  - **DDS\_LongLong sent\_nack\_count\_change**

*The change in `DDS_DataReaderProtocolStatus::sent_nack_count` (p. 640) since the last time the status was read.*
  - **DDS\_LongLong sent\_nack\_bytes**

*The number of bytes of NACKs sent from a local DataReader to a matching remote DataWriter.*
  - **DDS\_LongLong sent\_nack\_bytes\_change**

*The change in `DDS_DataReaderProtocolStatus::sent_nack_bytes` (p. 641) since the last time the status was read.*
  - **DDS\_LongLong received\_gap\_count**

*The number of GAPS received from remote DataWriter to this DataReader.*
  - **DDS\_LongLong received\_gap\_count\_change**

*The change in `DDS_DataReaderProtocolStatus::received_gap_count` (p. 641) since the last time the status was read.*
  - **DDS\_LongLong received\_gap\_bytes**

*The number of bytes of GAPS received from remote DataWriter to this DataReader.*
  - **DDS\_LongLong received\_gap\_bytes\_change**

*The change in `DDS_DataReaderProtocolStatus::received_gap_bytes` (p. 641) since the last time the status was read.*
  - **DDS\_LongLong rejected\_sample\_count**

*The number of times a sample is rejected because it cannot be accepted by a reliable DataReader.*
  - **DDS\_LongLong rejected\_sample\_count\_change**

*The change in `DDS_DataReaderProtocolStatus::rejected_sample_count` (p. 642) since the last time the status was read.*
  - struct **DDS\_SequenceNumber\_t first\_available\_sample\_sequence\_number**

*Sequence number of the first available sample in a matched DataWriters reliability queue.*
  - struct **DDS\_SequenceNumber\_t last\_available\_sample\_sequence\_number**

*Sequence number of the last available sample in a matched Datawriter's reliability queue.*
  - struct **DDS\_SequenceNumber\_t last\_committed\_sample\_sequence\_number**

*Sequence number of the newest sample received from the matched DataWriter committed to the DataReader's queue.*
  - **DDS\_Long uncommitted\_sample\_count**

*Number of received samples that are not yet available to be read or taken, due to being received out of order.*
  - **DDS\_LongLong out\_of\_range\_rejected\_sample\_count**

*The number of samples dropped by the DataReader due to received window is full and the sample is out-of-order.*
  - **DDS\_LongLong received\_fragment\_count**

*The number of `DATA_FRAG` messages that have been received by this DataReader.*
  - **DDS\_LongLong dropped\_fragment\_count**

*The number of `DATA_FRAG` messages that have been dropped by a DataReader.*
  - **DDS\_LongLong reassembled\_sample\_count**

*The number of fragmented samples that have been reassembled by a DataReader.*
  - **DDS\_LongLong sent\_nack\_fragment\_count**

*The number of NACK fragments that have been sent from a DataReader to a DataWriter.*
  - **DDS\_LongLong sent\_nack\_fragment\_bytes**

*The number of NACK fragment bytes that have been sent from a DataReader to a DataWriter.*

### 9.31.1 Detailed Description

<<*extension*>> (p. 237) The status of a reader's internal protocol related metrics, like the number of samples received, filtered, rejected; and status of wire protocol traffic.

Entity:

**DDSDataReader** (p. 1288)

### 9.31.2 Member Data Documentation

#### 9.31.2.1 received\_sample\_count

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::received\_sample\_count

The number of samples received by a DataReader.

Depending on how the **DDS\_DataReaderProtocolStatus** (p. 633) was obtained this may count samples coming from a specific DataWriter or from all the DataWriters that are matched with the DataReader.

If the **DDS\_DataReaderProtocolStatus** (p. 633) is obtained using the **DDSDataReader::get\_datareader\_protocol\_status** (p. 1305) operation then it will count samples from any DataWriter. If the DataReaderProtocolStatus is obtained using the **DDSDataReader::get\_matched\_publication\_datareader\_protocol\_status** (p. 1305) then it will count the samples for the DataWriter specified as a parameter to the function.

Duplicate samples arriving from the DataWriter(s) (e.g. via multiple network paths) are detected prior to increasing this counter. The duplicate samples are counted by **DDS\_DataReaderProtocolStatus::duplicate\_sample\_count** (p. 637).

If the DataReader has specified a ContentFilter the received samples that do not pass the filter are part of this counter. The filtered samples are counted by **DDS\_DataReaderProtocolStatus::filtered\_sample\_count** (p. 638).

Samples rejected because they do not fit on the DataReader Queue are also part of this counter.

Note the received\_sample\_count counts samples received from all DataWriters and it does not necessarily match the number of samples accepted into the DataReader Queue. This is because:

- Samples can also be inserted into the DataReader Queue by lifecycle events that are locally detected like an instance becoming not alive as a result of DataWriters leaving the network.
- Samples can be filtered out due to ContentFilter or TimeFilter
- Samples can be rejected because there is no space in DataReader Queue

Note that when data is fragmented, this statistic is updated when all of the fragments required to reassemble a sample are received, not when individual fragments are received.

### 9.31.2.2 received\_sample\_count\_change

`DDS_LongLong DDS_DataReaderProtocolStatus::received_sample_count_change`

The change in `DDS_DataReaderProtocolStatus::received_sample_count` (p. 636) since the last time the status was read.

See also

`DDS_DataReaderProtocolStatus::received_sample_count` (p. 636)

Note that when data is fragmented, this statistic is updated when all of the fragments required to reassemble a sample are received, not when individual fragments are received.

### 9.31.2.3 received\_sample\_bytes

`DDS_LongLong DDS_DataReaderProtocolStatus::received_sample_bytes`

The number of bytes received by a DataReader.

See also

`DDS_DataReaderProtocolStatus::received_sample_count` (p. 636)

Note that when data is fragmented, this statistic is updated upon the receipt of each fragment, not when a sample is reassembled.

### 9.31.2.4 received\_sample\_bytes\_change

`DDS_LongLong DDS_DataReaderProtocolStatus::received_sample_bytes_change`

The change in `DDS_DataReaderProtocolStatus::received_sample_bytes` (p. 637) since the last time the status was read.

See also

`DDS_DataReaderProtocolStatus::received_sample_count_change` (p. 636)

Note that when data is fragmented, this statistic is updated upon the receipt of each fragment, not when a sample is reassembled.

### 9.31.2.5 duplicate\_sample\_count

`DDS_LongLong DDS_DataReaderProtocolStatus::duplicate_sample_count`

The number of samples from a remote DataWriter received, not for the first time, by a local DataReader.

Such samples can be redundant, out-of-order, etc. and are not stored in the reader's queue.

### 9.31.2.6 duplicate\_sample\_count\_change

`DDS_LongLong DDS_DataReaderProtocolStatus::duplicate_sample_count_change`

The change in `DDS_DataReaderProtocolStatus::duplicate_sample_count` (p. 637) since the last time the status was read.

Such samples can be redundant, out-of-order, etc. and are not stored in the reader's queue.

### 9.31.2.7 duplicate\_sample\_bytes

`DDS_LongLong DDS_DataReaderProtocolStatus::duplicate_sample_bytes`

The number of bytes of samples from a remote DataWriter received, not for the first time, by a local DataReader.

Such samples can be redundant, out-of-order, etc. and are not stored in the reader's queue.

### 9.31.2.8 duplicate\_sample\_bytes\_change

`DDS_LongLong DDS_DataReaderProtocolStatus::duplicate_sample_bytes_change`

The change in `DDS_DataReaderProtocolStatus::duplicate_sample_bytes` (p. 638) since the last time the status was read.

Such samples can be redundant, out-of-order, etc. and are not stored in the reader's queue.

### 9.31.2.9 filtered\_sample\_count

`DDS_LongLong DDS_DataReaderProtocolStatus::filtered_sample_count`

**[DEPRECATED]**. See: `DDS_DataReaderCacheStatus::time_based_filter_dropped_sample_count` (p. 626) `DDS_↔_DataReaderCacheStatus::content_filter_dropped_sample_count` (p. 626)

### 9.31.2.10 filtered\_sample\_count\_change

`DDS_LongLong DDS_DataReaderProtocolStatus::filtered_sample_count_change`

**[DEPRECATED]**. See: `DDS_DataReaderCacheStatus::time_based_filter_dropped_sample_count` (p. 626) `DDS_↔_DataReaderCacheStatus::content_filter_dropped_sample_count` (p. 626)

### 9.31.2.11 filtered\_sample\_bytes

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::filtered\_sample\_bytes

[DEPRECATED]. See: [DDS\\_DataReaderCacheStatus::time\\_based\\_filter\\_dropped\\_sample\\_count](#) (p. 626) [DDS\\_DataReaderCacheStatus::content\\_filter\\_dropped\\_sample\\_count](#) (p. 626)

### 9.31.2.12 filtered\_sample\_bytes\_change

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::filtered\_sample\_bytes\_change

[DEPRECATED]. See: [DDS\\_DataReaderCacheStatus::time\\_based\\_filter\\_dropped\\_sample\\_count](#) (p. 626) [DDS\\_DataReaderCacheStatus::content\\_filter\\_dropped\\_sample\\_count](#) (p. 626)

### 9.31.2.13 received\_heartbeat\_count

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::received\_heartbeat\_count

The number of Heartbeats from a remote DataWriter received by a local DataReader.

### 9.31.2.14 received\_heartbeat\_count\_change

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::received\_heartbeat\_count\_change

The change in [DDS\\_DataReaderProtocolStatus::received\\_heartbeat\\_count](#) (p. 639) since the last time the status was read.

### 9.31.2.15 received\_heartbeat\_bytes

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::received\_heartbeat\_bytes

The number of bytes of Heartbeats from a remote DataWriter received by a local DataReader.

### 9.31.2.16 received\_heartbeat\_bytes\_change

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::received\_heartbeat\_bytes\_change

The change in **DDS\_DataReaderProtocolStatus::received\_heartbeat\_bytes** (p. 639) since the last time the status was read.

### 9.31.2.17 sent\_ack\_count

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::sent\_ack\_count

The number of ACKs sent from a local DataReader to a matching remote DataWriter.

### 9.31.2.18 sent\_ack\_count\_change

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::sent\_ack\_count\_change

The change in **DDS\_DataReaderProtocolStatus::sent\_ack\_count** (p. 640) since the last time the status was read.

### 9.31.2.19 sent\_ack\_bytes

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::sent\_ack\_bytes

The number of bytes of ACKs sent from a local DataReader to a matching remote DataWriter.

### 9.31.2.20 sent\_ack\_bytes\_change

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::sent\_ack\_bytes\_change

The change in **DDS\_DataReaderProtocolStatus::sent\_ack\_bytes** (p. 640) since the last time the status was read.

### 9.31.2.21 sent\_nack\_count

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::sent\_nack\_count

The number of NACKs sent from a local DataReader to a matching remote DataWriter.

### 9.31.2.22 sent\_nack\_count\_change

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::sent\_nack\_count\_change

The change in **DDS\_DataReaderProtocolStatus::sent\_nack\_count** (p. 640) since the last time the status was read.

### 9.31.2.23 sent\_nack\_bytes

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::sent\_nack\_bytes

The number of bytes of NACKs sent from a local DataReader to a matching remote DataWriter.

### 9.31.2.24 sent\_nack\_bytes\_change

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::sent\_nack\_bytes\_change

The change in **DDS\_DataReaderProtocolStatus::sent\_nack\_bytes** (p. 641) since the last time the status was read.

### 9.31.2.25 received\_gap\_count

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::received\_gap\_count

The number of GAPS received from remote DataWriter to this DataReader.

### 9.31.2.26 received\_gap\_count\_change

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::received\_gap\_count\_change

The change in **DDS\_DataReaderProtocolStatus::received\_gap\_count** (p. 641) since the last time the status was read.

### 9.31.2.27 received\_gap\_bytes

**DDS\_LongLong** DDS\_DataReaderProtocolStatus::received\_gap\_bytes

The number of bytes of GAPS received from remote DataWriter to this DataReader.

### 9.31.2.28 received\_gap\_bytes\_change

`DDS_LongLong DDS_DataReaderProtocolStatus::received_gap_bytes_change`

The change in `DDS_DataReaderProtocolStatus::received_gap_bytes` (p. 641) since the last time the status was read.

### 9.31.2.29 rejected\_sample\_count

`DDS_LongLong DDS_DataReaderProtocolStatus::rejected_sample_count`

The number of times a sample is rejected because it cannot be accepted by a reliable DataReader.

Samples rejected by a reliable DataReader will be NACKed, and they will have to be resent by the DataWriter if they are still available in the DataWriter queue.

This counter will always be 0 when using `DDS_BEST_EFFORT_RELIABILITY_QOS` (p. 435).

### 9.31.2.30 rejected\_sample\_count\_change

`DDS_LongLong DDS_DataReaderProtocolStatus::rejected_sample_count_change`

The change in `DDS_DataReaderProtocolStatus::rejected_sample_count` (p. 642) since the last time the status was read.

This counter will always be 0 when using `DDS_BEST_EFFORT_RELIABILITY_QOS` (p. 435).

### 9.31.2.31 first\_available\_sample\_sequence\_number

`struct DDS_SequenceNumber_t DDS_DataReaderProtocolStatus::first_available_sample_sequence_number`

Sequence number of the first available sample in a matched DataWriters reliability queue.

Applicable only for reliable DataReaders, and when retrieving matched DataWriter statuses.

Updated upon receiving Heartbeat submessages from a matched reliable DataWriter.

### 9.31.2.32 last\_available\_sample\_sequence\_number

`struct DDS_SequenceNumber_t DDS_DataReaderProtocolStatus::last_available_sample_sequence_number`

Sequence number of the last available sample in a matched Datawriter's reliability queue.

Applicable only for reliable DataReaders, and when retrieving matched DataWriter statuses.

Updated upon receiving Heartbeat submessages from a matched reliable DataWriter.



### 9.31.2.33 last\_committed\_sample\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_DataReaderProtocolStatus::last_committed_sample_sequence_number
```

Sequence number of the newest sample received from the matched DataWriter committed to the DataReader's queue.

Applicable only when retrieving matched DataWriter statuses.

For best-effort DataReaders, this is the sequence number of the latest sample received.

For reliable DataReaders, this is the sequence number of the latest sample that is available to be read or taken from the DataReader's queue.

### 9.31.2.34 uncommitted\_sample\_count

```
DDS_Long DDS_DataReaderProtocolStatus::uncommitted_sample_count
```

Number of received samples that are not yet available to be read or taken, due to being received out of order.

Applicable only when retrieving matched DataWriter statuses.

### 9.31.2.35 out\_of\_range\_rejected\_sample\_count

```
DDS_LongLong DDS_DataReaderProtocolStatus::out_of_range_rejected_sample_count
```

The number of samples dropped by the DataReader due to received window is full and the sample is out-of-order.

When using **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435); if the DataReader received samples out-of-order, they are stored internally until the missing samples are received. The number of out-of-order samples that the DataReader can keep is set by **DDS\_RtpsReliableReaderProtocol\_t::receive\_window\_size** (p. 1059). When the received window is full any out-of-order sample received will be dropped.

### 9.31.2.36 received\_fragment\_count

```
DDS_LongLong DDS_DataReaderProtocolStatus::received_fragment_count
```

The number of DATA\_FRAG messages that have been received by this DataReader.

This statistic is incremented upon the receipt of each DATA\_FRAG message. Fragments from duplicate samples do not count towards this statistic. Applicable only when data is fragmented.

### 9.31.2.37 dropped\_fragment\_count

```
DDS_LongLong DDS_DataReaderProtocolStatus::dropped_fragment_count
```

The number of DATA\_FRAG messages that have been dropped by a DataReader.

This statistic does not include malformed fragments. Applicable only when data is fragmented.

### 9.31.2.38 reassembled\_sample\_count

`DDS_LongLong DDS_DataReaderProtocolStatus::reassembled_sample_count`

The number of fragmented samples that have been reassembled by a DataReader.

This statistic is incremented when all of the fragments which are required to reassemble an entire sample have been received. Applicable only when data is fragmented.

### 9.31.2.39 sent\_nack\_fragment\_count

`DDS_LongLong DDS_DataReaderProtocolStatus::sent_nack_fragment_count`

The number of NACK fragments that have been sent from a DataReader to a DataWriter.

NACK FRAG RTPS messages are sent when large data is used in conjunction with reliable communication. They have the same properties as NACK messages, but instead of applying to samples, they apply to fragments. Applicable only when data is fragmented.

### 9.31.2.40 sent\_nack\_fragment\_bytes

`DDS_LongLong DDS_DataReaderProtocolStatus::sent_nack_fragment_bytes`

The number of NACK fragment bytes that have been sent from a DataReader to a DataWriter.

NACK FRAG RTPS messages are sent when large data is used in conjunction with reliable communication. They have the same properties as NACK messages, but instead of applying to samples, they apply to fragments. Applicable only when data is fragmented.

## 9.32 DDS\_DataReaderQos Struct Reference

QoS policies supported by a `DDSDataReader` (p. 1288) entity.

## Public Member Functions

- bool **operator==** (const **DDS\_DataReaderQos** &r) const  
*Compares two DataReaderQos objects for equality.*
- bool **operator!=** (const **DDS\_DataReaderQos** &r) const  
*Compares two DataReaderQos objects for inequality.*
- **DDS\_ReturnCode\_t print** () const  
*Prints this DDS\_DataReaderQos (p. 644) to stdout.*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
*Obtains a string representation of this DDS\_DataReaderQos (p. 644).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DataReaderQos** &base) const  
*Obtains a string representation of this DDS\_DataReaderQos (p. 644).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this DDS\_DataReaderQos (p. 644).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DataReaderQos** &base, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this DDS\_DataReaderQos (p. 644).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const  
*Obtains a string representation of this DDS\_DataReaderQos (p. 644).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this DDS\_DataReaderQos (p. 644).*

## Public Attributes

- struct **DDS\_DurabilityQosPolicy durability**  
*Durability policy, **DURABILITY** (p. 398).*
- struct **DDS\_DeadlineQosPolicy deadline**  
*Deadline policy, **DEADLINE** (p. 385).*
- struct **DDS\_LatencyBudgetQosPolicy latency\_budget**  
*Latency budget policy, **LATENCY\_BUDGET** (p. 407).*
- struct **DDS\_LivelinessQosPolicy liveliness**  
*Liveliness policy, **LIVELINESS** (p. 409).*
- struct **DDS\_ReliabilityQosPolicy reliability**  
*Reliability policy, **RELIABILITY** (p. 433).*
- struct **DDS\_DestinationOrderQosPolicy destination\_order**  
*Destination order policy, **DESTINATION\_ORDER** (p. 386).*
- struct **DDS\_HistoryQosPolicy history**  
*History policy, **HISTORY** (p. 405).*
- struct **DDS\_ResourceLimitsQosPolicy resource\_limits**  
*Resource limits policy, **RESOURCE\_LIMITS** (p. 437).*
- struct **DDS\_UserDataQosPolicy user\_data**  
*User data policy, **USER\_DATA** (p. 455).*
- struct **DDS\_OwnershipQosPolicy ownership**

- Ownership policy, **OWNERSHIP** (p. 414).*
- struct **DDS\_TimeBasedFilterQosPolicy** `time_based_filter`
  - Time-based filter policy, **TIME\_BASED\_FILTER** (p. 440).*
- struct **DDS\_ReaderDataLifecycleQosPolicy** `reader_data_lifecycle`
  - Reader data lifecycle policy, **READER\_DATA\_LIFECYCLE** (p. 432).*
- struct **DDS\_DataRepresentationQosPolicy** `representation`
  - Data representation policy, **DATA\_REPRESENTATION** (p. 369).*
- struct **DDS\_TypeConsistencyEnforcementQosPolicy** `type_consistency`
  - Type consistency enforcement policy, **TYPE\_CONSISTENCY\_ENFORCEMENT** (p. 451).*
- **DDS\_DataTagQosPolicy** `data_tags`
  - DataTag policy, **DATA\_TAG** (p. 376).*
- struct **DDS\_DataReaderResourceLimitsQosPolicy** `reader_resource_limits`
  - <<extension>> (p. 237) **DDSDataReader** (p. 1288) resource limits policy, **DATA\_READER\_RESOURCE\_LIMITS** (p. 367). This policy is an extension to the DDS standard.*
- struct **DDS\_DataReaderProtocolQosPolicy** `protocol`
  - <<extension>> (p. 237) **DDSDataReader** (p. 1288) protocol policy, **DATA\_READER\_PROTOCOL** (p. 366)*
- struct **DDS\_TransportSelectionQosPolicy** `transport_selection`
  - <<extension>> (p. 237) Transport selection policy, **TRANSPORT\_SELECTION** (p. 450).*
- struct **DDS\_TransportUnicastQosPolicy** `unicast`
  - <<extension>> (p. 237) Unicast transport policy, **TRANSPORT\_UNICAST** (p. 451).*
- struct **DDS\_TransportMulticastQosPolicy** `multicast`
  - <<extension>> (p. 237) Multicast transport policy, **TRANSPORT\_MULTICAST** (p. 447).*
- struct **DDS\_PropertyQosPolicy** `property`
  - <<extension>> (p. 237) Property policy, **PROPERTY** (p. 419). See also *Property Reference Guide*.*
- struct **DDS\_ServiceQosPolicy** `service`
  - <<extension>> (p. 237) Service policy, **SERVICE** (p. 438).*
- struct **DDS\_AvailabilityQosPolicy** `availability`
  - <<extension>> (p. 237) Availability policy, **AVAILABILITY** (p. 364).*
- struct **DDS\_EntityNameQosPolicy** `subscription_name`
  - <<extension>> (p. 237) EntityName policy, **ENTITY\_NAME** (p. 403).*
- struct **DDS\_TransportPriorityQosPolicy** `transport_priority`
  - Transport priority policy, **TRANSPORT\_PRIORITY** (p. 449).*
- struct **DDS\_TypeSupportQosPolicy** `type_support`
  - <<extension>> (p. 237) type support data, **TYPESUPPORT** (p. 453).*

### 9.32.1 Detailed Description

QoS policies supported by a **DDSDataReader** (p. 1288) entity.

You must set certain members in a consistent manner:

**DDS\_DataReaderQos::deadline** (p. 648) .period >= **DDS\_DataReaderQos::time\_based\_filter** (p. 650) .minimum↔  
\_separation

**DDS\_DataReaderQos::history** (p. 649) .depth <= **DDS\_DataReaderQos::resource\_limits** (p. 649) .max\_samples↔  
\_per\_instance

**DDS\_DataReaderQos::resource\_limits** (p. 649) .max\_samples\_per\_instance <= **DDS\_DataReaderQos::resource\_limits** (p. 649) .max\_samples **DDS\_DataReaderQos::resource\_limits** (p. 649) .initial\_samples <= **DDS\_DataReaderQos::resource\_limits** (p. 649) .max\_samples

**DDS\_DataReaderQos::resource\_limits** (p. 649) .initial\_instances <= **DDS\_DataReaderQos::resource\_limits** (p. 649) .max\_instances

**DDS\_DataReaderQos::reader\_resource\_limits** (p. 650) .initial\_remote\_writers\_per\_instance <= **DDS\_DataReaderQos::reader\_resource\_limits** (p. 650) .max\_remote\_writers\_per\_instance

**DDS\_DataReaderQos::reader\_resource\_limits** (p. 650) .initial\_infos <= **DDS\_DataReaderQos::reader\_resource\_limits** (p. 650) .max\_infos

**DDS\_DataReaderQos::reader\_resource\_limits** (p. 650) .max\_remote\_writers\_per\_instance <= **DDS\_DataReaderQos::reader\_resource\_limits** (p. 650) .max\_remote\_writers

**DDS\_DataReaderQos::reader\_resource\_limits** (p. 650) .max\_samples\_per\_remote\_writer <= **DDS\_DataReaderQos::resource\_limits** (p. 649) .max\_samples

length of **DDS\_DataReaderQos::user\_data** (p. 649) .value <= **DDS\_DomainParticipantQos::resource\_limits** (p. 744) .reader\_user\_data\_max\_length

If any of the above are not true, **DDSDataReader::set\_qos** (p. 1306) and **DDSDataReader::set\_qos\_with\_profile** (p. 1307) will fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337) and **DDSSubscriber::create\_datareader** (p. 1599) will return NULL.

## 9.32.2 Member Function Documentation

### 9.32.2.1 operator==( )

```
bool DDS_DataReaderQos::operator==(
    const DDS_DataReaderQos & r ) const [inline]
```

Compares two DataReaderQos objects for equality.

See also

**DDS\_DataReaderQos\_equals** (p. 142)

References **DDS\_DataReaderQos\_equals()**.

### 9.32.2.2 operator"!=(())

```
bool DDS_DataReaderQos::operator!=(  
    const DDS_DataReaderQos & r ) const [inline]
```

Compares two DataReaderQos objects for inequality.

See also

**DDS\_DataReaderQos\_equals** (p. 142)

References **DDS\_DataReaderQos\_equals()**.

## 9.32.3 Member Data Documentation

### 9.32.3.1 durability

```
struct DDS_DurabilityQosPolicy DDS_DataReaderQos::durability
```

Durability policy, **DURABILITY** (p. 398).

### 9.32.3.2 deadline

```
struct DDS_DeadlineQosPolicy DDS_DataReaderQos::deadline
```

Deadline policy, **DEADLINE** (p. 385).

### 9.32.3.3 latency\_budget

```
struct DDS_LatencyBudgetQosPolicy DDS_DataReaderQos::latency_budget
```

Latency budget policy, **LATENCY\_BUDGET** (p. 407).

#### 9.32.3.4 liveliness

```
struct DDS_LivelinessQosPolicy DDS_DataReaderQos::liveliness
```

Liveliness policy, **LIVELINESS** (p. 409).

#### 9.32.3.5 reliability

```
struct DDS_ReliabilityQosPolicy DDS_DataReaderQos::reliability
```

Reliability policy, **RELIABILITY** (p. 433).

#### 9.32.3.6 destination\_order

```
struct DDS_DestinationOrderQosPolicy DDS_DataReaderQos::destination_order
```

Destination order policy, **DESTINATION\_ORDER** (p. 386).

#### 9.32.3.7 history

```
struct DDS_HistoryQosPolicy DDS_DataReaderQos::history
```

History policy, **HISTORY** (p. 405).

#### 9.32.3.8 resource\_limits

```
struct DDS_ResourceLimitsQosPolicy DDS_DataReaderQos::resource_limits
```

Resource limits policy, **RESOURCE\_LIMITS** (p. 437).

#### 9.32.3.9 user\_data

```
struct DDS_UserDataQosPolicy DDS_DataReaderQos::user_data
```

User data policy, **USER\_DATA** (p. 455).

### 9.32.3.10 ownership

```
struct DDS_OwnershipQosPolicy DDS_DataReaderQos::ownership
```

Ownership policy, **OWNERSHIP** (p. 414).

### 9.32.3.11 time\_based\_filter

```
struct DDS_TimeBasedFilterQosPolicy DDS_DataReaderQos::time_based_filter
```

Time-based filter policy, **TIME\_BASED\_FILTER** (p. 440).

### 9.32.3.12 reader\_data\_lifecycle

```
struct DDS_ReaderDataLifecycleQosPolicy DDS_DataReaderQos::reader_data_lifecycle
```

Reader data lifecycle policy, **READER\_DATA\_LIFECYCLE** (p. 432).

### 9.32.3.13 representation

```
struct DDS_DataRepresentationQosPolicy DDS_DataReaderQos::representation
```

Data representation policy, **DATA\_REPRESENTATION** (p. 369).

### 9.32.3.14 type\_consistency

```
struct DDS_TypeConsistencyEnforcementQosPolicy DDS_DataReaderQos::type_consistency
```

Type consistency enforcement policy, **TYPE\_CONSISTENCY\_ENFORCEMENT** (p. 451).

### 9.32.3.15 data\_tags

```
DDS_DataTagQosPolicy DDS_DataReaderQos::data_tags
```

DataTag policy, **DATA\_TAG** (p. 376).



### 9.32.3.16 reader\_resource\_limits

```
struct DDS_DataReaderResourceLimitsQosPolicy DDS_DataReaderQos::reader_resource_limits
```

<<*extension*>> (p. 237) **DDSDataReader** (p. 1288) resource limits policy, **DATA\_READER\_RESOURCE\_LIMITS** (p. 367). This policy is an extension to the DDS standard.

### 9.32.3.17 protocol

```
struct DDS_DataReaderProtocolQosPolicy DDS_DataReaderQos::protocol
```

<<*extension*>> (p. 237) **DDSDataReader** (p. 1288) protocol policy, **DATA\_READER\_PROTOCOL** (p. 366)

### 9.32.3.18 transport\_selection

```
struct DDS_TransportSelectionQosPolicy DDS_DataReaderQos::transport_selection
```

<<*extension*>> (p. 237) Transport selection policy, **TRANSPORT\_SELECTION** (p. 450).

Specifies the transports available for use by the **DDSDataReader** (p. 1288).

### 9.32.3.19 unicast

```
struct DDS_TransportUnicastQosPolicy DDS_DataReaderQos::unicast
```

<<*extension*>> (p. 237) Unicast transport policy, **TRANSPORT\_UNICAST** (p. 451).

Specifies the unicast transport interfaces and ports on which **messages** can be received.

The unicast interfaces are used to receive messages from **DDSDataWriter** (p. 1321) entities in the domain.

### 9.32.3.20 multicast

```
struct DDS_TransportMulticastQosPolicy DDS_DataReaderQos::multicast
```

<<*extension*>> (p. 237) Multicast transport policy, **TRANSPORT\_MULTICAST** (p. 447).

Specifies the multicast group addresses and ports on which **messages** can be received.

The multicast addresses are used to receive messages from **DDSDataWriter** (p. 1321) entities in the domain.

### 9.32.3.21 property

```
struct DDS_PropertyQosPolicy DDS_DataReaderQos::property
```

<<*extension*>> (p. 237) Property policy, **PROPERTY** (p. 419). See also [Property Reference Guide](#).

### 9.32.3.22 service

```
struct DDS_ServiceQosPolicy DDS_DataReaderQos::service
```

<<*extension*>> (p. 237) Service policy, **SERVICE** (p. 438).

### 9.32.3.23 availability

```
struct DDS_AvailabilityQosPolicy DDS_DataReaderQos::availability
```

<<*extension*>> (p. 237) Availability policy, **AVAILABILITY** (p. 364).

### 9.32.3.24 subscription\_name

```
struct DDS_EntityNameQosPolicy DDS_DataReaderQos::subscription_name
```

<<*extension*>> (p. 237) EntityName policy, **ENTITY\_NAME** (p. 403).

### 9.32.3.25 transport\_priority

```
struct DDS_TransportPriorityQosPolicy DDS_DataReaderQos::transport_priority
```

Transport priority policy, **TRANSPORT\_PRIORITY** (p. 449).

### 9.32.3.26 type\_support

```
struct DDS_TypeSupportQosPolicy DDS_DataReaderQos::type_support
```

<<*extension*>> (p. 237) type support data, **TYPESUPPORT** (p. 453).

Optional value that is passed to a type plugin's `on_endpoint_attached` and `deserialization` functions.

## 9.33 DDS\_DataReaderResourceLimitsInstanceReplacementSettings Struct Reference

Instance replacement kind applied to each instance state.

### Public Attributes

- **DDS\_DataReaderInstanceRemovalKind** `alive_instance_removal`  
*Removal kind applied to alive (`DDS_ALIVE_INSTANCE_STATE` (p. 161)) instances.*
- **DDS\_DataReaderInstanceRemovalKind** `disposed_instance_removal`  
*Removal kind applied to disposed (`DDS_NOT_ALIVE_DISPOSED_INSTANCE_STATE` (p. 161)) instances.*
- **DDS\_DataReaderInstanceRemovalKind** `no_writers_instance_removal`  
*Removal kind applied to fully-unregistered (`DDS_NOT_ALIVE_NO_WRITERS_INSTANCE_STATE` (p. 161)) instances.*

### 9.33.1 Detailed Description

Instance replacement kind applied to each instance state.

[default]

- `DDS_DataReaderResourceLimitsInstanceReplacementSettings::alive_instance_removal` (p. 653) = `DDS_NO_INSTANCE_REMOVAL` (p. 368)
- `DDS_DataReaderResourceLimitsInstanceReplacementSettings::disposed_instance_removal` (p. 653) = `DDS_EMPTY_INSTANCE_REMOVAL` (p. 368)
- `DDS_DataReaderResourceLimitsInstanceReplacementSettings::no_writers_instance_removal` (p. 654) = `DDS_EMPTY_INSTANCE_REMOVAL` (p. 368)

See also

`DDS_DataReaderResourceLimitsQosPolicy::instance_replacement` (p. 666)

### 9.33.2 Member Data Documentation

#### 9.33.2.1 `alive_instance_removal`

`DDS_DataReaderInstanceRemovalKind` `DDS_DataReaderResourceLimitsInstanceReplacementSettings::alive_instance_removal`

Removal kind applied to alive (`DDS_ALIVE_INSTANCE_STATE` (p. 161)) instances.

[default] `DDS_NO_INSTANCE_REMOVAL` (p. 368)

### 9.33.2.2 disposed\_instance\_removal

`DDS_DataReaderInstanceRemovalKind DDS_DataReaderResourceLimitsInstanceReplacementSettings::disposed_instance_removal`

Removal kind applied to disposed (`DDS_NOT_ALIVE_DISPOSED_INSTANCE_STATE` (p. 161)) instances.

[default] `DDS_EMPTY_INSTANCE_REMOVAL` (p. 368)

### 9.33.2.3 no\_writers\_instance\_removal

`DDS_DataReaderInstanceRemovalKind DDS_DataReaderResourceLimitsInstanceReplacementSettings::no_writers_instance_removal`

Removal kind applied to fully-unregistered (`DDS_NOT_ALIVE_NO_WRITERS_INSTANCE_STATE` (p. 161)) instances.

[default] `DDS_EMPTY_INSTANCE_REMOVAL` (p. 368)

## 9.34 DDS\_DataReaderResourceLimitsQosPolicy Struct Reference

Various settings that configure how a `DDSDataReader` (p. 1288) allocates and uses physical memory for internal resources.

### Public Attributes

- **DDS\_Long max\_remote\_writers**  
*The maximum number of remote writers from which a `DDSDataReader` (p. 1288) may read, including all instances.*
- **DDS\_Long max\_remote\_writers\_per\_instance**  
*The maximum number of remote writers from which a `DDSDataReader` (p. 1288) may read a single instance.*
- **DDS\_Long max\_samples\_per\_remote\_writer**  
*The maximum number of out-of-order samples from a given remote `DDSDataWriter` (p. 1321) that a `DDSDataReader` (p. 1288) may store when maintaining a reliable connection to the `DDSDataWriter` (p. 1321).*
- **DDS\_Long max\_infos**  
*The maximum number of info units that a `DDSDataReader` (p. 1288) can use to store `DDS_SampleInfo` (p. 1082).*
- **DDS\_Long initial\_remote\_writers**  
*The initial number of remote writers from which a `DDSDataReader` (p. 1288) may read, including all instances.*
- **DDS\_Long initial\_remote\_writers\_per\_instance**  
*The initial number of remote writers from which a `DDSDataReader` (p. 1288) may read a single instance.*
- **DDS\_Long initial\_infos**  
*The initial number of info units that a `DDSDataReader` (p. 1288) can have, which are used to store `DDS_SampleInfo` (p. 1082).*
- **DDS\_Long initial\_outstanding\_reads**  
*The initial number of outstanding calls to read/take (or one of their variants) on the same `DDSDataReader` (p. 1288) for which memory has not been returned by calling `FooDataReader::return_loan` (p. 1672).*
- **DDS\_Long max\_outstanding\_reads**

The maximum number of outstanding read/take calls (or one of their variants) on the same **DDSDataReader** (p. 1288) for which memory has not been returned by calling **FooDataReader::return\_loan** (p. 1672).

- **DDS\_Long max\_samples\_per\_read**  
The maximum number of data samples that the application can receive from the middleware in a single call to **FooDataReader::read** (p. 1651) or **FooDataReader::take** (p. 1652). If more data exists in the middleware, the application will need to issue multiple read/take calls.
- **DDS\_Boolean disable\_fragmentation\_support**  
Determines whether the **DDSDataReader** (p. 1288) can receive fragmented samples.
- **DDS\_Long max\_fragmented\_samples**  
The maximum number of samples for which the **DDSDataReader** (p. 1288) may store fragments at a given point in time.
- **DDS\_Long initial\_fragmented\_samples**  
The initial number of samples for which a **DDSDataReader** (p. 1288) may store fragments.
- **DDS\_Long max\_fragmented\_samples\_per\_remote\_writer**  
The maximum number of samples per remote writer for which a **DDSDataReader** (p. 1288) may store fragments.
- **DDS\_Long max\_fragments\_per\_sample**  
Maximum number of fragments for a single sample.
- **DDS\_Boolean dynamically\_allocate\_fragmented\_samples**  
Determines whether the **DDSDataReader** (p. 1288) pre-allocates storage for storing fragmented samples.
- **DDS\_Long max\_total\_instances**  
Maximum number of instances for which a DataReader will keep state.
- **DDS\_Long max\_remote\_virtual\_writers**  
The maximum number of remote virtual writers from which a **DDSDataReader** (p. 1288) may read, including all instances.
- **DDS\_Long initial\_remote\_virtual\_writers**  
The initial number of remote virtual writers from which a **DDSDataReader** (p. 1288) may read, including all instances.
- **DDS\_Long max\_remote\_virtual\_writers\_per\_instance**  
The maximum number of virtual remote writers that can be associated with an instance.
- **DDS\_Long initial\_remote\_virtual\_writers\_per\_instance**  
The initial number of virtual remote writers per instance.
- **DDS\_Long max\_remote\_writers\_per\_sample**  
The maximum number of remote writers allowed to write the same sample.
- **DDS\_Long max\_query\_condition\_filters**  
The maximum number of query condition filters a reader is allowed.
- **DDS\_Long max\_app\_ack\_response\_length**  
Maximum length of application-level acknowledgment response data.
- **DDS\_Boolean keep\_minimum\_state\_for\_instances**  
Whether or not keep a minimum instance state for up to **DDS\_DataReaderResourceLimitsQosPolicy::max\_total\_instances** (p. 661).
- **DDS\_Long initial\_topic\_queries**  
The initial number of TopicQueries allocated by a **DDSDataReader** (p. 1288).
- **DDS\_Long max\_topic\_queries**  
The maximum number of active TopicQueries that a **DDSDataReader** (p. 1288) can create.
- struct **DDS\_AllocationSettings\_t shmem\_ref\_transfer\_mode\_attached\_segment\_allocation**  
Allocation resource for the shared memory segments attached by the **DDSDataReader** (p. 1288).
- struct **DDS\_DataReaderResourceLimitsInstanceReplacementSettings instance\_replacement**  
Sets the kind of instances allowed to be replaced for each instance state (**DDS\_InstanceStateKind** (p. 160)) when a DataReader reaches **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055).
- struct **DDS\_Duration\_t autopurge\_remote\_not\_alive\_writer\_delay**  
Maximum duration for which the **DDSDataReader** (p. 1288) will maintain information regarding a **DDSDataWriter** (p. 1321) once the **DDSDataWriter** (p. 1321) has become not alive.

### 9.34.1 Detailed Description

Various settings that configure how a **DDSDataReader** (p. 1288) allocates and uses physical memory for internal resources.

DataReaders must allocate internal structures to handle the maximum number of DataWriters that may connect to it, whether or not a **DDSDataReader** (p. 1288) handles data fragmentation and how many data fragments that it may handle (for data samples larger than the MTU of the underlying network transport), how many simultaneous outstanding loans of internal memory holding data samples can be provided to user code, as well as others.

Most of these internal structures start at an initial size and, by default, will grow as needed by dynamically allocating additional memory. You may set fixed, maximum sizes for these internal structures if you want to bound the amount of memory that can be used by a **DDSDataReader** (p. 1288). By setting the initial size to the maximum size, you will prevent RTI Connext from dynamically allocating any memory after the creation of the **DDSDataReader** (p. 1288).

This QoS policy is an extension to the DDS standard.

Entity:

**DDSDataReader** (p. 1288)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.34.2 Member Data Documentation

#### 9.34.2.1 max\_remote\_writers

```
DDS_Long DDS_DataReaderResourceLimitsQosPolicy::max_remote_writers
```

The maximum number of remote writers from which a **DDSDataReader** (p. 1288) may read, including all instances.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\geq$  initial\_remote\_writers,  $\geq$  max\_remote\_writers\_per\_instance

For unkeyed types, this value has to be equal to max\_remote\_writers\_per\_instance if max\_remote\_writers\_per\_instance is not equal to **DDS\_LENGTH\_UNLIMITED** (p. 438).

Note: For efficiency, set max\_remote\_writers  $\geq$  **DDS\_DataReaderResourceLimitsQosPolicy::max\_remote\_writers\_per\_instance** (p. 656).

### 9.34.2.2 max\_remote\_writers\_per\_instance

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::max\_remote\_writers\_per\_instance

The maximum number of remote writers from which a **DDSDataReader** (p. 1288) may read a single instance.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1024] or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\leq$  max\_remote\_writers or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\geq$  initial\_remote\_writers\_per\_instance

For unkeyed types, this value has to be equal to max\_remote\_writers if it is not **DDS\_LENGTH\_UNLIMITED** (p. 438).

Note: For efficiency, set max\_remote\_writers\_per\_instance  $\leq$  **DDS\_DataReaderResourceLimitsQosPolicy::max\_remote\_writers** (p. 656)

### 9.34.2.3 max\_samples\_per\_remote\_writer

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::max\_samples\_per\_remote\_writer

The maximum number of out-of-order samples from a given remote **DDSDataWriter** (p. 1321) that a **DDSDataReader** (p. 1288) may store when maintaining a reliable connection to the **DDSDataWriter** (p. 1321).

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 100 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\leq$  **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055)

### 9.34.2.4 max\_infos

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::max\_infos

The maximum number of info units that a **DDSDataReader** (p. 1288) can use to store **DDS\_SampleInfo** (p. 1082).

When read/take is called on a DataReader, the DataReader passes a sequence of data samples and an associated sample info sequence. The sample info sequence contains additional information for each data sample.

max\_infos determines the resources allocated for storing sample info. This memory is loaned to the application when passing a sample info sequence.

Note that sample info is a snapshot, generated when read/take is called.

max\_infos should not be less than max\_samples.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\geq$  initial\_infos

### 9.34.2.5 initial\_remote\_writers

`DDS_Long DDS_DataReaderResourceLimitsQosPolicy::initial_remote_writers`

The initial number of remote writers from which a **DDSDataReader** (p. 1288) may read, including all instances.

**[default]** 2

**[range]** [1, 1 million], <= max\_remote\_writers

For unkeyed types this value has to be equal to initial\_remote\_writers\_per\_instance.

Note: For efficiency, set initial\_remote\_writers >= **DDS\_DataReaderResourceLimitsQosPolicy::initial\_remote\_writers\_per\_instance** (p. 658).

### 9.34.2.6 initial\_remote\_writers\_per\_instance

`DDS_Long DDS_DataReaderResourceLimitsQosPolicy::initial_remote_writers_per_instance`

The initial number of remote writers from which a **DDSDataReader** (p. 1288) may read a single instance.

**[default]** 2

**[range]** [1,1024], <= max\_remote\_writers\_per\_instance

For unkeyed types this value has to be equal to initial\_remote\_writers.

Note: For efficiency, set initial\_remote\_writers\_per\_instance <= **DDS\_DataReaderResourceLimitsQosPolicy::initial\_remote\_writers** (p. 657).

### 9.34.2.7 initial\_infos

`DDS_Long DDS_DataReaderResourceLimitsQosPolicy::initial_infos`

The initial number of info units that a **DDSDataReader** (p. 1288) can have, which are used to store **DDS\_SampleInfo** (p. 1082).

**[default]** 32

**[range]** [1,1 million], <= max\_infos



### 9.34.2.8 initial\_outstanding\_reads

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::initial\_outstanding\_reads

The initial number of outstanding calls to read/take (or one of their variants) on the same **DDSDataReader** (p. 1288) for which memory has not been returned by calling **FooDataReader::return\_loan** (p. 1672).

**[default]** 2

**[range]** [1, 65536], <= max\_outstanding\_reads

### 9.34.2.9 max\_outstanding\_reads

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::max\_outstanding\_reads

The maximum number of outstanding read/take calls (or one of their variants) on the same **DDSDataReader** (p. 1288) for which memory has not been returned by calling **FooDataReader::return\_loan** (p. 1672).

**[default]** DDS\_LENGTH\_UNLIMITED (p. 438)

**[range]** [1, 65536] or DDS\_LENGTH\_UNLIMITED (p. 438), >= initial\_outstanding\_reads

### 9.34.2.10 max\_samples\_per\_read

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::max\_samples\_per\_read

The maximum number of data samples that the application can receive from the middleware in a single call to **FooDataReader::read** (p. 1651) or **FooDataReader::take** (p. 1652). If more data exists in the middleware, the application will need to issue multiple read/take calls.

When reading data using listeners, the expected number of samples available for delivery in a single `take` call is typically small: usually just one, in the case of unbatched data, or the number of samples in a single batch, in the case of batched data. (See **DDS\_BatchQosPolicy** (p. 600) for more information about this feature.) When polling for data or using a **DDSWaitSet** (p. 1629), however, multiple samples (or batches) could be retrieved at once, depending on the data rate.

A larger value for this parameter makes the API simpler to use at the expense of some additional memory consumption.

**[default]** 1024

**[range]** [1,65536]

### 9.34.2.11 disable\_fragmentation\_support

**DDS\_Boolean** DDS\_DataReaderResourceLimitsQosPolicy::disable\_fragmentation\_support

Determines whether the **DDSDataReader** (p. 1288) can receive fragmented samples.

When fragmentation support is not needed, disabling fragmentation support will save some memory resources.

**[default]** DDS\_BOOLEAN\_FALSE (p. 317)

### 9.34.2.12 max\_fragmented\_samples

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::max\_fragmented\_samples

The maximum number of samples for which the **DDSDataReader** (p. 1288) may store fragments at a given point in time.

At any given time, a **DDSDataReader** (p. 1288) may store fragments for up to `max_fragmented_samples` samples while waiting for the remaining fragments. These samples need not have consecutive sequence numbers and may have been sent by different **DDSDataWriter** (p. 1321) instances.

Once all fragments of a sample have been received, the sample is treated as a regular sample and becomes subject to standard QoS settings such as **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055).

The middleware will drop fragments if the `max_fragmented_samples` limit has been reached. For best-effort communication, the middleware will accept a fragment for a new sample, but drop the oldest fragmented sample from the same remote writer. For reliable communication, the middleware will drop fragments for any new samples until all fragments for at least one older sample from that writer have been received.

Only applies if **DDS\_DataReaderResourceLimitsQosPolicy::disable\_fragmentation\_support** (p. 659) is **DDS\_↔ BOOLEAN\_FALSE** (p. 317).

**[default]** 1024

**[range]** [1, 1 million]

### 9.34.2.13 initial\_fragmented\_samples

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::initial\_fragmented\_samples

The initial number of samples for which a **DDSDataReader** (p. 1288) may store fragments.

Only applies if **DDS\_DataReaderResourceLimitsQosPolicy::disable\_fragmentation\_support** (p. 659) is **DDS\_↔ BOOLEAN\_FALSE** (p. 317).

**[default]** 4

**[range]** [1,1024], <= max\_fragmented\_samples

### 9.34.2.14 max\_fragmented\_samples\_per\_remote\_writer

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::max\_fragmented\_samples\_per\_remote\_writer

The maximum number of samples per remote writer for which a **DDSDataReader** (p. 1288) may store fragments.

Logical limit so a single remote writer cannot consume all available resources.

Only applies if **DDS\_DataReaderResourceLimitsQosPolicy::disable\_fragmentation\_support** (p. 659) is **DDS\_↔ BOOLEAN\_FALSE** (p. 317).

**[default]** 256

**[range]** [1, 1 million], <= max\_fragmented\_samples

### 9.34.2.15 max\_fragments\_per\_sample

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::max\_fragments\_per\_sample

Maximum number of fragments for a single sample.

Only applies if **DDS\_DataReaderResourceLimitsQosPolicy::disable\_fragmentation\_support** (p. 659) is **DDS\_↔  
BOOLEAN\_FALSE** (p. 317).

[default] **DDS\_LENGTH\_UNLIMITED** (p. 438)

[range] [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.34.2.16 dynamically\_allocate\_fragmented\_samples

**DDS\_Boolean** DDS\_DataReaderResourceLimitsQosPolicy::dynamically\_allocate\_fragmented\_samples

Determines whether the **DDSDataReader** (p. 1288) pre-allocates storage for storing fragmented samples.

By default, the middleware does not allocate memory upfront, but instead allocates memory from the heap upon receiving the first fragment of a new sample. The amount of memory allocated equals the amount of memory needed to store all fragments in the sample. Once all fragments of a sample have been received, the sample is deserialized and stored in the regular receive queue. At that time, the dynamically allocated memory is freed again.

This QoS setting is useful for large, but variable-sized data types where upfront memory allocation for multiple samples based on the maximum possible sample size may be expensive. The main disadvantage of not pre-allocating memory is that one can no longer guarantee the middleware will have sufficient resources at runtime.

If `dynamically_allocate_fragmented_samples` is set to **DDS\_BOOLEAN\_FALSE** (p. 317), the middleware will allocate memory upfront for storing fragments for up to **DDS\_DataReaderResourceLimitsQosPolicy↔  
::initial\_fragmented\_samples** (p. 660) samples. This memory may grow up to **DDS\_DataReaderResourceLimits↔  
QosPolicy::max\_fragmented\_samples** (p. 659) if needed.

Only applies if **DDS\_DataReaderResourceLimitsQosPolicy::disable\_fragmentation\_support** (p. 659) is **DDS\_↔  
BOOLEAN\_FALSE** (p. 317).

[default] **DDS\_BOOLEAN\_TRUE** (p. 317)

### 9.34.2.17 max\_total\_instances

**DDS\_Long** `DDS_DataReaderResourceLimitsQosPolicy::max_total_instances`

Maximum number of instances for which a DataReader will keep state.

The maximum number of instances actively managed by a DataReader is determined by **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055).

These instances have associated DataWriters or samples in the DataReader's queue and are visible to the user through operations such as **FooDataReader::take** (p. 1652), **FooDataReader::read** (p. 1651), and **FooDataReader::get\_key\_value** (p. 1673).

The features Durable Reader State, MultiChannel DataWriters and RTI Persistence Service require RTI Connex to keep some internal state even for instances without DataWriters or samples in the DataReader's queue. The additional state is used to filter duplicate samples that could be coming from different DataWriter channels or from multiple executions of RTI Persistence Service.

The total maximum number of instances that will be managed by the middleware, including instances without associated DataWriters or samples, is determined by `max_total_instances`.

When a new instance is received, RTI Connex will check the resource limit **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055). If the limit is exceeded, RTI Connex will drop the sample with the reason `LOST_BY_INSTANCES_LIMIT`. If the limit is not exceeded, RTI Connex will check `max_total_instances`. If `max_total_instances` is exceeded, RTI Connex will replace an existing instance without DataWriters and samples with the new one. The application could receive duplicate samples for the replaced instance if it becomes alive again.

The `max_total_instances` limit is not used if **DDS\_DataReaderResourceLimitsQosPolicy::keep\_minimum\_state\_for\_instances** (p. 664) is false, and in that case should be left at the default value.

**[default]** `DDS_AUTO_MAX_TOTAL_INSTANCES` (p. 369)

**[range]** [1, 1 million] or `DDS_LENGTH_UNLIMITED` (p. 438) or `DDS_AUTO_MAX_TOTAL_INSTANCES` (p. 369),  $\geq$  **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055)

### 9.34.2.18 max\_remote\_virtual\_writers

**DDS\_Long** `DDS_DataReaderResourceLimitsQosPolicy::max_remote_virtual_writers`

The maximum number of remote virtual writers from which a **DDSDataReader** (p. 1288) may read, including all instances.

When **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) is set to **DDS\_GROUP\_PRESENTATION\_QOS** (p. 418), this value determines the maximum number of DataWriter groups that can be managed by the **DDSSubscriber** (p. 1592) containing this **DDSDataReader** (p. 1288).

Since the **DDSSubscriber** (p. 1592) may contain more than one **DDSDataReader** (p. 1288), only the setting of the first applies.

**[default]** `DDS_LENGTH_UNLIMITED` (p. 438)

**[range]** [1, 1 million] or `DDS_LENGTH_UNLIMITED` (p. 438),  $\geq$  `initial_remote_virtual_writers`,  $\geq$  `max_remote_virtual_writers_per_instance`

### 9.34.2.19 initial\_remote\_virtual\_writers

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::initial\_remote\_virtual\_writers

The initial number of remote virtual writers from which a **DDSDataReader** (p. 1288) may read, including all instances.

**[default]** 2

**[range]** [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438), <= max\_remote\_virtual\_writers

### 9.34.2.20 max\_remote\_virtual\_writers\_per\_instance

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::max\_remote\_virtual\_writers\_per\_instance

The maximum number of virtual remote writers that can be associated with an instance.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1024] or **DDS\_LENGTH\_UNLIMITED** (p. 438), >= initial\_remote\_virtual\_writers\_per\_instance

For unkeyed types, this value is ignored.

The features of Durable Reader State and MultiChannel DataWriters, and RTI Persistence Service require RTI Connex to keep some internal state per virtual writer and instance that is used to filter duplicate samples. These duplicate samples could be coming from different DataWriter channels or from multiple executions of RTI Persistence Service.

Once an association between a remote virtual writer and an instance is established, it is permanent – it will not disappear even if the physical writer incarnating the virtual writer is destroyed.

If max\_remote\_virtual\_writers\_per\_instance is exceeded for an instance, RTI Connex will not associate this instance with new virtual writers. Duplicates samples from these virtual writers will not be filtered on the reader.

If you are not using Durable Reader State, MultiChannel DataWriters or RTI Persistence Service in your system, you can set this property to 1 to optimize resources.

### 9.34.2.21 initial\_remote\_virtual\_writers\_per\_instance

**DDS\_Long** DDS\_DataReaderResourceLimitsQosPolicy::initial\_remote\_virtual\_writers\_per\_instance

The initial number of virtual remote writers per instance.

**[default]** 2

**[range]** [1, 1024], <= max\_remote\_virtual\_writers\_per\_instance

For unkeyed types, this value is ignored.

### 9.34.2.22 max\_remote\_writers\_per\_sample

`DDS_Long DDS_DataReaderResourceLimitsQosPolicy::max_remote_writers_per_sample`

The maximum number of remote writers allowed to write the same sample.

One scenario in which two DataWriters may write the same sample is Persistence Service. The DataReader may receive the same sample coming from the original DataWriter and from a Persistence Service DataWriter. **[default] 3**

**[range]** [1, 1024]

### 9.34.2.23 max\_query\_condition\_filters

`DDS_Long DDS_DataReaderResourceLimitsQosPolicy::max_query_condition_filters`

The maximum number of query condition filters a reader is allowed.

**[default]** 4

**[range]** [0, 32]

This value determines the maximum number of unique query condition content filters that a reader may create.

Each query condition content filter is comprised of both its `query_expression` and `query_parameters`. Two query conditions that have the same `query_expression` will require unique query condition filters if their `query_parameters` differ. Query conditions that differ only in their state masks will share the same query condition filter.

### 9.34.2.24 max\_app\_ack\_response\_length

`DDS_Long DDS_DataReaderResourceLimitsQosPolicy::max_app_ack_response_length`

Maximum length of application-level acknowledgment response data.

The maximum length of response data in an application-level acknowledgment.

When set to zero, no response data is sent with application-level acknowledgments.

**[default]** 1

**[range]** [0, 32768]

### 9.34.2.25 keep\_minimum\_state\_for\_instances

`DDS_Boolean` DDS\_DataReaderResourceLimitsQosPolicy::keep\_minimum\_state\_for\_instances

Whether or not keep a minimum instance state for up to `DDS_DataReaderResourceLimitsQosPolicy::max_total_instances` (p. 661).

The features Durable Reader State, multi-channel DataWriters, and Persistence Service require RTI Connext to keep some minimal internal state even for instances without DataWriters or DDS samples in the DataReader's queue, or that have been purged due to a dispose. The additional state is used to filter duplicate DDS samples that could be coming from different DataWriter channels or from multiple executions of Persistence Service. The total maximum number of instances that will be managed by the middleware, including instances without associated DataWriters or DDS samples or that have been purged due to a dispose, is determined by `DDS_DataReaderResourceLimitsQosPolicy::max_total_instances` (p. 661).

This additional state will only be kept for up to `max_total_instances` if this field is set to `DDS_BOOLEAN_TRUE` (p. 317), otherwise the additional state will not be kept for any instances.

The minimum state includes information such as the source timestamp of the last sample received by the instance and the last sequence number received from a virtual GUID.

[default] `DDS_BOOLEAN_TRUE` (p. 317)

### 9.34.2.26 initial\_topic\_queries

`DDS_Long` DDS\_DataReaderResourceLimitsQosPolicy::initial\_topic\_queries

The initial number of TopicQueries allocated by a `DDSDataReader` (p. 1288).

[default] 1

See also

`DDSTopicQuery` (p. 1627)

### 9.34.2.27 max\_topic\_queries

`DDS_Long` DDS\_DataReaderResourceLimitsQosPolicy::max\_topic\_queries

The maximum number of active TopicQueries that a `DDSDataReader` (p. 1288) can create.

Once this limit is reached, a `DDSDataReader` (p. 1288) can create more TopicQueries only if it deletes some of the previously created ones.

[default] `DDS_LENGTH_UNLIMITED` (p. 438)

See also

`DDSTopicQuery` (p. 1627)

### 9.34.2.28 shmем\_ref\_transfer\_mode\_attached\_segment\_allocation

```
struct DDS_AllocationSettings_t DDS_DataReaderResourceLimitsQosPolicy::shmем_ref_transfer_mode_↔
attached_segment_allocation
```

Allocation resource for the shared memory segments attached by the **DDSDataReader** (p. 1288).

The `max_count` does not limit the total number of shared memory segments used by the **DDSDataReader** (p. 1288). When this limit is hit, the **DDSDataReader** (p. 1288) will try to detach from a segment that doesn't contain any loaned samples and attach to a new segment. If samples are loaned from all attached segments, then the **DDSDataReader** (p. 1288) will fail to attach to the new segment. This scenario will result in a sample loss.

**[default]** `initial_count = DDS_AUTO_COUNT` (p. 397) (**DDS\_DataReaderResourceLimitsQosPolicy::initial\_↔remote\_writers** (p. 657)); `max_count = DDS_AUTO_COUNT` (p. 397) (**DDS\_DataReaderResourceLimitsQos\_↔Policy::max\_remote\_writers** (p. 656)); `incremental_count = DDS_AUTO_COUNT` (p. 397) (0 if `initial_count = max_↔count`; -1 otherwise);

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.34.2.29 instance\_replacement

```
struct DDS_DataReaderResourceLimitsInstanceReplacementSettings DDS_DataReaderResourceLimitsQos_↔
Policy::instance_replacement
```

Sets the kind of instances allowed to be replaced for each instance state (**DDS\_InstanceStateKind** (p. 160)) when a DataReader reaches **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055).

When **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055) is reached, a **DDSDataReader** (p. 1288) will try to make room for a new instance by attempting to reclaim an existing instance based on the instance replacement kinds specified by this field.

A DataReader can choose what kinds of instances can be replaced for each **DDS\_InstanceStateKind** (p. 160) separately. This means, for example, that a DataReader can choose to not allow replacing alive (**DDS\_ALIVE\_INSTANCE\_↔\_STATE** (p. 161)) instances but allow replacement of empty disposed (**DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_↔\_STATE** (p. 161)) instances.

Only instances whose states match the specified kinds are eligible to be replaced. In addition, there must be no outstanding loans on any of the samples belonging to the instance for it to be considered for replacement.

For all kinds, a **DDSDataReader** (p. 1288) will replace the least-recently-updated instance satisfying that kind. An instance is considered 'updated' when a valid sample or dispose sample is received and accepted for that instance. When using **DDS\_EXCLUSIVE\_OWNERSHIP\_QOS** (p. 415), only samples that are received from the owner of the instance will cause the instance to be considered updated. An instance is not considered updated when an unregister sample is received because the unregister message simply indicates that there is one less writer that has updates for the instance, not that the instance itself was updated.

If no replaceable instance exists, the sample for the new instance will be considered lost with lost reason **DDS\_LOST\_↔\_BY\_INSTANCES\_LIMIT** (p. 136) and the instance will not be asserted into the DataReader queue.

**[default]**

- **DDS\_DataReaderResourceLimitsInstanceReplacementSettings::alive\_instance\_removal** (p. 653) = **DDS\_↔\_NO\_INSTANCE\_REMOVAL** (p. 368)
- **DDS\_DataReaderResourceLimitsInstanceReplacementSettings::disposed\_instance\_removal** (p. 653) = **DDS\_EMPTY\_INSTANCE\_REMOVAL** (p. 368)
- **DDS\_DataReaderResourceLimitsInstanceReplacementSettings::no\_writers\_instance\_removal** (p. 654) = **DDS\_EMPTY\_INSTANCE\_REMOVAL** (p. 368)



See also

**DDS\_DataReaderResourceLimitsInstanceReplacementSettings** (p. 653)

### 9.34.2.30 autopurge\_remote\_not\_alive\_writer\_delay

```
struct DDS_Duration_t DDS_DataReaderResourceLimitsQosPolicy::autopurge_remote_not_alive_writer_↔
delay
```

Maximum duration for which the **DDSDataReader** (p. 1288) will maintain information regarding a **DDSDataWriter** (p. 1321) once the **DDSDataWriter** (p. 1321) has become not alive.

After this time elapses, the **DDSDataReader** (p. 1288) will purge all internal information regarding the not alive **DDSDataWriter** (p. 1321).

See also

**DDS\_LivelinessQosPolicy** (p. 936) for more information on when a **DDSDataWriter** (p. 1321) is considered not alive.

When set to **DDS\_DURATION\_AUTO** (p. 327), this parameter is set to 10 times the value of **DDS\_DiscoveryConfig**↔  
**QosPolicy::participant\_liveliness\_lease\_duration** (p. 714).

This QoS only applies when the **DDSDataReader** (p. 1288) is using **DDS\_RECOVER\_INSTANCE\_STATE**↔  
**CONSISTENCY** (p. 436) for the **DDS\_ReliabilityQosPolicy::instance\_state\_consistency\_kind** (p. 1044) QoS. When using **DDS\_RECOVER\_INSTANCE\_STATE\_CONSISTENCY** (p. 436), a **DDSDataReader** (p. 1288) keeps state about all **DDSDataWriter** (p. 1321) entities and the instances they were writing in order to be able to transition those instances back to their correct state if liveliness with the **DDSDataWriter** (p. 1321) is recovered. This can cause unbounded memory growth if that state is never purged and **DDSDataWriter** (p. 1321) entities continuously come and go in a system. This QoS avoids that unbounded memory growth by setting a time at which that state will be purged.

This QoS should be set such that it is longer than the longest period of time for which a **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) are expected to be disconnected and then reconnected in your system.

An alternative to using this QoS to purge the state is to set the **DDS\_DataReaderResourceLimitsQosPolicy::max**↔  
**\_remote\_writers** (p. 656) QoS to a finite value. If that QoS is set to a finite value and the number of alive + not alive **DDSDataWriter** (p. 1321) entities reaches the limit when a new **DDSDataWriter** (p. 1321) is discovered, the oldest not alive **DDSDataWriter** (p. 1321) will be replaced.

[default] **DDS\_DURATION\_AUTO** (p. 327)

[range] > 0 or **DDS\_DURATION\_AUTO** (p. 327)

## 9.35 DDS\_DataRepresentationIdSeq Struct Reference

Declares IDL sequence < **DDS\_DataRepresentationId\_t** (p. 370) >

### 9.35.1 Detailed Description

Declares IDL `sequence` < **DDS\_DataRepresentationId\_t** (p. 370) >

See also

**DDS\_DataRepresentationId\_t** (p. 370)

## 9.36 DDS\_DataRepresentationQosPolicy Struct Reference

This QoS policy contains a list of representation identifiers and compression settings used by **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) entities to negotiate which data representation and compression settings to use.

### Public Attributes

- struct **DDS\_DataRepresentationIdSeq** `value`  
*Sequence of representation identifiers.*
- struct **DDS\_CompressionSettings\_t** `compression_settings`  
<<*extension*>> (p. 237) *Structure that contains the compression settings.*

### 9.36.1 Detailed Description

This QoS policy contains a list of representation identifiers and compression settings used by **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) entities to negotiate which data representation and compression settings to use.

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Status:

**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_↔ STATUS** (p. 344)

Properties:

**RxO** (p. 360) = YES  
**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

See also

**DATA\_REPRESENTATION** (p. 369)

This policy has request-offer semantics for both representation and compression. For representation, a **DDSDataWriter** (p. 1321) may only offer a single representation. Attempting to put multiple representations in a **DDSDataWriter** (p. 1321) will result in **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337). A **DDSDataWriter** (p. 1321) will use its offered policy to communicate with its matched **DDSDataReader** (p. 1288) entities. A **DDSDataReader** (p. 1288) requests one or more representations. If a **DDSDataWriter** (p. 1321) offers a representation that is contained within the sequence of the **DDSDataReader** (p. 1288), the offer satisfies the request and the policies are compatible. Otherwise, they are incompatible.

When representations are specified in the **DDS\_TopicQos** (p. 1135), **DDSPublisher::copy\_from\_topic\_qos** (p. 1566) copies the first element of the sequence, and **DDSSubscriber::copy\_from\_topic\_qos** (p. 1608) copies the whole sequence.

For Compression, only the **DDS\_CompressionSettings\_t::compression\_ids** (p. 615) is propagated and a **DDSDataWriter** (p. 1321) may only offer a single compression id. Attempting to put multiple **compression\_ids** in a **DDSDataWriter** (p. 1321) will result in **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337).

A **DDSDataWriter** (p. 1321) will use its offered compression algorithm to compress data that it sends to its matched **DDSDataReader** (p. 1288) entities. A **DDSDataReader** (p. 1288) requests zero or more compression algorithms. If a **DDSDataWriter** (p. 1321) offers a representation that is contained within the algorithms requested by the **DDSDataReader** (p. 1288), the offer satisfies the request and the policies are compatible. Otherwise, they are incompatible.

When compression IDs are specified in the **DDS\_TopicQos** (p. 1135), **DDSPublisher::copy\_from\_topic\_qos** (p. 1566) copies a single compression ID (see **DDS\_CompressionSettings\_t::compression\_ids** (p. 615)), and **DDSSubscriber::copy\_from\_topic\_qos** (p. 1608) copies all of the **compression\_ids**.

## 9.36.2 Member Data Documentation

### 9.36.2.1 value

```
struct DDS_DataRepresentationIdSeq DDS_DataRepresentationQosPolicy::value
```

Sequence of representation identifiers.

**[default]** For **DDSTopic** (p. 1617), **DDSDataWriter** (p. 1321), and **DDSDataReader** (p. 1288), a list with one element: **DDS\_AUTO\_DATA\_REPRESENTATION** (p. 371).

Note

An empty sequence is equivalent to a list with one element: **DDS\_XCDR\_DATA\_REPRESENTATION** (p. 370).

### 9.36.2.2 compression\_settings

```
struct DDS_CompressionSettings_t DDS_DataRepresentationQosPolicy::compression_settings
```

<<*extension*>> (p. 237) Structure that contains the compression settings.

compression\_ids:

**[default]** The value depends on the entity

**DDSDataWriter** (p. 1321) and **DDSTopic** (p. 1617) are set to **DDS\_COMPRESSION\_ID\_MASK\_NONE** (p. 373)

**DDSDataReader** (p. 1288) **DDS\_COMPRESSION\_ID\_MASK\_ALL** (p. 373)

writer\_compression\_level:

**[default]** The value depends on the entity

**DDSDataWriter** (p. 1321) and **DDSTopic** (p. 1617) are set to **DDS\_COMPRESSION\_LEVEL\_DEFAULT** (p. 374)

**DDSDataReader** (p. 1288) NOT SUPPORTED

writer\_compression\_threshold:

**[default]** The value depends on the entity

**DDSDataWriter** (p. 1321) and **DDSTopic** (p. 1617) are set to **DDS\_COMPRESSION\_THRESHOLD\_DEFAULT** (p. 374)

**DDSDataReader** (p. 1288) NOT SUPPORTED

See also

**DDS\_CompressionSettings\_t** (p. 614)

## 9.37 DDS\_DataTags Struct Reference

Definition of **DDS\_DataTagQosPolicy** (p. 377).

### Public Attributes

- struct **DDS\_TagSeq tags**

*Sequence of data tags.*

### 9.37.1 Detailed Description

Definition of **DDS\_DataTagQosPolicy** (p. 377).

### 9.37.2 Member Data Documentation

### 9.37.2.1 tags

```
struct DDS_TagSeq DDS_DataTags::tags
```

Sequence of data tags.

**[default]** An empty list.

## 9.38 DDS\_DataWriterCacheStatus Struct Reference

<<**extension**>> (p. 237) The status of the DataWriter's cache. Provides information on cache related metrics such as the number of samples and instances in the DataWriter queue.

### Public Attributes

- **DDS\_LongLong sample\_count\_peak**  
*The highest value of `DDS_DataWriterCacheStatus::sample_count` (p. 672) over the lifetime of the DataWriter.*
- **DDS\_LongLong sample\_count**  
*The number of samples in the DataWriter's queue. This statistic includes meta-samples that represent the unregistration or disposal of an instance.*
- **DDS\_LongLong alive\_instance\_count**  
*The number of instances currently in the DataWriter's queue that have an `instance_state` equal to `DDS_ALIVE` ↔ `INSTANCE_STATE` (p. 161).*
- **DDS\_LongLong alive\_instance\_count\_peak**  
*The highest value of `DDS_DataWriterCacheStatus::alive_instance_count` (p. 672) over the lifetime of the DataWriter.*
- **DDS\_LongLong disposed\_instance\_count**  
*The number of instances currently in the DataWriter's queue that have an `instance_state` equal to `DDS_NOT_ALIVE` ↔ `DISPOSED_INSTANCE_STATE` (p. 161) (due to, for example, being disposed via the `FooDataWriter::dispose` (p. 1689) operation).*
- **DDS\_LongLong disposed\_instance\_count\_peak**  
*The highest value of `DDS_DataWriterCacheStatus::disposed_instance_count` (p. 672) over the lifetime of the DataWriter.*
- **DDS\_LongLong unregistered\_instance\_count**  
*The number of instances currently in the DataWriter's queue that the DataWriter has unregistered from via the `FooDataWriter::unregister_instance` (p. 1680) operation.*
- **DDS\_LongLong unregistered\_instance\_count\_peak**  
*The highest value of `DDS_DataWriterCacheStatus::unregistered_instance_count` (p. 673) over the lifetime of the DataWriter.*

### 9.38.1 Detailed Description

<<**extension**>> (p. 237) The status of the DataWriter's cache. Provides information on cache related metrics such as the number of samples and instances in the DataWriter queue.

Entity:

**DDSDataWriter** (p. 1321)

## 9.38.2 Member Data Documentation

### 9.38.2.1 sample\_count\_peak

**DDS\_LongLong** DDS\_DataWriterCacheStatus::sample\_count\_peak

The highest value of **DDS\_DataWriterCacheStatus::sample\_count** (p. 672) over the lifetime of the DataWriter.

### 9.38.2.2 sample\_count

**DDS\_LongLong** DDS\_DataWriterCacheStatus::sample\_count

The number of samples in the DataWriter's queue. This statistic includes meta-samples that represent the unregistration or disposal of an instance.

### 9.38.2.3 alive\_instance\_count

**DDS\_LongLong** DDS\_DataWriterCacheStatus::alive\_instance\_count

The number of instances currently in the DataWriter's queue that have an instance\_state equal to **DDS\_ALIVE\_↔INSTANCE\_STATE** (p. 161).

### 9.38.2.4 alive\_instance\_count\_peak

**DDS\_LongLong** DDS\_DataWriterCacheStatus::alive\_instance\_count\_peak

The highest value of **DDS\_DataWriterCacheStatus::alive\_instance\_count** (p. 672) over the lifetime of the DataWriter.

### 9.38.2.5 disposed\_instance\_count

**DDS\_LongLong** DDS\_DataWriterCacheStatus::disposed\_instance\_count

The number of instances currently in the DataWriter's queue that have an instance\_state equal to **DDS\_NOT\_↔ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) (due to, for example, being disposed via the **FooDataWriter::dispose** (p. 1689) operation).

### 9.38.2.6 disposed\_instance\_count\_peak

**DDS\_LongLong** DDS\_DataWriterCacheStatus::disposed\_instance\_count\_peak

The highest value of **DDS\_DataWriterCacheStatus::disposed\_instance\_count** (p. 672) over the lifetime of the DataWriter.

### 9.38.2.7 unregistered\_instance\_count

**DDS\_LongLong** DDS\_DataWriterCacheStatus::unregistered\_instance\_count

The number of instances currently in the DataWriter's queue that the DataWriter has unregistered from via the **FooDataWriter::unregister\_instance** (p. 1680) operation.

### 9.38.2.8 unregistered\_instance\_count\_peak

**DDS\_LongLong** DDS\_DataWriterCacheStatus::unregistered\_instance\_count\_peak

The highest value of **DDS\_DataWriterCacheStatus::unregistered\_instance\_count** (p. 673) over the lifetime of the DataWriter.

## 9.39 DDS\_DataWriterProtocolQosPolicy Struct Reference

Protocol that applies only to **DDSDataWriter** (p. 1321) instances.

### Public Attributes

- struct **DDS\_GUID\_t virtual\_guid**  
*The virtual GUID (Global Unique Identifier).*
- **DDS\_UnsignedLong rtps\_object\_id**  
*The RTPS Object ID.*
- **DDS\_Boolean push\_on\_write**  
*Whether to push sample out when write is called.*
- **DDS\_Boolean disable\_positive\_acks**  
*Controls whether or not the writer expects positive acknowledgements from matching readers.*
- **DDS\_Boolean disable\_inline\_keyhash**  
*Controls whether or not a keyhash is propagated on the wire with each sample.*
- **DDS\_Boolean serialize\_key\_with\_dispose**  
*Controls whether or not the serialized key is propagated on the wire with dispose samples.*
- **DDS\_Boolean propagate\_app\_ack\_with\_no\_response**  
*Controls whether or not a **DDSDataWriter** (p. 1321) receives **DDSDataWriterListener::on\_application\_acknowledgment** (p. 1349) notifications with an empty or invalid response.*
- struct **DDS\_RtpsReliableWriterProtocol\_t rtps\_reliable\_writer**  
*RTPS protocol-related configuration settings for the RTPS reliable writer associated with a **DDSDataWriter** (p. 1321). This parameter only has effect if both the writer and the matching reader are configured with **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) **DDS\_ReliabilityQosPolicyKind** (p. 434).*
- struct **DDS\_SequenceNumber\_t initial\_virtual\_sequence\_number**  
*Determines, the initial virtual sequence number for this DataWriter.*

### 9.39.1 Detailed Description

Protocol that applies only to **DDSDataWriter** (p. 1321) instances.

DDS has a standard protocol for packet (user and meta data) exchange between applications using DDS for communications. This QoS policy and **DDS\_DataWriterProtocolQosPolicy** (p. 673) give you control over configurable portions of the protocol, including the configuration of the reliable data delivery mechanism of the protocol on a per DataWriter or DataReader basis.

These configuration parameters control timing, timeouts, and give you the ability to tradeoff between speed of data loss detection and repair versus network and CPU bandwidth used to maintain reliability.

It is important to tune the reliability protocol (on a per **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) basis) to meet the requirements of the end-user application so that data can be sent between DataWriters and DataReaders in an efficient and optimal manner in the presence of data loss.

You can also use this QoS policy to control how RTI Connexr responds to "slow" reliable DataReaders or ones that disconnect or are otherwise lost. See **DDS\_ReliabilityQosPolicy** (p. 1041) for more information on the per-DataReader/↔ DataWriter reliability configuration. **DDS\_HistoryQosPolicy** (p. 919) and **DDS\_ResourceLimitsQosPolicy** (p. 1052) also play an important role in the DDS reliable protocol.

This QoS policy is an extension to the DDS standard.

Entity:

**DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.39.2 Member Data Documentation

#### 9.39.2.1 virtual\_guid

```
struct DDS_GUID_t DDS_DataWriterProtocolQosPolicy::virtual_guid
```

The virtual GUID (Global Unique Identifier).

The virtual GUID is used to uniquely identify different incarnations of the same **DDSDataWriter** (p. 1321).

RTI Connexr uses the virtual GUID to associate a persisted writer history to a specific **DDSDataWriter** (p. 1321).

The RTI Connexr Persistence Service uses the virtual GUID to send samples on behalf of the original **DDSDataWriter** (p. 1321).

**[default] DDS\_GUID\_AUTO** (p. 331)



### 9.39.2.2 rtps\_object\_id

**DDS\_UnsignedLong** DDS\_DataWriterProtocolQosPolicy::rtps\_object\_id

The RTPS Object ID.

This value is used to determine the RTPS object ID of a data writer according to the DDS-RTPS Interoperability Wire Protocol.

Only the last 3 bytes are used; the most significant byte is ignored.

If the default value is specified, RTI Connexx will automatically assign the object ID based on a counter value (per participant) starting at 0x00800000. That value is incremented for each new data writer.

A rtps\_object\_id value in the interval [0x00800000,0x00ffffff] may collide with the automatic values assigned by RTI Connexx. In those cases, the recommendation is not to use automatic object ID assignment.

**[default]** DDS\_RTPS\_AUTO\_ID (p. ??)

**[range]** [0,0x00ffffff]

### 9.39.2.3 push\_on\_write

**DDS\_Boolean** DDS\_DataWriterProtocolQosPolicy::push\_on\_write

Whether to push sample out when write is called.

If set to **DDS\_BOOLEAN\_TRUE** (p. 317) (the default), the writer will send a sample every time write is called. Otherwise, the sample is put into the queue waiting for a NACK from remote reader(s) to be sent out.

**[default]** DDS\_BOOLEAN\_TRUE (p. 317)

### 9.39.2.4 disable\_positive\_acks

**DDS\_Boolean** DDS\_DataWriterProtocolQosPolicy::disable\_positive\_acks

Controls whether or not the writer expects positive acknowledgements from matching readers.

If set to **DDS\_BOOLEAN\_TRUE** (p. 317), the writer does not expect readers to send send positive acknowledgments to the writer. Consequently, instead of keeping a sample queued until all readers have positively acknowledged it, the writer will keep a sample for at least **DDS\_RtpsReliableWriterProtocol\_t::disable\_positive\_acks\_min\_sample\_keep\_duration** (p. 1070), after which the sample is logically considered as positively acknowledged.

If set to **DDS\_BOOLEAN\_FALSE** (p. 317) (the default), the writer expects to receive positive acknowledgements from its acknowledging readers (**DDS\_DataReaderProtocolQosPolicy::disable\_positive\_acks** (p. 632) = **DDS\_BOOLEAN\_FALSE** (p. 317)) and it applies the keep-duration to its non-acknowledging readers (**DDS\_DataReaderProtocolQosPolicy::disable\_positive\_acks** (p. 632) = **DDS\_BOOLEAN\_TRUE** (p. 317)).

A writer with both acknowledging and non-acknowledging readers keeps a sample queued until acknowledgements have been received from all acknowledging readers and the keep-duration has elapsed for non-acknowledging readers.

**[default]** DDS\_BOOLEAN\_FALSE (p. 317)

### 9.39.2.5 `disable_inline_keyhash`

`DDS_Boolean` `DDS_DataWriterProtocolQosPolicy::disable_inline_keyhash`

Controls whether or not a keyhash is propagated on the wire with each sample.

This field only applies to keyed writers.

With each key, RTI Connex associates an internal 16-byte representation, called a keyhash.

When this field is `DDS_BOOLEAN_FALSE` (p. 317), the keyhash is sent on the wire with every data instance.

When this field is `DDS_BOOLEAN_TRUE` (p. 317), the keyhash is not sent on the wire and the readers must compute the value using the received data.

If the *reader* is CPU bound, sending the keyhash on the wire may increase performance, because the reader does not have to get the keyhash from the data.

If the *writer* is CPU bound, sending the keyhash on the wire may decrease performance, because it requires more bandwidth (16 more bytes per sample).

Note: Setting `disable_inline_keyhash` to `DDS_BOOLEAN_TRUE` (p. 317) is not compatible with using RTI Real-Time Connect or RTI Recorder.

[default] `DDS_BOOLEAN_FALSE` (p. 317)

### 9.39.2.6 `serialize_key_with_dispose`

`DDS_Boolean` `DDS_DataWriterProtocolQosPolicy::serialize_key_with_dispose`

Controls whether or not the serialized key is propagated on the wire with dispose samples.

This field only applies to keyed writers.

We recommend setting this field to `DDS_BOOLEAN_TRUE` (p. 317) if there are DataReaders where `DDS_DataReaderProtocolQosPolicy::propagate_dispose_of_unregistered_instances` (p. 632) is also `DDS_BOOLEAN_TRUE` (p. 317).

When setting `serialize_key_with_dispose` to `FALSE`, only a key hash is included in the dispose meta-sample sent by a DataWriter for a dispose action. If a dispose meta-sample only includes the key hash, then DataReaders must have previously received an actual data sample for the instance being disposed, in order for a DataReader to map a key hash/instance handle to actual key values.

If an actual data sample was never received for an instance and `serialize_key_with_dispose` is set to `FALSE`, then the DataReader application will not be able to determine the value of the key that was disposed, since `FooDataReader::get_key_value` (p. 1673) will not be able to map an instance handle to actual key values.

By setting `serialize_key_with_dispose` to `TRUE`, the values of the key members of a data type will be sent in the dispose meta-sample for a dispose action by the DataWriter. This allows the DataReader to map an instance handle to the values of the key members even when receiving a dispose meta-sample without previously having received a data sample for the instance.

*Important:* When this field is `DDS_BOOLEAN_TRUE` (p. 317), batching will not be compatible with RTI Connex 4.3e, 4.4b, or 4.4c. The `DDSDataReader` (p. 1288) entities will receive incorrect data and/or encounter deserialization errors.

[default] `DDS_BOOLEAN_FALSE` (p. 317)

### 9.39.2.7 propagate\_app\_ack\_with\_no\_response

```
DDS_Boolean DDS_DataWriterProtocolQosPolicy::propagate_app_ack_with_no_response
```

Controls whether or not a **DDSDataWriter** (p.1321) receives **DDSDataWriterListener::on\_application\_↔ acknowledgment** (p.1349) notifications with an empty or invalid response.

When this field is set to **DDS\_BOOLEAN\_FALSE** (p.317), the callback **DDSDataWriterListener::on\_application\_↔ acknowledgment** (p.1349) will not be invoked if the sample being acknowledged has an empty or invalid response.

**[default]** **DDS\_BOOLEAN\_TRUE** (p.317)

### 9.39.2.8 rtps\_reliable\_writer

```
struct DDS_RtpsReliableWriterProtocol_t DDS_DataWriterProtocolQosPolicy::rtps_reliable_writer
```

RTPS protocol-related configuration settings for the RTPS reliable writer associated with a **DDSDataWriter** (p.1321). This parameter only has effect if both the writer and the matching reader are configured with **DDS\_RELIABLE\_↔ RELIABILITY\_QOS** (p.435) **DDS\_ReliabilityQosPolicyKind** (p.434).

For details, refer to the **DDS\_RtpsReliableWriterProtocol\_t** (p.1061)

**[default]** **[default]** See **DDS\_RtpsReliableWriterProtocol\_t** (p.1061)

### 9.39.2.9 initial\_virtual\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_DataWriterProtocolQosPolicy::initial_virtual_sequence_number
```

Determines, the initial virtual sequence number for this DataWriter.

By default, the virtual sequence number of the first sample published by a DataWriter will be 1 for DataWriters that do not use durable writer history. For durable writers, the default virtual sequence number will be the last sequence number they published in a previous execution, plus one. So, when a non-durable DataWriter is restarted and must continue communicating with the same DataReaders, its samples start over with sequence number 1. Durable DataWriters start over where the last sequence number left off, plus one.

This QoS setting allows overwriting the default initial virtual sequence number.

Normally, this parameter is not expected to be modified; however, in some scenarios when continuing communication after restarting, applications may require the DataWriter's virtual sequence number to start at something other than the value described above. An example would be to enable non-durable DataWriters to start at the last sequence number published, plus one, similar to the durable DataWriter. This property enables you to make such a configuration, if desired.

The virtual sequence number can be overwritten as well on a per sample basis by updating **DDS\_WriteParams\_t\_↔ ::identity** (p.1252) in the **FooDataWriter::write\_w\_params** (p.1688).

**[default]** **DDS\_AUTO\_SEQUENCE\_NUMBER** (p.333)

## 9.40 DDS\_DataWriterProtocolStatus Struct Reference

<<*extension*>> (p. 237) The status of a writer's internal protocol related metrics, like the number of samples pushed, pulled, filtered; and status of wire protocol traffic.

### Public Attributes

- **DDS\_LongLong pushed\_sample\_count**  
*The number of user samples pushed on write from a local DataWriter to a matching remote DataReader.*
- **DDS\_LongLong pushed\_sample\_count\_change**  
*The change in `DDS_DataWriterProtocolStatus::pushed_sample_count` (p. 680) since the last time the status was read.*
- **DDS\_LongLong pushed\_sample\_bytes**  
*The number of bytes of user samples pushed on write from a local DataWriter to a matching remote DataReader.*
- **DDS\_LongLong pushed\_sample\_bytes\_change**  
*The change in `DDS_DataWriterProtocolStatus::pushed_sample_bytes` (p. 680) since the last time the status was read.*
- **DDS\_LongLong filtered\_sample\_count**  
*[Not supported.] The number of user samples preemptively filtered by a local DataWriter due to Content-Filtered Topics.*
- **DDS\_LongLong filtered\_sample\_count\_change**  
*[Not supported.] The incremental change in the number of user samples preemptively filtered by a local DataWriter due to Content-Filtered Topics since the last time the status was read.*
- **DDS\_LongLong filtered\_sample\_bytes**  
*[Not supported.] The number of bytes of user samples preemptively filtered by a local DataWriter due to Content-Filtered Topics.*
- **DDS\_LongLong filtered\_sample\_bytes\_change**  
*[Not supported.] The incremental change in the number of bytes of user samples preemptively filtered by a local DataWriter due to Content-Filtered Topics since the last time the status was read.*
- **DDS\_LongLong sent\_heartbeat\_count**  
*The number of Heartbeats sent between a local DataWriter and matching remote DataReader.*
- **DDS\_LongLong sent\_heartbeat\_count\_change**  
*The change in `DDS_DataWriterProtocolStatus::sent_heartbeat_count` (p. 682) since the last time the status was read.*
- **DDS\_LongLong sent\_heartbeat\_bytes**  
*The number of bytes of Heartbeats sent between a local DataWriter and matching remote DataReader.*
- **DDS\_LongLong sent\_heartbeat\_bytes\_change**  
*The change in `DDS_DataWriterProtocolStatus::sent_heartbeat_bytes` (p. 682) since the last time the status was read.*
- **DDS\_LongLong pulled\_sample\_count**  
*The number of user samples pulled from local DataWriter by matching DataReaders.*
- **DDS\_LongLong pulled\_sample\_count\_change**  
*The change in `DDS_DataWriterProtocolStatus::pulled_sample_count` (p. 682) since the last time the status was read.*
- **DDS\_LongLong pulled\_sample\_bytes**  
*The number of bytes of user samples pulled from local DataWriter by matching DataReaders.*
- **DDS\_LongLong pulled\_sample\_bytes\_change**  
*The change in `DDS_DataWriterProtocolStatus::pulled_sample_bytes` (p. 683) since the last time the status was read.*
- **DDS\_LongLong received\_ack\_count**  
*The number of ACKs from a remote DataReader received by a local DataWriter.*
- **DDS\_LongLong received\_ack\_count\_change**  
*The change in `DDS_DataWriterProtocolStatus::received_ack_count` (p. 683) since the last time the status was read.*
- **DDS\_LongLong received\_ack\_bytes**

*The number of bytes of ACKs from a remote DataReader received by a local DataWriter.*

- **DDS\_LongLong received\_ack\_bytes\_change**

*The change in `DDS_DataWriterProtocolStatus::received_ack_bytes` (p. 684) since the last time the status was read.*

- **DDS\_LongLong received\_nack\_count**

*The number of NACKs from a remote DataReader received by a local DataWriter.*

- **DDS\_LongLong received\_nack\_count\_change**

*The change in `DDS_DataWriterProtocolStatus::received_nack_count` (p. 684) since the last time the status was read.*

- **DDS\_LongLong received\_nack\_bytes**

*The number of bytes of NACKs from a remote DataReader received by a local DataWriter.*

- **DDS\_LongLong received\_nack\_bytes\_change**

*The change in `DDS_DataWriterProtocolStatus::received_nack_bytes` (p. 684) since the last time the status was read.*

- **DDS\_LongLong sent\_gap\_count**

*The number of GAPS sent from local DataWriter to matching remote DataReaders.*

- **DDS\_LongLong sent\_gap\_count\_change**

*The change in `DDS_DataWriterProtocolStatus::sent_gap_count` (p. 685) since the last time the status was read.*

- **DDS\_LongLong sent\_gap\_bytes**

*The number of bytes of GAPS sent from local DataWriter to matching remote DataReaders.*

- **DDS\_LongLong sent\_gap\_bytes\_change**

*The change in `DDS_DataWriterProtocolStatus::sent_gap_bytes` (p. 685) since the last time the status was read.*

- **DDS\_LongLong rejected\_sample\_count**

*[Not supported.]*

- **DDS\_LongLong rejected\_sample\_count\_change**

*[Not supported.]*

- **DDS\_Long send\_window\_size**

*Current maximum number of outstanding samples allowed in the DataWriter's queue.*

- struct **DDS\_SequenceNumber\_t first\_available\_sample\_sequence\_number**

*The sequence number of the first available sample currently queued in the local DataWriter.*

- struct **DDS\_SequenceNumber\_t last\_available\_sample\_sequence\_number**

*The sequence number of the last available sample currently queued in the local DataWriter.*

- struct **DDS\_SequenceNumber\_t first\_unacknowledged\_sample\_sequence\_number**

*The sequence number of the first unacknowledged sample currently queued in the local DataWriter.*

- struct **DDS\_SequenceNumber\_t first\_available\_sample\_virtual\_sequence\_number**

*The virtual sequence number of the first available sample currently queued in the local DataWriter.*

- struct **DDS\_SequenceNumber\_t last\_available\_sample\_virtual\_sequence\_number**

*The virtual sequence number of the last available sample currently queued in the local DataWriter.*

- struct **DDS\_SequenceNumber\_t first\_unacknowledged\_sample\_virtual\_sequence\_number**

*The virtual sequence number of the first unacknowledged sample currently queued in the local DataWriter.*

- **DDS\_InstanceHandle\_t first\_unacknowledged\_sample\_subscription\_handle**

*The handle of a remote DataReader that has not acknowledged the first unacknowledged sample of the local DataWriter.*

- struct **DDS\_SequenceNumber\_t first\_unelapsed\_keep\_duration\_sample\_sequence\_number**

*The sequence number of the first sample whose keep duration has not yet elapsed.*

- **DDS\_LongLong pushed\_fragment\_count**

*The number of `DATA_FRAG` messages that have been pushed by this DataWriter.*

- **DDS\_LongLong pushed\_fragment\_bytes**

*The number of bytes of `DATA_FRAG` messages that have been pushed by this DataWriter.*

- **DDS\_LongLong pulled\_fragment\_count**

*The number of `DATA_FRAG` messages that have been pulled from this DataWriter.*

- **DDS\_LongLong pulled\_fragment\_bytes**  
*The number of bytes of DATA\_FRAG messages that have been pulled from this DataWriter.*
- **DDS\_LongLong received\_nack\_fragment\_count**  
*The number of NACK\_FRAG messages that have been received by this DataWriter.*
- **DDS\_LongLong received\_nack\_fragment\_bytes**  
*The number of bytes of NACK\_FRAG messages that have been received by this DataWriter.*

### 9.40.1 Detailed Description

<<*extension*>> (p. 237) The status of a writer's internal protocol related metrics, like the number of samples pushed, pulled, filtered; and status of wire protocol traffic.

Entity:

**DDSDataWriter** (p. 1321)

### 9.40.2 Member Data Documentation

#### 9.40.2.1 pushed\_sample\_count

**DDS\_LongLong** DDS\_DataWriterProtocolStatus::pushed\_sample\_count

The number of user samples pushed on write from a local DataWriter to a matching remote DataReader.

Counts protocol (RTPS) messages pushed by a DataWriter when writing, unregistering, and disposing. The count is the number of sends done internally, and it may be greater than the number of user writes.

For large data, counts whole samples, not fragments. The fragment count is tracked in the **DDS\_DataWriterProtocolStatus::pushed\_fragment\_count** (p. 688) statistic.

#### 9.40.2.2 pushed\_sample\_count\_change

**DDS\_LongLong** DDS\_DataWriterProtocolStatus::pushed\_sample\_count\_change

The change in **DDS\_DataWriterProtocolStatus::pushed\_sample\_count** (p. 680) since the last time the status was read.

Counts protocol (RTPS) messages pushed by a DataWriter when writing, unregistering, and disposing.

For large data, counts whole samples, not fragments.

### 9.40.2.3 pushed\_sample\_bytes

`DDS_LongLong DDS_DataWriterProtocolStatus::pushed_sample_bytes`

The number of bytes of user samples pushed on write from a local DataWriter to a matching remote DataReader.

Counts bytes of protocol (RTPS) messages pushed by a DataWriter when writing, unregistering, and disposing. The count of bytes corresponds to the number of sends done internally, and it may be greater than the number of user writes.

When data fragmentation is used, this statistic is incremented as fragments are written.

### 9.40.2.4 pushed\_sample\_bytes\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::pushed_sample_bytes_change`

The change in `DDS_DataWriterProtocolStatus::pushed_sample_bytes` (p. 680) since the last time the status was read.

Counts bytes of protocol (RTPS) messages pushed by a DataWriter when writing, unregistering, and disposing.

When data fragmentation is used, this statistic is incremented as fragments are written.

### 9.40.2.5 filtered\_sample\_count

`DDS_LongLong DDS_DataWriterProtocolStatus::filtered_sample_count`

**[Not supported.]** The number of user samples preemptively filtered by a local DataWriter due to Content-Filtered Topics.

### 9.40.2.6 filtered\_sample\_count\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::filtered_sample_count_change`

**[Not supported.]** The incremental change in the number of user samples preemptively filtered by a local DataWriter due to Content-Filtered Topics since the last time the status was read.

### 9.40.2.7 filtered\_sample\_bytes

`DDS_LongLong DDS_DataWriterProtocolStatus::filtered_sample_bytes`

**[Not supported.]** The number of bytes of user samples preemptively filtered by a local DataWriter due to Content-Filtered Topics.

#### 9.40.2.8 filtered\_sample\_bytes\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::filtered_sample_bytes_change`

**[Not supported.]** The incremental change in the number of bytes of user samples preemptively filtered by a local DataWriter due to Content-Filtered Topics since the last time the status was read.

#### 9.40.2.9 sent\_heartbeat\_count

`DDS_LongLong DDS_DataWriterProtocolStatus::sent_heartbeat_count`

The number of Heartbeats sent between a local DataWriter and matching remote DataReader.

Because periodic and piggyback heartbeats are sent to remote readers and their locators differently in different situations, when a reader has more than one locator, this count may be larger than expected, to reflect the sending of Heartbeats to the multiple locators.

#### 9.40.2.10 sent\_heartbeat\_count\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::sent_heartbeat_count_change`

The change in `DDS_DataWriterProtocolStatus::sent_heartbeat_count` (p.682) since the last time the status was read.

#### 9.40.2.11 sent\_heartbeat\_bytes

`DDS_LongLong DDS_DataWriterProtocolStatus::sent_heartbeat_bytes`

The number of bytes of Heartbeats sent between a local DataWriter and matching remote DataReader.

Because periodic and piggyback heartbeats are sent to remote readers and their locators differently in different situations, when a reader has more than one locator, this count may be larger than expected, to reflect the sending of Heartbeats to the multiple locators.

#### 9.40.2.12 sent\_heartbeat\_bytes\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::sent_heartbeat_bytes_change`

The change in `DDS_DataWriterProtocolStatus::sent_heartbeat_bytes` (p.682) since the last time the status was read.



### 9.40.2.13 pulled\_sample\_count

`DDS_LongLong DDS_DataWriterProtocolStatus::pulled_sample_count`

The number of user samples pulled from local DataWriter by matching DataReaders.

Pulled samples are samples sent for repairs, for late joiners, and all samples sent by the local DataWriter when `DDS_DataWriterProtocolQosPolicy::push_on_write` (p. 675) is `DDS_BOOLEAN_FALSE` (p. 317).

When data fragmentation is used, this statistic is incremented as fragments are written.

### 9.40.2.14 pulled\_sample\_count\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::pulled_sample_count_change`

The change in `DDS_DataWriterProtocolStatus::pulled_sample_count` (p. 682) since the last time the status was read.

Pulled samples are samples sent for repairs, for late joiners, and all samples sent by the local DataWriter when `DDS_DataWriterProtocolQosPolicy::push_on_write` (p. 675) is `DDS_BOOLEAN_FALSE` (p. 317).

For large data, counts whole samples, not fragments.

### 9.40.2.15 pulled\_sample\_bytes

`DDS_LongLong DDS_DataWriterProtocolStatus::pulled_sample_bytes`

The number of bytes of user samples pulled from local DataWriter by matching DataReaders.

Pulled samples are samples sent for repairs, for late joiners, and all samples sent by the local DataWriter when `DDS_DataWriterProtocolQosPolicy::push_on_write` (p. 675) is `DDS_BOOLEAN_FALSE` (p. 317).

When data fragmentation is used, this statistic is incremented as fragments are written.

### 9.40.2.16 pulled\_sample\_bytes\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::pulled_sample_bytes_change`

The change in `DDS_DataWriterProtocolStatus::pulled_sample_bytes` (p. 683) since the last time the status was read.

Pulled samples are samples sent for repairs, for late joiners, and all samples sent by the local DataWriter when `DDS_DataWriterProtocolQosPolicy::push_on_write` (p. 675) is `DDS_BOOLEAN_FALSE` (p. 317).

For large data, counts bytes of whole samples, not fragments.

#### 9.40.2.17 received\_ack\_count

`DDS_LongLong DDS_DataWriterProtocolStatus::received_ack_count`

The number of ACKs from a remote DataReader received by a local DataWriter.

#### 9.40.2.18 received\_ack\_count\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::received_ack_count_change`

The change in `DDS_DataWriterProtocolStatus::received_ack_count` (p. 683) since the last time the status was read.

#### 9.40.2.19 received\_ack\_bytes

`DDS_LongLong DDS_DataWriterProtocolStatus::received_ack_bytes`

The number of bytes of ACKs from a remote DataReader received by a local DataWriter.

#### 9.40.2.20 received\_ack\_bytes\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::received_ack_bytes_change`

The change in `DDS_DataWriterProtocolStatus::received_ack_bytes` (p. 684) since the last time the status was read.

#### 9.40.2.21 received\_nack\_count

`DDS_LongLong DDS_DataWriterProtocolStatus::received_nack_count`

The number of NACKs from a remote DataReader received by a local DataWriter.

#### 9.40.2.22 received\_nack\_count\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::received_nack_count_change`

The change in `DDS_DataWriterProtocolStatus::received_nack_count` (p. 684) since the last time the status was read.

### 9.40.2.23 received\_nack\_bytes

`DDS_LongLong DDS_DataWriterProtocolStatus::received_nack_bytes`

The number of bytes of NACKs from a remote DataReader received by a local DataWriter.

### 9.40.2.24 received\_nack\_bytes\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::received_nack_bytes_change`

The change in `DDS_DataWriterProtocolStatus::received_nack_bytes` (p. 684) since the last time the status was read.

### 9.40.2.25 sent\_gap\_count

`DDS_LongLong DDS_DataWriterProtocolStatus::sent_gap_count`

The number of GAPS sent from local DataWriter to matching remote DataReaders.

### 9.40.2.26 sent\_gap\_count\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::sent_gap_count_change`

The change in `DDS_DataWriterProtocolStatus::sent_gap_count` (p. 685) since the last time the status was read.

### 9.40.2.27 sent\_gap\_bytes

`DDS_LongLong DDS_DataWriterProtocolStatus::sent_gap_bytes`

The number of bytes of GAPS sent from local DataWriter to matching remote DataReaders.

### 9.40.2.28 sent\_gap\_bytes\_change

`DDS_LongLong DDS_DataWriterProtocolStatus::sent_gap_bytes_change`

The change in `DDS_DataWriterProtocolStatus::sent_gap_bytes` (p. 685) since the last time the status was read.

**9.40.2.29 rejected\_sample\_count**

```
DDS_LongLong DDS_DataWriterProtocolStatus::rejected_sample_count
```

[Not supported.]

**9.40.2.30 rejected\_sample\_count\_change**

```
DDS_LongLong DDS_DataWriterProtocolStatus::rejected_sample_count_change
```

[Not supported.]

**9.40.2.31 send\_window\_size**

```
DDS_Long DDS_DataWriterProtocolStatus::send_window_size
```

Current maximum number of outstanding samples allowed in the DataWriter's queue.

Spans the range from **DDS\_RtpsReliableWriterProtocol\_t::min\_send\_window\_size** (p. 1072) to **DDS\_RtpsReliableWriterProtocol\_t::max\_send\_window\_size** (p. 1073).

**9.40.2.32 first\_available\_sample\_sequence\_number**

```
struct DDS_SequenceNumber_t DDS_DataWriterProtocolStatus::first_available_sample_sequence_number
```

The sequence number of the first available sample currently queued in the local DataWriter.

Applies only for local DataWriter status.

**9.40.2.33 last\_available\_sample\_sequence\_number**

```
struct DDS_SequenceNumber_t DDS_DataWriterProtocolStatus::last_available_sample_sequence_number
```

The sequence number of the last available sample currently queued in the local DataWriter.

Applies only for local DataWriter status.

#### 9.40.2.34 first\_unacknowledged\_sample\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_DataWriterProtocolStatus::first_unacknowledged_sample_sequence_↔  
number
```

The sequence number of the first unacknowledged sample currently queued in the local DataWriter.

Applies only for local DataWriter status.

#### 9.40.2.35 first\_available\_sample\_virtual\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_DataWriterProtocolStatus::first_available_sample_virtual_sequence_↔  
_number
```

The virtual sequence number of the first available sample currently queued in the local DataWriter.

Applies only for local DataWriter status.

#### 9.40.2.36 last\_available\_sample\_virtual\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_DataWriterProtocolStatus::last_available_sample_virtual_sequence_↔  
_number
```

The virtual sequence number of the last available sample currently queued in the local DataWriter.

Applies only for local DataWriter status.

#### 9.40.2.37 first\_unacknowledged\_sample\_virtual\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_DataWriterProtocolStatus::first_unacknowledged_sample_virtual_↔  
sequence_number
```

The virtual sequence number of the first unacknowledged sample currently queued in the local DataWriter.

Applies only for local DataWriter status.

#### 9.40.2.38 first\_unacknowledged\_sample\_subscription\_handle

```
DDS_InstanceHandle_t DDS_DataWriterProtocolStatus::first_unacknowledged_sample_subscription_↔  
handle
```

The handle of a remote DataReader that has not acknowledged the first unacknowledged sample of the local DataWriter.

Applies only for local DataWriter status.

### 9.40.2.39 first\_unelapsed\_keep\_duration\_sample\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_DataWriterProtocolStatus::first_unelapsed_keep_duration_sample_↔  
sequence_number
```

The sequence number of the first sample whose keep duration has not yet elapsed.

Applicable only when **DDS\_DataWriterProtocolQosPolicy::disable\_positive\_acks** (p. 675) is set.

Sequence number of the first sample kept in the DataWriter's queue whose keep\_duration (applied when **DDS\_Data↔  
WriterProtocolQosPolicy::disable\_positive\_acks** (p. 675) is set) has not yet elapsed.

Applies only for local DataWriter status.

### 9.40.2.40 pushed\_fragment\_count

```
DDS_LongLong DDS_DataWriterProtocolStatus::pushed_fragment_count
```

The number of DATA\_FRAG messages that have been pushed by this DataWriter.

This statistic is incremented as each DATA\_FRAG message is sent, not when the entire sample has been sent. Applicable only when data is fragmented.

### 9.40.2.41 pushed\_fragment\_bytes

```
DDS_LongLong DDS_DataWriterProtocolStatus::pushed_fragment_bytes
```

The number of bytes of DATA\_FRAG messages that have been pushed by this DataWriter.

This statistic is incremented as each DATA\_FRAG message is sent, not when the entire sample has been sent. Applicable only when data is fragmented.

### 9.40.2.42 pulled\_fragment\_count

```
DDS_LongLong DDS_DataWriterProtocolStatus::pulled_fragment_count
```

The number of DATA\_FRAG messages that have been pulled from this DataWriter.

This statistic is incremented as each DATA\_FRAG message is sent, not when the entire sample has been sent. Applicable only when data is fragmented.

### 9.40.2.43 pulled\_fragment\_bytes

```
DDS_LongLong DDS_DataWriterProtocolStatus::pulled_fragment_bytes
```

The number of bytes of DATA\_FRAG messages that have been pulled from this DataWriter.

This statistic is incremented as each DATA\_FRAG message is sent, not when the entire sample has been sent. Applicable only when data is fragmented.

#### 9.40.2.44 received\_nack\_fragment\_count

`DDS_LongLong DDS_DataWriterProtocolStatus::received_nack_fragment_count`

The number of NACK\_FRAG messages that have been received by this DataWriter.

NACK FRAG RTPS messages are sent when large data is used in conjunction with reliable communication. They have the same properties as NACK messages, but instead of applying to samples, they apply to fragments. Applicable only when data is fragmented.

#### 9.40.2.45 received\_nack\_fragment\_bytes

`DDS_LongLong DDS_DataWriterProtocolStatus::received_nack_fragment_bytes`

The number of bytes of NACK\_FRAG messages that have been received by this DataWriter.

NACK FRAG RTPS messages are sent when large data is used in conjunction with reliable communication. They have the same properties as NACK messages, but instead of applying to samples, they apply to fragments. Applicable only when data is fragmented.

## 9.41 DDS\_DataWriterQos Struct Reference

QoS policies supported by a `DDSDataWriter` (p. 1321) entity.

### Public Member Functions

- `bool operator==` (const `DDS_DataWriterQos` &r) const  
*Compares two DataWriterQos objects for equality.*
- `bool operator!=` (const `DDS_DataWriterQos` &r) const  
*Compares two DataWriterQos objects for inequality.*
- `DDS_ReturnCode_t print` () const  
*Prints this `DDS_DataWriterQos` (p. 689) to stdout.*
- `DDS_ReturnCode_t to_string` (char \*string, `DDS_UnsignedLong` &string\_size) const  
*Obtains a string representation of this `DDS_DataWriterQos` (p. 689).*
- `DDS_ReturnCode_t to_string` (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_DataWriterQos` &base) const  
*Obtains a string representation of this `DDS_DataWriterQos` (p. 689).*
- `DDS_ReturnCode_t to_string` (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_QosPrintFormat` &format) const  
*Obtains a string representation of this `DDS_DataWriterQos` (p. 689).*
- `DDS_ReturnCode_t to_string` (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_DataWriterQos` &base, const `DDS_QosPrintFormat` &format) const  
*Obtains a string representation of this `DDS_DataWriterQos` (p. 689).*
- `DDS_ReturnCode_t to_string` (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_QosPrintAll_t` &) const  
*Obtains a string representation of this `DDS_DataWriterQos` (p. 689).*
- `DDS_ReturnCode_t to_string` (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_QosPrintAll_t` &, const `DDS_QosPrintFormat` &format) const  
*Obtains a string representation of this `DDS_DataWriterQos` (p. 689).*

## Public Attributes

- struct **DDS\_DurabilityQosPolicy** `durability`  
*Durability policy, **DURABILITY** (p. 398).*
- struct **DDS\_DurabilityServiceQosPolicy** `durability_service`  
*DurabilityService policy, **DURABILITY\_SERVICE** (p. 402).*
- struct **DDS\_DeadlineQosPolicy** `deadline`  
*Deadline policy, **DEADLINE** (p. 385).*
- struct **DDS\_LatencyBudgetQosPolicy** `latency_budget`  
*Latency budget policy, **LATENCY\_BUDGET** (p. 407).*
- struct **DDS\_LivelinessQosPolicy** `liveliness`  
*Liveliness policy, **LIVELINESS** (p. 409).*
- struct **DDS\_ReliabilityQosPolicy** `reliability`  
*Reliability policy, **RELIABILITY** (p. 433).*
- struct **DDS\_DestinationOrderQosPolicy** `destination_order`  
*Destination order policy, **DESTINATION\_ORDER** (p. 386).*
- struct **DDS\_HistoryQosPolicy** `history`  
*History policy, **HISTORY** (p. 405).*
- struct **DDS\_ResourceLimitsQosPolicy** `resource_limits`  
*Resource limits policy, **RESOURCE\_LIMITS** (p. 437).*
- struct **DDS\_TransportPriorityQosPolicy** `transport_priority`  
*Transport priority policy, **TRANSPORT\_PRIORITY** (p. 449).*
- struct **DDS\_LifespanQosPolicy** `lifespan`  
*Lifespan policy, **LIFESPAN** (p. 408).*
- struct **DDS\_UserDataQosPolicy** `user_data`  
*User data policy, **USER\_DATA** (p. 455).*
- struct **DDS\_OwnershipQosPolicy** `ownership`  
*Ownership policy, **OWNERSHIP** (p. 414).*
- struct **DDS\_OwnershipStrengthQosPolicy** `ownership_strength`  
*Ownership strength policy, **OWNERSHIP\_STRENGTH** (p. 415).*
- struct **DDS\_WriterDataLifecycleQosPolicy** `writer_data_lifecycle`  
*Writer data lifecycle policy, **WRITER\_DATA\_LIFECYCLE** (p. 456).*
- struct **DDS\_DataRepresentationQosPolicy** `representation`  
*Data representation policy, **DATA\_REPRESENTATION** (p. 369).*
- **DDS\_DataTagQosPolicy** `data_tags`  
*DataTag policy, **DATA\_TAG** (p. 376).*
- struct **DDS\_DataWriterResourceLimitsQosPolicy** `writer_resource_limits`  
*<<extension>> (p. 237) Writer resource limits policy, **DATA\_WRITER\_RESOURCE\_LIMITS** (p. 382).*
- struct **DDS\_DataWriterProtocolQosPolicy** `protocol`  
*<<extension>> (p. 237) **DDSDataWriter** (p. 1321) protocol policy, **DATA\_WRITER\_PROTOCOL** (p. 381)*
- struct **DDS\_TransportSelectionQosPolicy** `transport_selection`  
*<<extension>> (p. 237) Transport plugin selection policy, **TRANSPORT\_SELECTION** (p. 450).*
- struct **DDS\_TransportUnicastQosPolicy** `unicast`  
*<<extension>> (p. 237) Unicast transport policy, **TRANSPORT\_UNICAST** (p. 451).*
- struct **DDS\_PublishModeQosPolicy** `publish_mode`  
*<<extension>> (p. 237) Publish mode policy, **PUBLISH\_MODE** (p. 429).*
- struct **DDS\_PropertyQosPolicy** `property`



- <<extension>> (p. 237) *Property policy*, **PROPERTY** (p. 419). See also *Property Reference Guide*.
- struct **DDS\_ServiceQosPolicy service**
  - <<extension>> (p. 237) *Service policy*, **SERVICE** (p. 438).
- struct **DDS\_BatchQosPolicy batch**
  - <<extension>> (p. 237) *Batch policy*, **BATCH** (p. 364).
- struct **DDS\_MultiChannelQosPolicy multi\_channel**
  - <<extension>> (p. 237) *Multi channel policy*, **MULTICHANNEL** (p. 413).
- struct **DDS\_AvailabilityQosPolicy availability**
  - <<extension>> (p. 237) *Availability policy*, **AVAILABILITY** (p. 364).
- struct **DDS\_EntityNameQosPolicy publication\_name**
  - <<extension>> (p. 237) *EntityName policy*, **ENTITY\_NAME** (p. 403).
- struct **DDS\_TopicQueryDispatchQosPolicy topic\_query\_dispatch**
  - <<extension>> (p. 237) *Topic Query dispatch policy*, **TOPIC\_QUERY\_DISPATCH** (p. 442).
- struct **DDS\_DataWriterTransferModeQosPolicy transfer\_mode**
  - <<extension>> (p. 237) *TransferMode policy*, **DATA\_WRITER\_TRANSFER\_MODE** (p. 385).
- struct **DDS\_TypeSupportQosPolicy type\_support**
  - <<extension>> (p. 237) *Type support data*, **TYPESUPPORT** (p. 453).

### 9.41.1 Detailed Description

QoS policies supported by a **DDSDataWriter** (p. 1321) entity.

You must set certain members in a consistent manner:

- **DDS\_DataWriterQos::history** (p. 693) .depth <= **DDS\_DataWriterQos::resource\_limits** (p. 694) .max\_↔ samples\_per\_instance
- **DDS\_DataWriterQos::resource\_limits** (p. 694) .max\_samples\_per\_instance <= **DDS\_DataWriterQos**↔  
::**resource\_limits** (p. 694) .max\_samples
- **DDS\_DataWriterQos::resource\_limits** (p. 694) .initial\_samples <= **DDS\_DataWriterQos::resource\_limits**  
(p. 694) .max\_samples
- **DDS\_DataWriterQos::resource\_limits** (p. 694) .initial\_instances <= **DDS\_DataWriterQos::resource\_limits**  
(p. 694) .max\_instances
- length of **DDS\_DataWriterQos::user\_data** (p. 694) .value <= **DDS\_DomainParticipantQos::resource\_limits**  
(p. 744) .writer\_user\_data\_max\_length

If any of the above are not true, **DDSDataWriter::set\_qos** (p. 1336) and **DDSDataWriter::set\_qos\_with\_profile** (p. 1337) and **DDSPublisher::set\_default\_datawriter\_qos** (p. 1554) and **DDSPublisher::set\_default\_datawriter**↔  
**\_qos\_with\_profile** (p. 1555) will fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337) and **DDSPublisher**↔  
::**create\_datawriter** (p. 1558) and **DDSPublisher::create\_datawriter\_with\_profile** (p. 1559) and will return NULL.

Entity:

**DDSDataWriter** (p. 1321)

See also

**QoS Policies** (p. 353) allowed ranges within each QoS.

## 9.41.2 Member Function Documentation

### 9.41.2.1 operator==( )

```
bool DDS_DataWriterQos::operator==(
    const DDS_DataWriterQos & r ) const [inline]
```

Compares two DataWriterQos objects for equality.

See also

**DDS\_DataWriterQos\_equals** (p. 113)

References **DDS\_DataWriterQos\_equals()**.

### 9.41.2.2 operator!=( )

```
bool DDS_DataWriterQos::operator!=(
    const DDS_DataWriterQos & r ) const [inline]
```

Compares two DataWriterQos objects for inequality.

See also

**DDS\_DataWriterQos\_equals** (p. 113)

References **DDS\_DataWriterQos\_equals()**.

## 9.41.3 Member Data Documentation

### 9.41.3.1 durability

```
struct DDS_DurabilityQosPolicy DDS_DataWriterQos::durability
```

Durability policy, **DURABILITY** (p. 398).

### 9.41.3.2 durability\_service

```
struct DDS_DurabilityServiceQosPolicy DDS_DataWriterQos::durability_service
```

DurabilityService policy, **DURABILITY\_SERVICE** (p. 402).

### 9.41.3.3 deadline

```
struct DDS_DeadlineQosPolicy DDS_DataWriterQos::deadline
```

Deadline policy, **DEADLINE** (p. 385).

### 9.41.3.4 latency\_budget

```
struct DDS_LatencyBudgetQosPolicy DDS_DataWriterQos::latency_budget
```

Latency budget policy, **LATENCY\_BUDGET** (p. 407).

### 9.41.3.5 liveliness

```
struct DDS_LivelinessQosPolicy DDS_DataWriterQos::liveliness
```

Liveliness policy, **LIVELINESS** (p. 409).

### 9.41.3.6 reliability

```
struct DDS_ReliabilityQosPolicy DDS_DataWriterQos::reliability
```

Reliability policy, **RELIABILITY** (p. 433).

### 9.41.3.7 destination\_order

```
struct DDS_DestinationOrderQosPolicy DDS_DataWriterQos::destination_order
```

Destination order policy, **DESTINATION\_ORDER** (p. 386).

#### 9.41.3.8 history

```
struct DDS_HistoryQosPolicy DDS_DataWriterQos::history
```

History policy, **HISTORY** (p. 405).

#### 9.41.3.9 resource\_limits

```
struct DDS_ResourceLimitsQosPolicy DDS_DataWriterQos::resource_limits
```

Resource limits policy, **RESOURCE\_LIMITS** (p. 437).

#### 9.41.3.10 transport\_priority

```
struct DDS_TransportPriorityQosPolicy DDS_DataWriterQos::transport_priority
```

Transport priority policy, **TRANSPORT\_PRIORITY** (p. 449).

#### 9.41.3.11 lifespan

```
struct DDS_LifespanQosPolicy DDS_DataWriterQos::lifespan
```

Lifespan policy, **LIFESPAN** (p. 408).

#### 9.41.3.12 user\_data

```
struct DDS_UserDataQosPolicy DDS_DataWriterQos::user_data
```

User data policy, **USER\_DATA** (p. 455).

#### 9.41.3.13 ownership

```
struct DDS_OwnershipQosPolicy DDS_DataWriterQos::ownership
```

Ownership policy, **OWNERSHIP** (p. 414).

#### 9.41.3.14 ownership\_strength

```
struct DDS_OwnershipStrengthQosPolicy DDS_DataWriterQos::ownership_strength
```

Ownership strength policy, **OWNERSHIP\_STRENGTH** (p. 415).

#### 9.41.3.15 writer\_data\_lifecycle

```
struct DDS_WriterDataLifecycleQosPolicy DDS_DataWriterQos::writer_data_lifecycle
```

Writer data lifecycle policy, **WRITER\_DATA\_LIFECYCLE** (p. 456).

#### 9.41.3.16 representation

```
struct DDS_DataRepresentationQosPolicy DDS_DataWriterQos::representation
```

Data representation policy, **DATA\_REPRESENTATION** (p. 369).

#### 9.41.3.17 data\_tags

```
DDS_DataTagQosPolicy DDS_DataWriterQos::data_tags
```

DataTag policy, **DATA\_TAG** (p. 376).

#### 9.41.3.18 writer\_resource\_limits

```
struct DDS_DataWriterResourceLimitsQosPolicy DDS_DataWriterQos::writer_resource_limits
```

<<*extension*>> (p. 237) Writer resource limits policy, **DATA\_WRITER\_RESOURCE\_LIMITS** (p. 382).

#### 9.41.3.19 protocol

```
struct DDS_DataWriterProtocolQosPolicy DDS_DataWriterQos::protocol
```

<<*extension*>> (p. 237) **DDSDataWriter** (p. 1321) protocol policy, **DATA\_WRITER\_PROTOCOL** (p. 381)

### 9.41.3.20 transport\_selection

```
struct DDS_TransportSelectionQosPolicy DDS_DataWriterQos::transport_selection
```

<<*extension*>> (p. 237) Transport plugin selection policy, **TRANSPORT\_SELECTION** (p. 450).

Specifies the transports available for use by the **DDSDataWriter** (p. 1321).

### 9.41.3.21 unicast

```
struct DDS_TransportUnicastQosPolicy DDS_DataWriterQos::unicast
```

<<*extension*>> (p. 237) Unicast transport policy, **TRANSPORT\_UNICAST** (p. 451).

Specifies the unicast transport interfaces and ports on which **messages** can be received.

The unicast interfaces are used to receive messages from **DDSDataReader** (p. 1288) entities in the domain.

### 9.41.3.22 publish\_mode

```
struct DDS_PublishModeQosPolicy DDS_DataWriterQos::publish_mode
```

<<*extension*>> (p. 237) Publish mode policy, **PUBLISH\_MODE** (p. 429).

Determines whether the **DDSDataWriter** (p. 1321) publishes data synchronously or asynchronously and how.

### 9.41.3.23 property

```
struct DDS_PropertyQosPolicy DDS_DataWriterQos::property
```

<<*extension*>> (p. 237) Property policy, **PROPERTY** (p. 419). See also `Property Reference Guide`.

### 9.41.3.24 service

```
struct DDS_ServiceQosPolicy DDS_DataWriterQos::service
```

<<*extension*>> (p. 237) Service policy, **SERVICE** (p. 438).

### 9.41.3.25 batch

```
struct DDS_BatchQosPolicy DDS_DataWriterQos::batch
```

<<*extension*>> (p. 237) Batch policy, **BATCH** (p. 364).

### 9.41.3.26 multi\_channel

```
struct DDS_MultiChannelQosPolicy DDS_DataWriterQos::multi_channel
```

<<*extension*>> (p. 237) Multi channel policy, **MULTICHANNEL** (p. 413).

### 9.41.3.27 availability

```
struct DDS_AvailabilityQosPolicy DDS_DataWriterQos::availability
```

<<*extension*>> (p. 237) Availability policy, **AVAILABILITY** (p. 364).

### 9.41.3.28 publication\_name

```
struct DDS_EntityNameQosPolicy DDS_DataWriterQos::publication_name
```

<<*extension*>> (p. 237) EntityName policy, **ENTITY\_NAME** (p. 403).

### 9.41.3.29 topic\_query\_dispatch

```
struct DDS_TopicQueryDispatchQosPolicy DDS_DataWriterQos::topic_query_dispatch
```

<<*extension*>> (p. 237) Topic Query dispatch policy, **TOPIC\_QUERY\_DISPATCH** (p. 442).

### 9.41.3.30 transfer\_mode

```
struct DDS_DataWriterTransferModeQosPolicy DDS_DataWriterQos::transfer_mode
```

<<*extension*>> (p. 237) TransferMode policy, **DATA\_WRITER\_TRANSFER\_MODE** (p. 385).

### 9.41.3.31 type\_support

```
struct DDS_TypeSupportQosPolicy DDS_DataWriterQos::type_support
```

<<*extension*>> (p. 237) Type support data, **TYPESUPPORT** (p. 453).

Optional value that is passed to a type plugin's `on_endpoint_attached` and serialization functions.

## 9.42 DDS\_DataWriterResourceLimitsQosPolicy Struct Reference

Various settings that configure how a **DDSDataWriter** (p. 1321) allocates and uses physical memory for internal resources.

### Public Attributes

- **DDS\_Long initial\_concurrent\_blocking\_threads**  
*The initial number of threads that are allowed to concurrently block on write call on the same **DDSDataWriter** (p. 1321).*
- **DDS\_Long max\_concurrent\_blocking\_threads**  
*The maximum number of threads that are allowed to concurrently block on write call on the same **DDSDataWriter** (p. 1321).*
- **DDS\_Long max\_remote\_reader\_filters**  
*The maximum number of remote DataReaders for which the **DDSDataWriter** (p. 1321) will perform content-based filtering.*
- **DDS\_Long initial\_batches**  
*Represents the initial number of batches a **DDSDataWriter** (p. 1321) will manage.*
- **DDS\_Long max\_batches**  
*Represents the maximum number of batches a **DDSDataWriter** (p. 1321) will manage.*
- **DDS\_DataWriterResourceLimitsInstanceReplacementKind instance\_replacement**  
*Sets the kinds of instances allowed to be replaced when instance resource limits are reached.*
- **DDS\_Boolean replace\_empty\_instances**  
*Whether or not to replace empty instances during instance replacement.*
- **DDS\_Boolean autoregister\_instances**  
*Whether or not to automatically register new instances.*
- **DDS\_Long initial\_virtual\_writers**  
*The initial number of virtual writers supported by a **DDSDataWriter** (p. 1321).*
- **DDS\_Long max\_virtual\_writers**  
*The maximum number of virtual writers supported by a **DDSDataWriter** (p. 1321).*
- **DDS\_Long max\_remote\_readers**  
*The maximum number of remote readers supported by a **DDSDataWriter** (p. 1321).*
- **DDS\_Long max\_app\_ack\_remote\_readers**  
*The maximum number of application-level acknowledging remote readers supported by a **DDSDataWriter** (p. 1321).*
- **DDS\_Long initial\_active\_topic\_queries**  
*Represents the initial number of active topic queries a **DDSDataWriter** (p. 1321) will manage.*
- **DDS\_Long max\_active\_topic\_queries**  
*Represents the maximum number of active topic queries a **DDSDataWriter** (p. 1321) will manage.*
- struct **DDS\_AllocationSettings\_t writer\_loaned\_sample\_allocation**  
*Represents the allocation settings of loaned samples managed by a **DDSDataWriter** (p. 1321).*
- **DDS\_Boolean initialize\_writer\_loaned\_sample**  
*Whether or not to initialize loaned samples returned by a **DDSDataWriter** (p. 1321).*



### 9.42.1 Detailed Description

Various settings that configure how a **DDSDataWriter** (p. 1321) allocates and uses physical memory for internal resources.

DataWriters must allocate internal structures to handle the simultaneously blocking of threads trying to call **FooDataWriter::write** (p. 1683) on the same **DDSDataWriter** (p. 1321), for the storage used to batch small samples, and for content-based filters specified by DataReaders.

Most of these internal structures start at an initial size and, by default, will be grown as needed by dynamically allocating additional memory. You may set fixed, maximum sizes for these internal structures if you want to bound the amount of memory that can be used by a **DDSDataWriter** (p. 1321). By setting the initial size to the maximum size, you will prevent RTI Connexx from dynamically allocating any memory after the creation of the **DDSDataWriter** (p. 1321).

This QoS policy is an extension to the DDS standard.

Entity:

**DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.42.2 Member Data Documentation

#### 9.42.2.1 initial\_concurrent\_blocking\_threads

**DDS\_Long** DDS\_DataWriterResourceLimitsQosPolicy::initial\_concurrent\_blocking\_threads

The initial number of threads that are allowed to concurrently block on write call on the same **DDSDataWriter** (p. 1321).

This value only applies if **DDS\_HistoryQosPolicy** (p. 919) has its kind set to **DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406) and **DDS\_ReliabilityQosPolicy::max\_blocking\_time** (p. 1043) is > 0.

**[default]** 1

**[range]** [1, 10000], <= max\_concurrent\_blocking\_threads

### 9.42.2.2 max\_concurrent\_blocking\_threads

`DDS_Long DDS_DataWriterResourceLimitsQosPolicy::max_concurrent_blocking_threads`

The maximum number of threads that are allowed to concurrently block on write call on the same **DDSDataWriter** (p. 1321).

This value only applies if **DDS\_HistoryQosPolicy** (p. 919) has its kind set to **DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406) and **DDS\_ReliabilityQosPolicy::max\_blocking\_time** (p. 1043) is  $> 0$ .

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 10000] or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\geq$  initial\_concurrent\_blocking\_threads

### 9.42.2.3 max\_remote\_reader\_filters

`DDS_Long DDS_DataWriterResourceLimitsQosPolicy::max_remote_reader_filters`

The maximum number of remote DataReaders for which the **DDSDataWriter** (p. 1321) will perform content-based filtering.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [0,  $(2^{31}-2)$ ] or **DDS\_LENGTH\_UNLIMITED** (p. 438).

0: The **DDSDataWriter** (p. 1321) will not perform filtering for any **DDSDataReader** (p. 1288).

1 to  $(2^{31}-2)$ : The DataWriter will filter for up to the specified number of DataReaders. In addition, the Datawriter will store the result of the filtering per sample per DataReader.

**DDS\_LENGTH\_UNLIMITED** (p. 438): The DataWriter will filter for up to  $(2^{31}-2)$  DataReaders. However, in this case, the DataWriter will not store the filtering result per sample per DataReader. Thus, if a sample is resent (such as due to a loss of reliable communication), the sample will be filtered again.

### 9.42.2.4 initial\_batches

`DDS_Long DDS_DataWriterResourceLimitsQosPolicy::initial_batches`

Represents the initial number of batches a **DDSDataWriter** (p. 1321) will manage.

**[default]** 8

**[range]** [1,100 million]

See also

**DDS\_BatchQosPolicy** (p. 600)

### 9.42.2.5 max\_batches

**DDS\_Long** DDS\_DataWriterResourceLimitsQosPolicy::max\_batches

Represents the maximum number of batches a **DDSDataWriter** (p. 1321) will manage.

[default] **DDS\_LENGTH\_UNLIMITED** (p. 438)

When batching is enabled, the maximum number of samples that a **DDSDataWriter** (p. 1321) can store is limited by this value and **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055).

[range] [1,100 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438)  $\geq$  **DDS\_RtpsReliableWriterProtocol\_t**↔  
**::heartbeats\_per\_max\_samples** (p. 1067) if batching is enabled

See also

**DDS\_BatchQosPolicy** (p. 600)

### 9.42.2.6 instance\_replacement

**DDS\_DataWriterResourceLimitsInstanceReplacementKind** DDS\_DataWriterResourceLimitsQosPolicy::instance↔  
\_replacement

Sets the kinds of instances allowed to be replaced when instance resource limits are reached.

When a **DDSDataWriter** (p. 1321)'s number of active instances is greater than **DDS\_ResourceLimitsQosPolicy**↔  
**::max\_instances** (p. 1055), it will try to make room by replacing an existing instance. This field specifies the kinds of instances allowed to be replaced.

If a replaceable instance is not available, either an out-of-resources exception will be returned, or the writer may block if the instance reclamation was done when writing.

[default] **DDS\_UNREGISTERED\_INSTANCE\_REPLACEMENT** (p. 383)

See also

**DDS\_DataWriterResourceLimitsInstanceReplacementKind** (p. 382)

### 9.42.2.7 `replace_empty_instances`

```
DDS_Boolean DDS_DataWriterResourceLimitsQosPolicy::replace_empty_instances
```

Whether or not to replace empty instances during instance replacement.

When a `DDSDataWriter` (p. 1321) has more active instances than allowed by `DDS_ResourceLimitsQosPolicy::max_instances` (p. 1055), it tries to make room by replacing an existing instance. This field configures whether empty instances (i.e. instances with no samples) may be replaced. If set `DDS_BOOLEAN_TRUE` (p. 317), then a `DDSDataWriter` (p. 1321) will first try reclaiming empty instances, before trying to replace whatever is specified by `DDS_DataWriterResourceLimitsQosPolicy::instance_replacement` (p. 701).

[default] `DDS_BOOLEAN_FALSE` (p. 317)

See also

`DDS_DataWriterResourceLimitsInstanceReplacementKind` (p. 382)

### 9.42.2.8 `autoregister_instances`

```
DDS_Boolean DDS_DataWriterResourceLimitsQosPolicy::autoregister_instances
```

Whether or not to automatically register new instances.

[default] `DDS_BOOLEAN_FALSE` (p. 317)

When set to true, it is possible to write with a non-NIL handle of an instance that is not registered: the write operation will succeed and the instance will be registered. Otherwise, that write operation would fail.

See also

`FooDataWriter::write` (p. 1683)

### 9.42.2.9 `initial_virtual_writers`

```
DDS_Long DDS_DataWriterResourceLimitsQosPolicy::initial_virtual_writers
```

The initial number of virtual writers supported by a `DDSDataWriter` (p. 1321).

[default] 1

[range] [1, 1000000], or `DDS_LENGTH_UNLIMITED` (p. 438)

### 9.42.2.10 max\_virtual\_writers

**DDS\_Long** DDS\_DataWriterResourceLimitsQosPolicy::max\_virtual\_writers

The maximum number of virtual writers supported by a **DDSDataWriter** (p. 1321).

Sets the maximum number of unique virtual writers supported by a **DDSDataWriter** (p. 1321), where virtual writers are added when samples are written with the virtual writer GUID.

This field is specially relevant in the configuration of Persistence Service DataWriters since these DataWriters will publish samples on behalf of multiple virtual writers.

**[default]** DDS\_LENGTH\_UNLIMITED (p. 438)

**[range]** [1, 1000000], or DDS\_LENGTH\_UNLIMITED (p. 438)

### 9.42.2.11 max\_remote\_readers

**DDS\_Long** DDS\_DataWriterResourceLimitsQosPolicy::max\_remote\_readers

The maximum number of remote readers supported by a **DDSDataWriter** (p. 1321).

**[default]** DDS\_LENGTH\_UNLIMITED (p. 438)

**[range]** [1, 1000000], or DDS\_LENGTH\_UNLIMITED (p. 438)

### 9.42.2.12 max\_app\_ack\_remote\_readers

**DDS\_Long** DDS\_DataWriterResourceLimitsQosPolicy::max\_app\_ack\_remote\_readers

The maximum number of application-level acknowledging remote readers supported by a **DDSDataWriter** (p. 1321).

**[default]** DDS\_LENGTH\_UNLIMITED (p. 438)

**[range]** [1, 1000000], or DDS\_LENGTH\_UNLIMITED (p. 438)

### 9.42.2.13 initial\_active\_topic\_queries

**DDS\_Long** DDS\_DataWriterResourceLimitsQosPolicy::initial\_active\_topic\_queries

Represents the initial number of active topic queries a **DDSDataWriter** (p. 1321) will manage.

**[default]** 1

**[range]** [1, 1000000]

See also

**DDS\_TopicQueryDispatchQosPolicy** (p. 1141)

### 9.42.2.14 max\_active\_topic\_queries

```
DDS_Long DDS_DataWriterResourceLimitsQosPolicy::max_active_topic_queries
```

Represents the maximum number of active topic queries a **DDSDataWriter** (p. 1321) will manage.

When topic queries are enabled, the maximum number of topic queries that a **DDSDataWriter** (p. 1321) can publish data samples for at the same time is limited by this value.

When the DataWriter receives one topic query above this limit, it will wait to process it until it finishes publishing all the samples for at least one of the current topic queries.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1000000] or **DDS\_LENGTH\_UNLIMITED** (p. 438)

See also

**DDS\_TopicQueryDispatchQosPolicy** (p. 1141)

### 9.42.2.15 writer\_loaned\_sample\_allocation

```
struct DDS_AllocationSettings_t DDS_DataWriterResourceLimitsQosPolicy::writer_loaned_sample_↔
allocation
```

Represents the allocation settings of loaned samples managed by a **DDSDataWriter** (p. 1321).

The number of samples loaned by a **DDSDataWriter** (p. 1321) via **FooDataWriter::get\_loan** (p. 1695) is limited by the **DDS\_AllocationSettings\_t::max\_count** (p. 589) of **DDS\_DataWriterResourceLimitsQosPolicy::writer\_loaned\_↔ sample\_allocation** (p. 704). **FooDataWriter::get\_loan** (p. 1695) returns NULL if and only if **DDS\_Allocation\_↔ Settings\_t::max\_count** (p. 589) samples have been loaned, and none of those samples has been written with **Foo\_↔ DataWriter::write** (p. 1683) or discarded via **FooDataWriter::discard\_loan** (p. 1696).

**[default]** `initial_count = DDS_AUTO_COUNT` (p. 397) (**DDS\_ResourceLimitsQosPolicy::initial\_samples** (p. 1055) + 1); `max_count = DDS_AUTO_COUNT` (p. 397) (**DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055) + 1); `incremental_count = DDS_AUTO_COUNT` (p. 397) (0 if `initial_count = max_count`; `initial_count` otherwise);

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

See also

**FooDataWriter::get\_loan** (p. 1695)

**FooDataWriter::discard\_loan** (p. 1696)

### 9.42.2.16 initialize\_writer\_loaned\_sample

`DDS_Boolean DDS_DataWriterResourceLimitsQosPolicy::initialize_writer_loaned_sample`

Whether or not to initialize loaned samples returned by a `DDSDataWriter` (p. 1321).

[default] `DDS_BOOLEAN_FALSE` (p. 317)

See also

`FooDataWriter::get_loan` (p. 1695)

## 9.43 DDS\_DataWriterShmemRefTransferModeSettings Struct Reference

Settings related to transferring data using shared memory references.

### Public Attributes

- `DDS_Boolean enable_data_consistency_check`  
*Controls if samples can be checked for consistency.*

### 9.43.1 Detailed Description

Settings related to transferring data using shared memory references.

It is used to configure a `DDSDataWriter` (p. 1321) using **Zero Copy transfer over shared memory** (p. 70).

Properties:

`RxO` (p. 360) = N/A

`Changeable` (p. 360) = `NO` (p. 360)

QoS:

`DDS_DataWriterTransferModeQosPolicy` (p. 706)

### 9.43.2 Member Data Documentation

### 9.43.2.1 enable\_data\_consistency\_check

**DDS\_Boolean** DDS\_DataWriterShmemRefTransferModeSettings::enable\_data\_consistency\_check

Controls if samples can be checked for consistency.

When this setting is true, the **DDSDataWriter** (p. 1321) sends an incrementing sequence number as an inline QoS with every sample. This sequence number allows a **DDSDataReader** (p. 1288) to use the **FooDataReader::is\_data\_↔\_consistent** (p. 1675) API to detect if the **DDSDataWriter** (p. 1321) overwrote the sample before the **DDSDataReader** (p. 1288) could complete processing the sample.

[default] **DDS\_BOOLEAN\_TRUE** (p. 317)

## 9.44 DDS\_DataWriterTransferModeQosPolicy Struct Reference

<<*extension*>> (p. 237) Qos related to transferring data

### Public Attributes

- struct **DDS\_DataWriterShmemRefTransferModeSettings** **shmem\_ref\_settings**  
*Settings related to transferring data using shared memory references.*

### 9.44.1 Detailed Description

<<*extension*>> (p. 237) Qos related to transferring data

It contains qualitative settings related to the actions a **DDSDataWriter** (p. 1321) performs while transferring its data.

Entity:

**DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.44.2 Member Data Documentation



### 9.44.2.1 shmem\_ref\_settings

```
struct DDS_DataWriterShmemRefTransferModeSettings DDS_DataWriterTransferModeQosPolicy::shmem_ref_settings
```

Settings related to transferring data using shared memory references.

For details, refer to the [DDS\\_DataWriterShmemRefTransferModeSettings](#) (p. 705)

## 9.45 DDS\_DeadlineQosPolicy Struct Reference

Expresses the maximum duration (deadline) within which an instance is expected to be updated.

### Public Attributes

- struct **DDS\_Duration\_t period**  
*Duration of the deadline period.*

### 9.45.1 Detailed Description

Expresses the maximum duration (deadline) within which an instance is expected to be updated.

A **DDSDataReader** (p. 1288) expects a new sample updating the value of each instance at least once every `period`. That is, `period` specifies the maximum expected elapsed time between arriving data samples.

A **DDSDataWriter** (p. 1321) indicates that the application commits to write a new value (using the **DDSDataWriter** (p. 1321)) for each instance managed by the **DDSDataWriter** (p. 1321) at least once every `period`.

This QoS can be used during system integration to ensure that applications have been coded to meet design specifications.

It can also be used during runtime to detect when systems are performing outside of design specifications. Receiving applications can take appropriate actions to prevent total system failure when data is not received in time. For topics on which data is not expected to be periodic, `period` should be set to an infinite value.

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Status:

**DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343), **DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS** (p. 344), **DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344)

Properties:

**RxO** (p. 360) = YES  
**Changeable** (p. 360) = YES (p. 360)

### 9.45.2 Usage

This policy is useful for cases where a **DDSTopic** (p. 1617) is expected to have each instance updated periodically. On the publishing side this setting establishes a contract that the application must meet. On the subscribing side the setting establishes a minimum requirement for the remote publishers that are expected to supply the data values.

When RTI Connex 'matches' a **DDSDataWriter** (p. 1321) and a **DDSDataReader** (p. 1288) it checks whether the settings are compatible (i.e., *offered deadline*  $\leq$  *requested deadline*); if they are not, the two entities are informed (via the **DDSListener** (p. 1526) or **DDSCondition** (p. 1276) mechanism) of the incompatibility of the QoS settings and communication will not occur.

Assuming that the reader and writer ends have compatible settings, the fulfilment of this contract is monitored by RTI Connex and the application is informed of any violations by means of the proper **DDSListener** (p. 1526) or **DDSCondition** (p. 1276).

### 9.45.3 Compatibility

The value offered is considered compatible with the value requested if and only if the inequality *offered period*  $\leq$  *requested period* holds.

### 9.45.4 Consistency

The setting of the **DEADLINE** (p. 385) policy must be set consistently with that of the **TIME\_BASED\_FILTER** (p. 440).

For these two policies to be consistent the settings must be such that *deadline period*  $\geq$  *minimum\_separation*.

An attempt to set these policies in an inconsistent manner will result in **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337) in **set\_qos (abstract)** (p. 1464), or the **DDSEntity** (p. 1463) will not be created.

For a **DDSDataReader** (p. 1288), the **DEADLINE** (p. 385) policy and **DDS\_TimeBasedFilterQosPolicy** (p. 1126) may interact such that even though the **DDSDataWriter** (p. 1321) is writing samples fast enough to fulfill its commitment to its own deadline, the **DDSDataReader** (p. 1288) may see violations of its deadline. This happens because RTI Connex will drop any samples received within the **DDS\_TimeBasedFilterQosPolicy::minimum\_separation** (p. 1128). To avoid triggering the **DDSDataReader** (p. 1288)'s deadline, even though the matched **DDSDataWriter** (p. 1321) is meeting its own deadline, set the two QoS parameters so that:

*reader deadline*  $\geq$  *reader minimum\_separation* + *writer deadline*

See **DDS\_TimeBasedFilterQosPolicy** (p. 1126) for more information about the interactions between deadlines and time-based filters.

See also

**DDS\_TimeBasedFilterQosPolicy** (p. 1126)

### 9.45.5 Member Data Documentation

### 9.45.5.1 period

```
struct DDS_Duration_t DDS_DeadlineQosPolicy::period
```

Duration of the deadline period.

[default] **DDS\_DURATION\_INFINITE** (p. 326)

[range] [1 nanosec, 1 year] or **DDS\_DURATION\_INFINITE** (p. 326),  $\geq$  **DDS\_TimeBasedFilterQosPolicy**↔  
::**minimum\_separation** (p. 1128)

## 9.46 DDS\_DestinationOrderQosPolicy Struct Reference

Controls how the middleware will deal with data sent by multiple **DDSDataWriter** (p. 1321) entities for the same instance of data (i.e., same **DDSTopic** (p. 1617) and key).

### Public Attributes

- **DDS\_DestinationOrderQosPolicyKind kind**  
*Specifies the desired kind of destination order.*
- **DDS\_DestinationOrderQosPolicyScopeKind scope**  
*Specifies the desired scope of the source destination order.*
- struct **DDS\_Duration\_t source\_timestamp\_tolerance**  
<<*extension*>> (p. 237) *Allowed tolerance between source timestamps of consecutive samples.*

### 9.46.1 Detailed Description

Controls how the middleware will deal with data sent by multiple **DDSDataWriter** (p. 1321) entities for the same instance of data (i.e., same **DDSTopic** (p. 1617) and key).

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Status:

**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_REQUESTED\_INCOMPATIBLE\_QOS**↔  
**STATUS** (p. 344)

Properties:

**RxO** (p. 360) = YES  
**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

## 9.46.2 Usage

When multiple DataWriters send data for the same topic, the order in which data from different DataWriters are received by the applications of different DataReaders may be different. So different DataReaders may not receive the same "last" value when DataWriters stop sending data.

This QoS policy controls how each subscriber resolves the final value of a data instance that is written by multiple **DDSDataWriter** (p. 1321) entities (which may be associated with different **DDSPublisher** (p. 1550) entities) running on different nodes.

This QoS can be used to create systems that have the property of "eventual consistency." Thus intermediate states across multiple applications may be inconsistent, but when DataWriters stop sending changes to the same topic, all applications will end up having the same state.

This QoS policy can be set for both DataWriters and DataReaders.

For the DataReader:

The default setting, **DDS\_BY\_RECEPTION\_TIMESTAMP\_DESTINATIONORDER\_QOS** (p. 387), indicates that (assuming the **OWNERSHIP\_STRENGTH** (p. 415) policy allows it) the latest received value for the instance should be the one whose value is kept. That is, data will be delivered by a **DDSDataReader** (p. 1288) in the order in which it was *received* (which may lead to inconsistent final values).

For **DDS\_BY\_SOURCE\_TIMESTAMP\_DESTINATIONORDER\_QOS** (p. 387), if the scope is set to **DDS\_INSTANCE\_↔\_SCOPE\_DESTINATIONORDER\_QOS** (p. 388) (default), within each instance, the sample's source timestamp shall be used to determine the most recent information. This is the only setting that, in the case of concurrent same-strength DataWriters updating the same instance, ensures that all DataReaders end up with the same final value for the instance. If a DataReader receives a sample for an instance with a source timestamp that is older than the last source timestamp received for the instance, the sample is dropped. The **SAMPLE\_REJECTED** status or the **SAMPLE\_LOST** status will not be updated.

If scope is set to **DDS\_TOPIC\_SCOPE\_DESTINATIONORDER\_QOS** (p. 388), the ordering is enforced per topic across all instances.

In addition, a DataReader will accept a sample only if the source timestamp is no farther in the future from the reception timestamp than `source_timestamp_tolerance`. Otherwise, the DDS sample is dropped. The **SAMPLE\_REJECTED** status or the **SAMPLE\_LOST** status will not be updated.

For the DataWriter:

For the default setting, **DDS\_BY\_RECEPTION\_TIMESTAMP\_DESTINATIONORDER\_QOS** (p. 387), the DataWriter will not enforce source timestamp ordering when writing samples using the **FooDataWriter::write\_w\_params** (p. 1688) or **FooDataWriter::write\_w\_timestamp** (p. 1687) API. The source timestamp of a new sample can be older than the source timestamp of the previous samples.

When using **DDS\_BY\_SOURCE\_TIMESTAMP\_DESTINATIONORDER\_QOS** (p. 387), If scope is set to **DDS\_↔\_INSTANCE\_SCOPE\_DESTINATIONORDER\_QOS** (p. 388) (default), when writing a sample, the sample's timestamp must not be older than the timestamp of the previously written DDS sample for the same instance. If, however, the timestamp is older than the timestamp of the previously written DDS sample—but the difference is less than the `source_↔_timestamp_tolerance`—the DDS sample will use the previously written DDS sample's timestamp as its timestamp. Otherwise, if the difference is greater than the tolerance, the write will fail with retcode **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336).

If scope is set to **DDS\_TOPIC\_SCOPE\_DESTINATIONORDER\_QOS** (p. 388), a new sample timestamp must not be older than the timestamp of the previously written DDS sample, across all instances. (The ordering is enforced across all instances.)

### 9.46.3 Compatibility

The value offered is considered compatible with the value requested if and only if the inequality *offered kind*  $\geq$  *requested kind* evaluates to 'TRUE'. For the purposes of this inequality, the values of `DDS_DestinationOrderQosPolicy::kind` (p. 711) are considered ordered such that `DDS_BY_RECEPTION_TIMESTAMP_DESTINATIONORDER_QOS` (p. 387)  $<$  `DDS_BY_SOURCE_TIMESTAMP_DESTINATIONORDER_QOS` (p. 387)

### 9.46.4 Member Data Documentation

#### 9.46.4.1 kind

```
DDS_DestinationOrderQosPolicyKind DDS_DestinationOrderQosPolicy::kind
```

Specifies the desired kind of destination order.

[default] `DDS_BY_RECEPTION_TIMESTAMP_DESTINATIONORDER_QOS` (p. 387),

#### 9.46.4.2 scope

```
DDS_DestinationOrderQosPolicyScopeKind DDS_DestinationOrderQosPolicy::scope
```

Specifies the desired scope of the source destination order.

Indicates if tolerance check and the current sample's timestamp is computed based on instance or topic basis.

[default] `DDS_INSTANCE_SCOPE_DESTINATIONORDER_QOS` (p. 388)

#### 9.46.4.3 source\_timestamp\_tolerance

```
struct DDS_Duration_t DDS_DestinationOrderQosPolicy::source_timestamp_tolerance
```

$\langle\langle$  *extension*  $\rangle\rangle$  (p. 237) Allowed tolerance between source timestamps of consecutive samples.

When a `DDSDataWriter` (p. 1321) sets `DDS_DestinationOrderQosPolicyKind` (p. 387) to `DDS_BY_SOURCE_TIMESTAMP_DESTINATIONORDER_QOS` (p. 387), when writing a sample, its timestamp must not be less than the timestamp of the previously written sample. However, if it is less than the timestamp of the previously written sample but the difference is less than this tolerance, the sample will use the previously written sample's timestamp as its timestamp. Otherwise, if the difference is greater than this tolerance, the write will fail.

When a `DDSDataReader` (p. 1288) sets `DDS_DestinationOrderQosPolicyKind` (p. 387) to `DDS_BY_SOURCE_TIMESTAMP_DESTINATIONORDER_QOS` (p. 387), the `DDSDataReader` (p. 1288) will accept a sample only if the source timestamp is no farther in the future from the reception timestamp than this tolerance. Otherwise, the sample is dropped.

[default] 100 milliseconds for `DDSDataWriter` (p. 1321), 30 seconds for `DDSDataReader` (p. 1288)

## 9.47 DDS\_DiscoveryConfigQosPolicy Struct Reference

Settings for discovery configuration.

### Public Attributes

- struct **DDS\_Duration\_t participant\_liveliness\_lease\_duration**  
*The liveliness lease duration for the participant.*
- struct **DDS\_Duration\_t participant\_liveliness\_assert\_period**  
*The period to assert liveliness for the participant.*
- struct **DDS\_Duration\_t participant\_announcement\_period**  
*The period at which a participant announces itself to potential peers when using the Simple Participant Discovery Protocol 2.0 (SPDP2).*
- **DDS\_RemoteParticipantPurgeKind remote\_participant\_purge\_kind**  
*The participant's behavior for maintaining knowledge of remote participants (and their contained entities) with which discovery communication has been lost.*
- struct **DDS\_Duration\_t max\_liveliness\_loss\_detection\_period**  
*The maximum amount of time between when a remote entity stops maintaining its liveliness and when the matched local entity realizes that fact.*
- **DDS\_Long initial\_participant\_announcements**  
*The number of initial announcements sent when a participant is first enabled.*
- **DDS\_Long new\_remote\_participant\_announcements**  
*The number of participant announcements sent when a remote participant is newly discovered.*
- struct **DDS\_Duration\_t min\_initial\_participant\_announcement\_period**  
*The minimum period between initial announcements when a participant is first enabled or when a remote participant is newly discovered.*
- struct **DDS\_Duration\_t max\_initial\_participant\_announcement\_period**  
*The maximum period between initial announcements when a participant is first enabled or when a remote participant is newly discovered.*
- struct **DDS\_BuiltinTopicReaderResourceLimits\_t participant\_reader\_resource\_limits**  
*Resource limits.*
- struct **DDS\_RtpsReliableReaderProtocol\_t publication\_reader**  
*RTPS protocol-related configuration settings for the RTPS reliable reader associated with a built-in publication reader.*
- struct **DDS\_BuiltinTopicReaderResourceLimits\_t publication\_reader\_resource\_limits**  
*Resource limits.*
- struct **DDS\_RtpsReliableReaderProtocol\_t subscription\_reader**  
*RTPS protocol-related configuration settings for the RTPS reliable reader associated with a built-in subscription reader.*
- struct **DDS\_BuiltinTopicReaderResourceLimits\_t subscription\_reader\_resource\_limits**  
*Resource limits.*
- struct **DDS\_RtpsReliableWriterProtocol\_t publication\_writer**  
*RTPS protocol-related configuration settings for the RTPS reliable writer associated with a built-in publication writer.*
- struct **DDS\_WriterDataLifecycleQosPolicy publication\_writer\_data\_lifecycle**  
*Writer data lifecycle settings for a built-in publication writer.*
- struct **DDS\_RtpsReliableWriterProtocol\_t subscription\_writer**  
*RTPS protocol-related configuration settings for the RTPS reliable writer associated with a built-in subscription writer.*
- struct **DDS\_WriterDataLifecycleQosPolicy subscription\_writer\_data\_lifecycle**  
*Writer data lifecycle settings for a built-in subscription writer.*

- **DDS\_DiscoveryConfigBuiltinPluginKindMask builtin\_discovery\_plugins**  
*Mask of built-in discovery plugin kinds.*
- **DDS\_DiscoveryConfigBuiltinChannelKindMask enabled\_builtin\_channels**  
*The mask specifying which built-in channels should be enabled.*
- **DDS\_ReliabilityQosPolicyKind participant\_message\_reader\_reliability\_kind**  
*Reliability policy for a built-in participant message reader.*
- struct **DDS\_RtpsReliableReaderProtocol\_t participant\_message\_reader**  
*RTPS reliable reader protocol-related configuration settings for a built-in participant message reader. This parameter only has effect if `DDS_DiscoveryConfigQosPolicy::participant_message_reader_reliability_kind` (p. 721) is set to `DDS_RELIABLE_RELIABILITY_QOS` (p. 435).*
- struct **DDS\_RtpsReliableWriterProtocol\_t participant\_message\_writer**  
*RTPS protocol-related configuration settings for the RTPS reliable writer associated with the built-in participant message writer. This parameter only has effect if the matching participant message reader is configured with `DDS_RELIABLE_RELIABILITY_QOS` (p. 435) `DDS_ReliabilityQosPolicyKind` (p. 434).*
- struct **DDS\_PublishModeQosPolicy publication\_writer\_publish\_mode**  
*Publish mode policy for the built-in publication writer.*
- struct **DDS\_PublishModeQosPolicy subscription\_writer\_publish\_mode**  
*Publish mode policy for the built-in subscription writer.*
- struct **DDS\_AsynchronousPublisherQosPolicy asynchronous\_publisher**  
*Asynchronous publishing settings for the discovery `DDSPublisher` (p. 1550) and all entities that are created by it.*
- struct **DDS\_Duration\_t default\_domain\_announcement\_period**  
*The period to announce a participant to the default domain 0.*
- **DDS\_Boolean ignore\_default\_domain\_announcements**  
*Used to ignore the announcements received by a participant on the default domain 0 corresponding to participants running on domains IDs other than 0.*
- struct **DDS\_RtpsReliableWriterProtocol\_t service\_request\_writer**  
*RTPS protocol-related configuration settings for the RTPS reliable writer associated with the built-in `DDS_ServiceRequest` (p. 1097) writer.*
- struct **DDS\_WriterDataLifecycleQosPolicy service\_request\_writer\_data\_lifecycle**  
*Writer data lifecycle settings for a built-in `DDS_ServiceRequest` (p. 1097) writer.*
- struct **DDS\_PublishModeQosPolicy service\_request\_writer\_publish\_mode**  
*Publish mode policy for the built-in service request writer.*
- struct **DDS\_RtpsReliableReaderProtocol\_t service\_request\_reader**  
*RTPS reliable reader protocol-related configuration settings for a built-in `DDS_ServiceRequest` (p. 1097) reader.*
- struct **DDS\_Duration\_t locator\_reachability\_assert\_period**  
*Period at which this DomainParticipant will assert the locators discovered from other DomainParticipants.*
- struct **DDS\_Duration\_t locator\_reachability\_lease\_duration**  
*The time period after which other DomainParticipants can consider one of their locators as "unreachable" if they do not receive a REACHABILITY PING from this DomainParticipant.*
- struct **DDS\_Duration\_t locator\_reachability\_change\_detection\_period**  
*Period at which this DomainParticipant will check if its locators are reachable from other DomainParticipants.*
- struct **DDS\_RtpsReliableWriterProtocol\_t secure\_volatile\_writer**  
*RTPS protocol-related configuration settings for the RTPS reliable writer associated with the built-in secure volatile writer.*
- struct **DDS\_PublishModeQosPolicy secure\_volatile\_writer\_publish\_mode**  
*Publish mode policy for the built-in secure volatile writer.*
- struct **DDS\_RtpsReliableReaderProtocol\_t secure\_volatile\_reader**  
*RTPS reliable reader protocol-related configuration settings for the built-in secure volatile reader.*
- **DDS\_Long endpoint\_type\_object\_lb\_serialization\_threshold**

*Option to reduce the size required to propagate a TypeObject in Simple Endpoint Discovery.*

- struct **DDS\_Duration\_t dns\_tracker\_polling\_period**

*Duration that specifies the period used by the DNS tracker to poll the DNS service and check for changes in the hostnames.*

- struct **DDS\_PublishModeQosPolicy participant\_configuration\_writer\_publish\_mode**

*Publish mode policy for the built-in participant configuration writer.*

- struct **DDS\_RtpsReliableWriterProtocol\_t participant\_configuration\_writer**

*RTPS protocol-related configuration settings for the RTPS reliable writer associated with a built-in participant configuration writer.*

- struct **DDS\_WriterDataLifecycleQosPolicy participant\_configuration\_writer\_data\_lifecycle**

*Writer data lifecycle settings for a built-in participant configuration writer.*

- struct **DDS\_RtpsReliableReaderProtocol\_t participant\_configuration\_reader**

*RTPS protocol-related configuration settings for the RTPS reliable reader associated with a built-in participant configuration reader.*

- struct **DDS\_BuiltinTopicReaderResourceLimits\_t participant\_configuration\_reader\_resource\_limits**

*Resource limits for the built-in topic participant configuration reader.*

### 9.47.1 Detailed Description

Settings for discovery configuration.

<<*extension*>> (p. 237) This QoS policy controls the amount of delay in discovering entities in the system and the amount of discovery traffic in the network.

The amount of network traffic required by the discovery process can vary widely, based on how your application has chosen to configure the middleware's network addressing (e.g., unicast vs. multicast, multicast TTL, etc.), the size of the system, whether all applications are started at the same time or whether start times are staggered, and other factors. Your application can use this policy to make tradeoffs between discovery completion time and network bandwidth utilization. In addition, you can introduce random back-off periods into the discovery process to decrease the probability of network contention when many applications start simultaneously.

Entity:

**DDSDomainParticipant** (p. 1351)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.47.2 Member Data Documentation



### 9.47.2.1 participant\_liveliness\_lease\_duration

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::participant_liveliness_lease_duration
```

The liveliness lease duration for the participant.

This is the same as the expiration time of the DomainParticipant as defined in the RTPS protocol.

If the participant has not refreshed its own liveliness to other participants at least once within this period, it may be considered as stale by other participants in the network.

Should be strictly greater than **DDS\_DiscoveryConfigQosPolicy::participant\_liveliness\_assert\_period** (p. 715).

**[default]** 100 seconds

**[range]** [1 nanosec,1 year], > participant\_liveliness\_assert\_period

### 9.47.2.2 participant\_liveliness\_assert\_period

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::participant_liveliness_assert_period
```

The period to assert liveliness for the participant.

The period at which the participant will refresh its liveliness to all the peers.

Should be strictly less than **DDS\_DiscoveryConfigQosPolicy::participant\_liveliness\_lease\_duration** (p. 714).

**[default]** 30 seconds

**[range]** [1 nanosec,1 year], < participant\_liveliness\_lease\_duration

### 9.47.2.3 participant\_announcement\_period

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::participant_announcement_period
```

The period at which a participant announces itself to potential peers when using the Simple Participant Discovery Protocol 2.0 (SPDP2).

The **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732) list **DDSDomainParticipant::add\_peer** (p. 1409) API are used to configure a set of potential peers that a DomainParticipant may discover. The **DDS\_DiscoveryConfigQosPolicy::participant\_announcement\_period** (p. 715) configures how frequently a DomainParticipant will announce itself to the subset of the configured potential peers that it has not matched with yet. Once a DomainParticipant matches with a DomainParticipant at one of configured potential peer locators, it will no longer announce itself to that locator at this period unless liveliness is lost.

This QoS policy is only supported when using the Simple Participant Discovery Protocol 2.0 (SPDP2). Setting this value when using the Simple Participant Discovery Protocol (SPDP) or other participant discovery protocols is not supported and will result in an error.

**[default]** **DDS\_DURATION\_AUTO** (p. 327) (Takes the value of **DDS\_DiscoveryConfigQosPolicy::participant\_liveliness\_assert\_period** (p. 715))

**[range]** [1 nanosec,1 year]

#### 9.47.2.4 remote\_participant\_purge\_kind

```
DDS_RemoteParticipantPurgeKind DDS_DiscoveryConfigQosPolicy::remote_participant_purge_kind
```

The participant's behavior for maintaining knowledge of remote participants (and their contained entities) with which discovery communication has been lost.

Most users will not need to change this value from its default, **DDS\_LIVELINESS\_BASED\_REMOTE\_PARTICIPANT\_PURGE** (p. 395). However, **DDS\_NO\_REMOTE\_PARTICIPANT\_PURGE** (p. 396) may be a good choice if the following conditions apply:

1. Discovery communication with a remote participant may be lost while data communication remains intact. Such will not typically be the case if discovery takes place over the Simple Discovery Protocol, but may be the case if the RTI Enterprise Discovery Service is used.
2. Extensive and prolonged lack of discovery communication between participants is not expected to be common, either because participant loss itself is expected to be rare, or because participants may be lost sporadically but will typically return again.
3. Maintaining inter-participant liveliness is problematic, perhaps because a participant has no writers with the appropriate **DDS\_LivelinessQosPolicyKind** (p. 409).

**[default]** **DDS\_LIVELINESS\_BASED\_REMOTE\_PARTICIPANT\_PURGE** (p. 395)

#### 9.47.2.5 max\_liveliness\_loss\_detection\_period

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::max_liveliness_loss_detection_period
```

The maximum amount of time between when a remote entity stops maintaining its liveliness and when the matched local entity realizes that fact.

Notification of the loss of liveliness of a remote entity may come more quickly than this duration, depending on the liveliness contract between the local and remote entities and the capabilities of the discovery mechanism in use. For example, a **DDSDataReader** (p. 1288) will learn of the loss of liveliness of a matched **DDSDataWriter** (p. 1321) within the reader's offered liveliness lease duration.

Shortening this duration will increase the responsiveness of entities to communication failures. However, it will also increase the CPU usage of the application, as the liveliness of remote entities will be examined more frequently.

**[default]** 60 seconds

**[range]** [1 nanosec, 1 year]

#### 9.47.2.6 initial\_participant\_announcements

```
DDS_Long DDS_DiscoveryConfigQosPolicy::initial_participant_announcements
```

The number of initial announcements sent when a participant is first enabled.

**[default]** 5

**[range]** [1,1 million]

### 9.47.2.7 new\_remote\_participant\_announcements

```
DDS_Long DDS_DiscoveryConfigQosPolicy::new_remote_participant_announcements
```

The number of participant announcements sent when a remote participant is newly discovered.

These announcements are only sent to the newly discovered remote participant, they are not also broadcast to the initial\_peers list.

**[default]** 2

**[range]** [0,1 million]

### 9.47.2.8 min\_initial\_participant\_announcement\_period

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::min_initial_participant_announcement_period
```

The minimum period between initial announcements when a participant is first enabled or when a remote participant is newly discovered.

A random delay between this and **DDS\_DiscoveryConfigQosPolicy::max\_initial\_participant\_announcement\_period** (p. 717) is introduced in between initial announcements when a new remote participant is discovered.

The setting of **DDS\_DiscoveryConfigQosPolicy::min\_initial\_participant\_announcement\_period** (p. 717) must be consistent with **DDS\_DiscoveryConfigQosPolicy::max\_initial\_participant\_announcement\_period** (p. 717). For these two values to be consistent, they must verify that:

**DDS\_DiscoveryConfigQosPolicy::min\_initial\_participant\_announcement\_period** (p. 717)  $\leq$  **DDS\_DiscoveryConfigQosPolicy::max\_initial\_participant\_announcement\_period** (p. 717).

**[default]** 10 milliseconds

**[range]** [1 nanosec,1 year]

### 9.47.2.9 max\_initial\_participant\_announcement\_period

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::max_initial_participant_announcement_period
```

The maximum period between initial announcements when a participant is first enabled or when a remote participant is newly discovered.

A random delay between **DDS\_DiscoveryConfigQosPolicy::min\_initial\_participant\_announcement\_period** (p. 717) and this is introduced in between initial announcements when a new remote participant is discovered.

The setting of **DDS\_DiscoveryConfigQosPolicy::max\_initial\_participant\_announcement\_period** (p. 717) must be consistent with **DDS\_DiscoveryConfigQosPolicy::min\_initial\_participant\_announcement\_period** (p. 717). For these two values to be consistent, they must verify that:

**DDS\_DiscoveryConfigQosPolicy::min\_initial\_participant\_announcement\_period** (p. 717)  $\leq$  **DDS\_DiscoveryConfigQosPolicy::max\_initial\_participant\_announcement\_period** (p. 717).

**[default]** 1 second

**[range]** [1 nanosec,1 year]

### 9.47.2.10 participant\_reader\_resource\_limits

```
struct DDS_BuiltinTopicReaderResourceLimits_t DDS_DiscoveryConfigQosPolicy::participant_reader_↔  
resource_limits
```

Resource limits.

Resource limit of the built-in topic participant reader. For details, see [DDS\\_BuiltinTopicReaderResourceLimits\\_t](#) (p. 605).

### 9.47.2.11 publication\_reader

```
struct DDS_RtpsReliableReaderProtocol_t DDS_DiscoveryConfigQosPolicy::publication_reader
```

RTPS protocol-related configuration settings for the RTPS reliable reader associated with a built-in publication reader.

For details, refer to the [DDS\\_RtpsReliableReaderProtocol\\_t](#) (p. 1057)

#### [default]

```
min_heartbeat_response_delay 0.0 seconds;  
max_heartbeat_response_delay 0.0 seconds;  
heartbeat_suppression_duration 0.0625 seconds;  
nack_period 5.0 seconds;  
receive_window_size 256;  
round_trip_time 0.0 seconds;  
app_ack_period 5.0 seconds;  
samples_per_app_ack 1;
```

### 9.47.2.12 publication\_reader\_resource\_limits

```
struct DDS_BuiltinTopicReaderResourceLimits_t DDS_DiscoveryConfigQosPolicy::publication_reader_↔  
resource_limits
```

Resource limits.

Resource limit of the built-in topic publication reader. For details, see [DDS\\_BuiltinTopicReaderResourceLimits\\_t](#) (p. 605).

### 9.47.2.13 subscription\_reader

```
struct DDS_RtpsReliableReaderProtocol_t DDS_DiscoveryConfigQosPolicy::subscription_reader
```

RTPS protocol-related configuration settings for the RTPS reliable reader associated with a built-in subscription reader.

For details, refer to the [DDS\\_RtpsReliableReaderProtocol\\_t](#) (p. 1057)

#### [default]

```
min_heartbeat_response_delay 0.0 seconds;  
max_heartbeat_response_delay 0.0 seconds;  
heartbeat_suppression_duration 0.0625 seconds;  
nack_period 5.0 seconds;  
receive_window_size 256;  
round_trip_time 0.0 seconds;  
app_ack_period 5.0 seconds;  
samples_per_app_ack 1;
```

**9.47.2.14 subscription\_reader\_resource\_limits**

```
struct DDS_BuiltinTopicReaderResourceLimits_t DDS_DiscoveryConfigQosPolicy::subscription_reader↔
_resource_limits
```

Resource limits.

Resource limit of the built-in topic subscription reader. For details, see **DDS\_BuiltinTopicReaderResourceLimits\_t** (p. 605).

**9.47.2.15 publication\_writer**

```
struct DDS_RtpsReliableWriterProtocol_t DDS_DiscoveryConfigQosPolicy::publication_writer
```

RTPS protocol-related configuration settings for the RTPS reliable writer associated with a built-in publication writer.

For details, refer to the **DDS\_RtpsReliableWriterProtocol\_t** (p. 1061)

**[default]**

```
low_watermark 0;
high_watermark 1;
heartbeat_period 3.0 seconds;
fast_heartbeat_period 3.0 seconds;
late_joiner_heartbeat_period 3.0 seconds;
virtual_heartbeat_period DDS_DURATION_INFINITE (p. 326);
samples_per_virtual_heartbeat DDS_LENGTH_UNLIMITED (p. 438);
max_heartbeat_retries 10;
inactivate_nonprogressing_readers DDS_BOOLEAN_FALSE (p. 317);
heartbeats_per_max_samples 8;
min_nack_response_delay 0.0 seconds;
max_nack_response_delay 0.0 seconds;
nack_suppression_duration 0.0 seconds;
max_bytes_per_nack_response 131072 bytes;
disable_positive_acks_min_sample_keep_duration 1.0 milliseconds;
disable_positive_acks_max_sample_keep_duration 1.0 seconds;
disable_positive_acks_enable_adaptive_sample_keep_duration DDS_BOOLEAN_TRUE (p. 317);
disable_positive_acks_decrease_sample_keep_duration_factor 95;
disable_positive_acks_increase_sample_keep_duration_factor 150;
min_send_window_size DDS_LENGTH_UNLIMITED (p. 438);
max_send_window_size DDS_LENGTH_UNLIMITED (p. 438);
send_window_update_period 3s;
send_window_increase_factor 105;
send_window_decrease_factor 50;
enable_multicast_periodic_heartbeat DDS_BOOLEAN_FALSE (p. 317);
multicast_resend_threshold 2 readers;
disable_repair_piggyback_heartbeat DDS_BOOLEAN_FALSE (p. 317);
```

### 9.47.2.16 publication\_writer\_data\_lifecycle

```
struct DDS_WriterDataLifecycleQosPolicy DDS_DiscoveryConfigQosPolicy::publication_writer_data_↔
lifecycle
```

Writer data lifecycle settings for a built-in publication writer.

For details, refer to the **DDS\_WriterDataLifecycleQosPolicy** (p. 1256). **DDS\_WriterDataLifecycleQosPolicy**↔  
::**autodispose\_unregistered\_instances** (p. 1257) will always be forced to **DDS\_BOOLEAN\_TRUE** (p. 317).

### 9.47.2.17 subscription\_writer

```
struct DDS_RtpsReliableWriterProtocol_t DDS_DiscoveryConfigQosPolicy::subscription_writer
```

RTPS protocol-related configuration settings for the RTPS reliable writer associated with a built-in subscription writer.

For details, refer to the **DDS\_RtpsReliableWriterProtocol\_t** (p. 1061)

#### [default]

```
low_watermark 0;
high_watermark 1;
heartbeat_period 3.0 seconds;
fast_heartbeat_period 3.0 seconds;
late_joiner_heartbeat_period 3.0 seconds;
virtual_heartbeat_period DDS_DURATION_INFINITE (p. 326);
samples_per_virtual_heartbeat DDS_LENGTH_UNLIMITED (p. 438);
max_heartbeat_retries 10;
inactivate_nonprogressing_readers DDS_BOOLEAN_FALSE (p. 317);
heartbeats_per_max_samples 8;
min_nack_response_delay 0.0 seconds;
max_nack_response_delay 0.0 seconds;
nack_suppression_duration 0.0 seconds;
max_bytes_per_nack_response 131072 bytes;
disable_positive_acks_min_sample_keep_duration 1.0 milliseconds;
disable_positive_acks_max_sample_keep_duration 1.0 seconds;
disable_positive_acks_enable_adaptive_sample_keep_duration DDS_BOOLEAN_TRUE (p. 317);
disable_positive_acks_decrease_sample_keep_duration_factor 95;
disable_positive_acks_increase_sample_keep_duration_factor 150;
min_send_window_size DDS_LENGTH_UNLIMITED (p. 438);
max_send_window_size DDS_LENGTH_UNLIMITED (p. 438);
send_window_update_period 3s;
send_window_increase_factor 105;
send_window_decrease_factor 50;
enable_multicast_periodic_heartbeat DDS_BOOLEAN_FALSE (p. 317);
multicast_resend_threshold 2 readers;
disable_repair_piggyback_heartbeat DDS_BOOLEAN_FALSE (p. 317);
```

### 9.47.2.18 subscription\_writer\_data\_lifecycle

```
struct DDS_WriterDataLifecycleQosPolicy DDS_DiscoveryConfigQosPolicy::subscription_writer_data_lifecycle
```

Writer data lifecycle settings for a built-in subscription writer.

For details, refer to the **DDS\_WriterDataLifecycleQosPolicy** (p. 1256). **DDS\_WriterDataLifecycleQosPolicy::autodispose\_unregistered\_instances** (p. 1257) will always be forced to **DDS\_BOOLEAN\_TRUE** (p. 317).

### 9.47.2.19 builtin\_discovery\_plugins

```
DDS_DiscoveryConfigBuiltinPluginKindMask DDS_DiscoveryConfigQosPolicy::builtin_discovery_plugins
```

Mask of built-in discovery plugin kinds.

There are several built-in discovery plugins. This mask enables the different plugins. Any plugin not enabled will not be created.

**[default] DDS\_DISCOVERYCONFIG\_BUILTIN\_SDP** (p. 393)

See also

**DDS\_DiscoveryConfigBuiltinPluginKind** (p. 393)

### 9.47.2.20 enabled\_builtin\_channels

```
DDS_DiscoveryConfigBuiltinChannelKindMask DDS_DiscoveryConfigQosPolicy::enabled_builtin_channels
```

The mask specifying which built-in channels should be enabled.

While there are a number of built-in channels that are used by Connex DDS, the only built-in channel which can currently be enabled or disabled is the Service Request Channel. This channel is used by the Locator Reachability and Topic Query features. If you are not using these features and wish to reduce network traffic and endpoint resource usage, you may disable the service request channel with this QoS.

**[default] DDS\_DISCOVERYCONFIG\_SERVICE\_REQUEST\_CHANNEL** (p. 394)

### 9.47.2.21 participant\_message\_reader\_reliability\_kind

```
DDS_ReliabilityQosPolicyKind DDS_DiscoveryConfigQosPolicy::participant_message_reader_reliability_kind
```

Reliability policy for a built-in participant message reader.

For details, refer to the **DDS\_ReliabilityQosPolicyKind** (p. 434).

**[default] DDS\_BEST\_EFFORT\_RELIABILITY\_QOS** (p. 435)

### 9.47.2.22 participant\_message\_reader

```
struct DDS_RtpsReliableReaderProtocol_t DDS_DiscoveryConfigQosPolicy::participant_message_reader
```

RTPS reliable reader protocol-related configuration settings for a built-in participant message reader. This parameter only has effect if **DDS\_DiscoveryConfigQosPolicy::participant\_message\_reader\_reliability\_kind** (p. 721) is set to **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435).

For details, refer to the **DDS\_RtpsReliableReaderProtocol\_t** (p. 1057)

#### [default]

```
min_heartbeat_response_delay 0.0 seconds;
max_heartbeat_response_delay 0.0 seconds;
heartbeat_suppression_duration 0.0625 seconds;
nack_period 5.0 seconds;
receive_window_size 256;
round_trip_time 0.0 seconds;
app_ack_period 5.0 seconds;
samples_per_app_ack 1;
```

### 9.47.2.23 participant\_message\_writer

```
struct DDS_RtpsReliableWriterProtocol_t DDS_DiscoveryConfigQosPolicy::participant_message_writer
```

RTPS protocol-related configuration settings for the RTPS reliable writer associated with the built-in participant message writer. This parameter only has effect if the matching participant message reader is configured with **DDS\_RELIABLE** ↔ **\_RELIABILITY\_QOS** (p. 435) **DDS\_ReliabilityQosPolicyKind** (p. 434).

For details, refer to the **DDS\_RtpsReliableWriterProtocol\_t** (p. 1061)

#### [default]

```
low_watermark 0;
high_watermark 1;
heartbeat_period 1.0 seconds;
fast_heartbeat_period 1.0 seconds;
late_joiner_heartbeat_period 1.0 seconds;
virtual_heartbeat_period DDS_DURATION_INFINITE (p. 326);
samples_per_virtual_heartbeat DDS_LENGTH_UNLIMITED (p. 438);
max_heartbeat_retries 10;
inactivate_nonprogressing_readers DDS_BOOLEAN_FALSE (p. 317);
heartbeats_per_max_samples 1;
min_nack_response_delay 0.0 seconds;
max_nack_response_delay 0.0 seconds;
nack_suppression_duration 0.0 seconds;
max_bytes_per_nack_response 9216 bytes;
disable_positive_acks_min_sample_keep_duration 1.0 milliseconds;
disable_positive_acks_max_sample_keep_duration 1.0 seconds;
disable_positive_acks_enable_adaptive_sample_keep_duration DDS_BOOLEAN_TRUE (p. 317);
disable_positive_acks_decrease_sample_keep_duration_factor 95;
disable_positive_acks_increase_sample_keep_duration_factor 150;
min_send_window_size DDS_LENGTH_UNLIMITED (p. 438);
```



max\_send\_window\_size **DDS\_LENGTH\_UNLIMITED** (p. 438);  
 send\_window\_update\_period 1s;  
 send\_window\_increase\_factor 105;  
 send\_window\_decrease\_factor 50;  
 enable\_multicast\_periodic\_heartbeat **DDS\_BOOLEAN\_FALSE** (p. 317);  
 multicast\_resend\_threshold 2 readers;  
 disable\_repair\_piggyback\_heartbeat **DDS\_BOOLEAN\_FALSE** (p. 317);

#### 9.47.2.24 publication\_writer\_publish\_mode

```
struct DDS_PublishModeQosPolicy DDS_DiscoveryConfigQosPolicy::publication_writer_publish_mode
```

Publish mode policy for the built-in publication writer.

Determines whether the Discovery built-in publication **DDSDataWriter** (p. 1321) publishes data synchronously or asynchronously and how.

#### 9.47.2.25 subscription\_writer\_publish\_mode

```
struct DDS_PublishModeQosPolicy DDS_DiscoveryConfigQosPolicy::subscription_writer_publish_mode
```

Publish mode policy for the built-in subscription writer.

Determines whether the Discovery built-in subscription **DDSDataWriter** (p. 1321) publishes data synchronously or asynchronously and how.

#### 9.47.2.26 asynchronous\_publisher

```
struct DDS_AsynchronousPublisherQosPolicy DDS_DiscoveryConfigQosPolicy::asynchronous_publisher
```

Asynchronous publishing settings for the discovery **DDSPublisher** (p. 1550) and all entities that are created by it.

#### 9.47.2.27 default\_domain\_announcement\_period

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::default_domain_announcement_period
```

The period to announce a participant to the default domain 0.

The period at which a participant will announce itself to the default domain 0 using the default UDPv4 multicast group address for discovery traffic on that domain.

For domain 0, the default discovery multicast address is 239.255.0.1:7400.

To disable announcement to the default domain, set this period to **DDS\_DURATION\_INFINITE** (p. 326).

When this period is set to a value other than **DDS\_DURATION\_INFINITE** (p. 326) and **DDS\_DiscoveryConfigQosPolicy::ignore\_default\_domain\_announcements** (p. 724) is set to **DDS\_BOOLEAN\_FALSE** (p. 317), you can get information about participants running in different domains by creating a participant in domain 0 and implementing the `on_data_available` callback in the **DDS\_ParticipantBuiltinTopicData** (p. 979) built-in DataReader's listener.

You can learn the domain ID associated with a participant by looking at the field **DDS\_ParticipantBuiltinTopicData::domain\_id** (p. 981).

**[default]** 30 seconds

**[range]** [1 nanosec, 1 year] or **DDS\_DURATION\_INFINITE** (p. 326)

See also

**DDS\_ParticipantBuiltinTopicData::domain\_id** (p. 981)

**DDS\_DiscoveryConfigQosPolicy::ignore\_default\_domain\_announcements** (p. 724)

### 9.47.2.28 ignore\_default\_domain\_announcements

```
DDS_Boolean DDS_DiscoveryConfigQosPolicy::ignore_default_domain_announcements
```

Used to ignore the announcements received by a participant on the default domain 0 corresponding to participants running on domains IDs other than 0.

This setting only applies to participants running on the default domain 0 and using the default port mapping.

When this setting is set to **DDS\_BOOLEAN\_TRUE** (p. 317), a participant running on the default domain 0 will ignore announcements from participants running on different domain IDs.

When this setting is set to **DDS\_BOOLEAN\_FALSE** (p. 317), a participant running on the default domain 0 will provide announcements from participants running on different domain IDs to the application via the **DDS\_ParticipantBuiltinTopicData** (p. 979) built-in DataReader.

**[default]** **DDS\_BOOLEAN\_TRUE** (p. 317)

See also

**DDS\_ParticipantBuiltinTopicData::domain\_id** (p. 981)

**DDS\_DiscoveryConfigQosPolicy::default\_domain\_announcement\_period** (p. 723)

### 9.47.2.29 service\_request\_writer

```
struct DDS_RtpsReliableWriterProtocol_t DDS_DiscoveryConfigQosPolicy::service_request_writer
```

RTPS protocol-related configuration settings for the RTPS reliable writer associated with the built-in **DDS\_ServiceRequest** (p. 1097) writer.

For details, refer to the **DDS\_RtpsReliableWriterProtocol\_t** (p. 1061)

**[default]**

low\_watermark 0;

high\_watermark 1;

heartbeat\_period 3.0 seconds;

fast\_heartbeat\_period 3.0 seconds;

late\_joiner\_heartbeat\_period 3.0 seconds;

virtual\_heartbeat\_period **DDS\_DURATION\_INFINITE** (p. 326);

samples\_per\_virtual\_heartbeat **DDS\_LENGTH\_UNLIMITED** (p. 438);

max\_heartbeat\_retries 10;

inactivate\_nonprogressing\_readers **DDS\_BOOLEAN\_FALSE** (p. 317);  
 heartbeats\_per\_max\_samples 8;  
 min\_nack\_response\_delay 0.0 seconds;  
 max\_nack\_response\_delay 0.0 seconds;  
 nack\_suppression\_duration 0.0 seconds;  
 max\_bytes\_per\_nack\_response 131072 bytes;  
 disable\_positive\_acks\_min\_sample\_keep\_duration 1.0 milliseconds;  
 disable\_positive\_acks\_max\_sample\_keep\_duration 1.0 seconds;  
 disable\_positive\_acks\_enable\_adaptive\_sample\_keep\_duration **DDS\_BOOLEAN\_TRUE** (p. 317);  
 disable\_positive\_acks\_decrease\_sample\_keep\_duration\_factor 95;  
 disable\_positive\_acks\_increase\_sample\_keep\_duration\_factor 150;  
 min\_send\_window\_size **DDS\_LENGTH\_UNLIMITED** (p. 438);  
 max\_send\_window\_size **DDS\_LENGTH\_UNLIMITED** (p. 438);  
 send\_window\_update\_period 3s;  
 send\_window\_increase\_factor 105;  
 send\_window\_decrease\_factor 50;  
 enable\_multicast\_periodic\_heartbeat **DDS\_BOOLEAN\_FALSE** (p. 317);  
 multicast\_resend\_threshold 2 readers;  
 disable\_repair\_piggyback\_heartbeat **DDS\_BOOLEAN\_FALSE** (p. 317);

#### 9.47.2.30 service\_request\_writer\_data\_lifecycle

```
struct DDS_WriterDataLifecycleQosPolicy DDS_DiscoveryConfigQosPolicy::service_request_writer_↔
data_lifecycle
```

Writer data lifecycle settings for a built-in **DDS\_ServiceRequest** (p. 1097) writer.

For details, refer to the **DDS\_WriterDataLifecycleQosPolicy** (p. 1256).

#### 9.47.2.31 service\_request\_writer\_publish\_mode

```
struct DDS_PublishModeQosPolicy DDS_DiscoveryConfigQosPolicy::service_request_writer_publish_mode
```

Publish mode policy for the built-in service request writer.

Determines whether the Discovery built-in service request **DDSDataWriter** (p. 1321) publishes data synchronously or asynchronously and how.

#### 9.47.2.32 service\_request\_reader

```
struct DDS_RtpsReliableReaderProtocol_t DDS_DiscoveryConfigQosPolicy::service_request_reader
```

RTPS reliable reader protocol-related configuration settings for a built-in **DDS\_ServiceRequest** (p. 1097) reader.

For details, refer to the **DDS\_RtpsReliableReaderProtocol\_t** (p. 1057)

##### [default]

min\_heartbeat\_response\_delay 0.0 seconds;  
 max\_heartbeat\_response\_delay 0.0 seconds;  
 heartbeat\_suppression\_duration 0.0625 seconds;  
 nack\_period 5.0 seconds;  
 receive\_window\_size 256;  
 round\_trip\_time 0.0 seconds;  
 app\_ack\_period 5.0 seconds;  
 samples\_per\_app\_ack 1;

### 9.47.2.33 locator\_reachability\_assert\_period

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::locator_reachability_assert_period
```

Period at which this DomainParticipant will assert the locators discovered from other DomainParticipants.

This setting configures the period at which this **DDSDomainParticipant** (p. 1351) will ping all the locators that it has discovered from other DomainParticipants. This period should be strictly less than **DDS\_DiscoveryConfigQosPolicy::locator\_reachability\_lease\_duration** (p. 726).

If **DDS\_DiscoveryConfigQosPolicy::locator\_reachability\_lease\_duration** (p. 726) is **DDS\_DURATION\_INFINITE** (p. 326) this parameter is ignored. The DomainParticipant will not assert remote locators.

**[default]** 20 seconds

**[range]** [1 nanosec,1 year]

See also

**DDS\_DiscoveryConfigQosPolicy::locator\_reachability\_lease\_duration** (p. 726)

### 9.47.2.34 locator\_reachability\_lease\_duration

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::locator_reachability_lease_duration
```

The time period after which other DomainParticipants can consider one of their locators as "unreachable" if they do not receive a REACHABILITY PING from this DomainParticipant.

For the purpose of this explanation, we will use 'local' to refer to the DomainParticipant in which we configure `locator_reachability_lease_duration` and 'remote' to refer to the other DomainParticipants communicating with the local DomainParticipant.

This setting configures a timeout announced to the remote DomainParticipants. This timeout is used by the remote DomainParticipants as the maximum period by which a remote locator must be asserted by the local DomainParticipant (through a REACHABILITY PING message) before considering this locator as "unreachable" from the local DomainParticipant.

When a remote DomainParticipant detects that one of its locators is not reachable from the local DomainParticipant, it will notify the local DomainParticipant of this event. From that moment on, and until notified otherwise, the local DomainParticipant will not send RTPS messages to remote DomainParticipants using this locator.

If this value is set to **DDS\_DURATION\_INFINITE** (p. 326), the local DomainParticipant will send RTPS messages to a remote DomainParticipant on the locators announced by the remote DomainParticipant, regardless of whether or not the remote DomainParticipant can be reached using these locators.

**[default]** **DDS\_DURATION\_INFINITE** (p. 326)

**[range]** [1 nanosec,1 year] or **DDS\_DURATION\_INFINITE** (p. 326)

### 9.47.2.35 locator\_reachability\_change\_detection\_period

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::locator_reachability_change_detection_period
```

Period at which this DomainParticipant will check if its locators are reachable from other DomainParticipants.

This setting determines the maximum period at which this DomainParticipant will check to see if its locators are reachable from other DomainParticipants according to the other DomainParticipants' **DDS\_DiscoveryConfigQosPolicy** ← **::locator\_reachability\_lease\_duration** (p. 726) value.

If **DDS\_DiscoveryConfigQosPolicy::locator\_reachability\_lease\_duration** (p. 726) is **DDS\_DURATION\_INFINITE** (p. 326) this parameter is ignored. The DomainParticipant will not schedule an event to see if its locators are reachable from other DomainParticipants.

**[default]** 60 seconds

**[range]** [1 nanosec,1 year]

See also

**DDS\_DiscoveryConfigQosPolicy::locator\_reachability\_lease\_duration** (p. 726)

### 9.47.2.36 secure\_volatile\_writer

```
struct DDS_RtpsReliableWriterProtocol_t DDS_DiscoveryConfigQosPolicy::secure_volatile_writer
```

RTPS protocol-related configuration settings for the RTPS reliable writer associated with the built-in secure volatile writer.

For details, refer to the **DDS\_RtpsReliableWriterProtocol\_t** (p. 1061)

**[default]**

```
low_watermark 0;
high_watermark 1;
heartbeat_period 1.0 second;
fast_heartbeat_period 250.0 milliseconds;
late_joiner_heartbeat_period 1.0 second;
virtual_heartbeat_period DDS_DURATION_INFINITE (p. 326);
samples_per_virtual_heartbeat DDS_LENGTH_UNLIMITED (p. 438);
max_heartbeat_retries DDS_LENGTH_UNLIMITED (p. 438);
inactivate_nonprogressing_readers DDS_BOOLEAN_FALSE (p. 317);
heartbeats_per_max_samples 1;
min_nack_response_delay 0.0 seconds;
max_nack_response_delay 0.0 seconds;
nack_suppression_duration 0.0 seconds;
max_bytes_per_nack_response 9216 bytes;
disable_positive_acks_min_sample_keep_duration 1.0 millisecond;
disable_positive_acks_max_sample_keep_duration 1.0 second;
disable_positive_acks_enable_adaptive_sample_keep_duration DDS_BOOLEAN_TRUE (p. 317);
```

```

disable_positive_acks_decrease_sample_keep_duration_factor 95;
disable_positive_acks_increase_sample_keep_duration_factor 150;
min_send_window_size DDS_LENGTH_UNLIMITED (p. 438);
max_send_window_size DDS_LENGTH_UNLIMITED (p. 438);
send_window_update_period 1.0 second;
send_window_increase_factor 105;
send_window_decrease_factor 50;
enable_multicast_periodic_heartbeat DDS_BOOLEAN_FALSE (p. 317);
multicast_resend_threshold 2 readers;
disable_repair_piggyback_heartbeat DDS_BOOLEAN_FALSE (p. 317);

```

### 9.47.2.37 secure\_volatile\_writer\_publish\_mode

```
struct DDS_PublishModeQosPolicy DDS_DiscoveryConfigQosPolicy::secure_volatile_writer_publish_mode
```

Publish mode policy for the built-in secure volatile writer.

Determines whether the built-in secure volatile **DDSDataWriter** (p.1321) publishes data synchronously or asynchronously and how.

### 9.47.2.38 secure\_volatile\_reader

```
struct DDS_RtpsReliableReaderProtocol_t DDS_DiscoveryConfigQosPolicy::secure_volatile_reader
```

RTPS reliable reader protocol-related configuration settings for the built-in secure volatile reader.

For details, refer to the **DDS\_RtpsReliableReaderProtocol\_t** (p. 1057)

#### [default]

```

min_heartbeat_response_delay 0.0 seconds;
max_heartbeat_response_delay 0.0 seconds;
heartbeat_suppression_duration 0.0625 seconds;
nack_period 5.0 seconds;
receive_window_size 256;
round_trip_time 0.0 seconds;
app_ack_period 5.0 seconds;
samples_per_app_ack 1;

```

### 9.47.2.39 endpoint\_type\_object\_lb\_serialization\_threshold

```
DDS_Long DDS_DiscoveryConfigQosPolicy::endpoint_type_object_lb_serialization_threshold
```

Option to reduce the size required to propagate a TypeObject in Simple Endpoint Discovery.

Minimum size (in bytes) of the serialized TypeObject that will trigger the serialization of a TypeObjectLb instead of the regular TypeObject.

For example, setting this property to 1000 will trigger the serialization of the TypeObjectLb for TypeObjects whose serialized size is greater than 1000 Bytes.

The sentinel value -1 disables TypeObject compression.

**[default]** 0. The default value 0 enables TypeObject compression by always sending TypeObjectLb.

**[range]** [-1, 2147483647]

### 9.47.2.40 dns\_tracker\_polling\_period

```
struct DDS_Duration_t DDS_DiscoveryConfigQosPolicy::dns_tracker_polling_period
```

Duration that specifies the period used by the DNS tracker to poll the DNS service and check for changes in the hostnames.

RTI Connexx allows the use of hostnames instead of IP addresses when configuring initial peers for specific transports (e.g.: UDPv4 and UDPv6). The DNS tracker keeps the IP addresses of these hostnames updated. The DNS tracker builds a list of hostnames from the initial peers of a DomainParticipant, queries the DNS for those hostnames, and updates the resolved IP addresses when the IP addresses change. The frequency of these queries is defined by the DNS tracker polling period. When the period is set to **DDS\_DURATION\_INFINITE** (p. 326), the tracker is disabled.

RTI Connexx keeps information regarding the hostnames of peers if they are part of the **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732). The information regarding peers added through the **DDSDomainParticipant::add\_peer** (p. 1409) operation is kept only if the DNS tracker has been enabled before adding a peer.

**[default]** **DDS\_DURATION\_INFINITE** (p. 326)

**[range]** [1 second,1 year], **DDS\_DURATION\_INFINITE** (p. 326)

### 9.47.2.41 participant\_configuration\_writer\_publish\_mode

```
struct DDS_PublishModeQosPolicy DDS_DiscoveryConfigQosPolicy::participant_configuration_writer_↔  
publish_mode
```

Publish mode policy for the built-in participant configuration writer.

Determines whether the Discovery built-in participant configuration **DDSDataWriter** (p. 1321) publishes data synchronously or asynchronously and how.

### 9.47.2.42 participant\_configuration\_writer

```
struct DDS_RtpsReliableWriterProtocol_t DDS_DiscoveryConfigQosPolicy::participant_configuration_↔  
_writer
```

RTPS protocol-related configuration settings for the RTPS reliable writer associated with a built-in participant configuration writer.

For details, refer to the **DDS\_RtpsReliableWriterProtocol\_t** (p. 1061)

**[default]**

```
low_watermark 0;  
high_watermark 1;  
heartbeat_period 3.0 seconds;  
fast_heartbeat_period 3.0 seconds;  
late_joiner_heartbeat_period 3.0 seconds;  
virtual_heartbeat_period DDS_DURATION_INFINITE (p. 326);  
samples_per_virtual_heartbeat DDS_LENGTH_UNLIMITED (p. 438);  
max_heartbeat_retries 10;
```

```

inactivate_nonprogressing_readers DDS_BOOLEAN_FALSE (p. 317);
heartbeats_per_max_samples 8;
min_nack_response_delay 0.0 seconds;
max_nack_response_delay 0.0 seconds;
nack_suppression_duration 0.0 seconds;
max_bytes_per_nack_response 131072 bytes;
disable_positive_acks_min_sample_keep_duration 1.0 milliseconds;
disable_positive_acks_max_sample_keep_duration 1.0 seconds;
disable_positive_acks_enable_adaptive_sample_keep_duration DDS_BOOLEAN_TRUE (p. 317);
disable_positive_acks_decrease_sample_keep_duration_factor 95;
disable_positive_acks_increase_sample_keep_duration_factor 150;
min_send_window_size DDS_LENGTH_UNLIMITED (p. 438);
max_send_window_size DDS_LENGTH_UNLIMITED (p. 438);
send_window_update_period 3s;
send_window_increase_factor 105;
send_window_decrease_factor 50;
enable_multicast_periodic_heartbeat DDS_BOOLEAN_FALSE (p. 317);
multicast_resend_threshold 2 readers;
disable_repair_piggyback_heartbeat DDS_BOOLEAN_FALSE (p. 317);

```

#### 9.47.2.43 participant\_configuration\_writer\_data\_lifecycle

```

struct DDS_WriterDataLifecycleQosPolicy DDS_DiscoveryConfigQosPolicy::participant_configuration↔
_writer_data_lifecycle

```

Writer data lifecycle settings for a built-in participant configuration writer.

For details, refer to the **DDS\_WriterDataLifecycleQosPolicy** (p. 1256). **DDS\_WriterDataLifecycleQosPolicy↔::autodispose\_unregistered\_instances** (p. 1257) will always be forced to **DDS\_BOOLEAN\_TRUE** (p. 317).

#### 9.47.2.44 participant\_configuration\_reader

```

struct DDS_RtpsReliableReaderProtocol_t DDS_DiscoveryConfigQosPolicy::participant_configuration↔
_reader

```

RTPS protocol-related configuration settings for the RTPS reliable reader associated with a built-in participant configuration reader.

For details, refer to the **DDS\_RtpsReliableReaderProtocol\_t** (p. 1057)

##### [default]

```

min_heartbeat_response_delay 0.0 seconds;
max_heartbeat_response_delay 0.0 seconds;
heartbeat_suppression_duration 0.0625 seconds;
nack_period 5.0 seconds;
receive_window_size 256;
round_trip_time 0.0 seconds;
app_ack_period 5.0 seconds;
samples_per_app_ack 1;

```



### 9.47.2.45 participant\_configuration\_reader\_resource\_limits

```
struct DDS_BuiltinTopicReaderResourceLimits_t DDS_DiscoveryConfigQosPolicy::participant_configuration←
_reader_resource_limits
```

Resource limits for the built-in topic participant configuration reader.

For details, see `DDS_BuiltinTopicReaderResourceLimits_t` (p. 605).

## 9.48 DDS\_DiscoveryQosPolicy Struct Reference

<<*extension*>> (p. 237) Configures the mechanism used by the middleware to automatically discover and connect with new remote applications.

### Public Attributes

- struct **DDS\_StringSeq enabled\_transports**  
*The transports available for use by the Discovery mechanism.*
- struct **DDS\_StringSeq initial\_peers**  
*Determines the initial list of peers that will be contacted by the Discovery mechanism to send announcements about the presence of this participant.*
- struct **DDS\_StringSeq multicast\_receive\_addresses**  
*Specifies the multicast group addresses on which discovery-related **meta-traffic** can be received by the Domain←→ Participant.*
- **DDS\_Long metatraffic\_transport\_priority**  
*The transport priority to use for the Discovery meta-traffic.*
- **DDS\_Boolean accept\_unknown\_peers**  
*Whether to accept a new participant that is not in the initial peers list.*
- **DDS\_Boolean enable\_endpoint\_discovery**  
*Whether to automatically enable endpoint discovery for all the remote participants.*

### 9.48.1 Detailed Description

<<*extension*>> (p. 237) Configures the mechanism used by the middleware to automatically discover and connect with new remote applications.

Entity:

**DDSDomainParticipant** (p. 1351)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

## 9.48.2 Usage

This QoS policy identifies where on the network this application can *potentially* discover other applications with which to communicate.

The middleware will periodically send network packets to these locations, announcing itself to any remote applications that may be present, and will listen for announcements from those applications.

This QoS policy is an extension to the DDS standard.

See also

**NDDS\_DISCOVERY\_PEERS** (p. 464)

**DDS\_DiscoveryConfigQosPolicy** (p. 712)

## 9.48.3 Member Data Documentation

### 9.48.3.1 enabled\_transports

```
struct DDS_StringSeq DDS_DiscoveryQosPolicy::enabled_transports
```

The transports available for use by the Discovery mechanism.

Only these transports can be used by the discovery mechanism to send meta-traffic via the builtin endpoints (built-in **DDSDataReader** (p. 1288) and **DDSDataWriter** (p. 1321)).

Also determines the unicast addresses on which the Discovery mechanism will listen for meta-traffic. These along with the `domain_id` and `participant_id` determine the unicast locators on which the Discovery mechanism can receive meta-data.

The memory for the strings in this sequence is managed according to the conventions described in **String Conventions** (p. 552). In particular, be careful to avoid a situation in which RTI Connex allocates a string on your behalf and you then reuse that string in such a way that RTI Connex believes it to have more memory allocated to it than it actually does.

Alias names for the builtin transports are defined in **TRANSPORT\_BUILTIN** (p. 443). These alias names are case sensitive and should be written in lowercase.

**[default]** Empty sequence. All the transports available to the DomainParticipant are available for use by the Discovery mechanism.

**[range]** Sequence of non-null, non-empty strings.

### 9.48.3.2 initial\_peers

```
struct DDS_StringSeq DDS_DiscoveryQosPolicy::initial_peers
```

Determines the initial list of peers that will be contacted by the Discovery mechanism to send announcements about the presence of this participant.

As part of the participant discovery phase, the **DDSDomainParticipant** (p. 1351) will announce itself to the domain by sending participant DATA messages. The `initial_peers` specifies the initial list of peers that will be contacted. A remote **DDSDomainParticipant** (p. 1351) is discovered by receiving participant announcements from a remote peer. When the new remote **DDSDomainParticipant** (p. 1351) has been added to the participant's database, the endpoint discovery phase commences and information about the DataWriters and DataReaders is exchanged.

Each element of this list must be a peer descriptor in the proper format (see **Peer Descriptor Format** (p. 465)).

**[default]** builtin.udpv4://239.255.0.1, builtin.udpv4://127.0.0.1, builtin.shmem:// (See also **NDDS\_DISCOVERY\_PEERS** (p. 464))

**[range]** Sequence of arbitrary length.

See also

**Peer Descriptor Format** (p. 465)

**DDSDomainParticipant::add\_peer()** (p. 1409)

### 9.48.3.3 multicast\_receive\_addresses

```
struct DDS_StringSeq DDS_DiscoveryQosPolicy::multicast_receive_addresses
```

Specifies the multicast group addresses on which discovery-related **meta-traffic** can be received by the Domain↔ Participant.

The multicast group addresses on which the Discovery mechanism will listen for meta-traffic.

Each element of this list must be a valid multicast address (IPv4 or IPv6) in the proper format (see **Address Format** (p. 466)).

The `domain_id` determines the multicast port on which the Discovery mechanism can receive meta-data.

If **NDDS\_DISCOVERY\_PEERS** does *not* contain a multicast address, then the string sequence **DDS\_DiscoveryQos↔ Policy::multicast\_receive\_addresses** (p. 733) is cleared and the RTI discovery process will not listen for discovery messages via multicast.

If **NDDS\_DISCOVERY\_PEERS** contains one or more multicast addresses, the addresses will be stored in **DDS\_↔ DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733), starting at element 0. They will be stored in the order they appear **NDDS\_DISCOVERY\_PEERS**.

Note: Currently, RTI Connext will only listen for discovery traffic on the first multicast address (element 0) in **DDS\_↔ DiscoveryQosPolicy::multicast\_receive\_addresses** (p. 733).

**[default]** builtin.udpv4://239.255.0.1 (See also **NDDS\_DISCOVERY\_PEERS** (p. 464))

**[range]** Sequence of length [0,1], whose elements are multicast addresses. Currently only the first multicast address (if any) is used. The rest are ignored.

See also

**Address Format** (p. 466)

#### 9.48.3.4 metatraffic\_transport\_priority

```
DDS_Long DDS_DiscoveryQosPolicy::metatraffic_transport_priority
```

The transport priority to use for the Discovery meta-traffic.

The discovery metatraffic will be sent by the built-in **DDSDataWriter** (p. 1321) using this transport priority.

**[default]** 0

**[range]** [0, MAX\_UINT]

#### 9.48.3.5 accept\_unknown\_peers

```
DDS_Boolean DDS_DiscoveryQosPolicy::accept_unknown_peers
```

Whether to accept a new participant that is not in the initial peers list.

If **DDS\_BOOLEAN\_FALSE** (p. 317), the participant will only communicate with those in the initial peers list and those added via **DDSDomainParticipant::add\_peer()** (p. 1409).

If **DDS\_BOOLEAN\_TRUE** (p. 317), the participant will also communicate with all discovered remote participants.

Note: If `accept_unknown_peers` is **DDS\_BOOLEAN\_FALSE** (p. 317) and shared memory is disabled, applications on the same node will *not* communicate if only 'localhost' is specified in the peers list. If shared memory is disabled or 'shmem://' is not specified in the peers list, to communicate with other applications on the same node through the loopback interface, you must put the actual node address or hostname in **NDDS\_DISCOVERY\_PEERS** (p. 464).

**[default]** **DDS\_BOOLEAN\_TRUE** (p. 317)

#### 9.48.3.6 enable\_endpoint\_discovery

```
DDS_Boolean DDS_DiscoveryQosPolicy::enable_endpoint_discovery
```

Whether to automatically enable endpoint discovery for all the remote participants.

If **DDS\_BOOLEAN\_TRUE** (p. 317), endpoint discovery will automatically occur for every discovered remote participant.

If **DDS\_BOOLEAN\_FALSE** (p. 317), endpoint discovery will be initially disabled and manual activation is required for each discovered participant by calling **DDSDomainParticipant::resume\_endpoint\_discovery** (p. 1400).

**[default]** **DDS\_BOOLEAN\_TRUE** (p. 317)

## 9.49 DDS\_DomainParticipantConfigParams\_t Struct Reference

<<**extension**>> (p. 237) Input parameters for creating a participant from configuration. It allows to modify or override some of the properties of the entities defined in the configuration.

## Public Attributes

- int **domain\_id**  
Domain ID from which the **DDSDomainParticipant** (p. 1351) is created.
- char \* **participant\_name**  
Name assigned to the **DDSDomainParticipant** (p. 1351).
- char \* **participant\_qos\_library\_name**  
QoS library name containing the QoS profile from which the **DDSDomainParticipant** (p. 1351) is created.
- char \* **participant\_qos\_profile\_name**  
QoS profile name from which the **DDSDomainParticipant** (p. 1351) is created.
- char \* **domain\_entity\_qos\_library\_name**  
QoS library name containing the QoS profile from which the all the **DDSDomainEntity** (p. 1350) defined under the participant configuration are created.
- char \* **domain\_entity\_qos\_profile\_name**  
QoS profile name from which the all the **DDSDomainEntity** (p. 1350) defined under the participant configuration are created.

### 9.49.1 Detailed Description

<<**extension**>> (p. 237) Input paramaters for creating a participant from configuration. It allows to modify or override some of the properties of the entities defined in the configuration.

### 9.49.2 Member Data Documentation

#### 9.49.2.1 domain\_id

```
int DDS_DomainParticipantConfigParams_t::domain_id
```

Domain ID from which the **DDSDomainParticipant** (p. 1351) is created.

Allows overriding the domain ID defined in the configuration for the participant to be created. If the special value **DDS↔\_DOMAIN\_ID\_USE\_XML\_CONFIG** (p. 518) is specified then the ID in the configuration will be used.

#### 9.49.2.2 participant\_name

```
char* DDS_DomainParticipantConfigParams_t::participant_name
```

Name assigned to the **DDSDomainParticipant** (p. 1351).

This is the name the name that will be set in the **DDS\_DomainParticipantQos::participant\_name** (p. 745). It allows overriding the participant name that is generated automatically.

When this member is lexicographically equal to the special value **DDS\_ENTITY\_NAME\_USE\_XML\_CONFIG** (p. 518) then an automatically generated name will be assigned.

### 9.49.2.3 participant\_qos\_library\_name

```
char* DDS_DomainParticipantConfigParams_t::participant_qos_library_name
```

QoS library name containing the QoS profile from which the **DDSDomainParticipant** (p. 1351) is created.

Allows overriding the QoS defined in the configuration for the participant to be created. This value only affects to the **DDSDomainParticipant** (p. 1351).

When this member is lexicographically equal to the special value **DDS\_QOS\_ELEMENT\_NAME\_USE\_XML\_CONFIG** (p. 518) then the QoS library from the configuration will be applied. Also, the same action will apply for the QoS profile and the value in **DDS\_DomainParticipantConfigParams\_t::participant\_qos\_profile\_name** (p. 736) will be ignored.

### 9.49.2.4 participant\_qos\_profile\_name

```
char* DDS_DomainParticipantConfigParams_t::participant_qos_profile_name
```

QoS profile name from which the **DDSDomainParticipant** (p. 1351) is created.

Allows overriding the QoS defined in the configuration for the participant to be created. This value only affects to the **DDSDomainParticipant** (p. 1351).

When this member is lexicographically equal to the special value **DDS\_QOS\_ELEMENT\_NAME\_USE\_XML\_CONFIG** (p. 518) then the QoS profile from the configuration will be applied. Also, the same action will apply for the QoS library and the value in **DDS\_DomainParticipantConfigParams\_t::participant\_qos\_library\_name** (p. 735) will be ignored.

### 9.49.2.5 domain\_entity\_qos\_library\_name

```
char* DDS_DomainParticipantConfigParams_t::domain_entity_qos_library_name
```

QoS library name containing the QoS profile from which the all the **DDSDomainEntity** (p. 1350) defined under the participant configuration are created.

Allows overriding the QoS defined in the configuration for the domain entities to be created. This value only affects to the **DDSDomainEntity** (p. 1350).

When this member is lexicographically equal to the special value **DDS\_QOS\_ELEMENT\_NAME\_USE\_XML\_CONFIG** (p. 518) then the QoS library from the configuration will be applied. Also, the same action will apply for the QoS profile and the value in **DDS\_DomainParticipantConfigParams\_t::domain\_entity\_qos\_profile\_name** (p. 736) will be ignored.

### 9.49.2.6 domain\_entity\_qos\_profile\_name

```
char* DDS_DomainParticipantConfigParams_t::domain_entity_qos_profile_name
```

QoS profile name from which the all the **DDSDomainEntity** (p. 1350) defined under the participant configuration are created.

Allows overriding the QoS defined in the configuration for the domain entities to be created. This value only affects to the **DDSDomainEntity** (p. 1350).

When this member is lexicographically equal to the special value **DDS\_QOS\_ELEMENT\_NAME\_USE\_XML\_CONFIG** (p. 518) then the QoS profile from the configuration will be applied. Also, the same action will apply for the QoS library and the value in **DDS\_DomainParticipantConfigParams\_t::domain\_entity\_qos\_library\_name** (p. 736) will be ignored.

## 9.50 DDS\_DomainParticipantFactoryQos Struct Reference

QoS policies supported by a `DDSDomainParticipantFactory` (p. 1426).

### Public Member Functions

- bool **operator==** (const `DDS_DomainParticipantFactoryQos` &r) const  
*Compares two DomainParticipantFactoryQos objects for equality.*
- bool **operator!=** (const `DDS_DomainParticipantFactoryQos` &r) const  
*Compares two DomainParticipantFactoryQos objects for inequality.*
- `DDS_ReturnCode_t` **print** () const  
*Prints this `DDS_DomainParticipantFactoryQos` (p. 737) to stdout.*
- `DDS_ReturnCode_t` **to\_string** (char \*string, `DDS_UnsignedLong` &string\_size) const  
*Obtains a string representation of this `DDS_DomainParticipantQos` (p. 741).*
- `DDS_ReturnCode_t` **to\_string** (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_DomainParticipantFactoryQos` &base) const  
*Obtains a string representation of this `DDS_DomainParticipantFactoryQos` (p. 737).*
- `DDS_ReturnCode_t` **to\_string** (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_QosPrintFormat` &format) const  
*Obtains a string representation of this `DDS_DomainParticipantFactoryQos` (p. 737).*
- `DDS_ReturnCode_t` **to\_string** (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_DomainParticipantFactoryQos` &base, const `DDS_QosPrintFormat` &format) const  
*Obtains a string representation of this `DDS_DomainParticipantFactoryQos` (p. 737).*
- `DDS_ReturnCode_t` **to\_string** (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_QosPrintAll_t` &) const  
*Obtains a string representation of this `DDS_DomainParticipantFactoryQos` (p. 737).*
- `DDS_ReturnCode_t` **to\_string** (char \*string, `DDS_UnsignedLong` &string\_size, const `DDS_QosPrintAll_t` &, const `DDS_QosPrintFormat` &format) const  
*Obtains a string representation of this `DDS_DomainParticipantFactoryQos` (p. 737).*

### Public Attributes

- struct `DDS_EntityFactoryQosPolicy` **entity\_factory**  
*Entity factory policy, `ENTITY_FACTORY` (p. 402).*
- struct `DDS_SystemResourceLimitsQosPolicy` **resource\_limits**  
*<<extension>> (p. 237) System resource limits, `SYSTEM_RESOURCE_LIMITS` (p. 440).*
- struct `DDS_ProfileQosPolicy` **profile**  
*<<extension>> (p. 237) Qos profile policy, `PROFILE` (p. 418).*
- struct `DDS_LoggingQosPolicy` **logging**  
*<<extension>> (p. 237) Logging qos policy, `LOGGING` (p. 411).*
- struct `DDS_MonitoringQosPolicy` **monitoring**  
*<<extension>> (p. 237) Monitoring qos policy, `MONITORING` (p. 412).*

### 9.50.1 Detailed Description

QoS policies supported by a **DDSDomainParticipantFactory** (p. 1426).

Entity:

**DDSDomainParticipantFactory** (p. 1426)

See also

**QoS Policies** (p. 353) and allowed ranges within each Qos.

### 9.50.2 Member Function Documentation

#### 9.50.2.1 operator==( )

```
bool DDS_DomainParticipantFactoryQos::operator==(
    const DDS_DomainParticipantFactoryQos & r ) const [inline]
```

Compares two DomainParticipantFactoryQos objects for equality.

See also

**DDS\_DomainParticipantFactoryQos\_equals** (p. 42)

References **DDS\_DomainParticipantFactoryQos\_equals()**.

#### 9.50.2.2 operator!=( )

```
bool DDS_DomainParticipantFactoryQos::operator!=(
    const DDS_DomainParticipantFactoryQos & r ) const [inline]
```

Compares two DomainParticipantFactoryQos objects for inequality.

See also

**DDS\_DomainParticipantFactoryQos\_equals** (p. 42)

References **DDS\_DomainParticipantFactoryQos\_equals()**.



### 9.50.3 Member Data Documentation

#### 9.50.3.1 entity\_factory

```
struct DDS_EntityFactoryQosPolicy DDS_DomainParticipantFactoryQos::entity_factory
```

Entity factory policy, **ENTITY\_FACTORY** (p. 402).

#### 9.50.3.2 resource\_limits

```
struct DDS_SystemResourceLimitsQosPolicy DDS_DomainParticipantFactoryQos::resource_limits
```

<<*extension*>> (p. 237) System resource limits, **SYSTEM\_RESOURCE\_LIMITS** (p. 440).

Note: This QoS policy cannot be configured from XML configuration files.

#### 9.50.3.3 profile

```
struct DDS_ProfileQosPolicy DDS_DomainParticipantFactoryQos::profile
```

<<*extension*>> (p. 237) Qos profile policy, **PROFILE** (p. 418).

Note: This QoS policy cannot be configured from XML configuration files.

#### 9.50.3.4 logging

```
struct DDS_LoggingQosPolicy DDS_DomainParticipantFactoryQos::logging
```

<<*extension*>> (p. 237) Logging qos policy, **LOGGING** (p. 411).

#### 9.50.3.5 monitoring

```
struct DDS_MonitoringQosPolicy DDS_DomainParticipantFactoryQos::monitoring
```

<<*extension*>> (p. 237) Monitoring qos policy, **MONITORING** (p. 412).

This QoS policy is used to collect and emit telemetry data of a Connex application using RTI Monitoring Library 2.0.

## 9.51 DDS\_DomainParticipantProtocolStatus Struct Reference

<<*extension*>> (p. 237) The status of a participant's protocol related metrics, like the number of corrupted messages, change in corrupted messages and timestamp of the last corrupted message.

### Public Attributes

- **DDS\_LongLong corrupted\_rtps\_message\_count**  
*The number of corrupted RTPS messages detected by the domain participant.*
- **DDS\_LongLong corrupted\_rtps\_message\_count\_change**  
*The incremental change in the number of corrupted RTPS messages detected by the domain participant since the last time the status was read.*
- struct **DDS\_Time\_t last\_corrupted\_message\_timestamp**  
*The timestamp when the last corrupted RTPS message was detected by the domain participant.*

### 9.51.1 Detailed Description

<<*extension*>> (p. 237) The status of a participant's protocol related metrics, like the number of corrupted messages, change in corrupted messages and timestamp of the last corrupted message.

Entity:

**DDSDomainParticipant** (p. 1351) The corrupted messages are detected by validating the received CRC. The participant protocol status can be obtained by enabling **DDS\_WireProtocolQosPolicy::compute\_crc** (p. 1250) and **DDS\_WireProtocolQosPolicy::check\_crc** (p. 1250) at the publishing and subscribing application respectively.

### 9.51.2 Member Data Documentation

#### 9.51.2.1 corrupted\_rtps\_message\_count

**DDS\_LongLong** DDS\_DomainParticipantProtocolStatus::corrupted\_rtps\_message\_count

The number of corrupted RTPS messages detected by the domain participant.

Counts the corrupted RTPS messages received by the participant. It includes messages belonging to discovery and user traffic.

#### 9.51.2.2 corrupted\_rtps\_message\_count\_change

**DDS\_LongLong** DDS\_DomainParticipantProtocolStatus::corrupted\_rtps\_message\_count\_change

The incremental change in the number of corrupted RTPS messages detected by the domain participant since the last time the status was read.

### 9.51.2.3 last\_corrupted\_message\_timestamp

```
struct DDS_Time_t DDS_DomainParticipantProtocolStatus::last_corrupted_message_timestamp
```

The timestamp when the last corrupted RTPS message was detected by the domain participant.

## 9.52 DDS\_DomainParticipantQos Struct Reference

QoS policies supported by a **DDSDomainParticipant** (p. 1351) entity.

### Public Member Functions

- bool **operator==** (const **DDS\_DomainParticipantQos** &r) const  
*Compares two DomainParticipantQos objects for inequality.*
- bool **operator!=** (const **DDS\_DomainParticipantQos** &r) const  
*Compares two DomainParticipantQos objects for inequality.*
- **DDS\_ReturnCode\_t print** () const  
*Prints this **DDS\_DomainParticipantQos** (p. 741) to stdout.*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DomainParticipantQos** &base) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_DomainParticipantQos** &base, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_DomainParticipantQos** (p. 741).*

### Public Attributes

- struct **DDS\_UserDataQosPolicy user\_data**  
*User data policy, **USER\_DATA** (p. 455).*
- struct **DDS\_EntityFactoryQosPolicy entity\_factory**  
*Entity factory policy, **ENTITY\_FACTORY** (p. 402).*
- struct **DDS\_WireProtocolQosPolicy wire\_protocol**  
*<<extension>> (p. 237) Wire Protocol policy, **WIRE\_PROTOCOL** (p. 456).*
- struct **DDS\_TransportBuiltinQosPolicy transport\_builtin**

- <<extension>> (p. 237) *Transport Builtin policy*, **TRANSPORT\_BUILTIN** (p. 443).
- struct **DDS\_TransportUnicastQosPolicy default\_unicast**
  - <<extension>> (p. 237) *Default Unicast Transport policy*, **TRANSPORT\_UNICAST** (p. 451).
- struct **DDS\_DiscoveryQosPolicy discovery**
  - <<extension>> (p. 237) *Discovery policy*, **DISCOVERY** (p. 388).
- struct **DDS\_DomainParticipantResourceLimitsQosPolicy resource\_limits**
  - <<extension>> (p. 237) *Domain participant resource limits policy*, **DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS** (p. 396).
- struct **DDS\_EventQosPolicy event**
  - <<extension>> (p. 237) *Event policy*, **EVENT** (p. 404).
- struct **DDS\_ReceiverPoolQosPolicy receiver\_pool**
  - <<extension>> (p. 237) *Receiver pool policy*, **RECEIVER\_POOL** (p. 432).
- struct **DDS\_DatabaseQosPolicy database**
  - <<extension>> (p. 237) *Database policy*, **DATABASE** (p. 365).
- struct **DDS\_DiscoveryConfigQosPolicy discovery\_config**
  - <<extension>> (p. 237) *Discovery config policy*, **DISCOVERY\_CONFIG** (p. 389).
- struct **DDS\_PropertyQosPolicy property**
  - <<extension>> (p. 237) *Property policy*, **PROPERTY** (p. 419). See also *Property Reference Guide*.
- struct **DDS\_EntityNameQosPolicy participant\_name**
  - <<extension>> (p. 237) *The participant name*. **ENTITY\_NAME** (p. 403)
- struct **DDS\_TransportMulticastMappingQosPolicy multicast\_mapping**
  - <<extension>> (p. 237) *The multicast mapping policy*. **TRANSPORT\_MULTICAST\_MAPPING** (p. 448)
- struct **DDS\_ServiceQosPolicy service**
  - <<extension>> (p. 237) *The service qos policy*. **SERVICE** (p. 438)
- struct **DDS\_PartitionQosPolicy partition**
  - <<extension>> (p. 237) *The partition qos policy*. **PARTITION** (p. 416)
- struct **DDS\_TypeSupportQosPolicy type\_support**
  - <<extension>> (p. 237) *Type support data*, **TYPESUPPORT** (p. 453).

### 9.52.1 Detailed Description

QoS policies supported by a **DDSDomainParticipant** (p. 1351) entity.

Certain members must be set in a consistent manner:

Length of **DDS\_DomainParticipantQos::user\_data** (p. 743) .value <= **DDS\_DomainParticipantQos::resource\_limits** (p. 744) .participant\_user\_data\_max\_length

For **DDS\_DomainParticipantQos::discovery\_config** (p. 745) .publication\_writer  
high\_watermark <= **DDS\_DomainParticipantQos::resource\_limits** (p. 744) .local\_writer\_allocation .max\_count  
heartbeats\_per\_max\_samples <= **DDS\_DomainParticipantQos::resource\_limits** (p. 744) .local\_writer\_allocation.↔  
max\_count

For **DDS\_DomainParticipantQos::discovery\_config** (p. 745) .subscription\_writer  
high\_watermark <= **DDS\_DomainParticipantQos::resource\_limits** (p. 744) .local\_reader\_allocation.max\_count  
heartbeats\_per\_max\_samples <= **DDS\_DomainParticipantQos::resource\_limits** (p. 744) .local\_reader\_allocation.↔  
max\_count

If any of the above are not true, **DDSDomainParticipant::set\_qos** (p. 1408) and **DDSDomainParticipant::set\_qos\_with\_profile** (p. 1408) and **DDSDomainParticipantFactory::set\_default\_participant\_qos** (p. 1430) will fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337), and **DDSDomainParticipantFactory::create\_participant** (p. 1442) will fail.

Entity:

**DDSDomainParticipant** (p. 1351)

See also

**QoS Policies** (p. 353) and allowed ranges within each Qos.

**NDDS\_DISCOVERY\_PEERS** (p. 464)

## 9.52.2 Member Function Documentation

### 9.52.2.1 operator==( )

```
bool DDS_DomainParticipantQos::operator==(
    const DDS_DomainParticipantQos & r ) const [inline]
```

Compares two DomainParticipantQos objects for inequality.

See also

**DDS\_DomainParticipantQos\_equals** (p. 51)

References **DDS\_DomainParticipantQos\_equals()**.

### 9.52.2.2 operator!=( )

```
bool DDS_DomainParticipantQos::operator!=(
    const DDS_DomainParticipantQos & r ) const [inline]
```

Compares two DomainParticipantQos objects for inequality.

See also

**DDS\_DomainParticipantQos\_equals** (p. 51)

References **DDS\_DomainParticipantQos\_equals()**.

## 9.52.3 Member Data Documentation

### 9.52.3.1 user\_data

```
struct DDS_UserDataQosPolicy DDS_DomainParticipantQos::user_data
```

User data policy, **USER\_DATA** (p. 455).

### 9.52.3.2 entity\_factory

```
struct DDS_EntityFactoryQosPolicy DDS_DomainParticipantQos::entity_factory
```

Entity factory policy, **ENTITY\_FACTORY** (p. 402).

### 9.52.3.3 wire\_protocol

```
struct DDS_WireProtocolQosPolicy DDS_DomainParticipantQos::wire_protocol
```

<<*extension*>> (p. 237) Wire Protocol policy, **WIRE\_PROTOCOL** (p. 456).

The wire protocol (RTPS) attributes associated with the participant.

### 9.52.3.4 transport\_builtin

```
struct DDS_TransportBuiltinQosPolicy DDS_DomainParticipantQos::transport_builtin
```

<<*extension*>> (p. 237) Transport Builtin policy, **TRANSPORT\_BUILTIN** (p. 443).

### 9.52.3.5 default\_unicast

```
struct DDS_TransportUnicastQosPolicy DDS_DomainParticipantQos::default_unicast
```

<<*extension*>> (p. 237) Default Unicast Transport policy, **TRANSPORT\_UNICAST** (p. 451).

### 9.52.3.6 discovery

```
struct DDS_DiscoveryQosPolicy DDS_DomainParticipantQos::discovery
```

<<*extension*>> (p. 237) Discovery policy, **DISCOVERY** (p. 388).

### 9.52.3.7 resource\_limits

```
struct DDS_DomainParticipantResourceLimitsQosPolicy DDS_DomainParticipantQos::resource_limits
```

<<*extension*>> (p. 237) Domain participant resource limits policy, **DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS** (p. 396).

### 9.52.3.8 event

```
struct DDS_EventQosPolicy DDS_DomainParticipantQos::event
```

<<*extension*>> (p. 237) Event policy, **EVENT** (p. 404).

### 9.52.3.9 receiver\_pool

```
struct DDS_ReceiverPoolQosPolicy DDS_DomainParticipantQos::receiver_pool
```

<<*extension*>> (p. 237) Receiver pool policy, **RECEIVER\_POOL** (p. 432).

### 9.52.3.10 database

```
struct DDS_DatabaseQosPolicy DDS_DomainParticipantQos::database
```

<<*extension*>> (p. 237) Database policy, **DATABASE** (p. 365).

### 9.52.3.11 discovery\_config

```
struct DDS_DiscoveryConfigQosPolicy DDS_DomainParticipantQos::discovery_config
```

<<*extension*>> (p. 237) Discovery config policy, **DISCOVERY\_CONFIG** (p. 389).

### 9.52.3.12 property

```
struct DDS_PropertyQosPolicy DDS_DomainParticipantQos::property
```

<<*extension*>> (p. 237) Property policy, **PROPERTY** (p. 419). See also [Property Reference Guide](#).

### 9.52.3.13 participant\_name

```
struct DDS_EntityNameQosPolicy DDS_DomainParticipantQos::participant_name
```

<<*extension*>> (p. 237) The participant name. **ENTITY\_NAME** (p. 403)

### 9.52.3.14 multicast\_mapping

```
struct DDS_TransportMulticastMappingQosPolicy DDS_DomainParticipantQos::multicast_mapping
```

<<*extension*>> (p. 237) The multicast mapping policy. **TRANSPORT\_MULTICAST\_MAPPING** (p. 448)

### 9.52.3.15 service

```
struct DDS_ServiceQosPolicy DDS_DomainParticipantQos::service
```

<<*extension*>> (p. 237) The service qos policy. **SERVICE** (p. 438)

### 9.52.3.16 partition

```
struct DDS_PartitionQosPolicy DDS_DomainParticipantQos::partition
```

<<*extension*>> (p. 237) The partition qos policy. **PARTITION** (p. 416)

### 9.52.3.17 type\_support

```
struct DDS_TypeSupportQosPolicy DDS_DomainParticipantQos::type_support
```

<<*extension*>> (p. 237) Type support data, **TYPESUPPORT** (p. 453).

Optional value that is passed to a type plugin's on\_participant\_attached function.

## 9.53 DDS\_DomainParticipantResourceLimitsQosPolicy Struct Reference

Various settings that configure how a **DDSDomainParticipant** (p. 1351) allocates and uses physical memory for internal resources, including the maximum sizes of various properties.



## Public Attributes

- struct **DDS\_AllocationSettings\_t local\_writer\_allocation**  
*Allocation settings applied to local DataWriters.*
- struct **DDS\_AllocationSettings\_t local\_reader\_allocation**  
*Allocation settings applied to local DataReaders.*
- struct **DDS\_AllocationSettings\_t local\_publisher\_allocation**  
*Allocation settings applied to local Publisher.*
- struct **DDS\_AllocationSettings\_t local\_subscriber\_allocation**  
*Allocation settings applied to local Subscriber.*
- struct **DDS\_AllocationSettings\_t local\_topic\_allocation**  
*Allocation settings applied to local Topic.*
- struct **DDS\_AllocationSettings\_t remote\_writer\_allocation**  
*Allocation settings applied to remote DataWriters.*
- struct **DDS\_AllocationSettings\_t remote\_reader\_allocation**  
*Allocation settings applied to remote DataReaders.*
- struct **DDS\_AllocationSettings\_t remote\_participant\_allocation**  
*Allocation settings applied to remote DomainParticipants.*
- struct **DDS\_AllocationSettings\_t matching\_writer\_reader\_pair\_allocation**  
*Allocation settings applied to matching local writer and remote/local reader pairs.*
- struct **DDS\_AllocationSettings\_t matching\_reader\_writer\_pair\_allocation**  
*Allocation settings applied to matching local reader and remote/local writer pairs.*
- struct **DDS\_AllocationSettings\_t ignored\_entity\_allocation**  
*Allocation settings applied to ignored entities.*
- struct **DDS\_AllocationSettings\_t content\_filtered\_topic\_allocation**  
*Allocation settings applied to content filtered topic.*
- struct **DDS\_AllocationSettings\_t content\_filter\_allocation**  
*Allocation settings applied to content filter.*
- struct **DDS\_AllocationSettings\_t read\_condition\_allocation**  
*Allocation settings applied to read condition pool.*
- struct **DDS\_AllocationSettings\_t query\_condition\_allocation**  
*Allocation settings applied to query condition pool.*
- struct **DDS\_AllocationSettings\_t outstanding\_asynchronous\_sample\_allocation**  
*Allocation settings applied to the maximum number of samples (from all **DDSDataWriter** (p. 1321)) waiting to be asynchronously written.*
- struct **DDS\_AllocationSettings\_t flow\_controller\_allocation**  
*Allocation settings applied to flow controllers.*
- **DDS\_Long local\_writer\_hash\_buckets**  
*Hash\_Buckets settings applied to local DataWriters.*
- **DDS\_Long local\_reader\_hash\_buckets**  
*Number of hash buckets for local DataReaders.*
- **DDS\_Long local\_publisher\_hash\_buckets**  
*Number of hash buckets for local Publisher.*
- **DDS\_Long local\_subscriber\_hash\_buckets**  
*Number of hash buckets for local Subscriber.*
- **DDS\_Long local\_topic\_hash\_buckets**  
*Number of hash buckets for local Topic.*

- **DDS\_Long remote\_writer\_hash\_buckets**  
*Number of hash buckets for remote DataWriters.*
- **DDS\_Long remote\_reader\_hash\_buckets**  
*Number of hash buckets for remote DataReaders.*
- **DDS\_Long remote\_participant\_hash\_buckets**  
*Number of hash buckets for remote DomainParticipants.*
- **DDS\_Long matching\_writer\_reader\_pair\_hash\_buckets**  
*Number of hash buckets for matching local writer and remote/local reader pairs.*
- **DDS\_Long matching\_reader\_writer\_pair\_hash\_buckets**  
*Number of hash buckets for matching local reader and remote/local writer pairs.*
- **DDS\_Long ignored\_entity\_hash\_buckets**  
*Number of hash buckets for ignored entities.*
- **DDS\_Long content\_filtered\_topic\_hash\_buckets**  
*Number of hash buckets for content filtered topics.*
- **DDS\_Long content\_filter\_hash\_buckets**  
*Number of hash buckets for content filters.*
- **DDS\_Long flow\_controller\_hash\_buckets**  
*Number of hash buckets for flow controllers.*
- **DDS\_Long max\_gather\_destinations**  
*Maximum number of destinations per RTI Connext send.*
- **DDS\_Long participant\_user\_data\_max\_length**  
*Maximum length of user data in [DDS\\_DomainParticipantQos](#) (p. 741) and [DDS\\_ParticipantBuiltinTopicData](#) (p. 979).*
- **DDS\_Long topic\_data\_max\_length**  
*Maximum length of topic data in [DDS\\_TopicQos](#) (p. 1135), [DDS\\_TopicBuiltinTopicData](#) (p. 1128), [DDS\\_PublicationBuiltinTopicData](#) (p. 1010) and [DDS\\_SubscriptionBuiltinTopicData](#) (p. 1108).*
- **DDS\_Long publisher\_group\_data\_max\_length**  
*Maximum length of group data in [DDS\\_PublisherQos](#) (p. 1022) and [DDS\\_PublicationBuiltinTopicData](#) (p. 1010).*
- **DDS\_Long subscriber\_group\_data\_max\_length**  
*Maximum length of group data in [DDS\\_SubscriberQos](#) (p. 1105) and [DDS\\_SubscriptionBuiltinTopicData](#) (p. 1108).*
- **DDS\_Long writer\_user\_data\_max\_length**  
*Maximum length of user data in [DDS\\_DataWriterQos](#) (p. 689) and [DDS\\_PublicationBuiltinTopicData](#) (p. 1010).*
- **DDS\_Long reader\_user\_data\_max\_length**  
*Maximum length of user data in [DDS\\_DataReaderQos](#) (p. 644) and [DDS\\_SubscriptionBuiltinTopicData](#) (p. 1108).*
- **DDS\_Long max\_partitions**  
*Maximum number of partition name strings allowable in a [DDS\\_PartitionQosPolicy](#) (p. 989).*
- **DDS\_Long max\_partition\_cumulative\_characters**  
*Maximum number of combined characters allowable in all partition names in a [DDS\\_PartitionQosPolicy](#) (p. 989).*
- **DDS\_Long type\_code\_max\_serialized\_length**  
*Maximum size of serialized string for type code.*
- **DDS\_Long type\_object\_max\_serialized\_length**  
*The maximum length, in bytes, that the buffer to serialize a `TypeObject` can consume.*
- **DDS\_Long serialized\_type\_object\_dynamic\_allocation\_threshold**  
*A threshold, in bytes, for dynamic memory allocation for the serialized `TypeObject`.*
- **DDS\_Long type\_object\_max\_deserialized\_length**  
*The maximum number of bytes that a deserialized `TypeObject` can consume.*
- **DDS\_Long deserialized\_type\_object\_dynamic\_allocation\_threshold**  
*A threshold, in bytes, for dynamic memory allocation for the deserialized `TypeObject`.*

- **DDS\_Long contentfilter\_property\_max\_length**  
*This field is the maximum length of all data related to a Content-filtered topic.*
- **DDS\_Long channel\_seq\_max\_length**  
*Maximum number of channels that can be specified in **DDS\_MultiChannelQosPolicy** (p. 964) for MultiChannel Data↔ Writers.*
- **DDS\_Long channel\_filter\_expression\_max\_length**  
*Maximum length of a channel **DDS\_ChannelSettings\_t::filter\_expression** (p. 611) in a MultiChannel DataWriter.*
- **DDS\_Long participant\_property\_list\_max\_length**  
*Maximum number of properties associated with the **DDSDomainParticipant** (p. 1351).*
- **DDS\_Long participant\_property\_string\_max\_length**  
*Maximum string length of the properties associated with the **DDSDomainParticipant** (p. 1351).*
- **DDS\_Long writer\_property\_list\_max\_length**  
*Maximum number of properties associated with a **DDSDataWriter** (p. 1321).*
- **DDS\_Long writer\_property\_string\_max\_length**  
*Maximum string length of the properties associated with a **DDSDataWriter** (p. 1321).*
- **DDS\_Long reader\_property\_list\_max\_length**  
*Maximum number of properties associated with a **DDSDataReader** (p. 1288).*
- **DDS\_Long reader\_property\_string\_max\_length**  
*Maximum string length of the properties associated with a **DDSDataReader** (p. 1288).*
- **DDS\_Long max\_endpoint\_groups**  
*Maximum number of **DDS\_EndpointGroup\_t** (p. 900) allowable in a **DDS\_AvailabilityQosPolicy** (p. 596).*
- **DDS\_Long max\_endpoint\_group\_cumulative\_characters**  
*Maximum number of combined role\_name characters allowed in all **DDS\_EndpointGroup\_t** (p. 900) in a **DDS\_↔ AvailabilityQosPolicy** (p. 596).*
- **DDS\_Long transport\_info\_list\_max\_length**  
*Maximum number of installed transports to send and receive information about in **DDS\_ParticipantBuiltinTopicData↔ ::transport\_info** (p. 981).*
- **DDS\_DomainParticipantResourceLimitsIgnoredEntityReplacementKind ignored\_entity\_replacement\_↔ kind**  
*Replacement policy for the ignored entities. It sets what entity can be replaced when resource limits set in **DDS\_Domain↔ ParticipantResourceLimitsQosPolicy::ignored\_entity\_allocation** (p. 753) are reached.*
- struct **DDS\_AllocationSettings\_t remote\_topic\_query\_allocation**  
*Allocation settings applied to remote TopicQueries.*
- **DDS\_Long remote\_topic\_query\_hash\_buckets**  
*Number of hash buckets for remote TopicQueries.*
- **DDS\_Long writer\_data\_tag\_list\_max\_length**  
*Maximum number of data tags associated with a **DDSDataWriter** (p. 1321).*
- **DDS\_Long writer\_data\_tag\_string\_max\_length**  
*Maximum string length of the data tags associated with a **DDSDataWriter** (p. 1321).*
- **DDS\_Long reader\_data\_tag\_list\_max\_length**  
*Maximum number of data tags associated with a **DDSDataReader** (p. 1288).*
- **DDS\_Long reader\_data\_tag\_string\_max\_length**  
*Maximum string length of the data tags associated with a **DDSDataReader** (p. 1288).*
- **DDS\_UnsignedLong shmем\_ref\_transfer\_mode\_max\_segments**  
*Maximum number of segments created by all DataWriters belonging to a **DDSDomainParticipant** (p. 1351).*

### 9.53.1 Detailed Description

Various settings that configure how a **DDSDomainParticipant** (p. 1351) allocates and uses physical memory for internal resources, including the maximum sizes of various properties.

This QoS policy sets maximum size limits on variable-length parameters used by the participant and its contained Entities. It also controls the initial and maximum sizes of data structures used by the participant to store information about locally-created and remotely-discovered entities (such as DataWriters/DataReaders), as well as parameters used by the internal database to size the hash tables it uses.

By default, a **DDSDomainParticipant** (p. 1351) is allowed to dynamically allocate memory as needed as users create local Entities such as **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) or as the participant discovers new applications to store their information. By setting fixed values for the maximum parameters in this QoS policy, you can bound the memory that can be allocated by a DomainParticipant. In addition, by setting the initial values to the maximum values, you can reduce the amount of memory allocated by DomainParticipants after the initialization period. Notice that memory can still be allocated dynamically after the initialization period. For example, when a new local **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288) is created, the initial memory required for its queue is allocated dynamically.

The maximum sizes of different variable-length parameters such as the number of partitions that can be stored in the **DDS\_PartitionQoSPolicy** (p. 989), the maximum length of data store in the **DDS\_UserDataQoSPolicy** (p. 1237) and **DDS\_GroupDataQoSPolicy** (p. 916), and many others can be changed from their defaults using this QoS policy. However, it is important that all DomainParticipants that need to communicate with each other use the *same set* of maximum values. Otherwise, when these parameters are propagated from one **DDSDomainParticipant** (p. 1351) to another, a **DDSDomainParticipant** (p. 1351) with a smaller maximum length may reject the parameter, resulting in an error.

An important parameter in this QoS policy that is often changed by users is **DDS\_DomainParticipantResourceLimitsQoSPolicy::type\_object\_max\_serialized\_length** (p. 760).

This QoS policy is an extension to the DDS standard.

Entity:

**DDSDomainParticipant** (p. 1351)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.53.2 Member Data Documentation

#### 9.53.2.1 local\_writer\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQoSPolicy::local_writer_allocation
```

Allocation settings applied to local DataWriters.

**[default]** initial\_count = 16; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.2 local\_reader\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::local_reader_↔  
allocation
```

Allocation settings applied to local DataReaders.

**[default]** initial\_count = 16; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.3 local\_publisher\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::local_publisher_↔  
allocation
```

Allocation settings applied to local Publisher.

**[default]** initial\_count = 4; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.4 local\_subscriber\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::local_subscriber_↔  
allocation
```

Allocation settings applied to local Subscriber.

**[default]** initial\_count = 4; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.5 local\_topic\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::local_topic_↔  
allocation
```

Allocation settings applied to local Topic.

**[default]** initial\_count = 16; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.6 remote\_writer\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::remote_writer_↔
allocation
```

Allocation settings applied to remote DataWriters.

Remote DataWriters include all DataWriters, both local and remote.

**[default]** initial\_count = 64; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.7 remote\_reader\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::remote_reader_↔
allocation
```

Allocation settings applied to remote DataReaders.

Remote DataReaders include all DataReaders, both local and remote.

**[default]** initial\_count = 64; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.8 remote\_participant\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::remote_participant_↔
_allocation
```

Allocation settings applied to remote DomainParticipants.

Remote DomainParticipants include all DomainParticipants, both local and remote.

**[default]** initial\_count = 16; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.9 matching\_writer\_reader\_pair\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::matching_writer_↔
reader_pair_allocation
```

Allocation settings applied to matching local writer and remote/local reader pairs.

**[default]** initial\_count = 32; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.10 matching\_reader\_writer\_pair\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::matching_reader_↔  
writer_pair_allocation
```

Allocation settings applied to matching local reader and remote/local writer pairs.

**[default]** initial\_count = 32; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.11 ignored\_entity\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::ignored_entity_↔  
allocation
```

Allocation settings applied to ignored entities.

**[default]** initial\_count = 8; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.12 content\_filtered\_topic\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::content_filtered_↔  
topic_allocation
```

Allocation settings applied to content filtered topic.

**[default]** initial\_count = 4; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.13 content\_filter\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::content_filter_↔  
allocation
```

Allocation settings applied to content filter.

**[default]** initial\_count = 4; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438); incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.14 read\_condition\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::read_condition_↔  
allocation
```

Allocation settings applied to read condition pool.

**[default]** initial\_count = 4; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438), incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.15 query\_condition\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::query_condition_↔  
allocation
```

Allocation settings applied to query condition pool.

**[default]** initial\_count = 4; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438), incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.16 outstanding\_asynchronous\_sample\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::outstanding_↔  
asynchronous_sample_allocation
```

Allocation settings applied to the maximum number of samples (from all **DDSDataWriter** (p. 1321)) waiting to be asynchronously written.

**[default]** initial\_count = 64; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438), incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.17 flow\_controller\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::flow_controller_↔  
allocation
```

Allocation settings applied to flow controllers.

**[default]** initial\_count = 4; max\_count = **DDS\_LENGTH\_UNLIMITED** (p. 438), incremental\_count = -1

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)



### 9.53.2.18 local\_writer\_hash\_buckets

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::local_writer_hash_buckets`

Hash\_Buckets settings applied to local DataWriters.

**[default]** 4

**[range]** [1, 10000]

### 9.53.2.19 local\_reader\_hash\_buckets

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::local_reader_hash_buckets`

Number of hash buckets for local DataReaders.

**[default]** 4

**[range]** [1, 10000]

### 9.53.2.20 local\_publisher\_hash\_buckets

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::local_publisher_hash_buckets`

Number of hash buckets for local Publisher.

**[default]** 1

**[range]** [1, 10000]

### 9.53.2.21 local\_subscriber\_hash\_buckets

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::local_subscriber_hash_buckets`

Number of hash buckets for local Subscriber.

**[default]** 1

**[range]** [1, 10000]

### 9.53.2.22 local\_topic\_hash\_buckets

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::local_topic_hash_buckets`

Number of hash buckets for local Topic.

**[default]** 4

**[range]** [1, 10000]

### 9.53.2.23 remote\_writer\_hash\_buckets

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::remote_writer_hash_buckets`

Number of hash buckets for remote DataWriters.

Remote DataWriters include all DataWriters, both local and remote.

**[default]** 16

**[range]** [1, 10000]

### 9.53.2.24 remote\_reader\_hash\_buckets

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::remote_reader_hash_buckets`

Number of hash buckets for remote DataReaders.

Remote DataReaders include all DataReaders, both local and remote.

**[default]** 16

**[range]** [1, 10000]

### 9.53.2.25 remote\_participant\_hash\_buckets

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::remote_participant_hash_buckets`

Number of hash buckets for remote DomainParticipants.

Remote DomainParticipants include all DomainParticipants, both local and remote.

**[default]** 4

**[range]** [1, 10000]

### 9.53.2.26 matching\_writer\_reader\_pair\_hash\_buckets

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::matching_writer_reader_pair_hash_buckets`

Number of hash buckets for matching local writer and remote/local reader pairs.

**[default]** 32

**[range]** [1, 10000]

### 9.53.2.27 matching\_reader\_writer\_pair\_hash\_buckets

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::matching\_reader\_writer\_pair\_hash\_buckets

Number of hash buckets for matching local reader and remote/local writer pairs.

**[default]** 32

**[range]** [1, 10000]

### 9.53.2.28 ignored\_entity\_hash\_buckets

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::ignored\_entity\_hash\_buckets

Number of hash buckets for ignored entities.

**[default]** 1

**[range]** [1, 10000]

### 9.53.2.29 content\_filtered\_topic\_hash\_buckets

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::content\_filtered\_topic\_hash\_buckets

Number of hash buckets for content filtered topics.

**[default]** 1

**[range]** [1, 10000]

### 9.53.2.30 content\_filter\_hash\_buckets

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::content\_filter\_hash\_buckets

Number of hash buckets for content filters.

**[default]** 1

**[range]** [1, 10000]

### 9.53.2.31 flow\_controller\_hash\_buckets

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::flow\_controller\_hash\_buckets

Number of hash buckets for flow controllers.

**[default]** 1

**[range]** [1, 10000]

### 9.53.2.32 max\_gather\_destinations

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::max_gather_destinations`

Maximum number of destinations per RTI Connex send.

When RTI Connex sends out a message, it has the capability to send to multiple destinations to be more efficient. The maximum number of destinations per RTI Connex send is specified by `max_gather_destinations`.

**[default]** 16

**[range]** [16, 1 million]

### 9.53.2.33 participant\_user\_data\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::participant_user_data_max_length`

Maximum length of user data in `DDS_DomainParticipantQos` (p. 741) and `DDS_ParticipantBuiltinTopicData` (p. 979).

**[default]** 256

**[range]** [0,0x7ffffff]

### 9.53.2.34 topic\_data\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::topic_data_max_length`

Maximum length of topic data in `DDS_TopicQos` (p.1135), `DDS_TopicBuiltinTopicData` (p.1128), `DDS_↔ PublicationBuiltinTopicData` (p. 1010) and `DDS_SubscriptionBuiltinTopicData` (p.1108).

**[default]** 256

**[range]** [0,0x7ffffff]

### 9.53.2.35 publisher\_group\_data\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::publisher_group_data_max_length`

Maximum length of group data in `DDS_PublisherQos` (p. 1022) and `DDS_PublicationBuiltinTopicData` (p. 1010).

**[default]** 256

**[range]** [0,0x7ffffff]

### 9.53.2.36 subscriber\_group\_data\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::subscriber_group_data_max_length`

Maximum length of group data in **DDS\_SubscriberQos** (p. 1105) and **DDS\_SubscriptionBuiltinTopicData** (p. 1108).

**[default]** 256

**[range]** [0,0x7ffffff]

### 9.53.2.37 writer\_user\_data\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::writer_user_data_max_length`

Maximum length of user data in **DDS\_DataWriterQos** (p. 689) and **DDS\_PublicationBuiltinTopicData** (p. 1010).

**[default]** 256

**[range]** [0,0x7ffffff]

### 9.53.2.38 reader\_user\_data\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::reader_user_data_max_length`

Maximum length of user data in **DDS\_DataReaderQos** (p. 644) and **DDS\_SubscriptionBuiltinTopicData** (p. 1108).

**[default]** 256

**[range]** [0,0x7ffffff]

### 9.53.2.39 max\_partitions

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::max_partitions`

Maximum number of partition name strings allowable in a **DDS\_PartitionQosPolicy** (p. 989).

This setting is made on a per DomainParticipant basis; it cannot be set individually on a per Publisher/Subscriber basis. However, the limit is enforced and applies per Publisher/Subscriber.

This value cannot exceed 64.

**[default]** 64

**[range]** [0,64]

#### 9.53.2.40 max\_partition\_cumulative\_characters

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::max\_partition\_cumulative\_characters

Maximum number of combined characters allowable in all partition names in a **DDS\_PartitionQosPolicy** (p. 989).

The maximum number of combined characters should account for a terminating NULL ("0") character for each partition name string.

This setting is made on a per DomainParticipant basis; it cannot be set individually on a per Publisher/Subscriber basis. However, the limit is enforced and applies per Publisher/Subscriber.

This value cannot exceed 256.

**[default]** 256

**[range]** [0,256]

#### 9.53.2.41 type\_code\_max\_serialized\_length

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::type\_code\_max\_serialized\_length

Maximum size of serialized string for type code.

This parameter is an alternative to **DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_serialized\_length** (p. 760) for limiting the size of the type code that a **DDSDomainParticipant** (p. 1351) is able to store and propagate for user data types. Type codes can be used by external applications to understand user data types without having the data type predefined in compiled form. However, since type codes contain all of the information of a data structure, including the strings that define the names of the members of a structure, complex data structures can result in large type codes. So it is common for users to set this parameter to a large value, if used (by default, it is set to 0). However, as with all parameters in this QoS policy defining maximum sizes for variable-length elements, all DomainParticipants in the same domain should use the same value for this parameter. Note: TypeObject is now the standard method of exchanging type information in RTI Connext. It is recommended to use **DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_serialized\_length** (p. 760) to configure the maximum serialized type object string.

**[default]** 0

**[range]** [0,0xffff]

#### 9.53.2.42 type\_object\_max\_serialized\_length

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_serialized\_length

The maximum length, in bytes, that the buffer to serialize a TypeObject can consume.

This parameter limits the size of the TypeObject that a DomainParticipant is able to propagate. Since TypeObjects contain all of the information of a data structure, including the strings that define the names of the members of a structure, complex data structures can result in TypeObjects larger than the default maximum of 8192 bytes. This field allows you to specify a larger value. The desired size for a given **DDS\_TypeCode** (p. 1164) can be obtained using **DDS\_TypeCode::get\_type\_object\_serialized\_size** (p. 1193).

**[default]** 8192

**[range]** [0,0x7ffffff]

### 9.53.2.43 serialized\_type\_object\_dynamic\_allocation\_threshold

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::serialized\_type\_object\_dynamic\_allocation\_threshold

A threshold, in bytes, for dynamic memory allocation for the serialized TypeObject.

Above this threshold, the memory for a TypeObject is allocated dynamically. Below it, the memory is obtained from a pool of fixed-size buffers. The size of the buffers is equal to this threshold.

In case **DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_serialized\_length** (p. 760) is different than **DDS\_LENGTH\_UNLIMITED** (p. 438) and is smaller than **DDS\_DomainParticipantResourceLimitsQosPolicy::serialized\_type\_object\_dynamic\_allocation\_threshold** (p. 760): **DDS\_DomainParticipantResourceLimitsQosPolicy::serialized\_type\_object\_dynamic\_allocation\_threshold** (p. 760) will be adjusted to **DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_serialized\_length** (p. 760).

[default] 8192

[range] [0,0x7fffffff] <= **DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_serialized\_length** (p. 760)

### 9.53.2.44 type\_object\_max\_deserialized\_length

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_deserialized\_length

The maximum number of bytes that a deserialized TypeObject can consume.

This parameter limits the size of the TypeObject that a DomainParticipant is able to store.

[default] **DDS\_LENGTH\_UNLIMITED** (p. 438)

[range] [0,0x7fffffff] or **DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.53.2.45 deserialized\_type\_object\_dynamic\_allocation\_threshold

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::deserialized\_type\_object\_dynamic\_allocation\_threshold

A threshold, in bytes, for dynamic memory allocation for the deserialized TypeObject.

Above this threshold, the memory for a TypeObject is allocated dynamically. Below it, the memory is obtained from a pool of fixed-size buffers. The size of the buffers is equal to this threshold.

In case **DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_deserialized\_length** (p. 761) is different than **DDS\_LENGTH\_UNLIMITED** (p. 438) and is smaller than **DDS\_DomainParticipantResourceLimitsQosPolicy::deserialized\_type\_object\_dynamic\_allocation\_threshold** (p. 761): **DDS\_DomainParticipantResourceLimitsQosPolicy::deserialized\_type\_object\_dynamic\_allocation\_threshold** (p. 761) will be adjusted to **DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_deserialized\_length** (p. 761).

[default] 4096

[range] [0,0x7fffffff] <= **DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_deserialized\_length** (p. 761)

### 9.53.2.46 contentfilter\_property\_max\_length

```
DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::contentfilter_property_max_length
```

This field is the maximum length of all data related to a Content-filtered topic.

This is the sum of the length of the ContentFilteredTopic name, the length of the related topic name, the length of the filter expression, the length of the filter parameters, and the length of the filter name. The maximum number of combined characters should account for a terminating NULL ('\0') character for each string.

**[default]** 256

**[range]** [0,0xffff]

### 9.53.2.47 channel\_seq\_max\_length

```
DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::channel_seq_max_length
```

Maximum number of channels that can be specified in **DDS\_MultiChannelQosPolicy** (p. 964) for MultiChannel Data↔ Writers.

**[default]** 32

**[range]** [0,0xffff]

### 9.53.2.48 channel\_filter\_expression\_max\_length

```
DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::channel_filter_expression_max_length
```

Maximum length of a channel **DDS\_ChannelSettings\_t::filter\_expression** (p. 611) in a MultiChannel DataWriter.

The length should account for a terminating NULL ('\0') character.

**[default]** 256

**[range]** [0,0xffff]

### 9.53.2.49 participant\_property\_list\_max\_length

```
DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::participant_property_list_max_length
```

Maximum number of properties associated with the **DDSDomainParticipant** (p. 1351).

**[default]** 32

**[range]** [0,0xffff]



### 9.53.2.50 participant\_property\_string\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::participant_property_string_max_length`

Maximum string length of the properties associated with the **DDSDomainParticipant** (p. 1351).

The string length is defined as the cumulative length in bytes, including the null terminating characters, of all the pairs (name, value) associated with the **DDSDomainParticipant** (p. 1351) properties.

**[default]** 4096

**[range]** [0,0xffff]

### 9.53.2.51 writer\_property\_list\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::writer_property_list_max_length`

Maximum number of properties associated with a **DDSDataWriter** (p. 1321).

**[range]** [0,0xffff]

**[default]** 32

### 9.53.2.52 writer\_property\_string\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::writer_property_string_max_length`

Maximum string length of the properties associated with a **DDSDataWriter** (p. 1321).

The string length is defined as the cumulative length in bytes, including the null terminating characters, of all the pairs (name, value) associated with the **DDSDataWriter** (p. 1321) properties.

**[default]** 1024

**[range]** [0,0xffff]

### 9.53.2.53 reader\_property\_list\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::reader_property_list_max_length`

Maximum number of properties associated with a **DDSDataReader** (p. 1288).

**[default]** 32

**[range]** [0,0xffff]

### 9.53.2.54 reader\_property\_string\_max\_length

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::reader\_property\_string\_max\_length

Maximum string length of the properties associated with a **DDSDataReader** (p. 1288).

The string length is defined as the cumulative length in bytes, including the null terminating characters, of all the pairs (name, value) associated with a **DDSDataReader** (p. 1288) properties.

**[default]** 1024

**[range]** [0,0xffff]

### 9.53.2.55 max\_endpoint\_groups

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::max\_endpoint\_groups

Maximum number of **DDS\_EndpointGroup\_t** (p. 900) allowable in a **DDS\_AvailabilityQosPolicy** (p. 596).

**[default]** 32

**[range]** [0,65535]

### 9.53.2.56 max\_endpoint\_group\_cumulative\_characters

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::max\_endpoint\_group\_cumulative\_characters

Maximum number of combined role\_name characters allowed in all **DDS\_EndpointGroup\_t** (p.900) in a **DDS\_↔AvailabilityQosPolicy** (p. 596).

The maximum number of combined characters should account for a terminating NULL character for each role\_name string.

**[default]** 1024

**[range]** [0,65535]

### 9.53.2.57 transport\_info\_list\_max\_length

**DDS\_Long** DDS\_DomainParticipantResourceLimitsQosPolicy::transport\_info\_list\_max\_length

Maximum number of installed transports to send and receive information about in **DDS\_ParticipantBuiltinTopicData↔::transport\_info** (p. 981).

**[default]** 12

**[range]** [0,100]

### 9.53.2.58 ignored\_entity\_replacement\_kind

```
DDS_DomainParticipantResourceLimitsIgnoredEntityReplacementKind DDS_DomainParticipantResourceLimitsQosPolicy::ignored_entity_replacement_kind
```

Replacement policy for the ignored entities. It sets what entity can be replaced when resource limits set in **DDS\_DomainParticipantResourceLimitsQosPolicy::ignored\_entity\_allocation** (p. 753) are reached.

When a **DDSDomainParticipant** (p. 1351)'s number of ignored entities is greater than **DDS\_DomainParticipantResourceLimitsQosPolicy::ignored\_entity\_allocation** (p. 753), the **DDSDomainParticipant** (p. 1351) will try to make room by replacing an existing ignored participant entry. This field specifies what entity is allowed to be replaced.

If a replaceable participant entry is not available, an out-of-resources exception will be returned.

**[default]** **DDS\_NO\_REPLACEMENT\_IGNORED\_ENTITY\_REPLACEMENT** (p. 397)

See also

**DDS\_DomainParticipantResourceLimitsIgnoredEntityReplacementKind** (p. 397)

### 9.53.2.59 remote\_topic\_query\_allocation

```
struct DDS_AllocationSettings_t DDS_DomainParticipantResourceLimitsQosPolicy::remote_topic_query_allocation
```

Allocation settings applied to remote TopicQueries.

Settings applied to the allocation of information about **DDSTopicQuery** (p. 1627) objects created by other participants and discovered by this participant.

When the participant receives a new topic query that would make the current count go above `max_count`, it is not processed until the current count drops (i.e. another topic query is cancelled). The topic query stays in the Built-in ServiceRequest DataReader queue until it can be processed or it is cancelled.

**[default]** `initial_count = 1`; `max_count = DDS_LENGTH_UNLIMITED` (p. 438); `incremental_count = -1`

**[range]** See allowed ranges in struct **DDS\_AllocationSettings\_t** (p. 588)

### 9.53.2.60 remote\_topic\_query\_hash\_buckets

```
DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::remote_topic_query_hash_buckets
```

Number of hash buckets for remote TopicQueries.

**[default]** 1

**[range]** [1, 10000]

See also

**DDS\_DomainParticipantResourceLimitsQosPolicy::remote\_topic\_query\_allocation** (p. 765)

### 9.53.2.61 writer\_data\_tag\_list\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::writer_data_tag_list_max_length`

Maximum number of data tags associated with a **DDSDataWriter** (p. 1321).

**[default]** 0

**[range]** [0,0xffff]

### 9.53.2.62 writer\_data\_tag\_string\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::writer_data_tag_string_max_length`

Maximum string length of the data tags associated with a **DDSDataWriter** (p. 1321).

The string length is defined as the cumulative length in bytes, including the null terminating characters, of all the pairs (name, value) associated with the **DDSDataWriter** (p. 1321) data tags.

**[default]** 0

**[range]** [0,0xffff]

### 9.53.2.63 reader\_data\_tag\_list\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::reader_data_tag_list_max_length`

Maximum number of data tags associated with a **DDSDataReader** (p. 1288).

**[default]** 0

**[range]** [0,0xffff]

### 9.53.2.64 reader\_data\_tag\_string\_max\_length

`DDS_Long DDS_DomainParticipantResourceLimitsQosPolicy::reader_data_tag_string_max_length`

Maximum string length of the data tags associated with a **DDSDataReader** (p. 1288).

The string length is defined as the cumulative length in bytes, including the null terminating characters, of all the pairs (name, value) associated with the **DDSDataReader** (p. 1288) data tags.

**[default]** 0

**[range]** [0,0xffff]

### 9.53.2.65 shmем\_ref\_transfer\_mode\_max\_segments

`DDS_UnsignedLong DDS_DomainParticipantResourceLimitsQosPolicy::shmем_ref_transfer_mode_max_↔ segments`

Maximum number of segments created by all DataWriters belonging to a **DDSDomainParticipant** (p. 1351).

**[default]** 500

**[range]** [0,0xffffffff], but in practice, this value will be limited by the system-wide maximum number of shared memory segments. On a Linux machine, this value is provided by the kernel parameter `shmni`.

## 9.54 DDS\_DoubleSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_Double** (p. 319) >

### 9.54.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_Double** (p. 319) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_Double** (p. 319)

**FooSeq** (p. 1697)

## 9.55 DDS\_DurabilityQosPolicy Struct Reference

This QoS policy specifies whether or not RTI Connex will store and deliver previously published data samples to new **DDSDataReader** (p. 1288) entities that join the network later.

### Public Attributes

- **DDS\_DurabilityQosPolicyKind kind**  
*The kind of durability.*
- **DDS\_Boolean direct\_communication**  
<<*extension*>> (p. 237) Indicates whether or not a **TRANSIENT** or **PERSISTENT DDSDataReader** (p. 1288) should receive samples directly from a **TRANSIENT** or **PERSISTENT DDSDataWriter** (p. 1321)
- **DDS\_Long writer\_depth**  
<<*extension*>> (p. 237) Indicates the number of samples per instance that a durable **DDSDataWriter** (p. 1321) will send to a late-joining **DDSDataReader** (p. 1288).
- struct **DDS\_PersistentStorageSettings storage\_settings**  
*Configures durable writer history and durable reader state.*

### 9.55.1 Detailed Description

This QoS policy specifies whether or not RTI Connex will store and deliver previously published data samples to new **DDSDataReader** (p. 1288) entities that join the network later.

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Status:

**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_↔  
STATUS** (p. 344)

Properties:

**RxO** (p. 360) = YES  
**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

See also

**DURABILITY\_SERVICE** (p. 402)

### 9.55.2 Usage

It is possible for a **DDSDataWriter** (p. 1321) to start publishing data before all (or any) **DDSDataReader** (p. 1288) entities have joined the network.

Moreover, a **DDSDataReader** (p. 1288) that joins the network after some data has been written could potentially be interested in accessing the most current values of the data, as well as potentially some history.

This policy makes it possible for a late-joining **DDSDataReader** (p. 1288) to obtain previously published samples.

By helping to ensure that DataReaders get all data that was sent by DataWriters, regardless of when it was sent, using this QoS policy can increase system tolerance to failure conditions.

Note that although related, this does not strictly control what data RTI Connex will maintain internally. That is, RTI Connex may choose to maintain some data for its own purposes (e.g., flow control) and yet not make it available to late-joining readers if the **DURABILITY** (p. 398) policy is set to **DDS\_VOLATILE\_DURABILITY\_QOS** (p. 400).

### 9.55.2.1 Transient and Persistent Durability

For the purpose of implementing the DURABILITY QoS kind TRANSIENT or PERSISTENT, RTI Connexx behaves as if for each Topic that has **DDS\_DurabilityQosPolicy::kind** (p. 770) of **DDS\_TRANSIENT\_DURABILITY\_QOS** (p. 401) or **DDS\_PERSISTENT\_DURABILITY\_QOS** (p. 401) there is a corresponding "built-in" **DDSDataReader** (p. 1288) and **DDSDataWriter** (p. 1321) configured with the same DURABILITY kind. In other words, it is as if somewhere in the system, independent of the original **DDSDataWriter** (p. 1321), there is a built-in durable **DDSDataReader** (p. 1288) subscribing to that Topic and a built-in durable DataWriter re-publishing it as needed for the new subscribers that join the system. This functionality is provided by the *RTI Persistence Service*.

The Persistence Service can configure itself based on the QoS of your application's **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) entities. For each transient or persistent **DDSTopic** (p. 1617), the built-in fictitious Persistence Service **DDSDataReader** (p. 1288) and **DDSDataWriter** (p. 1321) have their QoS configured from the QoS of your application's **DDSDataWriter** (p. 1321) and **DDSDataReader** (p. 1288) entities that communicate on that **DDSTopic** (p. 1617).

For a given **DDSTopic** (p. 1617), the usual request/offered semantics apply to the matching between any **DDSDataWriter** (p. 1321) in the domain that writes the **DDSTopic** (p. 1617) and the built-in transient/persistent **DDSDataReader** (p. 1288) for that **DDSTopic** (p. 1617); similarly for the built-in transient/persistent **DDSDataWriter** (p. 1321) for a **DDSTopic** (p. 1617) and any **DDSDataReader** (p. 1288) for the **DDSTopic** (p. 1617). As a consequence, a **DDSDataWriter** (p. 1321) that has an incompatible QoS will not send its data to the *RTI Persistence Service*, and a **DDSDataReader** (p. 1288) that has an incompatible QoS will not get data from it.

Incompatibilities between local **DDSDataReader** (p. 1288) and **DDSDataWriter** (p. 1321) entities and the corresponding fictitious built-in transient/persistent entities cause the **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) and **DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) to change and the corresponding Listener invocations and/or signaling of **DDSCondition** (p. 1276) objects as they would with your application's own entities.

The value of **DDS\_DurabilityServiceQosPolicy::service\_cleanup\_delay** (p. 773) controls when *RTI Persistence Service* is able to remove all information regarding a data instances.

Information on a data instance is maintained until the following conditions are met:

1. The instance has been explicitly disposed (`instance_state = NOT_ALIVE_DISPOSED`),

and

1. All samples for the disposed instance have been acknowledged, including the dispose sample itself,

and

1. A time interval longer than **DDS\_DurabilityServiceQosPolicy::service\_cleanup\_delay** (p. 773) has elapsed since the moment RTI Connexx detected that the previous two conditions were met. (Note: Only values of zero or **DDS\_DURATION\_INFINITE** (p. 326) are currently supported for the `service_cleanup_delay`)

The utility of **DDS\_DurabilityServiceQosPolicy::service\_cleanup\_delay** (p. 773) is apparent in the situation where an application disposes an instance and it crashes before it has a chance to complete additional tasks related to the disposition. Upon restart, the application may ask for initial data to regain its state and the delay introduced by the `service_cleanup_delay` will allow the restarted application to receive the information on the disposed instance and complete the interrupted tasks.

### 9.55.3 Compatibility

The value offered is considered compatible with the value requested if and only if the inequality *offered kind*  $\geq$  *requested kind* evaluates to 'TRUE'. For the purposes of this inequality, the values of DURABILITY kind are considered ordered such that **DDS\_VOLATILE\_DURABILITY\_QOS** (p. 400)  $<$  **DDS\_TRANSIENT\_LOCAL\_DURABILITY\_QOS** (p. 401)  $<$  **DDS\_TRANSIENT\_DURABILITY\_QOS** (p. 401)  $<$  **DDS\_PERSISTENT\_DURABILITY\_QOS** (p. 401).

### 9.55.4 Member Data Documentation

#### 9.55.4.1 kind

```
DDS_DurabilityQosPolicyKind DDS_DurabilityQosPolicy::kind
```

The kind of durability.

[default] **DDS\_VOLATILE\_DURABILITY\_QOS** (p. 400)

#### 9.55.4.2 direct\_communication

```
DDS_Boolean DDS_DurabilityQosPolicy::direct_communication
```

$\ll$  *extension*  $\gg$  (p. 237) Indicates whether or not a TRANSIENT or PERSISTENT **DDSDataReader** (p. 1288) should receive samples directly from a TRANSIENT or PERSISTENT **DDSDataWriter** (p. 1321)

When `direct_communication` is set to **DDS\_BOOLEAN\_TRUE** (p. 317), a TRANSIENT or PERSISTENT **DDSDataReader** (p. 1288) will receive samples from both the original **DDSDataWriter** (p. 1321) configured with TRANSIENT or PERSISTENT durability and the **DDSDataWriter** (p. 1321) created by the persistence service. This peer-to-peer communication pattern provides low latency between end-points.

If the same sample is received from the original **DDSDataWriter** (p. 1321) and the persistence service, the middleware will discard the duplicate.

When `direct_communication` is set to **DDS\_BOOLEAN\_FALSE** (p. 317), a TRANSIENT or PERSISTENT **DDSDataReader** (p. 1288) will only receive samples from the **DDSDataWriter** (p. 1321) created by the persistence service. This brokered communication pattern provides a way to guarantee eventual consistency.

[default] **DDS\_BOOLEAN\_TRUE** (p. 317)



### 9.55.4.3 writer\_depth

```
DDS_Long DDS_DurabilityQosPolicy::writer_depth
```

<<**extension**>> (p. 237) Indicates the number of samples per instance that a durable **DDSDataWriter** (p. 1321) will send to a late-joining **DDSDataReader** (p. 1288).

The default value, **DDS\_AUTO\_WRITER\_DEPTH** (p. 401), makes this parameter equal to the following:

- **DDS\_HistoryQosPolicy::depth** (p. 921) if the history kind is **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406).
- **DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance** (p. 1055) in the **DDS\_ResourceLimitsQosPolicy** (p. 1052) if the history kind is **DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406).

The `writer_depth` must be  $\leq$  **DDS\_HistoryQosPolicy::depth** (p. 921).

`writer_depth` applies only to non-volatile DataWriters (those for which the kind is **TRANSIENT\_LOCAL**, **TRANSIENT**, or **PERSISTENT**).

When **DDS\_BatchQosPolicy::enable** (p. 601) is set to true, `writer_depth` acts as a minimum number of samples per instance that will be sent to late joiners, as opposed to the maximum. As long as a batch contains a single sample that falls within the `writer_depth` for the instance to which it belongs, then the entire batch will be sent. This means that batches sent to late-joining DataReaders may contain more samples per instance than is specified by the `writer_depth` QoS setting.

When a DataWriter responds to a TopicQuery, the samples that are evaluated against the TopicQuery filter are only those samples that fall within the `writer_depth`, not the **DDS\_HistoryQosPolicy::depth** (p. 921).

Setting `writer_depth` on the DataReader side will be ignored.

[default] **DDS\_AUTO\_WRITER\_DEPTH** (p. 401)

### 9.55.4.4 storage\_settings

```
struct DDS_PersistentStorageSettings DDS_DurabilityQosPolicy::storage_settings
```

Configures durable writer history and durable reader state.

By default, durable writer history and durable reader state are disabled. This means that a DataWriter will not persist its historical cache and a DataReader will not persist its state.

To enable durable writer history and durable reader state set **DDS\_PersistentStorageSettings::enable** (p. 993) to **DDS\_BOOLEAN\_TRUE** (p. 317).

## 9.56 DDS\_DurabilityServiceQosPolicy Struct Reference

Various settings to configure the external *RTI Persistence Service* used by RTI Connex for DataWriters with a **DDS\_DurabilityQosPolicy** (p. 767) setting of **DDS\_PERSISTENT\_DURABILITY\_QOS** (p. 401) or **DDS\_TRANSIENT\_DURABILITY\_QOS** (p. 401).

## Public Attributes

- struct **DDS\_Duration\_t service\_cleanup\_delay**  
Controls when the service is able to remove all information regarding a data instances.
- **DDS\_HistoryQosPolicyKind history\_kind**  
The kind of history to apply in recouping durable data.
- **DDS\_Long history\_depth**  
Setting to use for the **DDS\_DurabilityQosPolicy::writer\_depth** (p. 770) when recouping durable data.
- **DDS\_Long max\_samples**  
Part of resource limits QoS policy to apply when feeding a late joiner.
- **DDS\_Long max\_instances**  
Part of resource limits QoS policy to apply when feeding a late joiner.
- **DDS\_Long max\_samples\_per\_instance**  
Part of resource limits QoS policy to apply when feeding a late joiner.

### 9.56.1 Detailed Description

Various settings to configure the external *RTI Persistence Service* used by RTI Connex for DataWriters with a **DDS\_↔\_DurabilityQosPolicy** (p. 767) setting of **DDS\_PERSISTENT\_DURABILITY\_QOS** (p. 401) or **DDS\_TRANSIENT\_↔\_DURABILITY\_QOS** (p. 401).

Entity:

**DDSTopic** (p. 1617), **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = NO  
**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

See also

**DURABILITY** (p. 398)  
**HISTORY** (p. 405)  
**RESOURCE\_LIMITS** (p. 437)

### 9.56.2 Usage

When a DataWriter's **DDS\_DurabilityQosPolicy::kind** (p. 770) is **DDS\_PERSISTENT\_DURABILITY\_QOS** (p. 401) or **DDS\_TRANSIENT\_DURABILITY\_QOS** (p. 401), an external service, the *RTI Persistence Service*, is used to store and possibly forward the data sent by the **DDSDataWriter** (p. 1321) to **DDSDataReader** (p. 1288) objects that are created *after* the data was initially sent.

This QoS policy is used to configure certain parameters of the Persistence Service when it operates on the behalf of the **DDSDataWriter** (p. 1321), such as how much data to store. For example, it configures the **DURABILITY** (p. 398), **HISTORY** (p. 405), and the **RESOURCE\_LIMITS** (p. 437) used by the fictitious DataReader and DataWriter used by the Persistence Service. Note, however, that the Persistence Service itself may be configured to ignore these values and instead use values from its own configuration file.

### 9.56.3 Member Data Documentation

#### 9.56.3.1 service\_cleanup\_delay

```
struct DDS_Duration_t DDS_DurabilityServiceQosPolicy::service_cleanup_delay
```

Controls when the service is able to remove all information regarding a data instances.

When the service cleanup delay is set to 0, disposed instances will be completely removed from the service. Only values of 0 and **DDS\_DURATION\_INFINITE** (p. 326) are currently supported.

**[default]** 0

#### 9.56.3.2 history\_kind

```
DDS_HistoryQosPolicyKind DDS_DurabilityServiceQosPolicy::history_kind
```

The kind of history to apply in recouping durable data.

**[default]** **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406)

#### 9.56.3.3 history\_depth

```
DDS_Long DDS_DurabilityServiceQosPolicy::history_depth
```

Setting to use for the **DDS\_DurabilityQosPolicy::writer\_depth** (p. 770) when recouping durable data.

If the **DDS\_HistoryQosPolicy::depth** (p. 921) is set to a value lower than this value, **DDS\_HistoryQosPolicy::depth** (p. 921) will be set equal to the value of this field.

**[default]** **DDS\_AUTO\_WRITER\_DEPTH** (p. 401) (1)

#### 9.56.3.4 max\_samples

```
DDS_Long DDS_DurabilityServiceQosPolicy::max_samples
```

Part of resource limits QoS policy to apply when feeding a late joiner.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.56.3.5 max\_instances

`DDS_Long DDS_DurabilityServiceQosPolicy::max_instances`

Part of resource limits QoS policy to apply when feeding a late joiner.

[default] `DDS_LENGTH_UNLIMITED` (p. 438)

### 9.56.3.6 max\_samples\_per\_instance

`DDS_Long DDS_DurabilityServiceQosPolicy::max_samples_per_instance`

Part of resource limits QoS policy to apply when feeding a late joiner.

[default] `DDS_LENGTH_UNLIMITED` (p. 438)

## 9.57 DDS\_Duration\_t Struct Reference

Type for *duration* representation.

### Static Public Member Functions

- static `DDS_Duration_t from_micros` ( `DDS_UnsignedLongLong` microseconds)  
*Creates a new duration object from a duration expressed in microseconds.*
- static `DDS_Duration_t from_millis` ( `DDS_UnsignedLongLong` milliseconds)  
*Creates a new duration object from a duration expressed in milliseconds.*
- static `DDS_Duration_t from_nanos` ( `DDS_UnsignedLongLong` nanoseconds)  
*Creates a new duration object from a duration expressed in nanoseconds.*
- static `DDS_Duration_t from_seconds` ( `DDS_UnsignedLong` seconds)  
*Creates a new duration object from a duration expressed in seconds.*

### Public Attributes

- `DDS_Long sec`  
*seconds*
- `DDS_UnsignedLong nanosec`  
*nanoseconds*

### 9.57.1 Detailed Description

Type for *duration* representation.

Represents a time interval.

#### Examples

`HelloWorld_publisher.cxx`, and `HelloWorld_subscriber.cxx`.

## 9.57.2 Member Data Documentation

### 9.57.2.1 sec

**DDS\_Long** DDS\_Duration\_t::sec

seconds

### 9.57.2.2 nanosec

**DDS\_UnsignedLong** DDS\_Duration\_t::nanosec

nanoseconds

[range] [0,1000000000)

## 9.58 DDS\_DynamicData Struct Reference

A sample of any complex data type, which can be inspected and manipulated reflectively.

### Public Member Functions

- **DDS\_DynamicData** (const **DDS\_TypeCode** \*type, const **DDS\_DynamicDataProperty\_t** &property)  
*The constructor for new **DDS\_DynamicData** (p. 775) objects.*
- **DDS\_Boolean** **is\_valid** () const  
*Indicates whether the object was constructed properly.*
- **DDS\_ReturnCode\_t** **copy** (const **DDS\_DynamicData** &src)  
*Deeply copy from the given object to this object.*
- **DDS\_Boolean** **equal** (const **DDS\_DynamicData** &other) const  
*Indicate whether the contents of another **DDS\_DynamicData** (p. 775) sample are the same as those of this one.*
- **DDS\_DynamicData** & **operator=** (const **DDS\_DynamicData** &src)  
*Deeply copy from the given object to this object.*
- **DDS\_Boolean** **operator==** (const **DDS\_DynamicData** &other) const  
*Indicate whether the contents of another **DDS\_DynamicData** (p. 775) sample are the same as those of this one.*
- **DDS\_ReturnCode\_t** **clear\_all\_members** ()  
*Clear the contents of all data members of this object.*
- **DDS\_ReturnCode\_t** **clear\_optional\_member** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id)  
*Clear the contents of a single optional data member of this object.*
- **DDS\_ReturnCode\_t** **clear\_member** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id)

- Clear the contents of a single data member of this object.*
- **DDS\_Boolean is\_cdr ()** const  
*Determine if a DynamicData object is using CDR as its data representation.*
  - const char \* **get\_cdr\_buffer ( DDS\_UnsignedLong &length)** const  
*Get the CDR buffer associated with a DynamicData object.*
  - **DDS\_ReturnCode\_t set\_cdr\_buffer (const char \*buffer, DDS\_UnsignedLong length)**  
*Associate a CDR buffer with a DynamicData object.*
  - **DDS\_ReturnCode\_t from\_cdr\_buffer (const char \*buffer, unsigned int length)**  
*Deserializes a DynamicData object from a buffer of octets.*
  - **DDS\_ReturnCode\_t to\_cdr\_buffer (char \*buffer, unsigned int &length)**  
*Serializes a DynamicData object into a CDR buffer of octets.*
  - **DDS\_ReturnCode\_t to\_cdr\_buffer\_ex (char \*buffer, unsigned int &length, DDS\_DataRepresentationId\_t representation)**  
*Serializes a DynamicData object into a buffer of octets.*
  - **DDS\_ReturnCode\_t to\_string (char \*str, DDS\_UnsignedLong &str\_size, const DDS\_PrintFormatProperty &property)**  
*Get a string representation of a DynamicData object.*
  - **DDS\_ReturnCode\_t from\_string (const char \*str, DDS\_PrintFormatKind format\_kind)**  
*Populates a DynamicData object from a JSON string representation.*
  - **DDS\_ReturnCode\_t print (FILE \*fp, int indent)** const  
*Output a textual representation of this object and its contents to the given file.*
  - void **get\_info ( DDS\_DynamicDataInfo &info\_out)** const  
*Fill in the given descriptor with information about this DDS\_DynamicData (p. 775).*
  - **DDS\_ReturnCode\_t bind\_type (const DDS\_TypeCode \*type)**  
*If this DDS\_DynamicData (p. 775) object is not yet associated with a data type, set that type now to the given DDS\_TypeCode (p. 1164).*
  - **DDS\_ReturnCode\_t unbind\_type ()**  
*Dissociate this DDS\_DynamicData (p. 775) object from any particular data type.*
  - **DDS\_ReturnCode\_t bind\_complex\_member ( DDS\_DynamicData &value\_out, const char \*member\_name, DDS\_DynamicDataMemberId member\_id)**  
*Use another DDS\_DynamicData (p. 775) object to provide access to a complex field of this DDS\_DynamicData (p. 775) object.*
  - **DDS\_ReturnCode\_t unbind\_complex\_member ( DDS\_DynamicData &value)**  
*Tear down the association created by a DDS\_DynamicData::bind\_complex\_member (p. 803) operation, committing any changes to the outer object since then.*
  - const **DDS\_TypeCode \* get\_type ()** const  
*Get the data type, of which this DDS\_DynamicData (p. 775) represents an instance.*
  - **DDS\_TCKind get\_type\_kind ()** const  
*Get the kind of this object's data type.*
  - **DDS\_UnsignedLong get\_member\_count ()** const  
*Get the number of members in the type.*
  - **DDS\_Boolean member\_exists (const char \*member\_name, DDS\_DynamicDataMemberId member\_id)** const  
*Indicates whether a member exists in this sample.*
  - **DDS\_Boolean member\_exists\_in\_type (const char \*member\_name, DDS\_DynamicDataMemberId member\_id)** const  
*Indicates whether a member of a particular name/ID exists in this data sample's type.*
  - **DDS\_ReturnCode\_t get\_member\_info ( DDS\_DynamicDataMemberInfo &info, const char \*member\_name, DDS\_DynamicDataMemberId member\_id)** const

Fill in the given descriptor with information about the identified member of this *DDS\_DynamicData* (p. 775) sample.

- **DDS\_ReturnCode\_t get\_member\_info\_by\_index** (struct *DDS\_DynamicDataMemberInfo* &info, *DDS\_↔* *UnsignedLong* index) const

Fill in the given descriptor with information about the identified member of this *DDS\_DynamicData* (p. 775) sample.

- **DDS\_ReturnCode\_t get\_member\_type** (const *DDS\_TypeCode* \*&type\_out, const char \*member\_name, *DDS\_DynamicDataMemberId* member\_id) const

Get the type of the given member of this sample.

- **DDS\_ReturnCode\_t is\_member\_key** (*DDS\_Boolean* &is\_key\_out, const char \*member\_name, *DDS\_↔* *DynamicDataMemberId* member\_id) const

Indicates whether a given member forms part of the key of this sample's data type.

- **DDS\_ReturnCode\_t get\_long** (*DDS\_Long* &value\_out, const char \*member\_name, *DDS\_DynamicData↔* *MemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_Long* (p. 318) or another type implicitly convertible to it (*DDS\_Octet* (p. 317), *DDS\_Char* (p. 317), *DDS\_Short* (p. 318), *DDS\_UnsignedShort* (p. 318), or *DDS\_Enum* (p. 320)).

- **DDS\_ReturnCode\_t get\_short** (*DDS\_Short* &value\_out, const char \*member\_name, *DDS\_DynamicData↔* *MemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_Short* (p. 318) or another type implicitly convertible to it (*DDS\_Octet* (p. 317) or *DDS\_Char* (p. 317)).

- **DDS\_ReturnCode\_t get\_ulong** (*DDS\_UnsignedLong* &value\_out, const char \*member\_name, *DDS\_↔* *DynamicDataMemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_UnsignedLong* (p. 318) or another type implicitly convertible to it (*DDS\_Octet* (p. 317), *DDS\_Char* (p. 317), *DDS\_Short* (p. 318), *DDS\_UnsignedShort* (p. 318), or *DDS\_Enum* (p. 320)).

- **DDS\_ReturnCode\_t get\_ushort** (*DDS\_UnsignedShort* &value\_out, const char \*member\_name, *DDS\_↔* *DynamicDataMemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_UnsignedShort* (p. 318) or another type implicitly convertible to it (*DDS\_Octet* (p. 317) or *DDS\_Char* (p. 317)).

- **DDS\_ReturnCode\_t get\_float** (*DDS\_Float* &value\_out, const char \*member\_name, *DDS\_DynamicData↔* *MemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_Float* (p. 319).

- **DDS\_ReturnCode\_t get\_double** (*DDS\_Double* &value\_out, const char \*member\_name, *DDS\_Dynamic↔* *DataMemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_Double* (p. 319) or another type implicitly convertible to it (*DDS\_Float* (p. 319)).

- **DDS\_ReturnCode\_t get\_boolean** (*DDS\_Boolean* &value\_out, const char \*member\_name, *DDS\_Dynamic↔* *DataMemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_Boolean* (p. 320).

- **DDS\_ReturnCode\_t get\_char** (*DDS\_Char* &value\_out, const char \*member\_name, *DDS\_DynamicData↔* *MemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_Char* (p. 317).

- **DDS\_ReturnCode\_t get\_octet** (*DDS\_Octet* &value\_out, const char \*member\_name, *DDS\_DynamicData↔* *MemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_Octet* (p. 317).

- **DDS\_ReturnCode\_t get\_longlong** (*DDS\_LongLong* &value\_out, const char \*member\_name, *DDS\_↔* *DynamicDataMemberId* member\_id) const

Get the value of the given field, which is of type *DDS\_LongLong* (p. 319) or another type implicitly convertible to it (*DDS↔* *\_Octet* (p. 317), *DDS\_Char* (p. 317), *DDS\_Short* (p. 318), *DDS\_UnsignedShort* (p. 318), *DDS\_Long* (p. 318), *DDS\_↔* *UnsignedLong* (p. 318), or *DDS\_Enum* (p. 320)).

- **DDS\_ReturnCode\_t get\_ulonglong** (*DDS\_UnsignedLongLong* &value\_out, const char \*member\_name, *DDS\_DynamicDataMemberId* member\_id) const

Get the value of the given field, which is of type **DDS\_UnsignedLongLong** (p. 319) or another type implicitly convertible to it (**DDS\_Octet** (p. 317), **DDS\_Char** (p. 317), **DDS\_Short** (p. 318), **DDS\_UnsignedShort** (p. 318), **DDS\_Long** (p. 318), **DDS\_UnsignedLong** (p. 318), or **DDS\_Enum** (p. 320)).

- **DDS\_ReturnCode\_t get\_longdouble** (**DDS\_LongDouble** &value\_out, const char \*member\_name, **DDS\_↔DynamicDataMemberId** member\_id) const
 

Get the value of the given field, which is of type **DDS\_LongDouble** (p. 319) or another type implicitly convertible to it (**DDS\_Float** (p. 319) or **DDS\_Double** (p. 319)).
- **DDS\_ReturnCode\_t get\_wchar** (**DDS\_Wchar** &value\_out, const char \*member\_name, **DDS\_Dynamic↔DataMemberId** member\_id) const
 

Get the value of the given field, which is of type **DDS\_Wchar** (p. 317) or another type implicitly convertible to it (**DDS\_Char** (p. 317)).
- **DDS\_ReturnCode\_t get\_string** (char \*&value, **DDS\_UnsignedLong** \*size, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get the value of the given field, which is of type char\*.
- **DDS\_ReturnCode\_t get\_wstring** (**DDS\_Wchar** \*&value, **DDS\_UnsignedLong** \*size, const char \*member↔\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get the value of the given field, which is of type **DDS\_Wchar** (p. 317)\*.
- **DDS\_ReturnCode\_t get\_int8** (**DDS\_Int8** &value\_out, const char \*member\_name, **DDS\_DynamicData↔MemberId** member\_id) const
 

Get the value of the given field, which is of type **DDS\_Int8** (p. 318).
- **DDS\_ReturnCode\_t get\_uint8** (**DDS\_UInt8** &value\_out, const char \*member\_name, **DDS\_DynamicData↔MemberId** member\_id) const
 

Get the value of the given field, which is of type **DDS\_UInt8** (p. 318).
- **DDS\_ReturnCode\_t get\_complex\_member** (**DDS\_DynamicData** &value\_out, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get a copy of the value of the given field, which is of some composed type.
- **DDS\_ReturnCode\_t get\_long\_array** (**DDS\_Long** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get a copy of the given array member. The array may contain members of type **DDS\_Long** (p. 318) or **DDS\_Enum** (p. 320).
- **DDS\_ReturnCode\_t get\_short\_array** (**DDS\_Short** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get a copy of the given array member.
- **DDS\_ReturnCode\_t get\_ulong\_array** (**DDS\_UnsignedLong** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get a copy of the given array member. The array may contain members of type **DDS\_UnsignedLong** (p. 318) or **DDS↔\_Enum** (p. 320).
- **DDS\_ReturnCode\_t get\_ushort\_array** (**DDS\_UnsignedShort** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get a copy of the given array member.
- **DDS\_ReturnCode\_t get\_float\_array** (**DDS\_Float** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get a copy of the given array member.
- **DDS\_ReturnCode\_t get\_double\_array** (**DDS\_Double** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get a copy of the given array member.
- **DDS\_ReturnCode\_t get\_boolean\_array** (**DDS\_Boolean** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const
 

Get a copy of the given array member.
- **DDS\_ReturnCode\_t get\_char\_array** (**DDS\_Char** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const



*Get a copy of the given array member.*

- **DDS\_ReturnCode\_t get\_octet\_array** ( **DDS\_Octet** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given array member.*

- **DDS\_ReturnCode\_t get\_longlong\_array** ( **DDS\_LongLong** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given array member.*

- **DDS\_ReturnCode\_t get\_ulonglong\_array** ( **DDS\_UnsignedLongLong** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given array member.*

- **DDS\_ReturnCode\_t get\_longdouble\_array** ( **DDS\_LongDouble** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given array member.*

- **DDS\_ReturnCode\_t get\_wchar\_array** ( **DDS\_Wchar** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given array member.*

- **DDS\_ReturnCode\_t get\_int8\_array** ( **DDS\_Int8** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given array member.*

- **DDS\_ReturnCode\_t get\_uint8\_array** ( **DDS\_UInt8** \*array, **DDS\_UnsignedLong** \*length, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given array member.*

- **DDS\_ReturnCode\_t get\_long\_seq** ( **DDS\_LongSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given sequence member.*

- **DDS\_ReturnCode\_t get\_short\_seq** ( **DDS\_ShortSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given sequence member.*

- **DDS\_ReturnCode\_t get\_ulong\_seq** ( **DDS\_UnsignedLongSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given sequence member.*

- **DDS\_ReturnCode\_t get\_ushort\_seq** ( **DDS\_UnsignedShortSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given sequence member.*

- **DDS\_ReturnCode\_t get\_float\_seq** ( **DDS\_FloatSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given sequence member.*

- **DDS\_ReturnCode\_t get\_double\_seq** ( **DDS\_DoubleSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given sequence member.*

- **DDS\_ReturnCode\_t get\_boolean\_seq** ( **DDS\_BooleanSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given sequence member.*

- **DDS\_ReturnCode\_t get\_char\_seq** ( **DDS\_CharSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given sequence member.*

- **DDS\_ReturnCode\_t get\_octet\_seq** ( **DDS\_OctetSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const

*Get a copy of the given sequence member.*

- **DDS\_ReturnCode\_t get\_longlong\_seq** ( **DDS\_LongLongSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const  
*Get a copy of the given sequence member.*
- **DDS\_ReturnCode\_t get\_ulonglong\_seq** ( **DDS\_UnsignedLongLongSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const  
*Get a copy of the given sequence member.*
- **DDS\_ReturnCode\_t get\_longdouble\_seq** ( **DDS\_LongDoubleSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const  
*Get a copy of the given sequence member.*
- **DDS\_ReturnCode\_t get\_wchar\_seq** ( **DDS\_WcharSeq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const  
*Get a copy of the given sequence member.*
- **DDS\_ReturnCode\_t get\_int8\_seq** ( **DDS\_Int8Seq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const  
*Get a copy of the given sequence member.*
- **DDS\_ReturnCode\_t get\_uint8\_seq** ( **DDS\_UInt8Seq** &seq, const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id) const  
*Get a copy of the given sequence member.*
- **DDS\_ReturnCode\_t set\_long** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_Long** value)  
*Set the value of the given field, which is of type **DDS\_Long** (p. 318).*
- **DDS\_ReturnCode\_t set\_short** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_Short** value)  
*Set the value of the given field, which is of type **DDS\_Short** (p. 318).*
- **DDS\_ReturnCode\_t set\_ulong** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** value)  
*Set the value of the given field, which is of type **DDS\_UnsignedLong** (p. 318).*
- **DDS\_ReturnCode\_t set\_ushort** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedShort** value)  
*Set the value of the given field, which is of type **DDS\_UnsignedShort** (p. 318).*
- **DDS\_ReturnCode\_t set\_float** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_Float** value)  
*Set the value of the given field, which is of type **DDS\_Float** (p. 319).*
- **DDS\_ReturnCode\_t set\_double** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_Double** value)  
*Set the value of the given field, which is of type **DDS\_Double** (p. 319).*
- **DDS\_ReturnCode\_t set\_boolean** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_Boolean** value)  
*Set the value of the given field, which is of type **DDS\_Boolean** (p. 320).*
- **DDS\_ReturnCode\_t set\_char** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_Char** value)  
*Set the value of the given field, which is of type **DDS\_Char** (p. 317).*
- **DDS\_ReturnCode\_t set\_octet** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_Octet** value)  
*Set the value of the given field, which is of type **DDS\_Octet** (p. 317).*
- **DDS\_ReturnCode\_t set\_longlong** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_LongLong** value)  
*Set the value of the given field, which is of type **DDS\_LongLong** (p. 319).*

- **DDS\_ReturnCode\_t set\_ulonglong** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLongLong** value)  
*Set the value of the given field, which is of type **DDS\_UnsignedLongLong** (p. 319).*
- **DDS\_ReturnCode\_t set\_longdouble** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_LongDouble** value)  
*Set the value of the given field, which is of type **DDS\_LongDouble** (p. 319).*
- **DDS\_ReturnCode\_t set\_wchar** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_Wchar** value)  
*Set the value of the given field, which is of type **DDS\_Wchar** (p. 317).*
- **DDS\_ReturnCode\_t set\_string** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const char \*value)  
*Set the value of the given field of type char\*.*
- **DDS\_ReturnCode\_t set\_wstring** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_Wchar** \*value)  
*Set the value of the given field of type **DDS\_Wchar** (p. 317)\*.*
- **DDS\_ReturnCode\_t set\_int8** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_Int8** value)  
*Set the value of the given field, which is of type **DDS\_Int8** (p. 318).*
- **DDS\_ReturnCode\_t set\_uint8** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UInt8** value)  
*Set the value of the given field, which is of type **DDS\_UInt8** (p. 318).*
- **DDS\_ReturnCode\_t set\_complex\_member** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_DynamicData** &value)  
*Copy the state of the given **DDS\_DynamicData** (p. 775) object into a member of this object.*
- **DDS\_ReturnCode\_t set\_long\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_Long** \*array)  
*Set the contents of the given array member. The array may contain members of type **DDS\_Long** (p. 318) or **DDS\_Enum** (p. 320).*
- **DDS\_ReturnCode\_t set\_short\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_Short** \*array)  
*Set the contents of the given array member.*
- **DDS\_ReturnCode\_t set\_ulong\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_UnsignedLong** \*array)  
*Set the contents of the given array member. The array may contain members of type **DDS\_UnsignedLong** (p. 318) or **DDS\_Enum** (p. 320).*
- **DDS\_ReturnCode\_t set\_ushort\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_UnsignedShort** \*array)  
*Set the contents of the given array member.*
- **DDS\_ReturnCode\_t set\_float\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_Float** \*array)  
*Set the contents of the given array member.*
- **DDS\_ReturnCode\_t set\_double\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_Double** \*array)  
*Set the contents of the given array member.*
- **DDS\_ReturnCode\_t set\_boolean\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_Boolean** \*array)  
*Set the contents of the given array member.*
- **DDS\_ReturnCode\_t set\_char\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_Char** \*array)

*Set the contents of the given array member.*

- **DDS\_ReturnCode\_t set\_octet\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_Octet** \*array)

*Set the contents of the given array member.*

- **DDS\_ReturnCode\_t set\_longlong\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_LongLong** \*array)

*Set the contents of the given array member.*

- **DDS\_ReturnCode\_t set\_ulonglong\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_UnsignedLongLong** \*array)

*Set the contents of the given array member.*

- **DDS\_ReturnCode\_t set\_longdouble\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_LongDouble** \*array)

*Set the contents of the given array member.*

- **DDS\_ReturnCode\_t set\_wchar\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_Wchar** \*array)

*Set the contents of the given array member.*

- **DDS\_ReturnCode\_t set\_int8\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_Int8** \*array)

*Set the contents of the given array member.*

- **DDS\_ReturnCode\_t set\_uint8\_array** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, **DDS\_UnsignedLong** length, const **DDS\_UInt8** \*array)

*Set the contents of the given array member.*

- **DDS\_ReturnCode\_t set\_long\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_LongSeq** &value)

*Set the contents of the given sequence member.*

- **DDS\_ReturnCode\_t set\_short\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_ShortSeq** &value)

*Set the contents of the given sequence member.*

- **DDS\_ReturnCode\_t set\_ulong\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_UnsignedLongSeq** &value)

*Set the contents of the given sequence member.*

- **DDS\_ReturnCode\_t set\_ushort\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_UnsignedShortSeq** &value)

*Set the contents of the given sequence member.*

- **DDS\_ReturnCode\_t set\_float\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_FloatSeq** &value)

*Set the contents of the given sequence member.*

- **DDS\_ReturnCode\_t set\_double\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_DoubleSeq** &value)

*Set the contents of the given sequence member.*

- **DDS\_ReturnCode\_t set\_boolean\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_BooleanSeq** &value)

*Set the contents of the given sequence member.*

- **DDS\_ReturnCode\_t set\_char\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_CharSeq** &value)

*Set the contents of the given sequence member.*

- **DDS\_ReturnCode\_t set\_octet\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_OctetSeq** &value)

*Set the contents of the given sequence member.*

- **DDS\_ReturnCode\_t set\_longlong\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_LongLongSeq** &value)  
Set the contents of the given sequence member.
- **DDS\_ReturnCode\_t set\_ulonglong\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_UnsignedLongLongSeq** &value)  
Set the contents of the given sequence member.
- **DDS\_ReturnCode\_t set\_longdouble\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_LongDoubleSeq** &value)  
Set the contents of the given sequence member.
- **DDS\_ReturnCode\_t set\_wchar\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_WcharSeq** &value)  
Set the contents of the given sequence member.
- **DDS\_ReturnCode\_t set\_int8\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_Int8Seq** &value)  
Set the contents of the given sequence member.
- **DDS\_ReturnCode\_t set\_uint8\_seq** (const char \*member\_name, **DDS\_DynamicDataMemberId** member\_id, const **DDS\_UInt8Seq** &value)  
Set the contents of the given sequence member.
- **~DDS\_DynamicData ()**  
Finalize and deallocate this **DDS\_DynamicData** (p. 775) sample.

### 9.58.1 Detailed Description

A sample of any complex data type, which can be inspected and manipulated reflectively.

Objects of type **DDS\_DynamicData** (p. 775) represent corresponding objects of the type identified by their **DDS\_TypeCode** (p. 1164). Because the definition of these types may not have existed at compile time on the system on which the application is running, you will interact with the data using an API of reflective getters and setters.

For example, if you had access to your data types at compile time, you could do this:

```
theValue = theObject.theField;
```

Instead, you will do something like this:

```
theValue = get(theObject, "theField");
```

**DDS\_DynamicData** (p. 775) objects can represent any complex data type, including those of type kinds **DDS\_TK\_ARRAY** (p. 86), **DDS\_TK\_SEQUENCE** (p. 86), **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_UNION** (p. 86), and **DDS\_TK\_VALUE** (p. 86). They cannot represent objects of basic types (e.g., integers and strings). Since those type definitions always exist on every system, you can examine their objects directly.

### 9.58.2 Member Names and IDs

The members of a data type can be identified in one of two ways: by their name or by their numeric ID. The former is often more transparent to human users; the latter is typically faster.

You define the name and ID of a type member when you add that member to that type. If you define your type in IDL or XML, the name will be the field name that appears in the type definition; the ID will be the one-based index of the field in declaration order. For example, in the following IDL structure, the ID of `theLong` is 2.

```
struct MyNestedType {
```

```

char theChar;

octet theOctetArray[10];

long long theMultidimensionalArray[4][6][12];

sequence<long> myArrayOfSeq[8];

};

struct MyType {

    short theShort;

    long theLong;

    MyNestedType theNestedType;

};

```

For unions (**DDS\_TK\_UNION** (p. 86)), the ID of a member is the discriminator value corresponding to that member. To access the current discriminator of a union, you must use the **DDS\_DynamicData::get\_member\_info\_by\_index** (p. 810) operation on the DynamicData object using an index value of 0. This operation fills in a **DDS\_DynamicDataMemberInfo** (p. 893), then you can access the populated **DDS\_DynamicDataMemberInfo::member\_id** (p. 893) field to get the current discriminator. Once you know the value of the discriminator, you can use it in the proper get/set\_xxx() operations to access and set the member's value. Here is an example of accessing the discriminator:

```

DynamicDataMemberInfo memberInfo;

myDynamicData.get_member_info_by_index(memberInfo, 0);

DynamicDataMemberId discriminatorValue = memberInfo.member_id;

DDS_Long myMemberValue = myDynamicData.get_long(NULL, discriminatorValue);

```

### 9.58.2.1 Hierarchical Member Names

It is possible to refer to a nested member in a type without first having to use the **DDS\_DynamicData::bind\_complex\_member** (p. 803) API. You can do this by using a hierarchical name. A hierarchical member name is a concatenation of member names separated by the '.' character. The hierarchical name describes the complete path from a top-level type to the nested member. For example, in the above type, any DynamicData API that receives a member name will accept "theNestedType.theChar" to refer to the char member in MyNestedType:

```
char myChar = myDynamicData.get_char("theNestedType.theChar", DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED);
```

In order to access the value of theChar without using a hierarchical name, you would have to first bind to theNestedType and then get the value:

```
myDynamicData.bind_complex_member(myBoundData, "theNestedType", DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED);

DDS_Char myChar = myBoundData.get_char("theChar", DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED);
```

As you can see, using a hierarchical member name removes the need to call the **DDS\_DynamicData::bind\_complex\_member** (p. 803) and **DDS\_DynamicData::unbind\_complex\_member** (p. 805) APIs, and allows for access to nested members at any depth directly from the top-level type.

The member name can also contain indexes to address members in arrays and sequences. For example, to set the third member in the array theOctetArray, you can pass in "theNestedType.theOctetArray[2]" as the member name to the **DDS\_DynamicData::set\_octet** (p. 859) API. The index values when used as part of the member name are 0-based.

For multi-dimensional arrays, the indexes for each dimension should be listed comma-separated in between brackets. For example, to address a member of theMultidimensionalArray, the member name should be something like "theNestedType.theMultidimensionalArray[3,2,5]".

In complex types with arrays and sequences that contain other arrays and sequences, the hierarchical name may include multiple index values, one right after another. For example, in MyNestedType, myArrayOfSeq is an array of sequences. In order to set the third member of the sequence in the fourth member of the array, the member name would be "myNestedType.myArrayOfSeq[3][2]".

### 9.58.3 Arrays and Sequences

The "members" of array and sequence types, unlike those of structure and union types, don't have names or explicit member IDs. However, they may nevertheless be accessed by "ID": the ID is one more than the index. (The first element has ID 1, the second 2, etc.)

Multi-dimensional arrays are effectively flattened by this pattern. For example, for an array `theArray[4][5]`, accessing ID 7 is equivalent to index 6, or the second element of the second group of 5.

To determine the length of a collection-typed member of a structure or union, you have two choices:

1. Get the length along with the data: call the appropriate array accessor (see **Getters and Setters** (p. 786)) and check the resulting length.
2. Get the length without getting the data itself: call `DDS_DynamicData::get_member_info` (p. 808) and check the resulting `DDS_DynamicDataMemberInfo::element_count` (p. 894).

### 9.58.4 Available Functionality

The Dynamic Data API is large when measured by the number of methods it contains. But each method falls into one of a very small number of categories. You will find it easier to navigate this documentation if you understand these categories.

#### 9.58.4.1 Lifecycle and Utility Methods

Managing the lifecycle of `DDS_DynamicData` (p. 775) objects is simple. You have two choices:

1. Usually, you will go through a `DDSDynamicDataTypeSupport` (p. 1456) factory object, which will ensure that the type and property information for the new `DDS_DynamicData` (p. 775) object corresponds to a registered type in your system.
2. In certain advanced cases, such as when you're navigating a nested structure, you will want to have a `DDS_DynamicData` (p. 775) object that is not bound up front to any particular type, or you will want to initialize the object in a custom way. In that case, you can call the constructor directly.

Table 9.5 Lifecycle

<code>DDSDynamicDataTypeSupport</code> (p. 1456)	<code>DDS_DynamicData</code> (p. 775)
<code>DDSDynamicDataTypeSupport::create_data</code> (p. 1460)	<code>DDS_DynamicData::DDS_DynamicData(const DDS_TypeCode *, const DDS_DynamicDataProperty_t &amp;)</code> (p. 790)
<code>DDSDynamicDataTypeSupport::delete_data</code> (p. 1461)	<code>DDS_DynamicData::~DDS_DynamicData</code> (p. 791)

You can also copy `DDS_DynamicData` (p. 775) objects:

- `DDS_DynamicData::copy` (p. 792)
- `DDS_DynamicData::operator=` (p. 793)

You can test them for equality:

- `DDS_DynamicData::equal` (p. 793)
- `DDS_DynamicData::operator==` (p. 793)

And you can print their contents:

- `DDS_DynamicData::print` (p. 801)
- `DDSDynamicDataSupport::print_data` (p. 1461)

#### 9.58.4.2 Getters and Setters

Most methods get or set the value of some field. These methods are named according to the type of the field they access.

The names of types vary across languages. The programming API for each language reflects that programming language. However, if your chosen language does not use the same names as the language that you used to define your types (e.g., IDL), or if you need to interoperate among programming languages, you will need to understand these differences. They are explained the following table. (Note: for modern C++, see the RTI Connex Modern C++ API reference.)

**Table 9.6 Type Names Across Languages**

Type	IDL	C, Traditional C++	Java	Ada
16-bit integer	short	DDS_Short	short	Standard.DDS.↔ Short
32-bit integer	long	DDS_Long	int	Standard.DDS.Long
64-bit integer	long long	DDS_LongLong	long	Standard.DDS.↔ Long_Long
Unsigned 16-bit integer	unsigned short	DDS_Unsigned↔ Short	short	Standard.DDS.↔ Unsigned_Short
Unsigned 32-bit integer	unsigned long	DDS_Unsigned↔ Long	int	Standard.DDS.Long
Unsigned 64-bit integer	unsigned long long	DDS_Unsigned↔ LongLong	long	Standard.DDS.↔ Unsigned_Long_↔ Long
float	float	DDS_Float	float	Standard.DDS.Float
double	double	DDS_Double	double	Standard.DDS.↔ Double
long double	long double	DDS_LongDouble	N/A (see CORE-14091 known issue)	Standard.DDS.↔ Long_Double
character	char	DDS_Char	char	Standard.DDS.Char
wide character	wchar	DDS_Wchar	char	Standard.DDS.↔ Wchar



Type	IDL	C, Traditional C++	Java	Ada
octet	octet	DDS_Octet	byte	Standard.DDS.Octet
boolean	boolean	DDS_Boolean	boolean	Standard.DDS.↔ Boolean
string	string	DDS_Char*	String	Standard.DDS.↔ String
wstring	wstring	DDS_Wchar*	String	Standard.DDS.↔ Wide_String

When working with a **DDS\_DynamicData** (p. 775) object representing an array or sequence, calling one of the "get" methods below for an index that is out of bounds will result in **DDS\_RETCODE\_NO\_DATA** (p. 337). Calling "set" for an index that is past the end of a sequence will cause that sequence to automatically lengthen (filling with default contents).

When working with a **DDS\_DynamicData** (p. 775) object whose type contains optional members, calling one of the "get" methods below on an unset optional member or any member that is part of an unset complex optional member will result in **DDS\_RETCODE\_NO\_DATA** (p. 337).

Table 9.7 Basic Types

Get	Set
<b>DDS_DynamicData::get_long</b> (p. 812)	<b>DDS_DynamicData::set_long</b> (p. 853)
<b>DDS_DynamicData::get_ulong</b> (p. 814)	<b>DDS_DynamicData::set_ulong</b> (p. 854)
<b>DDS_DynamicData::get_short</b> (p. 813)	<b>DDS_DynamicData::set_short</b> (p. 854)
<b>DDS_DynamicData::get_ushort</b> (p. 815)	<b>DDS_DynamicData::set_ushort</b> (p. 855)
<b>DDS_DynamicData::get_longlong</b> (p. 819)	<b>DDS_DynamicData::set_longlong</b> (p. 859)
<b>DDS_DynamicData::get_ulonglong</b> (p. 820)	<b>DDS_DynamicData::set_ulonglong</b> (p. 860)
<b>DDS_DynamicData::get_float</b> (p. 815)	<b>DDS_DynamicData::set_float</b> (p. 856)
<b>DDS_DynamicData::get_double</b> (p. 816)	<b>DDS_DynamicData::set_double</b> (p. 857)
<b>DDS_DynamicData::get_longdouble</b> (p. 821)	<b>DDS_DynamicData::set_longdouble</b> (p. 861)
<b>DDS_DynamicData::get_boolean</b> (p. 817)	<b>DDS_DynamicData::set_boolean</b> (p. 857)
<b>DDS_DynamicData::get_octet</b> (p. 819)	<b>DDS_DynamicData::set_octet</b> (p. 859)
<b>DDS_DynamicData::get_char</b> (p. 818)	<b>DDS_DynamicData::set_char</b> (p. 858)
<b>DDS_DynamicData::get_wchar</b> (p. 822)	<b>DDS_DynamicData::set_wchar</b> (p. 862)
<b>DDS_DynamicData::get_string</b> (p. 823)	<b>DDS_DynamicData::set_string</b> (p. 862)
<b>DDS_DynamicData::get_wstring</b> (p. 824)	<b>DDS_DynamicData::set_wstring</b> (p. 863)

Table 9.8 Structures, Arrays, and Other Complex Types

Get	Set
<b>DDS_DynamicData::get_complex_member</b> (p. 826)	<b>DDS_DynamicData::set_complex_member</b> (p. 865)

Table 9.9 Arrays of Basic Types

Get	Set
DDS_DynamicData::get_long_array (p. 827)	DDS_DynamicData::set_long_array (p. 867)
DDS_DynamicData::get_ulong_array (p. 829)	DDS_DynamicData::set_ulong_array (p. 868)
DDS_DynamicData::get_short_array (p. 828)	DDS_DynamicData::set_short_array (p. 868)
DDS_DynamicData::get_ushort_array (p. 830)	DDS_DynamicData::set_ushort_array (p. 869)
DDS_DynamicData::get_longlong_array (p. 835)	DDS_DynamicData::set_longlong_array (p. 874)
DDS_DynamicData::get_ulonglong_array (p. 836)	DDS_DynamicData::set_ulonglong_array (p. 875)
DDS_DynamicData::get_float_array (p. 831)	DDS_DynamicData::set_float_array (p. 870)
DDS_DynamicData::get_double_array (p. 832)	DDS_DynamicData::set_double_array (p. 871)
DDS_DynamicData::get_longdouble_array (p. 837)	DDS_DynamicData::set_longdouble_array (p. 876)
DDS_DynamicData::get_boolean_array (p. 832)	DDS_DynamicData::set_boolean (p. 857)
DDS_DynamicData::get_octet_array (p. 834)	DDS_DynamicData::set_octet_array (p. 874)
DDS_DynamicData::get_char_array (p. 833)	DDS_DynamicData::set_char_array (p. 873)
DDS_DynamicData::get_wchar_array (p. 838)	DDS_DynamicData::set_wchar_array (p. 877)

Table 9.10 Sequences of Basic Types

Get	Set
DDS_DynamicData::get_long_seq (p. 840)	DDS_DynamicData::set_long_seq (p. 880)
DDS_DynamicData::get_ulong_seq (p. 842)	DDS_DynamicData::set_ulong_seq (p. 881)
DDS_DynamicData::get_short_seq (p. 841)	DDS_DynamicData::set_short_seq (p. 880)
DDS_DynamicData::get_ushort_seq (p. 843)	DDS_DynamicData::set_ushort_seq (p. 882)
DDS_DynamicData::get_longlong_seq (p. 848)	DDS_DynamicData::set_longlong_seq (p. 887)
DDS_DynamicData::get_ulonglong_seq (p. 849)	DDS_DynamicData::set_ulonglong_seq (p. 888)
DDS_DynamicData::get_float_seq (p. 844)	DDS_DynamicData::set_float_seq (p. 883)
DDS_DynamicData::get_double_seq (p. 845)	DDS_DynamicData::set_double_seq (p. 884)
DDS_DynamicData::get_longdouble_seq (p. 850)	DDS_DynamicData::set_longdouble_seq (p. 888)
DDS_DynamicData::get_boolean_seq (p. 845)	DDS_DynamicData::set_boolean_seq (p. 884)
DDS_DynamicData::get_octet_seq (p. 847)	DDS_DynamicData::set_octet_seq (p. 886)
DDS_DynamicData::get_char_seq (p. 846)	DDS_DynamicData::set_char_seq (p. 885)
DDS_DynamicData::get_wchar_seq (p. 850)	DDS_DynamicData::set_wchar_seq (p. 889)

In addition to getting or setting a field, you can "clear" its value; that is, set it to a default zero value.

- `DDS_DynamicData::clear_all_members` (p. 794)
- `DDS_DynamicData::clear_optional_member` (p. 794)

#### 9.58.4.3 Query and Iteration

Not all components of your application will have static knowledge of all of the fields of your type. Sometimes, you will want to query meta-data about the fields that appear in a given data sample.

- **DDS\_DynamicData::get\_type** (p. 806)
- **DDS\_DynamicData::get\_type\_kind** (p. 806)
- **DDS\_DynamicData::get\_member\_type** (p. 810)
- **DDS\_DynamicData::get\_member\_info** (p. 808)
- **DDS\_DynamicData::get\_member\_count** (p. 806)
- **DDS\_DynamicData::get\_member\_info\_by\_index** (p. 810)
- **DDS\_DynamicData::member\_exists** (p. 807)
- **DDS\_DynamicData::member\_exists\_in\_type** (p. 808)
- **DDS\_DynamicData::is\_member\_key** (p. 811)

#### 9.58.4.4 Type/Object Association

Sometimes, you may want to change the association between a data object and its type. This is not something you can do with a typical object, but with **DDS\_DynamicData** (p. 775) objects, it is a powerful capability. It allows you to, for example, examine nested structures without copying them by using a "bound" **DDS\_DynamicData** (p. 775) object as a view into an enclosing **DDS\_DynamicData** (p. 775) object.

- **DDS\_DynamicData::bind\_type** (p. 802)
- **DDS\_DynamicData::unbind\_type** (p. 803)
- **DDS\_DynamicData::bind\_complex\_member** (p. 803)
- **DDS\_DynamicData::unbind\_complex\_member** (p. 805)

#### 9.58.4.5 Performance Considerations

By default, a DynamicData object stores its content in an implementation-specific representation that allows getting and setting its fields by name or ID.

When a sample is received, the CDR-formatted data is deserialized into this buffer.

When a sample is published, the data is serialized into CDR from the buffer and sent to the network.

However, there are scenarios where DynamicData is used for purposes that don't involve manipulating the object's content directly. Two common examples are:

- **Recording/Replaying:** Storing samples in persistent storage for later analysis or replay.
- **Bridging:** Transferring samples from one domain to another by transmitting samples received with a DynamicDataReader to another domain using a DynamicDataWriter.

RTI provides dedicated services, namely RTI Recording Service and RTI Routing Service, to address these use cases. However, in certain situations, you might be unable to utilize these services.

For scenarios where inspecting or modifying the content of DynamicData fields is unnecessary, DynamicData offers a high-performance method to configure a DataReader to avoid deserializing incoming samples into the internal representation. Additionally, the DynamicData API provides a method to link a CDR-formatted serialization buffer directly with a DynamicData object, facilitating direct transmission without converting the data from the internal representation to CDR.

To skip the deserialization of a DynamicData object on the DataReader side, you can set the field **DDS\_DynamicData::DataSerializationProperty\_t::skip\_deserialization** (p. 899) to **DDS\_BOOLEAN\_TRUE** (p. 317).

Once a sample is received, you can access the serialized buffer directly by using the **DDS\_DynamicData::get\_cdr\_buffer** (p. 796). This buffer can be stored in persistent storage in a Recording/Replaying use case.

To link a serialization buffer directly with a DynamicData object, you can use the **DDS\_DynamicData::set\_cdr\_buffer** (p. 797) method. This method allows you to set the buffer that will be used to serialize the DynamicData object when it is published.

#### MT Safety:

**UNSAFE.** In general, using a single **DDS\_DynamicData** (p. 775) object concurrently from multiple threads is *unsafe*.

#### Examples

**HelloWorldPlugin.cxx.**

## 9.58.5 Constructor & Destructor Documentation

### 9.58.5.1 DDS\_DynamicData()

```
DDS_DynamicData::DDS_DynamicData (
    const DDS_TypeCode * type,
    const DDS_DynamicDataProperty_t & property )
```

The constructor for new **DDS\_DynamicData** (p. 775) objects.

The type parameter may be NULL. In that case, this **DDS\_DynamicData** (p. 775) must be *bound* with **DDS\_DynamicData::bind\_type** (p. 802) or **DDS\_DynamicData::bind\_complex\_member** (p. 803) before it can be used.

If the **DDS\_TypeCode** (p. 1164) is not NULL, the newly constructed **DDS\_DynamicData** (p. 775) object will retain a reference to it. It is *not* safe to delete the **DDS\_TypeCode** (p. 1164) until all samples that use it have themselves been deleted.

In most cases, it is not necessary to call this constructor explicitly. Instead, use **DDSDynamicDataSupport::create\_data** (p. 1460), and the **DDS\_TypeCode** (p. 1164) and properties will be specified for you. Using the factory method also ensures that the memory management contract documented above is followed correctly, because the **DDSDynamicDataSupport** (p. 1456) object maintains the **DDS\_TypeCode** (p. 1164) used by the samples it creates.

However you create a **DDS\_DynamicData** (p. 775) object, you must delete it when you are finished with it. If you choose to use this constructor, delete the object with the destructor: **DDS\_DynamicData::~~DDS\_DynamicData** (p. 791).

```
DDS_DynamicData* sample = new DDS_DynamicData(
    myType, myProperties);
// Failure indicated by is_valid() method.
// Do something...
delete sample;
```

**NOTE** that RTI Connexx does not explicitly generate any exceptions in this constructor, because C++ exception support is not consistent across all platforms on which RTI Connexx runs. Therefore, to check whether construction succeeded, you must use the **DDS\_DynamicData::is\_valid** (p. 791) method. Alternatively, you can create an **DDS\_DynamicData** (p. 775) object with **DDSDynamicDataSupport::create\_data** (p. 1460), which returns NULL on failure, eliminating the need to call **DDS\_DynamicData::is\_valid** (p. 791).

#### Parameters

<i>type</i>	<< <i>in</i> >> (p. 238) The type of which the new object will represent an object.
<i>property</i>	<< <i>in</i> >> (p. 238) Properties that configure the behavior of the new object. Most users can simply use <b>DDS_DYNAMIC_DATA_PROPERTY_DEFAULT</b> (p. 102).

#### See also

- DDS\_DynamicData::is\_valid** (p. 791)
- DDS\_DynamicData::~~DDS\_DynamicData** (p. 791)
- DDSDynamicDataSupport::create\_data** (p. 1460)

#### 9.58.5.2 ~DDS\_DynamicData()

```
DDS_DynamicData::~~DDS_DynamicData ( )
```

Finalize and deallocate this **DDS\_DynamicData** (p. 775) sample.

#### MT Safety:

UNSAFE.

#### See also

- DDS\_DynamicData::DDS\_DynamicData(const DDS\_TypeCode \*, const DDS\_DynamicDataProperty\_t &)** (p. 790)

## 9.58.6 Member Function Documentation

### 9.58.6.1 is\_valid()

```
DDS_Boolean DDS_DynamicData::is_valid ( ) const
```

Indicates whether the object was constructed properly.

This method returns **DDS\_BOOLEAN\_TRUE** (p. 317) if the constructor succeeded; it returns **DDS\_BOOLEAN\_FALSE** (p. 317) if the constructor failed for any reason, which should also have resulted in a log message. It is only necessary to call this method if you created the **DDS\_DynamicData** (p. 775) object using the constructor, **DDS\_DynamicData::↔ DDS\_DynamicData(const DDS\_TypeCode \*, const DDS\_DynamicDataProperty\_t &)** (p. 790).

Possible failure reasons include passing an invalid type or invalid properties to the constructor.

This method is necessary because C++ exception support is not consistent across all of the platforms on which RTI Connext runs. Therefore, the implementation does not throw any exceptions in the constructor.

#### MT Safety:

UNSAFE.

#### See also

**DDS\_DynamicData::DDS\_DynamicData(const DDS\_TypeCode \*, const DDS\_DynamicDataProperty\_t &)** (p. 790)

### 9.58.6.2 copy()

```
DDS_ReturnCode_t DDS_DynamicData::copy (
    const DDS_DynamicData & src )
```

Deeply copy from the given object to this object.

#### MT Safety:

UNSAFE.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

See also

**DDS\_DynamicData::operator=** (p. 793)

### 9.58.6.3 equal()

```
DDS_Boolean DDS_DynamicData::equal (
    const DDS_DynamicData & other ) const
```

Indicate whether the contents of another **DDS\_DynamicData** (p. 775) sample are the same as those of this one.

This operation compares the data and type of existing members.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_BOOLEAN\_FALSE** (p. 317). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

**MT Safety:**

UNSAFE.

See also

**DDS\_DynamicData::operator==** (p. 793)

### 9.58.6.4 operator=()

```
DDS_DynamicData & DDS_DynamicData::operator= (
    const DDS_DynamicData & src )
```

Deeply copy from the given object to this object.

**MT Safety:**

UNSAFE.

See also

**DDS\_DynamicData::copy** (p. 792)

### 9.58.6.5 operator==( )

```
DDS_Boolean DDS_DynamicData::operator== (
    const DDS_DynamicData & other ) const
```

Indicate whether the contents of another **DDS\_DynamicData** (p. 775) sample are the same as those of this one.

This operation compares the data and type of existing members.

#### MT Safety:

UNSAFE.

#### See also

**DDS\_DynamicData::equal** (p. 793)

### 9.58.6.6 clear\_all\_members()

```
DDS_ReturnCode_t DDS_DynamicData::clear_all_members ( )
```

Clear the contents of all data members of this object.

#### MT Safety:

UNSAFE.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### See also

**DDS\_DynamicData::clear\_optional\_member** (p. 794)

### 9.58.6.7 clear\_optional\_member()

```
DDS_ReturnCode_t DDS_DynamicData::clear_optional_member (
    const char * member_name,
    DDS_DynamicDataMemberId member_id )
```



Clear the contents of a single optional data member of this object.

This method is only applicable to optional members. Members of unions, sequences, and arrays are not considered optional.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member (to look up the member by name), or NULL (to look up the member by its ID).
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member (to look up the member by its ID), or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) (to look up the member by name). See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDS\_DynamicData::clear\_all\_members** (p. 794)

#### 9.58.6.8 clear\_member()

```
DDS_ReturnCode_t DDS_DynamicData::clear_member (
    const char * member_name,
    DDS_DynamicDataMemberId member_id )
```

Clear the contents of a single data member of this object.

This method can be used to clear both optional and non-optional members.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member to clear or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member to clear or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDS\_DynamicData::clear\_all\_members** (p. 794)

## 9.58.6.9 is\_cdr()

```
DDS_Boolean DDS_DynamicData::is_cdr ( ) const
```

Determine if a DynamicData object is using CDR as its data representation.

This method returns **DDS\_BOOLEAN\_TRUE** (p. 317) if the DynamicData object is using CDR as its data representation, and **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

When the DynamicData object is using CDR as its data representation, many of the DynamicData APIs cannot be used. The DynamicData object will use CDR as its data representation when **DDS\_DynamicDataTypeSerializationProperty\_t::skip\_deserialization** (p. 899) has been set to **DDS\_BOOLEAN\_TRUE** (p. 317) or **DDS\_DynamicData::set\_cdr\_buffer** (p. 797) has been used to associate a CDR buffer with the DynamicData object. See each functions's documentation for whether or not the function is supported for DynamicData objects in CDR format.

## See also

**DDS\_DynamicData::get\_cdr\_buffer** (p. 796)

**DDS\_DynamicData::set\_cdr\_buffer** (p. 797)

**DDS\_DynamicDataTypeSerializationProperty\_t::skip\_deserialization** (p. 899)

**9.58.6.10 get\_cdr\_buffer()**

```
const char * DDS_DynamicData::get_cdr_buffer (
    DDS_UnsignedLong & length ) const
```

Get the CDR buffer associated with a DynamicData object.

This method returns the CDR buffer associated with a DynamicData object.

If the DynamicData object is not using CDR as its data representation, this method will return NULL and log an error.

To configure a DynamicData DataReader to not deserialize the incoming samples and keep the data in CDR format, you must set the configuration option **DDS\_DynamicDataTypeSerializationProperty\_t::skip\_deserialization** (p. 899) to **DDS\_BOOLEAN\_TRUE** (p. 317).

**MT Safety:**

UNSAFE.

**Parameters**

<i>length</i>	<< <b>out</b> >> (p. 238) CDR buffer length.
---------------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.58.6.11 set\_cdr\_buffer()**

```
DDS_ReturnCode_t DDS_DynamicData::set_cdr_buffer (
    const char * buffer,
    DDS_UnsignedLong length )
```

Associate a CDR buffer with a DynamicData object.

This method associates a CDR buffer with a DynamicData object.

In this context, 'associates' means that the DynamicData object will use the input buffer to store its value. Additionally, if the buffer is loaned, the application is responsible for keeping it alive.

If the DynamicData is owned by the reader, this method will return an error.

**MT Safety:**

UNSAFE.

## Parameters

<i>buffer</i>	<< <i>in</i> >> (p. 238) CDR buffer.
<i>length</i>	<< <i>in</i> >> (p. 238) CDR buffer length.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

9.58.6.12 `from_cdr_buffer()`

```
DDS_ReturnCode_t DDS_DynamicData::from_cdr_buffer (
    const char * buffer,
    unsigned int length )
```

Deserializes a DynamicData object from a buffer of octets.

This method deserializes a DynamicData object from a CDR buffer of octets.

The content of the buffer generated by the method `DDS_DynamicData::to_cdr_buffer` (p. 798) can be provided to this method to get the DynamicData object back.

This API is not supported when the DynamicData object is in CDR format and will fail with `DDS_RETCODE_↔PRECONDITION_NOT_MET` (p. 336). See `DDS_DynamicData::is_cdr` (p. 796) for more information.

## Parameters

<i>buffer</i>	<< <i>in</i> >> (p. 238). Deserialization buffer.
<i>length</i>	<< <i>in</i> >> (p. 238). Length of the serialized representation of the DynamicData object in the buffer.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

9.58.6.13 `to_cdr_buffer()`

```
DDS_ReturnCode_t DDS_DynamicData::to_cdr_buffer (
    char * buffer,
    unsigned int & length )
```

Serializes a DynamicData object into a CDR buffer of octets.

This method serializes a DynamicData object into a buffer of octets, using CDR as the data representation. Calling this method is equivalent to calling `DDS_DynamicData::to_cdr_buffer_ex` (p. 799) with `DDS_AUTO_DATA_↔ REPRESENTATION` (p. 371) as the representation.

The input buffer must be large enough to store the serialized representation of the DynamicData object. Otherwise, the method will return an error code.

To determine the minimum size of the input buffer, you must call this method with the buffer set to NULL.

#### Parameters

<i>buffer</i>	<< <b>out</b> >> (p. 238). Serialization buffer.
<i>length</i>	<< <b>inout</b> >> (p. 238). When the buffer is set to NULL, after the method executes, length will contain the required size for the serialization buffer. When buffer is not NULL, length must contain the size of the input buffer when the method is invoked. After the method executes, length will be updated to contain the actual size of the serialized content, which may be smaller than the size obtained when <i>buffer</i> is set to NULL.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### 9.58.6.14 to\_cdr\_buffer\_ex()

```
DDS_ReturnCode_t DDS_DynamicData::to_cdr_buffer_ex (
    char * buffer,
    unsigned int & length,
    DDS_DataRepresentationId_t representation )
```

Serializes a DynamicData object into a buffer of octets.

This method serializes a DynamicData object into a buffer of octets using the input data representation. See `DDS_↔ DynamicData::to_cdr_buffer` (p. 798) for details.

#### Parameters

<i>buffer</i>	<< <b>out</b> >> (p. 238). Serialization buffer.
<i>length</i>	<< <b>inout</b> >> (p. 238). Serialization buffer length.
<i>representation</i>	<< <b>in</b> >> (p. 238). Representation used to serialize the data

#### 9.58.6.15 to\_string()

```
DDS_ReturnCode_t DDS_DynamicData::to_string (
    char * str,
```

```

    DDS_UnsignedLong & str_size,
    const DDS_PrintFormatProperty & property )

```

Get a string representation of a DynamicData object.

This method takes a dynamic data sample and creates a string representation of the data.

The input character buffer must be big enough to store the string representation of the sample. Otherwise, the method will return an error.

To determine the minimum size of the input character buffer, the user must call this method with the buffer set to NULL.

If the size of the output string is longer than the size of an unsigned 32-bit integer, this operation will fail with **DDS\_↔ RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### Parameters

<i>str</i>	<< <b>out</b> >> (p. 238). Output string representing the dynamic data sample.
<i>str_size</i>	<< <b>inout</b> >> (p. 238). When <i>str</i> is set to NULL, after the method executes, <i>str_size</i> will contain a buffer size big enough to hold the string representation of the data. When <i>str</i> is not NULL, <i>str_size</i> must contain the size of the input buffer when the method is invoked. If the size of the input buffer is too small, after the method executes, <i>str_size</i> will be updated to contain the required size of the string content and the method will return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
<i>property</i>	<< <b>in</b> >> (p. 238). Properties describing what the format of the output string should be. Cannot be NULL.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

### 9.58.6.16 from\_string()

```

DDS_ReturnCode_t DDS_DynamicData::from_string (
    const char * str,
    DDS_PrintFormatKind format_kind )

```

Populates a DynamicData object from a JSON string representation.

This method takes a JSON string representing a data sample of this type, and uses it to populate this DynamicData.

#### Parameters

<i>str</i>	<< <b>in</b> >> (p. 238). The JSON string representation
<i>format_kind</i>	<< <b>in</b> >> (p. 238). Must be set to <b>DDS_JSON_PRINT_FORMAT</b> (p. 65), the only currently supported format.

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
-----	--

## 9.58.6.17 print()

```
DDS_ReturnCode_t DDS_DynamicData::print (
    FILE * fp,
    int indent ) const
```

Output a textual representation of this object and its contents to the given file.

This method is equivalent to **DDSDynamicDataSupport::print\_data** (p. 1461).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## Precondition

The type must be an aggregation or collection. That is, its **DDS\_TCKind** (p. 86) must be one of: **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_VALUE** (p. 86), **DDS\_TK\_UNION** (p. 86), **DDS\_TK\_SEQUENCE** (p. 86) or **DDS\_TK\_ARRAY** (p. 86), otherwise this function fails with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

## MT Safety:

UNSAFE.

## Parameters

<i>fp</i>	<< <i>in</i> >> (p. 238) The file into which the object should be printed (to print to standard output, provide the stream pointer 'stdout')
<i>indent</i>	<< <i>in</i> >> (p. 238) The output of this method will be pretty-printed. This argument indicates the amount of initial indentation of the output.

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## See also

**DDSDynamicDataSupport::print\_data** (p. 1461)

### 9.58.6.18 get\_info()

```
void DDS_DynamicData::get_info (
    DDS_DynamicDataInfo & info_out ) const
```

Fill in the given descriptor with information about this **DDS\_DynamicData** (p. 775).

This API is not supported when the DynamicData object is in CDR format and will print an error log. See **DDS\_↔ DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>info_out</i>	<<out>> (p. 238) The descriptor object whose contents will be overwritten by this operation.
-----------------	--

### 9.58.6.19 bind\_type()

```
DDS_ReturnCode_t DDS_DynamicData::bind_type (
    const DDS_TypeCode * type )
```

If this **DDS\_DynamicData** (p. 775) object is not yet associated with a data type, set that type now to the given **DDS\_↔ TypeCode** (p. 1164).

This advanced operation allows you to reuse a single **DDS\_DynamicData** (p. 775) object with multiple data types.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

```
DDS_DynamicData* myData = new DDS_DynamicData(NULL, myProperties);
```

```
DDS_TypeCode* myType = ...;
```

```
myData->bind_type(myType);
```

```
// Do something...
```

```
myData->unbind_type();
```

```
delete myData;
```

Note that the **DDS\_DynamicData** (p. 775) object will retain a reference to the **DDS\_TypeCode** (p. 1164) object you provide. It is *not* safe to delete the **DDS\_TypeCode** (p. 1164) until after it is unbound.

#### MT Safety:

UNSAFE.



## Parameters

<i>type</i>	<< <i>in</i> >> (p. 238) The type to associate with this <b>DDS_DynamicData</b> (p. 775) object.
-------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDS\_DynamicData::unbind\_type** (p. 803)

## 9.58.6.20 unbind\_type()

```
DDS_ReturnCode_t DDS_DynamicData::unbind_type ( )
```

Dissociate this **DDS\_DynamicData** (p. 775) object from any particular data type.

This step is necessary before the object can be associated with a new data type.

This operation clears all members as a side effect.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDS\_DynamicData::bind\_type** (p. 802)

**DDS\_DynamicData::clear\_all\_members** (p. 794)

## 9.58.6.21 bind\_complex\_member()

```
DDS_ReturnCode_t DDS_DynamicData::bind_complex_member (
    DDS_DynamicData & value_out,
```

```
const char * member_name,
    DDS_DynamicDataMemberId member_id )
```

Use another **DDS\_DynamicData** (p. 775) object to provide access to a complex field of this **DDS\_DynamicData** (p. 775) object.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

For example, consider the following data types:

```
struct MyFieldType {
    float theFloat;
};

struct MyOuterType {
    MyFieldType complexMember;
};
```

Suppose you have an instance of `MyOuterType`, and you would like to examine the contents of its member `complexMember`. To do this, you must *bind* another **DDS\_DynamicData** (p. 775) object to that member. This operation will bind the type code of the member to the provided **DDS\_DynamicData** (p. 775) object and perform additional initialization.

The following example demonstrates the usage pattern. Note that error handling has been omitted for brevity.

```
DDS_DynamicData outer = ...;

DDS_DynamicData toBeBound(NULL, myProperties);

outer.bind_complex_member(
    toBeBound,
    "complexMember",
    DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED);

float theFloatValue = 0.0f;

toBeBound.get_float(
    theFloat,
    "theFloat"
    DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED);

outer.unbind_complex_member(toBeBound);
```

This operation is only permitted when the object `toBeBound` (named as in the example above) is not currently associated with any type, including already being bound to another member. You can see in the example that this object is created directly with the constructor and is not provided with a **DDS\_TypeCode** (p. 1164).

Only a single member of a given **DDS\_DynamicData** (p. 775) object may be bound at one time – however, members of members may be recursively bound to any depth. Furthermore, while the outer object has a bound member, it may only be modified through that bound member. That is, after calling this member, all "set" operations on the outer object will be disabled until **DDS\_DynamicData::unbind\_complex\_member** (p. 805) has been called. Furthermore, any bound member must be unbound before a sample can be written or deleted.

This method is logically related to **DDS\_DynamicData::get\_complex\_member** (p. 826) in that both allow you to examine the state of nested objects. They are different in an important way: this method provides a view into an outer

object, such that any change made to the inner object will be reflected in the outer. But the `DDS_DynamicData::get_↔_complex_member` (p. 826) operation *copies* the state of the nested object; changes to it will not be reflected in the source object.

*Note* that you can bind to a member of a sequence at an index that is past the current length of that sequence. In that case, this method behaves like a "set" method: it automatically lengthens the sequence (filling in default elements) to allow the bind to take place. See **Getters and Setters** (p. 786).

MT Safety:

UNSAFE.

Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) The object that you wish to bind to the field.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

`DDS_DynamicData::unbind_complex_member` (p. 805)

`DDS_DynamicData::get_complex_member` (p. 826)

### 9.58.6.22 unbind\_complex\_member()

```
DDS_ReturnCode_t DDS_DynamicData::unbind_complex_member (
    DDS_DynamicData & value )
```

Tear down the association created by a `DDS_DynamicData::bind_complex_member` (p. 803) operation, committing any changes to the outer object since then.

Some changes to the outer object will not be observable until after you have performed this operation.

If you have called `DDS_DynamicData::bind_complex_member` (p. 803) on a data sample, you must unbind before writing or deleting the sample.

This API is not supported when the DynamicData object is in CDR format and will fail with `DDS_RETCODE_↔_PRECONDITION_NOT_MET` (p. 336). See `DDS_DynamicData::is_cdr` (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>value</i>	<< <i>in</i> >> (p. 238) The same object you passed to <b>DDS_DynamicData::bind_complex_member</b> (p. 803). This argument is used for error checking purposes.
--------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::bind\_complex\_member** (p. 803)

**9.58.6.23 get\_type()**

```
const DDS_TypeCode * DDS_DynamicData::get_type ( ) const
```

Get the data type, of which this **DDS\_DynamicData** (p. 775) represents an instance.

## MT Safety:

UNSAFE.

**9.58.6.24 get\_type\_kind()**

```
DDS_TCKind DDS_DynamicData::get_type_kind ( ) const
```

Get the kind of this object's data type.

This is a convenience method. It's equivalent to calling **DDS\_DynamicData::get\_type** (p. 806) followed by **DDS\_↔TypeCode::kind** (p. 1168).

## MT Safety:

UNSAFE.

### 9.58.6.25 get\_member\_count()

```
DDS_UnsignedLong DDS_DynamicData::get_member_count ( ) const
```

Get the number of members in the type.

For objects of type kind **DDS\_TK\_ARRAY** (p. 86) or **DDS\_TK\_SEQUENCE** (p. 86), this method returns the number of elements in the collection.

For objects of type kind **DDS\_TK\_STRUCT** (p. 86) or **DDS\_TK\_VALUE** (p. 86), it returns the number of fields in the type.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

See also

**DDS\_DynamicData::get\_member\_info\_by\_index** (p. 810)

### 9.58.6.26 member\_exists()

```
DDS_Boolean DDS_DynamicData::member_exists (
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Indicates whether a member exists in this sample.

You only need to specify the name OR the ID (not both).

If the member doesn't exist in the type, this function returns false. In all other cases, it provides the same result as **DDS\_DynamicDataMemberInfo::member\_exists** (p. 894), which is retrieved with **idref\_DynamicDataMember\_get\_↔member\_info**.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_BOOLEAN\_FALSE** (p. 317). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## See also

**DDS\_DynamicData::member\_exists\_in\_type** (p. 808)

**DDS\_DYNAMIC\_DATA\_MEMBER\_ID\_UNSPECIFIED** (p. 101)

**9.58.6.27 member\_exists\_in\_type()**

```
DDS_Boolean DDS_DynamicData::member_exists_in_type (
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Indicates whether a member of a particular name/ID exists in this data sample's type.

You only need to specify the name OR the ID (not both).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_BOOLEAN\_FALSE** (p. 317). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## See also

**DDS\_DynamicData::member\_exists** (p. 807)

**DDS\_DYNAMIC\_DATA\_MEMBER\_ID\_UNSPECIFIED** (p. 101)

## 9.58.6.28 get\_member\_info()

```
DDS_ReturnCode_t DDS_DynamicData::get_member_info (
    DDS_DynamicDataMemberInfo & info,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Fill in the given descriptor with information about the identified member of this **DDS\_DynamicData** (p. 775) sample.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

This operation is valid for objects of **DDS\_TCKind** (p. 86) **DDS\_TK\_ARRAY** (p. 86), **DDS\_TK\_SEQUENCE** (p. 86), **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_UNION** (p. 86), and **DDS\_TK\_VALUE** (p. 86).

## MT Safety:

UNSAFE.

When this sample represents a struct, a value type, or a union:

- If the specified member is not defined in the type, this function fails with **DDS\_RETCODE\_NO\_DATA** (p. 337).
- If the specified member is defined in the type but doesn't exist in this data sample, this function returns an object with **DDS\_DynamicDataMemberInfo::member\_exists** (p. 894) set to false.
- If the specified member is defined in the type and exists in this data sample, **DDS\_DynamicDataMemberInfo::member\_exists** (p. 894) is true.

When this sample represents a sequence and `member_id` is the 1-based element index:

- If `member_id` is greater than the sequence's maximum length, this function fails with **DDS\_RETCODE\_NO\_DATA** (p. 337).
- If `member_id` is greater than the sequence's current length but smaller than or equal to its maximum length, this function returns an object with **DDS\_DynamicDataMemberInfo::member\_exists** (p. 894) set to false.
- If `member_id` is smaller than or equal to the current length, **DDS\_DynamicDataMemberInfo::member\_exists** (p. 894) is true.

When this sample represents an array, this function either fails with **DDS\_RETCODE\_NO\_DATA** (p. 337) when the index is out of bounds or else returns an object with **DDS\_DynamicDataMemberInfo::member\_exists** (p. 894) set to true.

## Parameters

<i>info</i>	<< <b>out</b> >> (p. 238) The descriptor object whose contents will be overwritten by this operations.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member for which to get the info or NULL to look up the member by its ID. Only one of the name and the ID may be unspecified.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member for which to get the info, or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDS\_DynamicData::get\_member\_info\_by\_index** (p. 810)

**DDS\_DYNAMIC\_DATA\_MEMBER\_ID\_UNSPECIFIED** (p. 101)

9.58.6.29 **get\_member\_info\_by\_index()**

```
DDS_ReturnCode_t DDS_DynamicData::get_member_info_by_index (
    struct DDS_DynamicDataMemberInfo & info,
    DDS_UnsignedLong index ) const
```

Fill in the given descriptor with information about the identified member of this **DDS\_DynamicData** (p. 775) sample.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

This operation is valid for objects of **DDS\_TCKind** (p. 86) **DDS\_TK\_ARRAY** (p. 86), **DDS\_TK\_SEQUENCE** (p. 86), **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_VALUE** (p. 86), and **DDS\_TK\_UNION** (p. 86).

## MT Safety:

UNSAFE.

## Parameters

<i>info</i>	<< <b>out</b> >> (p. 238) The descriptor object whose contents will be overwritten by this operations.
<i>index</i>	<< <b>in</b> >> (p. 238) The zero-base of the member for which to get the info.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDS\_DynamicData::get\_member\_info** (p. 808)

**DDS\_DynamicData::get\_member\_count** (p. 806)

**DDS\_DYNAMIC\_DATA\_MEMBER\_ID\_UNSPECIFIED** (p. 101)



### 9.58.6.30 get\_member\_type()

```
DDS_ReturnCode_t DDS_DynamicData::get_member_type (
    const DDS_TypeCode *& type_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the type of the given member of this sample.

The member can be looked up either by name or by ID.

This operation is valid for objects of **DDS\_TCKind** (p. 86) **DDS\_TK\_ARRAY** (p. 86), **DDS\_TK\_SEQUENCE** (p. 86), **DDS\_TK\_STRUCT** (p. 86), and **DDS\_TK\_VALUE** (p. 86). For type kinds **DDS\_TK\_ARRAY** (p. 86) and **DDS\_TK\_SEQUENCE** (p. 86), the index into the collection is taken to be one less than the ID, if specified. If this index is valid, this operation will return the content type of this collection.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>type_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument refers to the found member's type.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDS\_DynamicData::get\_member\_info** (p. 808)

**DDS\_DYNAMIC\_DATA\_MEMBER\_ID\_UNSPECIFIED** (p. 101)

### 9.58.6.31 is\_member\_key()

```
DDS_ReturnCode_t DDS_DynamicData::is_member_key (
    DDS_Boolean & is_key_out,
```

```
const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Indicates whether a given member forms part of the key of this sample's data type.

This operation is only valid for samples of types of kind **DDS\_TK\_STRUCT** (p. 86) or **DDS\_TK\_VALUE** (p. 86).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>is_key_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument indicates whether the indicated member is part of the key.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.58.6.32 get\_long()

```
DDS_ReturnCode_t DDS_DynamicData::get_long (
    DDS_Long & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Long** (p. 318) or another type implicitly convertible to it (**DDS\_↔Octet** (p. 317), **DDS\_Char** (p. 317), **DDS\_Short** (p. 318), **DDS\_UnsignedShort** (p. 318), or **DDS\_Enum** (p. 320)).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

## Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

## See also

**DDS\_DynamicData::set\_long** (p. 853)

## 9.58.6.33 get\_short()

```
DDS_ReturnCode_t DDS_DynamicData::get_short (
    DDS_Short & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Short** (p. 318) or another type implicitly convertible to it (**DDS\_↔Octet** (p. 317) or **DDS\_Char** (p. 317)).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_short** (p. 854)

### 9.58.6.34 get\_ulong()

```
DDS_ReturnCode_t DDS_DynamicData::get_ulong (
    DDS_UnsignedLong & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_UnsignedLong** (p. 318) or another type implicitly convertible to it (**DDS\_Octet** (p. 317), **DDS\_Char** (p. 317), **DDS\_Short** (p. 318), **DDS\_UnsignedShort** (p. 318), or **DDS\_Enum** (p. 320)).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_ulong** (p. 854)

### 9.58.6.35 get\_ushort()

```
DDS_ReturnCode_t DDS_DynamicData::get_ushort (
    DDS_UnsignedShort & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_UnsignedShort** (p. 318) or another type implicitly convertible to it (**DDS\_Octet** (p. 317) or **DDS\_Char** (p. 317)).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_ushort** (p. 855)

### 9.58.6.36 get\_float()

```
DDS_ReturnCode_t DDS_DynamicData::get_float (
    DDS_Float & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Float** (p. 319).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

#### See also

**DDS\_DynamicData::set\_float** (p. 856)

### 9.58.6.37 get\_double()

```
DDS_ReturnCode_t DDS_DynamicData::get_double (
    DDS_Double & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Double** (p. 319) or another type implicitly convertible to it (**DDS\_↔\_Float** (p. 319)).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_double** (p. 857)

### 9.58.6.38 get\_boolean()

```
DDS_ReturnCode_t DDS_DynamicData::get_boolean (
    DDS_Boolean & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Boolean** (p. 320).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
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## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

## See also

**DDS\_DynamicData::set\_boolean** (p. 857)

**9.58.6.39 get\_char()**

```
DDS_ReturnCode_t DDS_DynamicData::get_char (
    DDS_Char & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Char** (p. 317).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

## See also

**DDS\_DynamicData::set\_char** (p. 858)



### 9.58.6.40 get\_octet()

```
DDS_ReturnCode_t DDS_DynamicData::get_octet (
    DDS_Octet & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Octet** (p. 317).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_octet** (p. 859)

### 9.58.6.41 get\_longlong()

```
DDS_ReturnCode_t DDS_DynamicData::get_longlong (
    DDS_LongLong & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_LongLong** (p. 319) or another type implicitly convertible to it (**DDS\_Octet** (p. 317), **DDS\_Char** (p. 317), **DDS\_Short** (p. 318), **DDS\_UnsignedShort** (p. 318), **DDS\_Long** (p. 318), **DDS\_UnsignedLong** (p. 318), or **DDS\_Enum** (p. 320)).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_longlong** (p. 859)

#### 9.58.6.42 get\_ulonglong()

```
DDS_ReturnCode_t DDS_DynamicData::get_ulonglong (
    DDS_UnsignedLongLong & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_UnsignedLongLong** (p. 319) or another type implicitly convertible to it (**DDS\_Octet** (p. 317), **DDS\_Char** (p. 317), **DDS\_Short** (p. 318), **DDS\_UnsignedShort** (p. 318), **DDS\_Long** (p. 318), **DDS\_UnsignedLong** (p. 318), or **DDS\_Enum** (p. 320)).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

## See also

**DDS\_DynamicData::set\_ulonglong** (p. 860)

## 9.58.6.43 get\_longdouble()

```
DDS_ReturnCode_t DDS_DynamicData::get_longdouble (
    DDS_LongDouble & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_LongDouble** (p. 319) or another type implicitly convertible to it (**DDS\_Float** (p. 319) or **DDS\_Double** (p. 319)).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_longdouble** (p. 861)

#### 9.58.6.44 get\_wchar()

```
DDS_ReturnCode_t DDS_DynamicData::get_wchar (
    DDS_Wchar & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Wchar** (p. 317) or another type implicitly convertible to it (**DDS\_↔\_Char** (p. 317)).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_wchar** (p. 862)

#### 9.58.6.45 get\_string()

```
DDS_ReturnCode_t DDS_DynamicData::get_string (
    char *& value,
    DDS_UnsignedLong * size,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type char\*.

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>value</i>	<< <b>out</b> >> (p. 238) The string into which the middleware should copy the string member. The allocated size of this string is indicated by <i>size</i> argument. If the size is sufficient to hold the contents of the member, they will be copied into this string. If <i>value</i> is a pointer to NULL, the middleware will allocate a new string for you of sufficient length; it will be your responsibility to free that string. If the size is insufficient but greater than zero, the middleware will <i>not</i> free your string; instead, this operation will fail and <i>size</i> will contain the minimum required size.
<i>size</i>	<< <b>inout</b> >> (p. 238) As an input argument, the allocated size of the string. As an output argument, the actual size of the contents.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_String\_alloc** (p. 553)

**DDS\_String\_free** (p. 554)

**DDS\_DynamicData::set\_string** (p. 862)

### 9.58.6.46 get\_wstring()

```
DDS_ReturnCode_t DDS_DynamicData::get_wstring (
    DDS_Wchar *& value,
    DDS_UnsignedLong * size,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Wchar** (p. 317)\*.

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>value</i>	<< <b>out</b> >> (p. 238) The string into which the middleware should copy the string member. The allocated size of this string is indicated by <i>size</i> argument. If the size is sufficient to hold the contents of the member, they will be copied into this string. If <i>value</i> is a pointer to NULL, the middleware will allocate a new string for you of sufficient length; it will be your responsibility to free that string. If the size is insufficient but greater than zero, the middleware will <i>not</i> free your string; instead, this operation will fail and <i>size</i> will contain the minimum required size.
<i>size</i>	<< <b>inout</b> >> (p. 238) As an input argument, the allocated size of the string. As an output argument, the actual size of the contents.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_String\_alloc** (p. 553)

**DDS\_String\_free** (p. 554)

**DDS\_DynamicData::set\_wstring** (p. 863)

### 9.58.6.47 get\_int8()

```
DDS_ReturnCode_t DDS_DynamicData::get_int8 (
    DDS_Int8 & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_Int8** (p. 318).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_int8** (p. 864)

### 9.58.6.48 get\_uint8()

```
DDS_ReturnCode_t DDS_DynamicData::get_uint8 (
    DDS_UInt8 & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get the value of the given field, which is of type **DDS\_UInt8** (p. 318).

The member may be specified by name or by ID.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>value_out</i>	<< <b>out</b> >> (p. 238) If this method returned success, this argument will contain the value of the indicated member.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

#### See also

**DDS\_DynamicData::set\_uint8** (p. 864)

### 9.58.6.49 get\_complex\_member()

```
DDS_ReturnCode_t DDS_DynamicData::get_complex_member (
    DDS_DynamicData & value_out,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the value of the given field, which is of some composed type.



This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

The member may be of type kind **DDS\_TK\_ARRAY** (p. 86), **DDS\_TK\_SEQUENCE** (p. 86), **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_VALUE** (p. 86), or **DDS\_TK\_UNION** (p. 86). It may be specified by name or by ID.

This method is logically related to **DDS\_DynamicData::bind\_complex\_member** (p. 803) in that both allow you to examine the state of nested objects. They are different in an important way: this method provides a *copy* of the data; changes to it will not be reflected in the source object.

MT Safety:

UNSAFE.

#### Parameters

<i>value_out</i>	<< <i>out</i> >> (p. 238) The <b>DDS_DynamicData</b> (p. 775) sample whose contents will be overwritten by this operation. This object must <i>not</i> be a bound member of another <b>DDS_DynamicData</b> (p. 775) sample.
<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_complex\_member** (p. 865)

**DDS\_DynamicData::bind\_complex\_member** (p. 803)

#### 9.58.6.50 get\_long\_array()

```
DDS_ReturnCode_t DDS_DynamicData::get_long_array (
    DDS_Long * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member. The array may contain members of type **DDS\_Long** (p. 318) or **DDS\_Enum** (p. 320).

This method will perform an automatic conversion from **DDS\_LongSeq** (p. 948).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the `DynamicData` object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <i>array</i> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_long\_array** (p. 867)

**DDS\_DynamicData::get\_long\_seq** (p. 840)

#### 9.58.6.51 get\_short\_array()

```
DDS_ReturnCode_t DDS_DynamicData::get_short_array (
    DDS_Short * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_ShortSeq** (p. 1101).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the `DynamicData` object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <code>array</code> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

## See also

**DDS\_DynamicData::set\_short\_array** (p. 868)

**DDS\_DynamicData::get\_short\_seq** (p. 841)

## 9.58.6.52 get\_ulong\_array()

```
DDS_ReturnCode_t DDS_DynamicData::get_ulong_array (
    DDS_UnsignedLong * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member. The array may contain members of type **DDS\_UnsignedLong** (p. 318) or **DDS\_Enum** (p. 320).

This method will perform an automatic conversion from **DDS\_UnsignedLongSeq** (p. 1237).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <code>array</code> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member</b>

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

## See also

**DDS\_DynamicData::set\_ulong\_array** (p. 868)

**DDS\_DynamicData::get\_ulong\_seq** (p. 842)

9.58.6.53 **get\_ushort\_array()**

```
DDS_ReturnCode_t DDS_DynamicData::get_ushort_array (
    DDS_UnsignedShort * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_UnsignedShortSeq** (p. 1237).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <code>array</code> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_ushort\_array** (p. 869)

**DDS\_DynamicData::get\_ushort\_seq** (p. 843)

### 9.58.6.54 get\_float\_array()

```
DDS_ReturnCode_t DDS_DynamicData::get_float_array (
    DDS_Float * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_FloatSeq** (p. 912).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <i>array</i> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_float\_array** (p. 870)

**DDS\_DynamicData::get\_float\_seq** (p. 844)

### 9.58.6.55 get\_double\_array()

```
DDS_ReturnCode_t DDS_DynamicData::get_double_array (
    DDS_Double * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_DoubleSeq** (p. 767).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <i>array</i> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

#### See also

**DDS\_DynamicData::set\_double\_array** (p. 871)

**DDS\_DynamicData::get\_double\_seq** (p. 845)

9.58.6.56 `get_boolean_array()`

```
DDS_ReturnCode_t DDS_DynamicData::get_boolean_array (
    DDS_Boolean * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_BooleanSeq** (p. 604).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <i>array</i> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_boolean\_array** (p. 872)

**DDS\_DynamicData::get\_boolean\_seq** (p. 845)

9.58.6.57 `get_char_array()`

```
DDS_ReturnCode_t DDS_DynamicData::get_char_array (
    DDS_Char * array,
```

```

    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const

```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_CharSeq** (p. 613).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <i>array</i> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

#### See also

**DDS\_DynamicData::set\_char\_array** (p. 873)

**DDS\_DynamicData::get\_char\_seq** (p. 846)

### 9.58.6.58 get\_octet\_array()

```

DDS_ReturnCode_t DDS_DynamicData::get_octet_array (
    DDS_Octet * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const

```



Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_OctetSeq** (p. 969).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_← PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <i>array</i> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_octet\_array** (p. 874)

**DDS\_DynamicData::get\_octet\_seq** (p. 847)

### 9.58.6.59 get\_longlong\_array()

```
DDS_ReturnCode_t DDS_DynamicData::get_longlong_array (
    DDS_LongLong * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_LongLongSeq** (p. 947).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_← PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <i>array</i> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_longlong\_array** (p. 874)

**DDS\_DynamicData::get\_longlong\_seq** (p. 848)

### 9.58.6.60 `get_ulonglong_array()`

```
DDS_ReturnCode_t DDS_DynamicData::get_ulonglong_array (
    DDS_UnsignedLongLong * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_UnsignedLongLongSeq** (p. 1236).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <code>array</code> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

## See also

**DDS\_DynamicData::set\_ulonglong\_array** (p. 875)

**DDS\_DynamicData::get\_ulonglong\_seq** (p. 849)

## 9.58.6.61 get\_longdouble\_array()

```
DDS_ReturnCode_t DDS_DynamicData::get_longdouble_array (
    DDS_LongDouble * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_LongDoubleSeq** (p. 947).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <code>array</code> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

## See also

**DDS\_DynamicData::set\_longdouble\_array** (p. 876)

**DDS\_DynamicData::get\_longdouble\_seq** (p. 850)

9.58.6.62 `get_wchar_array()`

```
DDS_ReturnCode_t DDS_DynamicData::get_wchar_array (
    DDS_Wchar * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_WcharSeq** (p. 1243).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <code>array</code> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_wchar\_array** (p. 877)

**DDS\_DynamicData::get\_wchar\_seq** (p. 850)

### 9.58.6.63 get\_int8\_array()

```
DDS_ReturnCode_t DDS_DynamicData::get_int8_array (
    DDS_Int8 * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_Int8Seq** (p. 923).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <i>array</i> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

See also

**DDS\_DynamicData::set\_int8\_array** (p. 878)

**DDS\_DynamicData::get\_int8\_seq** (p. 851)

### 9.58.6.64 get\_uint8\_array()

```
DDS_ReturnCode_t DDS_DynamicData::get_uint8_array (
    DDS_UInt8 * array,
    DDS_UnsignedLong * length,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given array member.

This method will perform an automatic conversion from **DDS\_UInt8Seq** (p. 1234).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>array</i>	<< <b>out</b> >> (p. 238) An already-allocated array, into which the elements will be copied.
<i>length</i>	<< <b>inout</b> >> (p. 238) As an input, the allocated length of <i>array</i> . As an output, the number of elements that were copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337)
------------	---

#### See also

**DDS\_DynamicData::set\_uint8\_array** (p. 879)

**DDS\_DynamicData::get\_uint8\_seq** (p. 852)

## 9.58.6.65 get\_long\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_long_seq (
    DDS_LongSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_Long** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>seq</i>	<< <b>out</b> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_long\_seq** (p. 880)

**DDS\_DynamicData::get\_long\_array** (p. 827)

## 9.58.6.66 get\_short\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_short_seq (
    DDS_ShortSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_Short** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>seq</i>	<< <i>out</i> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_short\_seq** (p. 880)

**DDS\_DynamicData::get\_short\_array** (p. 828)

#### 9.58.6.67 get\_ulong\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_ulong_seq (
    DDS_UnsignedLongSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_UnsignedLong** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.



## Parameters

<i>seq</i>	<< <i>out</i> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

## See also

**DDS\_DynamicData::set\_ulong\_seq** (p. 881)

**DDS\_DynamicData::get\_ulong\_array** (p. 829)

## 9.58.6.68 get\_ushort\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_ushort_seq (
    DDS_UnsignedShortSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_UnsignedShort** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>seq</i>	<< <i>out</i> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

## See also

**DDS\_DynamicData::set\_ushort\_seq** (p. 882)

**DDS\_DynamicData::get\_ushort\_array** (p. 830)

**9.58.6.69 get\_float\_seq()**

```
DDS_ReturnCode_t DDS_DynamicData::get_float_seq (
    DDS_FloatSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_Long** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>seq</i>	<< <b>out</b> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_long\_seq** (p. 880)

**DDS\_DynamicData::get\_long\_array** (p. 827)

### 9.58.6.70 get\_double\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_double_seq (
    DDS_DoubleSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_Double** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_← PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>seq</i>	<< <b>out</b> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_double\_seq** (p. 884)

**DDS\_DynamicData::get\_double\_array** (p. 832)

### 9.58.6.71 get\_boolean\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_boolean_seq (
    DDS_BooleanSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_Boolean** (p. 320).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>seq</i>	<< <b>out</b> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_boolean\_seq** (p. 884)

**DDS\_DynamicData::get\_boolean\_array** (p. 832)

### 9.58.6.72 get\_char\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_char_seq (
    DDS_CharSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_Char** (p. 317).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>seq</i>	<< <i>out</i> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_char\_seq** (p. 885)

**DDS\_DynamicData::get\_char\_array** (p. 833)

### 9.58.6.73 get\_octet\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_octet_seq (
    DDS_OctetSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_Octet** (p. 317).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>seq</i>	<< <b>out</b> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

## See also

**DDS\_DynamicData::set\_octet\_seq** (p. 886)

**DDS\_DynamicData::get\_octet\_array** (p. 834)

9.58.6.74 `get_longlong_seq()`

```
DDS_ReturnCode_t DDS_DynamicData::get_longlong_seq (
    DDS_LongLongSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_LongLong** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>seq</i>	<< <b>out</b> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

## See also

**DDS\_DynamicData::set\_longlong\_seq** (p. 887)

**DDS\_DynamicData::get\_longlong\_array** (p. 835)

9.58.6.75 `get_ulonglong_seq()`

```
DDS_ReturnCode_t DDS_DynamicData::get_ulonglong_seq (
    DDS_UnsignedLongLongSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_UnsignedLongLong** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>seq</i>	<< <b>out</b> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_ulonglong\_seq** (p. 888)

**DDS\_DynamicData::get\_ulonglong\_array** (p. 836)

### 9.58.6.76 get\_longdouble\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_longdouble_seq (
    DDS_LongDoubleSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_LongDouble** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_← PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>seq</i>	<< <b>out</b> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_longdouble\_seq** (p. 888)

**DDS\_DynamicData::get\_longdouble\_array** (p. 837)



## 9.58.6.77 get\_wchar\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_wchar_seq (
    DDS_WcharSeq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_Wchar** (p. 317).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>seq</i>	<< <b>out</b> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <b>in</b> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <b>in</b> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

See also

**DDS\_DynamicData::set\_wchar\_seq** (p. 889)

**DDS\_DynamicData::get\_wchar\_array** (p. 838)

## 9.58.6.78 get\_int8\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_int8_seq (
    DDS_Int8Seq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_Int8** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>seq</i>	<< <i>out</i> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
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See also

**DDS\_DynamicData::set\_int8\_seq** (p. 890)

**DDS\_DynamicData::get\_int8\_array** (p. 839)

#### 9.58.6.79 get\_uint8\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::get_uint8_seq (
    DDS_UInt8Seq & seq,
    const char * member_name,
    DDS_DynamicDataMemberId member_id ) const
```

Get a copy of the given sequence member.

The provided sequence will be automatically resized as necessary.

This method will perform an automatic conversion from an array of **DDS\_UInt8** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>seq</i>	<< <i>out</i> >> (p. 238) A sequence, into which the elements will be copied.
<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336). If the member is optional and not set, this operation will return <b>DDS_RETCODE_NO_DATA</b> (p. 337). This operation may also return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

## See also

**DDS\_DynamicData::set\_uint8\_seq** (p. 891)

**DDS\_DynamicData::get\_uint8\_array** (p. 840)

## 9.58.6.80 set\_long()

```
DDS_ReturnCode_t DDS_DynamicData::set_long (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_Long value )
```

Set the value of the given field, which is of type **DDS\_Long** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_long** (p. 812)

**9.58.6.81 set\_short()**

```
DDS_ReturnCode_t DDS_DynamicData::set_short (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_Short value )
```

Set the value of the given field, which is of type **DDS\_Short** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
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## See also

**DDS\_DynamicData::get\_short** (p. 813)

## 9.58.6.82 set\_ulong()

```
DDS_ReturnCode_t DDS_DynamicData::set_ulong (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong value )
```

Set the value of the given field, which is of type **DDS\_UnsignedLong** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
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## See also

**DDS\_DynamicData::get\_ulong** (p. 814)

## 9.58.6.83 set\_ushort()

```
DDS_ReturnCode_t DDS_DynamicData::set_ushort (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedShort value )
```

Set the value of the given field, which is of type **DDS\_UnsignedShort** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_ushort** (p. 815)

**9.58.6.84 set\_float()**

```
DDS_ReturnCode_t DDS_DynamicData::set_float (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_Float value )
```

Set the value of the given field, which is of type **DDS\_Float** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_float** (p. 815)

### 9.58.6.85 set\_double()

```
DDS_ReturnCode_t DDS_DynamicData::set_double (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_Double value )
```

Set the value of the given field, which is of type **DDS\_Double** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_double** (p. 816)

### 9.58.6.86 set\_boolean()

```
DDS_ReturnCode_t DDS_DynamicData::set_boolean (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_Boolean value )
```

Set the value of the given field, which is of type **DDS\_Boolean** (p. 320).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_boolean** (p. 817)

#### 9.58.6.87 set\_char()

```
DDS_ReturnCode_t DDS_DynamicData::set_char (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_Char value )
```

Set the value of the given field, which is of type **DDS\_Char** (p. 317).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.



## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_char** (p. 818)

**9.58.6.88 set\_octet()**

```
DDS_ReturnCode_t DDS_DynamicData::set_octet (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_Octet value )
```

Set the value of the given field, which is of type **DDS\_Octet** (p. 317).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_octet** (p. 819)

### 9.58.6.89 set\_longlong()

```
DDS_ReturnCode_t DDS_DynamicData::set_longlong (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_LongLong value )
```

Set the value of the given field, which is of type **DDS\_LongLong** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

#### See also

**DDS\_DynamicData::get\_longlong** (p. 819)

### 9.58.6.90 set\_ulonglong()

```
DDS_ReturnCode_t DDS_DynamicData::set_ulonglong (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLongLong value )
```

Set the value of the given field, which is of type **DDS\_UnsignedLongLong** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_ulonglong** (p. 820)

## 9.58.6.91 set\_longdouble()

```
DDS_ReturnCode_t DDS_DynamicData::set_longdouble (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_LongDouble value )
```

Set the value of the given field, which is of type **DDS\_LongDouble** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_longdouble** (p. 821)

### 9.58.6.92 set\_wchar()

```
DDS_ReturnCode_t DDS_DynamicData::set_wchar (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_Wchar value )
```

Set the value of the given field, which is of type **DDS\_Wchar** (p. 317).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_char** (p. 818)

### 9.58.6.93 set\_string()

```
DDS_ReturnCode_t DDS_DynamicData::set_string (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const char * value )
```

Set the value of the given field of type `char*`.

This API is not supported when the `DynamicData` object is in CDR format and will fail with `DDS_RETCODE_↔PRECONDITION_NOT_MET` (p. 336). See `DDS_DynamicData::is_cdr` (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <code>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</code> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <code>DDS_RETCODE_OUT_OF_RESOURCES</code> (p. 337)
------------	--

See also

`DDS_DynamicData::get_string` (p. 823)

#### 9.58.6.94 set\_wstring()

```
DDS_ReturnCode_t DDS_DynamicData::set_wstring (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_Wchar * value )
```

Set the value of the given field of type `DDS_Wchar` (p. 317)\*.

This API is not supported when the `DynamicData` object is in CDR format and will fail with `DDS_RETCODE_↔PRECONDITION_NOT_MET` (p. 336). See `DDS_DynamicData::is_cdr` (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <code>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</code> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
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<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_wstring** (p. 824)

**9.58.6.95 set\_int8()**

```
DDS_ReturnCode_t DDS_DynamicData::set_int8 (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_Int8 value )
```

Set the value of the given field, which is of type **DDS\_Int8** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
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## See also

**DDS\_DynamicData::get\_int8** (p. 825)

## 9.58.6.96 set\_uint8()

```
DDS_ReturnCode_t DDS_DynamicData::set_uint8 (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UInt8 value )
```

Set the value of the given field, which is of type **DDS\_UInt8** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) The value to which to set the member.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_uint8** (p. 825)

## 9.58.6.97 set\_complex\_member()

```
DDS_ReturnCode_t DDS_DynamicData::set_complex_member (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_DynamicData & value )
```

Copy the state of the given **DDS\_DynamicData** (p. 775) object into a member of this object.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

The member may be of type kind **DDS\_TK\_ARRAY** (p. 86), **DDS\_TK\_SEQUENCE** (p. 86), **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_VALUE** (p. 86), or **DDS\_TK\_UNION** (p. 86). It may be specified by name or by ID.

### Example: Copying Data

This method can be used with `DDS_DynamicData::bind_complex_member` (p.803) to copy from one `DDS_DynamicData` (p.775) object to another efficiently. Suppose the following data structure:

```
struct Bar {
    short theShort;
};

struct Foo {
    Bar theBar;
};
```

Suppose we have two instances of `Foo` (p.1648), `foo_dst` and `foo_src`, and we want to replace the contents of `foo_dst.theBar` with the contents of `foo_src.theBar`. The following example shows how to do this (error handling has been omitted for the sake of brevity).

```
DDS_DynamicData* foo_dst = ...;

DDS_DynamicData* foo_src = ...;

DDS_DynamicData* bar = new DDS_DynamicData(NULL, myProperties);

// Point to the source of the copy:
foo_src->bind_complex_member(
    bar,
    "theBar",
    DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED);

// Just one copy:
foo_dst->set_complex_member(
    "theBar",
    DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED,
    bar);

// Tear down:
foo_src->unbind_complex_member(bar);

delete bar;
```

#### MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p.238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p.238) The ID of the member or <code>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</code> (p.101) to look up by name. See <b>Member Names and IDs</b> (p.783).
<i>value</i>	<< <i>in</i> >> (p.238) The source <code>DDS_DynamicData</code> (p.775) object whose contents will be copied.



## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_complex\_member** (p. 826)

**DDS\_DynamicData::bind\_complex\_member** (p. 803)

## 9.58.6.98 set\_long\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_long_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_Long * array )
```

Set the contents of the given array member. The array may contain members of type **DDS\_Long** (p. 318) or **DDS\_Enum** (p. 320).

This method will perform an automatic conversion to **DDS\_LongSeq** (p. 948).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_long\_array** (p. 827)

**DDS\_DynamicData::set\_long\_seq** (p. 880)

### 9.58.6.99 set\_short\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_short_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_Short * array )
```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_ShortSeq** (p. 1101).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_short\_array** (p. 828)

**DDS\_DynamicData::set\_short\_seq** (p. 880)

## 9.58.6.100 set\_ulong\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_ulong_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_UnsignedLong * array )
```

Set the contents of the given array member. The array may contain members of type **DDS\_UnsignedLong** (p. 318) or **DDS\_Enum** (p. 320).

This method will perform an automatic conversion to **DDS\_UnsignedLongSeq** (p. 1237).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_ulong\_array** (p. 829)

**DDS\_DynamicData::set\_ulong\_seq** (p. 881)

## 9.58.6.101 set\_ushort\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_ushort_array (
    const char * member_name,
```

```

    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_UnsignedShort * array )

```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_UnsignedShortSeq** (p. 1237).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

#### See also

**DDS\_DynamicData::get\_ushort\_array** (p. 830)

**DDS\_DynamicData::set\_ushort\_seq** (p. 882)

#### 9.58.6.102 set\_float\_array()

```

DDS_ReturnCode_t DDS_DynamicData::set_float_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_Float * array )

```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_FloatSeq** (p. 912).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of array.
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_float\_array** (p. 831)

**DDS\_DynamicData::set\_float\_seq** (p. 883)

### 9.58.6.103 set\_double\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_double_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_Double * array )
```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_DoubleSeq** (p. 767).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_double\_array** (p. 832)

**DDS\_DynamicData::set\_double\_seq** (p. 884)

**9.58.6.104 set\_boolean\_array()**

```
DDS_ReturnCode_t DDS_DynamicData::set_boolean_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_Boolean * array )
```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_BooleanSeq** (p. 604).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_boolean\_array** (p. 832)

**DDS\_DynamicData::set\_boolean\_seq** (p. 884)

## 9.58.6.105 set\_char\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_char_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_Char * array )
```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_CharSeq** (p. 613).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_char\_array** (p. 833)

**DDS\_DynamicData::set\_char\_seq** (p. 885)

### 9.58.6.106 set\_octet\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_octet_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_Octet * array )
```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_OctetSeq** (p. 969).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_octet\_array** (p. 834)

**DDS\_DynamicData::set\_octet\_seq** (p. 886)



## 9.58.6.107 set\_longlong\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_longlong_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_LongLong * array )
```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_LongLongSeq** (p. 947).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_longlong\_array** (p. 835)

**DDS\_DynamicData::set\_longlong\_seq** (p. 887)

## 9.58.6.108 set\_ulonglong\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_ulonglong_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
```

```

    DDS_UnsignedLong length,
    const DDS_UnsignedLongLong * array )

```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_UnsignedLongLongSeq** (p. 1236).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

#### MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

#### See also

**DDS\_DynamicData::get\_ulonglong\_array** (p. 836)

**DDS\_DynamicData::set\_ulonglong\_seq** (p. 888)

#### 9.58.6.109 set\_longdouble\_array()

```

DDS_ReturnCode_t DDS_DynamicData::set_longdouble_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_LongDouble * array )

```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_LongDoubleSeq** (p. 947).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_longdouble\_array** (p. 837)

**DDS\_DynamicData::set\_longdouble\_seq** (p. 888)

### 9.58.6.110 set\_wchar\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_wchar_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_Wchar * array )
```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_WcharSeq** (p. 1243).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_wchar\_array** (p. 838)

**DDS\_DynamicData::set\_wchar\_seq** (p. 889)

**9.58.6.111 set\_int8\_array()**

```
DDS_ReturnCode_t DDS_DynamicData::set_int8_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_Int8 * array )
```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_Int8Seq** (p. 923).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_int8\_array** (p. 839)

**DDS\_DynamicData::set\_int8\_seq** (p. 890)

## 9.58.6.112 set\_uint8\_array()

```
DDS_ReturnCode_t DDS_DynamicData::set_uint8_array (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    DDS_UnsignedLong length,
    const DDS_UInt8 * array )
```

Set the contents of the given array member.

This method will perform an automatic conversion to **DDS\_UInt8Seq** (p. 1234).

If the destination array is insufficiently long to store the data, this operation will fail without copying anything.

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>length</i>	<< <i>in</i> >> (p. 238) The length of <i>array</i> .
<i>array</i>	<< <i>in</i> >> (p. 238) The elements to copy.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_uint8\_array** (p. 840)

**DDS\_DynamicData::set\_uint8\_seq** (p. 891)

### 9.58.6.113 set\_long\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::set_long_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_LongSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_Long** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_long\_seq** (p. 840)

**DDS\_DynamicData::set\_long\_array** (p. 867)

**9.58.6.114 set\_short\_seq()**

```
DDS_ReturnCode_t DDS_DynamicData::set_short_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_ShortSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_Short** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

**MT Safety:**

UNSAFE.

**Parameters**

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

**See also**

**DDS\_DynamicData::get\_short\_seq** (p. 841)

**DDS\_DynamicData::set\_short\_array** (p. 868)

**9.58.6.115 set\_ulong\_seq()**

```
DDS_ReturnCode_t DDS_DynamicData::set_ulong_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_UnsignedLongSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_UnsignedLong** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_ulong\_seq** (p. 842)

**DDS\_DynamicData::set\_ulong\_array** (p. 868)

### 9.58.6.116 set\_ushort\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::set_ushort_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_UnsignedShortSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_UnsignedShort** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.



## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_ushort\_seq** (p. 843)

**DDS\_DynamicData::set\_ushort\_array** (p. 869)

## 9.58.6.117 set\_float\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::set_float_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_FloatSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_Float** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_float\_seq** (p. 844)

**DDS\_DynamicData::set\_float\_array** (p. 870)

**9.58.6.118 set\_double\_seq()**

```
DDS_ReturnCode_t DDS_DynamicData::set_double_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_DoubleSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_Double** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔ PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

**Parameters**

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_double\_seq** (p. 845)

**DDS\_DynamicData::set\_double\_array** (p. 871)

**9.58.6.119 set\_boolean\_seq()**

```
DDS_ReturnCode_t DDS_DynamicData::set_boolean_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_BooleanSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_Boolean** (p. 320).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_boolean\_seq** (p. 845)

**DDS\_DynamicData::set\_boolean\_array** (p. 872)

#### 9.58.6.120 set\_char\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::set_char_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_CharSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_Char** (p. 317).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_char\_seq** (p. 846)

**DDS\_DynamicData::set\_char\_array** (p. 873)

**9.58.6.121 set\_octet\_seq()**

```
DDS_ReturnCode_t DDS_DynamicData::set_octet_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_OctetSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_Octet** (p. 317).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_octet\_seq** (p. 847)

**DDS\_DynamicData::set\_octet\_array** (p. 874)

## 9.58.6.122 set\_longlong\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::set_longlong_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_LongLongSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_LongLong** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_longlong\_seq** (p. 848)

**DDS\_DynamicData::set\_longlong\_array** (p. 874)

### 9.58.6.123 set\_ulonglong\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::set_ulonglong_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_UnsignedLongLongSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_UnsignedLongLong** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_ulonglong\_seq** (p. 849)

**DDS\_DynamicData::set\_ulonglong\_array** (p. 875)

### 9.58.6.124 set\_longdouble\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::set_longdouble_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_LongDoubleSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_LongDouble** (p. 319).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

#### Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

See also

**DDS\_DynamicData::get\_longdouble\_seq** (p. 850)

**DDS\_DynamicData::set\_longdouble\_array** (p. 876)

#### 9.58.6.125 set\_wchar\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::set_wchar_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_WcharSeq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_Wchar** (p. 317).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_wchar\_seq** (p. 850)

**DDS\_DynamicData::set\_wchar\_array** (p. 877)

**9.58.6.126 set\_int8\_seq()**

```
DDS_ReturnCode_t DDS_DynamicData::set_int8_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_Int8Seq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_Int8** (p. 318).

This API is not supported when the `DynamicData` object is in CDR format and will fail with **DDS\_RETCODE\_↔PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.



## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_int8\_seq** (p. 851)

**DDS\_DynamicData::set\_int8\_array** (p. 878)

## 9.58.6.127 set\_uint8\_seq()

```
DDS_ReturnCode_t DDS_DynamicData::set_uint8_seq (
    const char * member_name,
    DDS_DynamicDataMemberId member_id,
    const DDS_UInt8Seq & value )
```

Set the contents of the given sequence member.

This method will perform an automatic conversion to an array of **DDS\_UInt8** (p. 318).

This API is not supported when the DynamicData object is in CDR format and will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336). See **DDS\_DynamicData::is\_cdr** (p. 796) for more information.

## MT Safety:

UNSAFE.

## Parameters

<i>member_name</i>	<< <i>in</i> >> (p. 238) The name of the member or NULL to look up the member by its ID.
<i>member_id</i>	<< <i>in</i> >> (p. 238) The ID of the member or <b>DDS_DYNAMIC_DATA_MEMBER_ID_UNSPECIFIED</b> (p. 101) to look up by name. See <b>Member Names and IDs</b> (p. 783).
<i>value</i>	<< <i>in</i> >> (p. 238) A sequence, from which the elements will be copied.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

## See also

**DDS\_DynamicData::get\_uint8\_seq** (p. 852)

**DDS\_DynamicData::set\_uint8\_array** (p. 879)

## 9.59 DDS\_DynamicDataInfo Struct Reference

A descriptor for a **DDS\_DynamicData** (p. 775) object.

### Public Attributes

- **DDS\_Long member\_count**  
*The number of data members in this **DDS\_DynamicData** (p. 775) sample.*
- **DDS\_Long stored\_size**  
*The number of bytes currently used to store the data of this **DDS\_DynamicData** (p. 775) sample.*

### 9.59.1 Detailed Description

A descriptor for a **DDS\_DynamicData** (p. 775) object.

See also

**DDS\_DynamicData::get\_info** (p. 801)

### 9.59.2 Member Data Documentation

#### 9.59.2.1 member\_count

**DDS\_Long** DDS\_DynamicDataInfo::member\_count

The number of data members in this **DDS\_DynamicData** (p. 775) sample.

#### 9.59.2.2 stored\_size

**DDS\_Long** DDS\_DynamicDataInfo::stored\_size

The number of bytes currently used to store the data of this **DDS\_DynamicData** (p. 775) sample.

## 9.60 DDS\_DynamicDataJsonParserProperties\_t Struct Reference

A collection of attributes used to configure **DDS\_DynamicData** (p. 775) objects.

### 9.60.1 Detailed Description

A collection of attributes used to configure **DDS\_DynamicData** (p. 775) objects.

## 9.61 DDS\_DynamicDataMemberInfo Struct Reference

A descriptor for a single member (i.e. field) of dynamically defined data type.

### Public Attributes

- **DDS\_DynamicDataMemberId member\_id**  
*An integer that uniquely identifies the data member within this **DDS\_DynamicData** (p. 775) sample's type.*
- const char \* **member\_name**  
*The string name of the data member.*
- **DDS\_Boolean member\_exists**  
*Indicates whether the member exists in this sample.*
- **DDS\_TCKind member\_kind**  
*The kind of type of this data member (e.g., integer, structure, etc.).*
- **DDS\_UnsignedLong element\_count**  
*The number of elements within this data member.*
- **DDS\_TCKind element\_kind**  
*The kind of type of the elements within this data member.*

### 9.61.1 Detailed Description

A descriptor for a single member (i.e. field) of dynamically defined data type.

See also

**DDS\_DynamicData::get\_member\_info** (p. 808)

### 9.61.2 Member Data Documentation

#### 9.61.2.1 member\_id

**DDS\_DynamicDataMemberId** DDS\_DynamicDataMemberInfo::member\_id

An integer that uniquely identifies the data member within this **DDS\_DynamicData** (p. 775) sample's type.

The member ID is assigned automatically by the middleware based on the member's declaration order within the type. It is a 1-based index of the member's position in the type.

See also

**DDS\_TCKind** (p. 86)

### 9.61.2.2 member\_name

```
const char* DDS_DynamicDataMemberInfo::member_name
```

The string name of the data member.

This name will be unique among members of the same type. However, a single named member may have multiple type representations.

### 9.61.2.3 member\_exists

```
DDS_Boolean DDS_DynamicDataMemberInfo::member_exists
```

Indicates whether the member exists in this sample.

A member that is defined in a type may not exist in a sample of that type in the following situations

- The member is optional and is unset
- Being part of a union, the discriminator doesn't select this member
- When getting the information about a sequence element, with index  $i$ , and  $i$  is greater than the current sequence length but smaller than its maximum length.

See also

**DDS\_DynamicData::member\_exists\_in\_type** (p. 808)

### 9.61.2.4 member\_kind

```
DDS_TCKind DDS_DynamicDataMemberInfo::member_kind
```

The kind of type of this data member (e.g., integer, structure, etc.).

This is a convenience field; it is equivalent to looking up the member in the **DDS\_TypeCode** (p. 1164) and getting the **DDS\_TCKind** (p. 86) from there.

### 9.61.2.5 element\_count

```
DDS_UnsignedLong DDS_DynamicDataMemberInfo::element_count
```

The number of elements within this data member.

This information is only valid for members of array or sequence types. Members of other types will always report zero (0) here.

### 9.61.2.6 element\_kind

`DDS_TCKind DDS_DynamicDataMemberInfo::element_kind`

The kind of type of the elements within this data member.

This information is only valid for members of array or sequence types. Members of other types will always report `DDS_TK_NULL` (p. 86) here.

## 9.62 DDS\_DynamicDataProperty\_t Struct Reference

A collection of attributes used to configure `DDS_DynamicData` (p. 775) objects.

### Public Attributes

- **DDS\_Long buffer\_initial\_size**  
*The initial amount of memory used by the underlying `DDS_DynamicData` (p. 775) buffer, in bytes.*
- **DDS\_Long buffer\_max\_size**  
*The maximum amount of memory that the underlying `DDS_DynamicData` (p. 775) buffer may use, in bytes.*

### 9.62.1 Detailed Description

A collection of attributes used to configure `DDS_DynamicData` (p. 775) objects.

### 9.62.2 Member Data Documentation

#### 9.62.2.1 buffer\_initial\_size

`DDS_Long DDS_DynamicDataProperty_t::buffer_initial_size`

The initial amount of memory used by the underlying `DDS_DynamicData` (p. 775) buffer, in bytes.

This property is used to configure the `DynamicData` objects that are created stand-alone as well as the `DynamicData` samples that are obtained from the sample pool that is created by each `DynamicData DataReader`.

If set to 0 (default): The initial buffer size will be set to the minimum amount of space required to hold the overhead required by the `DynamicData` internal representation (about 100 bytes) in addition to the minimum deserialized size of a sample. The minimum deserialized size of a sample assumes that all strings are allocated to their default values, sequences are left to length 0, and all optional members are unset.

If set to any value other than 0: The underlying buffer will be allocated to the provided size plus the overhead required by the `DynamicData` internal representation (about 100 bytes). If the provided size plus the overhead is less than the size used when `buffer_initial_size` is left to 0, then the default value is used.

See also

**DDS\_DynamicDataProperty\_t::buffer\_max\_size** (p. 895)

### 9.62.2.2 `buffer_max_size`

```
DDS_Long DDS_DynamicDataProperty_t::buffer_max_size
```

The maximum amount of memory that the underlying `DDS_DynamicData` (p. 775) buffer may use, in bytes.

This property is used to configure the `DynamicData` objects that are created stand-alone as well as the `DynamicData` samples that are obtained from the sample pool that is created by each `DynamicData DataReader`.

A `DynamicData` object will grow to this size from the initial size as needed. The `buffer_max_size` includes all overhead that is required for the internal `DynamicData` representation and therefore represents a hard upper limit on the size of the underlying `DynamicData` buffer.

If set to -1 (default): The buffer will grow unbounded to the size required to fit all members.

If set to any value other than -1: The buffer will not grow beyond this size. If setting a member's values requires the buffer to grow beyond this maximum, the member will fail to be set. If the buffer is required to grow beyond this maximum during deserialization, the sample will fail to be deserialized. The `buffer_max_size` cannot be smaller than the `buffer_initial_size`.

See also

`DDS_DynamicDataProperty_t::buffer_initial_size` (p. 895)

## 9.63 `DDS_DynamicDataSeq` Struct Reference

An ordered collection of `DDS_DynamicData` (p. 775) elements.

### 9.63.1 Detailed Description

An ordered collection of `DDS_DynamicData` (p. 775) elements.

Instantiates `FooSeq` (p. 1697) < `DDS_DynamicData` (p. 775) > .

See also

`FooSeq` (p. 1697)

`DDS_DynamicData` (p. 775)

## 9.64 `DDS_DynamicDataTypeProperty_t` Struct Reference

A collection of attributes used to configure `DDSDynamicDataTypeSupport` (p. 1456) objects.

## Public Attributes

- struct **DDS\_DynamicDataProperty\_t data**

*These properties will be provided to every new **DDS\_DynamicData** (p. 775) sample created from the **DDSDynamicData↔DataTypeSupport** (p. 1456).*

- struct **DDS\_DynamicDataTypeSerializationProperty\_t serialization**

*Properties that govern how the data of this type will be serialized on the network.*

### 9.64.1 Detailed Description

A collection of attributes used to configure **DDSDynamicDataTypeSupport** (p. 1456) objects.

The properties of a **DDSDynamicDataTypeSupport** (p. 1456) object contain the properties that will be used to instantiate any samples created by that object.

### 9.64.2 Member Data Documentation

#### 9.64.2.1 data

```
struct DDS_DynamicDataProperty_t DDS_DynamicDataTypeProperty_t::data
```

These properties will be provided to every new **DDS\_DynamicData** (p. 775) sample created from the **DDSDynamicData↔DataTypeSupport** (p. 1456).

These properties are also used to create the samples that are kept in the DataReader's queue.

#### 9.64.2.2 serialization

```
struct DDS_DynamicDataTypeSerializationProperty_t DDS_DynamicDataTypeProperty_t::serialization
```

Properties that govern how the data of this type will be serialized on the network.

## 9.65 DDS\_DynamicDataTypeSerializationProperty\_t Struct Reference

Properties that govern how data of a certain type will be serialized on the network.

## Public Attributes

- **DDS\_Boolean use\_42e\_compatible\_alignment**  
*[No longer supported] Use RTI Connex 4.2e-compatible alignment for large primitive types.*
- **DDS\_UnsignedLong max\_size\_serialized**  
*[No longer supported] If you were previously using this property, use `DDS_DynamicDataProperty_t::buffer_max_size` (p. 895) instead. The maximum number of bytes that objects of a given type could consume when serialized on the network.*
- **DDS\_UnsignedLong min\_size\_serialized**  
*[No longer supported] If you were previously using this property, use `DDS_DynamicDataProperty_t::buffer_initial_size` (p. 895) instead. The minimum number of bytes that objects of a given type could consume when serialized on the network.*
- **DDS\_Boolean trim\_to\_size**  
*Controls the growth of the buffer in a `DynamicData` object.*
- **DDS\_Boolean skip\_deserialization**  
*Enable skipping the deserialization of data on the `DataReader` side.*

### 9.65.1 Detailed Description

Properties that govern how data of a certain type will be serialized on the network.

### 9.65.2 Member Data Documentation

#### 9.65.2.1 use\_42e\_compatible\_alignment

`DDS_Boolean DDS_DynamicDataTypeSerializationProperty_t::use_42e_compatible_alignment`

**[No longer supported]** Use RTI Connex 4.2e-compatible alignment for large primitive types.

In RTI Connex 4.2e, the default alignment for large primitive types – `DDS_LongLong` (p. 319), `DDS_UnsignedLongLong` (p. 319), `DDS_Double` (p. 319), and `DDS_LongDouble` (p. 319) – was not RTPS-compliant. This compatibility mode allows applications targeting post-4.2e versions of RTI Connex to interoperate with 4.2e-based applications, regardless of the data types they use.

If this flag is not set, all data will be serialized in an RTPS-compliant manner, which for the types listed above, will not be interoperable with RTI Connex 4.2e.

#### 9.65.2.2 max\_size\_serialized

`DDS_UnsignedLong DDS_DynamicDataTypeSerializationProperty_t::max_size_serialized`

**[No longer supported]** If you were previously using this property, use `DDS_DynamicDataProperty_t::buffer_max_size` (p. 895) instead. The maximum number of bytes that objects of a given type could consume when serialized on the network.

This value is used to set the sizes of certain internal middleware buffers.

The effective value of the maximum serialized size will be the value of this field or the size automatically inferred from the type's `DDS_TypeCode` (p. 1164), whichever is smaller.



### 9.65.2.3 min\_size\_serialized

`DDS_UnsignedLong DDS_DynamicDataTypeSerializationProperty_t::min_size_serialized`

**[No longer supported]** If you were previously using this property, use `DDS_DynamicDataProperty_t::buffer_initial_size` (p. 895) instead. The minimum number of bytes that objects of a given type could consume when serialized on the network.

This value is used to set the sizes of certain internal middleware buffers.

Default: 0xFFFFFFFF, a sentinel that indicates that this value must be equal to the value specified in `max_size_serialized`.

### 9.65.2.4 trim\_to\_size

`DDS_Boolean DDS_DynamicDataTypeSerializationProperty_t::trim_to_size`

Controls the growth of the buffer in a DynamicData object.

This property only applies to DynamicData samples that are obtained from the sample pool that is created by each DynamicData DataReader.

If set to 0 (default): The buffer will not be reallocated unless the deserialized size of the incoming sample is greater than the current buffer size.

If set to 1: The buffer of a DynamicData object obtained from the DDS sample pool will be freed and re-allocated for each sample to just fit the size of the deserialized data of the incoming sample. The newly allocated size will not be smaller than `DDS_DynamicDataProperty_t::buffer_initial_size` (p. 895).

### 9.65.2.5 skip\_deserialization

`DDS_Boolean DDS_DynamicDataTypeSerializationProperty_t::skip_deserialization`

Enable skipping the deserialization of data on the DataReader side.

Setting this member to `DDS_BOOLEAN_TRUE` (p. 317) boosts the performance for use cases in which the application does not require accessing the value of the different members of the received DynamicData object. Those use cases include recording, replaying, and bridging. You can access the CDR buffer of a DynamicData object by calling the method `DDS_DynamicData::get_cdr_buffer` (p. 796). This configuration option is only available in C, Traditional C++, Modern C++, and Python language bindings.

When this option is set to `DDS_BOOLEAN_TRUE` (p. 317), many of the DynamicData APIs cannot be used to access or manipulate the received DynamicData object. See each function's documentation for whether or not the function is supported for DynamicData objects in CDR format.

See also

`DDS_DynamicData::is_cdr` (p. 796)

`DDS_DynamicData::get_cdr_buffer` (p. 796)

`DDS_DynamicData::set_cdr_buffer` (p. 797)

**[default]** `DDS_BOOLEAN_FALSE` (p. 317)

## 9.66 DDS\_EndpointGroup\_t Struct Reference

Specifies a group of endpoints that can be collectively identified by a name and satisfied by a quorum.

### Public Attributes

- char \* **role\_name**  
*Defines the role name of the endpoint group.*
- int **quorum\_count**  
*Defines the minimum number of members that satisfies the endpoint group.*

### 9.66.1 Detailed Description

Specifies a group of endpoints that can be collectively identified by a name and satisfied by a quorum.

### 9.66.2 Member Data Documentation

#### 9.66.2.1 role\_name

```
char* DDS_EndpointGroup_t::role_name
```

Defines the role name of the endpoint group.

If used in the **DDS\_AvailabilityQosPolicy** (p. 596) on a **DDSDataWriter** (p. 1321), it specifies the name that identifies a Durable Subscription.

The role name can be at most 255 characters in length.

#### 9.66.2.2 quorum\_count

```
int DDS_EndpointGroup_t::quorum_count
```

Defines the minimum number of members that satisfies the endpoint group.

If used in the **DDS\_AvailabilityQosPolicy** (p. 596) on a **DDSDataWriter** (p. 1321), it specifies the number of Data↔Readers that must acknowledge a sample before the sample is considered to be acknowledged by the Durable Subscription.

## 9.67 DDS\_EndpointGroupSeq Struct Reference

A sequence of **DDS\_EndpointGroup\_t** (p. 900).

### 9.67.1 Detailed Description

A sequence of **DDS\_EndpointGroup\_t** (p. 900).

In the context of Collaborative DataWriters, it can be used by a **DDSDataReader** (p. 1288) to define a group of remote DataWriters that the **DDSDataReader** (p. 1288) will wait to discover before skipping missing samples.

In the context of Durable Subscriptions, it can be used to create a set of Durable Subscriptions identified by a name and a quorum count.

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_EndpointGroup\_t** (p. 900)

## 9.68 DDS\_EndpointTrustAlgorithmInfo Struct Reference

Trust Plugins algorithm information associated with the discovered endpoint.

### Public Attributes

- **DDS\_EndpointTrustInterceptorAlgorithmInfo** **interceptor**

*Information regarding algorithms for interception of data and metadata exchanged by the endpoint.*

### 9.68.1 Detailed Description

Trust Plugins algorithm information associated with the discovered endpoint.

### 9.68.2 Member Data Documentation

#### 9.68.2.1 interceptor

**DDS\_EndpointTrustInterceptorAlgorithmInfo** `DDS_EndpointTrustAlgorithmInfo::interceptor`

Information regarding algorithms for interception of data and metadata exchanged by the endpoint.

## 9.69 DDS\_EndpointTrustInterceptorAlgorithmInfo Struct Reference

Trust Plugins interception algorithm information associated with the discovered endpoint.

### Public Attributes

- **DDS\_TrustAlgorithmSet required\_mask**  
*Trust Plugins algorithms used for interception of data and metadata exchanged by the endpoint.*
- **DDS\_TrustAlgorithmSet supported\_mask**  
*Trust Plugins algorithms supported for interception of data and metadata exchanged by the endpoint.*

### 9.69.1 Detailed Description

Trust Plugins interception algorithm information associated with the discovered endpoint.

### 9.69.2 Member Data Documentation

#### 9.69.2.1 required\_mask

`DDS_TrustAlgorithmSet DDS_EndpointTrustInterceptorAlgorithmInfo::required_mask`

Trust Plugins algorithms used for interception of data and metadata exchanged by the endpoint.

#### 9.69.2.2 supported\_mask

`DDS_TrustAlgorithmSet DDS_EndpointTrustInterceptorAlgorithmInfo::supported_mask`

Trust Plugins algorithms supported for interception of data and metadata exchanged by the endpoint.

## 9.70 DDS\_EndpointTrustProtectionInfo Struct Reference

Trust Plugins Protection information associated with the discovered endpoint.

## Public Attributes

- **DDS\_EndpointTrustAttributesMask** bitmask

*Information about how RTPS wire serialization, discovery, and liveliness interact with the associated Trust Plugins Protection configuration.*

- **DDS\_PluginEndpointTrustAttributesMask** plugin\_bitmask

*Internal plugin information that is opaque to DDS.*

### 9.70.1 Detailed Description

Trust Plugins Protection information associated with the discovered endpoint.

### 9.70.2 Member Data Documentation

#### 9.70.2.1 bitmask

**DDS\_EndpointTrustAttributesMask** DDS\_EndpointTrustProtectionInfo::bitmask

Information about how RTPS wire serialization, discovery, and liveliness interact with the associated Trust Plugins Protection configuration.

The meaning of the contents of this field may vary depending on what Trust Plugins the endpoint is using. For information about how this field interacts with the RTI Security Plugins, please refer to the *RTI Security Plugins User's Manual*.

#### 9.70.2.2 plugin\_bitmask

**DDS\_PluginEndpointTrustAttributesMask** DDS\_EndpointTrustProtectionInfo::plugin\_bitmask

Internal plugin information that is opaque to DDS.

The meaning of the contents of this field may vary depending on what Trust Plugins the endpoint is using. For information about how this field interacts with the RTI Security Plugins, please refer to the *RTI Security Plugins User's Manual*.

## 9.71 DDS\_EntityFactoryQosPolicy Struct Reference

A QoS policy for all **DDSEntity** (p. 1463) types that can act as factories for one or more other **DDSEntity** (p. 1463) types.

## Public Attributes

- **DDS\_Boolean autoenable\_created\_entities**

*Specifies whether the entity acting as a factory automatically enables the instances it creates.*

### 9.71.1 Detailed Description

A QoS policy for all **DDSEntity** (p. 1463) types that can act as factories for one or more other **DDSEntity** (p. 1463) types.

Entity:

**DDSDomainParticipantFactory** (p. 1426), **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p. 360) = **YES** (p. 360)

### 9.71.2 Usage

This policy controls the behavior of the **DDSEntity** (p. 1463) as a factory for other entities. It controls whether or not child entities are created in the enabled state.

RTI Connext uses a factory design pattern for creating DDS Entities. That is, a parent entity must be used to create child entities. DomainParticipants create Topics, Publishers and Subscribers. Publishers create DataWriters. Subscribers create DataReaders.

By default, a child object is enabled upon creation (initialized and may be actively used). With this QoS policy, a child object can be created in a disabled state. A disabled entity is only partially initialized and cannot be used until the entity is enabled. Note: an entity can only be *enabled*; it cannot be *disabled* after it has been enabled.

This QoS policy is useful to synchronize the initialization of DDS Entities. For example, when a **DDSDataReader** (p. 1288) is created in an enabled state, its existence is immediately propagated for discovery and the **DDSDataReader** (p. 1288) object's listener called as soon as data is received. The initialization process for an application may extend beyond the creation of the **DDSDataReader** (p. 1288), and thus, it may not be desirable for the **DDSDataReader** (p. 1288) to start to receive or process any data until the initialization process is complete. So by creating readers in a disabled state, your application can make sure that no data is received until the rest of the application initialization is complete, and at that time, enable the them.

Note: if an entity is disabled, then all of the child entities it creates will be disabled, too, regardless of the setting of this QoS policy. However, enabling a disabled entity will enable all of its children if this QoS policy is set to automatically enable children entities.

This policy is mutable. A change in the policy affects only the entities created after the change, not any previously created entities.

### 9.71.3 Member Data Documentation

#### 9.71.3.1 autoenable\_created\_entities

`DDS_Boolean DDS_EntityFactoryQosPolicy::autoenable_created_entities`

Specifies whether the entity acting as a factory automatically enables the instances it creates.

The setting of `autoenable_created_entities` to `DDS_BOOLEAN_TRUE` (p. 317) indicates that the factory `create_<entity>` operation(s) will automatically invoke the `DDSEntity::enable` (p. 1466) operation each time a new `DDSEntity` (p. 1463) is created. Therefore, the `DDSEntity` (p. 1463) returned by `create_<entity>` will already be enabled. A setting of `DDS_BOOLEAN_FALSE` (p. 317) indicates that the `DDSEntity` (p. 1463) will not be automatically enabled. Your application will need to call `DDSEntity::enable` (p. 1466) itself.

The default setting of `autoenable_created_entities = DDS_BOOLEAN_TRUE` (p. 317) means that, by default, it is not necessary to explicitly call `DDSEntity::enable` (p. 1466) on newly created entities.

[default] `DDS_BOOLEAN_TRUE` (p. 317)

## 9.72 DDS\_EntityNameQosPolicy Struct Reference

Assigns a name and a role name to a `DDSDomainParticipant` (p. 1351), `DDSPublisher` (p. 1550), `DDSSubscriber` (p. 1592), `DDSDataWriter` (p. 1321) or `DDSDataReader` (p. 1288). Except for `DDSPublisher` (p. 1550) and `DDSSubscriber` (p. 1592), these names will be visible during the discovery process and in RTI tools to help you visualize and debug your system.

### Public Attributes

- char \* **name**  
*The name of the entity.*
- char \* **role\_name**  
*The entity role name.*

#### 9.72.1 Detailed Description

Assigns a name and a role name to a `DDSDomainParticipant` (p. 1351), `DDSPublisher` (p. 1550), `DDSSubscriber` (p. 1592), `DDSDataWriter` (p. 1321) or `DDSDataReader` (p. 1288). Except for `DDSPublisher` (p. 1550) and `DDSSubscriber` (p. 1592), these names will be visible during the discovery process and in RTI tools to help you visualize and debug your system.

Entity:

`DDSDomainParticipant` (p. 1351), `DDSSubscriber` (p. 1592), `DDSPublisher` (p. 1550), `DDSDataReader` (p. 1288), `DDSDataWriter` (p. 1321)

Properties:

`RxO` (p. 360) = NO;  
`Changeable` (p. 360) = `UNTIL ENABLE` (p. 360)

## 9.72.2 Usage

The name and role name can be at most 255 characters in length.

The strings must be null-terminated strings allocated with **DDS\_String\_alloc** (p. 553) or **DDS\_String\_dup** (p. 553).

If you provide a non-null pointer when getting the QoS, then it should point to valid memory that can be written to, to avoid ungraceful failures.

## 9.72.3 Member Data Documentation

### 9.72.3.1 name

```
char* DDS_EntityNameQosPolicy::name
```

The name of the entity.

**[default]** null

**[range]** Null terminated string with length not exceeding 255. It can be null.

### 9.72.3.2 role\_name

```
char* DDS_EntityNameQosPolicy::role_name
```

The entity role name.

With Durable Subscriptions this name is used to specify to which Durable Subscription the **DDSDataReader** (p. 1288) belongs.

With Collaborative DataWriters this name is used to specify to which endpoint group the **DDSDataWriter** (p. 1321) belongs.

**[range]** Null terminated string with length not exceeding 255. It can be null.

**[default]** null

## 9.73 DDS\_EnumMember Struct Reference

A description of a member of an enumeration.



## Public Attributes

- `char * name`  
*The name of the enumeration member.*
- `DDS_Long ordinal`  
*The value associated the the enumeration member.*

### 9.73.1 Detailed Description

A description of a member of an enumeration.

See also

[DDS\\_EnumMemberSeq](#) (p. 907)

[DDS\\_TypeCodeFactory::create\\_enum\\_tc](#) (p. 1218)

### 9.73.2 Member Data Documentation

#### 9.73.2.1 name

```
char* DDS_EnumMember::name
```

The name of the enumeration member.

Cannot be NULL.

#### 9.73.2.2 ordinal

```
DDS_Long DDS_EnumMember::ordinal
```

The value associated the the enumeration member.

## 9.74 DDS\_EnumMemberSeq Struct Reference

Defines a sequence of enumerator members.

### 9.74.1 Detailed Description

Defines a sequence of enumerator members.

See also

**DDS\_EnumMember** (p. 906)

**FooSeq** (p. 1697)

**DDS\_TypeCodeFactory::create\_enum\_tc** (p. 1218)

## 9.75 DDS\_EventQoSPolicy Struct Reference

Settings for event.

### Public Attributes

- struct **DDS\_ThreadSettings\_t** **thread**  
*Event thread QoS.*
- **DDS\_Long** **initial\_count**  
*The initial number of events.*
- **DDS\_Long** **max\_count**  
*The maximum number of events.*

### 9.75.1 Detailed Description

Settings for event.

In a **DDSDomainParticipant** (p. 1351), a thread is dedicated to handle all timed events, including checking for timeouts and deadlines and executing internal and user-defined timeout or exception handling routines/callbacks.

This QoS policy allows you to configure thread properties such as priority level and stack size. You can also configure the maximum number of events that can be posted to the event thread. By default, a **DDSDomainParticipant** (p. 1351) will dynamically allocate memory as needed for events posted to the event thread. However, by setting a maximum value or setting the initial and maximum value to be the same, you can either bound the amount of memory allocated for the event thread or prevent a **DDSDomainParticipant** (p. 1351) from dynamically allocating memory for the event thread after initialization.

This QoS policy is an extension to the DDS standard.

Entity:

**DDSDomainParticipant** (p. 1351)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

## 9.75.2 Member Data Documentation

### 9.75.2.1 thread

```
struct DDS_ThreadSettings_t DDS_EventQoSPolicy::thread
```

Event thread QoS.

There is only one event thread.

Priority:

**[default]** The actual value depends on your architecture:

For Windows: -2

For Linux: OS default priority

For a complete list of platform specific values, please refer to [Platform Notes](#).

Stack Size:

**[default]** The actual value depends on your architecture:

For Windows: OS default stack size

For Linux: OS default stack size

For a complete list of platform specific values, please refer to [Platform Notes](#).

Mask:

**[default]** mask = `DDS_THREAD_SETTINGS_FLOATING_POINT` (p. 352) | `DDS_THREAD_SETTINGS_STUDIO` (p. 352)

### 9.75.2.2 initial\_count

```
DDS_Long DDS_EventQoSPolicy::initial_count
```

The initial number of events.

**[default]** 256

**[range]** [1, 1 million], <= max\_count

### 9.75.2.3 max\_count

```
DDS_Long DDS_EventQoSPolicy::max_count
```

The maximum number of events.

The maximum number of events. If the limit is reached, no new event can be added.

**[default]** `DDS_LENGTH_UNLIMITED` (p. 438)

**[range]** [1, 1 million] or `DDS_LENGTH_UNLIMITED` (p. 438), >= initial\_count

## 9.76 DDS\_ExpressionProperty Struct Reference

Provides additional information about the filter expression passed to **DDSWriterContentFilter::writer\_compile** (p. 1638) .

### Public Attributes

- **DDS\_Boolean key\_only\_filter**  
*Indicates if the filter expression is based only on key fields. In this case, RTI Connexx itself can cache the filtering results.*
- **DDS\_Boolean writer\_side\_filter\_optimization**  
*Indicates if the filter implementation can cache the filtering result for the provided expression.*

### 9.76.1 Detailed Description

Provides additional information about the filter expression passed to **DDSWriterContentFilter::writer\_compile** (p. 1638) .

It is used by the filter implementation to indicate to the middleware whether or not the **DDSWriterContentFilter** (p. 1637) will cache the result of filter evaluation.

### 9.76.2 Member Data Documentation

#### 9.76.2.1 key\_only\_filter

```
DDS_Boolean DDS_ExpressionProperty::key_only_filter
```

Indicates if the filter expression is based only on key fields. In this case, RTI Connexx itself can cache the filtering results.

When this field is set to **DDS\_BOOLEAN\_TRUE** (p. 317), it indicates to RTI Connexx that the filter expression is based only on key fields.

#### 9.76.2.2 writer\_side\_filter\_optimization

```
DDS_Boolean DDS_ExpressionProperty::writer_side_filter_optimization
```

Indicates if the filter implementation can cache the filtering result for the provided expression.

When this field is set to **DDS\_BOOLEAN\_TRUE** (p. 317), RTI Connexx will do no caching or explicit filter evaluation for the associated **DDSDataReader** (p. 1288). Instead, it will rely on the filter implementation to provide appropriate results.

## 9.77 DDS\_FilterSampleInfo Struct Reference

Provides meta information associated with the sample.

### Public Attributes

- struct **DDS\_SampleIdentity\_t** **related\_sample\_identity**  
*The identity of another sample related to this one.*
- struct **DDS\_GUID\_t** **related\_source\_guid**  
*Identifies the application logical data source that is related to the sample being written.*
- struct **DDS\_GUID\_t** **related\_reader\_guid**  
*Identifies a DataReader that is logically related to the sample.*

### 9.77.1 Detailed Description

Provides meta information associated with the sample.

This can be used by a content filter to perform filtering on meta data.

### 9.77.2 Member Data Documentation

#### 9.77.2.1 related\_sample\_identity

```
struct DDS_SampleIdentity_t DDS_FilterSampleInfo::related_sample_identity
```

The identity of another sample related to this one.

The value of this field identifies another sample that is logically related to the one that is written. For example, the **DDSDataWriter** (p. 1321) created by a Replier uses this field to associate the identity of the request sample with a response sample.

To specify that there is no related sample identity, use the value **DDS\_UNKNOWN\_SAMPLE\_IDENTITY** (p. 479).

A **DDSDataReader** (p. 1288) can inspect the related sample identity of a received sample by accessing the fields **DDS\_SampleInfo::related\_original\_publication\_virtual\_guid** (p. 1090) and **DDS\_SampleInfo::related\_original\_publication\_virtual\_sequence\_number** (p. 1091).

#### 9.77.2.2 related\_source\_guid

```
struct DDS_GUID_t DDS_FilterSampleInfo::related_source_guid
```

Identifies the application logical data source that is related to the sample being written.

The `related_source_guid` can be set by using the field **DDS\_WriteParams\_t::related\_source\_guid** (p. 1255) when writing a sample using the method **FooDataWriter::write\_w\_params** (p. 1688).

### 9.77.2.3 related\_reader\_guid

```
struct DDS_GUID_t DDS_FilterSampleInfo::related_reader_guid
```

Identifies a DataReader that is logically related to the sample.

The related\_reader\_guid can be set by using the field `DDS_WriteParams_t::related_reader_guid` (p. 1255) when writing a sample using the method `FooDataWriter::write_w_params` (p. 1688).

## 9.78 DDS\_FloatSeq Struct Reference

Instantiates `FooSeq` (p. 1697) < `DDS_Float` (p. 319) >

### 9.78.1 Detailed Description

Instantiates `FooSeq` (p. 1697) < `DDS_Float` (p. 319) >

Instantiates:

<<*generic*>> (p. 237) `FooSeq` (p. 1697)

See also

`DDS_Float` (p. 319)

`FooSeq` (p. 1697)

## 9.79 DDS\_FlowControllerProperty\_t Struct Reference

Determines the flow control characteristics of the `DDSFlowController` (p. 1468).

### Public Attributes

- `DDS_FlowControllerSchedulingPolicy scheduling_policy`  
*Scheduling policy.*
- struct `DDS_FlowControllerTokenBucketProperty_t token_bucket`  
*Settings for the token bucket.*

## 9.79.1 Detailed Description

Determines the flow control characteristics of the **DDSFlowController** (p. 1468).

The flow control characteristics shape the network traffic by determining how often and in what order associated asynchronous **DDSDataWriter** (p. 1321) instances are serviced and how much data they are allowed to send.

Note that these settings apply directly to the **DDSFlowController** (p.1468), and do not depend on the number of **DDSDataWriter** (p. 1321) instances the **DDSFlowController** (p. 1468) is servicing. For instance, the specified flow rate does *not* double simply because two **DDSDataWriter** (p. 1321) instances are waiting to write.

Entity:

**DDSFlowController** (p. 1468)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360) for **DDS\_FlowControllerProperty\_t::scheduling\_policy** (p.913), **YES** (p. 360) for **DDS\_FlowControllerProperty\_t::token\_bucket** (p.913). However, the special value of **DDS\_DURATION\_INFINITE** (p.326) as **DDS\_FlowControllerTokenBucketProperty\_t::period** (p.915) is strictly used to create an *on-demand* **DDSFlowController** (p. 1468). The token period cannot toggle from an infinite to finite value (or vice versa). It can, however, change from one finite value to another.

## 9.79.2 Member Data Documentation

### 9.79.2.1 scheduling\_policy

```
DDS_FlowControllerSchedulingPolicy DDS_FlowControllerProperty_t::scheduling_policy
```

Scheduling policy.

Determines the scheduling policy for servicing the **DDSDataWriter** (p. 1321) instances associated with the **DDSFlowController** (p. 1468).

[default] **DDS\_EDF\_FLOW\_CONTROLLER\_SCHED\_POLICY** (p. 120)

### 9.79.2.2 token\_bucket

```
struct DDS_FlowControllerTokenBucketProperty_t DDS_FlowControllerProperty_t::token_bucket
```

Settings for the token bucket.

## 9.80 DDS\_FlowControllerTokenBucketProperty\_t Struct Reference

**DDSFlowController** (p. 1468) uses the popular token bucket approach for open loop network flow control. The flow control characteristics are determined by the token bucket properties.

### Public Attributes

- **DDS\_Long max\_tokens**  
*Maximum number of tokens that can accumulate in the token bucket.*
- **DDS\_Long tokens\_added\_per\_period**  
*The number of tokens added to the token bucket per specified period.*
- **DDS\_Long tokens\_leaked\_per\_period**  
*The number of tokens removed from the token bucket per specified period.*
- struct **DDS\_Duration\_t period**  
*Period for adding tokens to and removing tokens from the bucket.*
- **DDS\_Long bytes\_per\_token**  
*Maximum number of bytes allowed to send for each token available.*

### 9.80.1 Detailed Description

**DDSFlowController** (p. 1468) uses the popular token bucket approach for open loop network flow control. The flow control characteristics are determined by the token bucket properties.

Asynchronously published samples are queued up and transmitted based on the token bucket flow control scheme. The token bucket contains tokens, each of which represents a number of bytes. Samples can be sent only when there are sufficient tokens in the bucket. As samples are sent, tokens are consumed. The number of tokens consumed is proportional to the size of the data being sent. Tokens are replenished on a periodic basis.

The rate at which tokens become available and other token bucket properties determine the network traffic flow.

Note that if the same sample must be sent to multiple destinations, separate tokens are required for each destination. Only when multiple samples are destined to the same destination will they be co-alesced and sent using the same token(s). In other words, each token can only contribute to a single network packet.

Entity:

**DDSFlowController** (p. 1468)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **YES** (p. 360). However, the special value of **DDS\_DURATION\_INFINITE** (p. 326) as **DDS\_↔FlowControllerTokenBucketProperty\_t::period** (p. 915) is strictly used to create an *on-demand DDSFlowController* (p. 1468). The token period cannot toggle from an infinite to finite value (or vice versa). It can, however, change from one finite value to another.



## 9.80.2 Member Data Documentation

### 9.80.2.1 max\_tokens

`DDS_Long DDS_FlowControllerTokenBucketProperty_t::max_tokens`

Maximum number of tokens than can accumulate in the token bucket.

The number of tokens in the bucket will never exceed this value. Any excess tokens are discarded. This property value, combined with `DDS_FlowControllerTokenBucketProperty_t::bytes_per_token` (p.916), determines the maximum allowable data burst.

Use `DDS_LENGTH_UNLIMITED` (p.438) to allow accumulation of an unlimited amount of tokens (and therefore potentially an unlimited burst size).

[default] `DDS_LENGTH_UNLIMITED` (p.438)

[range] [1, `DDS_LENGTH_UNLIMITED` (p.438)]

### 9.80.2.2 tokens\_added\_per\_period

`DDS_Long DDS_FlowControllerTokenBucketProperty_t::tokens_added_per_period`

The number of tokens added to the token bucket per specified period.

`DDSFlowController` (p.1468) transmits data only when tokens are available. Tokens are periodically replenished. This field determines the number of tokens added to the token bucket with each periodic replenishment.

Available tokens are distributed to associated `DDSDataWriter` (p.1321) instances based on the `DDS_FlowControllerProperty_t::scheduling_policy` (p.913).

Use `DDS_LENGTH_UNLIMITED` (p.438) to add the maximum number of tokens allowed by `DDS_FlowControllerTokenBucketProperty_t::max_tokens` (p.915).

[default] `DDS_LENGTH_UNLIMITED` (p.438)

[range] [1, `DDS_LENGTH_UNLIMITED` (p.438)]

### 9.80.2.3 tokens\_leaked\_per\_period

`DDS_Long DDS_FlowControllerTokenBucketProperty_t::tokens_leaked_per_period`

The number of tokens removed from the token bucket per specified period.

`DDSFlowController` (p.1468) transmits data only when tokens are available. When tokens are replenished and there are sufficient tokens to send all samples in the queue, this property determines whether any or all of the leftover tokens remain in the bucket.

Use `DDS_LENGTH_UNLIMITED` (p.438) to remove all excess tokens from the token bucket once all samples have been sent. In other words, no token accumulation is allowed. When new samples are written after tokens were purged, the earliest point in time at which they can be sent is at the next periodic replenishment.

[default] 0

[range] [0, `DDS_LENGTH_UNLIMITED` (p.438)]

### 9.80.2.4 period

```
struct DDS_Duration_t DDS_FlowControllerTokenBucketProperty_t::period
```

Period for adding tokens to and removing tokens from the bucket.

**DDSFlowController** (p. 1468) transmits data only when tokens are available. This field determines the period by which tokens are added or removed from the token bucket.

The special value **DDS\_DURATION\_INFINITE** (p.326) can be used to create an *on-demand* **DDSFlowController** (p. 1468), for which tokens are no longer replenished periodically. Instead, tokens must be added explicitly by calling **DDSFlowController::trigger\_flow** (p.1470). This external trigger adds **DDS\_FlowControllerTokenBucketProperty\_t::tokens\_added\_per\_period** (p. 915) tokens each time it is called (subject to the other property settings).

**[default]** 1 second

**[range]** [1 nanosec, 1 year] or **DDS\_DURATION\_INFINITE** (p. 326)

### 9.80.2.5 bytes\_per\_token

```
DDS_Long DDS_FlowControllerTokenBucketProperty_t::bytes_per_token
```

Maximum number of bytes allowed to send for each token available.

**DDSFlowController** (p. 1468) transmits data only when tokens are available. This field determines the number of bytes that can actually be transmitted based on the number of tokens.

Tokens are always consumed in whole by each **DDSDataWriter** (p.1321). That is, in cases where **DDS\_FlowControllerTokenBucketProperty\_t::bytes\_per\_token** (p.916) is greater than the sample size, multiple samples may be sent to the same destination using a single token (regardless of **DDS\_FlowControllerProperty\_t::scheduling\_policy** (p.913)).

Where fragmentation is required, the fragment size will be **DDS\_FlowControllerTokenBucketProperty\_t::bytes\_per\_token** (p.916) or the minimum largest message size across all transports installed with the **DDSDataWriter** (p. 1321), whichever is less.

Use **DDS\_LENGTH\_UNLIMITED** (p. 438) to indicate that an unlimited number of bytes can be transmitted per token. In other words, a single token allows the recipient **DDSDataWriter** (p. 1321) to transmit all its queued samples to a single destination. A separate token is required to send to each additional destination.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1024,**DDS\_LENGTH\_UNLIMITED** (p. 438)]

## 9.81 DDS\_GroupDataQosPolicy Struct Reference

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

## Public Attributes

- struct **DDS\_OctetSeq** value  
*a sequence of octets*

### 9.81.1 Detailed Description

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

Entity:

**DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p. 360) = **YES** (p. 360)

See also

**DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

### 9.81.2 Usage

The additional information is attached to a **DDSPublisher** (p. 1550) or **DDSSubscriber** (p. 1592). This extra data is not used by RTI Connext itself. When a remote application discovers the **DDSPublisher** (p. 1550) or **DDSSubscriber** (p. 1592), it can access that information and use it for its own purposes.

Use cases for this QoS policy, as well as the **DDS\_TopicDataQosPolicy** (p. 1133) and **DDS\_UserDataQosPolicy** (p. 1237), are often application-to-application identification, authentication, authorization, and encryption purposes. For example, applications can use Group or User Data to send security certificates to each other for RSA-type security.

In combination with **DDSDataReaderListener** (p. 1315), **DDSDataWriterListener** (p. 1344) and operations such as **DDSDomainParticipant::ignore\_publication** (p. 1396) and **DDSDomainParticipant::ignore\_subscription** (p. 1396), this QoS policy can help an application to define and enforce its own security policies. For example, an application can implement matching policies similar to those of the **DDS\_PartitionQosPolicy** (p. 989), except the decision can be made based on an application-defined policy.

The use of this QoS is not limited to security; it offers a simple, yet flexible extensibility mechanism.

*Important:* RTI Connext stores the data placed in this policy in pre-allocated pools. It is therefore necessary to configure RTI Connext with the maximum size of the data that will be stored in policies of this type. This size is configured with **DDS\_DomainParticipantResourceLimitsQosPolicy::publisher\_group\_data\_max\_length** (p. 758) and **DDS\_DomainParticipantResourceLimitsQosPolicy::subscriber\_group\_data\_max\_length** (p. 758).

### 9.81.3 Member Data Documentation

#### 9.81.3.1 value

```
struct DDS_OctetSeq DDS_GroupDataQosPolicy::value
```

a sequence of octets

**[default]** Empty (zero-sized)

**[range]** Octet sequence of length [0,max\_length]

## 9.82 DDS\_GUID\_t Struct Reference

Type for *GUID* (Global Unique Identifier) representation.

### Public Attributes

- **DDS\_Octet value** [DDS\_GUID\_LENGTH]  
*A 16 byte array containing the GUID value.*

### 9.82.1 Detailed Description

Type for *GUID* (Global Unique Identifier) representation.

Represents a 128 bit GUID.

Alternative representation of **DDS\_RTSPS\_GUID\_t** (p. 1057). Memory and wire representation for this type is the same as the one for **DDS\_RTSPS\_GUID\_t** (p. 1057).

### 9.82.2 Member Data Documentation

#### 9.82.2.1 value

```
DDS_Octet DDS_GUID_t::value [DDS_GUID_LENGTH]
```

A 16 byte array containing the GUID value.

## 9.83 DDS\_HistoryQosPolicy Struct Reference

Specifies the behavior of RTI Connexx in the case where the value of a sample changes (one or more times) before it can be successfully communicated to one or more existing subscribers.

### Public Attributes

- **DDS\_HistoryQosPolicyKind kind**  
*Specifies the kind of history to be kept.*
- **DDS\_Long depth**  
*Specifies the number of samples per instance to be kept, when the `kind` is `DDS_KEEP_LAST_HISTORY_QOS` (p. 406).*

### 9.83.1 Detailed Description

Specifies the behavior of RTI Connexx in the case where the value of a sample changes (one or more times) before it can be successfully communicated to one or more existing subscribers.

This QoS policy specifies how much data must to stored by RTI Connexx for a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288). It controls whether RTI Connexx should deliver only the most recent value, attempt to deliver all intermediate values, or do something in between.

On the publishing side, this QoS policy controls the samples that should be maintained by the **DDSDataWriter** (p. 1321) on behalf of existing **DDSDataReader** (p. 1288) entities. The behavior with regards to a **DDSDataReader** (p. 1288) entities discovered after a sample is written is controlled by the **DURABILITY** (p. 398) policy.

On the subscribing side, this QoS policy controls the samples that should be maintained until the application "takes" them from RTI Connexx.

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = NO  
**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

See also

**DDS\_ReliabilityQosPolicy** (p. 1041)  
**DDS\_HistoryQosPolicy** (p. 919)

### 9.83.2 Usage

This policy controls the behavior of RTI Connex when the value of an instance changes before it is finally communicated to **DDSDataReader** (p. 1288) entities.

When a **DDSDataWriter** (p. 1321) sends data, or a **DDSDataReader** (p. 1288) receives data, the data sent or received is stored in a cache whose contents are controlled by this QoS policy. This QoS policy interacts with **DDS\_ReliabilityQoSPolicy** (p. 1041) by controlling whether RTI Connex guarantees that *all* of the sent data is received (**DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406)) or if only the last N data values sent are guaranteed to be received (**DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406))—this is a reduced level of reliability.

The amount of data that is sent to new DataReaders who have configured their **DDS\_DurabilityQoSPolicy** (p. 767) to receive previously published data is controlled by **DDS\_DurabilityQoSPolicy::writer\_depth** (p. 770), not by the History QoS policy.

Note that the History QoS policy does not control the *physical* sizes of the send and receive queues. The memory allocation for the queues is controlled by the **DDS\_ResourceLimitsQoSPolicy** (p. 1052).

If `kind` is **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406) (the default), then RTI Connex will only attempt to keep the latest values of the instance and discard the older ones. In this case, the value of `depth` regulates the maximum number of values (up to and including the most current one) RTI Connex will maintain and deliver until the samples are fully acknowledged. After N values have been sent or received, any new data will overwrite the oldest data in the queue. Thus the queue acts like a circular buffer of length N.

For keyed-data, there is different behavior on the publishing and subscribing sides associated with how invalid samples representing the disposal of or unregistration from an instance affect history.

On the publishing side, unregistering from or disposing of an instance creates an invalid sample that is accounted for in the history depth. This means that an invalid sample may replace a value that is currently being stored in the writer queue.

On the subscribing side, however, invalid samples do not count towards history depth and will not replace a value that is being stored in the reader queue.

On both the publishing and subscribing sides, there can only ever be one invalid sample per-instance and that one sample can be in different states depending on whether the instance has been disposed, unregistered, or both.

The default (and most common setting) for `depth` is 1, indicating that only the most recent value should be delivered.

If `kind` is **DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406), then RTI Connex will attempt to maintain and deliver all the values of the instance to existing subscribers. The resources that RTI Connex can use to keep this history are limited by the settings of the **RESOURCE\_LIMITS** (p. 437). If the limit is reached, then the behavior of RTI Connex will depend on the **RELIABILITY** (p. 433). If the Reliability `kind` is **DDS\_BEST\_EFFORT\_RELIABILITY\_QOS** (p. 435), then the old values will be discarded. If Reliability `kind` is **RELIABLE**, then RTI Connex will block the **DDSDataWriter** (p. 1321) until it can deliver the necessary old values to all subscribers.

### 9.83.3 Consistency

This QoS policy's `depth` must be consistent with the **RESOURCE\_LIMITS** (p. 437) `max_samples_per_instance`. For these two QoS to be consistent, they must verify that  $depth \leq max\_samples\_per\_instance$ .

See also

**DDS\_ResourceLimitsQoSPolicy** (p. 1052)

## 9.83.4 Member Data Documentation

### 9.83.4.1 kind

`DDS_HistoryQosPolicyKind` `DDS_HistoryQosPolicy::kind`

Specifies the kind of history to be kept.

For DataWriters, the samples are only kept either until they are fully acknowledged by all matching DataReaders or until they are replaced or removed. Samples can be replaced or removed for a number of reasons, including but not limited to `DDS_LifespanQosPolicy` (p. 931) expiration, replacement because the `DDS_HistoryQosPolicy::depth` (p. 921) has been exceeded, or one of the `DDS_ResourceLimitsQosPolicy` (p. 1052) settings has been exceeded.

[default] `DDS_KEEP_LAST_HISTORY_QOS` (p. 406)

### 9.83.4.2 depth

`DDS_Long` `DDS_HistoryQosPolicy::depth`

Specifies the number of samples per instance to be kept, when the `kind` is `DDS_KEEP_LAST_HISTORY_QOS` (p. 406).

If a value other than 1 (the default) is specified, it should be consistent with the settings of the `RESOURCE_LIMITS` (p. 437) policy. That is:

$\text{depth} \leq \text{DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance}$  (p. 1055)

When the `kind` is `DDS_KEEP_ALL_HISTORY_QOS` (p. 406), the depth has no effect. Its implied value is `infinity` (in practice limited by the settings of the `RESOURCE_LIMITS` (p. 437) policy).

When a DataWriter responds to a TopicQuery, the samples that are evaluated against the TopicQuery filter are only those samples that fall within the `DDS_DurabilityQosPolicy::writer_depth` (p. 770), not this depth.

[default] 1

[range] [1,100 million],  $\leq \text{DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance}$  (p. 1055)

## 9.84 DDS\_InconsistentTopicStatus Struct Reference

`DDS_INCONSISTENT_TOPIC_STATUS` (p. 343)

## Public Attributes

- **DDS\_Long total\_count**

*Total cumulative count of the pairs (**DDSDataReader** (p. 1288),**DDSDataWriter** (p. 1321)) whose topic names match the **DDSTopic** (p. 1617) to which this status is attached and whose types are inconsistent according to the rules defined in **DDS\_TypeConsistencyEnforcementQosPolicy** (p. 1228).*

- **DDS\_Long total\_count\_change**

*The incremental number of inconsistent pairs (**DDSDataReader** (p. 1288),**DDSDataWriter** (p. 1321)) for the **DDSTopic** (p. 1617) to which this status is attached, that have been discovered since the last time this status was read.*

### 9.84.1 Detailed Description

**DDS\_INCONSISTENT\_TOPIC\_STATUS** (p. 343)

Entity:

**DDSTopic** (p. 1617)

Listener:

**DDSTopicListener** (p. 1626)

Every time a **DDSDataReader** (p. 1288) and **DDSDataWriter** (p. 1321) with the same **DDSTopic** (p. 1617) do not match because the type-consistency enforcement policy fails, the inconsistent topic status is updated for the **DDSTopic** (p. 1617).

See also

**DDS\_TypeConsistencyEnforcementQosPolicy** (p. 1228)

### 9.84.2 Member Data Documentation

#### 9.84.2.1 total\_count

**DDS\_Long** `DDS_InconsistentTopicStatus::total_count`

Total cumulative count of the pairs (**DDSDataReader** (p. 1288),**DDSDataWriter** (p. 1321)) whose topic names match the **DDSTopic** (p. 1617) to which this status is attached and whose types are inconsistent according to the rules defined in **DDS\_TypeConsistencyEnforcementQosPolicy** (p. 1228).



### 9.84.2.2 total\_count\_change

`DDS_Long DDS_InconsistentTopicStatus::total_count_change`

The incremental number of inconsistent pairs (**DDSDataReader** (p. 1288),**DDSDataWriter** (p. 1321)) for the **DDSTopic** (p. 1617) to which this status is attached, that have been discovered since the last time this status was read.

## 9.85 DDS\_InstanceHandleSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_InstanceHandle\_t** (p. 74) > .

### 9.85.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_InstanceHandle\_t** (p. 74) > .

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_InstanceHandle\_t** (p. 74)

**FooSeq** (p. 1697)

## 9.86 DDS\_Int8Seq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_Int8** (p. 318) >

### 9.86.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_Int8** (p. 318) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_Int8** (p. 318)

**FooSeq** (p. 1697)

## 9.87 DDS\_InvalidLocalIdentityAdvanceNoticeStatus Struct Reference

DDS\_INVALID\_LOCAL\_IDENTITY\_ADVANCE\_NOTICE\_STATUS (p. 347)

### Public Attributes

- struct **DDS\_Time\_t** **expiration\_time**  
*The time when the local identity will expire.*

### 9.87.1 Detailed Description

DDS\_INVALID\_LOCAL\_IDENTITY\_ADVANCE\_NOTICE\_STATUS (p. 347)

Currently, this status is only triggered when enabling the RTI Security Plugins. Please refer to the `RTI Security Plugins User's Manual` for more information.

### 9.87.2 Member Data Documentation

#### 9.87.2.1 expiration\_time

```
struct DDS_Time_t DDS_InvalidLocalIdentityAdvanceNoticeStatus::expiration_time
```

The time when the local identity will expire.

## 9.88 DDS\_KeyedOctets Struct Reference

Built-in type consisting of a variable-length array of opaque bytes and a string that is the key.

### Public Member Functions

- **DDS\_KeyedOctets** ()  
*Constructor.*
- **DDS\_KeyedOctets** (int key\_size, int size)  
*Constructor that specifies the allocated sizes.*
- **~DDS\_KeyedOctets** ()  
*Destructor.*

## Public Attributes

- char \* **key**  
*Instance key associated with the specified value.*
- int **length**  
*Number of octets to serialize.*
- unsigned char \* **value**  
*DDS\_Octets (p. 967) array value.*

### 9.88.1 Detailed Description

Built-in type consisting of a variable-length array of opaque bytes and a string that is the key.

### 9.88.2 Constructor & Destructor Documentation

#### 9.88.2.1 DDS\_KeyedOctets() [1/2]

```
DDS_KeyedOctets::DDS_KeyedOctets ( ) [inline]
```

Constructor.

The default constructor initializes the newly created object with NULL key, NULL value, and zero length.

#### 9.88.2.2 DDS\_KeyedOctets() [2/2]

```
DDS_KeyedOctets::DDS_KeyedOctets (
    int key_size,
    int size ) [inline]
```

Constructor that specifies the allocated sizes.

After this method is called, key is initialized with the empty string and length is set to zero.

If a memory allocation failure occurs, and the **DDS\_KeyedOctets** (p. 924) structure is allocated but the array and/or key string inside of it cannot be, the unallocated member will be NULL.

#### Parameters

<i>key_size</i>	<< <i>in</i> >> (p. 238) Size of the allocated key (with NULL-terminated character).
<i>size</i>	<< <i>in</i> >> (p. 238) Size of the allocated octets array.

References **DDS\_OctetBuffer\_alloc()**, **DDS\_String\_alloc()**, **DDS\_String\_free()**, **key**, and **value**.

### 9.88.2.3 ~DDS\_KeyedOctets()

```
DDS_KeyedOctets::~~DDS_KeyedOctets ( ) [inline]
```

Destructor.

References [DDS\\_OctetBuffer\\_free\(\)](#), [DDS\\_String\\_free\(\)](#), [key](#), and [value](#).

## 9.88.3 Member Data Documentation

### 9.88.3.1 key

```
char* DDS_KeyedOctets::key
```

Instance key associated with the specified value.

Referenced by [DDS\\_KeyedOctets\(\)](#), and [~DDS\\_KeyedOctets\(\)](#).

### 9.88.3.2 length

```
int DDS_KeyedOctets::length
```

Number of octets to serialize.

### 9.88.3.3 value

```
unsigned char* DDS_KeyedOctets::value
```

[DDS\\_Octets](#) (p. 967) array value.

Referenced by [DDS\\_KeyedOctets\(\)](#), and [~DDS\\_KeyedOctets\(\)](#).

## 9.89 DDS\_KeyedOctetsSeq Struct Reference

Instantiates [FooSeq](#) (p. 1697) < [DDS\\_KeyedOctets](#) (p. 924) >.

### 9.89.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_KeyedOctets** (p. 924) >.

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_KeyedOctets** (p. 924)

## 9.90 DDS\_KeyedString Struct Reference

Keyed string built-in type.

### Public Member Functions

- **DDS\_KeyedString** ()  
*Constructor.*
- **DDS\_KeyedString** (int key\_size, int size)  
*Constructor that specifies the allocated sizes.*
- **~DDS\_KeyedString** ()  
*Destructor.*

### Public Attributes

- char \* **key**  
*Instance key associated with the specified value.*
- char \* **value**  
*String value.*

### 9.90.1 Detailed Description

Keyed string built-in type.

### 9.90.2 Constructor & Destructor Documentation

**9.90.2.1 DDS\_KeyedString()** [1/2]

```
DDS_KeyedString::DDS_KeyedString ( ) [inline]
```

Constructor.

The default constructor initializes the newly created object with NULL key and value.

**9.90.2.2 DDS\_KeyedString()** [2/2]

```
DDS_KeyedString::DDS_KeyedString (
    int key_size,
    int size ) [inline]
```

Constructor that specifies the allocated sizes.

The allocated strings are initialized to empty ("").

If a memory allocation failure occurs, and the **DDS\_KeyedString** (p. 927) structure is allocated but one or both strings inside of it cannot be, the unallocated string will be NULL.

**Parameters**

<i>key_size</i>	<< <i>in</i> >> (p. 238) Size of the allocated key string (with NULL-terminated character).
<i>size</i>	<< <i>in</i> >> (p. 238) Size of the allocated value string (with NULL-terminated character).

References **DDS\_String\_alloc()**, **DDS\_String\_free()**, **key**, and **value**.

**9.90.2.3 ~DDS\_KeyedString()**

```
DDS_KeyedString::~~DDS_KeyedString ( ) [inline]
```

Destructor.

References **DDS\_String\_free()**, **key**, and **value**.

**9.90.3 Member Data Documentation**

### 9.90.3.1 key

```
char* DDS_KeyedString::key
```

Instance key associated with the specified value.

Referenced by [DDS\\_KeyedString\(\)](#), and [~DDS\\_KeyedString\(\)](#).

### 9.90.3.2 value

```
char* DDS_KeyedString::value
```

String value.

Referenced by [DDS\\_KeyedString\(\)](#), and [~DDS\\_KeyedString\(\)](#).

## 9.91 DDS\_KeyedStringSeq Struct Reference

Instantiates [FooSeq](#) (p. 1697) < [DDS\\_KeyedString](#) (p. 927) > .

### 9.91.1 Detailed Description

Instantiates [FooSeq](#) (p. 1697) < [DDS\\_KeyedString](#) (p. 927) > .

Instantiates:

<<*generic*>> (p. 237) [FooSeq](#) (p. 1697)

See also

[DDS\\_KeyedString](#) (p. 927)

## 9.92 DDS\_LatencyBudgetQosPolicy Struct Reference

Provides a hint as to the maximum acceptable delay from the time the data is written to the time it is received by the subscribing applications.

### Public Attributes

- struct [DDS\\_Duration\\_t](#) **duration**  
*Duration of the maximum acceptable delay.*

### 9.92.1 Detailed Description

Provides a hint as to the maximum acceptable delay from the time the data is written to the time it is received by the subscribing applications.

This policy is a *hint* to a DDS implementation; it can be used to change how it processes and sends data that has low latency requirements. The DDS specification does not mandate whether or how this policy is used.

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Status:

**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344)

Properties:

**RxO** (p. 360) = YES

**Changeable** (p. 360) = YES (p. 360)

See also

**DDS\_PublishModeQosPolicy** (p. 1025)

**DDSFlowController** (p. 1468)

### 9.92.2 Usage

This policy provides a means for the application to indicate to the middleware the urgency of the data communication. By having a non-zero *duration*, RTI Connext can optimize its internal operation.

RTI Connext uses it in conjunction with **DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431) **DDSDataWriter** (p. 1321) instances associated with a **DDS\_EDF\_FLOW\_CONTROLLER\_SCHED\_POLICY** (p. 120) **DDSFlowController** (p. 1468) only. Together with the time of write, **DDS\_LatencyBudgetQosPolicy::duration** (p. 931) determines the deadline of each individual sample. RTI Connext uses this information to prioritize the sending of asynchronously published data; see **DDS\_AsynchronousPublisherQosPolicy** (p. 590).

### 9.92.3 Compatibility

The value offered is considered compatible with the value requested if and only if the inequality *offered duration*  $\leq$  *requested duration* evaluates to 'TRUE'.



## 9.92.4 Member Data Documentation

### 9.92.4.1 duration

```
struct DDS_Duration_t DDS_LatencyBudgetQosPolicy::duration
```

Duration of the maximum acceptable delay.

**[default]** 0 (meaning minimize the delay)

## 9.93 DDS\_LifespanQosPolicy Struct Reference

Specifies how long the data written by the **DDSDataWriter** (p. 1321) is considered valid.

### Public Attributes

- struct **DDS\_Duration\_t** **duration**  
*Maximum duration for the data's validity.*

### 9.93.1 Detailed Description

Specifies how long the data written by the **DDSDataWriter** (p. 1321) is considered valid.

Each data sample written by the **DDSDataWriter** (p. 1321) has an associated expiration time beyond which the data should not be delivered to any application. Once the sample expires, the data will be removed from the **DDSDataReader** (p. 1288) caches as well as from the transient and persistent information caches.

The expiration time of each sample from the **DDSDataWriter** (p. 1321)'s cache is computed by adding the duration specified by this QoS policy to the time when the sample is added to the **DDSDataWriter** (p. 1321)'s cache. This timestamp is not necessarily equal to the sample's source timestamp that can be provided by the user using the **FooDataWriter::write\_w\_timestamp** (p. 1687) or **FooDataWriter::write\_w\_params** (p. 1688) API.

The expiration time of each sample from the **DDSDataReader** (p. 1288)'s cache is computed by adding the duration to the reception timestamp.

See also

- FooDataWriter::write** (p. 1683)
- FooDataWriter::write\_w\_timestamp** (p. 1687)

Entity:

**DDSTopic** (p. 1617), **DDSDataWriter** (p. 1321)

Properties:

- RxO** (p. 360) = N/A
- Changeable** (p. 360) = **YES** (p. 360)

## 9.93.2 Usage

The Lifespan QoS policy can be used to control how much data is stored by RTI Connex. Even if it is configured to store "all" of the data sent or received for a topic (see **DDS\_HistoryQoSPolicy** (p. 919)), the total amount of data it stores may be limited by this QoS policy.

You may also use this QoS policy to ensure that applications do not receive or act on data, commands or messages that are too old and have 'expired.'

To avoid inconsistencies, multiple writers of the same instance should have the same lifespan.

See also

**DDS\_SampleInfo::source\_timestamp** (p. 1086)

**DDS\_SampleInfo::reception\_timestamp** (p. 1089)

## 9.93.3 Member Data Documentation

### 9.93.3.1 duration

```
struct DDS_Duration_t DDS_LifespanQoSPolicy::duration
```

Maximum duration for the data's validity.

[default] **DDS\_DURATION\_INFINITE** (p. 326)

[range] [1 nanosec, 1 year] or **DDS\_DURATION\_INFINITE** (p. 326)

## 9.94 DDS\_LivelinessChangedStatus Struct Reference

**DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346)

### Public Attributes

- **DDS\_Long alive\_count**  
*The total count of currently alive **DDSDataWriter** (p. 1321) entities that write the **DDSTopic** (p. 1617) that this **DDSDataReader** (p. 1288) reads.*
- **DDS\_Long not\_alive\_count**  
*The total count of currently not\_alive **DDSDataWriter** (p. 1321) entities that write the **DDSTopic** (p. 1617) that this **DDSDataReader** (p. 1288) reads.*
- **DDS\_Long alive\_count\_change**  
*The change in the alive\_count since the last time the listener was called or the status was read.*
- **DDS\_Long not\_alive\_count\_change**  
*The change in the not\_alive\_count since the last time the listener was called or the status was read.*
- **DDS\_InstanceHandle\_t last\_publication\_handle**  
*This InstanceHandle can be used to look up which remote **DDSDataWriter** (p. 1321) was the last to cause this **DataReader**'s status to change, using **DDSDataReader::get\_matched\_publication\_data** (p. 1300).*

## 9.94.1 Detailed Description

**DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346)

The **DDSDataReaderListener::on\_liveliness\_changed** (p. 1316) callback may be invoked for the following reasons:

- The liveliness of any **DDSDataWriter** (p. 1321) matching this DataReader (as defined by the **DDS\_LivelinessQoSPolicyKind** (p. 409) setting) is lost.
- A DataWriter's liveliness is recovered after being lost.
- A new matching DataWriter has been discovered.
- A matching DataWriter has been deleted.
- A QoS Policy has changed such that a DataWriter that matched this DataReader before no longer matches (such as a change to the **DDS\_PartitionQoSPolicy** (p. 989)). In this case, RTI Connex will no longer keep track of the DataWriter's liveliness. Furthermore, consider two scenarios:
  - DataWriter was alive when it and DataReader stopped matching: **DDS\_LivelinessChangedStatus::alive\_count** (p.933) will decrease (since there's one less matching alive DataWriter) and **DDS\_LivelinessChangedStatus::not\_alive\_count** (p. 933) will remain the same (since the DataWriter is still alive).
  - DataWriter was not alive when it and DataReader stopped matching: **DDS\_LivelinessChangedStatus::alive\_count** (p.933) will remain the same (since the matching DataWriter was not alive) and **DDS\_LivelinessChangedStatus::not\_alive\_count** (p. 933) will decrease (since there's one less not-alive matching DataWriter).

Note: There are several ways that a DataWriter and DataReader can become incompatible after the DataWriter has lost liveliness. For example, when the **DDS\_LivelinessQoSPolicyKind** (p. 409) is set to **DDS\_MANUAL\_BY\_PARTICIPANT\_LIVELINESS\_QOS**, it is possible that the DataWriter has not asserted its liveliness in a timely manner, and then a QoS change occurs on the DataWriter or DataReader that makes the entities incompatible.
- A QoS Policy (such as the **DDS\_PartitionQoSPolicy** (p.989)) has changed such that a DataWriter that was unmatched with the DataReader now matches.

## 9.94.2 Member Data Documentation

### 9.94.2.1 alive\_count

**DDS\_Long** DDS\_LivelinessChangedStatus::alive\_count

The total count of currently alive **DDSDataWriter** (p.1321) entities that write the **DDSTopic** (p.1617) that this **DDSDataReader** (p. 1288) reads.

### 9.94.2.2 not\_alive\_count

```
DDS_Long DDS_LivelinessChangedStatus::not_alive_count
```

The total count of currently not\_alive **DDSDataWriter** (p. 1321) entities that write the **DDSTopic** (p. 1617) that this **DDSDataReader** (p. 1288) reads.

### 9.94.2.3 alive\_count\_change

```
DDS_Long DDS_LivelinessChangedStatus::alive_count_change
```

The change in the alive\_count since the last time the listener was called or the status was read.

### 9.94.2.4 not\_alive\_count\_change

```
DDS_Long DDS_LivelinessChangedStatus::not_alive_count_change
```

The change in the not\_alive\_count since the last time the listener was called or the status was read.

Note that a positive not\_alive\_count\_change means one of the following:

- The DomainParticipant containing the matched DataWriter has lost liveliness or has been deleted.
- The matched DataWriter has lost liveliness or has been deleted.

### 9.94.2.5 last\_publication\_handle

```
DDS_InstanceHandle_t DDS_LivelinessChangedStatus::last_publication_handle
```

This InstanceHandle can be used to look up which remote **DDSDataWriter** (p. 1321) was the last to cause this DataReader's status to change, using **DDSDataReader::get\_matched\_publication\_data** (p. 1300).

It's possible that the DataWriter has been purged from the discovery database. (See the "Discovery Overview" section of the *User's Manual*.) If so, the **DDSDataReader::get\_matched\_publication\_data** (p. 1300) method will not be able to return information about the DataWriter. In this case, the only way to get information about the lost DataWriter is if you cached the information previously.

## 9.95 DDS\_LivelinessLostStatus Struct Reference

**DDS\_LIVELINESS\_LOST\_STATUS** (p. 346)

## Public Attributes

- **DDS\_Long total\_count**

*Total cumulative number of times that a previously-alive **DDSDataWriter** (p. 1321) became not alive due to a failure to to actively signal its liveliness within the offered liveliness period.*

- **DDS\_Long total\_count\_change**

*The incremental changes in total\_count since the last time the listener was called or the status was read.*

### 9.95.1 Detailed Description

**DDS\_LIVELINESS\_LOST\_STATUS** (p. 346)

Entity:

**DDSDataWriter** (p. 1321)

Listener:

**DDSDataWriterListener** (p. 1344)

The liveliness that the **DDSDataWriter** (p. 1321) has committed through its **DDS\_LivelinessQosPolicy** (p. 936) was not respected; thus **DDSDataReader** (p. 1288) entities will consider the **DDSDataWriter** (p. 1321) as no longer "alive/active".

### 9.95.2 Member Data Documentation

#### 9.95.2.1 total\_count

```
DDS_Long DDS_LivelinessLostStatus::total_count
```

Total cumulative number of times that a previously-alive **DDSDataWriter** (p. 1321) became not alive due to a failure to to actively signal its liveliness within the offered liveliness period.

This count does not change when an already not alive **DDSDataWriter** (p. 1321) simply remains not alive for another liveliness period.

#### 9.95.2.2 total\_count\_change

```
DDS_Long DDS_LivelinessLostStatus::total_count_change
```

The incremental changes in total\_count since the last time the listener was called or the status was read.

## 9.96 DDS\_LivelinessQosPolicy Struct Reference

Specifies and configures the mechanism that allows **DDSDataReader** (p. 1288) entities to detect when **DDSDataWriter** (p. 1321) entities become disconnected or "dead".

### Public Attributes

- **DDS\_LivelinessQosPolicyKind** `kind`  
*The kind of liveliness desired.*
- struct **DDS\_Duration\_t** `lease_duration`  
*The duration within which a **DDSDataWriter** (p. 1321) must be asserted, or else it is assumed to be not alive.*
- **DDS\_Long** `assertions_per_lease_duration`  
*The number of assertions a **DDSDataWriter** (p. 1321) will send during a its **DDS\_LivelinessQosPolicy::lease\_duration** (p. 938).*

### 9.96.1 Detailed Description

Specifies and configures the mechanism that allows **DDSDataReader** (p. 1288) entities to detect when **DDSDataWriter** (p. 1321) entities become disconnected or "dead".

The liveliness status of a **DDSDataWriter** (p. 1321) is used to maintain instance ownership in combination with the setting of the **OWNERSHIP** (p. 414) policy. The application is also informed via **DDSListener** (p. 1526) when an **DDSDataWriter** (p. 1321) is no longer alive.

A **DDSDataWriter** (p. 1321) commits to signalling its liveliness at intervals not to exceed the **DDS\_LivelinessQosPolicy::lease\_duration** (p. 938) configured on the **DDSDataWriter** (p. 1321). The rate at which the **DDSDataWriter** (p. 1321) will signal its liveliness is defined by **DDS\_LivelinessQosPolicy::assertions\_per\_lease\_duration** (p. 938).

The **DDSDataReader** (p. 1288) `lease_duration` specifies the maximum period at which matching DataWriters must have their liveliness asserted.

In addition, in the subscribing application Connex DDS uses an internal thread that wakes up at the period set by the DataReader's `lease_duration` to see if a DataWriter `lease_duration` has been violated.

**Important:** The DataReader `lease_duration` only configures how often a DataReader will check the liveliness of the matching DataWriters. The DataWriter `lease_duration` configures the period at which a DataWriter must assert its liveliness and is the value that the DataReader uses to determine if a matching DataWriter is alive or not.

Listeners are used to notify a **DDSDataReader** (p. 1288) of loss of liveliness and **DDSDataWriter** (p. 1321) of violations to the liveliness contract. The `on_liveliness_lost()` callback is only called *once*, after the first time the `lease_duration` is exceeded (when the **DDSDataWriter** (p. 1321) first loses liveliness).

This QoS policy can be used during system integration to ensure that applications have been coded to meet design specifications. It can also be used during runtime to detect when systems are performing outside of design specifications. Receiving applications can take appropriate actions in response to disconnected DataWriters.

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Status:

**DDS\_LIVELINESS\_LOST\_STATUS** (p. 346), **DDS\_LivelinessLostStatus** (p. 934);  
**DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346), **DDS\_LivelinessChangedStatus** (p. 932);  
**DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_OFFERED\_INCOMPATIBLE\_QOS\_↔  
STATUS** (p. 344)

Properties:

**RxO** (p. 360) = YES  
**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

## 9.96.2 Usage

This policy controls the mechanism and parameters used by RTI Connext to ensure that particular DataWriters on the network are still alive. The liveliness can also affect the ownership of a particular instance, as determined by the **OWNERSHIP** (p. 414) policy.

This policy has several settings to support both data types that are updated periodically as well as those that are changed sporadically. It also allows customisation for different application requirements in terms of the kinds of failures that will be detected by the liveliness mechanism.

The **DDS\_AUTOMATIC\_LIVELINESS\_QOS** (p. 410) liveliness setting is most appropriate for applications that only need to detect failures at the process-level, but not application-logic failures within a process. RTI Connext takes responsibility for renewing the leases at the required rates and thus, as long as the local process where a **DDSDomain↔  
Participant** (p. 1351) is running and the link connecting it to remote participants remains connected, the entities within the **DDSDomainParticipant** (p. 1351) will be considered alive. This requires the lowest overhead.

The manual settings (**DDS\_MANUAL\_BY\_PARTICIPANT\_LIVELINESS\_QOS** (p. 410), **DDS\_MANUAL\_BY\_TOPIC↔  
\_LIVELINESS\_QOS** (p. 410)) require the application on the publishing side to periodically assert the liveliness before the lease expires to indicate the corresponding **DDSEntity** (p. 1463) is still alive. The action can be explicit by calling the **DDSDataWriter::assert\_liveliness** (p. 1329) operation or implicit by writing some data.

The two possible manual settings control the granularity at which the application must assert liveliness.

- The setting **DDS\_MANUAL\_BY\_PARTICIPANT\_LIVELINESS\_QOS** (p. 410) requires only that one **DDSEntity** (p. 1463) within a participant is asserted to be alive to deduce all other **DDSEntity** (p. 1463) objects within the same **DDSDomainParticipant** (p. 1351) are also alive.
- The setting **DDS\_MANUAL\_BY\_TOPIC\_LIVELINESS\_QOS** (p. 410) requires that at least one instance within the **DDSDataWriter** (p. 1321) is asserted.

Changes in **LIVELINESS** (p. 409) must be detected by the Service with a time-granularity greater or equal to the **DDS↔  
\_LivelinessQosPolicy::lease\_duration** (p. 938). This ensures that the value of the **DDS\_LivelinessChangedStatus** (p. 932) is updated at least once during each lease\_duration and the related Listeners and **DDSWaitSet** (p. 1629) s are notified within a lease\_duration from the time the **LIVELINESS** (p. 409) changed.

### 9.96.3 Compatibility

The value offered is considered compatible with the value requested if and only if the following conditions are met:

- the inequality *offered kind*  $\geq$  *requested kind* evaluates to 'TRUE'. For the purposes of this inequality, the values of **DDS\_LivelinessQosPolicyKind** (p. 409) kind are considered ordered such that: **DDS\_AUTOMATIC** ↔ **\_LIVELINESS\_QOS** (p. 410) < **DDS\_MANUAL\_BY\_PARTICIPANT\_LIVELINESS\_QOS** (p. 410) < **DDS\_** ↔ **MANUAL\_BY\_TOPIC\_LIVELINESS\_QOS** (p. 410).
- the inequality *offered lease\_duration*  $\leq$  *requested lease\_duration* evaluates to **DDS\_BOOLEAN** ↔ **\_TRUE** (p. 317).

See also

**Relationship between registration, liveliness and ownership** (p. 975)

### 9.96.4 Member Data Documentation

#### 9.96.4.1 kind

```
DDS_LivelinessQosPolicyKind DDS_LivelinessQosPolicy::kind
```

The kind of liveliness desired.

**[default]** **DDS\_AUTOMATIC\_LIVELINESS\_QOS** (p. 410)

#### 9.96.4.2 lease\_duration

```
struct DDS_Duration_t DDS_LivelinessQosPolicy::lease_duration
```

The duration within which a **DDSDataWriter** (p. 1321) must be asserted, or else it is assumed to be not alive.

For a DataWriter, the *lease\_duration* specifies a timeout by which liveliness must be asserted for the DataWriter, or the DataWriter will be considered inactive or not alive.

For a DataReader, the *lease\_duration* specifies the maximum period at which the DataReader will check to see if the matching DataWriters are still alive according to the DataWriters *lease\_duration* value.

**Important:** The DataWriter *lease\_duration* is the value that the DataReader uses to determine if a matching DataWriter is alive or not.

**[default]** **DDS\_DURATION\_INFINITE** (p. 326)

**[range]** [0,1 year] or **DDS\_DURATION\_INFINITE** (p. 326)



### 9.96.4.3 assertions\_per\_lease\_duration

`DDS_Long DDS_LivelinessQosPolicy::assertions_per_lease_duration`

The number of assertions a `DDSDataWriter` (p. 1321) will send during a its `DDS_LivelinessQosPolicy::lease_↔duration` (p. 938).

This field only applies to a `DDSDataWriter` (p. 1321) and is not considered during QoS compatibility checks.

The default value is 3. A higher value will make the liveliness mechanism more robust against packet losses, but it will also increase the network traffic.

**[default]** 3

**[range]** [2, 100 million]

## 9.97 DDS\_Locator\_t Struct Reference

<<*extension*>> (p. 237) Type used to represent the addressing information needed to send a message to an RTPS Endpoint using one of the supported transports.

### Public Attributes

- **DDS\_Long kind**  
*The kind of locator.*
- **DDS\_UnsignedLong port**  
*the port number*
- **DDS\_Octet address [ DDS\_LOCATOR\_ADDRESS\_LENGTH\_MAX]**  
*A DDS\_LOCATOR\_ADDRESS\_LENGTH\_MAX (p. 305) octet field to hold the IP address.*

### 9.97.1 Detailed Description

<<*extension*>> (p. 237) Type used to represent the addressing information needed to send a message to an RTPS Endpoint using one of the supported transports.

### 9.97.2 Member Data Documentation

### 9.97.2.1 kind

```
DDS_Long DDS_Locator_t::kind
```

The kind of locator.

If the Locator\_t kind is **DDS\_LOCATOR\_KIND\_UDPv4** (p. 311), the address contains an IPv4 address. In this case, the leading 12 octets of the **DDS\_Locator\_t::address** (p. 940) must be zero. The last 4 octets of **DDS\_Locator\_t::address** (p. 940) are used to store the IPv4 address.

If the Locator\_t kind is **DDS\_LOCATOR\_KIND\_UDPv6** (p. 311), the address contains an IPv6 address. IPv6 addresses typically use a shorthand hexadecimal notation that maps one-to-one to the 16 octets in the **DDS\_Locator\_t::address** (p. 940) field.

### 9.97.2.2 port

```
DDS_UnsignedLong DDS_Locator_t::port
```

the port number

### 9.97.2.3 address

```
DDS_Octet DDS_Locator_t::address[ DDS_LOCATOR_ADDRESS_LENGTH_MAX]
```

A **DDS\_LOCATOR\_ADDRESS\_LENGTH\_MAX** (p. 305) octet field to hold the IP address.

## 9.98 DDS\_LocatorFilter\_t Struct Reference

Specifies the configuration of an individual channel within a MultiChannel DataWriter.

### Public Attributes

- struct **DDS\_LocatorSeq locators**  
*Sequence containing from one to 16 DDS\_Locator\_t (p. 939), used to specify the multicast address locators of an individual channel within a MultiChannel DataWriter.*
- char \* **filter\_expression**  
*A logical expression used to determine the data that will be published in the channel.*

### 9.98.1 Detailed Description

Specifies the configuration of an individual channel within a MultiChannel DataWriter.

QoS:

**DDS\_LocatorFilterQosPolicy** (p. 941)

## 9.98.2 Member Data Documentation

### 9.98.2.1 locators

```
struct DDS_LocatorSeq DDS_LocatorFilter_t::locators
```

Sequence containing from one to 16 **DDS\_Locator\_t** (p.939), used to specify the multicast address locators of an individual channel within a MultiChannel DataWriter.

**[default]** Empty sequence.

### 9.98.2.2 filter\_expression

```
char* DDS_LocatorFilter_t::filter_expression
```

A logical expression used to determine the data that will be published in the channel.

If the expression evaluates to TRUE, a sample will be published on the channel.

An empty string always evaluates the expression to TRUE.

A NULL value is not allowed.

The syntax of the expression will depend on the value of **DDS\_LocatorFilterQosPolicy::filter\_name** (p.942)

*Important:* This value must be an allocated string with **DDS\_String\_alloc** (p.553) or **DDS\_String\_dup** (p.553). It should not be assigned to a string constant.

See also

**Queries and Filters Syntax** (p.179)

**[default]** NULL (invalid value)

## 9.99 DDS\_LocatorFilterQosPolicy Struct Reference

The QoS policy used to report the configuration of a MultiChannel DataWriter as part of **DDS\_PublicationBuiltin<->TopicData** (p.1010).

### Public Attributes

- struct **DDS\_LocatorFilterSeq locator\_filters**

*A sequence of **DDS\_LocatorFilter\_t** (p.940). Each **DDS\_LocatorFilter\_t** (p.940) reports the configuration of a single channel of a MultiChannel DataWriter.*

- char \* **filter\_name**

*Name of the filter class used to describe the filter expressions of a MultiChannel DataWriter.*

### 9.99.1 Detailed Description

The QoS policy used to report the configuration of a MultiChannel DataWriter as part of **DDS\_PublicationBuiltinTopicData** (p. 1010).

Entity:

**DDS\_PublicationBuiltinTopicData** (p. 1010)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.99.2 Member Data Documentation

#### 9.99.2.1 locator\_filters

```
struct DDS_LocatorFilterSeq DDS_LocatorFilterQosPolicy::locator_filters
```

A sequence of **DDS\_LocatorFilter\_t** (p. 940). Each **DDS\_LocatorFilter\_t** (p. 940) reports the configuration of a single channel of a MultiChannel DataWriter.

A sequence length of zero indicates the **DDS\_MultiChannelQosPolicy** (p. 964) is not in use.

**[default]** Empty sequence.

#### 9.99.2.2 filter\_name

```
char* DDS_LocatorFilterQosPolicy::filter_name
```

Name of the filter class used to describe the filter expressions of a MultiChannel DataWriter.

The following builtin filters are supported: **DDS\_SQLFILTER\_NAME** (p. 59) and **DDS\_STRINGMATCHFILTER\_NAME** (p. 59).

Warning

This value must be assigned to either one of the predefined values (**DDS\_SQLFILTER\_NAME** (p. 59) or **DDS\_STRINGMATCHFILTER\_NAME** (p. 59)), or to an allocated string with **DDS\_String\_alloc** (p. 553) or **DDS\_String\_dup** (p. 553). It should not be assigned to a string constant.

**[default]** **DDS\_STRINGMATCHFILTER\_NAME** (p. 59)

## 9.100 DDS\_LocatorFilterSeq Struct Reference

Declares IDL `sequence< DDS_LocatorFilter_t (p. 940) >`.

### 9.100.1 Detailed Description

Declares IDL `sequence< DDS_LocatorFilter_t (p. 940) >`.

A sequence of **DDS\_LocatorFilter\_t** (p. 940) used to report the channels' properties. If the length of the sequence is zero, the **DDS\_MultiChannelQosPolicy** (p. 964) is not in use.

Instantiates:

`<<generic>>` (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_LocatorFilter\_t** (p. 940)

## 9.101 DDS\_LocatorSeq Struct Reference

Declares IDL `sequence < DDS_Locator_t (p. 939) >`

### 9.101.1 Detailed Description

Declares IDL `sequence < DDS_Locator_t (p. 939) >`

See also

**DDS\_Locator\_t** (p. 939)

## 9.102 DDS\_LoggingQosPolicy Struct Reference

Configures the RTI Connext logging facility.

## Public Attributes

- **NDDS\_Config\_LogVerbosity verbosity**  
*The verbosity at which RTI Connex diagnostic information is logged.*
- **NDDS\_Config\_LogCategory category**  
*Categories of logged messages.*
- **NDDS\_Config\_LogPrintFormat print\_format**  
*The format used to output RTI Connex diagnostic information.*
- char \* **output\_file**  
*Specifies the file to which log messages will be redirected to.*
- char \* **output\_file\_suffix**  
*Sets the file suffix when logging to a set of files.*
- **DDS\_Long max\_bytes\_per\_file**  
*Specifies the maximum number of bytes a single file can contain.*
- **DDS\_Long max\_files**  
*Specifies the maximum number of files to create before overwriting the previous ones.*

### 9.102.1 Detailed Description

Configures the RTI Connex logging facility.

All the properties associated with RTI Connex logging can be configured using this QoS policy. This allows you to configure logging using XML QoS Profiles. See the "Troubleshooting" chapter in the `User's Manual` for details.

Entity:

**DDSDomainParticipantFactory** (p. 1426)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p. 360) = **Changeable** (p. 360)

### 9.102.2 Member Data Documentation

#### 9.102.2.1 verbosity

**NDDS\_Config\_LogVerbosity** `DDS_LoggingQosPolicy::verbosity`

The verbosity at which RTI Connex diagnostic information is logged.

[default] **NDDS\_CONFIG\_LOG\_VERBOSITY\_ERROR** (p. 525)

### 9.102.2.2 category

`NDDS_Config_LogCategory` `DDS_LoggingQosPolicy::category`

Categories of logged messages.

**[default]** Logging will be enabled for all the categories.

### 9.102.2.3 print\_format

`NDDS_Config_LogPrintFormat` `DDS_LoggingQosPolicy::print_format`

The format used to output RTI Connex diagnostic information.

**[default]** `NDDS_CONFIG_LOG_PRINT_FORMAT_DEFAULT` (p. 527).

### 9.102.2.4 output\_file

`char*` `DDS_LoggingQosPolicy::output_file`

Specifies the file to which log messages will be redirected to.

If the value of `output_file` is set to `NULL`, log messages will sent to standard output.

If `DDS_LoggingQosPolicy::max_bytes_per_file` (p. 946) is not `DDS_LENGTH_UNLIMITED` (p. 438), this is used as the file name prefix for a set of numbered files.

*Important:* This value must be an allocated string with `DDS_String_alloc` (p. 553) or `DDS_String_dup` (p. 553). It should not be assigned to a string constant.

**[default]** `NULL`

See also

`NDDSSConfigLogger::set_output_file_set` (p. 1825)

### 9.102.2.5 output\_file\_suffix

```
char* DDS_LoggingQosPolicy::output_file_suffix
```

Sets the file suffix when logging to a set of files.

#### Note

This field only applies when `idref_LoggingQosPolicy_max_bytes_per_file` is different than **DDS\_LENGTH\_UNLIMITED** (p. 438).

It specifies the suffix to use for the set of files used to redirect the logging output. The prefix is **DDS\_LoggingQosPolicy::output\_file** (p. 945).

*Important:* This value must be an allocated string with **DDS\_String\_alloc** (p. 553) or **DDS\_String\_dup** (p. 553). It should not be assigned to a string constant.

**[default]** NULL

**[default]** No suffix

#### See also

**NDDSSConfigLogger::set\_output\_file\_set** (p. 1825)

### 9.102.2.6 max\_bytes\_per\_file

```
DDS_Long DDS_LoggingQosPolicy::max_bytes_per_file
```

Specifies the maximum number of bytes a single file can contain.

When this field is different than **DDS\_LENGTH\_UNLIMITED** (p. 438), it enables logging to separate files as they reach this size.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438) (a single file is used)

#### See also

**NDDSSConfigLogger::set\_output\_file\_set** (p. 1825)



### 9.102.2.7 max\_files

`DDS_Long DDS_LoggingQosPolicy::max_files`

Specifies the maximum number of files to create before overwriting the previous ones.

#### Note

This field only applies when `idref_LoggingQosPolicy_max_bytes_per_file` is different than `DDS_LENGTH_UNLIMITED` (p. 438).

When this field is different than `DDS_LENGTH_UNLIMITED` (p. 438), and the number of files reaches this number, future logging messages overwrite the previously created files.

[default] `DDS_LENGTH_UNLIMITED` (p. 438) (files aren't overwritten)

#### See also

`NDDConfigLogger::set_output_file_set` (p. 1825)

## 9.103 DDS\_LongDoubleSeq Struct Reference

Instantiates `FooSeq` (p. 1697) < `DDS_LongDouble` (p. 319) >

### 9.103.1 Detailed Description

Instantiates `FooSeq` (p. 1697) < `DDS_LongDouble` (p. 319) >

Instantiates:

<<*generic*>> (p. 237) `FooSeq` (p. 1697)

#### See also

`DDS_LongDouble` (p. 319)

`FooSeq` (p. 1697)

## 9.104 DDS\_LongLongSeq Struct Reference

Instantiates `FooSeq` (p. 1697) < `DDS_LongLong` (p. 319) >

### 9.104.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_LongLong** (p. 319) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_LongLong** (p. 319)

**FooSeq** (p. 1697)

## 9.105 DDS\_LongSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_Long** (p. 318) >

### 9.105.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_Long** (p. 318) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_Long** (p. 318)

**FooSeq** (p. 1697)

## 9.106 DDS\_MonitoringDedicatedParticipantSettings Struct Reference

Configures the use of a dedicated **DDSDomainParticipant** (p. 1351) to distribute the RTI Connex application telemetry data.

### Public Attributes

- **DDS\_Boolean enable**  
*Enables the use of a dedicated **DDSDomainParticipant** (p. 1351) to distribute the RTI Connex application telemetry data.*
- int **domain\_id**  
*The domain ID used in the creation of RTI Monitoring Library 2.0 **DDSDomainParticipant** (p. 1351).*
- char \* **participant\_qos\_profile\_name**  
*The fully qualified name of the profile used to configure the **DDSDomainParticipant** (p. 1351) that will be used to distribute telemetry data.*
- struct **DDS\_StringSeq collector\_initial\_peers**  
*Determines the initial list of peers that the discovery process will contact to send announcements about the presence of the **DDS\_MonitoringDistributionSettings::dedicated\_participant** (p. 951).*

## 9.106.1 Detailed Description

Configures the use of a dedicated **DDSDomainParticipant** (p. 1351) to distribute the RTI Connex application telemetry data.

## 9.106.2 Member Data Documentation

### 9.106.2.1 enable

```
DDS_Boolean DDS_MonitoringDedicatedParticipantSettings::enable
```

Enables the use of a dedicated **DDSDomainParticipant** (p. 1351) to distribute the RTI Connex application telemetry data.

Setting this value to **DDS\_BOOLEAN\_FALSE** (p. 317) is not currently supported.

**[default]** **DDS\_BOOLEAN\_TRUE** (p. 317)

### 9.106.2.2 domain\_id

```
int DDS_MonitoringDedicatedParticipantSettings::domain_id
```

The domain ID used in the creation of RTI Monitoring Library 2.0 **DDSDomainParticipant** (p. 1351).

**[default]** 2

### 9.106.2.3 participant\_qos\_profile\_name

```
char* DDS_MonitoringDedicatedParticipantSettings::participant_qos_profile_name
```

The fully qualified name of the profile used to configure the **DDSDomainParticipant** (p. 1351) that will be used to distribute telemetry data.

If NULL (the default value) then RTI Monitoring Library 2.0 uses **DDS\_PROFILE\_GENERIC\_MONITORING2** (p. 497).

**[default]** NULL

### 9.106.2.4 collector\_initial\_peers

```
struct DDS_StringSeq DDS_MonitoringDedicatedParticipantSettings::collector_initial_peers
```

Determines the initial list of peers that the discovery process will contact to send announcements about the presence of the **DDS\_MonitoringDistributionSettings::dedicated\_participant** (p. 951).

These initial peers should correspond with the RTI Observability Collector Service with which RTI Monitoring Library 2.0 has to communicate. The `collector_initial_peers` works the same as `initial_peers` for other `DomainParticipants`, except that it allows you to easily specify the initial peer(s) for the RTI Monitoring Library 2.0 **DDSDomainParticipant** (p. 1351), which usually has different initial peer(s) than those used by your application.

If no `collector_initial_peers` are specified, or if it is explicitly set to an empty list, the **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732) list of **DDS\_MonitoringDedicatedParticipantSettings::participant\_qos\_profile\_name** (p. 949) will be used as the initial peers of **DDS\_MonitoringDistributionSettings::dedicated\_participant** (p. 951).

**[default]** An empty sequence.

See also

**DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732) for further information about initial peers.

## 9.107 DDS\_MonitoringDistributionSettings Struct Reference

Configures the distribution of telemetry data.

### Public Attributes

- struct **DDS\_MonitoringDedicatedParticipantSettings** **dedicated\_participant**  
*Configures the use of a dedicated **DDSDomainParticipant** (p. 1351) to distribute the RTI Connex application telemetry data.*
- char \* **publisher\_qos\_profile\_name**  
*The fully qualified name of the profile used to configure the Publishers that distribute telemetry data.*
- struct **DDS\_MonitoringEventDistributionSettings** **event\_settings**  
*Configures the distribution of event metrics.*
- struct **DDS\_MonitoringPeriodicDistributionSettings** **periodic\_settings**  
*Configures the distribution of periodic metrics.*
- struct **DDS\_MonitoringLoggingDistributionSettings** **logging\_settings**  
*Configures the distribution of logging messages.*

### 9.107.1 Detailed Description

Configures the distribution of telemetry data.

## 9.107.2 Member Data Documentation

### 9.107.2.1 dedicated\_participant

```
struct DDS_MonitoringDedicatedParticipantSettings DDS_MonitoringDistributionSettings::dedicated↔  
_participant
```

Configures the use of a dedicated **DDSDomainParticipant** (p. 1351) to distribute the RTI Connex application telemetry data.

### 9.107.2.2 publisher\_qos\_profile\_name

```
char* DDS_MonitoringDistributionSettings::publisher_qos_profile_name
```

The fully qualified name of the profile used to configure the Publishers that distribute telemetry data.

There is one Publisher for each telemetry data **DDSTopic** (p.1617): **RTI\_MONITORING\_PERIODIC\_TOPIC\_↔  
NAME** (p.521), **RTI\_MONITORING\_EVENT\_TOPIC\_NAME** (p.521), and **RTI\_MONITORING\_LOGGING\_TOPIC\_↔  
NAME** (p.522).

If NULL (the default value) then RTI Monitoring Library 2.0 uses **DDS\_PROFILE\_GENERIC\_MONITORING2** (p.497).

**[default]** NULL

### 9.107.2.3 event\_settings

```
struct DDS_MonitoringEventDistributionSettings DDS_MonitoringDistributionSettings::event_settings
```

Configures the distribution of event metrics.

### 9.107.2.4 periodic\_settings

```
struct DDS_MonitoringPeriodicDistributionSettings DDS_MonitoringDistributionSettings::periodic_↔  
settings
```

Configures the distribution of periodic metrics.

### 9.107.2.5 logging\_settings

```
struct DDS_MonitoringLoggingDistributionSettings DDS_MonitoringDistributionSettings::logging_↔
settings
```

Configures the distribution of logging messages.

## 9.108 DDS\_MonitoringEventDistributionSettings Struct Reference

Configures the distribution of event metrics.

### Public Attributes

- **DDS\_UnsignedLong concurrency\_level**  
*Defines how concurrent the push of event metrics to RTI Monitoring Library 2.0 is.*
- char \* **datawriter\_qos\_profile\_name**  
*The fully qualified name of the profile used to configure the **DDSDataWriter** (p. 1321) that distributes event metrics.*
- struct **DDS\_ThreadSettings\_t thread**  
*The settings of the event metric thread.*
- struct **DDS\_Duration\_t publication\_period**  
*Period at which the event metric thread publishes the event metrics that have changed since the last time they were published.*

### 9.108.1 Detailed Description

Configures the distribution of event metrics.

Event metrics are provided to RTI Monitoring Library 2.0 when they change.

For example, if the liveliness of a **DDSDataWriter** (p. 1321) is lost, a matching **DDSDataReader** (p. 1288) will push the new value of **DDS\_LivelinessChangedStatus** (p. 932) to RTI Monitoring Library 2.0 so that the liveliness status change can be distributed.

There are three kinds of event metrics:

- **Configuration metrics:** Provided to RTI Monitoring Library 2.0 by pushing changes to QoS policies.
- **Status metrics:** Provided to RTI Monitoring Library 2.0 by pushing changes to the event statuses such as **DDS\_↔\_LivelinessChangedStatus** (p. 932).
- **Resource metrics:** Provided to RTI Monitoring Library 2.0 when a resource (such as **DDSDataWriter** (p. 1321)) is created or deleted.

The event metrics that will be distributed for an observable resource can be configured with **DDS\_Monitoring\_↔TelemetryData::metrics** (p. 964).

## 9.108.2 Member Data Documentation

### 9.108.2.1 concurrency\_level

```
DDS_UnsignedLong DDS_MonitoringEventDistributionSettings::concurrency_level
```

Defines how concurrent the push of event metrics to RTI Monitoring Library 2.0 is.

With a `concurrency_level` of one, all the event metrics pushed to RTI Monitoring Library 2.0 will be stored in a single queue protected by a single mutex.

With a `concurrency_level` of 'n', RTI Monitoring Library 2.0 will create 'n' queues for event metrics, each queue protected by its own mutex. Each resource (e.g, a **DDSDataReader** (p. 1288)) will be associated with one of the queues when the resource is registered with RTI Monitoring Library 2.0. Therefore, all the event metrics for a single resource always go to the same queue.

The event metrics for two resources associated with different event queues can be pushed in parallel. This is why a higher `concurrency_level` provides more concurrency.

The event metrics added to the event queues are processed by a single thread configured using **DDS\_MonitoringEventDistributionSettings::thread** (p. 953).

**[default]** 5

**[range]** [1, 100]

### 9.108.2.2 datawriter\_qos\_profile\_name

```
char* DDS_MonitoringEventDistributionSettings::datawriter_qos_profile_name
```

The fully qualified name of the profile used to configure the **DDSDataWriter** (p. 1321) that distributes event metrics.

The **DDSDataWriter** (p. 1321) Topic is **RTI\_MONITORING\_EVENT\_TOPIC\_NAME** (p. 521).

If NULL (the default value), then RTI Monitoring Library 2.0 uses **DDS\_PROFILE\_GENERIC\_MONITORING2** (p. 497).

**[default]** NULL

### 9.108.2.3 thread

```
struct DDS_ThreadSettings_t DDS_MonitoringEventDistributionSettings::thread
```

The settings of the event metric thread.

The event metric thread periodically publishes the event metrics pushed into RTI Monitoring Library 2.0 event metric queues after they change their values.

The thread runs at the period configured using **DDS\_MonitoringEventDistributionSettings::publication\_period** (p. 953).

**[default]** DDS\_THREAD\_SETTINGS\_DEFAULT

### 9.108.2.4 publication\_period

```
struct DDS_Duration_t DDS_MonitoringEventDistributionSettings::publication_period
```

Period at which the event metric thread publishes the event metrics that have changed since the last time they were published.

With a period of 0 seconds, changes to event metrics will be published immediately after they are pushed into RTI Monitoring Library 2.0.

**[default]** 1 second

## 9.109 DDS\_MonitoringLoggingDistributionSettings Struct Reference

Configures the distribution of log messages.

### Public Attributes

- **DDS\_UnsignedLong concurrency\_level**  
*Defines how concurrent the push of log messages to RTI Monitoring Library 2.0 is.*
- **DDS\_UnsignedLong max\_historical\_logs**  
*The number of log messages that RTI Monitoring Library 2.0 will keep as history.*
- char \* **datawriter\_qos\_profile\_name**  
*The fully qualified name of the profile used to configure the **DDSDataWriter** (p. 1321) that distributes log messages.*
- struct **DDS\_ThreadSettings\_t thread**  
*The settings of the logging thread.*
- struct **DDS\_Duration\_t publication\_period**  
*Period at which the logging thread publishes log messages.*

### 9.109.1 Detailed Description

Configures the distribution of log messages.

Log messages are pushed into RTI Monitoring Library 2.0 and published by the logging thread.

The logging thread only publishes a log message with a Syslog level smaller than or equal to the forwarding level of the **NDDS\_Config\_LogFacility** (p. 528) associated with the log message.

The default value of the forwarding level for all facilities is **NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_WARNING** (p. 529). This value can be changed with the **DDS\_MonitoringTelemetryData::logs** (p. 964) QoS Policy or by sending a command to RTI Monitoring Library 2.0.

In this release, commands can only be sent from the RTI Observability Dashboards.

RTI Monitoring Library 2.0 can be configured to keep a history of log messages for later distribution when a log snapshot is requested by a RTI Observability Collector Service.

The log messages maintained in the history are the last 'n' messages published by the logging thread (where 'n' is the value of **DDS\_MonitoringLoggingDistributionSettings::max\_historical\_logs** (p. 955)).



## 9.109.2 Member Data Documentation

### 9.109.2.1 concurrency\_level

`DDS_UnsignedLong DDS_MonitoringLoggingDistributionSettings::concurrency_level`

Defines how concurrent the push of log messages to RTI Monitoring Library 2.0 is.

With a `concurrency_level` of one, all the log messages pushed to RTI Monitoring Library 2.0 will be stored into a single queue protected by a single mutex.

With a `concurrency_level` of 'n', RTI Monitoring Library 2.0 will create 'n' queues for log messages, each queue protected by its own mutex.

The log messages generated by a single thread will always be pushed to the same queue. The log messages for two threads associated with different log queues can be pushed in parallel. This is why a higher `concurrency_level` provides more concurrency.

The log messages added to the log queues are processed and published by a single thread configured using `DDS_MonitoringLoggingDistributionSettings::thread` (p. 955).

**[default]** 5

**[range]** [1, 100]

### 9.109.2.2 max\_historical\_logs

`DDS_UnsignedLong DDS_MonitoringLoggingDistributionSettings::max_historical_logs`

The number of log messages that RTI Monitoring Library 2.0 will keep as history.

RTI Monitoring Library 2.0 will keep as history the last `max_historical_logs` published messages.

A value of 0 means that RTI Monitoring Library 2.0 should not keep any history.

**[default]** 128

### 9.109.2.3 datawriter\_qos\_profile\_name

`char* DDS_MonitoringLoggingDistributionSettings::datawriter_qos_profile_name`

The fully qualified name of the profile used to configure the `DDSDataWriter` (p. 1321) that distributes log messages.

The `DDSDataWriter` (p. 1321) Topic is `RTI_MONITORING_LOGGING_TOPIC_NAME` (p. 522).

If NULL (the default value), then RTI Monitoring Library 2.0 uses `DDS_PROFILE_GENERIC_MONITORING2` (p. 497).

**[default]** NULL

### 9.109.2.4 thread

```
struct DDS_ThreadSettings_t DDS_MonitoringLoggingDistributionSettings::thread
```

The settings of the logging thread.

The logging thread periodically publishes the log messages pushed into RTI Monitoring Library 2.0 log message queues after they are generated.

The thread runs at the period configured using **DDS\_MonitoringLoggingDistributionSettings::publication\_period** (p. 956).

**[default]** DDS\_THREAD\_SETTINGS\_DEFAULT

### 9.109.2.5 publication\_period

```
struct DDS_Duration_t DDS_MonitoringLoggingDistributionSettings::publication_period
```

Period at which the logging thread publishes log messages.

With a period of 0 seconds, log messages will be published immediately after they are pushed into RTI Monitoring Library 2.0.

**[default]** 1 second

## 9.110 DDS\_MonitoringLoggingForwardingSettings Struct Reference

Configures the forwarding levels of log messages for the different **NDDS\_Config\_LogFacility** (p. 528).

### Public Attributes

- **NDDS\_Config\_SyslogVerbosity middleware\_forwarding\_level**  
*Log messages with **NDDS\_CONFIG\_LOG\_FACILITY\_MIDDLEWARE** (p. 528) and a log level more verbose than this value will not be distributed by RTI Monitoring Library 2.0.*
- **NDDS\_Config\_SyslogVerbosity security\_event\_forwarding\_level**  
*Log messages with **NDDS\_CONFIG\_LOG\_FACILITY\_SECURITY\_EVENT** (p. 528) and a log level more verbose than this value will not be distributed by RTI Monitoring Library 2.0.*
- **NDDS\_Config\_SyslogVerbosity service\_forwarding\_level**  
*Log messages with **NDDS\_CONFIG\_LOG\_FACILITY\_SERVICE** (p. 528) and a log level more verbose than this value will not be distributed by RTI Monitoring Library 2.0.*
- **NDDS\_Config\_SyslogVerbosity user\_forwarding\_level**  
*Log messages with **NDDS\_CONFIG\_LOG\_FACILITY\_USER** (p. 528) and a log level more verbose than this value will not be distributed by RTI Monitoring Library 2.0.*

## 9.110.1 Detailed Description

Configures the forwarding levels of log messages for the different **NDDS\_Config\_LogFacility** (p. 528).

## 9.110.2 Member Data Documentation

### 9.110.2.1 middleware\_forwarding\_level

**NDDS\_Config\_SyslogVerbosity** DDS\_MonitoringLoggingForwardingSettings::middleware\_forwarding\_level

Log messages with **NDDS\_CONFIG\_LOG\_FACILITY\_MIDDLEWARE** (p. 528) and a log level more verbose than this value will not be distributed by RTI Monitoring Library 2.0.

[default] **NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_WARNING** (p. 529)

Keep in mind that setting this property beyond WARNING if your application's verbosity is greater than **NDDS\_CONFIG\_LOG\_VERBOSITY\_WARNING** (p. 525), may affect performance due to the large amount of messages produced.

### 9.110.2.2 security\_event\_forwarding\_level

**NDDS\_Config\_SyslogVerbosity** DDS\_MonitoringLoggingForwardingSettings::security\_event\_forwarding\_level

Log messages with **NDDS\_CONFIG\_LOG\_FACILITY\_SECURITY\_EVENT** (p. 528) and a log level more verbose than this value will not be distributed by RTI Monitoring Library 2.0.

[default] **NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_WARNING** (p. 529)

Keep in mind that setting this property beyond WARNING if your application's verbosity is greater than **NDDS\_CONFIG\_LOG\_VERBOSITY\_WARNING** (p. 525), may affect performance due to the large amount of messages produced.

### 9.110.2.3 service\_forwarding\_level

**NDDS\_Config\_SyslogVerbosity** DDS\_MonitoringLoggingForwardingSettings::service\_forwarding\_level

Log messages with **NDDS\_CONFIG\_LOG\_FACILITY\_SERVICE** (p. 528) and a log level more verbose than this value will not be distributed by RTI Monitoring Library 2.0.

[default] **NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_WARNING** (p. 529)

Keep in mind that setting this property beyond WARNING if your application's verbosity is greater than **NDDS\_CONFIG\_LOG\_VERBOSITY\_WARNING** (p. 525), may affect performance due to the large amount of messages produced.

### 9.110.2.4 user\_forwarding\_level

`NDDS_Config_SyslogVerbosity` `DDS_MonitoringLoggingForwardingSettings::user_forwarding_level`

Log messages with `NDDS_CONFIG_LOG_FACILITY_USER` (p. 528) and a log level more verbose than this value will not be distributed by RTI Monitoring Library 2.0.

[default] `NDDS_CONFIG_SYSLOG_VERBOSITY_WARNING` (p. 529)

Keep in mind that setting this property beyond `WARNING` if your application's verbosity is greater than `NDDS_CONFIG_LOG_VERBOSITY_WARNING` (p. 525), may affect performance due to the large amount of messages produced.

## 9.111 DDS\_MonitoringMetricSelection Struct Reference

This data structure is used to configure event and periodic metrics collection and distribution for a specific set of observable resources.

### Public Attributes

- char \* **resource\_selection**

*An expression pattern that selects a subset of resources by matching the pattern to the resource names. `DDS_MonitoringMetricSelection::enabled_metrics_selection` (p. 959) and `DDS_MonitoringMetricSelection::disabled_metrics_selection` (p. 959) are applied to this subset of resources.*

- struct `DDS_StringSeq` **enabled\_metrics\_selection**

*A sequence of POSIX fnmatch patterns that match the names of the metrics that should be collected and distributed for the observable resources selected by `DDS_MonitoringMetricSelection::resource_selection` (p. 958).*

- struct `DDS_StringSeq` **disabled\_metrics\_selection**

*A sequence of POSIX fnmatch patterns that mach the names of the metrics that should not be collected and distributed for the observable resources selected by `DDS_MonitoringMetricSelection::resource_selection` (p. 958).*

### 9.111.1 Detailed Description

This data structure is used to configure event and periodic metrics collection and distribution for a specific set of observable resources.

### 9.111.2 Member Data Documentation

### 9.111.2.1 resource\_selection

```
char* DDS_MonitoringMetricSelection::resource_selection
```

An expression pattern that selects a subset of resources by matching the pattern to the resource names. **DDS\_MonitoringMetricSelection::enabled\_metrics\_selection** (p. 959) and **DDS\_MonitoringMetricSelection::disabled\_metrics\_selection** (p. 959) are applied to this subset of resources.

Examples of resource expression patterns:

- /applications/myApp/domain\_participants/myParticipant
- /applications/\*/domain\_participants\*/subscribers/\*
- /applications/myApp/domain\_participants/GUID(1234.5678.4321.8765)
- //myEntity

The first expression refers to a DomainParticipant named "myParticipant" that belongs to an application named "myApp". The second expression applies to all the Subscribers in the system (resource name wildcards follow the POSIX fnmatch syntax). The third expression refers to a DomainParticipant with a specific resource GUID in the "myApp" application. The last expression uses the XPath "/" operator. It matches observable resources named "myEntity" no matter where they are located in the resource hierarchy.

See the Telemetry Data / Resources chapter of the RTI Connex Observability Framework documentation for further information on the observable resource names and expression patterns.

### 9.111.2.2 enabled\_metrics\_selection

```
struct DDS_StringSeq DDS_MonitoringMetricSelection::enabled_metrics_selection
```

A sequence of POSIX fnmatch patterns that match the names of the metrics that should be collected and distributed for the observable resources selected by **DDS\_MonitoringMetricSelection::resource\_selection** (p. 958).

This sequence is evaluated first, followed by **DDS\_MonitoringMetricSelection::disabled\_metrics\_selection** (p. 959). Therefore, if the same metric is enabled and disabled at the same time, the disablement will be the final result.

The patterns in the sequence are evaluated in order.

Examples of valid patterns:

- dds\_data\_writer\_qos\_durability\_writer\_depth
- dds\_data\_reader\_qos\_reliability\_\*
- dds\_application\_\*

The first pattern refers to a specific DataWriter metric (**DDS\_DurabilityQosPolicy::writer\_depth** (p. 770)). The second pattern refers to all the DataReader **DDS\_ReliabilityQosPolicy** (p. 1041) metrics. The last pattern selects all the available application metrics.

See the Telemetry Data / Metrics chapter of the RTI Connex Observability Framework documentation for further information on the metric names and metric patterns.

### 9.111.2.3 disabled\_metrics\_selection

```
struct DDS_StringSeq DDS_MonitoringMetricSelection::disabled_metrics_selection
```

A sequence of POSIX fnmatch patterns that match the names of the metrics that should not be collected and distributed for the observable resources selected by **DDS\_MonitoringMetricSelection::resource\_selection** (p. 958).

This sequence is evaluated after **DDS\_MonitoringMetricSelection::enabled\_metrics\_selection** (p. 959). Therefore, if the same metric is enabled and disabled at the same time, the disablement will be the final result.

The patterns in the sequence are evaluated in order.

Examples of valid patterns:

- dds\_data\_writer\_qos\_durability\_writer\_depth
- dds\_data\_reader\_qos\_reliability\_\*
- dds\_application\_\*

The first pattern refers to a specific DataWriter metric (**DDS\_DurabilityQosPolicy::writer\_depth** (p. 770)). The second pattern refers to all the DataReader **DDS\_ReliabilityQosPolicy** (p. 1041) metrics. The last pattern selects all the available application metrics.

See the Telemetry Data / Metrics chapter of the RTI Connex Observability Framework documentation for further information on the metric names and metric patterns.

## 9.112 DDS\_MonitoringMetricSelectionSeq Struct Reference

Declares IDL sequence < **DDS\_MonitoringMetricSelection** (p. 958) >

### 9.112.1 Detailed Description

Declares IDL sequence < **DDS\_MonitoringMetricSelection** (p. 958) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_MonitoringMetricSelection** (p. 958)

## 9.113 DDS\_MonitoringPeriodicDistributionSettings Struct Reference

Configures the distribution of periodic metrics.

## Public Attributes

- char \* **datawriter\_qos\_profile\_name**  
The fully qualified name of the profile used to configure the **DDSDataWriter** (p. 1321) that distributes periodic metrics.
- struct **DDS\_ThreadSettings\_t** **thread**  
The settings of the periodic metric thread.
- struct **DDS\_Duration\_t** **polling\_period**  
Period at which the periodic metric thread polls and publishes the periodic metrics.

### 9.113.1 Detailed Description

Configures the distribution of periodic metrics.

Periodic metrics change often, and they are polled and published periodically by a thread created by RTI Monitoring Library 2.0.

RTI Monitoring Library 2.0 obtains periodic metrics by polling the current value of periodic statuses such as **DDS\_↔DataWriterProtocolStatus** (p. 678).

The periodic metrics that will be distributed for an observable resource can be configured with **DDS\_Monitoring\_↔TelemetryData::metrics** (p. 964).

### 9.113.2 Member Data Documentation

#### 9.113.2.1 datawriter\_qos\_profile\_name

```
char* DDS_MonitoringPeriodicDistributionSettings::datawriter_qos_profile_name
```

The fully qualified name of the profile used to configure the **DDSDataWriter** (p. 1321) that distributes periodic metrics.

The **DDSDataWriter** (p. 1321) Topic is **RTI\_MONITORING\_PERIODIC\_TOPIC\_NAME** (p. 521).

If NULL (the default value), then RTI Monitoring Library 2.0 uses **DDS\_PROFILE\_GENERIC\_MONITORING2** (p. 497).

**[default]** NULL

#### 9.113.2.2 thread

```
struct DDS_ThreadSettings_t DDS_MonitoringPeriodicDistributionSettings::thread
```

The settings of the periodic metric thread.

The periodic metric thread periodically polls and publishes periodic event metrics.

The thread runs at the period configured using **DDS\_MonitoringPeriodicDistributionSettings::polling\_period** (p. 961).

**[default]** DDS\_THREAD\_SETTINGS\_DEFAULT

### 9.113.2.3 polling\_period

```
struct DDS_Duration_t DDS_MonitoringPeriodicDistributionSettings::polling_period
```

Period at which the periodic metric thread polls and publishes the periodic metrics.

**[default]** 5 seconds

**[range]** > 0 seconds

## 9.114 DDS\_MonitoringQosPolicy Struct Reference

Configures the use of RTI Monitoring Library 2.0 to collect and distribute RTI Connexx telemetry data.

### Public Attributes

- **DDS\_Boolean enable**  
*Enables the collection and distribution of telemetry data for an RTI Connexx application using RTI Monitoring Library 2.0.*
- char \* **application\_name**  
*The name of the resource that represents this RTI Connexx application.*
- struct **DDS\_MonitoringDistributionSettings distribution\_settings**  
*Configures the distribution of telemetry data.*
- struct **DDS\_MonitoringTelemetryData telemetry\_data**  
*Configures the telemetry data that will be distributed.*

### 9.114.1 Detailed Description

Configures the use of RTI Monitoring Library 2.0 to collect and distribute RTI Connexx telemetry data.

### 9.114.2 Member Data Documentation

#### 9.114.2.1 enable

```
DDS_Boolean DDS_MonitoringQosPolicy::enable
```

Enables the collection and distribution of telemetry data for an RTI Connexx application using RTI Monitoring Library 2.0.

**Note:** Enabling and disabling RTI Monitoring Library 2.0 while DDS Entities are being created or deleted is not a safe operation. The entities created while RTI Monitoring Library 2.0 is being enabled may not be monitored. In that case, children entities from that entity (invisible to the library) will not be monitored either.

**[default]** `DDS_BOOLEAN_FALSE` (p. 317)



### 9.114.2.2 application\_name

```
char* DDS_MonitoringQosPolicy::application_name
```

The name of the resource that represents this RTI Connex application.

When this member is set to a value other than NULL , the resource identifier representing this application will be:

```
/applications/<application_name>
```

This is the resource identifier that will be used to send commands to this application from the RTI Observability Dashboards.

The application\_name should be unique across the RTI Connex system; however, RTI Monitoring Library 2.0 does not currently enforce uniqueness.

When this member is set to NULL , RTI Monitoring Library 2.0 will automatically assign a resource identifier with this format:

```
/applications/<host_name:process_id:uuid>
```

**[default]** NULL

### 9.114.2.3 distribution\_settings

```
struct DDS_MonitoringDistributionSettings DDS_MonitoringQosPolicy::distribution_settings
```

Configures the distribution of telemetry data.

### 9.114.2.4 telemetry\_data

```
struct DDS_MonitoringTelemetryData DDS_MonitoringQosPolicy::telemetry_data
```

Configures the telemetry data that will be distributed.

## 9.115 DDS\_MonitoringTelemetryData Struct Reference

Configures the telemetry data that will be distributed.

### Public Attributes

- struct **DDS\_MonitoringMetricSelectionSeq** **metrics**  
*Sequence of **DDS\_MonitoringMetricSelection** (p. 958) containing the event and periodic metrics that will be collected and distributed for a given set of observable resources.*
- struct **DDS\_MonitoringLoggingForwardingSettings** **logs**  
*DDS\_MonitoringLoggingForwardingSettings (p. 956) containing the **NDDS\_Config\_SyslogVerbosity** (p. 528) levels that will be forwarded for the different **NDDS\_Config\_LogFacility** (p. 528).*

### 9.115.1 Detailed Description

Configures the telemetry data that will be distributed.

### 9.115.2 Member Data Documentation

#### 9.115.2.1 metrics

```
struct DDS_MonitoringMetricSelectionSeq DDS_MonitoringTelemetryData::metrics
```

Sequence of **DDS\_MonitoringMetricSelection** (p. 958) containing the event and periodic metrics that will be collected and distributed for a given set of observable resources.

The different **DDS\_MonitoringMetricSelection** (p. 958) in the sequence are evaluated in order.

**[default]** An empty sequence, meaning that no metrics will be collected and distributed for any observable resource.

See also

**DDS\_MonitoringEventDistributionSettings** (p. 952) and **DDS\_MonitoringPeriodicDistributionSettings** (p. 960) for further information on how RTI Monitoring Library 2.0 distributes **metrics** (p. 964).

#### 9.115.2.2 logs

```
struct DDS_MonitoringLoggingForwardingSettings DDS_MonitoringTelemetryData::logs
```

**DDS\_MonitoringLoggingForwardingSettings** (p. 956) containing the **NDDS\_Config\_SyslogVerbosity** (p. 528) levels that will be forwarded for the different **NDDS\_Config\_LogFacility** (p. 528).

See also

**DDS\_MonitoringLoggingDistributionSettings** (p. 954) for further information on how RTI Monitoring Library 2.0 distributes log messages.

## 9.116 DDS\_MultiChannelQosPolicy Struct Reference

Configures the ability of a DataWriter to send data on different multicast groups (addresses) based on the value of the data.

## Public Attributes

- struct **DDS\_ChannelSettingsSeq channels**  
*A sequence of **DDS\_ChannelSettings\_t** (p. 610) used to configure the channels' properties. If the length of the sequence is zero, the QoS policy will be ignored.*
- char \* **filter\_name**  
*Name of the filter class used to describe the filter expressions of a MultiChannel DataWriter.*

### 9.116.1 Detailed Description

Configures the ability of a DataWriter to send data on different multicast groups (addresses) based on the value of the data.

This QoS policy is used to partition the data published by a **DDSDataWriter** (p. 1321) across multiple channels. A *channel* is defined by a filter expression and a sequence of multicast locators.

Entity:

**DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.116.2 Usage

By using this QoS, a **DDSDataWriter** (p. 1321) can be configured to send data to different multicast groups based on the content of the data. Using syntax similar to those used in Content-Based Filters, you can associate different multicast addresses with filter expressions that operate on the values of the fields within the data. When your application's code calls **FooDataWriter::write** (p. 1683), data is sent to any multicast address for which the data passes the filter.

Multi-channel DataWriters can be used to trade off network bandwidth with the unnecessary processing of unwanted data for situations where there are multiple DataReaders that are interested in different subsets of data that come from the same data stream (Topic). For example, in Financial applications, the data stream may be quotes for different stocks at an exchange. Applications usually only want to receive data (quotes) for only a subset of the stocks being traded. In tracking applications, a data stream may carry information on hundreds or thousands of objects being tracked, but again, applications may only be interested in a subset.

The problem is that the most efficient way to deliver data to multiple applications is to use multicast, so that a data value is only sent once on the network for any number of subscribers to the data. However, using multicast, an application will receive *all* of the data sent and not just the data in which it is interested, thus extra CPU time is wasted to throw away unwanted data. With this QoS, you can analyze the data-usage patterns of your applications and optimize network vs. CPU usage by partitioning the data into multiple multicast streams. While network bandwidth is still being conserved by sending data only once using multicast, most applications will only need to listen to a subset of the multicast addresses and receive a reduced amount of unwanted data.

Your system can gain more of the benefits of using multiple multicast groups if your network uses Layer 2 Ethernet switches. Layer 2 switches can be configured to only route multicast packets to those ports that have added membership to specific multicast groups. Using those switches will ensure that only the multicast packets used by applications on a node are routed to the node; all others are filtered-out by the switch.

### 9.116.3 Member Data Documentation

#### 9.116.3.1 channels

```
struct DDS_ChannelSettingsSeq DDS_MultiChannelQosPolicy::channels
```

A sequence of **DDS\_ChannelSettings\_t** (p.610) used to configure the channels' properties. If the length of the sequence is zero, the QoS policy will be ignored.

A sequence length of zero indicates the **DDS\_MultiChannelQosPolicy** (p.964) is not in use.

The sequence length cannot be greater than **DDS\_DomainParticipantResourceLimitsQosPolicy::channel\_seq\_↔ max\_length** (p.762).

**[default]** Empty sequence.

#### 9.116.3.2 filter\_name

```
char* DDS_MultiChannelQosPolicy::filter_name
```

Name of the filter class used to describe the filter expressions of a MultiChannel DataWriter.

The following builtin filters are supported:

- **DDS\_SQLFILTER\_NAME** (p.59)
- **DDS\_STRINGMATCHFILTER\_NAME** (p.59)

#### Warning

The value for this field can be one of the constants above or a string allocated with **DDS\_String\_dup()** (p.553) to specify your own filter. You should not assign a string literal. When you assign a new value with **DDS\_String\_↔ dup()** (p.553), first check if the current value is one of the constants above. If it is, simply replace it; if it's not, you have to release the current string and assign the new one. Here is an example of such an approach:

```
struct DDS_DataWriterQos writer_qos;
char *filter_name = NULL;
DDS_DataWriterQos_initialize(&writer_qos);
...
DDS_Publisher_get_default_datawriter_qos(publisher, &writer_qos);
...
filter_name = writer_qos.multi_channel.filter_name;
if (filter_name == DDS_SQLFILTER_NAME
    || filter_name == DDS_STRINGMATCH_FILTER_NAME) {
    // Since the value was never on the heap, this won't leak memory
```

```

    filter_name = NULL;
} else {
    // This means the value is present on the heap
    DDS_String_free(filter_name);
}
// New value using DDS_String_dup() or one of the predefined constants
filter_name = DDS_String_dup("My custom filter name");
...
DDS_DataWriterQos_finalize(&writer_qos);

```

The strings allocated with **DDS\_String\_dup()** (p. 553) are released when `writer_qos` is finalized.

More information about string handling can be found under **String Conventions** (p. 552).

**[default] DDS\_STRINGMATCHFILTER\_NAME** (p. 59)

## 9.117 DDS\_Octets Struct Reference

Built-in type consisting of a variable-length array of opaque bytes.

### Public Member Functions

- **DDS\_Octets ()**  
*Constructor.*
- **DDS\_Octets (int size)**  
*Constructor that specifies the size of the allocated octets array.*
- **~DDS\_Octets ()**  
*Destructor.*

### Public Attributes

- int **length**  
*Number of octets to serialize.*
- unsigned char \* **value**  
*DDS\_Octets (p. 967) array value.*

#### 9.117.1 Detailed Description

Built-in type consisting of a variable-length array of opaque bytes.

## 9.117.2 Constructor & Destructor Documentation

### 9.117.2.1 DDS\_Octets() [1/2]

```
DDS_Octets::DDS_Octets ( ) [inline]
```

Constructor.

The default constructor initializes the newly created object with NULL value, and zero length.

### 9.117.2.2 DDS\_Octets() [2/2]

```
DDS_Octets::DDS_Octets (
    int size ) [inline]
```

Constructor that specifies the size of the allocated octets array.

After this method is called, length is set to zero.

If a memory allocation failure occurs, and the **DDS\_Octets** (p. 967) structure is allocated but the array inside of it cannot be, the array will be NULL.

#### Parameters

<i>size</i>	<< <i>in</i> >> (p. 238) Size of the allocated octets array
-------------	---

References **DDS\_OctetBuffer\_alloc()**, and **value**.

### 9.117.2.3 ~DDS\_Octets()

```
DDS_Octets::~~DDS_Octets ( ) [inline]
```

Destructor.

References **DDS\_OctetBuffer\_free()**, and **value**.

## 9.117.3 Member Data Documentation

### 9.117.3.1 length

```
int DDS_Octets::length
```

Number of octets to serialize.

### 9.117.3.2 value

```
unsigned char* DDS_Octets::value
```

**DDS\_Octets** (p. 967) array value.

Referenced by **DDS\_Octets()**, and **~DDS\_Octets()**.

## 9.118 DDS\_OctetSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_Octet** (p. 317) >

### 9.118.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_Octet** (p. 317) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_Octet** (p. 317)

**FooSeq** (p. 1697)

## 9.119 DDS\_OctetsSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_Octets** (p. 967) > .

### 9.119.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_Octets** (p. 967) > .

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_Octets** (p. 967)

## 9.120 DDS\_OfferedDeadlineMissedStatus Struct Reference

**DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343)

### Public Attributes

- **DDS\_Long total\_count**  
*Total cumulative count of the number of times the **DDSDataWriter** (p. 1321) failed to write within its offered deadline.*
- **DDS\_Long total\_count\_change**  
*The incremental changes in total\_count since the last time the listener was called or the status was read.*
- **DDS\_InstanceHandle\_t last\_instance\_handle**  
*Handle to the last instance in the **DDSDataWriter** (p. 1321) for which an offered deadline was missed.*

### 9.120.1 Detailed Description

**DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343)

Entity:

**DDSDataWriter** (p. 1321)

Listener:

**DDSDataWriterListener** (p. 1344)

The deadline that the **DDSDataWriter** (p. 1321) has committed through its **DDS\_DeadlineQosPolicy** (p. 707) was not respected for a specific instance.

### 9.120.2 Member Data Documentation



### 9.120.2.1 total\_count

`DDS_Long DDS_OfferedDeadlineMissedStatus::total_count`

Total cumulative count of the number of times the **DDSDataWriter** (p. 1321) failed to write within its offered deadline.

Missed deadlines accumulate; that is, each deadline period the `total_count` will be incremented by one.

### 9.120.2.2 total\_count\_change

`DDS_Long DDS_OfferedDeadlineMissedStatus::total_count_change`

The incremental changes in `total_count` since the last time the listener was called or the status was read.

### 9.120.2.3 last\_instance\_handle

`DDS_InstanceHandle_t DDS_OfferedDeadlineMissedStatus::last_instance_handle`

Handle to the last instance in the **DDSDataWriter** (p. 1321) for which an offered deadline was missed.

## 9.121 DDS\_OfferedIncompatibleQoSStatus Struct Reference

**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344)

### Public Attributes

- **DDS\_Long total\_count**

*Total cumulative number of times the concerned **DDSDataWriter** (p. 1321) discovered a **DDSDataReader** (p. 1288) for the same **DDSTopic** (p. 1617), common partition with a requested QoS that is incompatible with that offered by the **DDSDataWriter** (p. 1321).*

- **DDS\_Long total\_count\_change**

*The incremental changes in `total_count` since the last time the listener was called or the status was read.*

- **DDS\_QoSPolicyId\_t last\_policy\_id**

*The **DDS\_QoSPolicyId\_t** (p. 360) of one of the policies that was found to be incompatible the last time an incompatibility was detected.*

- struct **DDS\_QoSPolicyCountSeq policies**

*A list containing for each policy the total number of times that the concerned **DDSDataWriter** (p. 1321) discovered a **DDSDataReader** (p. 1288) for the same **DDSTopic** (p. 1617) and common partition with a requested QoS that is incompatible with that offered by the **DDSDataWriter** (p. 1321).*

### 9.121.1 Detailed Description

**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344)

Entity:

**DDSDataWriter** (p. 1321)

Listener:

**DDSDataWriterListener** (p. 1344)

The qos policy value was incompatible with what was requested.

### 9.121.2 Member Data Documentation

#### 9.121.2.1 total\_count

**DDS\_Long** `DDS_OfferedIncompatibleQosStatus::total_count`

Total cumulative number of times the concerned **DDSDataWriter** (p. 1321) discovered a **DDSDataReader** (p. 1288) for the same **DDSTopic** (p. 1617), common partition with a requested QoS that is incompatible with that offered by the **DDSDataWriter** (p. 1321).

#### 9.121.2.2 total\_count\_change

**DDS\_Long** `DDS_OfferedIncompatibleQosStatus::total_count_change`

The incremental changes in total\_count since the last time the listener was called or the status was read.

#### 9.121.2.3 last\_policy\_id

**DDS\_QosPolicyId\_t** `DDS_OfferedIncompatibleQosStatus::last_policy_id`

The **DDS\_QosPolicyId\_t** (p. 360) of one of the policies that was found to be incompatible the last time an incompatibility was detected.

### 9.121.2.4 policies

```
struct DDS_QosPolicyCountSeq DDS_OfferedIncompatibleQosStatus::policies
```

A list containing for each policy the total number of times that the concerned **DDSDataWriter** (p. 1321) discovered a **DDSDataReader** (p. 1288) for the same **DDSTopic** (p. 1617) and common partition with a requested QoS that is incompatible with that offered by the **DDSDataWriter** (p. 1321).

## 9.122 DDS\_OwnershipQosPolicy Struct Reference

Specifies whether it is allowed for multiple **DDSDataWriter** (p. 1321) (s) to write the same instance of the data and if so, how these modifications should be arbitrated.

### Public Attributes

- **DDS\_OwnershipQosPolicyKind kind**

*The kind of ownership.*

### 9.122.1 Detailed Description

Specifies whether it is allowed for multiple **DDSDataWriter** (p. 1321) (s) to write the same instance of the data and if so, how these modifications should be arbitrated.

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Status:

**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_↔  
STATUS** (p. 344)

Properties:

**RxO** (p. 360) = YES  
**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

See also

**OWNERSHIP\_STRENGTH** (p. 415)

## 9.122.2 Usage

Along with the **OWNERSHIP\_STRENGTH** (p. 415), this QoS policy specifies if **DDSDataReader** (p. 1288) entities can receive updates to the same instance (identified by its key) from multiple **DDSDataWriter** (p. 1321) entities at the same time.

There are two kinds of ownership, selected by the setting of the `kind`: SHARED and EXCLUSIVE.

### 9.122.2.1 SHARED ownership

**DDS\_SHARED\_OWNERSHIP\_QOS** (p. 415) indicates that RTI Connexx does not enforce unique ownership for each instance. In this case, multiple writers can update the same data type instance. The subscriber to the **DDSTopic** (p. 1617) will be able to access modifications from all **DDSDataWriter** (p. 1321) objects, subject to the settings of other QoS that may filter particular samples (e.g. the **TIME\_BASED\_FILTER** (p. 440) or **HISTORY** (p. 405) policy). In any case, there is no "filtering" of modifications made based on the identity of the **DDSDataWriter** (p. 1321) that causes the modification.

### 9.122.2.2 EXCLUSIVE ownership

**DDS\_EXCLUSIVE\_OWNERSHIP\_QOS** (p. 415) indicates that each instance of a data type can only be modified by one **DDSDataWriter** (p. 1321). In other words, at any point in time, a single **DDSDataWriter** (p. 1321) owns each instance and is the only one whose modifications will be visible to the **DDSDataReader** (p. 1288) objects. The owner is determined by selecting the **DDSDataWriter** (p. 1321) with the highest value of the **DDS\_OwnershipStrengthQos**↔**Policy::value** (p. 978) that is currently alive, as defined by the **LIVELINESS** (p. 409) policy, and has not violated its **DEADLINE** (p. 385) contract with regards to the data instance.

Ownership can therefore change as a result of:

- a **DDSDataWriter** (p. 1321) in the system with a higher value of the strength that modifies the instance,
- a change in the strength value of the **DDSDataWriter** (p. 1321) that owns the instance, and
- a change in the liveliness of the **DDSDataWriter** (p. 1321) that owns the instance.
- a deadline with regards to the instance that is missed by the **DDSDataWriter** (p. 1321) that owns the instance.

The behavior of the system is as if the determination was made independently by each **DDSDataReader** (p. 1288). Each **DDSDataReader** (p. 1288) may detect the change of ownership at a different time. It is not a requirement that at a particular point in time all the **DDSDataReader** (p. 1288) objects for that **DDSTopic** (p. 1617) have a consistent picture of who owns each instance.

It is also not a requirement that the **DDSDataWriter** (p. 1321) objects are aware of whether they own a particular instance. There is no error or notification given to a **DDSDataWriter** (p. 1321) that modifies an instance it does not currently own.

The requirements are chosen to (a) preserve the decoupling of publishers and subscriber, and (b) allow the policy to be implemented efficiently.

It is possible that multiple **DDSDataWriter** (p. 1321) objects with the same strength modify the same instance. If this occurs RTI Connex will pick one of the **DDSDataWriter** (p. 1321) objects as the owner. It is not specified how the owner is selected. However, the algorithm used to select the owner guarantees that all **DDSDataReader** (p. 1288) objects will make the same choice of the particular **DDSDataWriter** (p. 1321) that is the owner. It also guarantees that the owner remains the same until there is a change in strength, liveliness, the owner misses a deadline on the instance, or a new **DDSDataWriter** (p. 1321) with higher same strength, or a new **DDSDataWriter** (p. 1321) with same strength that should be deemed the owner according to the policy of the Service, modifies the instance.

Exclusive ownership is on an instance-by-instance basis. That is, a subscriber can receive values written by a lower strength **DDSDataWriter** (p. 1321) as long as they affect instances whose values have not been set by the higher-strength **DDSDataWriter** (p. 1321).

### 9.122.3 Compatibility

The value of the **DDS\_OwnershipQosPolicyKind** (p. 414) offered must exactly match the one requested or else they are considered incompatible.

### 9.122.4 Relationship between registration, liveliness and ownership

The need for registering/unregistering instances stems from two use cases:

- Ownership resolution on redundant systems
- Detection of loss in topological connectivity

These two use cases also illustrate the semantic differences between the **FooDataWriter::unregister\_instance** (p. 1680) and **FooDataWriter::dispose** (p. 1689).

#### 9.122.4.1 Ownership Resolution on Redundant Systems

It is expected that users may use DDS to set up redundant systems where multiple **DDSDataWriter** (p. 1321) entities are "capable" of writing the same instance. In this situation, the **DDSDataWriter** (p. 1321) entities are configured such that:

- Either both are writing the instance "constantly"
- Or else they use some mechanism to classify each other as "primary" and "secondary", such that the primary is the only one writing, and the secondary monitors the primary and only writes when it detects that the primary "writer" is no longer writing.

Both cases above use the **DDS\_EXCLUSIVE\_OWNERSHIP\_QOS** (p. 415) and arbitrate themselves by means of the **DDS\_OwnershipStrengthQosPolicy** (p. 978). Regardless of the scheme, the desired behavior from the **DDSDataReader** (p. 1288) point of view is that **DDSDataReader** (p. 1288) normally receives data from the primary unless the "primary" writer stops writing, in which case the **DDSDataReader** (p. 1288) starts to receive data from the secondary **DDSDataWriter** (p. 1321).

This approach requires some mechanism to detect that a **DDSDataWriter** (p. 1321) (the primary) is no longer "writing" the data as it should. There are several reasons why this may happen and all must be detected (but not necessarily distinguished):

crash The writing process is no longer running (e.g. the whole application has crashed)

connectivity loss Connectivity to the writing application has been lost (e.g. network disconnection)

application fault The application logic that was writing the data is faulty and has stopped calling **FooDataWriter::write** (p. 1683).

Arbitrating from a **DDSDataWriter** (p. 1321) to one of a higher strength is simple and the decision can be taken autonomously by the **DDSDataReader** (p. 1288). Switching ownership from a higher strength **DDSDataWriter** (p. 1321) to one of a lower strength **DDSDataWriter** (p. 1321) requires that the **DDSDataReader** (p. 1288) can make a determination that the stronger **DDSDataWriter** (p. 1321) is "no longer writing the instance".

**9.122.4.1.1 Case where the data is periodically updated** This determination is reasonably simple when the data is being written periodically at some rate. The **DDSDataWriter** (p. 1321) simply states its offered **DDS\_DeadlineQosPolicy** (p. 707) (maximum interval between updates) and the **DDSDataReader** (p. 1288) automatically monitors that the **DDSDataWriter** (p. 1321) indeed updates the instance at least once per **DDS\_DeadlineQosPolicy::period** (p. 708). If the deadline is missed, the **DDSDataReader** (p. 1288) considers the **DDSDataWriter** (p. 1321) "not alive" and automatically gives ownership to the next highest-strength **DDSDataWriter** (p. 1321) that *is* alive.

**9.122.4.1.2 Case where data is not periodically updated** The case where the **DDSDataWriter** (p. 1321) is not writing data periodically is also a very important use-case. Since the instance is not being updated at any fixed period, the "deadline" mechanism cannot be used to determine ownership. The liveliness solves this situation. Ownership is maintained while the **DDSDataWriter** (p. 1321) is "alive" and for the **DDSDataWriter** (p. 1321) to be alive it must fulfill its **DDS\_LivelinessQosPolicy** (p. 936) contract. The different means to renew liveliness (automatic, manual) combined by the implied renewal each time data is written handle the three conditions above [crash], [connectivity loss], and [application fault]. Note that to handle [application fault], LIVELINESS must be **DDS\_MANUAL\_BY\_TOPIC LIVELINESS\_QOS** (p. 410). The **DDSDataWriter** (p. 1321) can retain ownership by periodically writing data or else calling `assert_liveliness` if it has no data to write. Alternatively if only protection against [crash] or [connectivity loss] is desired, it is sufficient that some task on the **DDSDataWriter** (p. 1321) process periodically writes data or calls **DDSDomainParticipant::assert\_liveliness** (p. 1399). However, this scenario requires that the **DDSDataReader** (p. 1288) knows what instances are being "written" by the **DDSDataWriter** (p. 1321). That is the only way that the **DDSDataReader** (p. 1288) deduces the ownership of specific instances from the fact that the **DDSDataWriter** (p. 1321) is still "alive". Hence the need for the **DDSDataWriter** (p. 1321) to "register" and "unregister" instances. Note that while "registration" can be done lazily the first time the **DDSDataWriter** (p. 1321) writes the instance, "unregistration," in general, cannot. Similar reasoning will lead to the fact that unregistration will also require a message to be sent to the **DDSDataReader** (p. 1288).

### 9.122.4.2 Detection of Loss in Topological Connectivity

There are applications that are designed in such a way that their correct operation requires some minimal topological connectivity, that is, the writer needs to have a minimum number of readers or alternatively the reader must have a minimum number of writers.

A common scenario is that the application does not start doing its logic until it knows that some specific writers have the minimum configured readers (e.g. the alarm monitor is up).

A *more* common scenario is that the application logic will wait until some writers appear that can provide some needed source of information (e.g. the raw sensor data that must be processed).

Furthermore, once the application is running it is a requirement that this minimal connectivity (from the source of the data) is monitored and the application informed if it is ever lost. For the case where data is being written periodically, the **DDS\_DeadlineQosPolicy** (p. 707) and the `on_deadline_missed` listener provides the notification. The case where data is not periodically updated requires the use of the **DDS\_LivelinessQosPolicy** (p. 936) in combination with `register_instance/unregister_instance` to detect whether the "connectivity" has been lost, and the notification is provided by means of **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161).

In terms of the required mechanisms, the scenario is very similar to the case of maintaining ownership. In both cases, the reader needs to know whether a writer is still "managing the current value of an instance" even though it is not continually writing it and this knowledge requires the writer to keep its liveliness plus some means to know which instances the writer is currently "managing" (i.e. the registered instances).

### 9.122.4.3 Semantic Difference between `unregister_instance` and `dispose`

**FooDataWriter::dispose** (p. 1689) is semantically different from **FooDataWriter::unregister\_instance** (p. 1680). **FooDataWriter::dispose** (p. 1689) indicates that the data instance no longer exists (e.g. a track that has disappeared, a simulation entity that has been destroyed, a record entry that has been deleted, etc.) whereas **FooDataWriter::unregister\_instance** (p. 1680) indicates that the writer is no longer taking responsibility for updating the value of the instance.

Deleting a **DDSDataWriter** (p. 1321) is equivalent to unregistering all the instances it was writing, but is *not* the same as "disposing" all the instances.

For a **DDSTopic** (p. 1617) with **DDS\_EXCLUSIVE\_OWNERSHIP\_QOS** (p. 415), if the current owner of an instance *disposes* it, the readers accessing the instance will see the `instance_state` as being "DISPOSED" and not see the values being written by the weaker writer (even after the stronger one has disposed the instance). This is because the **DDSDataWriter** (p. 1321) that owns the instance is saying that the instance no longer exists (e.g. the master of the database is saying that a record has been deleted) and thus the readers should see it as such.

For a **DDSTopic** (p. 1617) with **DDS\_EXCLUSIVE\_OWNERSHIP\_QOS** (p. 415), if the current owner of an instance *unregisters* it, then it will relinquish ownership of the instance and thus the readers may see the value updated by another writer (which will then become the owner). This is because the owner said that it no longer will be providing values for the instance and thus another writer can take ownership and provide those values.

## 9.122.5 Member Data Documentation

### 9.122.5.1 kind

`DDS_OwnershipQosPolicyKind DDS_OwnershipQosPolicy::kind`

The kind of ownership.

[default] `DDS_SHARED_OWNERSHIP_QOS` (p. 415)

## 9.123 DDS\_OwnershipStrengthQosPolicy Struct Reference

Specifies the value of the strength used to arbitrate among multiple **DDSDataWriter** (p. 1321) objects that attempt to modify the same instance of a data type (identified by **DDSTopic** (p. 1617) + key).

### Public Attributes

- **DDS\_Long value**

*The strength value used to arbitrate among multiple writers.*

### 9.123.1 Detailed Description

Specifies the value of the strength used to arbitrate among multiple **DDSDataWriter** (p. 1321) objects that attempt to modify the same instance of a data type (identified by **DDSTopic** (p. 1617) + key).

This policy only applies if the **OWNERSHIP** (p. 414) policy is of kind **DDS\_EXCLUSIVE\_OWNERSHIP\_QOS** (p. 415).

Entity:

**DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **YES** (p. 360)

The value of the **OWNERSHIP\_STRENGTH** (p. 415) is used to determine the ownership of a data instance (identified by the key). The arbitration is performed by the **DDSDataReader** (p. 1288).

See also

**EXCLUSIVE ownership** (p. 974)

### 9.123.2 Member Data Documentation



## 9.123.2.1 value

**DDS\_Long** DDS\_OwnershipStrengthQosPolicy::value

The strength value used to arbitrate among multiple writers.

[default] 0

[range] [0, 1 million]

## 9.124 DDS\_ParticipantBuiltinTopicData Struct Reference

Entry created when a DomainParticipant object is discovered.

### Public Attributes

- **DDS\_BuiltinTopicKey\_t key**  
*DCPS key to distinguish entries.*
- struct **DDS\_UserDataQosPolicy user\_data**  
*Policy of the corresponding DomainParticipant.*
- struct **DDS\_PropertyQosPolicy property**  
*<<extension>> (p. 237) Name value pair properties to be stored with DomainParticipant*
- **DDS\_ProtocolVersion\_t rtps\_protocol\_version**  
*<<extension>> (p. 237) Version number of the RTPS wire protocol used.*
- struct **DDS\_VendorId\_t rtps\_vendor\_id**  
*<<extension>> (p. 237) ID of vendor implementing the RTPS wire protocol.*
- **DDS\_UnsignedLong dds\_builtin\_endpoints**  
*<<extension>> (p. 237) Bitmap of builtin endpoints supported by the participant.*
- struct **DDS\_LocatorSeq default\_unicast\_locators**  
*<<extension>> (p. 237) Unicast locators used when individual entities do not specify unicast locators.*
- struct **DDS\_ProductVersion\_t product\_version**  
*<<extension>> (p. 237) This is a vendor specific parameter. It gives the current version for rti-dds.*
- struct **DDS\_EntityNameQosPolicy participant\_name**  
*<<extension>> (p. 237) The participant name and role name.*
- **DDS\_DomainId\_t domain\_id**  
*<<extension>> (p. 237) Domain ID associated with the discovered participant.*
- struct **DDS\_TransportInfoSeq transport\_info**  
*<<extension>> (p. 237) A sequence of DDS\_TransportInfo\_t (p. 1145) containing information about each of the installed transports of the discovered participant.*
- struct **DDS\_Duration\_t reachability\_lease\_duration**  
*<<extension>> (p. 237) Locator reachability lease duration.*
- struct **DDS\_PartitionQosPolicy partition**  
*<<extension>> (p. 237) PartitionQosPolicy of the participant.*
- **DDS\_ParticipantTrustProtectionInfo trust\_protection\_info**  
*<<extension>> (p. 237) Trust Plugins protection information associated with the discovered DomainParticipant.*
- **DDS\_ParticipantTrustAlgorithmInfo trust\_algorithm\_info**  
*<<extension>> (p. 237) Trust Plugins algorithms associated with the discovered DomainParticipant.*
- **DDS\_Boolean partial\_configuration**  
*<<extension>> (p. 237) Indicates whether a DDS\_ParticipantBuiltinTopicData (p. 979) only contains bootstrapping information.*

### 9.124.1 Detailed Description

Entry created when a DomainParticipant object is discovered.

Data associated with the built-in topic **DDS\_PARTICIPANT\_TOPIC\_NAME** (p. 295). It contains QoS policies and additional information that apply to the remote **DDSDomainParticipant** (p. 1351).

See also

**DDS\_PARTICIPANT\_TOPIC\_NAME** (p. 295)

**DDSParticipantBuiltinTopicDataDataReader** (p. 1548)

### 9.124.2 Member Data Documentation

#### 9.124.2.1 key

```
DDS_BuiltinTopicKey_t DDS_ParticipantBuiltinTopicData::key
```

DCPS key to distinguish entries.

#### 9.124.2.2 user\_data

```
struct DDS_UserDataQosPolicy DDS_ParticipantBuiltinTopicData::user_data
```

Policy of the corresponding DomainParticipant.

#### 9.124.2.3 property

```
struct DDS_PropertyQosPolicy DDS_ParticipantBuiltinTopicData::property
```

<<*extension*>> (p. 237) Name value pair properties to be stored with DomainParticipant

#### 9.124.2.4 rtps\_protocol\_version

```
DDS_ProtocolVersion_t DDS_ParticipantBuiltinTopicData::rtps_protocol_version
```

<<*extension*>> (p. 237) Version number of the RTPS wire protocol used.

### 9.124.2.5 rtps\_vendor\_id

```
struct DDS_VendorId_t DDS_ParticipantBuiltinTopicData::rtps_vendor_id
```

<<*extension*>> (p. 237) ID of vendor implementing the RTPS wire protocol.

### 9.124.2.6 dds\_builtin\_endpoints

```
DDS_UnsignedLong DDS_ParticipantBuiltinTopicData::dds_builtin_endpoints
```

<<*extension*>> (p. 237) Bitmap of builtin endpoints supported by the participant.

Each bit indicates a builtin endpoint that may be available on the participant for use in discovery.

### 9.124.2.7 default\_unicast\_locators

```
struct DDS_LocatorSeq DDS_ParticipantBuiltinTopicData::default_unicast_locators
```

<<*extension*>> (p. 237) Unicast locators used when individual entities do not specify unicast locators.

### 9.124.2.8 product\_version

```
struct DDS_ProductVersion_t DDS_ParticipantBuiltinTopicData::product_version
```

<<*extension*>> (p. 237) This is a vendor specific parameter. It gives the current version for rti-dds.

### 9.124.2.9 participant\_name

```
struct DDS_EntityNameQosPolicy DDS_ParticipantBuiltinTopicData::participant_name
```

<<*extension*>> (p. 237) The participant name and role name.

This parameter contains the name and the role name of the discovered participant.

### 9.124.2.10 domain\_id

```
DDS_DomainId_t DDS_ParticipantBuiltinTopicData::domain_id
```

<<*extension*>> (p. 237) Domain ID associated with the discovered participant.

### 9.124.2.11 transport\_info

```
struct DDS_TransportInfoSeq DDS_ParticipantBuiltinTopicData::transport_info
```

<<*extension*>> (p. 237) A sequence of **DDS\_TransportInfo\_t** (p. 1145) containing information about each of the installed transports of the discovered participant.

This parameter contains a sequence of **DDS\_TransportInfo\_t** (p. 1145) containing the `class_id` and `message_size_max` for all installed transports of the discovered participant. The maximum number of **DDS\_TransportInfo\_t** (p. 1145) that will be stored in this sequence is controlled by the Domain Participant's resource limit **DDS\_DomainParticipantResourceLimitsQosPolicy::transport\_info\_list\_max\_length** (p. 764).

### 9.124.2.12 reachability\_lease\_duration

```
struct DDS_Duration_t DDS_ParticipantBuiltinTopicData::reachability_lease_duration
```

<<*extension*>> (p. 237) Locator reachability lease duration.

This parameter contains the value of the participant properties: **dds.domain\_participant.locator\_reachability\_lease\_duration.sec** and **dds.domain\_participant.locator\_reachability\_lease\_duration.nanosec** used to configure the locator reachability lease duration.

### 9.124.2.13 partition

```
struct DDS_PartitionQosPolicy DDS_ParticipantBuiltinTopicData::partition
```

<<*extension*>> (p. 237) PartitionQosPolicy of the participant.

### 9.124.2.14 trust\_protection\_info

```
DDS_ParticipantTrustProtectionInfo DDS_ParticipantBuiltinTopicData::trust_protection_info
```

<<*extension*>> (p. 237) Trust Plugins protection information associated with the discovered DomainParticipant.

Trust Plugins is a generic abstraction that represents any plugin intended to do transformation, interception, and validation of exchanged DomainParticipant data and metadata.

`trust_protection_info` contains information about how RTPS wire serialization, discovery, and liveliness interact with the loaded Trust Plugins. Two DomainParticipants will not match if their `trust_protection_info` is incompatible.

The meaning of the contents of this field may vary depending on what Trust Plugins the DomainParticipant is using. For information about how this field interacts with the RTI Security Plugins, please refer to the [RTI Security Plugins User's Manual](#).

### 9.124.2.15 trust\_algorithm\_info

`DDS_ParticipantTrustAlgorithmInfo DDS_ParticipantBuiltinTopicData::trust_algorithm_info`

<<*extension*>> (p. 237) Trust Plugins algorithms associated with the discovered DomainParticipant.

Trust Plugins is a generic abstraction that represents any plugin intended to do transformation, interception, and validation of exchanged DomainParticipant data and metadata. `trust_algorithm_info` contains information about what algorithms the loaded Trust Plugins are running. Two DomainParticipants will not match if their `trust_algorithm_info` are incompatible.

The meaning of the contents of this field may vary depending on what Trust Plugins the DomainParticipant is using. For information about how this field interacts with the RTI Security Plugins, please refer to the [RTI Security Plugins User's Manual](#).

### 9.124.2.16 partial\_configuration

`DDS_Boolean DDS_ParticipantBuiltinTopicData::partial_configuration`

<<*extension*>> (p. 237) Indicates whether a `DDS_ParticipantBuiltinTopicData` (p. 979) only contains bootstrapping information.

If this is `DDS_BOOLEAN_TRUE` (p. 317), the `DDS_ParticipantBuiltinTopicData` (p. 979) only contains bootstrapping information. If it is `DDS_BOOLEAN_FALSE` (p. 317), it contains both bootstrapping and configuration information. The following fields are valid when this is set to `DDS_BOOLEAN_TRUE` (p. 317):

- `DDS_ParticipantBuiltinTopicData::key` (p. 980)
- `DDS_ParticipantBuiltinTopicData::property` (p. 980) (only `dds.domain_participant.domain_tag` is valid if set)
- `DDS_ParticipantBuiltinTopicData::rtps_protocol_version` (p. 980)
- `DDS_ParticipantBuiltinTopicData::rtps_vendor_id` (p. 980)
- `DDS_ParticipantBuiltinTopicData::product_version` (p. 981)
- `DDS_ParticipantBuiltinTopicData::domain_id` (p. 981)
- `DDS_ParticipantBuiltinTopicData::transport_info` (p. 981)
- `DDS_ParticipantBuiltinTopicData::partition` (p. 982)
- `DDS_ParticipantBuiltinTopicData::trust_protection_info` (p. 982)
- `DDS_ParticipantBuiltinTopicData::trust_algorithm_info` (p. 982)

All other fields are invalid.

This field will only be set to `DDS_BOOLEAN_TRUE` (p. 317) if a participant using `DDS_DISCOVERYCONFIG_BUILTIN_SPDP2` (p. 394) receives a bootstrap message and `DDS_DiscoveryConfigQosPolicy::ignore_default_domain_announcements` (p. 724) is set to `DDS_BOOLEAN_FALSE` (p. 317) (non-default).

If a participant is using `DDS_DISCOVERYCONFIG_BUILTIN_SPDP` (p. 393), this field will always be set to `DDS_BOOLEAN_FALSE` (p. 317).

## 9.125 DDS\_ParticipantBuiltinTopicDataSeq Struct Reference

Instantiates `FooSeq` (p. 1697) < `DDS_ParticipantBuiltinTopicData` (p. 979) > .

### 9.125.1 Detailed Description

Instantiates `FooSeq` (p. 1697) < `DDS_ParticipantBuiltinTopicData` (p. 979) > .

Instantiates:

<<*generic*>> (p. 237) `FooSeq` (p. 1697)

See also

`DDS_ParticipantBuiltinTopicData` (p. 979)

## 9.126 DDS\_ParticipantTrustAlgorithmInfo Struct Reference

Trust Plugins algorithm information associated with the discovered `DomainParticipant`.

### Public Attributes

- **DDS\_ParticipantTrustSignatureAlgorithmInfo** `signature`  
*Information regarding algorithms for validation of data and metadata exchanged by the DomainParticipant.*
- **DDS\_ParticipantTrustKeyEstablishmentAlgorithmInfo** `key_establishment`  
*Information regarding algorithms for transformation of data and metadata exchanged between two DomainParticipants.*
- **DDS\_ParticipantTrustInterceptorAlgorithmInfo** `interceptor`  
*Information regarding algorithms for interception of data and metadata exchanged by the DomainParticipant.*

### 9.126.1 Detailed Description

Trust Plugins algorithm information associated with the discovered `DomainParticipant`.

### 9.126.2 Member Data Documentation

### 9.126.2.1 signature

`DDS_ParticipantTrustSignatureAlgorithmInfo DDS_ParticipantTrustAlgorithmInfo::signature`

Information regarding algorithms for validation of data and metadata exchanged by the DomainParticipant.

### 9.126.2.2 key\_establishment

`DDS_ParticipantTrustKeyEstablishmentAlgorithmInfo DDS_ParticipantTrustAlgorithmInfo::key_establishment`

Information regarding algorithms for transformation of data and metadata exchanged between two DomainParticipants.

### 9.126.2.3 interceptor

`DDS_ParticipantTrustInterceptorAlgorithmInfo DDS_ParticipantTrustAlgorithmInfo::interceptor`

Information regarding algorithms for interception of data and metadata exchanged by the DomainParticipant.

## 9.127 DDS\_ParticipantTrustInterceptorAlgorithmInfo Struct Reference

Trust Plugins interception algorithm information associated with the discovered DomainParticipant.

### Public Attributes

- **DDS\_TrustAlgorithmSet supported\_mask**  
*Trust Plugins algorithms supported for interception of data and metadata exchanged by the DomainParticipant.*
- **DDS\_TrustAlgorithmSet builtin\_endpoints\_required\_mask**  
*Trust Plugins algorithms used for interception of metadata exchanged by the discovery, service request, and liveliness builtin endpoints.*
- **DDS\_TrustAlgorithmSet builtin\_kx\_endpoints\_required\_mask**  
*Trust Plugins algorithms used for interception of metadata exchanged by the key exchange builtin endpoints.*
- **DDS\_TrustAlgorithmSet user\_endpoints\_default\_required\_mask**  
*Default trust plugin algorithms used for interception of data exchanged by the user endpoints. This is the algorithm that remote DomainParticipants should assume when `DDS_EndpointTrustInterceptorAlgorithmInfo` (p. 902) is not serialized.*

### 9.127.1 Detailed Description

Trust Plugins interception algorithm information associated with the discovered DomainParticipant.

## 9.127.2 Member Data Documentation

### 9.127.2.1 supported\_mask

`DDS_TrustAlgorithmSet DDS_ParticipantTrustInterceptorAlgorithmInfo::supported_mask`

Trust Plugins algorithms supported for interception of data and metadata exchanged by the DomainParticipant.

### 9.127.2.2 builtin\_endpoints\_required\_mask

`DDS_TrustAlgorithmSet DDS_ParticipantTrustInterceptorAlgorithmInfo::builtin_endpoints_required_↔  
mask`

Trust Plugins algorithms used for interception of metadata exchanged by the discovery, service request, and liveliness builtin endpoints.

### 9.127.2.3 builtin\_kx\_endpoints\_required\_mask

`DDS_TrustAlgorithmSet DDS_ParticipantTrustInterceptorAlgorithmInfo::builtin_kx_endpoints_required_↔  
_mask`

Trust Plugins algorithms used for interception of metadata exchanged by the key exchange builtin endpoints.

### 9.127.2.4 user\_endpoints\_default\_required\_mask

`DDS_TrustAlgorithmSet DDS_ParticipantTrustInterceptorAlgorithmInfo::user_endpoints_default_↔  
required_mask`

Default trust plugin algorithms used for interception of data exchanged by the user endpoints. This is the algorithm that remote DomainParticipants should assume when `DDS_EndpointTrustInterceptorAlgorithmInfo` (p.902) is not serialized.

## 9.128 DDS\_ParticipantTrustKeyEstablishmentAlgorithmInfo Struct Reference

Trust Plugins key establishment algorithm information associated with the discovered DomainParticipant.



## Public Attributes

- **DDS\_TrustAlgorithmRequirements shared\_secret**

*Trust Plugins key establishment algorithm requirements of the DomainParticipant in the context of deriving a shared secret.*

### 9.128.1 Detailed Description

Trust Plugins key establishment algorithm information associated with the discovered DomainParticipant.

### 9.128.2 Member Data Documentation

#### 9.128.2.1 shared\_secret

`DDS_TrustAlgorithmRequirements` `DDS_ParticipantTrustKeyEstablishmentAlgorithmInfo::shared_secret`

Trust Plugins key establishment algorithm requirements of the DomainParticipant in the context of deriving a shared secret.

## 9.129 DDS\_ParticipantTrustProtectionInfo Struct Reference

Trust Plugins Protection information associated with the discovered DomainParticipant.

## Public Attributes

- **DDS\_ParticipantTrustAttributesMask bitmask**

*Information about how RTPS wire serialization, discovery, and liveliness interact with the associated Trust Plugins Protection configuration.*

- **DDS\_PluginParticipantTrustAttributesMask plugin\_bitmask**

*Internal plugin information that is opaque to DDS.*

### 9.129.1 Detailed Description

Trust Plugins Protection information associated with the discovered DomainParticipant.

### 9.129.2 Member Data Documentation

### 9.129.2.1 bitmask

**DDS\_ParticipantTrustAttributesMask** DDS\_ParticipantTrustProtectionInfo::bitmask

Information about how RTPS wire serialization, discovery, and liveliness interact with the associated Trust Plugins Protection configuration.

The meaning of the contents of this field may vary depending on what Trust Plugins the DomainParticipant is using. For information about how this field interacts with the RTI Security Plugins, please refer to the [RTI Security Plugins User's Manual](#).

### 9.129.2.2 plugin\_bitmask

**DDS\_PluginParticipantTrustAttributesMask** DDS\_ParticipantTrustProtectionInfo::plugin\_bitmask

Internal plugin information that is opaque to DDS.

The meaning of the contents of this field may vary depending on what Trust Plugins the DomainParticipant is using. For information about how this field interacts with the RTI Security Plugins, please refer to the [RTI Security Plugins User's Manual](#).

## 9.130 DDS\_ParticipantTrustSignatureAlgorithmInfo Struct Reference

Trust Plugins signature algorithm information associated with the discovered DomainParticipant.

### Public Attributes

- **DDS\_TrustAlgorithmRequirements trust\_chain**  
*Trust Plugins signature algorithm requirements of the DomainParticipant in the context of creating a chain of trust.*
- **DDS\_TrustAlgorithmRequirements message\_auth**  
*Trust Plugins signature algorithm requirements of the DomainParticipant in the context of checking that messages are authentic.*

### 9.130.1 Detailed Description

Trust Plugins signature algorithm information associated with the discovered DomainParticipant.

### 9.130.2 Member Data Documentation

### 9.130.2.1 trust\_chain

`DDS_TrustAlgorithmRequirements DDS_ParticipantTrustSignatureAlgorithmInfo::trust_chain`

Trust Plugins signature algorithm requirements of the DomainParticipant in the context of creating a chain of trust.

### 9.130.2.2 message\_auth

`DDS_TrustAlgorithmRequirements DDS_ParticipantTrustSignatureAlgorithmInfo::message_auth`

Trust Plugins signature algorithm requirements of the DomainParticipant in the context of checking that messages are authentic.

## 9.131 DDS\_PartitionQosPolicy Struct Reference

Set of strings that introduces logical partitions in **DDSDomainParticipant** (p.1351), **DDSPublisher** (p.1550), or **DDSSubscriber** (p.1592) entities.

### Public Attributes

- struct **DDS\_StringSeq** name

*A list of partition names.*

### 9.131.1 Detailed Description

Set of strings that introduces logical partitions in **DDSDomainParticipant** (p.1351), **DDSPublisher** (p.1550), or **DDSSubscriber** (p.1592) entities.

This QoS policy is used to set string identifiers that are used for partitioning entities that would otherwise be connected to and exchange data with each other:

- A **DDSDataWriter** (p.1321) within a **DDSPublisher** (p.1550) only communicates with a **DDSDataReader** (p.1288) in a **DDSSubscriber** (p.1592) if (in addition to matching the **DDSTopic** (p.1617) and having compatible QoS) the **DDSPublisher** (p.1550) and **DDSSubscriber** (p.1592) have a common partition name string.
- **DDSDomainParticipant** (p.1351) entities (with the same domain ID and domain tag) are visible to each other only if they have at least one partition name string in common.

Entity:

**DDSPublisher** (p.1550), **DDSSubscriber** (p.1592), **DDSDomainParticipant** (p.1351)

Properties:

**RxO** (p.360) = NO

**Changeable** (p.360) = YES (p.360)

### 9.131.2 Usage

The Partition QoS policy provides another way to control which entities will match-and thus communicate with-which other entities. It can be used to prevent entities that would have otherwise matched from talking to each other. Much in the same way that only applications within the same DDS domain will communicate with each other, only entities that belong to the same partition can talk to each other.

The Partition QoS policy allows you to add one or more strings, "partitions", to an entity:

- A DataWriter and DataReader for the same topic are only considered matched if their Publishers and Subscribers have partitions in common (intersecting partitions).
- DomainParticipants (with the same domain ID and domain tag) are visible to each other only if they have at least one partition in common.

Since the set of partitions for an entity can be dynamically changed, the Partition QoS policy is useful for creating temporary separation groups among entities that would otherwise be connected to and exchange data with each other.

DomainParticipant partitions and Publisher/Subscriber partitions are independent of each other. You can use both features independently or in combination to provide the right level of isolation.

Failure to match partitions is not considered an incompatible QoS and does not trigger any listeners or conditions. A change in this policy *can* potentially modify the "match" of existing DataReader and DataWriter entities. It may establish new "matches" that did not exist before, or break existing matches.

Partition strings are usually directly matched via string comparisons. However, partition strings can also contain wildcard symbols so that partitions can be matched via pattern matching. As long as the partitions or wildcard patterns of an entity intersect with the partitions or wildcard patterns of otherwise matching entities, the entities match; otherwise they do not.

These partition name patterns are regular expressions as defined by the POSIX fnmatch API (1003.2-1992 section B.6). A **DDSDomainParticipant** (p. 1351), **DDSPublisher** (p. 1550), or **DDSSubscriber** (p. 1592) entity may include regular expressions in partition names, but no two names that both contain wildcards will ever be considered to match. This means that although regular expressions may be used on the entities, RTI Connexx will not try to match two regular expressions.

Each entity must belong to at least one logical partition. A regular expression is not considered to be a logical partition. If an entity has not specified a logical partition, it is assumed to be in the default partition. The default partition is defined to be an empty string (""). Put another way:

- An empty sequence of strings in this QoS policy is considered equivalent to a sequence containing only a single string, the empty string.
- A string sequence that contains only regular expressions and no literal strings, it is treated as if it had an additional element, the empty string.

Partitions are different from creating **DDSEntity** (p. 1463) objects in different domains in several ways.

- First, entities belonging to different domains are completely isolated from each other; there is no traffic, meta-traffic or any other way for an application or RTI Connexx itself to see entities in a domain it does not belong to.
- Second, a **DDSEntity** (p. 1463) can only belong to one domain whereas a **DDSEntity** (p. 1463) can be in multiple partitions.
- Finally, as far as RTI Connexx is concerned, each unique data instance is identified by the tuple (**DomainID**, **domain tag**, **DDSTopic** (p. 1617), **key**). Therefore two **DDSEntity** (p. 1463) objects in different domains cannot refer to the same data instance. On the other hand, the same data instance can be made available (published) or requested (subscribed) on one or more partitions.

For more information, see the "PARTITION QoS Policy" section of the `Core Libraries User's Manual`.

### 9.131.3 Member Data Documentation

#### 9.131.3.1 name

```
struct DDS_StringSeq DDS_PartitionQosPolicy::name
```

A list of partition names.

Several restrictions apply to the partition names in this sequence. A violation of one of the following rules will result in a **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337) when setting a **DDSPublisher** (p. 1550)'s or **DDSSubscriber** (p. 1592)'s QoS.

- A partition name string cannot be NULL, nor can it contain the reserved comma character (',').
- The maximum number of partition name strings allowable in a **DDS\_PartitionQosPolicy** (p. 989) is specified on a domain basis in **DDS\_DomainParticipantResourceLimitsQosPolicy::max\_partitions** (p. 759). The length of this sequence may not be greater than that value.
- The maximum cumulative length of all partition name strings in a **DDS\_PartitionQosPolicy** (p. 989) is specified on a domain basis in **DDS\_DomainParticipantResourceLimitsQosPolicy::max\_partition\_cumulative\_characters** (p. 759).

The memory for the strings in this sequence is managed according to the conventions described in **String Conventions** (p. 552). In particular, be careful to avoid a situation in which RTI Connexx allocates a string on your behalf and you then reuse that string in such a way that RTI Connexx believes it to have more memory allocated to it than it actually does.

**[default]** Empty sequence (zero-length sequence). Since no logical partition is specified, RTI Connexx will assume the entity to be in default partition (empty string partition "").

**[range]** List of partition name with above restrictions

## 9.132 DDS\_PersistentStorageSettings Struct Reference

Configures durable writer history and durable reader state.

## Public Attributes

- **DDS\_Boolean enable**  
*Enables durable writer history in a **DDSDataWriter** (p. 1321) and durable reader state in a **DDSDataReader** (p. 1288).*
- char \* **file\_name**  
*The file name where the durable writer history or durable reader state will be stored.*
- char \* **trace\_file\_name**  
*The file name where to store the SQL statements executed when loading and storing the durable writer history or durable reader state.*
- **DDS\_PersistentJournalKind journal\_kind**  
*Sets the journal mode of the persistent storage.*
- **DDS\_PersistentSynchronizationKind synchronization\_kind**  
*Sets the level of synchronization with the physical disk.*
- **DDS\_Boolean vacuum**  
*Sets the auto-vacuum status of the storage.*
- **DDS\_Boolean restore**  
*Indicates if the persisted writer history or reader state must be restored.*
- struct **DDS\_AllocationSettings\_t writer\_instance\_cache\_allocation**  
*Configures the resource limits associated with the instance durable writer history cache.*
- struct **DDS\_AllocationSettings\_t writer\_sample\_cache\_allocation**  
*Configures the resource limits associated with the sample durable writer history cache.*
- **DDS\_Boolean writer\_memory\_state**  
*Determines how much state will be kept in memory by the durable writer history in order to avoid accessing the persistent storage in disk.*
- **DDS\_UnsignedLong reader\_checkpoint\_frequency**  
*Controls how often the reader state is stored into the database.*

### 9.132.1 Detailed Description

Configures durable writer history and durable reader state.

In a **DDSDataWriter** (p. 1321), this structure configures durable writer history. This feature allows a DataWriter to persist its historical cache, so that it can survive shutdowns, crashes, and restarts. When an application restarts, each DataWriter that has been configured to have durable writer history automatically loads all of the data in this cache from disk and can carry on sending data as if it had never stopped executing.

In a **DDSDataReader** (p. 1288), this structure configures durable reader state. This feature allows a DataReader to persist its state and remember which data it has already received. When an application restarts, each DataReader that has been configured to have durable reader state automatically loads its state from disk and can carry on receiving data as if it had never stopped executing. Data that had already been received by the DataReader before the restart will be suppressed so that it is not even sent over the network.

RTI Connex uses SQLite to store the durable writer history and durable reader state.

QoS:

**DDS\_DurabilityQosPolicy** (p. 767)

## 9.132.2 Member Data Documentation

### 9.132.2.1 enable

`DDS_Boolean DDS_PersistentStorageSettings::enable`

Enables durable writer history in a **DDSDataWriter** (p. 1321) and durable reader state in a **DDSDataReader** (p. 1288).

When this field is set to **DDS\_BOOLEAN\_TRUE** (p.317), the persistent storage configuration using this structure will take precedence over the configuration using the deprecated `dds.data_writer.history.odbc_plugin.builtin.*` and `dds.data_reader.state.*` properties.

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.132.2.2 file\_name

`char* DDS_PersistentStorageSettings::file_name`

The file name where the durable writer history or durable reader state will be stored.

Setting this field to a value other than NULL is mandatory when enabling durable writer history or durable reader state.

If the file does not exist, it will be created.

If the file exists and **DDS\_PersistentStorageSettings::restore** (p.994) is set to **DDS\_BOOLEAN\_TRUE** (p. 317), the durable writer history or durable reader state will be restored from the file. Otherwise, the file will be overwritten.

Important: When the file exists, the fields **DDS\_DataReaderProtocolQosPolicy::virtual\_guid** (p.631) and **DDS\_DataWriterProtocolQosPolicy::virtual\_guid** (p.674) will be set by RTI Connexx based on the file content. If you change these fields, the value will be ignored.

RTI Connexx uses SQLite to store the durable writer history and durable reader state.

[default] NULL

### 9.132.2.3 trace\_file\_name

`char* DDS_PersistentStorageSettings::trace_file_name`

The file name where to store the SQL statements executed when loading and storing the durable writer history or durable reader state.

Setting this field to a value other than NULL will enable tracing of the SQL statements executed when loading and storing the durable writer history or durable reader state.

Important: Enabling tracing will have a negative impact on performance. Use this feature only for debugging purposes.

[default] NULL

#### 9.132.2.4 journal\_kind

`DDS_PersistentJournalKind DDS_PersistentStorageSettings::journal_kind`

Sets the journal mode of the persistent storage.

[default] `DDS_WAL_PERSISTENT_JOURNAL` (p. 399)

#### 9.132.2.5 synchronization\_kind

`DDS_PersistentSynchronizationKind DDS_PersistentStorageSettings::synchronization_kind`

Sets the level of synchronization with the physical disk.

[default] `DDS_NORMAL_PERSISTENT_SYNCHRONIZATION` (p. 400)

#### 9.132.2.6 vacuum

`DDS_Boolean DDS_PersistentStorageSettings::vacuum`

Sets the auto-vacuum status of the storage.

When auto-vacuum is `DDS_BOOLEAN_TRUE` (p. 317), the storage files will be compacted automatically with every transaction.

When auto-vacuum is `DDS_BOOLEAN_FALSE` (p. 317), after data is deleted from the storage files, the files remain the same size.

[default] `DDS_BOOLEAN_TRUE` (p. 317)

#### 9.132.2.7 restore

`DDS_Boolean DDS_PersistentStorageSettings::restore`

Indicates if the persisted writer history or reader state must be restored.

For a `DDSDataWriter` (p. 1321), this field indicates whether or not the persisted writer history must be restored once the `DataWriter` is restarted.

For a `DDSDataReader` (p. 1288), this field indicates whether or not the persisted reader state must be restored once the `DataReader` is restarted.

[default] `DDS_BOOLEAN_TRUE` (p. 317)



### 9.132.2.8 writer\_instance\_cache\_allocation

```
struct DDS_AllocationSettings_t DDS_PersistentStorageSettings::writer_instance_cache_allocation
```

Configures the resource limits associated with the instance durable writer history cache.

This field only applies to **DDSDataWriter** (p. 1321) entities.

To minimize the number of accesses to the persisted storage, RTI Connex uses an instance cache.

Do not confuse this limit with the initial and maximum number of instances that can be maintained by a **DataWriter** in persistent storage. These resource limits are configured using **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055) and **DDS\_ResourceLimitsQosPolicy::initial\_instances** (p. 1056).

If **DDS\_PersistentStorageSettings::writer\_memory\_state** (p. 995) is set to **DDS\_BOOLEAN\_TRUE** (p. 317), then the value of **DDS\_AllocationSettings\_t::max\_count** (p. 589) is set to **DDS\_LENGTH\_UNLIMITED** (p. 438), overwriting any value set by the user.

**DDS\_AllocationSettings\_t::incremental\_count** (p. 589) is ignored.

[range] **DDS\_AllocationSettings\_t::max\_count** (p. 589) in interval [1, INT\_MAX], **DDS\_LENGTH\_AUTO** (p. 433), or **DDS\_LENGTH\_UNLIMITED** (p. 438). **DDS\_AllocationSettings\_t::initial\_count** (p. 589) in interval [1, INT\_MAX], or **DDS\_LENGTH\_AUTO** (p. 433).

**DDS\_LENGTH\_AUTO** (p. 433) means that the value will be set to the equivalent value of **DDS\_ResourceLimitsQosPolicy** (p. 1052).

[default] **DDS\_AllocationSettings\_t::max\_count** (p. 589) = **DDS\_LENGTH\_AUTO** (p. 433) (= **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055)) and **DDS\_AllocationSettings\_t::initial\_count** (p. 589) = **DDS\_LENGTH\_AUTO** (p. 433) (= **DDS\_ResourceLimitsQosPolicy::initial\_instances** (p. 1056)).

### 9.132.2.9 writer\_sample\_cache\_allocation

```
struct DDS_AllocationSettings_t DDS_PersistentStorageSettings::writer_sample_cache_allocation
```

Configures the resource limits associated with the sample durable writer history cache.

This field only applies to **DDSDataWriter** (p. 1321) entities.

To minimize the number of accesses to the persisted storage, RTI Connex uses a sample cache.

Do not confuse this limit with the initial and maximum number of samples that can be maintained by a **DataWriter** in persistent storage. These resource limits are configured using **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055) and **DDS\_ResourceLimitsQosPolicy::initial\_samples** (p. 1055).

**DDS\_AllocationSettings\_t::incremental\_count** (p. 589) is ignored.

[range] **DDS\_AllocationSettings\_t::max\_count** (p. 589) in interval [1, INT\_MAX], **DDS\_LENGTH\_AUTO** (p. 433), or **DDS\_LENGTH\_UNLIMITED** (p. 438). **DDS\_AllocationSettings\_t::initial\_count** (p. 589) in interval [1, INT\_MAX], or **DDS\_LENGTH\_AUTO** (p. 433).

**DDS\_LENGTH\_AUTO** (p. 433) means that the value will be set to the equivalent value of **DDS\_ResourceLimitsQosPolicy** (p. 1052).

[default] **DDS\_AllocationSettings\_t::max\_count** (p. 589) = 32 and **DDS\_AllocationSettings\_t::initial\_count** (p. 589) = 32.

### 9.132.2.10 `writer_memory_state`

`DDS_Boolean DDS_PersistentStorageSettings::writer_memory_state`

Determines how much state will be kept in memory by the durable writer history in order to avoid accessing the persistent storage in disk.

This field only applies to `DDSDataWriter` (p. 1321) entities.

If this field is set to `DDS_BOOLEAN_TRUE` (p. 317), then `DDS_AllocationSettings_t::max_count` (p. 589) in `DDS_PersistentStorageSettings::writer_instance_cache_allocation` (p. 994) is set to `DDS_LENGTH_UNLIMITED` (p. 438), overwriting any value set by the user.

In addition, the durable writer history will keep a fixed state overhead per sample in memory. This mode provides the best durable writer history performance. However, the restore operation will be slower, and the maximum number of samples that the durable writer history can manage is limited by the available physical memory.

If this field is set to `DDS_BOOLEAN_FALSE` (p. 317), all the state will be kept in the underlying database. In this mode, the maximum number of samples in the durable writer history is not limited by the physical memory available.

This field is always set to `DDS_BOOLEAN_FALSE` (p. 317) when the DataWriter is configured with `DDS_ReliabilityQosPolicy::acknowledgment_kind` (p. 1043) set to `DDS_APPLICATION_AUTO_ACKNOWLEDGMENT_MODE` (p. 435) or `DDS_APPLICATION_EXPLICIT_ACKNOWLEDGMENT_MODE` (p. 436), or `DDS_AvailabilityQosPolicy::enable_required_subscriptions` (p. 599) is set to `DDS_BOOLEAN_TRUE` (p. 317).

[default] `DDS_BOOLEAN_TRUE` (p. 317)

### 9.132.2.11 `reader_checkpoint_frequency`

`DDS_UnsignedLong DDS_PersistentStorageSettings::reader_checkpoint_frequency`

Controls how often the reader state is stored into the database.

This field only applies to `DDSDataReader` (p. 1288) entities.

A value of N means store the state once every N received and processed samples.

The circumstances under which a data sample is considered "processed by the application" depends on the DataReader configuration.

For additional information on when a sample is considered "processed by the application" see `Durable Reader State`, in the Core Libraries User's Manual.

A high value will provide better performance. However, if the DataReader is restarted it may receive some duplicate samples.

[range] [1, 1000000] [default] 1

## 9.133 `DDS_PresentationQosPolicy` Struct Reference

Specifies how the samples representing changes to data instances are presented to a subscribing application.

## Public Attributes

- **DDS\_PresentationQosPolicyAccessScopeKind access\_scope**  
*Determines the largest scope spanning the entities for which the order and coherency of changes can be preserved.*
- **DDS\_Boolean coherent\_access**  
*Specifies support for coherent access. Controls whether coherent access is supported within the scope access\_scope.*
- **DDS\_Boolean ordered\_access**  
*Specifies support for ordered access to the samples received at the subscription end. Controls whether ordered access is supported within the scope access\_scope.*
- **DDS\_Boolean drop\_incomplete\_coherent\_set**  
*<<extension>> (p. 237) Indicates whether or not a **DDSDataReader** (p. 1288) should drop samples from an incomplete coherent set (one for which not all the samples were received). Such samples are reported as lost in the **SAMPLE\_LOST** Status.*

### 9.133.1 Detailed Description

Specifies how the samples representing changes to data instances are presented to a subscribing application.

This QoS policy controls the extent to which changes to data instances can be made dependent on each other and also the kind of dependencies that can be propagated and maintained by RTI Connext. Specifically, this policy affects the application's ability to:

- specify and receive coherent changes to instances
- specify the relative order in which changes are presented

Entity:

**DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592)

Status:

**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_↔  
STATUS** (p. 344)

Properties:

**RxO** (p. 360) = YES

**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

### 9.133.2 Usage

A **DDSDataReader** (p. 1288) will usually receive data in the order that it was sent by a **DDSDataWriter** (p. 1321), and the data is presented to the **DDSDataReader** (p. 1288) as soon as the application receives the next expected value. However, sometimes you may want a set of data for the same DataWriter or different DataWriters to be presented to the DataReader(s) only after *all* of the elements of the set have been received, but not before. Or you may want the data to be presented in a different order than that in which it was sent. Specifically for keyed data, you may want the middleware to present the data in keyed – or *instance* – order, such that samples pertaining to the same instance are presented together.

The Presentation QoS policy is a request-offered QoS policy that allows you to specify different *scopes* of presentation. It also controls whether or not a set of changes within the scope is delivered at the same time or can be delivered as soon as each element is received.

- `coherent_access` controls whether RTI Connexx will preserve the groupings of changes made by a publishing application by means of the operations **DDSPublisher::begin\_coherent\_changes** (p. 1564) and **DDSPublisher::end\_coherent\_changes** (p. 1565).
- `ordered_access` controls whether RTI Connexx will preserve the order of changes.
- `access_scope` controls the granularity of the other settings. See below:

If `coherent_access` is set, then the `access_scope` set on the **DDSSubscriber** (p. 1592) controls the maximum extent of coherent changes. The behavior is as follows:

- If `access_scope` is set to **DDS\_INSTANCE\_PRESENTATION\_QOS** (p. 418) (the default), the behavior is the same as **DDS\_TOPIC\_PRESENTATION\_QOS** (p. 418).
- If `access_scope` is set to **DDS\_TOPIC\_PRESENTATION\_QOS** (p. 418), then coherent changes (indicated by their enclosure within calls to **DDSPublisher::begin\_coherent\_changes** (p. 1564) and **DDSPublisher::end\_coherent\_changes** (p. 1565)) will be made available as a unit to each remote **DDSDataReader** (p. 1288) independently. That is, changes made to instances within each individual **DDSDataWriter** (p. 1321) will be presented as a unit. They will not be grouped with changes made to instances belonging to a different **DDSDataWriter** (p. 1321).
- If `access_scope` is set to **DDS\_GROUP\_PRESENTATION\_QOS** (p. 418), then coherent changes made to instances through a set of **DDSDataWriter** (p. 1321) entities attached to a common **DDSPublisher** (p. 1550) will be made available as a unit to the **DDSDataReader** (p. 1288) entities within a **DDSSubscriber** (p. 1592).

If `ordered_access` is set, then the `access_scope` set on the **DDSSubscriber** (p. 1592) controls the maximum extent to which order will be preserved by RTI Connexx.

- If `access_scope` is set to **DDS\_INSTANCE\_PRESENTATION\_QOS** (p. 418) (the lowest level), then the relative order of DDS samples sent by a **DDSDataWriter** (p. 1321) is only preserved on a per-instance basis. If two DDS samples refer to the same instance (identified by Topic and a particular value for the key), then the order in which they are stored in the **DDSDataReader** (p. 1288) queue is consistent with the order in which the changes occurred. However, if the two DDS samples belong to different instances, the order in which they are presented may or may not match the order in which the changes occurred. This is the case even if it is the same application thread making the changes using the same **DDSDataWriter** (p. 1321).

- If `access_scope` is set to **DDS\_TOPIC\_PRESENTATION\_QOS** (p. 418), changes (creations, deletions, modifications) made by a single **DDSDataWriter** (p. 1321) to one or more instances are presented to a **DDSDataReader** (p. 1288) in the same order in which they occur. Changes made to instances through different **DDSDataWriter** (p. 1321) entities are not required to be presented in the order in which they occur. This is the case even if the changes are made by a single application thread using **DDSDataWriter** (p. 1321) objects attached to the same **DDSPublisher** (p. 1550).
- Finally, if `access_scope` is set to **DDS\_GROUP\_PRESENTATION\_QOS** (p. 418), changes made to instances via **DDSDataWriter** (p. 1321) entities attached to the same **DDSPublisher** (p. 1550) object are presented to the **DDSDataReader** (p. 1288) entities within a **DDSSubscriber** (p. 1592) in the same order in which they occur. For this to happen, the application must take the samples using the Subscriber's **DDSSubscriber::begin\_access** (p. 1605) and **DDSSubscriber::end\_access** (p. 1606) operations (see the "Ordered Access" section in the "PRESENTATION QosPolicy" section of the [Core Libraries User's Manual](http://manual.rti.com/manual/RTI_ConnextDDS_CoreLibraries_UsersManual.pdf)).

If `access_scope` is set to **DDS\_HIGHEST\_OFFERED\_PRESENTATION\_QOS** (p. 418) on the **DDSSubscriber** (p. 1592), then the **DDSSubscriber** (p. 1592) will use the `access_scope` offered by the remote **DDSPublisher** (p. 1550).

Note that this QoS policy controls the scope at which related changes are made available to the subscriber. This means the subscriber **can** access the changes in a coherent manner and in the proper order; however, it does not necessarily imply that the **DDSSubscriber** (p. 1592) **will** indeed access the changes in the correct order. For that to occur, the application at the subscriber end must use the proper logic in reading the **DDSDataReader** (p. 1288) objects.

For **DDS\_GROUP\_PRESENTATION\_QOS** (p. 418) the subscribing application must use the APIs **DDSSubscriber::begin\_access** (p. 1605), **DDSSubscriber::end\_access** (p. 1606) and **DDSSubscriber::get\_datareaders** (p. 1606) to access the changes in the proper order. If you do not use these operations, the data may not be ordered across DataWriters that belong to the same **DDSPublisher** (p. 1550).

The field **DDS\_SampleInfo::coherent\_set\_info** (p. 1092) is set when a sample is part of a coherent set. This field provides information to identify the coherent set that a sample is part of. In addition, **DDS\_CoherentSetInfo\_t::incomplete\_coherent\_set** (p. 614) indicates if a sample is part of an incomplete coherent set (one for which not all samples have been received). Coherent sets for which some of the samples are filtered out by content or time on the **DDSDataWriter** (p. 1321) are considered incomplete.

By default, the samples that are received from an incomplete coherent set are dropped by the DataReader(s) and they are not provided to the application. Such samples are reported as lost in the `SAMPLE_LOST` Status. By setting **DDS\_PresentationQosPolicy::drop\_incomplete\_coherent\_set** (p. 1000) to **DDS\_BOOLEAN\_FALSE** (p. 317), you can change this behavior and, in this case, samples from incomplete coherent sets will be provided to the application. These samples have **DDS\_CoherentSetInfo\_t::incomplete\_coherent\_set** (p. 614) set to **DDS\_BOOLEAN\_TRUE** (p. 317).

### 9.133.3 Compatibility

The value offered is considered compatible with the value requested if and only if the following conditions are met:

- the inequality *offered access\_scope*  $\geq$  *requested access\_scope* evaluates to 'TRUE' or requested `access_scope` is **DDS\_HIGHEST\_OFFERED\_PRESENTATION\_QOS** (p. 418). For the purposes of this inequality, the values of `access_scope` are considered ordered such that **DDS\_INSTANCE\_PRESENTATION\_QOS** (p. 418)  $<$  **DDS\_TOPIC\_PRESENTATION\_QOS** (p. 418)  $<$  **DDS\_GROUP\_PRESENTATION\_QOS** (p. 418).
- requested `coherent_access` is **DDS\_BOOLEAN\_FALSE** (p. 317), or else both offered and requested `coherent_access` are **DDS\_BOOLEAN\_TRUE** (p. 317).
- requested `ordered_access` is **DDS\_BOOLEAN\_FALSE** (p. 317), or else both offered and requested `ordered_access` are **DDS\_BOOLEAN\_TRUE** (p. 317).

## 9.133.4 Member Data Documentation

### 9.133.4.1 access\_scope

`DDS_PresentationQosPolicyAccessScopeKind DDS_PresentationQosPolicy::access_scope`

Determines the largest scope spanning the entities for which the order and coherency of changes can be preserved.

[default] `DDS_INSTANCE_PRESENTATION_QOS` (p. 418)

### 9.133.4.2 coherent\_access

`DDS_Boolean DDS_PresentationQosPolicy::coherent_access`

Specifies support for *coherent* access. Controls whether coherent access is supported within the scope `access_scope`.

That is, the ability to group a set of changes as a unit on the publishing end such that they are received as a unit at the subscribing end.

Note: To use this feature, the DataWriter must be configured for RELIABLE communication (see `DDS_RELIABLE_RELIABILITY_QOS` (p. 435)).

[default] `DDS_BOOLEAN_FALSE` (p. 317)

### 9.133.4.3 ordered\_access

`DDS_Boolean DDS_PresentationQosPolicy::ordered_access`

Specifies support for *ordered* access to the samples received at the subscription end. Controls whether ordered access is supported within the scope `access_scope`.

That is, the ability of the subscriber to see changes in the same order as they occurred on the publishing end.

[default] `DDS_BOOLEAN_FALSE` (p. 317)

### 9.133.4.4 drop\_incomplete\_coherent\_set

`DDS_Boolean DDS_PresentationQosPolicy::drop_incomplete_coherent_set`

<<*extension*>> (p. 237) Indicates whether or not a `DDSDataReader` (p. 1288) should drop samples from an incomplete coherent set (one for which not all the samples were received). Such samples are reported as lost in the `SAMPLE_LOST` Status.

Note that a coherent set will be considered incomplete if some of its samples are filtered by content or time on the DataWriter side.

By default, the samples that are received from an incomplete coherent set are dropped (and reported as lost) by the DataReader(s) and they are not provided to the application. By setting this parameter to `DDS_BOOLEAN_FALSE` (p. 317), you can change this behavior.

Samples from an incomplete coherent set have `DDS_CoherentSetInfo_t::incomplete_coherent_set` (p. 614) set to `DDS_BOOLEAN_TRUE` (p. 317) in `DDS_SampleInfo::coherent_set_info` (p. 1092).

[default] `DDS_BOOLEAN_TRUE` (p. 317)

## 9.134 DDS\_PrintFormatProperty Struct Reference

A collection of attributes used to configure how data samples will be formatted when converted to a string.

### Public Attributes

- **DDS\_PrintFormatKind kind**  
*The kind of format to be used when converting a data sample to a string.*
- **DDS\_Boolean pretty\_print**  
*Choose whether to print a data sample in a more readable format or to eliminate all white space.*
- **DDS\_Boolean enum\_as\_int**  
*Choose whether to print enum values as integers or as strings.*
- **DDS\_Boolean include\_root\_elements**  
*Choose whether or not to include the root elements of the print format in the output string.*

### 9.134.1 Detailed Description

A collection of attributes used to configure how data samples will be formatted when converted to a string.

Examples

```
HelloWorldPlugin.cxx.
```

### 9.134.2 Member Data Documentation

#### 9.134.2.1 kind

```
DDS_PrintFormatKind DDS_PrintFormatProperty::kind
```

The kind of format to be used when converting a data sample to a string.

Data samples can be represented in a default, XML, or JSON format.

See also

**DDS\_PrintFormatKind** (p. 64)

**[default] DDS\_DEFAULT\_PRINT\_FORMAT** (p. 65)

### 9.134.2.2 pretty\_print

**DDS\_Boolean** DDS\_PrintFormatProperty::pretty\_print

Choose whether to print a data sample in a more readable format or to eliminate all white space.

A value of **DDS\_BOOLEAN\_TRUE** (p.317) will add indentation and newlines to the string representation of the data sample making it more readable. For example:

```
<FooType>
  <myLong>5</myLong>
</FooType>
```

A value of **DDS\_BOOLEAN\_FALSE** (p.317) will cause all white space in the string representation of the data sample to be eliminated. For example:

```
<FooType><myLong>5</myLong></FooType>
```

**[default] DDS\_BOOLEAN\_TRUE** (p.317)

### 9.134.2.3 enum\_as\_int

**DDS\_Boolean** DDS\_PrintFormatProperty::enum\_as\_int

Choose whether to print enum values as integers or as strings.

A value of **DDS\_BOOLEAN\_TRUE** (p.317) will cause enumeration literals to be printed using their integer value. For example:

```
<FooType>
  <myEnum>5</myEnum>
</FooType>
```

A value of **DDS\_BOOLEAN\_FALSE** (p.317) will cause enumeration literals to be printed as strings using their member names. For example:

```
<FooType>
  <myEnum>RED</myEnum>
</FooType>
```

**[default] DDS\_BOOLEAN\_FALSE** (p.317)

### 9.134.2.4 include\_root\_elements

**DDS\_Boolean** DDS\_PrintFormatProperty::include\_root\_elements

Choose whether or not to include the root elements of the print format in the output string.

This field only applies if the **DDS\_PrintFormatProperty::kind** (p.1001) is **DDS\_XML\_PRINT\_FORMAT** (p.65) or **DDS\_JSON\_PRINT\_FORMAT** (p.65)

If the value is **DDS\_BOOLEAN\_TRUE** (p.317) and the kind is **DDS\_XML\_PRINT\_FORMAT** (p.65) then a top-level tag with the type's name in it will be included in the output. For example:

```
<FooType>
  <myLong>5</myLong>
</FooType>
```

If the value is **DDS\_BOOLEAN\_TRUE** (p.317) and the kind is **DDS\_JSON\_PRINT\_FORMAT** (p.65) then top-level opening and closing braces will be included in the output. For example:

```
{
  "myLong":5
}
```

If the value is **DDS\_BOOLEAN\_FALSE** (p.317) the elements described above will not be included in the output. For example:

```
<myLong>5</myLong>
"myLong":5
```

**[default] DDS\_BOOLEAN\_TRUE** (p.317)



## 9.135 DDS\_ProductVersion\_t Struct Reference

<<*extension*>> (p. 237) Type used to represent the current version of RTI Connex.

### Public Attributes

- **DDS\_Char major**  
*Major product version.*
- **DDS\_Char minor**  
*Minor product version.*
- **DDS\_Char release**  
*Release letter for product version.*
- **DDS\_Char revision**  
*Revision number of product.*

### 9.135.1 Detailed Description

<<*extension*>> (p. 237) Type used to represent the current version of RTI Connex.

### 9.135.2 Member Data Documentation

#### 9.135.2.1 major

**DDS\_Char** DDS\_ProductVersion\_t::major

Major product version.

#### 9.135.2.2 minor

**DDS\_Char** DDS\_ProductVersion\_t::minor

Minor product version.

### 9.135.2.3 release

**DDS\_Char** DDS\_ProductVersion\_t::release

Release letter for product version.

### 9.135.2.4 revision

**DDS\_Char** DDS\_ProductVersion\_t::revision

Revision number of product.

## 9.136 DDS\_ProfileQoSPolicy Struct Reference

Configures the way that XML documents containing QoS profiles are loaded by RTI Connex.

### Public Attributes

- struct **DDS\_StringSeq string\_profile**  
*Sequence of strings containing a XML document to load.*
- struct **DDS\_StringSeq url\_profile**  
*Sequence of **URL groups** (p. 199) containing a set of XML documents to load.*
- **DDS\_Boolean ignore\_user\_profile**  
*Ignores the file `USER_QOS_PROFILES.xml` in the current working directory.*
- **DDS\_Boolean ignore\_environment\_profile**  
*Ignores the value of the `NDDS_QOS_PROFILES` environment variable (p. 199).*
- **DDS\_Boolean ignore\_resource\_profile**  
*Ignores the file `NDDS_QOS_PROFILES.xml`.*

### 9.136.1 Detailed Description

Configures the way that XML documents containing QoS profiles are loaded by RTI Connex.

All QoS values for Entities can be configured in QoS profiles defined in XML documents. XML documents can be passed to RTI Connex in string form or, more likely, through files found on a file system.

There are also default locations where DomainParticipants will look for files to load QoS profiles. These include the current working directory from where an application is started, a file in the distribution directory for RTI Connex, and the locations specified by an environment variable.

You may disable any or all of these default locations using the Profile QoS policy.

Entity:

**DDSDomainParticipantFactory** (p. 1426)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p. 360) = **Changeable** (p. 360)

## 9.136.2 Member Data Documentation

### 9.136.2.1 string\_profile

```
struct DDS_StringSeq DDS_ProfileQosPolicy::string_profile
```

Sequence of strings containing a XML document to load.

The concatenation of the strings in this sequence must be a valid XML document according to the XML QoS profile schema.

**[default]** Empty sequence (zero-length).

### 9.136.2.2 url\_profile

```
struct DDS_StringSeq DDS_ProfileQosPolicy::url_profile
```

Sequence of **URL groups** (p. 199) containing a set of XML documents to load.

Only one of the elements of each group will be loaded by RTI Connext, starting from the left.

**[default]** Empty sequence (zero-length).

### 9.136.2.3 ignore\_user\_profile

```
DDS_Boolean DDS_ProfileQosPolicy::ignore_user_profile
```

Ignores the file USER\_QOS\_PROFILES.xml in the current working directory.

When this field is set to **DDS\_BOOLEAN\_TRUE** (p.317), the QoS profiles contained in the file USER\_QOS\_↔  
PROFILES.xml in the current working directory will be ignored.

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.136.2.4 ignore\_environment\_profile

```
DDS_Boolean DDS_ProfileQosPolicy::ignore_environment_profile
```

Ignores the value of the **NDDS\_QOS\_PROFILES environment variable** (p. 199).

When this field is set to **DDS\_BOOLEAN\_TRUE** (p. 317), the value of the environment variable NDDS\_QOS\_PROFILES will be ignored.

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.136.2.5 ignore\_resource\_profile

`DDS_Boolean` `DDS_ProfileQosPolicy::ignore_resource_profile`

Ignores the file `NDDS_QOS_PROFILES.xml`.

When this field is set to **DDS\_BOOLEAN\_TRUE** (p.317), the QoS profiles contained in the file `NDDS_QOS_PROFILES.xml` in `$NDDSHOME/resource/xml` will be ignored.

[default] **DDS\_BOOLEAN\_FALSE** (p.317)

## 9.137 DDS\_Property\_t Struct Reference

Properties are name/value pairs objects.

### Public Attributes

- `char * name`  
*Property name.*
- `char * value`  
*Property value.*
- **DDS\_Boolean propagate**  
*Indicates if the property must be propagated on discovery.*

### 9.137.1 Detailed Description

Properties are name/value pairs objects.

### 9.137.2 Member Data Documentation

#### 9.137.2.1 name

`char* DDS_Property_t::name`

Property name.

It must be a NULL-terminated string allocated with **DDS\_String\_alloc** (p.553) or **DDS\_String\_dup** (p.553).

### 9.137.2.2 value

```
char* DDS_Property_t::value
```

Property value.

It must be a NULL-terminated string allocated with **DDS\_String\_alloc** (p. 553) or **DDS\_String\_dup** (p. 553).

### 9.137.2.3 propagate

```
DDS_Boolean DDS_Property_t::propagate
```

Indicates if the property must be propagated on discovery.

## 9.138 DDS\_PropertyQosPolicy Struct Reference

Stores name/value(string) pairs that can be used to configure certain parameters of RTI Connex that are not exposed through formal QoS policies. Can also be used to store and propagate application-specific name/value pairs that can be retrieved by user code during discovery.

### Public Attributes

- struct **DDS\_PropertySeq** value  
*Sequence of properties.*

### 9.138.1 Detailed Description

Stores name/value(string) pairs that can be used to configure certain parameters of RTI Connex that are not exposed through formal QoS policies. Can also be used to store and propagate application-specific name/value pairs that can be retrieved by user code during discovery.

Entity:

**DDSDomainParticipant** (p. 1351) **DDSDataReader** (p. 1288) **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A;  
**Changeable** (p. 360) = **YES** (p. 360)

See also

**DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

## 9.138.2 Usage

The **PROPERTY** QoS policy can be used to associate a set of properties in the form of (name, value) pairs with a **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321), or **DDSDomainParticipant** (p. 1351). This is similar to the **DDS\_UserDataQosPolicy** (p. 1237), except this policy uses (name, value) pairs, and you can select whether or not a particular pair should be propagated (included in the builtin topic).

You can find a complete list of predefined properties in the [Property Reference Guide](#).

This QoS policy may be used to configure:

- Durable Writer History, see **Configuring Durable Writer History** (p. 193)
- Durable Reader State, see **Configuring Durable Reader State** (p. 195)
- Builtin Transport Plugins, see **UDIPv4 Transport Property Names in Property QoS Policy of Domain Participant** (p. 269), **UDIPv6 Transport Property Names in Property QoS Policy of Domain Participant** (p. 285), and **Shared Memory Transport Property Names in Property QoS Policy of Domain Participant** (p. 263)
- Extension Transport Plugins, see **Loading Transport Plugins through Property QoS Policy of Domain Participant** (p. 173)
- **Clock Selection** (p. 38)

In addition, you may add your own name/value pairs to the Property QoS policy of an Entity. Via this QoS policy, you can direct RTI Connext to propagate these name/value pairs with the discovery information for the Entity. Applications that discover the Entity can then access the user-specific name/value pairs in the discovery information of the remote Entity. This allows you to add meta-information about an Entity for application-specific use, for example, authentication/authorization certificates (which can also be done using the **DDS\_UserDataQosPolicy** (p. 1237) or **DDS\_GroupDataQosPolicy** (p. 916)).

### 9.138.2.1 Reasons for Using the PropertyQosPolicy

- Supports dynamic loading of extension transports
- Supports multiple instances of the builtin transports
- Allows full pluggable transport configuration for non-C/C++ language bindings (Java, .NET, etc.)
- Avoids the process of creating entities disabled, changing their QoS settings, then enabling them
- Allows selection of clock

Some of the RTI Connext capabilities configurable via the Property QoS policy can also be configured in code via APIs. However, the Property QoS policy allows you to configure those parameters via XML files. In addition, some of the configuration APIs will only work if the Entity was created in a disabled state and then enabled after the configuration change was applied. By configuring those parameters using the Property QoS policy during entity creation, you avoid the additional work of first creating a disabled entity and then enabling it afterwards.

There are helper functions to facilitate working with properties, see the **PROPERTY** (p. 419) page.

### 9.138.3 Member Data Documentation

#### 9.138.3.1 value

```
struct DDS_PropertySeq DDS_PropertyQosPolicy::value
```

Sequence of properties.

[default] An empty list.

## 9.139 DDS\_PropertySeq Struct Reference

Declares IDL `sequence < DDS_Property_t (p. 1006) >`

### 9.139.1 Detailed Description

Declares IDL `sequence < DDS_Property_t (p. 1006) >`

See also

`DDS_Property_t` (p. 1006)

## 9.140 DDS\_ProtocolVersion\_t Struct Reference

`<<extension>>` (p. 237) Type used to represent the version of the RTPS protocol.

### Public Attributes

- `DDS_Octet major`  
*Major protocol version number.*
- `DDS_Octet minor`  
*Minor protocol version number.*

### 9.140.1 Detailed Description

`<<extension>>` (p. 237) Type used to represent the version of the RTPS protocol.

## 9.140.2 Member Data Documentation

### 9.140.2.1 major

`DDS_Octet DDS_ProtocolVersion_t::major`

Major protocol version number.

### 9.140.2.2 minor

`DDS_Octet DDS_ProtocolVersion_t::minor`

Minor protocol version number.

## 9.141 DDS\_PublicationBuiltinTopicData Struct Reference

Entry created when a `DDSDataWriter` (p. 1321) is discovered in association with its Publisher.

### Public Attributes

- **DDS\_BuiltinTopicKey\_t key**  
*DCPS key to distinguish entries.*
- **DDS\_BuiltinTopicKey\_t participant\_key**  
*DCPS key of the participant to which the DataWriter belongs.*
- char \* **topic\_name**  
*Name of the related **DDSTopic** (p. 1617).*
- char \* **type\_name**  
*Name of the type attached to the **DDSTopic** (p. 1617).*
- struct **DDS\_DurabilityQosPolicy durability**  
*durability policy of the corresponding DataWriter*
- struct **DDS\_DurabilityServiceQosPolicy durability\_service**  
*durability\_service policy of the corresponding DataWriter*
- struct **DDS\_DeadlineQosPolicy deadline**  
*Policy of the corresponding DataWriter.*
- struct **DDS\_LatencyBudgetQosPolicy latency\_budget**  
*Policy of the corresponding DataWriter.*
- struct **DDS\_LivelinessQosPolicy liveliness**  
*Policy of the corresponding DataWriter.*
- struct **DDS\_ReliabilityQosPolicy reliability**



- Policy of the corresponding DataWriter.*

  - struct **DDS\_LifespanQosPolicy** **lifespan**
- Policy of the corresponding DataWriter.*

  - struct **DDS\_UserDataQosPolicy** **user\_data**
- Policy of the corresponding DataWriter.*

  - struct **DDS\_OwnershipQosPolicy** **ownership**
- Policy of the corresponding DataWriter.*

  - struct **DDS\_OwnershipStrengthQosPolicy** **ownership\_strength**
- Policy of the corresponding DataWriter.*

  - struct **DDS\_DestinationOrderQosPolicy** **destination\_order**
- Policy of the Publisher to which the DataWriter belongs.*

  - struct **DDS\_PresentationQosPolicy** **presentation**
- Policy of the Publisher to which the DataWriter belongs.*

  - struct **DDS\_PartitionQosPolicy** **partition**
- Policy of the related Topic.*

  - struct **DDS\_TopicDataQosPolicy** **topic\_data**
- Policy of the Publisher to which the DataWriter belongs.*

  - struct **DDS\_GroupDataQosPolicy** **group\_data**
- Data representation policy of the corresponding DataWriter.*

  - struct **DDS\_DataRepresentationQosPolicy** **representation**
- Tags of the corresponding DataWriter.*

  - **DDS\_DataTagQosPolicy** **data\_tags**
- <<extension>> (p. 237) Type code information of the corresponding Topic*

  - struct **DDS\_TypeCode** \* **type\_code**
- <<extension>> (p. 237) DCPS key of the publisher to which the DataWriter belongs*

  - **DDS\_BuiltinTopicKey\_t** **publisher\_key**
- <<extension>> (p. 237) Properties of the corresponding DataWriter.*

  - struct **DDS\_PropertyQosPolicy** **property**
- <<extension>> (p. 237) Custom unicast locators that the endpoint can specify. The default locators will be used if this is not specified.*

  - struct **DDS\_LocatorSeq** **unicast\_locators**
- <<extension>> (p. 237) Virtual GUID associated to the DataWriter.*

  - struct **DDS\_GUID\_t** **virtual\_guid**
- <<extension>> (p. 237) Policy of the corresponding DataWriter.*

  - struct **DDS\_ServiceQosPolicy** **service**
- <<extension>> (p. 237) Version number of the RTPS wire protocol used.*

  - **DDS\_ProtocolVersion\_t** **rtps\_protocol\_version**
- <<extension>> (p. 237) ID of vendor implementing the RTPS wire protocol.*

  - struct **DDS\_VendorId\_t** **rtps\_vendor\_id**
- <<extension>> (p. 237) This is a vendor specific parameter. It gives the current version for rti-dds.*

  - struct **DDS\_ProductVersion\_t** **product\_version**
- <<extension>> (p. 237) Policy of the corresponding DataWriter*

  - struct **DDS\_LocatorFilterQosPolicy** **locator\_filter**
- <<extension>> (p. 237) This is a vendor specific parameter. Determines whether matching DataReaders send positive acknowledgements for reliability.*

  - **DDS\_Boolean** **disable\_positive\_acks**

- struct **DDS\_EntityNameQosPolicy** `publication_name`  
 <<*extension*>> (p. 237) *The publication name and role name.*
- struct **DDS\_EndpointTrustProtectionInfo** `trust_protection_info`  
 <<*extension*>> (p. 237) *Trust Plugins protection information associated with the discovered DataWriter.*
- struct **DDS\_EndpointTrustAlgorithmInfo** `trust_algorithm_info`  
 <<*extension*>> (p. 237) *Trust Plugins algorithms associated with the discovered DataWriter.*

### 9.141.1 Detailed Description

Entry created when a **DDSDataWriter** (p. 1321) is discovered in association with its Publisher.

Data associated with the built-in topic **DDS\_PUBLICATION\_TOPIC\_NAME** (p. 298). It contains QoS policies and additional information that apply to the remote **DDSDataWriter** (p. 1321) the related **DDSPublisher** (p. 1550).

See also

**DDS\_PUBLICATION\_TOPIC\_NAME** (p. 298)

**DDSPublicationBuiltinTopicDataDataReader** (p. 1549)

### 9.141.2 Member Data Documentation

#### 9.141.2.1 key

`DDS_BuiltinTopicKey_t` `DDS_PublicationBuiltinTopicData::key`

DCPS key to distinguish entries.

#### 9.141.2.2 participant\_key

`DDS_BuiltinTopicKey_t` `DDS_PublicationBuiltinTopicData::participant_key`

DCPS key of the participant to which the DataWriter belongs.

### 9.141.2.3 topic\_name

```
char* DDS_PublicationBuiltinTopicData::topic_name
```

Name of the related **DDSTopic** (p. 1617).

The length of this string is limited to 255 characters.

The memory for this field is managed as described in **String Conventions** (p. 552).

See also

**String Conventions** (p. 552)

### 9.141.2.4 type\_name

```
char* DDS_PublicationBuiltinTopicData::type_name
```

Name of the type attached to the **DDSTopic** (p. 1617).

The length of this string is limited to 255 characters.

The memory for this field is managed as described in **String Conventions** (p. 552).

See also

**String Conventions** (p. 552)

### 9.141.2.5 durability

```
struct DDS_DurabilityQosPolicy DDS_PublicationBuiltinTopicData::durability
```

durability policy of the corresponding DataWriter

### 9.141.2.6 durability\_service

```
struct DDS_DurabilityServiceQosPolicy DDS_PublicationBuiltinTopicData::durability_service
```

durability\_service policy of the corresponding DataWriter

#### 9.141.2.7 deadline

```
struct DDS_DeadlineQosPolicy DDS_PublicationBuiltinTopicData::deadline
```

Policy of the corresponding DataWriter.

#### 9.141.2.8 latency\_budget

```
struct DDS_LatencyBudgetQosPolicy DDS_PublicationBuiltinTopicData::latency_budget
```

Policy of the corresponding DataWriter.

#### 9.141.2.9 liveliness

```
struct DDS_LivelinessQosPolicy DDS_PublicationBuiltinTopicData::liveliness
```

Policy of the corresponding DataWriter.

#### 9.141.2.10 reliability

```
struct DDS_ReliabilityQosPolicy DDS_PublicationBuiltinTopicData::reliability
```

Policy of the corresponding DataWriter.

#### 9.141.2.11 lifespan

```
struct DDS_LifespanQosPolicy DDS_PublicationBuiltinTopicData::lifespan
```

Policy of the corresponding DataWriter.

#### 9.141.2.12 user\_data

```
struct DDS_UserDataQosPolicy DDS_PublicationBuiltinTopicData::user_data
```

Policy of the corresponding DataWriter.

### 9.141.2.13 ownership

```
struct DDS_OwnershipQosPolicy DDS_PublicationBuiltinTopicData::ownership
```

Policy of the corresponding DataWriter.

### 9.141.2.14 ownership\_strength

```
struct DDS_OwnershipStrengthQosPolicy DDS_PublicationBuiltinTopicData::ownership_strength
```

Policy of the corresponding DataWriter.

### 9.141.2.15 destination\_order

```
struct DDS_DestinationOrderQosPolicy DDS_PublicationBuiltinTopicData::destination_order
```

Policy of the corresponding DataWriter.

#### Warning

Only the field **DDS\_DestinationOrderQosPolicy::kind** (p. 711) is propagated during discovery. The other fields always contain their default values.

### 9.141.2.16 presentation

```
struct DDS_PresentationQosPolicy DDS_PublicationBuiltinTopicData::presentation
```

Policy of the Publisher to which the DataWriter belongs.

### 9.141.2.17 partition

```
struct DDS_PartitionQosPolicy DDS_PublicationBuiltinTopicData::partition
```

Policy of the Publisher to which the DataWriter belongs.

#### 9.141.2.18 topic\_data

```
struct DDS_TopicDataQosPolicy DDS_PublicationBuiltinTopicData::topic_data
```

Policy of the related Topic.

#### 9.141.2.19 group\_data

```
struct DDS_GroupDataQosPolicy DDS_PublicationBuiltinTopicData::group_data
```

Policy of the Publisher to which the DataWriter belongs.

#### 9.141.2.20 representation

```
struct DDS_DataRepresentationQosPolicy DDS_PublicationBuiltinTopicData::representation
```

Data representation policy of the corresponding DataWriter.

#### 9.141.2.21 data\_tags

```
DDS_DataTagQosPolicy DDS_PublicationBuiltinTopicData::data_tags
```

Tags of the corresponding DataWriter.

#### 9.141.2.22 type\_code

```
struct DDS_TypeCode* DDS_PublicationBuiltinTopicData::type_code
```

<<*extension*>> (p. 237) Type code information of the corresponding Topic

#### 9.141.2.23 publisher\_key

```
DDS_BuiltinTopicKey_t DDS_PublicationBuiltinTopicData::publisher_key
```

<<*extension*>> (p. 237) DCPS key of the publisher to which the DataWriter belongs

#### 9.141.2.24 property

```
struct DDS_PropertyQosPolicy DDS_PublicationBuiltinTopicData::property
```

<<*extension*>> (p. 237) Properties of the corresponding DataWriter.

#### 9.141.2.25 unicast\_locators

```
struct DDS_LocatorSeq DDS_PublicationBuiltinTopicData::unicast_locators
```

<<*extension*>> (p. 237) Custom unicast locators that the endpoint can specify. The default locators will be used if this is not specified.

#### 9.141.2.26 virtual\_guid

```
struct DDS_GUID_t DDS_PublicationBuiltinTopicData::virtual_guid
```

<<*extension*>> (p. 237) Virtual GUID associated to the DataWriter.

See also

**DDS\_GUID\_t** (p. 918)

#### 9.141.2.27 service

```
struct DDS_ServiceQosPolicy DDS_PublicationBuiltinTopicData::service
```

<<*extension*>> (p. 237) Policy of the corresponding DataWriter.

#### 9.141.2.28 rtps\_protocol\_version

```
DDS_ProtocolVersion_t DDS_PublicationBuiltinTopicData::rtps_protocol_version
```

<<*extension*>> (p. 237) Version number of the RTPS wire protocol used.

### 9.141.2.29 rtps\_vendor\_id

```
struct DDS_VendorId_t DDS_PublicationBuiltinTopicData::rtps_vendor_id
```

<<*extension*>> (p. 237) ID of vendor implementing the RTPS wire protocol.

### 9.141.2.30 product\_version

```
struct DDS_ProductVersion_t DDS_PublicationBuiltinTopicData::product_version
```

<<*extension*>> (p. 237) This is a vendor specific parameter. It gives the current version for rti-dds.

### 9.141.2.31 locator\_filter

```
struct DDS_LocatorFilterQosPolicy DDS_PublicationBuiltinTopicData::locator_filter
```

<<*extension*>> (p. 237) Policy of the corresponding DataWriter

Related to **DDS\_MultiChannelQosPolicy** (p. 964).

### 9.141.2.32 disable\_positive\_acks

```
DDS_Boolean DDS_PublicationBuiltinTopicData::disable_positive_acks
```

<<*extension*>> (p. 237) This is a vendor specific parameter. Determines whether matching DataReaders send positive acknowledgements for reliability.

### 9.141.2.33 publication\_name

```
struct DDS_EntityNameQosPolicy DDS_PublicationBuiltinTopicData::publication_name
```

<<*extension*>> (p. 237) The publication name and role name.

This member contains the name and the role name of the discovered publication.



### 9.141.2.34 trust\_protection\_info

```
struct DDS_EndpointTrustProtectionInfo DDS_PublicationBuiltinTopicData::trust_protection_info
```

<<*extension*>> (p. 237) Trust Plugins protection information associated with the discovered DataWriter.

Trust Plugins is a generic abstraction that represents any plugin intended to do transformation, interception, and validation of exchanged data and metadata.

trust\_protection\_info contains information about how RTPS wire serialization, discovery, and liveliness interact with the loaded Trust Plugins. Two endpoints will not match if their trust\_protection\_info is incompatible.

The meaning of the contents of this field may vary depending on what Trust Plugins the endpoint is using. For information about how this field interacts with the RTI Security Plugins, please refer to the [RTI Security Plugins User's Manual](#).

### 9.141.2.35 trust\_algorithm\_info

```
struct DDS_EndpointTrustAlgorithmInfo DDS_PublicationBuiltinTopicData::trust_algorithm_info
```

<<*extension*>> (p. 237) Trust Plugins algorithms associated with the discovered DataWriter.

Trust Plugins is a generic abstraction that represents any plugin intended to do transformation, interception, and validation of exchanged data and metadata.

trust\_algorithm\_info contains information about what algorithms the loaded Trust Plugins are running. Two endpoints will not match if their trust\_algorithm\_info are incompatible.

The meaning of the contents of this field may vary depending on what Trust Plugins the endpoint is using. For information about how this field interacts with the RTI Security Plugins, please refer to the [RTI Security Plugins User's Manual](#).

## 9.142 DDS\_PublicationBuiltinTopicDataSeq Struct Reference

Instantiates [FooSeq](#) (p. 1697) < [DDS\\_PublicationBuiltinTopicData](#) (p. 1010) > .

### 9.142.1 Detailed Description

Instantiates [FooSeq](#) (p. 1697) < [DDS\\_PublicationBuiltinTopicData](#) (p. 1010) > .

Instantiates:

<<*generic*>> (p. 237) [FooSeq](#) (p. 1697)

See also

[DDS\\_PublicationBuiltinTopicData](#) (p. 1010)

## 9.143 DDS\_PublicationMatchedStatus Struct Reference

**DDS\_PUBLICATION\_MATCHED\_STATUS** (p. 347)

### Public Attributes

- **DDS\_Long total\_count**  
*The total cumulative number of times that this **DDSDataWriter** (p. 1321) discovered a "match" with a **DDSDataReader** (p. 1288).*
- **DDS\_Long total\_count\_change**  
*The changes in total\_count since the last time the listener was called or the status was read.*
- **DDS\_Long current\_count**  
*The current number of DataReaders with which this **DDSDataWriter** (p. 1321) is matched.*
- **DDS\_Long current\_count\_peak**  
*<<extension>> (p. 237) Greatest number of DataReaders that matched this **DDSDataWriter** (p. 1321) simultaneously.*
- **DDS\_Long current\_count\_change**  
*The change in current\_count since the last time the listener was called or the status was read.*
- **DDS\_InstanceHandle\_t last\_subscription\_handle**  
*This InstanceHandle can be used to look up which remote **DDSDataReader** (p. 1288) was the last to cause this Data↔Writer's status to change, using **DDSDataWriter::get\_matched\_subscription\_data** (p. 1332).*

### 9.143.1 Detailed Description

**DDS\_PUBLICATION\_MATCHED\_STATUS** (p. 347)

A "match" happens when the **DDSDataWriter** (p. 1321) finds a **DDSDataReader** (p. 1288) with the same **DDSTopic** (p. 1617), same or compatible data type, and requested QoS that is compatible with that offered by the **DDSDataWriter** (p. 1321). (For information on compatible data types, see the `Extensible Types Guide`.)

This status is also changed (and the listener, if any, called) when a match is ended. A local **DDSDataWriter** (p. 1321) will become "unmatched" from a remote **DDSDataReader** (p. 1288) when that **DDSDataReader** (p. 1288) goes away for any of the following reasons:

- The matched **DDSDataReader** (p. 1288)'s **DDSDomainParticipant** (p. 1351) has lost liveliness.
- This DataWriter or the matched DataReader has changed QoS such that the entities are now incompatible.
- The matched DataReader has been deleted.

This status may reflect changes from multiple match or unmatched events, and the **DDS\_PublicationMatchedStatus**↔**::current\_count\_change** (p. 1021) can be used to determine the number of changes since the listener was called back or the status was checked.

### 9.143.2 Member Data Documentation

### 9.143.2.1 total\_count

```
DDS_Long DDS_PublicationMatchedStatus::total_count
```

The total cumulative number of times that this **DDSDataWriter** (p. 1321) discovered a "match" with a **DDSDataReader** (p. 1288).

This number increases whenever a new match is discovered. It does not decrease when an existing match goes away for any of the reasons described in **DDS\_PublicationMatchedStatus** (p. 1020).

### 9.143.2.2 total\_count\_change

```
DDS_Long DDS_PublicationMatchedStatus::total_count_change
```

The changes in total\_count since the last time the listener was called or the status was read.

Note that this number will never be negative (because it's the total number of times this DataWriter ever matched with a DataReader).

### 9.143.2.3 current\_count

```
DDS_Long DDS_PublicationMatchedStatus::current_count
```

The current number of DataReaders with which this **DDSDataWriter** (p. 1321) is matched.

This number increases when a new match is discovered and decreases when an existing match goes away for any of the reasons described in **DDS\_PublicationMatchedStatus** (p. 1020).

### 9.143.2.4 current\_count\_peak

```
DDS_Long DDS_PublicationMatchedStatus::current_count_peak
```

<<*extension*>> (p. 237) Greatest number of DataReaders that matched this **DDSDataWriter** (p. 1321) simultaneously.

That is, there was no moment in time when more than this many DataReaders matched this DataWriter. (As a result, total\_count can be higher than current\_count\_peak.)

### 9.143.2.5 current\_count\_change

```
DDS_Long DDS_PublicationMatchedStatus::current_count_change
```

The change in current\_count since the last time the listener was called or the status was read.

Note that a negative current\_count\_change means that one or more DataReaders have become unmatched for one or more of the reasons described in **DDS\_PublicationMatchedStatus** (p. 1020).

### 9.143.2.6 last\_subscription\_handle

```
DDS_InstanceHandle_t DDS_PublicationMatchedStatus::last_subscription_handle
```

This InstanceHandle can be used to look up which remote **DDSDataReader** (p. 1288) was the last to cause this DataWriter's status to change, using **DDSDataWriter::get\_matched\_subscription\_data** (p. 1332).

If the DataReader no longer matches this DataWriter due to any of the reasons in **DDS\_PublicationMatchedStatus** (p. 1020) except incompatible QoS, then the DataReader has been purged from this DataWriter's DomainParticipant discovery database. (See the "Discovery Overview" section of the *User's Manual*.) In that case, the **DDSDataWriter::get\_matched\_subscription\_data** (p. 1332) method will not be able to return information about the DataReader. The only way to get information about the lost DataReader is if you cached the information previously.

## 9.144 DDS\_PublisherQos Struct Reference

QoS policies supported by a **DDSPublisher** (p. 1550) entity.

### Public Member Functions

- bool **operator==** (const **DDS\_PublisherQos** &r) const  
*Compares two PublisherQos objects for equality.*
- bool **operator!=** (const **DDS\_PublisherQos** &r) const  
*Compares two PublisherQos objects for inequality.*
- **DDS\_ReturnCode\_t print** () const  
*Prints this DDS\_PublisherQos (p. 1022) to stdout.*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
*Obtains a string representation of this DDS\_PublisherQos (p. 1022).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_PublisherQos** &base) const  
*Obtains a string representation of this DDS\_PublisherQos (p. 1022).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this DDS\_PublisherQos (p. 1022).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_PublisherQos** &base, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this DDS\_PublisherQos (p. 1022).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const  
*Obtains a string representation of this DDS\_PublisherQos (p. 1022).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this DDS\_PublisherQos (p. 1022).*

## Public Attributes

- struct **DDS\_PresentationQosPolicy** **presentation**  
*Presentation policy, **PRESENTATION** (p. 417).*
- struct **DDS\_PartitionQosPolicy** **partition**  
*Partition policy, **PARTITION** (p. 416).*
- struct **DDS\_GroupDataQosPolicy** **group\_data**  
*Group data policy, **GROUP\_DATA** (p. 406).*
- struct **DDS\_EntityFactoryQosPolicy** **entity\_factory**  
*Entity factory policy, **ENTITY\_FACTORY** (p. 402).*
- struct **DDS\_AsynchronousPublisherQosPolicy** **asynchronous\_publisher**  
*<<extension>> (p. 237) Asynchronous publishing settings for the **DDSPublisher** (p. 1550) and all entities that are created by it.*
- struct **DDS\_EntityNameQosPolicy** **publisher\_name**  
*<<extension>> (p. 237) EntityName policy, **ENTITY\_NAME** (p. 403).*

### 9.144.1 Detailed Description

QoS policies supported by a **DDSPublisher** (p. 1550) entity.

You must set certain members in a consistent manner:

length of **DDS\_GroupDataQosPolicy::value** (p. 918) <= **DDS\_DomainParticipantResourceLimitsQosPolicy::publisher\_group\_data\_max\_length** (p. 758)

length of **DDS\_PartitionQosPolicy::name** (p. 991) <= **DDS\_DomainParticipantResourceLimitsQosPolicy::max\_partitions** (p. 759)

combined number of characters (including terminating 0) in **DDS\_PartitionQosPolicy::name** (p. 991) <= **DDS\_DomainParticipantResourceLimitsQosPolicy::max\_partition\_cumulative\_characters** (p. 759)

If any of the above are not true, **DDSPublisher::set\_qos** (p. 1568) and **DDSPublisher::set\_qos\_with\_profile** (p. 1569) will fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337) and **DDSDomainParticipant::create\_publisher** (p. 1376) will return NULL.

### 9.144.2 Member Function Documentation

#### 9.144.2.1 operator==( )

```
bool DDS_PublisherQos::operator==(
    const DDS_PublisherQos & r ) const [inline]
```

Compares two PublisherQos objects for equality.

See also

**DDS\_PublisherQos\_equals** (p. 105)

References **DDS\_PublisherQos\_equals()**.

### 9.144.2.2 operator"!=()

```
bool DDS_PublisherQos::operator!= (
    const DDS_PublisherQos & r ) const [inline]
```

Compares two PublisherQos objects for inequality.

See also

**DDS\_PublisherQos\_equals** (p. 105)

References **DDS\_PublisherQos\_equals()**.

## 9.144.3 Member Data Documentation

### 9.144.3.1 presentation

```
struct DDS_PresentationQosPolicy DDS_PublisherQos::presentation
```

Presentation policy, **PRESENTATION** (p. 417).

### 9.144.3.2 partition

```
struct DDS_PartitionQosPolicy DDS_PublisherQos::partition
```

Partition policy, **PARTITION** (p. 416).

### 9.144.3.3 group\_data

```
struct DDS_GroupDataQosPolicy DDS_PublisherQos::group_data
```

Group data policy, **GROUP\_DATA** (p. 406).

#### 9.144.3.4 entity\_factory

```
struct DDS_EntityFactoryQosPolicy DDS_PublisherQos::entity_factory
```

Entity factory policy, **ENTITY\_FACTORY** (p. 402).

#### 9.144.3.5 asynchronous\_publisher

```
struct DDS_AsynchronousPublisherQosPolicy DDS_PublisherQos::asynchronous_publisher
```

<<*extension*>> (p. 237) Asynchronous publishing settings for the **DDSPublisher** (p. 1550) and all entities that are created by it.

#### 9.144.3.6 publisher\_name

```
struct DDS_EntityNameQosPolicy DDS_PublisherQos::publisher_name
```

<<*extension*>> (p. 237) EntityName policy, **ENTITY\_NAME** (p. 403).

## 9.145 DDS\_PublishModeQosPolicy Struct Reference

Specifies how RTI Connext sends application data on the network. This QoS policy can be used to tell RTI Connext to use its *own* thread to send data, instead of the user thread.

### Public Attributes

- **DDS\_PublishModeQosPolicyKind** kind  
*Publishing mode.*
- char \* **flow\_controller\_name**  
*Name of the associated flow controller.*
- **DDS\_Long** priority  
*Publication priority.*

### 9.145.1 Detailed Description

Specifies how RTI Connexx sends application data on the network. This QoS policy can be used to tell RTI Connexx to use its *own* thread to send data, instead of the user thread.

The publishing mode of a **DDSDataWriter** (p. 1321) determines whether data is written synchronously in the context of the user thread when calling **FooDataWriter::write** (p. 1683) or asynchronously in the context of a separate thread internal to the middleware.

Each **DDSPublisher** (p. 1550) spawns a single asynchronous publishing thread (**DDS\_AsynchronousPublisherQosPolicy::thread** (p. 592)) to serve all its asynchronous **DDSDataWriter** (p. 1321) instances.

See also

**DDS\_AsynchronousPublisherQosPolicy** (p. 590)

**DDS\_HistoryQosPolicy** (p. 919)

**DDSFlowController** (p. 1468)

Entity:

**DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.145.2 Usage

The fastest way for RTI Connexx to send data is for the user thread to execute the middleware code that actually sends the data itself. However, there are times when user applications may need or want an internal middleware thread to send the data instead. For instance, to send large data reliably, you must use an asynchronous thread.

When data is written asynchronously, a **DDSFlowController** (p. 1468), identified by `flow_controller_name`, can be used to shape the network traffic. Shaping a data flow usually means limiting the maximum data rates at which the middleware will send data for a **DDSDataWriter** (p. 1321). The flow controller will buffer any excess data and only send it when the send rate drops below the maximum rate. The flow controller's properties determine when the asynchronous publishing thread is allowed to send data and how much.

Asynchronous publishing may increase latency, but offers the following advantages:

- The **FooDataWriter::write** (p. 1683) call does not make any network calls and is therefore faster and more deterministic. This becomes important when the user thread is executing time-critical code.
- When data is written in bursts or when sending large data types as multiple fragments, a flow controller can throttle the send rate of the asynchronous publishing thread to avoid flooding the network.



- Asynchronously written samples for the same destination will be coalesced into a single network packet which reduces bandwidth consumption.

The maximum number of samples that will be coalesced depends on **NDDS\_Transport\_Property\_t::gather\_send\_↔buffer\_count\_max** (p. 1779) (each sample requires at least 2-4 gather-send buffers). Performance can be improved by increasing **NDDS\_Transport\_Property\_t::gather\_send\_buffer\_count\_max** (p. 1779). Note that the maximum value is operating system dependent.

The middleware must queue samples until they can be sent by the asynchronous publishing thread (as determined by the corresponding **DDSFlowController** (p. 1468)). The number of samples that will be queued is determined by the **DDS\_HistoryQosPolicy** (p. 919). When using **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406), only the most recent **DDS\_HistoryQosPolicy::depth** (p. 921) samples are kept in the queue. Once unsent samples are removed from the queue, they are no longer available to the asynchronous publishing thread and will therefore never be sent.

### 9.145.3 Member Data Documentation

#### 9.145.3.1 kind

```
DDS_PublishModeQosPolicyKind DDS_PublishModeQosPolicy::kind
```

Publishing mode.

[default] **DDS\_SYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431)

#### 9.145.3.2 flow\_controller\_name

```
char* DDS_PublishModeQosPolicy::flow_controller_name
```

Name of the associated flow controller.

The following builtin values are supported:

- **DDS\_DEFAULT\_FLOW\_CONTROLLER\_NAME** (p. 121)
- **DDS\_FIXED\_RATE\_FLOW\_CONTROLLER\_NAME** (p. 122)
- **DDS\_ON\_DEMAND\_FLOW\_CONTROLLER\_NAME** (p. 123)

NULL value or zero-length string refers to **DDS\_DEFAULT\_FLOW\_CONTROLLER\_NAME** (p. 121).

## Warning

The value for this field can be one of the constants above or a string allocated with **DDS\_String\_dup()** (p. 553) to specify your own custom flow controller name. You should not assign a string literal. When you assign a new value with **DDS\_String\_dup()** (p. 553), first check if the current value is one of the constants above. If it is, simply replace it; if it's not, you have to release the current string and assign the new one. Here is an example of such an approach:

```
struct DDS_DataWriterQos writer_qos;
char *flow_controller_name = NULL;
DDS_DataWriterQos_initialize(&writer_qos);
...
DDS_Publisher_get_default_datawriter_qos(publisher, &writer_qos);
...
flow_controller_name = writer_qos.publish_mode.flow_controller_name;
if (flow_controller_name == DDS_DEFAULT_FLOW_CONTROLLER_NAME
    || flow_controller_name == DDS_FIXED_RATE_FLOW_CONTROLLER_NAME
    || flow_controller_name == DDS_ON_DEMAND_FLOW_CONTROLLER_NAME) {
    // Since the value was never on the heap, this won't leak memory
    flow_controller_name = NULL;
} else {
    // This means the value is present on the heap
    DDS_String_free(flow_controller_name);
}
// New value using DDS_String_dup() or one of the predefined constants
flow_controller_name = DDS_String_dup("My custom flow controller name");
...
DDS_DataWriterQos_finalize(&writer_qos);
```

The strings allocated with **DDS\_String\_dup()** (p. 553) are released when `writer_qos` is finalized.

More information about string handling can be found under **String Conventions** (p. 552).

## See also

**DDSDomainParticipant::create\_flowcontroller** (p. 1391)

**[default] DDS\_DEFAULT\_FLOW\_CONTROLLER\_NAME** (p. 121)

### 9.145.3.3 priority

**DDS\_Long** `DDS_PublishModeQosPolicy::priority`

Publication priority.

A positive integer value designating the relative priority of the **DDSDataWriter** (p. 1321), used to determine the transmission order of pending writes.

Use of publication priorities requires the asynchronous publisher (**DDS\_ASYNCRONOUS\_PUBLISH\_MODE\_↔\_QOS** (p. 431)) with **DDS\_FlowControllerProperty\_t::scheduling\_policy** (p. 913) set to **DDS\_HPF\_FLOW\_↔\_CONTROLLER\_SCHED\_POLICY** (p. 121).

Larger numbers have higher priority.

For multi-channel DataWriters, if the publication priority of any channel is set to any value other than **DDS\_↔\_PUBLICATION\_PRIORITY\_UNDEFINED** (p. 430), then the channel's priority will take precedence over that of the DataWriter.

For multi-channel DataWriters, if the publication priority of any channel is **DDS\_PUBLICATION\_PRIORITY\_↔\_UNDEFINED** (p. 430), then the channel will inherit the publication priority of the DataWriter.

If the publication priority of the DataWriter, and of any channel of a multi-channel DataWriter, are **DDS\_PUBLICATION\_↔\_PRIORITY\_UNDEFINED** (p. 430), then the priority of the DataWriter or DataWriter channel will be assigned the lowest priority value.

If the publication priority of the DataWriter is **DDS\_PUBLICATION\_PRIORITY\_AUTOMATIC** (p. 430), then the Data↔Writer will be assigned the priority of the largest publication priority of all samples in the DataWriter.

The publication priority of each sample can be set in the **DDS\_WriteParams\_t** (p. 1251) of the **FooDataWriter::write\_↔\_w\_params** (p. 1688) function.

For dispose and unregister samples, use the **DDS\_WriteParams\_t** (p. 1251) of **FooDataWriter::dispose\_w\_params** (p. 1691) and **FooDataWriter::unregister\_instance\_w\_params** (p. 1683).

[default] **DDS\_PUBLICATION\_PRIORITY\_UNDEFINED** (p. 430)

[range] [-1, MAX\_INT]

## 9.146 DDS\_QosPolicyCount Struct Reference

Type to hold a counter for a **DDS\_QosPolicyId\_t** (p. 360).

### Public Attributes

- **DDS\_QosPolicyId\_t policy\_id**  
*The QosPolicy ID.*
- **DDS\_Long count**  
*a counter*

### 9.146.1 Detailed Description

Type to hold a counter for a **DDS\_QosPolicyId\_t** (p. 360).

## 9.146.2 Member Data Documentation

### 9.146.2.1 `policy_id`

```
DDS_QosPolicyId_t DDS_QosPolicyCount::policy_id
```

The QosPolicy ID.

### 9.146.2.2 `count`

```
DDS_Long DDS_QosPolicyCount::count
```

a counter

## 9.147 DDS\_QosPolicyCountSeq Struct Reference

Declares IDL sequence < [DDS\\_QosPolicyCount](#) (p. 1029) >

### 9.147.1 Detailed Description

Declares IDL sequence < [DDS\\_QosPolicyCount](#) (p. 1029) >

Instantiates:

<<*generic*>> (p. 237) [FooSeq](#) (p. 1697)

See also

[DDS\\_QosPolicyCount](#) (p. 1029)

## 9.148 DDS\_QosPrintAll\_t Struct Reference

Special type which is used to select the `to_string` overloads when printing Qos objects.

### 9.148.1 Detailed Description

Special type which is used to select the to\_string overloads when printing Qos objects.

This sentinel value is used to select the to\_string overload which prints the entirety of a Qos object (e.g., `DDS_DataReaderQos::to_string(char*, DDS_UnsignedLong&, const DDS_QosPrintAll_t&) const` (p. 146)). The only valid value for this type is the sentinel value `DDS_QOS_PRINT_ALL` (p. 164).

For example:

```
DataReaderQos qos;
char *str = NULL;
DDS_UnsignedLong str_size = 0;
qos.to_string(str, str_size, DDS_QOS_PRINT_ALL);
```

## 9.149 DDS\_QosPrintFormat Struct Reference

A collection of attributes used to configure how a QoS appears when printed.

### Public Attributes

- **DDS\_Boolean is\_standalone**  
*Controls whether or not to print valid XML for this QoS policy (through the inclusion of a preamble).*
- **DDS\_Boolean print\_private**  
*Configures how private QoS policies should be printed.*
- **DDS\_UnsignedLong indent**  
*Configures how much additional indent should be added to the string representation of a QoS.*

### 9.149.1 Detailed Description

A collection of attributes used to configure how a QoS appears when printed.

To ensure that new objects of this type are initialized to a known value, assign them with the static initializer `DDS_QosPrintFormat_INITIALIZER` (p. 360).

### 9.149.2 Member Data Documentation

### 9.149.2.1 is\_standalone

**DDS\_Boolean** DDS\_QosPrintFormat::is\_standalone

Controls whether or not to print valid XML for this QoS policy (through the inclusion of a preamble).

The default value for this property (false) results in QoS being printed starting from the <ENTITY\_qos> tag (where the <ENTITY\_qos> tag is, e.g., <domain\_participant\_qos>, or, <datareader\_qos>. This result cannot be directly parsed as valid XML (as it lacks <dds>, <qos\_library>, and <qos\_profile> tags). If is\_standalone is set to true, these additional tags are printed, resulting in valid, parseable XML.

For example, with is\_standalone set to false, a Qos may appear as:

```
<datareader_qos>
  <durability>
    <kind>TRANSIENT_LOCAL_DURABILITY_QOS</kind>
  </durability>
</datareader_qos>
```

Setting is\_standalone to true would result in the same Qos being printed as:

```
<?xml version="1.0"?>
<dds xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <qos_library name="QosLibrary">
    <qos_profile name="QosProfile">
      <datareader_qos>
        <durability>
          <kind>TRANSIENT_LOCAL_DURABILITY_QOS</kind>
        </durability>
      </datareader_qos>
    </qos_profile>
  </qos_library>
</dds>
```

**[default]** false

### 9.149.2.2 print\_private

**DDS\_Boolean** DDS\_QosPrintFormat::print\_private

Configures how private QoS policies should be printed.

There are some QoS policies which are not intended for external use. By default, these QoS policies are only printed if they are different to the default value for that policy. When true, private policies are treated like any other policy, and printed if they are different to the supplied base QoS. These private policies cannot be parsed from XML, and are always printed as XML comments.

**[default]** false

### 9.149.2.3 indent

`DDS_UnsignedLong DDS_QosPrintFormat::indent`

Configures how much additional indent should be added to the string representation of a QoS.

Configures how much additional indent is applied when converting a QoS to a string. This value acts as a total offset on the string, increasing the indent which is applied to all elements by the same amount. With indent set to 0, a string representation of a QoS may appear as:

```
<datareader_qos>
  <durability>
    <kind>TRANSIENT_LOCAL_DURABILITY_QOS</kind>
  </durability>
</datareader_qos>
```

Setting the indent property to 1, the same QoS would be printed as:

```
  <datareader_qos>
    <durability>
      <kind>TRANSIENT_LOCAL_DURABILITY_QOS</kind>
    </durability>
  </datareader_qos>
```

I.e., the entire structure is indented.

**[default]** 0

## 9.150 DDS\_QueryConditionParams Struct Reference

<<*extension*>> (p. 237) Input parameters for `DDSDataReader::create_querycondition_w_params` (p. 1294)

### Public Attributes

- struct **DDS\_ReadConditionParams** `as_readconditionparams`  
*Read condition parameters.*
- char \* **query\_expression**  
*Expression for the query.*
- struct **DDS\_StringSeq** `query_parameters`  
*Parameters for the query expression.*

### 9.150.1 Detailed Description

<<*extension*>> (p. 237) Input parameters for `DDSDataReader::create_querycondition_w_params` (p. 1294)

### 9.150.2 Member Data Documentation

#### 9.150.2.1 `as_readconditionparams`

```
struct DDS_ReadConditionParams DDS_QueryConditionParams::as_readconditionparams
```

Read condition parameters.

#### 9.150.2.2 `query_expression`

```
char* DDS_QueryConditionParams::query_expression
```

Expression for the query.

#### 9.150.2.3 `query_parameters`

```
struct DDS_StringSeq DDS_QueryConditionParams::query_parameters
```

Parameters for the query expression.

## 9.151 DDS\_ReadConditionParams Struct Reference

<<*extension*>> (p. 237) Input parameters for `DDSDataReader::create_readcondition_w_params` (p. 1293)

### Public Attributes

- **DDS\_SampleStateMask** `sample_states`  
*Sample state.*
- **DDS\_ViewStateMask** `view_states`  
*View state.*
- **DDS\_InstanceStateMask** `instance_states`  
*Instance state.*
- **DDS\_StreamKindMask** `stream_kinds`  
*Stream kind.*



### 9.151.1 Detailed Description

<<*extension*>> (p. 237) Input parameters for `DDSDataReader::create_readcondition_w_params` (p. 1293)

### 9.151.2 Member Data Documentation

#### 9.151.2.1 `sample_states`

`DDS_SampleStateMask` `DDS_ReadConditionParams::sample_states`

Sample state.

Sample state of the data samples that are of interest.

#### 9.151.2.2 `view_states`

`DDS_ViewStateMask` `DDS_ReadConditionParams::view_states`

View state.

View state of the data samples that are of interest.

#### 9.151.2.3 `instance_states`

`DDS_InstanceStateMask` `DDS_ReadConditionParams::instance_states`

Instance state.

Instance state of the data samples that are of interest.

#### 9.151.2.4 `stream_kinds`

`DDS_StreamKindMask` `DDS_ReadConditionParams::stream_kinds`

Stream kind.

Stream kind of the data samples that are of interest.

## 9.152 DDS\_ReaderDataLifecycleQosPolicy Struct Reference

Controls how a DataReader manages the lifecycle of the data that it has received.

## Public Attributes

- struct **DDS\_Duration\_t autopurge\_nowriter\_samples\_delay**  
*Minimum duration for which the **DDSDataReader** (p. 1288) will maintain information regarding an instance once its `instance_state` becomes **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161).*
- struct **DDS\_Duration\_t autopurge\_disposed\_samples\_delay**  
*Minimum duration for which the **DDSDataReader** (p. 1288) will maintain samples for an instance once its `instance_state` becomes **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161).*
- struct **DDS\_Duration\_t autopurge\_disposed\_instances\_delay**  
*<<extension>> (p. 237) Minimum duration for which the **DDSDataReader** (p. 1288) will maintain information about a received instance once its `instance_state` becomes **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) and there are no samples for the instance in the DataReader queue.*
- struct **DDS\_Duration\_t autopurge\_nowriter\_instances\_delay**  
*<<extension>> (p. 237) Minimum duration for which the **DDSDataReader** (p. 1288) will maintain information about a received instance once its `instance_state` becomes **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) and there are no samples for the instance in the DataReader queue.*

### 9.152.1 Detailed Description

Controls how a DataReader manages the lifecycle of the data that it has received.

When a DataReader receives data, it is stored in a receive queue for the DataReader. The user application may either take the data from the queue or leave it there.

This QoS policy controls whether or not RTI Connex will automatically remove data from the receive queue (so that user applications cannot access it afterwards) when it detects that there are no more DataWriters alive for that data. It specifies how long a **DDSDataReader** (p. 1288) must retain information regarding instances that have the `instance_state` **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161).

Note: This policy is not concerned with keeping reliable reader state or discovery information.

The **DDSDataReader** (p. 1288) internally maintains the samples that have not been "taken" by the application, subject to the constraints imposed by other QoS policies such as **DDS\_HistoryQosPolicy** (p. 919) and **DDS\_ResourceLimitsQosPolicy** (p. 1052).

The **DDSDataReader** (p. 1288) also maintains information regarding the identity, `view_state` and `instance_state` of data instances even after all samples have been taken. This is needed to properly compute the states when future samples arrive.

Under normal circumstances the **DDSDataReader** (p. 1288) can only reclaim all resources for instances for which there are no writers and for which all samples have been 'taken'. The last sample the **DDSDataReader** (p. 1288) will have taken for that instance will have an `instance_state` of either **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) or **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) depending on whether or not the last writer that had ownership of the instance disposed it.

In the absence of **READER\_DATA\_LIFECYCLE** (p. 432), this behavior could cause problems if the application forgets to take those samples. "Untaken" samples will prevent the **DDSDataReader** (p. 1288) from reclaiming the resources and they would remain in the **DDSDataReader** (p. 1288) indefinitely.

A DataReader can also reclaim all resources for instances that have an `instance_state` of **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) and for which all DDS samples have been 'taken'. DataReaders will only reclaim resources in this situation when the `autopurge_disposed_instances_delay` has been set to zero.

For keyed Topics, the consideration of removing data samples from the receive queue is done on a per instance (key) basis. Thus when RTI Connex detects that there are no longer DataWriters alive for a certain key value of a Topic (an instance of the Topic), it can be configured to remove all data samples for that instance (key).

Entity:

**DDSDataReader** (p. 1288)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **YES** (p. 360)

## 9.152.2 Member Data Documentation

### 9.152.2.1 autopurge\_nowriter\_samples\_delay

```
struct DDS_Duration_t DDS_ReaderDataLifecyleQosPolicy::autopurge_nowriter_samples_delay
```

Minimum duration for which the **DDSDataReader** (p. 1288) will maintain information regarding an instance once its `instance_state` becomes **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161).

At some point after this time elapses, the **DDSDataReader** (p. 1288) will purge all internal information regarding the instance, any "untaken" samples will also be dropped.

**[default]** **DDS\_DURATION\_INFINITE** (p. 326)

**[range]** [1 nanosec, 1 year] or **DDS\_DURATION\_INFINITE** (p. 326)

### 9.152.2.2 autopurge\_disposed\_samples\_delay

```
struct DDS_Duration_t DDS_ReaderDataLifecyleQosPolicy::autopurge_disposed_samples_delay
```

Minimum duration for which the **DDSDataReader** (p. 1288) will maintain samples for an instance once its `instance_state` becomes **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161).

After this time elapses, the **DDSDataReader** (p. 1288) will purge all samples for the instance even if they have not been read by the application. This purge is done lazily when space is needed for other samples or instances.

**[default]** **DDS\_DURATION\_INFINITE** (p. 326)

**[range]** [1 nanosec, 1 year] or **DDS\_DURATION\_INFINITE** (p. 326)

### 9.152.2.3 autopurge\_disposed\_instances\_delay

```
struct DDS_Duration_t DDS_ReaderDataLifecycleQosPolicy::autopurge_disposed_instances_delay
```

<<**extension**>> (p. 237) Minimum duration for which the **DDSDataReader** (p. 1288) will maintain information about a received instance once its `instance_state` becomes **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) and there are no samples for the instance in the DataReader queue.

After this time elapses, when the last sample for the disposed instance is taken, the **DDSDataReader** (p. 1288) will keep only the minimum state about the instance.

If you do not want to keep this minimum state after the delay period, also set `keep_minimum_state_for_instances` to `FALSE` in **DDS\_DataReaderResourceLimitsQosPolicy** (p. 654).

The only currently supported values are **DDS\_DURATION\_ZERO** (p. 327) and **DDS\_DURATION\_INFINITE** (p. 326). A value of **DDS\_DURATION\_ZERO** (p. 327) will purge an instance's state immediately after the instance state transitions to **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161), as long as all samples, including the dispose sample, associated with that instance have been 'taken'.

[default] **DDS\_DURATION\_INFINITE** (p. 326)

### 9.152.2.4 autopurge\_nowriter\_instances\_delay

```
struct DDS_Duration_t DDS_ReaderDataLifecycleQosPolicy::autopurge_nowriter_instances_delay
```

<<**extension**>> (p. 237) Minimum duration for which the **DDSDataReader** (p. 1288) will maintain information about a received instance once its `instance_state` becomes **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) and there are no samples for the instance in the DataReader queue.

An instance will transition to the **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) `instance_state` when all known writers for the instance have either lost liveliness or have unregistered themselves from the instance. After this time elapses, when the last sample for the instance without writers is taken, the **DDSDataReader** (p. 1288) will keep only the minimum state about the instance.

If you do not want to keep this minimum state after the delay period, also set `keep_minimum_state_for_instances` to `FALSE` in **DDS\_DataReaderResourceLimitsQosPolicy** (p. 654).

The only currently supported values are **DDS\_DURATION\_ZERO** (p. 327) and **DDS\_DURATION\_INFINITE** (p. 326). A value of **DDS\_DURATION\_ZERO** (p. 327) will purge an instance's state immediately after the instance state transitions to **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161), as long as all samples, including the `no_writers` sample, associated with that instance have been 'taken'.

[default] **DDS\_DURATION\_ZERO** (p. 327)

## 9.153 DDS\_ReceiverPoolQosPolicy Struct Reference

Configures threads used by RTI Connext to receive and process data from transports (for example, UDP sockets).

## Public Attributes

- struct **DDS\_ThreadSettings\_t** **thread**  
*Receiver pool thread(s).*
- **DDS\_Long** **buffer\_size**  
*The receive buffer size in bytes.*
- **DDS\_Long** **buffer\_alignment**  
*The receive buffer alignment.*

### 9.153.1 Detailed Description

Configures threads used by RTI Connex to receive and process data from transports (for example, UDP sockets).

This QoS policy is an extension to the DDS standard.

Entity:

**DDSDomainParticipant** (p. 1351)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

See also

**Controlling CPU Core Affinity for RTI Threads** (p. 352)

### 9.153.2 Usage

This QoS policy sets the thread properties such as priority level and stack size for the threads used by the middleware to receive and process data from transports.

RTI uses a separate receive thread per port per transport plug-in. To force RTI Connex to use a separate thread to process the data for a **DDSDataReader** (p. 1288), set a unique port for the **DDS\_TransportUnicastQosPolicy** (p. 1158) or **DDS\_TransportMulticastQosPolicy** (p. 1151) for the **DDSDataReader** (p. 1288).

This QoS policy also sets the size of the buffer used to store packets received from a transport. This buffer size will limit the largest single packet of data that a **DDSDomainParticipant** (p. 1351) will accept from a transport. Users will often set this size to the largest packet that any of the transports used by their application will deliver. For many applications, the value 65,536 (64 K) is a good choice; this value is the largest packet that can be sent/received via UDP.

### 9.153.3 Member Data Documentation

### 9.153.3.1 thread

```
struct DDS_ThreadSettings_t DDS_ReceiverPoolQosPolicy::thread
```

Receiver pool thread(s).

There is at least one receive thread, possibly more.

**[default]** priority above normal.

The actual value depends on your architecture:

For Windows: 2

For Linux: OS default priority

For a complete list of platform specific values, please refer to `Platform Notes`.

**[default]** The actual value depends on your architecture:

For Windows: OS default stack size

For Linux: OS default stack size

For a complete list of platform specific values, please refer to `Platform Notes`.

**[default]** mask `DDS_THREAD_SETTINGS_FLOATING_POINT` (p. 352) | `DDS_THREAD_SETTINGS_STUDIO` (p. 352)

### 9.153.3.2 buffer\_size

```
DDS_Long DDS_ReceiverPoolQosPolicy::buffer_size
```

The receive buffer size in bytes.

The receive buffer is used by the receive thread to store the raw data that arrives over the transports in non-zero-copy transports.

Zero-copy transports do not copy their data into the buffer provided by the receive thread. Instead, they provide the receive thread data in buffers allocated by the transports themselves. Only the shared memory built-in transport (SHMEM) supports zero-copy.

`buffer_size` must always be at least as large as the maximum `NDDS_Transport_Property_t::message_size_max` (p. 1779) across *all* of the transports being used that are not doing zero-copy.

By default (`DDS_LENGTH_AUTO` (p. 433)): the size is equal to the maximum `NDDS_Transport_Property_t::message_size_max` (p. 1779) across *all* of the non-zero-copy transports.

You may want the value to be greater than the default if you try to limit the largest data packet that can be sent through the transport(s) in one application, but you still want to receive data from other applications that have not made the same change.

For example, to avoid IP fragmentation, you may want to set `NDDS_Transport_Property_t::message_size_max` (p. 1779) for IP-based transports to a small value, such as 1400 bytes. However, you may not be able to apply this change to all the applications at the same time. To receive data from these other applications the `buffer_size` should be equal to the original `NDDS_Transport_Property_t::message_size_max` (p. 1779).

**[default]** `DDS_LENGTH_AUTO` (p. 433)

**[range]** [1, 1 GB] or `DDS_LENGTH_AUTO` (p. 433)

### 9.153.3.3 buffer\_alignment

`DDS_Long DDS_ReceiverPoolQosPolicy::buffer_alignment`

The receive buffer alignment.

Most users will not need to change this alignment.

**[default]** 16

**[range]** [1,1024] Value must be a power of 2.

## 9.154 DDS\_ReliabilityQosPolicy Struct Reference

Indicates the level of reliability offered/requested by RTI Connex.

### Public Attributes

- **DDS\_ReliabilityQosPolicyKind kind**  
*Kind of reliability.*
- struct **DDS\_Duration\_t max\_blocking\_time**  
*The maximum time a DataWriter can block on a write() call.*
- **DDS\_ReliabilityQosPolicyAcknowledgmentModeKind acknowledgment\_kind**  
<<extension>> (p. 237) *Kind of reliable acknowledgment*
- **DDS\_InstanceStateConsistencyKind instance\_state\_consistency\_kind**  
<<extension>> (p. 237) *Whether instance state consistency is enabled*

### 9.154.1 Detailed Description

Indicates the level of reliability offered/requested by RTI Connex.

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Status:

**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344)

Properties:

**RxO** (p. 360) = YES

**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360) (the `instance_state_consistency_kind` is **Changeable** (p. 360) = **NO** (p. 360))

## 9.154.2 Usage

This policy indicates the level of reliability requested by a **DDSDataReader** (p. 1288) or offered by a **DDSDataWriter** (p. 1321).

The reliability of a connection between a DataWriter and DataReader is entirely user configurable. It can be done on a per DataWriter/DataReader connection. A connection may be configured to be "best effort" which means that RTI Connext will not use any resources to monitor or guarantee that the data sent by a DataWriter is received by a DataReader.

For some use cases, such as the periodic update of sensor values to a GUI displaying the value to a person, **DDS\_←\_BEST\_EFFORT\_RELIABILITY\_QOS** (p. 435) delivery is often good enough. It is certainly the fastest, most efficient, and least resource-intensive (CPU and network bandwidth) method of getting the newest/latest value for a topic from DataWriters to DataReaders. But there is no guarantee that the data sent will be received. It may be lost due to a variety of factors, including data loss by the physical transport such as wireless RF or even Ethernet.

However, there are data streams (topics) in which you want an absolute guarantee that all data sent by a DataWriter is received reliably by DataReaders. This means that RTI Connext must check whether or not data was received, and repair any data that was rejected by resending a copy of the data as many times as it takes for the DataReader to receive the data. RTI Connext uses a reliability protocol configured and tuned by these QoS policies: **DDS\_History\_←\_QosPolicy** (p. 919), **DDS\_DataWriterProtocolQosPolicy** (p. 673), **DDS\_DataReaderProtocolQosPolicy** (p. 630), and **DDS\_ResourceLimitsQosPolicy** (p. 1052).

The Reliability QoS policy is simply a switch to turn on the reliability protocol for a DataWriter/DataReader connection. The level of reliability provided by RTI Connext is determined by the configuration of the aforementioned QoS policies.

You can configure RTI Connext to deliver *all* data in the order they were sent (also known as absolute or strict reliability). Or, as a tradeoff for less memory, CPU, and network usage, you can choose a reduced level of reliability where only the last *N* values are guaranteed to be delivered reliably to DataReaders (where *N* is user-configurable). In the reduced level of reliability, there are no guarantees that the data sent before the last *N* are received. Only the last *N* data packets are monitored and repaired if necessary.

These levels are ordered, **DDS\_BEST\_EFFORT\_RELIABILITY\_QOS** (p. 435) < **DDS\_RELIABLE\_RELIABILITY\_←\_QOS** (p. 435). A **DDSDataWriter** (p. 1321) offering one level is implicitly offering all levels below.

Note: To send *large* data reliably, you will also need to set **DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431). *Large* in this context means that the data cannot be sent as a single packet by the transport (for example, data larger than 63K when using UDP/IP).

The setting of this policy has a dependency on the setting of the **RESOURCE\_LIMITS** (p. 437) policy. In case the reliability kind is set to **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) the write operation on the **DDSDataWriter** (p. 1321) may block if the modification would cause data to be lost or else cause one of the limits in specified in the **RESOURCE\_←\_LIMITS** (p. 437) to be exceeded. Under these circumstances, the **RELIABILITY** (p. 433) `max_blocking_time` configures the maximum duration the write operation may block.

If the **DDS\_ReliabilityQosPolicy::kind** (p. 1043) is set to **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435), data samples originating from a single **DDSDataWriter** (p. 1321) cannot be made available to the **DDSDataReader** (p. 1288) if there are previous data samples that have not been received yet due to a communication error. In other words, RTI Connext will repair the error and resend data samples as needed in order to reconstruct a correct snapshot of the **DDSDataWriter** (p. 1321) history before it is accessible by the **DDSDataReader** (p. 1288).

If the **DDS\_ReliabilityQosPolicy::kind** (p. 1043) is set to **DDS\_BEST\_EFFORT\_RELIABILITY\_QOS** (p. 435), the service will not re-transmit missing data samples. However, for data samples originating from any one DataWriter the service will ensure they are stored in the **DDSDataReader** (p. 1288) history in the same order they originated in the **DDSDataWriter** (p. 1321). In other words, the **DDSDataReader** (p. 1288) may miss some data samples, but it will never see the value of a data object change from a newer value to an older value.

See also

**DDS\_HistoryQosPolicy** (p. 919)

**DDS\_ResourceLimitsQosPolicy** (p. 1052)



### 9.154.3 Compatibility

The value offered is considered compatible with the value requested if and only if:

- the inequality *offered kind*  $\geq$  *requested kind* evaluates to 'TRUE'. For the purposes of this inequality, the values of **DDS\_ReliabilityQosPolicy::kind** (p. 1043) are considered ordered such that **DDS\_BEST\_EFFORT\_RELIABILITY\_QOS** (p. 435)  $<$  **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435).
- The offered *acknowledgment\_kind* = **DDS\_PROTOCOL\_ACKNOWLEDGMENT\_MODE** (p.435) and requested *acknowledgment\_kind* = **DDS\_PROTOCOL\_ACKNOWLEDGMENT\_MODE** (p.435) OR offered *acknowledgment\_kind*  $\neq$  **DDS\_PROTOCOL\_ACKNOWLEDGMENT\_MODE** (p. 435).
- the inequality *offered instance\_state\_consistency\_kind*  $\geq$  *requested instance\_state\_consistency\_kind* evaluates to 'TRUE'. For the purposes of this inequality, the values of **DDS\_ReliabilityQosPolicy::instance\_state\_consistency\_kind** (p. 1044) are considered ordered such that **DDS\_NO\_RECOVER\_INSTANCE\_STATE\_CONSISTENCY** (p. 436)  $<$  **DDS\_RECOVER\_INSTANCE\_STATE\_CONSISTENCY** (p. 436).

### 9.154.4 Member Data Documentation

#### 9.154.4.1 kind

```
DDS_ReliabilityQosPolicyKind DDS_ReliabilityQosPolicy::kind
```

Kind of reliability.

**[default]** **DDS\_BEST\_EFFORT\_RELIABILITY\_QOS** (p. 435) for **DDSDataReader** (p. 1288) and **DDSTopic** (p. 1617), **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) for **DDSDataWriter** (p. 1321)

#### 9.154.4.2 max\_blocking\_time

```
struct DDS_Duration_t DDS_ReliabilityQosPolicy::max_blocking_time
```

The maximum time a DataWriter can block on a write() call.

See *Writing Data*, in the Core Libraries User's Manual, for more information about when the write() call can block and what happens when it times out.

Has no meaning for DataReaders.

**[default]** 100 milliseconds

**[range]** [0,1 year] or **DDS\_DURATION\_INFINITE** (p. 326)

See also

**DDS\_ResourceLimitsQosPolicy** (p. 1052)

### 9.154.4.3 acknowledgment\_kind

`DDS_ReliabilityQosPolicyAcknowledgmentModeKind` `DDS_ReliabilityQosPolicy::acknowledgment_kind`

<<*extension*>> (p. 237) Kind of reliable acknowledgment

This setting applies only to the case where `DDS_ReliabilityQosPolicy::kind` (p. 1043) = `DDS_RELIABLE_↔RELIABILITY_QOS` (p. 435).

Sets the kind acknowledgments supported by a `DDSDataWriter` (p. 1321) and sent by `DDSDataReader` (p. 1288).

[default] `DDS_PROTOCOL_ACKNOWLEDGMENT_MODE` (p. 435)

### 9.154.4.4 instance\_state\_consistency\_kind

`DDS_InstanceStateConsistencyKind` `DDS_ReliabilityQosPolicy::instance_state_consistency_kind`

<<*extension*>> (p. 237) Whether instance state consistency is enabled

A DataReader that determines that the DataWriter is no longer alive will transition instances to `NOT_ALIVE_NO_↔WRITERS` if there are no other DataWriters updating that instance. If the DataReader rediscovers the DataWriter, the DataReader does not automatically transition instances back to the state they were in prior to the disconnection until it gets updates (i.e., samples) for them.

If `InstanceStateConsistencyKind` is set to `RECOVER_INSTANCE_STATE_CONSISTENCY`, then when the DataReader rediscovers a DataWriter, the DataReader will query the DataWriter for the state of its instances, and restore the instances to their correct state.

[default] `DDS_NO_RECOVER_INSTANCE_STATE_CONSISTENCY` (p. 436) for `DDSDataReader` (p. 1288), `DDS_↔RECOVER_INSTANCE_STATE_CONSISTENCY` (p. 436) for `DDSDataWriter` (p. 1321)

## 9.155 DDS\_ReliableReaderActivityChangedStatus Struct Reference

<<*extension*>> (p. 237) Describes the activity (i.e. are acknowledgements forthcoming) of reliable readers matched to a reliable writer.

### Public Attributes

- **DDS\_Long active\_count**  
*The current number of reliable readers currently matched with this reliable writer.*
- **DDS\_Long inactive\_count**  
*The number of reliable readers that have been dropped by this reliable writer because they failed to send acknowledgements in a timely fashion.*
- **DDS\_Long active\_count\_change**  
*The most recent change in the number of active remote reliable readers.*
- **DDS\_Long inactive\_count\_change**  
*The most recent change in the number of inactive remote reliable readers.*
- **DDS\_InstanceHandle\_t last\_instance\_handle**  
*The instance handle of the last reliable remote reader to be determined inactive.*

## 9.155.1 Detailed Description

<<*extension*>> (p. 237) Describes the activity (i.e. are acknowledgements forthcoming) of reliable readers matched to a reliable writer.

Entity:

**DDSDataWriter** (p. 1321)

Listener:

**DDSDataWriterListener** (p. 1344)

This status is the reciprocal status to the **DDS\_LivelinessChangedStatus** (p. 932) on the reader. It is different than the **DDS\_LivelinessLostStatus** (p. 934) on the writer in that the latter informs the writer about its own liveliness; this status informs the writer about the "liveliness" (activity) of its matched readers.

All counts in this status will remain at zero for best effort writers.

## 9.155.2 Member Data Documentation

### 9.155.2.1 active\_count

**DDS\_Long** DDS\_ReliableReaderActivityChangedStatus::active\_count

The current number of reliable readers currently matched with this reliable writer.

### 9.155.2.2 inactive\_count

**DDS\_Long** DDS\_ReliableReaderActivityChangedStatus::inactive\_count

The number of reliable readers that have been dropped by this reliable writer because they failed to send acknowledgements in a timely fashion.

A reader is considered to be inactive after is has been sent heartbeats **DDS\_RtpsReliableWriterProtocol\_t::max\_heartbeat\_retries** (p. 1066) times, each heartbeat having been separated from the previous by the current heartbeat period.

### 9.155.2.3 active\_count\_change

`DDS_Long DDS_ReliableReaderActivityChangedStatus::active_count_change`

The most recent change in the number of active remote reliable readers.

### 9.155.2.4 inactive\_count\_change

`DDS_Long DDS_ReliableReaderActivityChangedStatus::inactive_count_change`

The most recent change in the number of inactive remote reliable readers.

### 9.155.2.5 last\_instance\_handle

`DDS_InstanceHandle_t DDS_ReliableReaderActivityChangedStatus::last_instance_handle`

The instance handle of the last reliable remote reader to be determined inactive.

## 9.156 DDS\_ReliableWriterCacheChangedStatus Struct Reference

<<*extension*>> (p. 237) A summary of the state of a data writer's cache of unacknowledged samples written.

### Public Attributes

- struct **DDS\_ReliableWriterCacheEventCount empty\_reliable\_writer\_cache**  
*The number of times the reliable writer's cache of unacknowledged samples has become empty.*
- struct **DDS\_ReliableWriterCacheEventCount full\_reliable\_writer\_cache**  
*The number of times the reliable writer's cache, or send window, of unacknowledged samples has become full.*
- struct **DDS\_ReliableWriterCacheEventCount low\_watermark\_reliable\_writer\_cache**  
*The number of times the reliable writer's cache of unacknowledged samples has fallen to the low watermark.*
- struct **DDS\_ReliableWriterCacheEventCount high\_watermark\_reliable\_writer\_cache**  
*The number of times the reliable writer's cache of unacknowledged samples has risen to the high watermark.*
- **DDS\_Long unacknowledged\_sample\_count**  
*The current number of unacknowledged samples in the writer's cache.*
- **DDS\_Long unacknowledged\_sample\_count\_peak**  
*The highest value that unacknowledged\_sample\_count has reached until now.*
- **DDS\_LongLong replaced\_unacknowledged\_sample\_count**  
*The number of unacknowledged samples that have been replaced in the writer's cache.*

### 9.156.1 Detailed Description

<<**extension**>> (p. 237) A summary of the state of a data writer's cache of unacknowledged samples written.

Entity:

**DDSDataWriter** (p. 1321)

Listener:

**DDSDataWriterListener** (p. 1344)

A written sample is unacknowledged (and therefore accounted for in this status) if the writer is reliable and one or more readers matched with the writer has not yet sent an acknowledgement to the writer declaring that it has received the sample.

If the low watermark is zero and the unacknowledged sample count decreases to zero, both the low watermark and cache empty events are considered to have taken place. A single callback will be dispatched (assuming the user has requested one) that contains both status changes. The same logic applies when the high watermark is set equal to the maximum number of samples and the cache becomes full.

### 9.156.2 Member Data Documentation

#### 9.156.2.1 empty\_reliable\_writer\_cache

```
struct DDS_ReliableWriterCacheEventCount DDS_ReliableWriterCacheChangedStatus::empty_reliable_↔
writer_cache
```

The number of times the reliable writer's cache of unacknowledged samples has become empty.

#### 9.156.2.2 full\_reliable\_writer\_cache

```
struct DDS_ReliableWriterCacheEventCount DDS_ReliableWriterCacheChangedStatus::full_reliable_↔
writer_cache
```

The number of times the reliable writer's cache, or send window, of unacknowledged samples has become full.

Applies to writer's cache when the send window is enabled (when both **DDS\_RtpsReliableWriterProtocol\_t::min\_↔\_send\_window\_size** (p. 1072) and **DDS\_RtpsReliableWriterProtocol\_t::max\_send\_window\_size** (p. 1073) are not **DDS\_LENGTH\_UNLIMITED** (p. 438)).

Otherwise, applies when the number of unacknowledged samples has reached the send window limit.

### 9.156.2.3 low\_watermark\_reliable\_writer\_cache

```
struct DDS_ReliableWriterCacheEventCount DDS_ReliableWriterCacheChangedStatus::low_watermark_↔
reliable_writer_cache
```

The number of times the reliable writer's cache of unacknowledged samples has fallen to the low watermark.

A low watermark event will only be considered to have taken place when the number of unacknowledged samples in the writer's cache *decreases* to this value. A sample count that increases to this value will not result in a callback or in a change to the total count of low watermark events.

When the writer's send window is enabled, the low watermark is scaled down, if necessary, to fit within the current send window.

Set the low watermark value using the **DDS\_RtpsReliableWriterProtocol\_t::low\_watermark** (p. 1063) field of the **DDS\_RtpsReliableWriterProtocol\_t** (p. 1061) structure.

### 9.156.2.4 high\_watermark\_reliable\_writer\_cache

```
struct DDS_ReliableWriterCacheEventCount DDS_ReliableWriterCacheChangedStatus::high_watermark_↔
reliable_writer_cache
```

The number of times the reliable writer's cache of unacknowledged samples has risen to the high watermark.

A high watermark event will only be considered to have taken place when the number of unacknowledged sampled *increases* to this value. A sample count that was above this value and then decreases back to it will not trigger an event.

When the writer's send window is enabled, the high watermark is scaled down, if necessary, to fit within the current send window.

Set the high watermark value using the **DDS\_RtpsReliableWriterProtocol\_t::high\_watermark** (p. 1063) field of the **DDS\_RtpsReliableWriterProtocol\_t** (p. 1061) structure.

### 9.156.2.5 unacknowledged\_sample\_count

```
DDS_Long DDS_ReliableWriterCacheChangedStatus::unacknowledged_sample_count
```

The current number of unacknowledged samples in the writer's cache.

A sample is considered unacknowledged if the writer has failed to receive an acknowledgement from one or more reliable readers matched to it.

### 9.156.2.6 unacknowledged\_sample\_count\_peak

```
DDS_Long DDS_ReliableWriterCacheChangedStatus::unacknowledged_sample_count_peak
```

The highest value that `unacknowledged_sample_count` has reached until now.

### 9.156.2.7 replaced\_unacknowledged\_sample\_count

```
DDS_LongLong DDS_ReliableWriterCacheChangedStatus::replaced_unacknowledged_sample_count
```

The number of unacknowledged samples that have been replaced in the writer's cache.

Total number of unacknowledged samples that have been replaced by a DataWriter after applying **DDS\_KEEP\_LAST**↔  
**\_HISTORY\_QOS** (p. 406) policy.

## 9.157 DDS\_ReliableWriterCacheEventCount Struct Reference

<<*extension*>> (p. 237) The number of times the number of unacknowledged samples in the cache of a reliable writer hit a certain well-defined threshold.

### Public Attributes

- **DDS\_Long total\_count**  
*The total number of times the event has occurred.*
- **DDS\_Long total\_count\_change**  
*The incremental number of times the event has occurred since the listener was last invoked or the status read.*

### 9.157.1 Detailed Description

<<*extension*>> (p. 237) The number of times the number of unacknowledged samples in the cache of a reliable writer hit a certain well-defined threshold.

The threshold interpretation depends on the usage of this data type in **DDS\_ReliableWriterCacheChangedStatus** (p. 1046).

See also

**DDS\_ReliableWriterCacheChangedStatus** (p. 1046)

### 9.157.2 Member Data Documentation

#### 9.157.2.1 total\_count

```
DDS_Long DDS_ReliableWriterCacheEventCount::total_count
```

The total number of times the event has occurred.

### 9.157.2.2 total\_count\_change

`DDS_Long DDS_ReliableWriterCacheEventCount::total_count_change`

The incremental number of times the event has occurred since the listener was last invoked or the status read.

## 9.158 DDS\_RequestedDeadlineMissedStatus Struct Reference

`DDS_REQUESTED_DEADLINE_MISSED_STATUS` (p. 344)

### Public Attributes

- **DDS\_Long total\_count**  
*Total cumulative count of the deadlines detected for any instance read by the `DDSDataReader` (p. 1288).*
- **DDS\_Long total\_count\_change**  
*The incremental number of deadlines detected since the last time the listener was called or the status was read.*
- **DDS\_InstanceHandle\_t last\_instance\_handle**  
*Handle to the last instance in the `DDSDataReader` (p. 1288) for which a deadline was detected.*

### 9.158.1 Detailed Description

`DDS_REQUESTED_DEADLINE_MISSED_STATUS` (p. 344)

### 9.158.2 Member Data Documentation

#### 9.158.2.1 total\_count

`DDS_Long DDS_RequestedDeadlineMissedStatus::total_count`

Total cumulative count of the deadlines detected for any instance read by the `DDSDataReader` (p. 1288).

#### 9.158.2.2 total\_count\_change

`DDS_Long DDS_RequestedDeadlineMissedStatus::total_count_change`

The incremental number of deadlines detected since the last time the listener was called or the status was read.



### 9.158.2.3 last\_instance\_handle

`DDS_InstanceHandle_t DDS_RequestedDeadlineMissedStatus::last_instance_handle`

Handle to the last instance in the `DDSDataReader` (p. 1288) for which a deadline was detected.

## 9.159 DDS\_RequestedIncompatibleQoSStatus Struct Reference

`DDS_REQUESTED_INCOMPATIBLE_QOS_STATUS` (p. 344)

### Public Attributes

- `DDS_Long total_count`

*Total cumulative count of how many times the concerned `DDSDataReader` (p. 1288) discovered a `DDSDataWriter` (p. 1321) for the same `DDSTopic` (p. 1617) with an offered QoS that is incompatible with that requested by the `DDSDataReader` (p. 1288).*

- `DDS_Long total_count_change`

*The change in `total_count` since the last time the listener was called or the status was read.*

- `DDS_QosPolicyId_t last_policy_id`

*The `DDS_QosPolicyId_t` (p. 360) of one of the policies that was found to be incompatible the last time an incompatibility was detected.*

- struct `DDS_QosPolicyCountSeq policies`

*A list containing, for each policy, the total number of times that the concerned `DDSDataReader` (p. 1288) discovered a `DDSDataWriter` (p. 1321) for the same `DDSTopic` (p. 1617) with an offered QoS that is incompatible with that requested by the `DDSDataReader` (p. 1288).*

### 9.159.1 Detailed Description

`DDS_REQUESTED_INCOMPATIBLE_QOS_STATUS` (p. 344)

See also

`DURABILITY` (p. 398)

`PRESENTATION` (p. 417)

`RELIABILITY` (p. 433)

`OWNERSHIP` (p. 414)

`LIVELINESS` (p. 409)

`DEADLINE` (p. 385)

`LATENCY_BUDGET` (p. 407)

`DESTINATION_ORDER` (p. 386)

### 9.159.2 Member Data Documentation

### 9.159.2.1 total\_count

```
DDS_Long DDS_RequestedIncompatibleQosStatus::total_count
```

Total cumulative count of how many times the concerned **DDSDataReader** (p. 1288) discovered a **DDSDataWriter** (p. 1321) for the same **DDSTopic** (p. 1617) with an offered QoS that is incompatible with that requested by the **DDSDataReader** (p. 1288).

### 9.159.2.2 total\_count\_change

```
DDS_Long DDS_RequestedIncompatibleQosStatus::total_count_change
```

The change in `total_count` since the last time the listener was called or the status was read.

### 9.159.2.3 last\_policy\_id

```
DDS_QosPolicyId_t DDS_RequestedIncompatibleQosStatus::last_policy_id
```

The **DDS\_QosPolicyId\_t** (p. 360) of one of the policies that was found to be incompatible the last time an incompatibility was detected.

### 9.159.2.4 policies

```
struct DDS_QosPolicyCountSeq DDS_RequestedIncompatibleQosStatus::policies
```

A list containing, for each policy, the total number of times that the concerned **DDSDataReader** (p. 1288) discovered a **DDSDataWriter** (p. 1321) for the same **DDSTopic** (p. 1617) with an offered QoS that is incompatible with that requested by the **DDSDataReader** (p. 1288).

## 9.160 DDS\_ResourceLimitsQosPolicy Struct Reference

Controls the amount of physical memory allocated for DDS entities, if dynamic allocations are allowed, and how they occur. Also controls memory usage among different instance values for keyed topics.

## Public Attributes

- **DDS\_Long max\_samples**  
*Represents the maximum samples the middleware can store for any one **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)).*
- **DDS\_Long max\_instances**  
*Represents the maximum number of instances a **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)) can manage.*
- **DDS\_Long max\_samples\_per\_instance**  
*Represents the maximum number of samples of any one instance a **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)) can manage.*
- **DDS\_Long initial\_samples**  
*<<extension>> (p. 237) Represents the initial samples the middleware will store for any one **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)).*
- **DDS\_Long initial\_instances**  
*<<extension>> (p. 237) Represents the initial number of instances a **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)) will manage.*
- **DDS\_Long instance\_hash\_buckets**  
*<<extension>> (p. 237) Number of hash buckets for instances.*

### 9.160.1 Detailed Description

Controls the amount of physical memory allocated for DDS entities, if dynamic allocations are allowed, and how they occur. Also controls memory usage among different instance values for keyed topics.

Entity:

**DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Status:

**DDS\_SAMPLE\_REJECTED\_STATUS** (p. 345), **DDS\_SampleRejectedStatus** (p. 1094)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p. 360) = UNTIL ENABLE (p. 360)

### 9.160.2 Usage

This policy controls the resources that RTI Connext can use to meet the requirements imposed by the application and other QoS settings.

For the reliability protocol (and **DDS\_DurabilityQosPolicy** (p. 767)), this QoS policy determines the actual maximum queue size when the **DDS\_HistoryQosPolicy** (p. 919) is set to **DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406).

In general, this QoS policy is used to limit the amount of system memory that RTI Connext can allocate. For embedded real-time systems and safety-critical systems, pre-determination of maximum memory usage is often required. In addition, dynamic memory allocation could introduce non-deterministic latencies in time-critical paths.

This QoS policy can be set such that an entity does not dynamically allocate any more memory after its initialization phase.

If **DDSDataWriter** (p. 1321) objects are communicating samples faster than they are ultimately taken by the **DDSDataReader** (p. 1288) objects, the middleware will eventually hit against some of the QoS-imposed resource limits. Note that this may occur when just a single **DDSDataReader** (p. 1288) cannot keep up with its corresponding **DDSDataWriter** (p. 1321). The behavior in this case depends on the setting for the **RELIABILITY** (p. 433). If reliability is **DDS\_BEST\_EFFORT\_RELIABILITY\_QOS** (p. 435), then RTI Connext is allowed to drop samples. If the reliability is **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435), RTI Connext will block the **DDSDataWriter** (p. 1321) or discard the sample at the **DDSDataReader** (p. 1288) in order not to lose existing samples.

The constant **DDS\_LENGTH\_UNLIMITED** (p. 438) may be used to indicate the absence of a particular limit. For example setting **DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance** (p. 1055) to **DDS\_LENGTH\_UNLIMITED** (p. 438) will cause RTI Connext not to enforce this particular limit.

If these resource limits are not set sufficiently, under certain circumstances the **DDSDataWriter** (p. 1321) may block on a write() call even though the **DDS\_HistoryQosPolicy** (p. 919) is **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406). To guarantee the writer does not block for **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406), make sure the resource limits are set such that:

```
max_samples >= max_instances * max_samples_per_instance
```

See also

**DDS\_ReliabilityQosPolicy** (p. 1041)

**DDS\_HistoryQosPolicy** (p. 919)

### 9.160.3 Consistency

The setting of **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055) must be consistent with **DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance** (p. 1055). For these two values to be consistent, it must be true that **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055)  $\geq$  **DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance** (p. 1055). As described above, this limit will not be enforced if **DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance** (p. 1055) is set to **DDS\_LENGTH\_UNLIMITED** (p. 438).

The setting of **RESOURCE\_LIMITS** (p. 437) `max_samples_per_instance` must be consistent with the **HISTORY** (p. 405) `depth`. For these two QoS to be consistent, it must be true that `depth`  $\leq$  `max_samples_per_instance`.

See also

**DDS\_HistoryQosPolicy** (p. 919)

## 9.160.4 Member Data Documentation

### 9.160.4.1 max\_samples

**DDS\_Long** DDS\_ResourceLimitsQosPolicy::max\_samples

Represents the maximum samples the middleware can store for any one **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)).

Specifies the maximum number of data samples a **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)) can manage across all the instances associated with it.

For unkeyed types, this value has to be equal to max\_samples\_per\_instance if max\_samples\_per\_instance is not equal to **DDS\_LENGTH\_UNLIMITED** (p. 438).

When batching is enabled, the maximum number of data samples a **DDSDataWriter** (p. 1321) can manage will also be limited by **DDS\_DataWriterResourceLimitsQosPolicy::max\_batches** (p. 700).

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 100 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\geq$  initial\_samples,  $\geq$  max\_samples\_per\_instance,  $\geq$  **DDS\_DataReaderResourceLimitsQosPolicy::max\_samples\_per\_remote\_writer** (p. 657) or  $\geq$  **DDS\_RtpsReliableWriterProtocol\_t::heartbeats\_per\_max\_samples** (p. 1067)

For **DDS\_DataWriterQos** (p. 689) max\_samples  $\geq$  **DDS\_RtpsReliableWriterProtocol\_t::heartbeats\_per\_max\_samples** (p. 1067) in **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677) if batching is disabled.

### 9.160.4.2 max\_instances

**DDS\_Long** DDS\_ResourceLimitsQosPolicy::max\_instances

Represents the maximum number of instances a **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)) can manage.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\geq$  initial\_instances

### 9.160.4.3 max\_samples\_per\_instance

**DDS\_Long** DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance

Represents the maximum number of samples of any one instance a **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)) can manage.

While an unkeyed type is logically considered as a single instance, for unkeyed types this value has to be equal to max\_samples or **DDS\_LENGTH\_UNLIMITED** (p. 438).

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 100 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\leq$  max\_samples or **DDS\_LENGTH\_UNLIMITED** (p. 438),  $\geq$  **DDS\_HistoryQosPolicy::depth** (p. 921)

#### 9.160.4.4 initial\_samples

`DDS_Long DDS_ResourceLimitsQosPolicy::initial_samples`

<<*extension*>> (p. 237) Represents the initial samples the middleware will store for any one **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)).

Specifies the initial number of data samples a **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)) will manage across all the instances associated with it.

**[default]** 32

**[range]** [1,100 million], <= max\_samples

#### 9.160.4.5 initial\_instances

`DDS_Long DDS_ResourceLimitsQosPolicy::initial_instances`

<<*extension*>> (p. 237) Represents the initial number of instances a **DDSDataWriter** (p. 1321) (or **DDSDataReader** (p. 1288)) will manage.

**[default]** 32

**[range]** [1,1 million], <= max\_instances

#### 9.160.4.6 instance\_hash\_buckets

`DDS_Long DDS_ResourceLimitsQosPolicy::instance_hash_buckets`

<<*extension*>> (p. 237) Number of hash buckets for instances.

The instance hash table facilitates instance lookup. A higher number of buckets decreases instance lookup time but increases the memory usage.

**[default]** 1 **[range]** [1,1 million]

## 9.161 DDS\_RTPS\_EntityId\_t Struct Reference

From the DDS-RTPS specification: type used to hold the suffix part of the globally-unique RTPS-entity identifiers.

### 9.161.1 Detailed Description

From the DDS-RTPS specification: type used to hold the suffix part of the globally-unique RTPS-entity identifiers.

From DDS-RTPS Specification, clauses 8.4.2.1 and 9.3.1.

## 9.162 DDS\_RTPS\_GUID\_t Struct Reference

From the DDS-RTPS specification: type used to hold a globally-unique RTPS-entity identifier.

### 9.162.1 Detailed Description

From the DDS-RTPS specification: type used to hold a globally-unique RTPS-entity identifier.

From DDS-RTPS Specification, clauses 8.4.2.1 and 9.3.1.

## 9.163 DDS\_RtpsReliableReaderProtocol\_t Struct Reference

Qos related to reliable reader protocol defined in RTPS.

### Public Attributes

- struct **DDS\_Duration\_t min\_heartbeat\_response\_delay**  
*The minimum delay to respond to a heartbeat.*
- struct **DDS\_Duration\_t max\_heartbeat\_response\_delay**  
*The maximum delay to respond to a heartbeat.*
- struct **DDS\_Duration\_t heartbeat\_suppression\_duration**  
*The duration a reader ignores consecutively received heartbeats.*
- struct **DDS\_Duration\_t nack\_period**  
*The period at which to send NACKs.*
- **DDS\_Long receive\_window\_size**  
*The number of received out-of-order samples a reader can keep at a time.*
- struct **DDS\_Duration\_t round\_trip\_time**  
*The duration from sending a NACK to receiving a repair of a sample.*
- struct **DDS\_Duration\_t app\_ack\_period**  
*The period at which application-level acknowledgment messages are sent.*
- struct **DDS\_Duration\_t min\_app\_ack\_response\_keep\_duration**  
*Minimum duration for which application-level acknowledgment response data is kept.*
- **DDS\_Long samples\_per\_app\_ack**  
*The minimum number of samples acknowledged by one application-level acknowledgment message.*

### 9.163.1 Detailed Description

Qos related to reliable reader protocol defined in RTPS.

It is used to config reliable reader according to RTPS protocol.

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

QoS:

**DDS\_DataReaderProtocolQosPolicy** (p. 630) **DDS\_DiscoveryConfigQosPolicy** (p. 712)

## 9.163.2 Member Data Documentation

### 9.163.2.1 min\_heartbeat\_response\_delay

```
struct DDS_Duration_t DDS_RtpsReliableReaderProtocol_t::min_heartbeat_response_delay
```

The minimum delay to respond to a heartbeat.

When a reliable reader receives a heartbeat from a remote writer and finds out that it needs to send back an ACK/NACK message, the reader can choose to delay a while. This sets the value of the minimum delay.

**[default]** 0 seconds

**[range]** [0, 1 year], <= max\_heartbeat\_response\_delay

### 9.163.2.2 max\_heartbeat\_response\_delay

```
struct DDS_Duration_t DDS_RtpsReliableReaderProtocol_t::max_heartbeat_response_delay
```

The maximum delay to respond to a heartbeat.

When a reliable reader receives a heartbeat from a remote writer and finds out that it needs to send back an ACK/NACK message, the reader can choose to delay a while. This sets the value of maximum delay.

**[default]** The default value depends on the container policy:

- For **DDS\_DataReaderProtocolQosPolicy::rtps\_reliable\_reader** (p. 633): 0.5 seconds
- For **DDS\_DiscoveryConfigQosPolicy::publication\_reader** (p. 718): 0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::subscription\_reader** (p. 718): 0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::participant\_message\_reader** (p. 721): 0 seconds

**[range]** [0, 1 year], >= min\_heartbeat\_response\_delay



### 9.163.2.3 heartbeat\_suppression\_duration

```
struct DDS_Duration_t DDS_RtpsReliableReaderProtocol_t::heartbeat_suppression_duration
```

The duration a reader ignores consecutively received heartbeats.

When a reliable reader receives consecutive heartbeats within a short duration that will trigger redundant NACKs, the reader may ignore the latter heartbeat(s). This sets the duration during which additionally received heartbeats are suppressed.

**[default]** 0.0625 seconds

**[range]** [0, 1 year],

### 9.163.2.4 nack\_period

```
struct DDS_Duration_t DDS_RtpsReliableReaderProtocol_t::nack_period
```

The period at which to send NACKs.

A reliable reader will send periodic NACKs at this rate when it first matches with a reliable writer. The reader will stop sending NACKs when it has received all available historical data from the writer.

**[default]** 5 seconds

**[range]** [1 nanosec, 1 year]

### 9.163.2.5 receive\_window\_size

```
DDS_Long DDS_RtpsReliableReaderProtocol_t::receive_window_size
```

The number of received out-of-order samples a reader can keep at a time.

A reliable reader stores the out-of-order samples it receives until it can present them to the application in-order. The receive window is the maximum number of out-of-order samples that a reliable reader keeps at a given time. When the receive window is full, subsequently received out-of-order samples are dropped.

**[default]** 256

**[range]** [ $\geq 1$ ]

### 9.163.2.6 round\_trip\_time

```
struct DDS_Duration_t DDS_RtpsReliableReaderProtocol_t::round_trip_time
```

The duration from sending a NACK to receiving a repair of a sample.

This round-trip time is an estimate of the time starting from when the reader sends a NACK for a specific sample to when it receives that sample. For each sample, the reader will not send a subsequent NACK for it until the round-trip time has passed, thus preventing inefficient redundant requests.

**[default]** 0 seconds

**[range]** [0 nanosec, 1 year]

### 9.163.2.7 app\_ack\_period

```
struct DDS_Duration_t DDS_RtpsReliableReaderProtocol_t::app_ack_period
```

The period at which application-level acknowledgment messages are sent.

A **DDSDataReader** (p. 1288) sends application-level acknowledgment messages to a **DDSDataWriter** (p. 1321) at this periodic rate, and will continue sending until it receives a message from the **DDSDataWriter** (p. 1321) that it has received and processed the acknowledgment and an AppAckConfirmation has been received by the **DDSDataReader** (p. 1288). Note: application-level acknowledgment messages can also be sent non-periodically, as determined by **DDS\_RtpsReliableReaderProtocol\_t::samples\_per\_app\_ack** (p. 1060).

**[default]** 5 seconds

**[range]** [1 nanosec, 1 year]

### 9.163.2.8 min\_app\_ack\_response\_keep\_duration

```
struct DDS_Duration_t DDS_RtpsReliableReaderProtocol_t::min_app_ack_response_keep_duration
```

Minimum duration for which application-level acknowledgment response data is kept.

The user-specified response data of an explicit application-level acknowledgment (called by **DDSDataReader::acknowledge\_sample** (p. 1296) or **DDSDataReader::acknowledge\_all** (p. 1297)) is cached by the **DDSDataReader** (p. 1288) for the purpose of reliably resending the data with the acknowledgment message. After this duration has passed from the time of the first acknowledgment, the response data is dropped from the cache and will not be resent with future acknowledgments for the corresponding sample(s).

**[default]** 0 sec

**[range]** [0 sec, 1 year]

### 9.163.2.9 samples\_per\_app\_ack

**DDS\_Long** DDS\_RtpsReliableReaderProtocol\_t::samples\_per\_app\_ack

The minimum number of samples acknowledged by one application-level acknowledgment message.

This setting applies only when **DDS\_ReliabilityQosPolicy::acknowledgment\_kind** (p. 1043) = **DDS\_APPLICATION\_←\_EXPLICIT\_ACKNOWLEDGMENT\_MODE** (p. 436) or **DDS\_APPLICATION\_AUTO\_ACKNOWLEDGMENT\_MODE** (p. 435)

A **DDSDataReader** (p. 1288) will immediately send an application-level acknowledgment message when it has at least this many samples that have been acknowledged. It will not send an acknowledgment message until it has at least this many samples pending acknowledgment.

For example, calling **DDSDataReader::acknowledge\_sample** (p. 1296) this many times consecutively will trigger the sending of an acknowledgment message. Calling **DDSDataReader::acknowledge\_all** (p. 1297) may trigger the sending of an acknowledgment message, if at least this many samples are being acknowledged at once.

This is independent of the **DDS\_RtpsReliableReaderProtocol\_t::app\_ack\_period** (p. 1060), where a **DDSData←Reader** (p. 1288) will send acknowledgement messages at the periodic rate regardless.

When this is set to **DDS\_LENGTH\_UNLIMITED** (p. 438), then acknowledgement messages are sent only periodically, at the rate set by **DDS\_RtpsReliableReaderProtocol\_t::app\_ack\_period** (p. 1060).

[default] 1

[range] [1, 1000000], or **DDS\_LENGTH\_UNLIMITED** (p. 438)

## 9.164 DDS\_RtpsReliableWriterProtocol\_t Struct Reference

QoS related to the reliable writer protocol defined in RTPS.

### Public Attributes

- **DDS\_Long low\_watermark**

*When the number of unacknowledged samples in the current send window of a reliable writer meets or falls below this threshold, the **DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS** (p. 349) is considered to have changed.*

- **DDS\_Long high\_watermark**

*When the number of unacknowledged samples in the current send window of a reliable writer meets or exceeds this threshold, the **DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS** (p. 349) is considered to have changed.*

- struct **DDS\_Duration\_t heartbeat\_period**

*The period at which to send heartbeats.*

- struct **DDS\_Duration\_t fast\_heartbeat\_period**

*An alternative heartbeat period used when a reliable writer needs to flush its unacknowledged samples more quickly.*

- struct **DDS\_Duration\_t late\_joiner\_heartbeat\_period**

*An alternative heartbeat period used when a reliable reader joins late and needs to be caught up on cached samples of a reliable writer more quickly than the normal heartbeat rate.*

- struct **DDS\_Duration\_t virtual\_heartbeat\_period**

The period at which to send virtual heartbeats. Virtual heartbeats inform the reliable reader about the range of samples currently present, for each virtual GUID, in the reliable writer's queue.

- **DDS\_Long samples\_per\_virtual\_heartbeat**  
The number of samples that a reliable writer has to publish before sending a virtual heartbeat.
- **DDS\_Long max\_heartbeat\_retries**  
The maximum number of periodic heartbeat retries before marking a remote reader as inactive.
- **DDS\_Boolean inactivate\_nonprogressing\_readers**  
Whether to treat remote readers as inactive when their NACKs do not progress.
- **DDS\_Long heartbeats\_per\_max\_samples**  
The number of piggyback heartbeats sent per max send window.
- struct **DDS\_Duration\_t min\_nack\_response\_delay**  
The minimum delay to respond to a NACK.
- struct **DDS\_Duration\_t max\_nack\_response\_delay**  
The maximum delay to respond to a nack.
- struct **DDS\_Duration\_t nack\_suppression\_duration**  
The duration for ignoring consecutive NACKs that may trigger redundant repairs.
- **DDS\_Long max\_bytes\_per\_nack\_response**  
The maximum total message size when resending rejected samples.
- struct **DDS\_Duration\_t disable\_positive\_acks\_min\_sample\_keep\_duration**  
The minimum duration a sample is queued for ACK-disabled readers.
- struct **DDS\_Duration\_t disable\_positive\_acks\_max\_sample\_keep\_duration**  
The maximum duration a sample is queued for ACK-disabled readers.
- **DDS\_Boolean disable\_positive\_acks\_enable\_adaptive\_sample\_keep\_duration**  
Enables dynamic adjustment of sample keep duration in response to congestion.
- **DDS\_Long disable\_positive\_acks\_decrease\_sample\_keep\_duration\_factor**  
Controls rate of contraction of dynamic sample keep duration.
- **DDS\_Long disable\_positive\_acks\_increase\_sample\_keep\_duration\_factor**  
Controls rate of growth of dynamic sample keep duration.
- **DDS\_Long min\_send\_window\_size**  
Minimum size of send window of unacknowledged samples.
- **DDS\_Long max\_send\_window\_size**  
Maximum size of send window of unacknowledged samples.
- struct **DDS\_Duration\_t send\_window\_update\_period**  
Period in which send window may be dynamically changed.
- **DDS\_Long send\_window\_increase\_factor**  
Increases send window size by this percentage when reacting dynamically to network conditions.
- **DDS\_Long send\_window\_decrease\_factor**  
Decreases send window size by this percentage when reacting dynamically to network conditions.
- **DDS\_Boolean enable\_multicast\_periodic\_heartbeat**  
Whether periodic heartbeat messages are sent over multicast.
- **DDS\_Long multicast\_resend\_threshold**  
The minimum number of requesting readers needed to trigger a multicast resend.
- **DDS\_Boolean disable\_repair\_piggyback\_heartbeat**  
Prevents piggyback heartbeats from being sent with repair samples.

### 9.164.1 Detailed Description

QoS related to the reliable writer protocol defined in RTPS.

It is used to configure a reliable writer according to RTPS protocol.

The reliability protocol settings are applied to batches instead of individual data samples when batching is enabled.

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

QoS:

**DDS\_DataWriterProtocolQosPolicy** (p. 673) **DDS\_DiscoveryConfigQosPolicy** (p. 712)

### 9.164.2 Member Data Documentation

#### 9.164.2.1 low\_watermark

**DDS\_Long** DDS\_RtpsReliableWriterProtocol\_t::low\_watermark

When the number of unacknowledged samples in the current send window of a reliable writer meets or falls below this threshold, the **DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS** (p. 349) is considered to have changed.

This value is measured in units of samples, except with batching configurations where it is measured in units of batches.

The value must be greater than or equal to zero and strictly less than high\_watermark.

The high and low watermarks are used for switching between the regular and fast heartbeat rates (**DDS\_RtpsReliableWriterProtocol\_t::heartbeat\_period** (p. 1064) and **DDS\_RtpsReliableWriterProtocol\_t::fast\_heartbeat\_period** (p. 1064), respectively). When the number of unacknowledged samples in the queue of a reliable **DDSDataWriter** (p. 1321) meets or exceeds high\_watermark, the **DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS** (p. 349) is changed, and the DataWriter will start heartbeating at **DDS\_RtpsReliableWriterProtocol\_t::fast\_heartbeat\_period** (p. 1064). When the number of samples meets or falls below low\_watermark, **DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS** (p. 349) is changed, and the heartbeat rate will return to the "normal" rate (**DDS\_RtpsReliableWriterProtocol\_t::heartbeat\_period** (p. 1064)).

**[default]** 0

**[range]** [0, 100 million], < high\_watermark

### 9.164.2.2 high\_watermark

```
DDS_Long DDS_RtpsReliableWriterProtocol_t::high_watermark
```

When the number of unacknowledged samples in the current send window of a reliable writer meets or exceeds this threshold, the **DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS** (p. 349) is considered to have changed.

This value is measured in units of samples, except with batching configurations where it is measured in units of batches.

The value must be strictly greater than `low_watermark` and less than or equal to a maximum that depends on the container QoS policy:

In **DDS\_DomainParticipantQos::discovery\_config** (p. 745):

For **DDS\_DiscoveryConfigQosPolicy::publication\_writer** (p. 719)

`high_watermark <= DDS_AllocationSettings_t::max_count` (p. 589) in **DDS\_DomainParticipantResourceLimits**↔  
**QosPolicy::local\_writer\_allocation** (p. 750)

For **DDS\_DiscoveryConfigQosPolicy::subscription\_writer** (p. 720)

`high_watermark <= DDS_AllocationSettings_t::max_count` (p. 589) in **DDS\_DomainParticipantResourceLimits**↔  
**QosPolicy::local\_reader\_allocation** (p. 750)

In **DDS\_DataWriterQos::protocol** (p. 695):

For **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677),

`high_watermark <= DDS_ResourceLimitsQosPolicy::max_samples` (p. 1055) if batching is disabled. Otherwise,  
`high_watermark <= DDS_DataWriterResourceLimitsQosPolicy::max_batches` (p. 700) `high_watermark <= DDS_↔`  
**RtpsReliableWriterProtocol\_t::max\_send\_window\_size** (p. 1073)

**[default]** 1

**[range]** [1, 100 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438), `> low_watermark <= maximum` which depends on the container policy

### 9.164.2.3 heartbeat\_period

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::heartbeat_period
```

The period at which to send heartbeats.

A reliable writer will send periodic heartbeats at this rate.

**[default]** The default value depends on the container policy:

- For **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677): 3.0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::publication\_writer** (p. 719): 3.0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::subscription\_writer** (p. 720): 3.0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::participant\_message\_writer** (p. 722): 1.0 seconds

**[range]** [1 nanosec, 1 year], `>= DDS_RtpsReliableWriterProtocol_t::fast_heartbeat_period` (p. 1064), `>= DDS_↔`  
**RtpsReliableWriterProtocol\_t::late\_joiner\_heartbeat\_period** (p. 1065)

#### 9.164.2.4 fast\_heartbeat\_period

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::fast_heartbeat_period
```

An alternative heartbeat period used when a reliable writer needs to flush its unacknowledged samples more quickly.

This heartbeat period will be used when the number of unacknowledged samples in the cache of a reliable writer meets or exceeds the writer's high watermark and has not subsequently dropped to the low watermark. The normal period will be used at all other times.

This period must not be slower (i.e. must be of the same or shorter duration) than the normal heartbeat period.

**[default]** The default value depends on the container policy:

- For **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677): 3.0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::publication\_writer** (p. 719): 3.0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::subscription\_writer** (p. 720): 3.0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::participant\_message\_writer** (p. 722): 1.0 seconds

**[range]** [1 nanosec,1 year], <= **DDS\_RtpsReliableWriterProtocol\_t::heartbeat\_period** (p. 1064)

#### 9.164.2.5 late\_joiner\_heartbeat\_period

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::late_joiner_heartbeat_period
```

An alternative heartbeat period used when a reliable reader joins late and needs to be caught up on cached samples of a reliable writer more quickly than the normal heartbeat rate.

This heartbeat period will be used when a reliable reader joins after a reliable writer with non-volatile durability has begun publishing samples. Once the reliable reader has received all cached samples, it will be serviced at the same rate as other reliable readers.

This period must not be slower (i.e., must be of the same or shorter duration) than the normal heartbeat period.

A reliable writer will use whichever heartbeat period is faster, the current heartbeat period being used for other reliable readers or the **DDS\_RtpsReliableWriterProtocol\_t::late\_joiner\_heartbeat\_period** (p. 1065), to service the late joining reader. This means that if the **DDS\_RtpsReliableWriterProtocol\_t::fast\_heartbeat\_period** (p. 1064) is currently being used and is faster than the `late_joiner_heartbeat_period`, then the `fast_heartbeat_period` will continue to be used for the late joiner as well.

**[default]** The default value depends on the container policy:

- For `DDS_DataWriterProtocolQosPolicy::rtps_reliable_writer` (p. 677): 3.0 seconds
- For `DDS_DiscoveryConfigQosPolicy::publication_writer` (p. 719): 3.0 seconds
- For `DDS_DiscoveryConfigQosPolicy::subscription_writer` (p. 720): 3.0 seconds
- For `DDS_DiscoveryConfigQosPolicy::participant_message_writer` (p. 722): 1.0 seconds

**[range]** [1 nanosec,1 year], <= `DDS_RtpsReliableWriterProtocol_t::heartbeat_period` (p. 1064)

### 9.164.2.6 virtual\_heartbeat\_period

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::virtual_heartbeat_period
```

The period at which to send virtual heartbeats. Virtual heartbeats inform the reliable reader about the range of samples currently present, for each virtual GUID, in the reliable writer's queue.

A reliable writer will send periodic virtual heartbeats at this rate.

**[default]** The default value depends on the container policy:

- For `DDS_DataWriterProtocolQosPolicy::rtps_reliable_writer` (p. 677): `DDS_DURATION_AUTO` (p. 327). If `DDS_PresentationQosPolicy::access_scope` (p. 1000) is set to `DDS_GROUP_PRESENTATION_QOS` (p. 418) on the DataWriter, this value is set to `DDS_RtpsReliableWriterProtocol_t::heartbeat_period` (p. 1064). Otherwise, the value is set to `DDS_DURATION_INFINITE` (p. 326).
- For `DDS_DiscoveryConfigQosPolicy::publication_writer` (p. 719): `DDS_DURATION_INFINITE` (p. 326)
- For `DDS_DiscoveryConfigQosPolicy::subscription_writer` (p. 720): `DDS_DURATION_INFINITE` (p. 326)
- For `DDS_DiscoveryConfigQosPolicy::participant_message_writer` (p. 722): `DDS_DURATION_INFINITE` (p. 326)

**[range]** > 1 nanosec, `DDS_DURATION_INFINITE` (p. 326), or `DDS_DURATION_AUTO` (p. 327)

### 9.164.2.7 samples\_per\_virtual\_heartbeat

```
DDS_Long DDS_RtpsReliableWriterProtocol_t::samples_per_virtual_heartbeat
```

The number of samples that a reliable writer has to publish before sending a virtual heartbeat.

**[default]** `DDS_LENGTH_UNLIMITED` (p. 438)

**[range]** [1,1000000], `DDS_LENGTH_UNLIMITED` (p. 438)



### 9.164.2.8 max\_heartbeat\_retries

```
DDS_Long DDS_RtpsReliableWriterProtocol_t::max_heartbeat_retries
```

The maximum number of *periodic* heartbeat retries before marking a remote reader as inactive.

When a remote reader has not acked all the samples the reliable writer has in its queue, and max\_heartbeat\_retries number of periodic heartbeats has been sent without receiving any ack/nack back, the remote reader will be marked as inactive (not alive) and be ignored until it resumes sending ack/nack.

Note that piggyback heartbeats do NOT count towards this value.

**[default]** 10

**[range]** [1, 1 million] or **DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.164.2.9 inactivate\_nonprogressing\_readers

```
DDS_Boolean DDS_RtpsReliableWriterProtocol_t::inactivate_nonprogressing_readers
```

Whether to treat remote readers as inactive when their NACKs do not progress.

Nominally, a remote reader is marked inactive when a successive number of periodic heartbeats equal or greater than **DDS\_RtpsReliableWriterProtocol\_t::max\_heartbeat\_retries** (p. 1066) have been sent without receiving any ack/nacks back.

By setting this **DDS\_BOOLEAN\_TRUE** (p. 317), it changes the conditions of inactivating a remote reader: a reader will be considered inactive when it either does not send any ack/nacks or keeps sending non-progressing nacks for **DDS\_RtpsReliableWriterProtocol\_t::max\_heartbeat\_retries** (p. 1066) number of heartbeat periods, where a non-progressing nack is one whose oldest sample requested has not advanced from the oldest sample requested of the previous nack.

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.164.2.10 heartbeats\_per\_max\_samples

```
DDS_Long DDS_RtpsReliableWriterProtocol_t::heartbeats_per_max_samples
```

The number of piggyback heartbeats sent per max send window.

When a DataWriter is configured with a fixed send window size (**DDS\_RtpsReliableWriterProtocol\_t::min\_send\_window\_size** (p. 1072) is equal to effective max\_send\_window\_size), a piggyback heartbeat is sent every [(effective max send window size/heartbeats\_per\_max\_samples)] number of samples written.

Otherwise, the number of piggyback heartbeats sent is scaled according to the current size of the send window. For example, consider a **DDS\_RtpsReliableWriterProtocol\_t::heartbeats\_per\_max\_samples** (p. 1067) of 50. If the current send window size is 100, a piggyback heartbeat will be sent every 2 samples. If the send window size grows to 150, a piggyback heartbeat will be sent every 3 samples, and so on. Additionally, when the send window size grows, a piggyback heartbeat is sent with the next sample. (If it weren't, the sending of that heartbeat could be delayed, since the heartbeat rate scales with the increasing window size.)

The effective max send window is calculated as follows:

Without batching:

`min (DDS_ResourceLimitsQosPolicy::max_samples (p. 1055), DDS_RtpsReliableWriterProtocol_t::max_send_window_size (p. 1073))`

With batching:

`min (DDS_DataWriterResourceLimitsQosPolicy::max_batches (p. 700), DDS_RtpsReliableWriterProtocol_t::max_send_window_size (p. 1073))`

If `heartbeats_per_max_samples` is set to zero, no piggyback heartbeats will be sent.

If current send window size is `DDS_LENGTH_UNLIMITED` (p. 438), 100 million is assumed as the effective max send window.

**[default]** The default value depends on the container policy:

- For `DDS_DataWriterProtocolQosPolicy::rtps_reliable_writer` (p. 677): 8
- For `DDS_DiscoveryConfigQosPolicy::publication_writer` (p. 719): 8
- For `DDS_DiscoveryConfigQosPolicy::subscription_writer` (p. 720): 8
- For `DDS_DiscoveryConfigQosPolicy::participant_message_writer` (p. 722): 1

**[range]** [0, 100 million]

- For `DDS_DiscoveryConfigQosPolicy::publication_writer` (p. 719):  
`heartbeats_per_max_samples` ≤ `DDS_AllocationSettings_t::max_count` (p. 589) in `DDS_Domain` ↔ `ParticipantResourceLimitsQosPolicy::local_writer_allocation` (p. 750)
- For `DDS_DiscoveryConfigQosPolicy::subscription_writer` (p. 720):  
`heartbeats_per_max_samples` ≤ `DDS_AllocationSettings_t::max_count` (p. 589) in `DDS_Domain` ↔ `ParticipantResourceLimitsQosPolicy::local_reader_allocation` (p. 750)
- For `DDS_DataWriterProtocolQosPolicy::rtps_reliable_writer` (p. 677):

`heartbeats_per_max_samples` ≤ `DDS_ResourceLimitsQosPolicy::max_samples` (p. 1055) if batching is disabled. Otherwise:

`heartbeats_per_max_samples` ≤ `DDS_DataWriterResourceLimitsQosPolicy::max_batches` (p. 700)

`heartbeats_per_max_samples` ≤ `DDS_RtpsReliableWriterProtocol_t::max_send_window_size` (p. 1073)

### 9.164.2.11 min\_nack\_response\_delay

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::min_nack_response_delay
```

The minimum delay to respond to a NACK.

When a reliable writer receives a NACK from a remote reader, the writer can choose to delay a while before it sends repair samples or a heartbeat. This sets the value of the minimum delay.

**[default]** 0 seconds

**[range]** [0,1 day], <= max\_nack\_response\_delay

### 9.164.2.12 max\_nack\_response\_delay

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::max_nack_response_delay
```

The maximum delay to respond to a nack.

This set the value of maximum delay between receiving a NACK and sending repair samples or a heartbeat.

**[default]** The default value depends on the container policy:

- For **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677): 0.2 seconds
- For **DDS\_DiscoveryConfigQosPolicy::publication\_writer** (p. 719): 0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::subscription\_writer** (p. 720): 0 seconds
- For **DDS\_DiscoveryConfigQosPolicy::participant\_message\_writer** (p. 722): 0 seconds

**[range]** [0,1 day], >= min\_nack\_response\_delay

### 9.164.2.13 nack\_suppression\_duration

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::nack_suppression_duration
```

The duration for ignoring consecutive NACKs that may trigger redundant repairs.

A reliable writer may receive consecutive NACKs within a short duration from a remote reader that will trigger the sending of redundant repair messages.

This specifies the duration during which consecutive NACKs are ignored to prevent redundant repairs from being sent.

**[default]** 0 seconds

**[range]** [0,1 day],

### 9.164.2.14 max\_bytes\_per\_nack\_response

```
DDS_Long DDS_RtpsReliableWriterProtocol_t::max_bytes_per_nack_response
```

The maximum total message size when resending rejected samples.

As part of the reliable communication protocol, data writers send heartbeat (HB) messages to their data readers. Each HB message contains the sequence number of the most recent sample sent by the data writer.

In response, a data reader sends an acknowledgement (ACK) message, indicating what sequence numbers it did not receive, if any. If the data reader is missing some samples, the data writer will send them again.

max\_bytes\_per\_nack\_response determines the maximum size of the message sent by the data writer in response to an ACK. This message may contain multiple samples. The data writer will always send at least one message, even if the size of that message exceeds the max\_bytes\_per\_nack\_response value.

If max\_bytes\_per\_nack\_response is larger than the maximum message size supported by the underlying transport, RTI Connext will send multiple messages. If the total size of all samples that need to be resent is larger than max\_bytes\_per\_nack\_response, the remaining samples will be resent the next time an ACK arrives.

**[default]** The default value depends on the container policy:

- For **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677): 131072 bytes
- For **DDS\_DiscoveryConfigQosPolicy::publication\_writer** (p. 719): 131072 bytes
- For **DDS\_DiscoveryConfigQosPolicy::subscription\_writer** (p. 720): 131072 bytes
- For **DDS\_DiscoveryConfigQosPolicy::participant\_message\_writer** (p. 722): 9216 bytes

**[range]** [0, 1 GB]

### 9.164.2.15 disable\_positive\_acks\_min\_sample\_keep\_duration

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::disable_positive_acks_min_sample_keep_↔
duration
```

The minimum duration a sample is queued for ACK-disabled readers.

When positive ACKs are disabled for a data writer (**DDS\_DataWriterProtocolQosPolicy::disable\_positive\_acks** (p. 675) = **DDS\_BOOLEAN\_TRUE** (p. 317)) or a data reader (**DDS\_DataReaderProtocolQosPolicy::disable\_↔positive\_acks** (p. 632) = **DDS\_BOOLEAN\_TRUE** (p. 317)), a sample is available from the data writer's queue for at least this duration, after which the sample may be considered to be acknowledged.

**[default]** 1 millisecond

**[range]** [0,1 year], <= **DDS\_RtpsReliableWriterProtocol\_t::disable\_positive\_acks\_max\_sample\_keep\_duration** (p. 1070)

**9.164.2.16 disable\_positive\_acks\_max\_sample\_keep\_duration**

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::disable_positive_acks_max_sample_keep_↵
duration
```

The maximum duration a sample is queued for ACK-disabled readers.

When positive ACKs are disabled for a data writer (**DDS\_DataWriterProtocolQosPolicy::disable\_positive\_acks** (p.675) = **DDS\_BOOLEAN\_TRUE** (p.317)) or a data reader (**DDS\_DataReaderProtocolQosPolicy::disable\_↵positive\_acks** (p.632) = **DDS\_BOOLEAN\_TRUE** (p.317)), a sample is available from the data writer's queue for at most this duration, after which the sample is considered to be acknowledged.

**[default]** 1 second

**[range]** [0,1 year], >= **DDS\_RtpsReliableWriterProtocol\_t::disable\_positive\_acks\_min\_sample\_keep\_duration** (p.1070)

**9.164.2.17 disable\_positive\_acks\_enable\_adaptive\_sample\_keep\_duration**

```
DDS_Boolean DDS_RtpsReliableWriterProtocol_t::disable_positive_acks_enable_adaptive_sample_keep_↵
duration
```

Enables dynamic adjustment of sample keep duration in response to congestion.

For dynamic networks where a static minimum sample keep duration may not provide sufficient performance or reliability, setting **DDS\_RtpsReliableWriterProtocol\_t::disable\_positive\_acks\_enable\_adaptive\_sample\_keep\_duration** (p.1071) = **DDS\_BOOLEAN\_TRUE** (p.317), enables the sample keep duration to be dynamically adjusted to adapt to network conditions. The keep duration changes according to the detected level of congestion, which is determined to be proportional to the rate of NACKs received. An adaptive algorithm automatically controls the keep duration to optimize throughput and reliability.

To relieve high congestion, the keep duration is increased to effectively decrease the send rate; this lengthening of the keep duration is controlled by **DDS\_RtpsReliableWriterProtocol\_t::disable\_positive\_acks\_increase\_sample\_↵keep\_duration\_factor** (p.1072). Alternatively, when congestion is low, the keep duration is decreased to effectively increase send rate; this shortening of the keep duration is controlled by **DDS\_RtpsReliableWriterProtocol\_t::disable\_↵positive\_acks\_decrease\_sample\_keep\_duration\_factor** (p.1071).

The lower and upper bounds of the dynamic sample keep duration are set by **DDS\_RtpsReliableWriterProtocol\_↵t::disable\_positive\_acks\_min\_sample\_keep\_duration** (p.1070) and **DDS\_RtpsReliableWriterProtocol\_t\_↵::disable\_positive\_acks\_max\_sample\_keep\_duration** (p.1070), respectively.

When **DDS\_RtpsReliableWriterProtocol\_t::disable\_positive\_acks\_enable\_adaptive\_sample\_keep\_duration** (p.1071) = **DDS\_BOOLEAN\_FALSE** (p.317), the sample keep duration is set to **DDS\_RtpsReliableWriterProtocol\_↵t::disable\_positive\_acks\_min\_sample\_keep\_duration** (p.1070) .

**[default]** **DDS\_BOOLEAN\_TRUE** (p.317)

### 9.164.2.18 `disable_positive_acks_decrease_sample_keep_duration_factor`

**DDS\_Long** `DDS_RtpsReliableWriterProtocol_t::disable_positive_acks_decrease_sample_keep_duration_factor`

Controls rate of contraction of dynamic sample keep duration.

Used when `DDS_RtpsReliableWriterProtocol_t::disable_positive_acks_enable_adaptive_sample_keep_duration` (p. 1071) = `DDS_BOOLEAN_TRUE` (p. 317).

When the adaptive algorithm determines that the keep duration should be decreased, this factor (a percentage) is multiplied with the current keep duration to get the new shorter keep duration. For example, if the current keep duration is 20 milliseconds, using the default factor of 95% would result in a new keep duration of 19 milliseconds.

**[default]** 95

**[range]**  $\leq 100$

### 9.164.2.19 `disable_positive_acks_increase_sample_keep_duration_factor`

**DDS\_Long** `DDS_RtpsReliableWriterProtocol_t::disable_positive_acks_increase_sample_keep_duration_factor`

Controls rate of growth of dynamic sample keep duration.

Used when `DDS_RtpsReliableWriterProtocol_t::disable_positive_acks_enable_adaptive_sample_keep_duration` (p. 1071) = `DDS_BOOLEAN_TRUE` (p. 317).

When the adaptive algorithm determines that the keep duration should be increased, this factor (a percentage) is multiplied with the current keep duration to get the new longer keep duration. For example, if the current keep duration is 20 milliseconds, using the default factor of 150% would result in a new keep duration of 30 milliseconds.

**[default]** 150

**[range]**  $\geq 100$

### 9.164.2.20 `min_send_window_size`

**DDS\_Long** `DDS_RtpsReliableWriterProtocol_t::min_send_window_size`

Minimum size of send window of unacknowledged samples.

A `DDSDataWriter` (p. 1321) has a limit on the number of unacknowledged samples in-flight at a time. This send window can be configured to have a minimum size (this field) and a maximum size (`max_send_window_size`). The send window can dynamically change, between the min and max sizes, to throttle the effective send rate in response to changing network congestion, as measured by negative acknowledgements received.

When a variable sized send window is used (i.e., when `min_send_window_size` and `max_send_window_size` are not set to the same value) the send window is initialized to `min_send_window_size`.

**[default]** `DDS_LENGTH_UNLIMITED` (p. 438)

**[range]**  $> 0$ ,  $\leq \text{max\_send\_window\_size}$ , or `DDS_LENGTH_UNLIMITED` (p. 438)

See also

**DDS\_RtpsReliableWriterProtocol\_t::max\_send\_window\_size** (p. 1073)

**DDS\_RtpsReliableWriterProtocol\_t::low\_watermark** (p. 1063)

**DDS\_RtpsReliableWriterProtocol\_t::high\_watermark** (p. 1063)

**DDS\_ReliableWriterCacheChangedStatus::full\_reliable\_writer\_cache** (p. 1047)

### 9.164.2.21 max\_send\_window\_size

**DDS\_Long** DDS\_RtpsReliableWriterProtocol\_t::max\_send\_window\_size

Maximum size of send window of unacknowledged samples.

A **DDSDataWriter** (p. 1321) has a limit on the number of unacknowledged samples in-flight at a time. This send window can be configured to have a minimum size (`min_send_window_size`) and a maximum size (this field). The send window can dynamically change, between the min and max sizes, to throttle the effective send rate in response to changing network congestion, as measured by negative acknowledgements received.

When a variable sized send window is used (i.e., when `min_send_window_size` and `max_send_window_size` are not set to the same value) the send window is initialized to `min_send_window_size`.

When both `min_send_window_size` and `max_send_window_size` are **DDS\_LENGTH\_UNLIMITED** (p. 438), then either **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055) (for non-batching) or **DDS\_DataWriterResourceLimitsQosPolicy::max\_batches** (p. 700) (for batching) serves as the effective `max_send_window_size`. When **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055) (for non-batching) or **DDS\_DataWriterResourceLimitsQosPolicy::max\_batches** (p. 700) (for batching) is less than `max_send_window_size`, then it serves as the effective `max_send_window_size`. If it is also less than `min_send_window_size`, then effectively both min and max send window sizes are equal to `max_samples` or `max_batches`.

In addition, the low and high watermarks are scaled down linearly to stay within the current send window size, and the full reliable queue status is set when the send window is full.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]**  $> 0$ ,  $\geq \text{min\_send\_window\_size}$ , or **DDS\_LENGTH\_UNLIMITED** (p. 438)

See also

**DDS\_RtpsReliableWriterProtocol\_t::min\_send\_window\_size** (p. 1072)

**DDS\_RtpsReliableWriterProtocol\_t::low\_watermark** (p. 1063)

**DDS\_RtpsReliableWriterProtocol\_t::high\_watermark** (p. 1063)

**DDS\_ReliableWriterCacheChangedStatus::full\_reliable\_writer\_cache** (p. 1047)

### 9.164.2.22 send\_window\_update\_period

```
struct DDS_Duration_t DDS_RtpsReliableWriterProtocol_t::send_window_update_period
```

Period in which send window may be dynamically changed.

The **DDSDataWriter** (p. 1321)'s send window will dynamically change, between the min and max send window sizes, to throttle the effective send rate in response to changing network congestion, as measured by negative acknowledgements received.

The change in send window size happens at this update period, whereupon the send window is either increased or decreased in size according to the increase or decrease factors, respectively.

**[default]** The default value depends on the container policy:

- For **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677): 3 seconds
- For **DDS\_DiscoveryConfigQosPolicy::publication\_writer** (p. 719): 3 seconds
- For **DDS\_DiscoveryConfigQosPolicy::subscription\_writer** (p. 720): 3 seconds
- For **DDS\_DiscoveryConfigQosPolicy::participant\_message\_writer** (p. 722): 1 second

**[range]** > [0,1 year]

See also

**DDS\_RtpsReliableWriterProtocol\_t::send\_window\_increase\_factor** (p. 1074), **DDS\_RtpsReliableWriterProtocol\_t::send\_window\_decrease\_factor** (p. 1074)

### 9.164.2.23 send\_window\_increase\_factor

```
DDS_Long DDS_RtpsReliableWriterProtocol_t::send_window_increase_factor
```

Increases send window size by this percentage when reacting dynamically to network conditions.

The **DDSDataWriter** (p. 1321)'s send window will dynamically change, between the min and max send window sizes, to throttle the effective send rate in response to changing network congestion, as measured by negative acknowledgements received.

After an update period during which no negative acknowledgements were received, the send window will be increased by this factor. The factor is treated as a percentage, where a factor of 150 would increase the send window by 150%. The increased send window size will not exceed the `max_send_window_size`.

**[default]** 105

**[range]** > 100

See also

**DDS\_RtpsReliableWriterProtocol\_t::send\_window\_update\_period** (p. 1073), **DDS\_RtpsReliableWriterProtocol\_t::send\_window\_decrease\_factor** (p. 1074)



### 9.164.2.24 send\_window\_decrease\_factor

**DDS\_Long** DDS\_RtpsReliableWriterProtocol\_t::send\_window\_decrease\_factor

Decreases send window size by this percentage when reacting dynamically to network conditions.

The **DDSDataWriter** (p. 1321)'s send window will dynamically change, between the min and max send window sizes, to throttle the effective send rate in response to changing network congestion, as measured by negative acknowledgements received.

When increased network congestion causes a negative acknowledgement to be received by a writer, the send window will be decreased by this factor to throttle the effective send rate. The factor is treated as a percentage, where a factor of 80 would decrease the send window to 80% of its previous size. The decreased send window size will not be less than the min\_send\_window\_size.

**[default]** The default value depends on the container policy:

- For **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p. 677): 70
- For **DDS\_DiscoveryConfigQosPolicy::publication\_writer** (p. 719): 50
- For **DDS\_DiscoveryConfigQosPolicy::subscription\_writer** (p. 720): 50
- For **DDS\_DiscoveryConfigQosPolicy::participant\_message\_writer** (p. 722): 50

**[range]** [0, 100]

See also

**DDS\_RtpsReliableWriterProtocol\_t::send\_window\_update\_period** (p. 1073), **DDS\_RtpsReliableWriterProtocol\_t::send\_window\_increase\_factor** (p. 1074)

### 9.164.2.25 enable\_multicast\_periodic\_heartbeat

**DDS\_Boolean** DDS\_RtpsReliableWriterProtocol\_t::enable\_multicast\_periodic\_heartbeat

Whether periodic heartbeat messages are sent over multicast.

When enabled, if a reader has a multicast destination, then the writer will send its periodic HEARTBEAT messages to that destination. Otherwise, if not enabled or the reader does not have a multicast destination, the writer will send its periodic HEARTBEATs over unicast.

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.164.2.26 multicast\_resend\_threshold

**DDS\_Long** DDS\_RtpsReliableWriterProtocol\_t::multicast\_resend\_threshold

The minimum number of requesting readers needed to trigger a multicast resend.

Given readers with multicast destinations, when a reader NACKs for samples to be resent, the writer can either resend them over unicast or multicast. In order for the writer to resend over multicast, this threshold is the minimum number of readers of the same multicast group that the writer must receive NACKs from within a single response-delay. This allows the writer to coalesce near-simultaneous unicast resends into a multicast resend. Note that a threshold of 1 means that all resends will be sent over multicast, if available.

**[default]** 2

**[range]** [ $\geq$  1]

### 9.164.2.27 disable\_repair\_piggyback\_heartbeat

**DDS\_Boolean** DDS\_RtpsReliableWriterProtocol\_t::disable\_repair\_piggyback\_heartbeat

Prevents piggyback heartbeats from being sent with repair samples.

When samples are repaired, the **DDSDataWriter** (p.1321) resends **DDS\_RtpsReliableWriterProtocol\_t::max\_bytes\_per\_nack\_response** (p.1069) bytes and a piggyback heartbeat with each message. You can configure the **DDSDataWriter** (p.1321) to not send the piggyback heartbeat and instead rely on the **DDS\_RtpsReliableWriterProtocol\_t::late\_joiner\_heartbeat\_period** (p.1065) to control the throughput used to repair samples. This field is mutable only for **DDS\_DataWriterProtocolQosPolicy::rtps\_reliable\_writer** (p.677). **[default]** **DDS\_BOOLEAN\_FALSE** (p.317)

## 9.165 DDS\_RtpsWellKnownPorts\_t Struct Reference

RTPS well-known port mapping configuration.

### Public Attributes

- **DDS\_Long port\_base**  
*The base port offset.*
- **DDS\_Long domain\_id\_gain**  
*Tunable domain gain parameter.*
- **DDS\_Long participant\_id\_gain**  
*Tunable participant gain parameter.*
- **DDS\_Long builtin\_multicast\_port\_offset**  
*Additional offset for **metatraffic** multicast port.*
- **DDS\_Long builtin\_unicast\_port\_offset**  
*Additional offset for **metatraffic** unicast port.*
- **DDS\_Long user\_multicast\_port\_offset**  
*Additional offset for **usertraffic** multicast port.*
- **DDS\_Long user\_unicast\_port\_offset**  
*Additional offset for **usertraffic** unicast port.*

### 9.165.1 Detailed Description

RTPS well-known port mapping configuration.

RTI Connex uses the RTPS wire protocol. The discovery protocols defined by RTPS rely on well-known ports to initiate discovery. These well-known ports define the multicast and unicast ports on which a Participant will listen for discovery **metatraffic** from other Participants. The discovery metatraffic contains all the information required to establish the presence of remote DDS entities in the network.

The well-known ports are defined by RTPS in terms of port mapping expressions with several tunable parameters, which allow you to customize what network ports are used by RTI Connex. These parameters are exposed in **DDS\_RtpsWellKnownPorts\_t** (p. 1076). In order for all Participants in a system to correctly discover each other, it is important that they all use the same port mapping expressions.

The actual port mapping expressions, as defined by the RTPS specification, can be found below. In addition to the parameters listed in **DDS\_RtpsWellKnownPorts\_t** (p. 1076), the port numbers depend on:

- `domain_id`, as specified in **DDSDomainParticipantFactory::create\_participant** (p. 1442)
- `participant_id`, as specified using **DDS\_WireProtocolQoSPolicy::participant\_id** (p. 1247)

The `domain_id` parameter ensures no port conflicts exist between Participants belonging to different domains. This also means that discovery metatraffic in one domain is not visible to Participants in a different domain. The `participant_id` parameter ensures that unique unicast port numbers are assigned to Participants belonging to the same domain on a given host.

The `metatraffic_unicast_port` is used to exchange discovery metatraffic using unicast.

```
metatraffic_unicast_port = port_base + (domain_id_gain * domain_id) + (participant_id_gain * participant_id) + b
```

The `metatraffic_multicast_port` is used to exchange discovery metatraffic using multicast. The corresponding multicast group addresses are specified via **DDS\_DiscoveryQoSPolicy::multicast\_receive\_addresses** (p. 733) on a **DDSDomainParticipant** (p. 1351) entity.

```
metatraffic_multicast_port = port_base + (domain_id_gain * domain_id) + builtin_multicast_port_offset
```

RTPS also defines the *default* multicast and unicast ports on which DataReaders and DataWriters receive **usertraffic**. These default ports can be overridden using the **DDS\_DataReaderQoS::multicast** (p. 651), **DDS\_DataReaderQoS::unicast** (p. 651), or by the **DDS\_DataWriterQoS::unicast** (p. 696) QoS policies.

The `usertraffic_unicast_port` is used to exchange user data using unicast.

```
usertraffic_unicast_port = port_base + (domain_id_gain * domain_id) + (participant_id_gain * participant_id) + u
```

The `usertraffic_multicast_port` is used to exchange user data using multicast. The corresponding multicast group addresses can be configured using **DDS\_TransportMulticastQoSPolicy** (p. 1151).

```
usertraffic_multicast_port = port_base + (domain_id_gain * domain_id) + user_multicast_port_offset
```

By default, the port mapping parameters are configured to compliant with OMG's DDS Interoperability Wire Protocol (see also **DDS\_INTEROPERABLE\_RTPTS\_WELL\_KNOWN\_PORTS** (p. 461)).

The OMG's DDS Interoperability Wire Protocol compliant port mapping parameters are *not* backwards compatible with previous versions of the RTI Connex middleware.

When modifying the port mapping parameters, care must be taken to avoid port aliasing. This would result in undefined discovery behavior. The chosen parameter values will also determine the maximum possible number of domains in the system and the maximum number of participants per domain. Additionally, any resulting mapped port number must be within the range imposed by the underlying transport. For example, for UDPv4, this range typically equals [1024 - 65535].

Note: On Windows, you should avoid using ports 49152 through 65535 for inbound traffic. RTI Connex's ephemeral ports (see "Ports Used for Communication" in the *User's Manual*) may be within that range (see [https://msdn.microsoft.com/en-us/library/windows/desktop/ms737550\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/desktop/ms737550(v=vs.85).aspx)). With the default `RtpsWellKnownPorts` settings, port 49152 corresponds to domain ID 167, so using domain IDs 168 through 232 on Windows introduces the risk of a port collision and failure to create the Domain Participant when using multicast discovery. You may see this error:

RTIOsapiSocket\_bindWithIP:OS bind() failure, error 0X271D: An attempt was made to access a socket in a way forbidden by its access permissions.

QoS:

**DDS\_WireProtocolQosPolicy** (p. 1244)

## 9.165.2 Member Data Documentation

### 9.165.2.1 port\_base

`DDS_Long DDS_RtpsWellKnownPorts_t::port_base`

The base port offset.

All mapped well-known ports are offset by this value.

**[default]** 7400

**[range]** [ $\geq$  1], but resulting ports must be within the range imposed by the underlying transport.

### 9.165.2.2 domain\_id\_gain

```
DDS_Long DDS_RtpsWellKnownPorts_t::domain_id_gain
```

Tunable domain gain parameter.

Multiplier of the `domain_id`. Together with `participant_id_gain`, it determines the highest `domain_id` and `participant_id` allowed on this network.

In general, there are two ways to setup `domain_id_gain` and `participant_id_gain` parameters.

If `domain_id_gain > participant_id_gain`, it results in a port mapping layout where all **DDSDomain**↔**Participant** (p. 1351) instances within a single domain occupy a consecutive range of `domain_id_gain` ports. Precisely, all ports occupied by the domain fall within:

```
(port_base + (domain_id_gain * domain_id))
```

and:

```
(port_base + (domain_id_gain * (domain_id + 1)) - 1)
```

Under such a case, the highest `domain_id` is limited only by the underlying transport's maximum port. The highest `participant_id`, however, must satisfy:

```
max_participant_id < (domain_id_gain / participant_id_gain)
```

On the contrary, if `domain_id_gain <= participant_id_gain`, it results in a port mapping layout where a given domain's **DDSDomainParticipant** (p. 1351) instances occupy ports spanned across the entire valid port range allowed by the underlying transport. For instance, it results in the following potential mapping:

Mapped Port	Domain Id	Participant ID
higher port number	Domain Id = 1	Participant ID = 2
	Domain Id = 0	Participant ID = 2
	Domain Id = 1	Participant ID = 1
	Domain Id = 0	Participant ID = 1
	Domain Id = 1	Participant ID = 0
lower port number	Domain Id = 0	Participant ID = 0

Under this case, the highest `participant_id` is limited only by the underlying transport's maximum port. The highest `domain_id`, however, must satisfy:

```
max_domain_id < (participant_id_gain / domain_id_gain)
```

Additionally, `domain_id_gain` also determines the range of the port-specific offsets.

```
domain_id_gain > abs(builtin_multicast_port_offset - user_multicast_port_offset)
```

```
domain_id_gain > abs(builtin_unicast_port_offset - user_unicast_port_offset)
```

Violating this may result in port aliasing and undefined discovery behavior.

**[default]** 250

**[range]** [ $> 0$ ], but resulting ports must be within the range imposed by the underlying transport.

### 9.165.2.3 participant\_id\_gain

```
DDS_Long DDS_RtpsWellKnownPorts_t::participant_id_gain
```

Tunable participant gain parameter.

Multiplier of the `participant_id`. See `DDS_RtpsWellKnownPorts_t::domain_id_gain` (p. 1078) for its implications on the highest `domain_id` and `participant_id` allowed on this network.

Additionally, `participant_id_gain` also determines the range of `builtin_unicast_port_offset` and `user_unicast_port_offset`.

```
participant_id_gain > abs(builtin_unicast_port_offset - user_unicast_port_offset)
```

**[default]** 2

**[range]** [ $> 0$ ], but resulting ports must be within the range imposed by the underlying transport.

### 9.165.2.4 builtin\_multicast\_port\_offset

```
DDS_Long DDS_RtpsWellKnownPorts_t::builtin_multicast_port_offset
```

Additional offset for **metatraffic** multicast port.

It must be unique from other port-specific offsets.

**[default]** 0

**[range]** [ $\geq 0$ ], but resulting ports must be within the range imposed by the underlying transport.

### 9.165.2.5 builtin\_unicast\_port\_offset

```
DDS_Long DDS_RtpsWellKnownPorts_t::builtin_unicast_port_offset
```

Additional offset for **metatraffic** unicast port.

It must be unique from other port-specific offsets.

**[default]** 10

**[range]** [ $\geq 0$ ], but resulting ports must be within the range imposed by the underlying transport.

### 9.165.2.6 user\_multicast\_port\_offset

`DDS_Long DDS_RtpsWellKnownPorts_t::user_multicast_port_offset`

Additional offset for **usertraffic** multicast port.

It must be unique from other port-specific offsets.

**[default]** 1

**[range]** [ $\geq 0$ ], but resulting ports must be within the range imposed by the underlying transport.

### 9.165.2.7 user\_unicast\_port\_offset

`DDS_Long DDS_RtpsWellKnownPorts_t::user_unicast_port_offset`

Additional offset for **usertraffic** unicast port.

It must be unique from other port-specific offsets.

**[default]** 11

**[range]** [ $\geq 0$ ], but resulting ports must be within the range imposed by the underlying transport.

## 9.166 DDS\_SampleIdentity\_t Struct Reference

Type definition for a Sample Identity.

### Public Attributes

- struct **DDS\_GUID\_t** **writer\_guid**  
*16-byte identifier identifying the virtual GUID.*
- struct **DDS\_SequenceNumber\_t** **sequence\_number**  
*monotonically increasing 64-bit integer that identifies the sample in the data source.*

### 9.166.1 Detailed Description

Type definition for a Sample Identity.

A SampleIdentity defines a pair (Virtual Writer GUID, Sequence Number) that uniquely identifies a sample within a DDS domain and a Topic.

## 9.167 DDS\_SampleInfo Struct Reference

Information that accompanies each sample that is read or taken.

### Public Attributes

- **DDS\_SampleStateKind sample\_state**  
*The sample state of the sample.*
- **DDS\_ViewStateKind view\_state**  
*The view state of the instance.*
- **DDS\_InstanceStateKind instance\_state**  
*The instance state of the instance.*
- struct **DDS\_Time\_t source\_timestamp**  
*The timestamp when the sample was written by a DataWriter.*
- **DDS\_InstanceHandle\_t instance\_handle**  
*Identifies locally the corresponding instance.*
- **DDS\_InstanceHandle\_t publication\_handle**  
*Identifies locally the DataWriter that modified the instance.*
- **DDS\_Long disposed\_generation\_count**  
*The disposed generation count of the instance at the time of sample reception.*
- **DDS\_Long no\_writers\_generation\_count**  
*The no writers generation count of the instance at the time of sample reception.*
- **DDS\_Long sample\_rank**  
*The sample rank of the sample.*
- **DDS\_Long generation\_rank**  
*The generation rank of the sample.*
- **DDS\_Long absolute\_generation\_rank**  
*The absolute generation rank of the sample.*
- **DDS\_Boolean valid\_data**  
*Indicates whether the DataSample contains data or else it is only used to communicate a change in the instance↵\_state of the instance.*
- struct **DDS\_Time\_t reception\_timestamp**  
*<<extension>> (p. 237) The timestamp when the sample was committed by a DataReader.*
- struct **DDS\_SequenceNumber\_t publication\_sequence\_number**  
*<<extension>> (p. 237) The publication sequence number.*
- struct **DDS\_SequenceNumber\_t reception\_sequence\_number**  
*<<extension>> (p. 237) The reception sequence number when sample was committed by a DataReader*
- struct **DDS\_GUID\_t original\_publication\_virtual\_guid**  
*<<extension>> (p. 237) The original publication virtual GUID.*
- struct **DDS\_SequenceNumber\_t original\_publication\_virtual\_sequence\_number**  
*<<extension>> (p. 237) The original publication virtual sequence number.*
- struct **DDS\_GUID\_t related\_original\_publication\_virtual\_guid**  
*<<extension>> (p. 237) The original publication virtual GUID of a related sample.*
- struct **DDS\_SequenceNumber\_t related\_original\_publication\_virtual\_sequence\_number**  
*<<extension>> (p. 237) The original publication virtual sequence number of a related sample.*
- **DDS\_SampleFlag flag**



- `<<extension>>` (p. 237) *Flags associated with the sample.*
- struct **DDS\_GUID\_t source\_guid**
  - `<<extension>>` (p. 237) *The application logical data source associated with the sample.*
- struct **DDS\_GUID\_t related\_source\_guid**
  - `<<extension>>` (p. 237) *The application logical data source that is related to the sample.*
- struct **DDS\_GUID\_t related\_subscription\_guid**
  - `<<extension>>` (p. 237) *The related\_reader\_guid associated with the sample.*
- struct **DDS\_GUID\_t topic\_query\_guid**
  - `<<extension>>` (p. 237) *The GUID of the **DDSTopicQuery** (p. 1627) that is related to the sample.*
- struct **DDS\_CoherentSetInfo\_t \* coherent\_set\_info**
  - `<<extension>>` (p. 237) *The information about the coherent set that this sample is a part of.*

### 9.167.1 Detailed Description

Information that accompanies each sample that is `read` or `taken`.

### 9.167.2 Interpretation of the SampleInfo

The **DDS\_SampleInfo** (p. 1082) contains information pertaining to the associated `Data` instance sample including:

- the `sample_state` of the `Data` value (i.e., if it has already been read or not)
- the `view_state` of the related instance (i.e., if the instance is new or not)
- the `instance_state` of the related instance (i.e., if the instance is alive or not)
- **DDS\_SampleInfo::valid\_data** (p. 1089) flag. This flag indicates whether there is data associated with the sample. Some samples do not contain data indicating only a change on the `instance_state` of the corresponding instance.
- The values of `disposed_generation_count` and `no_writers_generation_count` for the related instance at the time the sample was received. These counters indicate the number of times the instance had become ALIVE (with `instance_state= DDS_ALIVE_INSTANCE_STATE` (p. 161)) at the time the sample was received.
- The `sample_rank` and `generation_rank` of the sample within the returned sequence. These ranks provide a preview of the samples that follow within the sequence returned by the `read` or `take` operations.
- The `absolute_generation_rank` of the sample within the **DDSDataReader** (p. 1288). This rank provides a preview of what is available within the **DDSDataReader** (p. 1288).
- The `source_timestamp` of the sample. This is the timestamp provided by the **DDSDataWriter** (p. 1321) at the time the sample was produced.

### 9.167.3 Interpretation of the SampleInfo disposed\_generation\_count and no\_writers\_generation\_count

For each instance, RTI Connexx internally maintains two counts, the **DDS\_SampleInfo::disposed\_generation\_count** (p. 1087) and **DDS\_SampleInfo::no\_writers\_generation\_count** (p. 1087), relative to each DataReader:

- The **DDS\_SampleInfo::disposed\_generation\_count** (p. 1087) and **DDS\_SampleInfo::no\_writers\_generation\_count** (p. 1087) are initialized to zero when the **DDSDataReader** (p. 1288) first detects the presence of a never-seen-before instance.
- The **DDS\_SampleInfo::disposed\_generation\_count** (p. 1087) is incremented each time the `instance_state` of the corresponding instance changes from **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) to **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161).
- The **DDS\_SampleInfo::no\_writers\_generation\_count** (p. 1087) is incremented each time the `instance_state` of the corresponding instance changes from **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) to **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161).
- These 'generation counts' are reset to zero when the instance resource is reclaimed.

The **DDS\_SampleInfo::disposed\_generation\_count** (p. 1087) and **DDS\_SampleInfo::no\_writers\_generation\_count** (p. 1087) available in the **DDS\_SampleInfo** (p. 1082) capture a snapshot of the corresponding counters at the time the sample was received.

### 9.167.4 Interpretation of the SampleInfo sample\_rank, generation\_rank and absolute\_generation\_rank

The **DDS\_SampleInfo::sample\_rank** (p. 1088) and **DDS\_SampleInfo::generation\_rank** (p. 1088) available in the **DDS\_SampleInfo** (p. 1082) are computed based solely on the actual samples in the ordered collection returned by read or take.

- The **DDS\_SampleInfo::sample\_rank** (p. 1088) indicates the number of samples of the same instance that follow the current one in the collection.
- The **DDS\_SampleInfo::generation\_rank** (p. 1088) available in the **DDS\_SampleInfo** (p. 1082) indicates the difference in "generations" between the sample (S) and the Most Recent Sample of the same instance that appears in the returned Collection (MRSIC). That is, it counts the number of times the instance transitioned from not-alive to alive in the time from the reception of the S to the reception of MRSIC.
- These 'generation ranks' are reset to zero when the instance resource is reclaimed.

The **DDS\_SampleInfo::generation\_rank** (p. 1088) is computed using the formula:

```

generation_rank = (MRSIC.disposed_generation_count
                   + MRSIC.no_writers_generation_count)
                 - (S.disposed_generation_count
                   + S.no_writers_generation_count)

```

The **DDS\_SampleInfo::absolute\_generation\_rank** (p. 1088) available in the **DDS\_SampleInfo** (p. 1082) indicates the difference in "generations" between the sample (S) and the Most Recent Sample of the same instance that the middleware has received (MRS). That is, it counts the number of times the instance transitioned from not-alive to alive in the time from the reception of the S to the time when the read or take was called.

```

absolute_generation_rank = (MRS.disposed_generation_count
                            + MRS.no_writers_generation_count)
                          - (S.disposed_generation_count
                            + S.no_writers_generation_count)

```

### 9.167.5 Interpretation of the SampleInfo counters and ranks

These counters and ranks allow the application to distinguish samples belonging to different "generations" of the instance. Note that it is possible for an instance to transition from not-alive to alive (and back) several times before the application accesses the data by means of read or take. In this case, the returned collection may contain samples that cross generations (i.e. some samples were received before the instance became not-alive, other after the instance re-appeared again). Using the information in the **DDS\_SampleInfo** (p. 1082), the application can anticipate what other information regarding the same instance appears in the returned collection, as well as in the infrastructure and thus make appropriate decisions.

For example, an application desiring to only consider the most current sample for each instance would only look at samples with `sample_rank == 0`. Similarly, an application desiring to only consider samples that correspond to the latest generation in the collection will only look at samples with `generation_rank == 0`. An application desiring only samples pertaining to the latest generation available will ignore samples for which `absolute_generation_rank != 0`. Other application-defined criteria may also be used.

See also

**DDS\_SampleStateKind** (p. 156), **DDS\_InstanceStateKind** (p. 160), **DDS\_ViewStateKind** (p. 158), **DDS\_SampleInfo::valid\_data** (p. 1089)

"Statechart of the \p instance\_state and \p view\_state of a single instance"

### 9.167.6 Member Data Documentation

### 9.167.6.1 sample\_state

`DDS_SampleStateKind DDS_SampleInfo::sample_state`

The sample state of the sample.

Indicates whether or not the corresponding data sample has already been read.

See also

**DDS\_SampleStateKind** (p. 156)

### 9.167.6.2 view\_state

`DDS_ViewStateKind DDS_SampleInfo::view_state`

The view state of the instance.

Indicates whether the **DDSDataReader** (p. 1288) has already seen samples for the most-current generation of the related instance.

See also

**DDS\_ViewStateKind** (p. 158)

### 9.167.6.3 instance\_state

`DDS_InstanceStateKind DDS_SampleInfo::instance_state`

The instance state of the instance.

Indicates whether the instance is currently in existence or, if it has been disposed, the reason why it was disposed.

See also

**DDS\_InstanceStateKind** (p. 160)

#### 9.167.6.4 source\_timestamp

```
struct DDS_Time_t DDS_SampleInfo::source_timestamp
```

The timestamp when the sample was written by a DataWriter.

#### 9.167.6.5 instance\_handle

```
DDS_InstanceHandle_t DDS_SampleInfo::instance_handle
```

Identifies locally the corresponding instance.

The handle is equal to **DDS\_HANDLE\_NIL** (p. 76) for unkeyed topics.

#### 9.167.6.6 publication\_handle

```
DDS_InstanceHandle_t DDS_SampleInfo::publication_handle
```

Identifies locally the DataWriter that modified the instance.

The `publication_handle` is the same **DDS\_InstanceHandle\_t** (p. 74) that is returned by the operation **DDSDataReader::get\_matched\_publications** (p. 1299) and can also be used as a parameter to the operation **DDSDataReader::get\_matched\_publication\_data** (p. 1300).

#### 9.167.6.7 disposed\_generation\_count

```
DDS_Long DDS_SampleInfo::disposed_generation_count
```

The disposed generation count of the instance at the time of sample reception.

Indicates how many times the `instance_state` of the corresponding instance changed from **DDS\_NOT\_ALIVE**↔**\_DISPOSED\_INSTANCE\_STATE** (p. 161) to **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161). The counter is reset when the instance resource is reclaimed (removed from the DataReader cache).

See also

**Interpretation of the SampleInfo disposed\_generation\_count and no\_writers\_generation\_count** (p. 1084)

**Interpretation of the SampleInfo counters and ranks** (p. 1085)

### 9.167.6.8 no\_writers\_generation\_count

```
DDS_Long DDS_SampleInfo::no_writers_generation_count
```

The no writers generation count of the instance at the time of sample reception.

Indicates how many times the `instance_state` of the corresponding instance changed from **DDS\_NOT\_ALIVE**↔**\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) to **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161). The counter is reset when the instance resource is reclaimed (removed from the DataReader cache).

See also

**Interpretation of the SampleInfo disposed\_generation\_count and no\_writers\_generation\_count** (p. 1084)  
**Interpretation of the SampleInfo counters and ranks** (p. 1085)

### 9.167.6.9 sample\_rank

```
DDS_Long DDS_SampleInfo::sample_rank
```

The sample rank of the sample.

Indicates the number of samples related to the same instance that follow in the collection returned by `read` or `take`.

See also

**Interpretation of the SampleInfo sample\_rank, generation\_rank and absolute\_generation\_rank** (p. 1084)  
**Interpretation of the SampleInfo counters and ranks** (p. 1085)

### 9.167.6.10 generation\_rank

```
DDS_Long DDS_SampleInfo::generation_rank
```

The generation rank of the sample.

Indicates the generation difference (number of times the instance was **NOT\_ALIVE** and become alive again) between the time the sample was received and the time the most recent sample in the collection related to the same instance was received.

See also

**Interpretation of the SampleInfo sample\_rank, generation\_rank and absolute\_generation\_rank** (p. 1084)  
**Interpretation of the SampleInfo counters and ranks** (p. 1085)

### 9.167.6.11 absolute\_generation\_rank

```
DDS_Long DDS_SampleInfo::absolute_generation_rank
```

The absolute generation rank of the sample.

Indicates the generation difference (number of times the instance was disposed and become alive again) between the time the sample was received, and the time the most recent sample (which may not be in the returned collection) related to the same instance was received.

See also

**Interpretation of the SampleInfo sample\_rank, generation\_rank and absolute\_generation\_rank** (p. 1084)  
**Interpretation of the SampleInfo counters and ranks** (p. 1085)

### 9.167.6.12 valid\_data

```
DDS_Boolean DDS_SampleInfo::valid_data
```

Indicates whether the `DataSample` contains data or else it is only used to communicate a change in the `instance↔_state` of the instance.

Normally each `DataSample` contains both a **DDS\_SampleInfo** (p. 1082) and some `Data`. However there are situations where a `DataSample` contains only the **DDS\_SampleInfo** (p. 1082) and does not have any associated data. This occurs when the RTI Connexx notifies the application of a change of state for an instance that was caused by some internal mechanism (such as a timeout) for which there is no associated data. An example of this situation is when the RTI Connexx detects that an instance has no writers and changes the corresponding `instance_state` to **DDS\_NOT\_↔ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161).

The application can distinguish whether a particular `DataSample` has data by examining the value of the **DDS\_↔SampleInfo::valid\_data** (p. 1089). If this flag is set to **DDS\_BOOLEAN\_TRUE** (p. 317), then the `Data↔Sample` contains valid `Data`. If the flag is set to **DDS\_BOOLEAN\_FALSE** (p. 317), the `DataSample` contains no `Data`.

To ensure correctness and portability, the `valid_data` flag must be examined by the application prior to accessing the `Data` associated with the `DataSample` and if the flag is set to **DDS\_BOOLEAN\_FALSE** (p. 317), the application should not access the `Data` associated with the `DataSample`, that is, the application should access only the **DDS\_↔SampleInfo** (p. 1082).

### 9.167.6.13 reception\_timestamp

```
struct DDS_Time_t DDS_SampleInfo::reception_timestamp
```

<<*extension*>> (p. 237) The timestamp when the sample was committed by a `DataReader`.

#### 9.167.6.14 publication\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_SampleInfo::publication_sequence_number
```

<<*extension*>> (p. 237) The publication sequence number.

#### 9.167.6.15 reception\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_SampleInfo::reception_sequence_number
```

<<*extension*>> (p. 237) The reception sequence number when sample was committed by a DataReader

#### 9.167.6.16 original\_publication\_virtual\_guid

```
struct DDS_GUID_t DDS_SampleInfo::original_publication_virtual_guid
```

<<*extension*>> (p. 237) The original publication virtual GUID.

If the **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) of the **DDSPublisher** (p. 1550) is **DDS\_GROUP\_↔ PRESENTATION\_QOS** (p. 418), this field contains the **DDSPublisher** (p. 1550) virtual GUID that uniquely identifies the DataWriter group.

See also

**connext::Sample::identity()** (p. 1914)

#### 9.167.6.17 original\_publication\_virtual\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_SampleInfo::original_publication_virtual_sequence_number
```

<<*extension*>> (p. 237) The original publication virtual sequence number.

If the **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) of the **DDSPublisher** (p. 1550) is **DDS\_GROUP\_↔ PRESENTATION\_QOS** (p. 418), this field contains the **DDSPublisher** (p. 1550) virtual sequence number that uniquely identifies a sample within the DataWriter group.

See also

**connext::Sample::identity()** (p. 1914)



### 9.167.6.18 related\_original\_publication\_virtual\_guid

```
struct DDS_GUID_t DDS_SampleInfo::related_original_publication_virtual_guid
```

<<*extension*>> (p. 237) The original publication virtual GUID of a related sample.

See also

**connext::Sample::related\_identity()** (p. 1914)

### 9.167.6.19 related\_original\_publication\_virtual\_sequence\_number

```
struct DDS_SequenceNumber_t DDS_SampleInfo::related_original_publication_virtual_sequence_number
```

<<*extension*>> (p. 237) The original publication virtual sequence number of a related sample.

See also

**connext::Sample::related\_identity()** (p. 1914)

### 9.167.6.20 flag

```
DDS_SampleFlag DDS_SampleInfo::flag
```

<<*extension*>> (p. 237) Flags associated with the sample.

The flags can be set by using the field **DDS\_WriteParams\_t::flag** (p. 1254) when writing a sample using the method **FooDataWriter::write\_w\_params** (p. 1688).

### 9.167.6.21 source\_guid

```
struct DDS_GUID_t DDS_SampleInfo::source_guid
```

<<*extension*>> (p. 237) The application logical data source associated with the sample.

The `source_guid` can be set by using the field **DDS\_WriteParams\_t::source\_guid** (p. 1254) when writing a sample using the method **FooDataWriter::write\_w\_params** (p. 1688).

### 9.167.6.22 related\_source\_guid

```
struct DDS_GUID_t DDS_SampleInfo::related_source_guid
```

<<**extension**>> (p. 237) The application logical data source that is related to the sample.

The related\_source\_guid can be set by using the field **DDS\_WriteParams\_t::related\_source\_guid** (p. 1255) when writing a sample using the method **FooDataWriter::write\_w\_params** (p. 1688).

### 9.167.6.23 related\_subscription\_guid

```
struct DDS_GUID_t DDS_SampleInfo::related_subscription_guid
```

<<**extension**>> (p. 237) The related\_reader\_guid associated with the sample.

The related\_reader\_guid can be set by using the field **DDS\_WriteParams\_t::related\_reader\_guid** (p. 1255) when writing a sample using the method **FooDataWriter::write\_w\_params** (p. 1688).

### 9.167.6.24 topic\_query\_guid

```
struct DDS_GUID_t DDS_SampleInfo::topic_query_guid
```

<<**extension**>> (p. 237) The GUID of the **DDSTopicQuery** (p. 1627) that is related to the sample.

This GUID indicates whether a sample is part of the response to a **DDSTopicQuery** (p. 1627) or a regular ("live") sample:

- If the sample was written for the TopicQuery stream, this field contains the GUID of the target TopicQuery.
- If the sample was written for the live stream, this field will be set to **DDS\_GUID\_UNKNOWN** (p. 331).

### 9.167.6.25 coherent\_set\_info

```
struct DDS_CoherentSetInfo_t* DDS_SampleInfo::coherent_set_info
```

<<**extension**>> (p. 237) The information about the coherent set that this sample is a part of.

This field is set for all samples that are part of a coherent set. Coherent sets are initiated using the operation **DDSPublisher::begin\_coherent\_changes** (p. 1564) and finalized using the operation **DDSPublisher::end\_coherent\_changes** (p. 1565).

See also

**DDSPublisher::begin\_coherent\_changes** (p. 1564) for additional information on coherent sets.

## 9.168 DDS\_SampleInfoSeq Struct Reference

Declares IDL sequence < DDS\_SampleInfo (p. 1082) > .

### 9.168.1 Detailed Description

Declares IDL sequence < DDS\_SampleInfo (p. 1082) > .

See also

**FooSeq** (p. 1697)

Examples

HelloWorld\_subscriber.cxx.

## 9.169 DDS\_SampleLostStatus Struct Reference

DDS\_SAMPLE\_LOST\_STATUS (p. 345)

### Public Attributes

- **DDS\_Long total\_count**  
*Total cumulative count of all samples lost across all instances of data published under the **DDSTopic** (p. 1617).*
- **DDS\_Long total\_count\_change**  
*The incremental number of samples lost since the last time the listener was called or the status was read.*
- **DDS\_SampleLostStatusKind last\_reason**  
*<<extension>> (p. 237) Reason why the last sample was lost.*

### 9.169.1 Detailed Description

DDS\_SAMPLE\_LOST\_STATUS (p. 345)

### 9.169.2 Member Data Documentation

#### 9.169.2.1 total\_count

```
DDS_Long DDS_SampleLostStatus::total_count
```

Total cumulative count of all samples lost across all instances of data published under the **DDSTopic** (p. 1617).

### 9.169.2.2 total\_count\_change

`DDS_Long DDS_SampleLostStatus::total_count_change`

The incremental number of samples lost since the last time the listener was called or the status was read.

### 9.169.2.3 last\_reason

`DDS_SampleLostStatusKind DDS_SampleLostStatus::last_reason`

<<*extension*>> (p. 237) Reason why the last sample was lost.

See also

`DDS_SampleLostStatusKind` (p. 136)

## 9.170 DDS\_SampleRejectedStatus Struct Reference

`DDS_SAMPLE_REJECTED_STATUS` (p. 345)

### Public Attributes

- **DDS\_Long total\_count**  
*Total cumulative count of samples rejected by the `DDSDataReader` (p. 1288).*
- **DDS\_Long total\_count\_change**  
*The incremental number of samples rejected since the last time the listener was called or the status was read.*
- **DDS\_SampleRejectedStatusKind last\_reason**  
*Reason for rejecting the last sample rejected.*
- **DDS\_InstanceHandle\_t last\_instance\_handle**  
*Handle to the instance being updated by the last sample that was rejected.*

### 9.170.1 Detailed Description

`DDS_SAMPLE_REJECTED_STATUS` (p. 345)

### 9.170.2 Member Data Documentation

### 9.170.2.1 total\_count

`DDS_Long DDS_SampleRejectedStatus::total_count`

Total cumulative count of samples rejected by the **DDSDataReader** (p. 1288).

### 9.170.2.2 total\_count\_change

`DDS_Long DDS_SampleRejectedStatus::total_count_change`

The incremental number of samples rejected since the last time the listener was called or the status was read.

### 9.170.2.3 last\_reason

`DDS_SampleRejectedStatusKind DDS_SampleRejectedStatus::last_reason`

Reason for rejecting the last sample rejected.

See also

**DDS\_SampleRejectedStatusKind** (p. 140)

### 9.170.2.4 last\_instance\_handle

`DDS_InstanceHandle_t DDS_SampleRejectedStatus::last_instance_handle`

Handle to the instance being updated by the last sample that was rejected.

If the sample was rejected because of **DDS\_REJECTED\_BY\_DECODE\_FAILURE** (p. 142) and the **DDSDataWriter** (p. 1321) set **DDS\_DataWriterProtocolQosPolicy::disable\_inline\_keyhash** (p. 675) to **DDS\_BOOLEAN\_TRUE** (p. 317), then the `last_instance_handle` may not be correct if the sample was encrypted.

## 9.171 DDS\_SequenceNumber\_t Struct Reference

Type for *sequence* number representation.

## Public Attributes

- **DDS\_Long high**  
*The most significant part of the sequence number.*
- **DDS\_UnsignedLong low**  
*The least significant part of the sequence number.*

### 9.171.1 Detailed Description

Type for *sequence* number representation.

Represents a 64-bit sequence number.

### 9.171.2 Member Data Documentation

#### 9.171.2.1 high

**DDS\_Long** DDS\_SequenceNumber\_t::high

The most significant part of the sequence number.

#### 9.171.2.2 low

**DDS\_UnsignedLong** DDS\_SequenceNumber\_t::low

The least significant part of the sequence number.

## 9.172 DDS\_ServiceQosPolicy Struct Reference

Service associated with a DDS entity.

## Public Attributes

- **DDS\_ServiceQosPolicyKind kind**  
*The kind of service.*

### 9.172.1 Detailed Description

Service associated with a DDS entity.

This QoS policy is intended to be used by RTI infrastructure services.

User applications should not modify its value.

Entity:

**DDSDomainParticipant** (p. 1351), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

### 9.172.2 Member Data Documentation

#### 9.172.2.1 kind

`DDS_ServiceQosPolicyKind DDS_ServiceQosPolicy::kind`

The kind of service.

[default] **DDS\_NO\_SERVICE\_QOS** (p. 439)

## 9.173 DDS\_ServiceRequest Struct Reference

A request coming from one of the built-in services.

### Public Attributes

- **DDS\_Long service\_id**  
*The id of the service that the request was sent on.*
- struct **DDS\_GUID\_t instance\_id**  
*Each ServiceRequest is keyed on the instance\_id.*
- struct **DDS\_OctetSeq request\_body**  
*Service-specific information.*

### 9.173.1 Detailed Description

A request coming from one of the built-in services.

Data associated with the built-in topic **DDS\_SERVICE\_REQUEST\_TOPIC\_NAME** (p. 303). It contains service-specific information.

See also

**DDS\_SERVICE\_REQUEST\_TOPIC\_NAME** (p. 303)

**DDSParticipantBuiltinTopicDataDataReader** (p. 1548)

### 9.173.2 Member Data Documentation

#### 9.173.2.1 service\_id

```
DDS_Long DDS_ServiceRequest::service_id
```

The id of the service that the request was sent on.

There can be multiple services that use the built-in ServiceRequest topic. The `service_id` identifies which service a specific request was sent from.

See also

**DDS\_UNKNOWN\_SERVICE\_REQUEST\_ID** (p. 302)

**DDS\_TOPIC\_QUERY\_SERVICE\_REQUEST\_ID** (p. 302)

#### 9.173.2.2 instance\_id

```
struct DDS_GUID_t DDS_ServiceRequest::instance_id
```

Each ServiceRequest is keyed on the `instance_id`.

The `instance_id` provides a way for users to differentiate between different requests coming from the same service.



### 9.173.2.3 request\_body

```
struct DDS_OctetSeq DDS_ServiceRequest::request_body
```

Service-specific information.

Each service uses the `request_body` field to send information specific to that service in the form of an opaque sequence of bytes. Each service provides a helper function that will deserialize the information from the request body.

See also

`DDSTopicQueryHelper::topic_query_data_from_service_request` (p. 1628)

## 9.174 DDS\_ServiceRequestAcceptedStatus Struct Reference

`DDS_SERVICE_REQUEST_ACCEPTED_STATUS` (p. 348)

### Public Attributes

- **DDS\_Long total\_count**  
*The total cumulative number of ServiceRequests that have been accepted by a `DDSDataWriter` (p. 1321).*
- **DDS\_Long total\_count\_change**  
*The incremental changes in `total_count` since the last time the listener was called or the status was read.*
- **DDS\_Long current\_count**  
*The current number of ServiceRequests that have been accepted by this `DDSDataWriter` (p. 1321).*
- **DDS\_Long current\_count\_change**  
*The change in `current_count` since the last time the listener was called or the status was read.*
- **DDS\_InstanceHandle\_t last\_request\_handle**  
*A handle to the last `DDS_ServiceRequest` (p. 1097) that caused the `DDSDataWriter` (p. 1321)'s status to change.*
- **DDS\_Long service\_id**  
*ID of the service to which the accepted Request belongs.*

### 9.174.1 Detailed Description

`DDS_SERVICE_REQUEST_ACCEPTED_STATUS` (p. 348)

Currently, the only service that causes the `ServiceRequestAcceptedStatus` to be triggered is the `DDSTopicQuery` (p. 1627) service. A `DDS_ServiceRequest` (p. 1097) is accepted when a `DDSDataWriter` (p. 1321) matches with a `DDSDataReader` (p. 1288) that has created a `DDSTopicQuery` (p. 1627).

This status is also changed (and the listener, if any, called) when a `ServiceRequest` has been cancelled, or deleted. This will happen when a `DDSDataReader` (p. 1288) deletes a `TopicQuery` using `DDSDataReader::delete_topic_query` (p. 1310).

## 9.174.2 Member Data Documentation

### 9.174.2.1 total\_count

`DDS_Long DDS_ServiceRequestAcceptedStatus::total_count`

The total cumulative number of ServiceRequests that have been accepted by a **DDSDataWriter** (p. 1321).

This number increases whenever a new request is accepted. It does not change when a request is cancelled.

### 9.174.2.2 total\_count\_change

`DDS_Long DDS_ServiceRequestAcceptedStatus::total_count_change`

The incremental changes in total\_count since the last time the listener was called or the status was read.

### 9.174.2.3 current\_count

`DDS_Long DDS_ServiceRequestAcceptedStatus::current_count`

The current number of ServiceRequests that have been accepted by this **DDSDataWriter** (p. 1321).

This number increases when a new request is accepted and decreases when an existing request is cancelled.

### 9.174.2.4 current\_count\_change

`DDS_Long DDS_ServiceRequestAcceptedStatus::current_count_change`

The change in current\_count since the last time the listener was called or the status was read.

### 9.174.2.5 last\_request\_handle

`DDS_InstanceHandle_t DDS_ServiceRequestAcceptedStatus::last_request_handle`

A handle to the last **DDS\_ServiceRequest** (p. 1097) that caused the **DDSDataWriter** (p. 1321)'s status to change.

### 9.174.2.6 service\_id

`DDS_Long DDS_ServiceRequestAcceptedStatus::service_id`

ID of the service to which the accepted Request belongs.

See also

`DDS_TOPIC_QUERY_SERVICE_REQUEST_ID` (p. 302)

## 9.175 DDS\_ServiceRequestSeq Struct Reference

Instantiates `FooSeq` (p. 1697) < `DDS_ServiceRequest` (p. 1097) > .

### 9.175.1 Detailed Description

Instantiates `FooSeq` (p. 1697) < `DDS_ServiceRequest` (p. 1097) > .

Instantiates:

<<*generic*>> (p. 237) `FooSeq` (p. 1697)

See also

`DDS_ServiceRequest` (p. 1097)

## 9.176 DDS\_ShortSeq Struct Reference

Instantiates `FooSeq` (p. 1697) < `DDS_Short` (p. 318) >

### 9.176.1 Detailed Description

Instantiates `FooSeq` (p. 1697) < `DDS_Short` (p. 318) >

Instantiates:

<<*generic*>> (p. 237) `FooSeq` (p. 1697)

See also

`DDS_Short` (p. 318)

`FooSeq` (p. 1697)

## 9.177 DDS\_StringSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < char\* > with value type semantics.

### 9.177.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < char\* > with value type semantics.

StringSeq is a sequence that contains strings.

Even though the element type is a `char*`, i.e. a pointer, the sequence semantically behaves as a sequence of `char*` *value* types. When a **DDS\_StringSeq** (p. 1102) is copied or deleted, the contained strings are also respectively copied or deleted.

*Important:* Users of this type must understand its memory management contract.

- Ownership of this sequence's buffer implies ownership of the pointers stored in that buffer; a loan of the buffer implies lack of ownership of the pointers. In other words, for a type **FooSeq** (p. 1697) where **Foo** (p. 1648) is a pointer, ownership of **Foo** (p. 1648) implies ownership of \* **Foo** (p. 1648). In other words, deleting a string sequence that owns its memory implies the deletion of all strings in that sequence. See **FooSeq::loan\_contiguous** (p. 1708) for more information about sequence memory ownership.
- The second important rule is that non-NULL strings are *assumed to be of sufficient size* to store the necessary characters. This is a dangerous rule, but it cannot be avoided because a string doesn't store the amount of memory it has. The only other alternative is to always free and re-allocate memory. Not only would this latter policy be very expensive, but it would essentially render any loaned **DDS\_StringSeq** (p. 1102) immutable, since to modify any string in it would require freeing and re-allocating that string, which would violate the first principle discussed above.

It is also worth noting that the element type of a string sequence is `char*`, not `const char*`. It is therefore incorrect and dangerous, for example, to insert a string literal into a string sequence without first copying it into mutable memory.

In order to guarantee correct behavior, it is recommended that the contained elements always be manipulated using the string support API's described in **String Support** (p. 551).

See also

**String Support** (p. 551)

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**FooSeq** (p. 1697)

## 9.178 DDS\_StructMember Struct Reference

A description of a member of a struct.

### Public Attributes

- `char * name`  
*The name of the struct member.*
- `const DDS_TypeCode * type`  
*The type of the struct member.*
- `DDS_Boolean is_pointer`  
*Indicates whether the struct member is a pointer or not.*
- `DDS_Short bits`  
*Number of bits of a bitfield member.*
- `DDS_Boolean is_key`  
*Indicates if the struct member is a key member or not.*
- `DDS_Long id`  
*The member ID.*
- `DDS_Boolean is_optional`  
*Indicates if the struct member is optional or required.*

### 9.178.1 Detailed Description

A description of a member of a struct.

See also

[DDS\\_StructMemberSeq](#) (p. 1105)

[DDS\\_TypeCodeFactory::create\\_struct\\_tc](#) (p. 1214)

### 9.178.2 Member Data Documentation

#### 9.178.2.1 name

```
char* DDS_StructMember::name
```

The name of the struct member.

Cannot be NULL.

### 9.178.2.2 type

```
const DDS_TypeCode* DDS_StructMember::type
```

The type of the struct member.

Cannot be NULL.

### 9.178.2.3 is\_pointer

```
DDS_Boolean DDS_StructMember::is_pointer
```

Indicates whether the struct member is a pointer or not.

### 9.178.2.4 bits

```
DDS_Short DDS_StructMember::bits
```

Number of bits of a bitfield member.

If the struct member is a bitfield, this field contains the number of bits of the bitfield. Otherwise, bits should contain **DDS\_TYPECODE\_NOT\_BITFIELD** (p. 81).

### 9.178.2.5 is\_key

```
DDS_Boolean DDS_StructMember::is_key
```

Indicates if the struct member is a key member or not.

### 9.178.2.6 id

```
DDS_Long DDS_StructMember::id
```

The member ID.

Use **DDS\_TYPECODE\_MEMBER\_ID\_INVALID** (p. 81) to have the member ID automatically assigned.

### 9.178.2.7 is\_optional

```
DDS_Boolean DDS_StructMember::is_optional
```

Indicates if the struct member is optional or required.

## 9.179 DDS\_StructMemberSeq Struct Reference

Defines a sequence of struct members.

### 9.179.1 Detailed Description

Defines a sequence of struct members.

See also

**DDS\_StructMember** (p. 1103)

**FooSeq** (p. 1697)

**DDS\_TypeCodeFactory::create\_struct\_tc** (p. 1214)

## 9.180 DDS\_SubscriberQos Struct Reference

QoS policies supported by a **DDSSubscriber** (p. 1592) entity.

### Public Member Functions

- bool **operator==** (const **DDS\_SubscriberQos** &r) const  
*Compares two SubscriberQos objects for equality.*
- bool **operator!=** (const **DDS\_SubscriberQos** &r) const  
*Compares two SubscriberQos objects for inequality.*
- **DDS\_ReturnCode\_t print** () const  
*Prints this **DDS\_SubscriberQos** (p. 1105) to stdout.*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
*Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_SubscriberQos** &base) const  
*Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_SubscriberQos** &base, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const  
*Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_SubscriberQos** (p. 1105).*

## Public Attributes

- struct **DDS\_PresentationQosPolicy** **presentation**  
*Presentation policy, **PRESENTATION** (p. 417).*
- struct **DDS\_PartitionQosPolicy** **partition**  
*Partition policy, **PARTITION** (p. 416).*
- struct **DDS\_GroupDataQosPolicy** **group\_data**  
*Group data policy, **GROUP\_DATA** (p. 406).*
- struct **DDS\_EntityFactoryQosPolicy** **entity\_factory**  
*Entity factory policy, **ENTITY\_FACTORY** (p. 402).*
- struct **DDS\_EntityNameQosPolicy** **subscriber\_name**  
*<<extension>> (p. 237) EntityName policy, **ENTITY\_NAME** (p. 403).*

### 9.180.1 Detailed Description

QoS policies supported by a **DDSSubscriber** (p. 1592) entity.

You must set certain members in a consistent manner:

length of **DDS\_GroupDataQosPolicy::value** (p. 918)  $\leq$  **DDS\_DomainParticipantResourceLimitsQosPolicy**↔  
**::subscriber\_group\_data\_max\_length** (p. 758)

length of **DDS\_PartitionQosPolicy::name** (p. 991)  $\leq$  **DDS\_DomainParticipantResourceLimitsQosPolicy::max**↔  
**partitions** (p. 759)

combined number of characters (including terminating 0) in **DDS\_PartitionQosPolicy::name** (p. 991)  $\leq$  **DDS**↔  
**DomainParticipantResourceLimitsQosPolicy::max\_partition\_cumulative\_characters** (p. 759)

If any of the above are not true, **DDSSubscriber::set\_qos** (p. 1609) and **DDSSubscriber::set\_qos\_with\_profile** (p. 1610) will fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

### 9.180.2 Member Function Documentation

#### 9.180.2.1 operator==( )

```
bool DDS_SubscriberQos::operator==(
    const DDS_SubscriberQos & r ) const [inline]
```

Compares two SubscriberQos objects for equality.

See also

**DDS\_SubscriberQos\_equals** (p. 127)

References **DDS\_SubscriberQos\_equals()**.



### 9.180.2.2 operator"!=()

```
bool DDS_SubscriberQos::operator!= (
    const DDS_SubscriberQos & r ) const [inline]
```

Compares two SubscriberQos objects for inequality.

See also

**DDS\_SubscriberQos\_equals** (p. 127)

References **DDS\_SubscriberQos\_equals()**.

## 9.180.3 Member Data Documentation

### 9.180.3.1 presentation

```
struct DDS_PresentationQosPolicy DDS_SubscriberQos::presentation
```

Presentation policy, **PRESENTATION** (p. 417).

### 9.180.3.2 partition

```
struct DDS_PartitionQosPolicy DDS_SubscriberQos::partition
```

Partition policy, **PARTITION** (p. 416).

### 9.180.3.3 group\_data

```
struct DDS_GroupDataQosPolicy DDS_SubscriberQos::group_data
```

Group data policy, **GROUP\_DATA** (p. 406).

### 9.180.3.4 entity\_factory

```
struct DDS_EntityFactoryQosPolicy DDS_SubscriberQos::entity_factory
```

Entity factory policy, **ENTITY\_FACTORY** (p. 402).

### 9.180.3.5 subscriber\_name

```
struct DDS_EntityNameQosPolicy DDS_SubscriberQos::subscriber_name
```

<<*extension*>> (p. 237) EntityName policy, **ENTITY\_NAME** (p. 403).

## 9.181 DDS\_SubscriptionBuiltinTopicData Struct Reference

Entry created when a **DDSDataReader** (p. 1288) is discovered in association with its Subscriber.

### Public Attributes

- **DDS\_BuiltinTopicKey\_t key**  
*DCPS key to distinguish entries.*
- **DDS\_BuiltinTopicKey\_t participant\_key**  
*DCPS key of the participant to which the DataReader belongs.*
- char \* **topic\_name**  
*Name of the related **DDSTopic** (p. 1617).*
- char \* **type\_name**  
*Name of the type attached to the **DDSTopic** (p. 1617).*
- struct **DDS\_DurabilityQosPolicy durability**  
*Policy of the corresponding DataReader.*
- struct **DDS\_DeadlineQosPolicy deadline**  
*Policy of the corresponding DataReader.*
- struct **DDS\_LatencyBudgetQosPolicy latency\_budget**  
*Policy of the corresponding DataReader.*
- struct **DDS\_LivelinessQosPolicy liveliness**  
*Policy of the corresponding DataReader.*
- struct **DDS\_ReliabilityQosPolicy reliability**  
*Policy of the corresponding DataReader.*
- struct **DDS\_OwnershipQosPolicy ownership**  
*Policy of the corresponding DataReader.*
- struct **DDS\_DestinationOrderQosPolicy destination\_order**  
*Policy of the corresponding DataReader.*
- struct **DDS\_UserDataQosPolicy user\_data**  
*Policy of the corresponding DataReader.*

- struct **DDS\_TimeBasedFilterQosPolicy** `time_based_filter`  
*Policy of the corresponding DataReader.*
- struct **DDS\_PresentationQosPolicy** `presentation`  
*Policy of the Subscriber to which the DataReader belongs.*
- struct **DDS\_PartitionQosPolicy** `partition`  
*Policy of the Subscriber to which the DataReader belongs.*
- struct **DDS\_TopicDataQosPolicy** `topic_data`  
*Policy of the related Topic.*
- struct **DDS\_GroupDataQosPolicy** `group_data`  
*Policy of the Subscriber to which the DataReader belongs.*
- struct **DDS\_TypeConsistencyEnforcementQosPolicy** `type_consistency`  
*Policy of the corresponding DataReader.*
- struct **DDS\_DataRepresentationQosPolicy** `representation`  
*Data representation policy of the corresponding DataReader.*
- **DDS\_DataTagQosPolicy** `data_tags`  
*Tags of the corresponding DataReader.*
- struct **DDS\_TypeCode** \* `type_code`  
<<extension>> (p. 237) Type code information of the corresponding Topic
- **DDS\_BuiltinTopicKey\_t** `subscriber_key`  
<<extension>> (p. 237) DCPS key of the subscriber to which the DataReader belongs.
- struct **DDS\_PropertyQosPolicy** `property`  
<<extension>> (p. 237) Properties of the corresponding DataReader.
- struct **DDS\_LocatorSeq** `unicast_locators`  
<<extension>> (p. 237) Custom unicast locators that the endpoint can specify. The default locators will be used if this is not specified.
- struct **DDS\_LocatorSeq** `multicast_locators`  
<<extension>> (p. 237) Custom multicast locators that the endpoint can specify. The default locators will be used if this is not specified.
- struct **DDS\_ContentFilterProperty\_t** `content_filter_property`  
<<extension>> (p. 237) This field provides all the required information to enable content filtering on the Writer side.
- struct **DDS\_GUID\_t** `virtual_guid`  
<<extension>> (p. 237) Virtual GUID associated to the DataReader.
- struct **DDS\_ServiceQosPolicy** `service`  
<<extension>> (p. 237) Policy of the corresponding DataReader.
- **DDS\_ProtocolVersion\_t** `rtps_protocol_version`  
<<extension>> (p. 237) Version number of the RTPS wire protocol used.
- struct **DDS\_VendorId\_t** `rtps_vendor_id`  
<<extension>> (p. 237) ID of vendor implementing the RTPS wire protocol.
- struct **DDS\_ProductVersion\_t** `product_version`  
<<extension>> (p. 237) This is a vendor specific parameter. It gives the current version of RTI Connext
- **DDS\_Boolean** `disable_positive_acks`  
<<extension>> (p. 237) This is a vendor specific parameter. Determines whether the corresponding DataReader sends positive acknowledgments for reliability.
- struct **DDS\_EntityNameQosPolicy** `subscription_name`  
<<extension>> (p. 237) The subscription name and role name.
- struct **DDS\_EndpointTrustProtectionInfo** `trust_protection_info`  
<<extension>> (p. 237) Trust plugins protection information associated with the discovered DataReader.
- struct **DDS\_EndpointTrustAlgorithmInfo** `trust_algorithm_info`  
<<extension>> (p. 237) Trust Plugins algorithms associated with the discovered DataReader.

### 9.181.1 Detailed Description

Entry created when a **DDSDataReader** (p. 1288) is discovered in association with its Subscriber.

Data associated with the built-in topic **DDS\_SUBSCRIPTION\_TOPIC\_NAME** (p. 300). It contains QoS policies and additional information that apply to the remote **DDSDataReader** (p. 1288) the related **DDSSubscriber** (p. 1592).

See also

**DDS\_SUBSCRIPTION\_TOPIC\_NAME** (p. 300)

**DDSSubscriptionBuiltinTopicDataDataReader** (p. 1614)

### 9.181.2 Member Data Documentation

#### 9.181.2.1 key

```
DDS_BuiltinTopicKey_t DDS_SubscriptionBuiltinTopicData::key
```

DCPS key to distinguish entries.

#### 9.181.2.2 participant\_key

```
DDS_BuiltinTopicKey_t DDS_SubscriptionBuiltinTopicData::participant_key
```

DCPS key of the participant to which the DataReader belongs.

#### 9.181.2.3 topic\_name

```
char* DDS_SubscriptionBuiltinTopicData::topic_name
```

Name of the related **DDSTopic** (p. 1617).

The length of this string is limited to 255 characters.

The memory for this field is managed as described in **String Conventions** (p. 552).

See also

**String Conventions** (p. 552)

#### 9.181.2.4 type\_name

```
char* DDS_SubscriptionBuiltinTopicData::type_name
```

Name of the type attached to the **DDSTopic** (p. 1617).

The length of this string is limited to 255 characters.

The memory for this field is managed as described in **String Conventions** (p. 552).

See also

**String Conventions** (p. 552)

#### 9.181.2.5 durability

```
struct DDS_DurabilityQosPolicy DDS_SubscriptionBuiltinTopicData::durability
```

Policy of the corresponding DataReader.

#### 9.181.2.6 deadline

```
struct DDS_DeadlineQosPolicy DDS_SubscriptionBuiltinTopicData::deadline
```

Policy of the corresponding DataReader.

#### 9.181.2.7 latency\_budget

```
struct DDS_LatencyBudgetQosPolicy DDS_SubscriptionBuiltinTopicData::latency_budget
```

Policy of the corresponding DataReader.

#### 9.181.2.8 liveliness

```
struct DDS_LivelinessQosPolicy DDS_SubscriptionBuiltinTopicData::liveliness
```

Policy of the corresponding DataReader.

### 9.181.2.9 reliability

```
struct DDS_ReliabilityQosPolicy DDS_SubscriptionBuiltinTopicData::reliability
```

Policy of the corresponding DataReader.

### 9.181.2.10 ownership

```
struct DDS_OwnershipQosPolicy DDS_SubscriptionBuiltinTopicData::ownership
```

Policy of the corresponding DataReader.

### 9.181.2.11 destination\_order

```
struct DDS_DestinationOrderQosPolicy DDS_SubscriptionBuiltinTopicData::destination_order
```

Policy of the corresponding DataReader.

#### Warning

Only the field **DDS\_DestinationOrderQosPolicy::kind** (p. 711) is propagated during discovery. The other fields always contain their default values.

### 9.181.2.12 user\_data

```
struct DDS_UserDataQosPolicy DDS_SubscriptionBuiltinTopicData::user_data
```

Policy of the corresponding DataReader.

### 9.181.2.13 time\_based\_filter

```
struct DDS_TimeBasedFilterQosPolicy DDS_SubscriptionBuiltinTopicData::time_based_filter
```

Policy of the corresponding DataReader.

#### 9.181.2.14 presentation

```
struct DDS_PresentationQosPolicy DDS_SubscriptionBuiltinTopicData::presentation
```

Policy of the Subscriber to which the DataReader belongs.

#### 9.181.2.15 partition

```
struct DDS_PartitionQosPolicy DDS_SubscriptionBuiltinTopicData::partition
```

Policy of the Subscriber to which the DataReader belongs.

#### 9.181.2.16 topic\_data

```
struct DDS_TopicDataQosPolicy DDS_SubscriptionBuiltinTopicData::topic_data
```

Policy of the related Topic.

#### 9.181.2.17 group\_data

```
struct DDS_GroupDataQosPolicy DDS_SubscriptionBuiltinTopicData::group_data
```

Policy of the Subscriber to which the DataReader belongs.

#### 9.181.2.18 type\_consistency

```
struct DDS_TypeConsistencyEnforcementQosPolicy DDS_SubscriptionBuiltinTopicData::type_consistency
```

Policy of the corresponding DataReader.

#### 9.181.2.19 representation

```
struct DDS_DataRepresentationQosPolicy DDS_SubscriptionBuiltinTopicData::representation
```

Data representation policy of the corresponding DataReader.

### 9.181.2.20 data\_tags

`DDS_DataTagQosPolicy DDS_SubscriptionBuiltinTopicData::data_tags`

Tags of the corresponding DataReader.

### 9.181.2.21 type\_code

`struct DDS_TypeCode* DDS_SubscriptionBuiltinTopicData::type_code`

<<*extension*>> (p. 237) Type code information of the corresponding Topic

### 9.181.2.22 subscriber\_key

`DDS_BuiltinTopicKey_t DDS_SubscriptionBuiltinTopicData::subscriber_key`

<<*extension*>> (p. 237) DCPS key of the subscriber to which the DataReader belongs.

### 9.181.2.23 property

`struct DDS_PropertyQosPolicy DDS_SubscriptionBuiltinTopicData::property`

<<*extension*>> (p. 237) Properties of the corresponding DataReader.

### 9.181.2.24 unicast\_locators

`struct DDS_LocatorSeq DDS_SubscriptionBuiltinTopicData::unicast_locators`

<<*extension*>> (p. 237) Custom unicast locators that the endpoint can specify. The default locators will be used if this is not specified.



### 9.181.2.25 multicast\_locators

```
struct DDS_LocatorSeq DDS_SubscriptionBuiltinTopicData::multicast_locators
```

<<*extension*>> (p. 237) Custom multicast locators that the endpoint can specify. The default locators will be used if this is not specified.

### 9.181.2.26 content\_filter\_property

```
struct DDS_ContentFilterProperty_t DDS_SubscriptionBuiltinTopicData::content_filter_property
```

<<*extension*>> (p. 237) This field provides all the required information to enable content filtering on the Writer side.

### 9.181.2.27 virtual\_guid

```
struct DDS_GUID_t DDS_SubscriptionBuiltinTopicData::virtual_guid
```

<<*extension*>> (p. 237) Virtual GUID associated to the DataReader.

See also

**DDS\_GUID\_t** (p. 918)

### 9.181.2.28 service

```
struct DDS_ServiceQosPolicy DDS_SubscriptionBuiltinTopicData::service
```

<<*extension*>> (p. 237) Policy of the corresponding DataReader.

### 9.181.2.29 rtps\_protocol\_version

```
DDS_ProtocolVersion_t DDS_SubscriptionBuiltinTopicData::rtps_protocol_version
```

<<*extension*>> (p. 237) Version number of the RTPS wire protocol used.

### 9.181.2.30 rtps\_vendor\_id

```
struct DDS_VendorId_t DDS_SubscriptionBuiltinTopicData::rtps_vendor_id
```

<<*extension*>> (p. 237) ID of vendor implementing the RTPS wire protocol.

### 9.181.2.31 product\_version

```
struct DDS_ProductVersion_t DDS_SubscriptionBuiltinTopicData::product_version
```

<<*extension*>> (p. 237) This is a vendor specific parameter. It gives the current version of RTI Connext

### 9.181.2.32 disable\_positive\_acks

```
DDS_Boolean DDS_SubscriptionBuiltinTopicData::disable_positive_acks
```

<<*extension*>> (p. 237) This is a vendor specific parameter. Determines whether the corresponding DataReader sends positive acknowledgments for reliability.

### 9.181.2.33 subscription\_name

```
struct DDS_EntityNameQosPolicy DDS_SubscriptionBuiltinTopicData::subscription_name
```

<<*extension*>> (p. 237) The subscription name and role name.

This member contains the name and the role name of the discovered subscription.

### 9.181.2.34 trust\_protection\_info

```
struct DDS_EndpointTrustProtectionInfo DDS_SubscriptionBuiltinTopicData::trust_protection_info
```

<<*extension*>> (p. 237) Trust plugins protection information associated with the discovered DataReader.

Trust Plugins is a generic abstraction that represents any plugin intended to do transformation, interception, and validation of exchanged data and metadata.

trust\_protection\_info contains information about how RTPS wire serialization, discovery, and liveliness interact with the loaded Trust Plugins. Two endpoints will not match if their trust\_protection\_info is incompatible.

The meaning of the contents of this field may vary depending on what Trust Plugins the endpoint is using. For information about how this field interacts with the RTI Security Plugins, please refer to the [RTI Security Plugins User's Manual](#).

### 9.181.2.35 trust\_algorithm\_info

```
struct DDS_EndpointTrustAlgorithmInfo DDS_SubscriptionBuiltinTopicData::trust_algorithm_info
```

<<*extension*>> (p. 237) Trust Plugins algorithms associated with the discovered DataReader.

Trust Plugins is a generic abstraction that represents any plugin intended to do transformation, interception, and validation of exchanged data and metadata.

trust\_algorithm\_info contains information about what algorithms the loaded Trust Plugins are running. Two endpoints will not match if their trust\_algorithm\_info are incompatible.

The meaning of the contents of this field may vary depending on what Trust Plugins the endpoint is using. For information about how this field interacts with the RTI Security Plugins, please refer to the *RTI Security Plugins User's Manual*.

## 9.182 DDS\_SubscriptionBuiltinTopicDataSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_SubscriptionBuiltinTopicData** (p. 1108) > .

### 9.182.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_SubscriptionBuiltinTopicData** (p. 1108) > .

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_SubscriptionBuiltinTopicData** (p. 1108)

## 9.183 DDS\_SubscriptionMatchedStatus Struct Reference

**DDS\_SUBSCRIPTION\_MATCHED\_STATUS** (p. 347)

## Public Attributes

- **DDS\_Long total\_count**

*The total cumulative number of times that this **DDSDataReader** (p. 1288) discovered a "match" with a **DDSDataWriter** (p. 1321).*

- **DDS\_Long total\_count\_change**

*The changes in total\_count since the last time the listener was called or the status was read.*

- **DDS\_Long current\_count**

*The current number of DataWriters with which the **DDSDataReader** (p. 1288) is matched.*

- **DDS\_Long current\_count\_peak**

*<<extension>> (p. 237) Greatest number of DataWriters that matched this DataReader simultaneously.*

- **DDS\_Long current\_count\_change**

*The change in current\_count since the last time the listener was called or the status was read.*

- **DDS\_InstanceHandle\_t last\_publication\_handle**

*This InstanceHandle can be used to look up which remote **DDSDataWriter** (p. 1321) was the last to cause this DataReader's status to change, using **DDSDataReader::get\_matched\_publication\_data** (p. 1300).*

### 9.183.1 Detailed Description

#### **DDS\_SUBSCRIPTION\_MATCHED\_STATUS** (p. 347)

A "match" happens when the **DDSDataReader** (p. 1288) finds a **DDSDataWriter** (p. 1321) with the same **DDSTopic** (p. 1617), same or compatible data type, and an offered QoS that is compatible with that requested by the **DDSDataReader** (p. 1288). (For information on compatible data types, see the `Extensible Types Guide`.)

This status is also changed (and the listener, if any, called) when a match is ended. A local **DDSDataReader** (p. 1288) will become "unmatched" from a remote **DDSDataWriter** (p. 1321) when that **DDSDataWriter** (p. 1321) goes away for any of the following reasons:

- The **DDSDomainParticipant** (p. 1351) containing the matched **DDSDataWriter** (p. 1321) has lost liveliness.
- This DataReader or the matched DataWriter has changed QoS such that the entities are now incompatible.
- The matched DataWriter has been deleted.

This status may reflect changes from multiple match or unmatched events, and the **DDS\_SubscriptionMatchedStatus::current\_count\_change** (p. 1119) can be used to determine the number of changes since the listener was called back or the status was checked.

Note: A DataWriter's loss of liveliness (which is determined by **DDS\_LivelinessQosPolicyKind** (p. 409)) does not trigger an unmatched event. So a DataWriter may still match even though its liveliness is lost.

### 9.183.2 Member Data Documentation

### 9.183.2.1 total\_count

```
DDS_Long DDS_SubscriptionMatchedStatus::total_count
```

The total cumulative number of times that this **DDSDataReader** (p. 1288) discovered a "match" with a **DDSDataWriter** (p. 1321).

This number increases whenever a new match is discovered. It does not decrease when an existing match goes away for any of the reasons described in **DDS\_SubscriptionMatchedStatus** (p. 1117).

### 9.183.2.2 total\_count\_change

```
DDS_Long DDS_SubscriptionMatchedStatus::total_count_change
```

The changes in total\_count since the last time the listener was called or the status was read.

Note that this number will never be negative (because it's the total number of times the DataReader ever matched with a DataWriter).

### 9.183.2.3 current\_count

```
DDS_Long DDS_SubscriptionMatchedStatus::current_count
```

The current number of DataWriters with which the **DDSDataReader** (p. 1288) is matched.

This number increases when a new match is discovered and decreases when an existing match goes away for any of the reasons described in **DDS\_SubscriptionMatchedStatus** (p. 1117).

### 9.183.2.4 current\_count\_peak

```
DDS_Long DDS_SubscriptionMatchedStatus::current_count_peak
```

<<*extension*>> (p. 237) Greatest number of DataWriters that matched this DataReader simultaneously.

That is, there was no moment in time when more than this many DataWriters matched this DataReader. (As a result, total\_count can be higher than current\_count\_peak.)

### 9.183.2.5 current\_count\_change

```
DDS_Long DDS_SubscriptionMatchedStatus::current_count_change
```

The change in current\_count since the last time the listener was called or the status was read.

Note that a negative current\_count\_change means that one or more DataWriters have become unmatched for one or more of the reasons described in **DDS\_SubscriptionMatchedStatus** (p. 1117).

### 9.183.2.6 last\_publication\_handle

```
DDS_InstanceHandle_t DDS_SubscriptionMatchedStatus::last_publication_handle
```

This InstanceHandle can be used to look up which remote **DDSDataWriter** (p. 1321) was the last to cause this DataReader's status to change, using **DDSDataReader::get\_matched\_publication\_data** (p. 1300).

If the DataWriter no longer matches this DataReader due to any of the reasons in **DDS\_SubscriptionMatchedStatus** (p. 1117) except incompatible QoS, then the DataWriter has been purged from this DataReader's DomainParticipant discovery database. (See the "Discovery Overview" section of the *User's Manual*.) In that case, the **DDSDataReader::get\_matched\_publication\_data** (p. 1300) method will not be able to return information about the DataWriter. The only way to get information about the lost DataWriter is if you cached the information previously.

## 9.184 DDS\_SystemResourceLimitsQosPolicy Struct Reference

<<*extension*>> (p. 237) Configures **DDSDomainParticipant** (p. 1351)-independent resources used by RTI Connex. Mainly used to change the maximum number of **DDSDomainParticipant** (p. 1351) entities that can be created within a single process (address space).

### Public Attributes

- **DDS\_Long max\_objects\_per\_thread**

*The maximum number of objects that can be stored per thread for a **DDSDomainParticipantFactory** (p. 1426).*

- **DDS\_Long initial\_objects\_per\_thread**

*The number of objects per thread for a **DDSDomainParticipantFactory** (p. 1426) for which infrastructure will initially be allocated.*

### 9.184.1 Detailed Description

<<*extension*>> (p. 237) Configures **DDSDomainParticipant** (p. 1351)-independent resources used by RTI Connex. Mainly used to change the maximum number of **DDSDomainParticipant** (p. 1351) entities that can be created within a single process (address space).

Entity:

**DDSDomainParticipantFactory** (p. 1426)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

## 9.184.2 Usage

Within a single process (or address space for some supported real-time operating systems), applications may create and use multiple **DDSDomainParticipant** (p. 1351) entities. This QoS policy sets a parameter that places an effective upper bound on the maximum number of **DDSDomainParticipant** (p. 1351) entities that can be created in a single process/address space. These values cannot be changed after a DomainParticipant has been created and they cannot be set in a QoS XML file.

## 9.184.3 Member Data Documentation

### 9.184.3.1 max\_objects\_per\_thread

```
DDS_Long DDS_SystemResourceLimitsQoSPolicy::max_objects_per_thread
```

The maximum number of objects that can be stored per thread for a **DDSDomainParticipantFactory** (p. 1426).

This value is the upper bound on the number of objects that can be stored per thread. When a **DDSDomainParticipantFactory** (p. 1426) is created, infrastructure will be created to manage the number of objects specified by `initial_objects_per_thread`. As more objects are required by the application, the infrastructure will be automatically grown to accommodate up to `max_objects_per_thread` objects. Leave this property set to the default value to allow the infrastructure to grow as needed. If you wish to strictly control memory allocation, set `max_objects_per_thread` to a smaller value, but note that this runs the risk of a runtime error and reduced application functionality if your limit is reached.

**[default]** 261120

**[range]** [1, 261120]

### 9.184.3.2 initial\_objects\_per\_thread

```
DDS_Long DDS_SystemResourceLimitsQoSPolicy::initial_objects_per_thread
```

The number of objects per thread for a **DDSDomainParticipantFactory** (p. 1426) for which infrastructure will initially be allocated.

The infrastructure for managing thread-specific objects will initially be sized according to this value. The infrastructure will grow automatically, up to a maximum of `max_objects_per_thread`, as required by the application at runtime. If you are certain that more than the default value of `initial_objects_per_thread` will be required for your application and you wish to reduce the number of memory allocations performed while your application reaches steady state, you may set this value to a larger number. To improve the efficiency of memory allocation, RTI Connexant may initially size the infrastructure to a larger value than the value of `initial_objects_per_thread`. The infrastructure will never be sized less than `initial_objects_per_thread` or greater than `max_objects_per_thread`. When the infrastructure for managing thread-specific objects is created or increased, a log message stating "Allowed number of thread specific objects is now " will be produced at the local log level.

**[default]** 1024

**[range]** [1, 261120]; must be less than or equal to `max_objects_per_thread`

## 9.185 DDS\_Tag Struct Reference

Tags are name/value pair objects.

### Public Attributes

- char \* **name**  
*Tag name.*
- char \* **value**  
*Tag value.*

### 9.185.1 Detailed Description

Tags are name/value pair objects.

### 9.185.2 Member Data Documentation

#### 9.185.2.1 name

```
char* DDS_Tag::name
```

Tag name.

It must be a NULL-terminated string.

#### 9.185.2.2 value

```
char* DDS_Tag::value
```

Tag value.

It must be a NULL-terminated string.

## 9.186 DDS\_TagSeq Struct Reference

Declares IDL sequence < **DDS\_Tag** (p. 1122) >



### 9.186.1 Detailed Description

Declares IDL `sequence` < **DDS\_Tag** (p. 1122) >

See also

**DDS\_Tag** (p. 1122)

## 9.187 DDS\_ThreadSettings\_t Struct Reference

The properties of a thread of execution.

### Public Attributes

- **DDS\_ThreadSettingsKindMask** `mask`  
*Describes the type of thread.*
- **DDS\_Long** `priority`  
*Thread priority.*
- **DDS\_Long** `stack_size`  
*The thread stack-size.*
- struct **DDS\_LongSeq** `cpu_list`  
*The list of processors on which the thread(s) may run.*
- **DDS\_ThreadSettingsCpuRotationKind** `cpu_rotation`  
*Determines how processor affinity is applied to multiple threads.*

### 9.187.1 Detailed Description

The properties of a thread of execution.

QoS:

**DDS\_EventQosPolicy** (p. 908) **DDS\_DatabaseQosPolicy** (p. 619) **DDS\_ReceiverPoolQosPolicy** (p. 1038)  
**DDS\_AsynchronousPublisherQosPolicy** (p. 590)

### 9.187.2 Member Data Documentation

#### 9.187.2.1 mask

**DDS\_ThreadSettingsKindMask** `DDS_ThreadSettings_t::mask`

Describes the type of thread.

The meaning of each bit of the mask are defined by **DDS\_ThreadSettingsKind** (p. 352).

**[default]** 0, use default options of the OS

### 9.187.2.2 priority

```
DDS_Long DDS_ThreadSettings_t::priority
```

Thread priority.

**[range]** Platform-dependent - Consult `Platform Notes` for additional details.

### 9.187.2.3 stack\_size

```
DDS_Long DDS_ThreadSettings_t::stack_size
```

The thread stack-size.

**[range]** Platform-dependent. Consult `Platform Notes` for additional details.

### 9.187.2.4 cpu\_list

```
struct DDS_LongSeq DDS_ThreadSettings_t::cpu_list
```

The list of processors on which the thread(s) may run.

A sequence of integers that represent the set of processors on which the thread(s) controlled by this QoS may run. An empty sequence (the default) means the middleware will make no CPU affinity adjustments.

Note: This feature is currently only supported on a subset of architectures (see the `Platform Notes`). The API may change as more architectures are added in future releases.

This value is only relevant to the **DDS\_ReceiverPoolQoSPolicy** (p. 1038). It is ignored within other QoS policies that include **DDS\_ThreadSettings\_t** (p. 1123).

See also

**Controlling CPU Core Affinity for RTI Threads** (p. 352)

**[default]** Empty sequence

### 9.187.2.5 cpu\_rotation

```
DDS_ThreadSettingsCpuRotationKind DDS_ThreadSettings_t::cpu_rotation
```

Determines how processor affinity is applied to multiple threads.

This value is only relevant to the **DDS\_ReceiverPoolQoSPolicy** (p. 1038). It is ignored within other QoS policies that include **DDS\_ThreadSettings\_t** (p. 1123).

See also

**Controlling CPU Core Affinity for RTI Threads** (p. 352)

Note: This feature is currently only supported on a subset of architectures (see the `Platform Notes`). The API may change as more architectures are added in future releases. ;

## 9.188 DDS\_Time\_t Struct Reference

Type for *time* representation.

### Static Public Member Functions

- static **DDS\_Time\_t from\_micros** ( **DDS\_UnsignedLongLong** microseconds)  
*Creates a new time object from a time expressed in microseconds.*
- static **DDS\_Time\_t from\_millis** ( **DDS\_UnsignedLongLong** milliseconds)  
*Creates a new time object from a time expressed in milliseconds.*
- static **DDS\_Time\_t from\_nanos** ( **DDS\_UnsignedLongLong** nanoseconds)  
*Creates a new time object from a time expressed in nanoseconds.*
- static **DDS\_Time\_t from\_seconds** ( **DDS\_UnsignedLongLong** seconds)  
*Creates a new time object from a time expressed in seconds.*

### Public Attributes

- **DDS\_LongLong sec**  
*seconds*
- **DDS\_UnsignedLong nanosec**  
*nanoseconds*

### 9.188.1 Detailed Description

Type for *time* representation.

A **DDS\_Time\_t** (p. 1125) represents a moment in time.

### 9.188.2 Member Data Documentation

#### 9.188.2.1 sec

**DDS\_LongLong** DDS\_Time\_t::sec

seconds

### 9.188.2.2 nanosec

`DDS_UnsignedLong DDS_Time_t::nanosec`

nanoseconds

[range] [0,1000000000)

## 9.189 DDS\_TimeBasedFilterQosPolicy Struct Reference

Filter that allows a **DDSDataReader** (p. 1288) to specify that it is interested only in (potentially) a subset of the values of the data.

### Public Attributes

- struct **DDS\_Duration\_t** `minimum_separation`  
*The minimum separation duration between subsequent samples.*

### 9.189.1 Detailed Description

Filter that allows a **DDSDataReader** (p. 1288) to specify that it is interested only in (potentially) a subset of the values of the data.

The filter states that the **DDSDataReader** (p. 1288) does not want to receive more than one value each `minimum_↔separation`, regardless of how fast the changes occur.

Entity:

**DDSDataReader** (p. 1288)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **YES** (p. 360)

## 9.189.2 Usage

You can use this QoS policy to reduce the amount of data received by a **DDSDataReader** (p. 1288). **DDSDataWriter** (p. 1321) entities may send data faster than needed by a **DDSDataReader** (p. 1288). For example, a **DDSDataReader** (p. 1288) of sensor data that is displayed to a human operator in a GUI application does not need to receive data updates faster than a user can reasonably perceive changes in data values. This is often measured in tenths (0.1) of a second up to several seconds. However, a **DDSDataWriter** (p. 1321) of sensor information may have other **DDSDataReader** (p. 1288) entities that are processing the sensor information to control parts of the system and thus need new data updates in measures of hundredths (0.01) or thousandths (0.001) of a second.

With this QoS policy, different **DDSDataReader** (p. 1288) entities can set their own time-based filters, so that data published faster than the period set by a each **DDSDataReader** (p. 1288) will not be delivered to that **DDSDataReader** (p. 1288).

The **TIME\_BASED\_FILTER** (p. 440) also applies to each instance separately; that is, the constraint is that the **DDSDataReader** (p. 1288) does not want to see more than one sample of each instance per `minimum_separation` period.

This QoS policy allows you to optimize resource usage (CPU and possibly network bandwidth) by only delivering the required amount of data to each **DDSDataReader** (p. 1288), accommodating the fact that, for rapidly-changing data, different subscribers may have different requirements and constraints as to how frequently they need or can handle being notified of the most current values. As such, it can also be used to protect applications that are running on a heterogeneous network where some nodes are capable of generating data much faster than others can consume it.

For best effort data delivery, if the data type is unkeyed and the **DDSDataWriter** (p. 1321) has an infinite **DDS\_LivelinessQosPolicy::lease\_duration** (p. 938), RTI Connexx will only send as many packets to a **DDSDataReader** (p. 1288) as required by the **TIME\_BASED\_FILTER**, no matter how fast **DDSDataWriter::write** (p. 1683) is called.

For multicast data delivery to multiple DataReaders, the one with the lowest `minimum_separation` determines the DataWriter's send rate. For example, if a **DDSDataWriter** (p. 1321) sends over multicast to two DataReaders, one with `minimum_separation` of 2 seconds and one with `minimum_separation` of 1 second, the DataWriter will send every 1 second.

In configurations where RTI Connexx must send all the data published by the **DDSDataWriter** (p. 1321) (for example, when the **DDSDataWriter** (p. 1321) is reliable, when the data type is keyed, or when the **DDSDataWriter** (p. 1321) has a finite **DDS\_LivelinessQosPolicy::lease\_duration** (p. 938)), only the data that passes the **TIME\_BASED\_FILTER** will be stored in the receive queue of the **DDSDataReader** (p. 1288). Extra data will be accepted but dropped. Note that filtering is only applied on alive samples (that is, samples that have not been disposed/unregistered).

## 9.189.3 Consistency

It is inconsistent for a **DDSDataReader** (p. 1288) to have a `minimum_separation` longer than its **DEADLINE** (p. 385) period.

However, it is important to be aware of certain edge cases that can occur when your publication rate, minimum separation, and deadline period align and that can cause missed deadlines that you may not expect. For example, suppose that you nominally publish samples every second but that this rate can vary somewhat over time. You declare a minimum separation of 1 second to filter out rapid updates and set a deadline of two seconds so that you will be aware if the rate falls too low. Even if your update rate never wavers, you can still miss deadlines! Here's why:

Suppose you publish the first sample at time  $t=0$  seconds. You then publish your next sample at  $t=1$  seconds. Depending on how your operating system schedules the time-based filter execution relative to the publication, this second sample may be filtered. You then publish your third sample at  $t=2$  seconds, and depending on how your OS schedules this publication in relation to the deadline check, you could miss the deadline.

This scenario demonstrates a couple of rules of thumb:

- Beware of setting your `minimum_separation` to a value very close to your publication rate: you may filter more data than you intend to.
- Beware of setting your `minimum_separation` to a value that is too close to your deadline period relative to your publication rate. You may miss deadlines.

See **DDS\_DeadlineQosPolicy** (p. 707) for more information about the interactions between deadlines and time-based filters.

The setting of a **TIME\_BASED\_FILTER** (p. 440) – that is, the selection of a `minimum_separation` with a value greater than zero – is consistent with all settings of the **HISTORY** (p. 405) and **RELIABILITY** (p. 433) QoS. The **TIME\_BASED\_FILTER** (p. 440) specifies the samples that are of interest to the **DDSDataReader** (p. 1288). The **HISTORY** (p. 405) and **RELIABILITY** (p. 433) QoS affect the behavior of the middleware with respect to the samples that have been determined to be of interest to the **DDSDataReader** (p. 1288); that is, they apply *after* the **TIME\_BASED\_FILTER** (p. 440) has been applied.

In the case where the reliability QoS kind is **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435), in steady-state – defined as the situation where the **DDSDataWriter** (p. 1321) does not write new samples for a period "long" compared to the `minimum_separation` – the system should guarantee delivery of the last sample to the **DDSDataReader** (p. 1288).

See also

DeadlineQosPolicy

HistoryQosPolicy

ReliabilityQosPolicy

## 9.189.4 Member Data Documentation

### 9.189.4.1 `minimum_separation`

```
struct DDS_Duration_t DDS_TimeBasedFilterQosPolicy::minimum_separation
```

The minimum separation duration between subsequent samples.

**[default]** 0 (meaning the **DDSDataReader** (p. 1288) is potentially interested in all values)

**[range]** [0,1 year], < **DDS\_DeadlineQosPolicy::period** (p. 708)

## 9.190 DDS\_TopicBuiltinTopicData Struct Reference

Entry created when a Topic object discovered.

## Public Attributes

- **DDS\_BuiltinTopicKey\_t key**  
*DCPS key to distinguish entries.*
- char \* **name**  
*Name of the **DDSTopic** (p. 1617).*
- char \* **type\_name**  
*Name of the type attached to the **DDSTopic** (p. 1617).*
- struct **DDS\_DurabilityQosPolicy durability**  
*durability policy of the corresponding Topic*
- struct **DDS\_DurabilityServiceQosPolicy durability\_service**  
*durability service policy of the corresponding Topic*
- struct **DDS\_DeadlineQosPolicy deadline**  
*Policy of the corresponding Topic.*
- struct **DDS\_LatencyBudgetQosPolicy latency\_budget**  
*Policy of the corresponding Topic.*
- struct **DDS\_LivelinessQosPolicy liveliness**  
*Policy of the corresponding Topic.*
- struct **DDS\_ReliabilityQosPolicy reliability**  
*Policy of the corresponding Topic.*
- struct **DDS\_TransportPriorityQosPolicy transport\_priority**  
*Policy of the corresponding Topic.*
- struct **DDS\_LifespanQosPolicy lifespan**  
*Policy of the corresponding Topic.*
- struct **DDS\_DestinationOrderQosPolicy destination\_order**  
*Policy of the corresponding Topic.*
- struct **DDS\_HistoryQosPolicy history**  
*Policy of the corresponding Topic.*
- struct **DDS\_ResourceLimitsQosPolicy resource\_limits**  
*Policy of the corresponding Topic.*
- struct **DDS\_OwnershipQosPolicy ownership**  
*Policy of the corresponding Topic.*
- struct **DDS\_TopicDataQosPolicy topic\_data**  
*Policy of the corresponding Topic.*
- struct **DDS\_DataRepresentationQosPolicy representation**  
*Data representation policy of the corresponding Topic.*

### 9.190.1 Detailed Description

Entry created when a Topic object discovered.

Data associated with the built-in topic **DDS\_TOPIC\_TOPIC\_NAME** (p. 297). It contains QoS policies and additional information that apply to the remote **DDSTopic** (p. 1617).

Note: The **DDS\_TopicBuiltinTopicData** (p. 1128) built-in topic is meant to convey information about discovered Topics. This Topic's samples are not propagated in a separate packet on the wire. Instead, the data is sent as part of the information carried by other built-in topics (**DDS\_PublicationBuiltinTopicData** (p. 1010) and **DDS\_SubscriptionBuiltinTopicData** (p. 1108)). Therefore TopicBuiltinTopicData DataReaders will not receive any data.

See also

**DDS\_TOPIC\_TOPIC\_NAME** (p. 297)

**DDSTopicBuiltinTopicDataReader** (p. 1622)

## 9.190.2 Member Data Documentation

### 9.190.2.1 key

```
DDS_BuiltinTopicKey_t DDS_TopicBuiltinTopicData::key
```

DCPS key to distinguish entries.

### 9.190.2.2 name

```
char* DDS_TopicBuiltinTopicData::name
```

Name of the **DDSTopic** (p. 1617).

The length of this string is limited to 255 characters.

The memory for this field is managed as described in **String Conventions** (p. 552).

See also

**String Conventions** (p. 552)

### 9.190.2.3 type\_name

```
char* DDS_TopicBuiltinTopicData::type_name
```

Name of the type attached to the **DDSTopic** (p. 1617).

The length of this string is limited to 255 characters.

The memory for this field is managed as described in **String Conventions** (p. 552).

See also

**String Conventions** (p. 552)



#### 9.190.2.4 durability

```
struct DDS_DurabilityQosPolicy DDS_TopicBuiltinTopicData::durability
```

durability policy of the corresponding Topic

#### 9.190.2.5 durability\_service

```
struct DDS_DurabilityServiceQosPolicy DDS_TopicBuiltinTopicData::durability_service
```

durability service policy of the corresponding Topic

#### 9.190.2.6 deadline

```
struct DDS_DeadlineQosPolicy DDS_TopicBuiltinTopicData::deadline
```

Policy of the corresponding Topic.

#### 9.190.2.7 latency\_budget

```
struct DDS_LatencyBudgetQosPolicy DDS_TopicBuiltinTopicData::latency_budget
```

Policy of the corresponding Topic.

#### 9.190.2.8 liveliness

```
struct DDS_LivelinessQosPolicy DDS_TopicBuiltinTopicData::liveliness
```

Policy of the corresponding Topic.

#### 9.190.2.9 reliability

```
struct DDS_ReliabilityQosPolicy DDS_TopicBuiltinTopicData::reliability
```

Policy of the corresponding Topic.

#### 9.190.2.10 transport\_priority

```
struct DDS_TransportPriorityQosPolicy DDS_TopicBuiltinTopicData::transport_priority
```

Policy of the corresponding Topic.

#### 9.190.2.11 lifespan

```
struct DDS_LifespanQosPolicy DDS_TopicBuiltinTopicData::lifespan
```

Policy of the corresponding Topic.

#### 9.190.2.12 destination\_order

```
struct DDS_DestinationOrderQosPolicy DDS_TopicBuiltinTopicData::destination_order
```

Policy of the corresponding Topic.

#### 9.190.2.13 history

```
struct DDS_HistoryQosPolicy DDS_TopicBuiltinTopicData::history
```

Policy of the corresponding Topic.

#### 9.190.2.14 resource\_limits

```
struct DDS_ResourceLimitsQosPolicy DDS_TopicBuiltinTopicData::resource_limits
```

Policy of the corresponding Topic.

#### 9.190.2.15 ownership

```
struct DDS_OwnershipQosPolicy DDS_TopicBuiltinTopicData::ownership
```

Policy of the corresponding Topic.

### 9.190.2.16 topic\_data

```
struct DDS_TopicDataQosPolicy DDS_TopicBuiltinTopicData::topic_data
```

Policy of the corresponding Topic.

### 9.190.2.17 representation

```
struct DDS_DataRepresentationQosPolicy DDS_TopicBuiltinTopicData::representation
```

Data representation policy of the corresponding Topic.

## 9.191 DDS\_TopicBuiltinTopicDataSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_TopicBuiltinTopicData** (p. 1128) > .

### 9.191.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_TopicBuiltinTopicData** (p. 1128) > .

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_TopicBuiltinTopicData** (p. 1128)

## 9.192 DDS\_TopicDataQosPolicy Struct Reference

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

### Public Attributes

- struct **DDS\_OctetSeq** value  
*a sequence of octets*

### 9.192.1 Detailed Description

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

Entity:

**DDSTopic** (p. 1617)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p. 360) = **YES** (p. 360)

See also

**DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

### 9.192.2 Usage

The purpose of this QoS is to allow the application to attach additional information to the created **DDSTopic** (p. 1617) objects, so that when a remote application discovers their existence, it can access that information and use it for its own purposes. This extra data is not used by RTI Connex.

One possible use of this QoS is to attach security credentials or some other information that can be used by the remote application to authenticate the source.

In combination with **DDSDataReaderListener** (p. 1315), **DDSDataWriterListener** (p. 1344), or operations such as **DDSDomainParticipant::ignore\_topic** (p. 1395), this QoS policy can assist an application in defining and enforcing its own security policies.

The use of this QoS is not limited to security; it offers a simple, yet flexible extensibility mechanism.

*Important:* RTI Connex stores the data placed in this policy in pre-allocated pools. It is therefore necessary to configure RTI Connex with the maximum size of the data that will be stored in policies of this type. This size is configured with **DDS\_DomainParticipantResourceLimitsQosPolicy::topic\_data\_max\_length** (p. 758).

### 9.192.3 Member Data Documentation

#### 9.192.3.1 value

```
struct DDS_OctetSeq DDS_TopicDataQosPolicy::value
```

a sequence of octets

**[default]** empty (zero-length)

**[range]** Octet sequence of length [0,max\_length]

## 9.193 DDS\_TopicQos Struct Reference

QoS policies supported by a **DDSTopic** (p. 1617) entity.

### Public Member Functions

- bool **operator==** (const **DDS\_TopicQos** &r) const  
*Compares two TopicQos objects for equality.*
- bool **operator!=** (const **DDS\_TopicQos** &r) const  
*Compares two TopicQos objects for inequality.*
- **DDS\_ReturnCode\_t print** () const  
*Prints this **DDS\_TopicQos** (p. 1135) to stdout.*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size) const  
*Obtains a string representation of this **DDS\_TopicQos** (p. 1135).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_TopicQos** &base) const  
*Obtains a string representation of this **DDS\_TopicQos** (p. 1135).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_TopicQos** (p. 1135).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_TopicQos** &base, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_TopicQos** (p. 1135).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &) const  
*Obtains a string representation of this **DDS\_TopicQos** (p. 1135).*
- **DDS\_ReturnCode\_t to\_string** (char \*string, **DDS\_UnsignedLong** &string\_size, const **DDS\_QosPrintAll\_t** &, const **DDS\_QosPrintFormat** &format) const  
*Obtains a string representation of this **DDS\_TopicQos** (p. 1135).*

### Public Attributes

- struct **DDS\_TopicDataQosPolicy topic\_data**  
*Topic data policy, **TOPIC\_DATA** (p. 441).*
- struct **DDS\_DurabilityQosPolicy durability**  
*Durability policy, **DURABILITY** (p. 398).*
- struct **DDS\_DurabilityServiceQosPolicy durability\_service**  
*DurabilityService policy, **DURABILITY\_SERVICE** (p. 402).*
- struct **DDS\_DeadlineQosPolicy deadline**  
*Deadline policy, **DEADLINE** (p. 385).*
- struct **DDS\_LatencyBudgetQosPolicy latency\_budget**  
*Latency budget policy, **LATENCY\_BUDGET** (p. 407).*
- struct **DDS\_LivelinessQosPolicy liveliness**  
*Liveliness policy, **LIVELINESS** (p. 409).*
- struct **DDS\_ReliabilityQosPolicy reliability**  
*Reliability policy, **RELIABILITY** (p. 433).*

- struct **DDS\_DestinationOrderQosPolicy** `destination_order`  
*Destination order policy, **DESTINATION\_ORDER** (p. 386).*
- struct **DDS\_HistoryQosPolicy** `history`  
*History policy, **HISTORY** (p. 405).*
- struct **DDS\_ResourceLimitsQosPolicy** `resource_limits`  
*Resource limits policy, **RESOURCE\_LIMITS** (p. 437).*
- struct **DDS\_TransportPriorityQosPolicy** `transport_priority`  
*Transport priority policy, **TRANSPORT\_PRIORITY** (p. 449).*
- struct **DDS\_LifespanQosPolicy** `lifespan`  
*Lifespan policy, **LIFESPAN** (p. 408).*
- struct **DDS\_OwnershipQosPolicy** `ownership`  
*Ownership policy, **OWNERSHIP** (p. 414).*
- struct **DDS\_DataRepresentationQosPolicy** `representation`  
*Data representation policy, **DATA\_REPRESENTATION** (p. 369).*

### 9.193.1 Detailed Description

QoS policies supported by a **DDSTopic** (p. 1617) entity.

You must set certain members in a consistent manner:

length of **DDS\_TopicQos::topic\_data** (p. 1137) `.value <= DDS_DomainParticipantQos::resource_limits` (p. 744) `.topic_data_max_length`

If any of the above are not true, **DDSTopic::set\_qos** (p. 1619), **DDSTopic::set\_qos\_with\_profile** (p. 1620) and **DDSDomainParticipant::set\_default\_topic\_qos** (p. 1369) will fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337) and **DDSDomainParticipant::create\_topic** (p. 1382) will return NULL.

Entity:

**DDSTopic** (p. 1617)

See also

**QoS Policies** (p. 353) allowed ranges within each Qos.

### 9.193.2 Member Function Documentation

### 9.193.2.1 operator==( )

```
bool DDS_TopicQos::operator==(
    const DDS_TopicQos & r ) const [inline]
```

Compares two TopicQos objects for equality.

See also

**DDS\_TopicQos\_equals** (p. 65)

References **DDS\_TopicQos\_equals()**.

### 9.193.2.2 operator!=( )

```
bool DDS_TopicQos::operator!=(
    const DDS_TopicQos & r ) const [inline]
```

Compares two TopicQos objects for inequality.

See also

**DDS\_TopicQos\_equals** (p. 65)

References **DDS\_TopicQos\_equals()**.

## 9.193.3 Member Data Documentation

### 9.193.3.1 topic\_data

```
struct DDS_TopicDataQosPolicy DDS_TopicQos::topic_data
```

Topic data policy, **TOPIC\_DATA** (p. 441).

### 9.193.3.2 durability

```
struct DDS_DurabilityQosPolicy DDS_TopicQos::durability
```

Durability policy, **DURABILITY** (p. 398).

### 9.193.3.3 durability\_service

```
struct DDS_DurabilityServiceQosPolicy DDS_TopicQos::durability_service
```

DurabilityService policy, **DURABILITY\_SERVICE** (p. 402).

### 9.193.3.4 deadline

```
struct DDS_DeadlineQosPolicy DDS_TopicQos::deadline
```

Deadline policy, **DEADLINE** (p. 385).

### 9.193.3.5 latency\_budget

```
struct DDS_LatencyBudgetQosPolicy DDS_TopicQos::latency_budget
```

Latency budget policy, **LATENCY\_BUDGET** (p. 407).

### 9.193.3.6 liveliness

```
struct DDS_LivelinessQosPolicy DDS_TopicQos::liveliness
```

Liveliness policy, **LIVELINESS** (p. 409).

### 9.193.3.7 reliability

```
struct DDS_ReliabilityQosPolicy DDS_TopicQos::reliability
```

Reliability policy, **RELIABILITY** (p. 433).

### 9.193.3.8 destination\_order

```
struct DDS_DestinationOrderQosPolicy DDS_TopicQos::destination_order
```

Destination order policy, **DESTINATION\_ORDER** (p. 386).



### 9.193.3.9 history

```
struct DDS_HistoryQosPolicy DDS_TopicQos::history
```

History policy, **HISTORY** (p. 405).

### 9.193.3.10 resource\_limits

```
struct DDS_ResourceLimitsQosPolicy DDS_TopicQos::resource_limits
```

Resource limits policy, **RESOURCE\_LIMITS** (p. 437).

### 9.193.3.11 transport\_priority

```
struct DDS_TransportPriorityQosPolicy DDS_TopicQos::transport_priority
```

Transport priority policy, **TRANSPORT\_PRIORITY** (p. 449).

### 9.193.3.12 lifespan

```
struct DDS_LifespanQosPolicy DDS_TopicQos::lifespan
```

Lifespan policy, **LIFESPAN** (p. 408).

### 9.193.3.13 ownership

```
struct DDS_OwnershipQosPolicy DDS_TopicQos::ownership
```

Ownership policy, **OWNERSHIP** (p. 414).

### 9.193.3.14 representation

```
struct DDS_DataRepresentationQosPolicy DDS_TopicQos::representation
```

Data representation policy, **DATA\_REPRESENTATION** (p. 369).

## 9.194 DDS\_TopicQueryData Struct Reference

<<*extension*>> (p. 237) Provides information about a **DDSTopicQuery** (p. 1627)

### Public Attributes

- struct **DDS\_TopicQuerySelection** **topic\_query\_selection**  
*The data selection.*
- char \* **topic\_name**  
*The topic name of the **DDSDataReader** (p. 1288).*
- struct **DDS\_GUID\_t** **original\_related\_reader\_guid**  
*Identifies the **DDSDataReader** (p. 1288) that created the **DDSTopicQuery** (p. 1627).*

### 9.194.1 Detailed Description

<<*extension*>> (p. 237) Provides information about a **DDSTopicQuery** (p. 1627)

Contains the information about a TopicQuery that can be retrieved using **DDSTopicQueryHelper::topic\_query\_data**↔  
**\_from\_service\_request** (p. 1628).

See also

**DDSTopicQueryHelper::topic\_query\_data\_from\_service\_request** (p. 1628)

### 9.194.2 Member Data Documentation

#### 9.194.2.1 topic\_query\_selection

```
struct DDS_TopicQuerySelection DDS_TopicQueryData::topic_query_selection
```

The data selection.

#### 9.194.2.2 topic\_name

```
char* DDS_TopicQueryData::topic_name
```

The topic name of the **DDSDataReader** (p. 1288).

### 9.194.2.3 original\_related\_reader\_guid

```
struct DDS_GUID_t DDS_TopicQueryData::original_related_reader_guid
```

Identifies the **DDSDataReader** (p. 1288) that created the **DDSTopicQuery** (p. 1627).

## 9.195 DDS\_TopicQueryDispatchQosPolicy Struct Reference

Configures the ability of a **DDSDataWriter** (p. 1321) to publish samples in response to a **DDSTopicQuery** (p. 1627).

### Public Attributes

- **DDS\_Boolean enable**  
*Allows this writer to dispatch TopicQueries.*
- struct **DDS\_Duration\_t publication\_period**  
*Sets the periodic interval at which samples are published.*
- **DDS\_Long samples\_per\_period**  
*Sets the maximum number of samples to publish in each publication\_period.*

### 9.195.1 Detailed Description

Configures the ability of a **DDSDataWriter** (p. 1321) to publish samples in response to a **DDSTopicQuery** (p. 1627).

Enables the ability of a **DDSDataWriter** (p. 1321) to publish historical samples upon reception of a **DDSTopicQuery** (p. 1627) and how often they are published.

Since a TopicQuery selects previously written samples, the DataWriter must have a **DDS\_DurabilityQosPolicy::kind** (p. 770) different from **DDS\_VOLATILE\_DURABILITY\_QOS** (p. 400). Also, **DDS\_ReliabilityQosPolicy::kind** (p. 1043) must be set to **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435).

Only samples that fall within the **DDS\_DurabilityQosPolicy::writer\_depth** (p. 770) for an instance are evaluated against the TopicQuery filter. While the DataWriter is waiting for acknowledgements from one or more DataReaders, there may temporarily be more than **DDS\_DurabilityQosPolicy::writer\_depth** (p. 770) samples per instance in the DataWriter's queue if the **DDS\_HistoryQosPolicy::depth** (p. 921) is set to a higher value than **DDS\_DurabilityQosPolicy::writer\_↵\_depth** (p. 770). Those additional samples past **DDS\_DurabilityQosPolicy::writer\_depth** (p. 770) are not eligible to be sent in response to the TopicQuery.

A TopicQuery may select multiple samples at once. The writer will publish them periodically, independently from newly written samples. **DDS\_TopicQueryDispatchQosPolicy::publication\_period** (p. 1142) configures the frequency of that period and **DDS\_TopicQueryDispatchQosPolicy::samples\_per\_period** (p. 1142) configures the maximum number of samples to publish each period.

If the DataWriter blocks during the publication of one of these samples, it will stop and try again the next period. (See **FooDataWriter::write** (p. 1683) for the conditions that may cause the write operation to block.)

All the DataWriters that belong to a single **DDSPublisher** (p. 1550) and enable TopicQueries share the same event thread, but each DataWriter schedules separate events. To configure that thread, see **DDS\_AsynchronousPublisher↵\_QosPolicy::topic\_query\_publication\_thread** (p. 593).

If the DataWriter is dispatching more than one TopicQuery at the same time, the configuration of this periodic event applies to all of them. For example, if a DataWriter receives two TopicQueries around the same time, the period is 1 second, the number of samples per period is 10, the first TopicQuery selects 5 samples, and the second one selects 8, the DataWriter will immediately attempt to publish all 5 for the first TopicQuery and 5 for the second one. After one second, it will publish the remaining 3 samples.

Entity:

**DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

See also

**DDSPublisher** (p. 1550)

## 9.195.2 Member Data Documentation

### 9.195.2.1 enable

```
DDS_Boolean DDS_TopicQueryDispatchQosPolicy::enable
```

Allows this writer to dispatch TopicQueries.

When set to true, this writer can receive and dispatch TopicQueries.

**[default]** **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.195.2.2 publication\_period

```
struct DDS_Duration_t DDS_TopicQueryDispatchQosPolicy::publication_period
```

Sets the periodic interval at which samples are published.

**[default]** 1 second

**[range]** [0,1 year]

### 9.195.2.3 samples\_per\_period

```
DDS_Long DDS_TopicQueryDispatchQosPolicy::samples_per_period
```

Sets the maximum number of samples to publish in each publication\_period.

**[default]** **DDS\_LENGTH\_UNLIMITED** (p. 438)

**[range]** [1, 100000000] or **DDS\_LENGTH\_UNLIMITED** (p. 438)

## 9.196 DDS\_TopicQuerySelection Struct Reference

<<**extension**>> (p. 237) Specifies the data query that defines a **DDSTopicQuery** (p. 1627)

### Public Attributes

- char \* **filter\_class\_name**  
*The name of the filter to use.*
- char \* **filter\_expression**  
*The filter expression.*
- struct **DDS\_StringSeq filter\_parameters**  
*The query parameters.*
- **DDS\_TopicQuerySelectionKind kind**  
*Indicates whether the sample selection is limited to cached samples or not.*

### 9.196.1 Detailed Description

<<**extension**>> (p. 237) Specifies the data query that defines a **DDSTopicQuery** (p. 1627)

The query format is similar to the expression and parameters of a **DDSQueryCondition** (p. 1573) or a **DDSContentFilteredTopic** (p. 1283), as described in **DDSDomainParticipant::create\_contentfilteredtopic\_with\_filter** (p. 1386).

There are two special queries:

- **DDS\_TOPIC\_QUERY\_SELECTION\_SELECT\_ALL** (p. 155)
- **DDS\_TOPIC\_QUERY\_SELECTION\_USE\_READER\_CONTENT\_FILTER** (p. 155)

See also

**Queries and Filters Syntax** (p. 179)

### 9.196.2 Member Data Documentation

#### 9.196.2.1 filter\_class\_name

```
char* DDS_TopicQuerySelection::filter_class_name
```

The name of the filter to use.

Name of content filter to use. Must be one of the built-in filter names or previously registered with **DDSDomainParticipant::register\_contentfilter** (p. 1364) on the same **DDSDomainParticipant** (p. 1351).

Built-in filter names are **DDS\_SQLFILTER\_NAME** (p. 59) and **DDS\_STRINGMATCHFILTER\_NAME** (p. 59).

[default] See **DDS\_TOPIC\_QUERY\_SELECTION\_USE\_READER\_CONTENT\_FILTER** (p. 155)

### 9.196.2.2 filter\_expression

```
char* DDS_TopicQuerySelection::filter_expression
```

The filter expression.

The expression to filter samples in the DataWriters. It follows the format described in **Queries and Filters Syntax** (p. 179).

**[default]** See **DDS\_TOPIC\_QUERY\_SELECTION\_USE\_READER\_CONTENT\_FILTER** (p. 155)

See also

**Queries and Filters Syntax** (p. 179)

### 9.196.2.3 filter\_parameters

```
struct DDS_StringSeq DDS_TopicQuerySelection::filter_parameters
```

The query parameters.

**[default]** See **DDS\_TOPIC\_QUERY\_SELECTION\_USE\_READER\_CONTENT\_FILTER** (p. 155)

See also

**DDSDomainParticipant::create\_contentfilteredtopic\_with\_filter** (p. 1386).

### 9.196.2.4 kind

```
DDS_TopicQuerySelectionKind DDS_TopicQuerySelection::kind
```

Indicates whether the sample selection is limited to cached samples or not.

**[default]** **DDS\_TOPIC\_QUERY\_SELECTION\_KIND\_HISTORY\_SNAPSHOT** (p. 155)

## 9.197 DDS\_TransportBuiltinQosPolicy Struct Reference

Specifies which built-in transports are used.

## Public Attributes

- **DDS\_TransportBuiltinKindMask** *mask*

*Specifies the built-in transports that are registered automatically when the **DDSDomainParticipant** (p. 1351) is enabled.*

### 9.197.1 Detailed Description

Specifies which built-in transports are used.

Three different transport plug-ins are built into the core RTI Connex libraries (for most supported target platforms): UDPv4, shared memory, and UDPv6.

This QoS policy allows you to control which of these built-in transport plug-ins are used by a **DDSDomainParticipant** (p. 1351). By default, only the UDPv4 and shared memory plug-ins are enabled (although on some embedded platforms, the shared memory plug-in is not available). In some cases, users will disable the shared memory transport when they do not want applications to use shared memory to communicate when running on the same node.

Entity:

**DDSDomainParticipant** (p. 1351)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.197.2 Member Data Documentation

#### 9.197.2.1 mask

`DDS_TransportBuiltinKindMask DDS_TransportBuiltinQosPolicy::mask`

Specifies the built-in transports that are registered automatically when the **DDSDomainParticipant** (p. 1351) is enabled.

RTI Connex provides several built-in transports. Only those that are specified with this mask are registered automatically when the **DDSDomainParticipant** (p. 1351) is enabled.

[default] `DDS_TRANSPORTBUILTIN_MASK_DEFAULT` (p. 444)

## 9.198 DDS\_TransportInfo\_t Struct Reference

Contains the `class_id` and `message_size_max` of an installed transport.

## Public Attributes

- **NDDS\_Transport\_ClassId\_t class\_id**  
*The class\_id identifies the transport associated with the message\_size\_max.*
- **DDS\_Long message\_size\_max**  
*The maximum size of an RTPS message in bytes that can be sent or received by the transport plugin identified by the class\_id.*

### 9.198.1 Detailed Description

Contains the class\_id and message\_size\_max of an installed transport.

### 9.198.2 Member Data Documentation

#### 9.198.2.1 class\_id

```
NDDS_Transport_ClassId_t DDS_TransportInfo_t::class_id
```

The class\_id identifies the transport associated with the message\_size\_max.

#### 9.198.2.2 message\_size\_max

```
DDS_Long DDS_TransportInfo_t::message_size_max
```

The maximum size of an RTPS message in bytes that can be sent or received by the transport plugin identified by the class\_id.

## 9.199 DDS\_TransportInfoSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_TransportInfo\_t** (p. 1145) > .

### 9.199.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_TransportInfo\_t** (p. 1145) > .

Instantiates:

```
<<generic>> (p. 237) FooSeq (p. 1697)
```

See also

```
DDS_TransportInfo_t (p. 1145)
```



## 9.200 DDS\_TransportMulticastMapping\_t Struct Reference

Type representing a list of multicast mapping elements.

### Public Attributes

- char \* **addresses**  
*A string containing a comma-separated list of IP addresses or IP address ranges to be used to receive multicast traffic for the entity with a topic that matches the `DDS_TransportMulticastMapping_t::topic_expression` (p. 1147).*
- char \* **topic\_expression**  
*A regular expression that will be used to map topic names to corresponding multicast receive addresses.*
- struct **DDS\_TransportMulticastMappingFunction\_t mapping\_function**  
*Specifies a function that will define the mapping between a topic name and a specific multicast address from a list of addresses.*

### 9.200.1 Detailed Description

Type representing a list of multicast mapping elements.

A multicast mapping element specifies a string containing a list of IP addresses, a topic expression and a mapping function.

QoS:

**DDS\_TransportMulticastMappingQosPolicy** (p. 1149)

### 9.200.2 Member Data Documentation

#### 9.200.2.1 addresses

```
char* DDS_TransportMulticastMapping_t::addresses
```

A string containing a comma-separated list of IP addresses or IP address ranges to be used to receive *multicast* traffic for the entity with a topic that matches the `DDS_TransportMulticastMapping_t::topic_expression` (p. 1147).

The string must contain IPv4 or IPv6 addresses separated by commas. For example: "239.255.100.1,239.255.100.↵  
2,239.255.100.3"

You may specify ranges of addresses by enclosing the start address and the end address in square brackets. For example: "[239.255.100.1,239.255.100.3]"

You may combine the two approaches. For example:

```
"239.255.200.1,[239.255.100.1,239.255.100.3], 239.255.200.3"
```

IPv4 addresses must be specified in Dot-decimal notation.

IPv6 addresses must be specified using 8 groups of 16-bit hexadecimal values separated by colons. For example: FF00:0000:0000:0000:0202:B3FF:FE1E:8329

Leading zeroes can be skipped. For example: "FF00:0:0:0:202:B3FF:FE1E:8329"

You may replace a consecutive number of zeroes with a double colon, but only once within an address. For example: "FF00::202:B3FF:FE1E:8329"

**[default]** NULL

### 9.200.2.2 topic\_expression

```
char* DDS_TransportMulticastMapping_t::topic_expression
```

A regular expression that will be used to map topic names to corresponding multicast receive addresses.

A topic name must match the expression before a corresponding address is assigned.

**[default]** NULL

### 9.200.2.3 mapping\_function

```
struct DDS_TransportMulticastMappingFunction_t DDS_TransportMulticastMapping_t::mapping_function
```

Specifies a function that will define the mapping between a topic name and a specific multicast address from a list of addresses.

This function is optional. If not specified, the middleware will use a hash function to perform the mapping.

## 9.201 DDS\_TransportMulticastMappingFunction\_t Struct Reference

Type representing an external mapping function.

### Public Attributes

- char \* **dll**  
*Specifies a dynamic library that contains a mapping function.*
- char \* **function\_name**  
*Specifies the name of a mapping function.*

### 9.201.1 Detailed Description

Type representing an external mapping function.

A mapping function is defined by a dynamic library name and a function name.

QoS:

**DDS\_TransportMulticastMappingQosPolicy** (p. 1149)

### 9.201.2 Member Data Documentation

### 9.201.2.1 dll

```
char* DDS_TransportMulticastMappingFunction_t::dll
```

Specifies a dynamic library that contains a mapping function.

A relative or absolute path can be specified.

If the name is specified as "foo", the library name on Linux systems will be libfoo.so; on Windows systems it will be foo.dll.

**[default]** NULL

### 9.201.2.2 function\_name

```
char* DDS_TransportMulticastMappingFunction_t::function_name
```

Specifies the name of a mapping function.

This function must be implemented in the library specified in **DDS\_TransportMulticastMappingFunction\_t::dll** (p. 1148).

The function must implement the following interface:

```
int function(const char* topic_name, int numberOfAddresses);
```

The function must return an integer that indicates the *index* of the address to use for the given `topic_name`. For example, if the first address in the list should be used, it must return 0; if the second address in the list should be used, it must return 1, etc.

## 9.202 DDS\_TransportMulticastMappingQosPolicy Struct Reference

Specifies a list of `topic_expressions` and multicast addresses that can be used by an Entity with a specific topic name to receive data.

### Public Attributes

- struct **DDS\_TransportMulticastMappingSeq** value  
*A sequence of multicast communication mappings.*

## 9.202.1 Detailed Description

Specifies a list of `topic_expressions` and multicast addresses that can be used by an Entity with a specific topic name to receive data.

This QoS policy provides an alternate way to assign multicast receive addresses to DataReaders. It allows you to perform multicast configuration at the **DDSDomainParticipant** (p. 1351) level.

To use multicast communication *without* this QoS policy, you must explicitly assign a multicast receive address on each **DDSDataReader** (p. 1288). This can quickly become difficult to configure as more DataReaders of different topics and multicast addresses are added.

With this QoS policy, you can configure a set of multicast addresses on the **DDSDomainParticipant** (p. 1351); those addresses will then be automatically assigned to the DomainParticipant's DataReaders. A single configuration on the **DDSDomainParticipant** (p. 1351) can thus replace per-DataReader configuration.

On the DomainParticipant, the set of assignable addresses can be configured for specific topics. Addresses are configured on topics because efficient usage of multicast will have all DataWriters and DataReaders of a single topic using the same multicast address.

You can specify a mapping between a topic's name and a multicast address. For example, topic 'A' can be assigned to address 239.255.1.1 and topic 'B' can be assigned to address 239.255.1.2.

You can use filter expressions to configure a subset of topics to use a specific list of addresses. For example, suppose topics "X", "Y" and "Z" need to be sent to any address within the range [239.255.1.1, 239.255.1.255]. You can specify an expression on the topic name (e.g. "[X-Z]") corresponding to that range of addresses. Then the DomainParticipant will select an address for a topic whose name matches the expression.

The middleware will use a hash function to perform the mapping from topic to address. Alternatively, you can specify a pluggable mapping function.

IMPORTANT: All the strings defined in each element of the sequence must be assigned using `RTI_String_dup("foo");`. For example:

```
mcastMappingElement->addresses = DDS_String_dup("[239.255.1.1,239.255.1.255]");
```

**NOTE:** To use this QoS policy, you must:

- Set **DDS\_TransportMulticastQosPolicy::kind** (p. 1152) to **DDS\_AUTOMATIC\_TRANSPORT\_MULTICAST\_QOS** (p. 448).
- Set the first element in **DDSDataReader** (p. 1288)'s **DDS\_TransportMulticastQosPolicy::value** (p. 1152) with an empty address.

Entity:

**DDSDomainParticipant** (p. 1351)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

## 9.202.2 Member Data Documentation

### 9.202.2.1 value

```
struct DDS_TransportMulticastMappingSeq DDS_TransportMulticastMappingQosPolicy::value
```

A sequence of multicast communication mappings.

[default] Empty sequence.

## 9.203 DDS\_TransportMulticastMappingSeq Struct Reference

Declares IDL `sequence< DDS_TransportMulticastMapping_t (p. 1147) >`

### 9.203.1 Detailed Description

Declares IDL `sequence< DDS_TransportMulticastMapping_t (p. 1147) >`

Instantiates:

`<<generic>>` (p. 237) `FooSeq` (p. 1697)

See also

`DDS_TransportMulticastMapping_t` (p. 1147)

## 9.204 DDS\_TransportMulticastQosPolicy Struct Reference

Specifies the multicast address on which a `DDSDataReader` (p. 1288) wants to receive its data. It can also specify a port number as well as a subset of the available (at the `DDSDomainParticipant` (p. 1351) level) transports with which to receive the multicast data.

### Public Attributes

- struct `DDS_TransportMulticastSettingsSeq` `value`  
*A sequence of multicast communications settings.*
- `DDS_TransportMulticastQosPolicyKind` `kind`  
*A value that specifies a way to determine how to obtain the multicast address.*

### 9.204.1 Detailed Description

Specifies the multicast address on which a **DDSDataReader** (p. 1288) wants to receive its data. It can also specify a port number as well as a subset of the available (at the **DDSDomainParticipant** (p. 1351) level) transports with which to receive the multicast data.

By default, a **DDSDataWriter** (p. 1321) will send individually addressed packets for each **DDSDataReader** (p. 1288) that subscribes to the topic of the DataWriter – this is known as unicast delivery. Thus, as many copies of the data will be sent over the network as there are DataReaders for the data. The network bandwidth used by a DataWriter will thus increase linearly with the number of DataReaders.

Multicast addressing (on UDP/IP transports) allows multiple DataReaders to receive the *same* network packet. By using multicast, a **DDSDataWriter** (p. 1321) can send a single network packet that is received by all subscribing applications. Thus the network bandwidth usage will be constant, independent of the number of DataReaders.

Coordinating the multicast address specified by DataReaders can help optimize network bandwidth usage in systems where there are multiple DataReaders for the same **DDSTopic** (p. 1617).

Entity:

**DDSDataReader** (p. 1288)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.204.2 Member Data Documentation

#### 9.204.2.1 value

```
struct DDS_TransportMulticastSettingsSeq DDS_TransportMulticastQosPolicy::value
```

A sequence of multicast communications settings.

An empty sequence means that multicast is not used by the entity.

The RTPS wire protocol currently limits the maximum number of multicast locators to

1. Note that this is a hard limit that cannot be increased. However, this limit can be decreased by configuring the 'dds.domain\_participant.max\_announced\_locator\_list\_size' property in the **DDS\_PropertyQosPolicy** (p. 1007) associated with the **DDS\_DomainParticipantQos** (p. 741).

**[default]** Empty sequence.

### 9.204.2.2 kind

`DDS_TransportMulticastQosPolicyKind` `DDS_TransportMulticastQosPolicy::kind`

A value that specifies a way to determine how to obtain the multicast address.

This field can be set to one of the following two values: `DDS_AUTOMATIC_TRANSPORT_MULTICAST_QOS` (p. 448) or `DDS_UNICAST_ONLY_TRANSPORT_MULTICAST_QOS` (p. 448).

- If it is set to `DDS_AUTOMATIC_TRANSPORT_MULTICAST_QOS` (p. 448), the behavior will depend on the `DDS_TransportMulticastQosPolicy::value` (p. 1152):
  - If `DDS_TransportMulticastQosPolicy::value` (p. 1152) does not have any elements, then multicast will not be used.
  - If `DDS_TransportMulticastQosPolicy::value` (p. 1152) first element has an empty address, then the address will be obtained from `DDS_TransportMulticastMappingQosPolicy` (p. 1149).
  - If none of the elements in `DDS_TransportMulticastQosPolicy::value` (p. 1152) is empty, and at least one element has a valid address, then that address will be used.
- If it is set to `DDS_UNICAST_ONLY_TRANSPORT_MULTICAST_QOS` (p. 448), then multicast will not be used.

[default] `DDS_AUTOMATIC_TRANSPORT_MULTICAST_QOS` (p. 448)

## 9.205 DDS\_TransportMulticastSettings\_t Struct Reference

Type representing a list of multicast locators.

### Public Attributes

- struct `DDS_StringSeq transports`  
*A sequence of transport aliases that specifies the transports on which to receive multicast traffic for the entity.*
- char \* `receive_address`  
*The multicast group address on which the entity can receive data.*
- `DDS_Long receive_port`  
*The multicast port on which the entity can receive data.*

### 9.205.1 Detailed Description

Type representing a list of multicast locators.

A multicast locator specifies a transport class, a multicast address, and a multicast port number on which messages can be received by an entity.

QoS:

`DDS_TransportMulticastQosPolicy` (p. 1151)

## 9.205.2 Member Data Documentation

### 9.205.2.1 transports

```
struct DDS_StringSeq DDS_TransportMulticastSettings_t::transports
```

A sequence of transport aliases that specifies the transports on which to receive *multicast* traffic for the entity.

Of the transport instances available to the entity, only those with aliases matching an alias in this sequence are used to subscribe to the multicast group addresses. Thus, this list of aliases sub-selects from the transport s available to the entity.

An empty sequence is a special value that specifies all the transports available to the entity.

The memory for the strings in this sequence is managed according to the conventions described in **String Conventions** (p. 552). In particular, be careful to avoid a situation in which RTI Connexx allocates a string on your behalf and you then reuse that string in such a way that RTI Connexx believes it to have more memory allocated to it than it actually does.

Alias names for the builtin transports are defined in **TRANSPORT\_BUILTIN** (p. 443).

**[default]** Empty sequence; i.e. all the transports available to the entity.

**[range]** Any sequence of non-null, non-empty strings.

### 9.205.2.2 receive\_address

```
char* DDS_TransportMulticastSettings_t::receive_address
```

The multicast group address on which the entity can receive data.

Must be an address in the proper format (see **Address Format** (p. 466)).

**[default]** NONE/INVALID. Required to specify a multicast group address to join.

**[range]** A valid IPv4 or IPv6 multicast address.

See also

**Address Format** (p. 466)



### 9.205.2.3 receive\_port

`DDS_Long DDS_TransportMulticastSettings_t::receive_port`

The multicast port on which the entity can receive data.

**[default]** 0, which implies that the actual port number is determined by a formula as a function of the `domain_id` (see `DDS_WireProtocolQosPolicy::participant_id` (p. 1247)).

**[range]** [0,0xffffffff]

## 9.206 DDS\_TransportMulticastSettingsSeq Struct Reference

Declares IDL `sequence< DDS_TransportMulticastSettings_t` (p. 1153) >

### 9.206.1 Detailed Description

Declares IDL `sequence< DDS_TransportMulticastSettings_t` (p. 1153) >

Instantiates:

<<*generic*>> (p. 237) `FooSeq` (p. 1697)

See also

`DDS_TransportMulticastSettings_t` (p. 1153)

## 9.207 DDS\_TransportPriorityQosPolicy Struct Reference

This QoS policy allows the application to take advantage of transports that are capable of sending messages with different priorities.

### Public Attributes

- `DDS_Long` `value`

*This policy is a hint to the infrastructure as to how to set the priority of the underlying transport used to send the data.*

### 9.207.1 Detailed Description

This QoS policy allows the application to take advantage of transports that are capable of sending messages with different priorities.

The Transport Priority QoS policy is optional and only supported on certain OSs and transports. It allows you to specify on a per-DataWriter or DataReader basis that the data sent by that endpoint is of a different priority.

The DDS specification does not indicate how a DDS implementation should treat data of different priorities. It is often difficult or impossible for DDS implementations to treat data of higher priority differently than data of lower priority, especially when data is being sent (delivered to a physical transport) directly by the thread that called **FooDataWriter**↔**::write** (p. 1683). Also, many physical network transports themselves do not have a end-user controllable level of data packet priority.

Entity:

**DDSDataWriter** (p. 1321), **DDSDataReader** (p. 1288), **DDSTopic** (p. 1617)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.207.2 Usage

In RTI Connext, for the IP-based transports (UDPv4, UDPv6, Real-Time WAN, and TCP), the value set in the Transport Priority QoS policy can be used to set the differentiated services field (DS field) bits of the IPv4 and IPv6 headers for datagrams sent by a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288). It is platform-dependent on how and whether setting the DS field has an effect. Some platforms may require external permissions in order to set the DS field.

The transport priority value is not provided as is to the transports, but transformed according to the following fields: `transport_priority_mask` (for example, see **NDDS\_Transport\_UDPv4\_Property\_t::transport\_priority\_mask** (p. 1794)), `transport_priority_mapping_low` (for example, see **NDDS\_Transport\_UDPv4\_Property\_t::transport\_↔priority\_mapping\_low** (p. 1794)), and `transport_priority_mapping_high` (for example, see **NDDS\_Transport\_UDPv4\_↔\_Property\_t::transport\_priority\_mapping\_high** (p. 1794)). If you want the priority value to be exactly equal to the DS value, then the only change you need to make is to set `transport_priority_mask` to `0xff` (and keep the `transport_↔priority_mapping_low` and `transport_priority_mapping_high` defaults).

It is incorrect to assume that using the Transport Priority QoS policy will have any effect at all on the end-to-end delivery of data from a **DDSDataWriter** (p. 1321) and a **DDSDataReader** (p. 1288). All network elements, including switches and routers, must have the capability and be enabled to actually use the DS field to treat higher priority packets differently. Thus the ability to use the Transport Priority QoS policy must be designed and configured at a *system* level; just turning it on in an application may have no effect at all at a transport level.

For additional details on how to set the DS field in IP-based transports, see the "TRANSPORT\_PRIORITY QoSPolicy" section of the `User's Manual`.

### 9.207.3 Member Data Documentation

#### 9.207.3.1 value

`DDS_Long DDS_TransportPriorityQosPolicy::value`

This policy is a hint to the infrastructure as to how to set the priority of the underlying transport used to send the data.

You may choose any value within the range of a 32-bit signed integer; higher values indicate higher priority. However, any further interpretation of this policy is specific to a particular transport and a particular DDS implementation. For example, a particular transport is permitted to treat a range of priority values as equivalent to one another.

[default] 0

## 9.208 DDS\_TransportSelectionQosPolicy Struct Reference

Specifies the physical transports a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288) may use to send or receive data.

### Public Attributes

- struct **DDS\_StringSeq enabled\_transports**

*A sequence of transport aliases that specifies the transport instances available for use by the entity.*

### 9.208.1 Detailed Description

Specifies the physical transports a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288) may use to send or receive data.

An application may be simultaneously connected to many different physical transports, e.g., Ethernet, Infiniband, shared memory, VME backplane, and wireless. By default, RTI Connex will use up to 16 transports to deliver data from a DataWriter to a DataReader.

This QoS policy can be used to both limit and control which of the application's available transports may be used by a **DDSDataWriter** (p. 1321) to send data or by a **DDSDataReader** (p. 1288) to receive data.

Entity:

**DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

## 9.208.2 Member Data Documentation

### 9.208.2.1 enabled\_transports

```
struct DDS_StringSeq DDS_TransportSelectionQosPolicy::enabled_transports
```

A sequence of transport aliases that specifies the transport instances available for use by the entity.

Of the transport instances installed with the **DDSDomainParticipant** (p. 1351), only those with aliases matching an alias in this sequence are available to the entity.

Thus, this list of aliases sub-selects from the transports available to the **DDSDomainParticipant** (p. 1351).

An empty sequence is a special value that specifies all the transports installed with the **DDSDomainParticipant** (p. 1351).

The memory for the strings in this sequence is managed according to the conventions described in **String Conventions** (p. 552). In particular, be careful to avoid a situation in which RTI Connexx allocates a string on your behalf and you then reuse that string in such a way that RTI Connexx believes it to have more memory allocated to it than it actually does.

Alias names for the builtin transports are defined in **TRANSPORT\_BUILTIN** (p. 443). These alias names are case sensitive and should be written in lowercase.

**[default]** Empty sequence; i.e. all the transports installed with and available to the **DDSDomainParticipant** (p. 1351).

**[range]** A sequence of non-null, non-empty strings.

See also

**DDS\_DomainParticipantQos::transport\_builtin** (p. 744).

## 9.209 DDS\_TransportUnicastQosPolicy Struct Reference

Specifies a subset of transports and a port number that can be used by an Entity to receive data.

### Public Attributes

- struct **DDS\_TransportUnicastSettingsSeq** value  
*A sequence of unicast communication settings.*

## 9.209.1 Detailed Description

Specifies a subset of transports and a port number that can be used by an Entity to receive data.

Entity:

**DDSDomainParticipant** (p. 1351), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

## 9.209.2 Usage

RTI Connext may send data to a variety of Entities, not just DataReaders. For example, reliable DataWriters may receive ACK/NACK packets from reliable DataReaders.

During discovery, each **DDSEntity** (p. 1463) announces to remote applications a list of (up to 16) unicast addresses to which the remote application should send data (either user data packets or reliable protocol meta-data such as ACK/↔NACKs and heartbeats). Note that this is a hard limit that cannot be increased. However, this limit can be decreased by configuring the 'dds.domain\_participant.max\_announced\_locator\_list\_size' property in the **DDS\_PropertyQosPolicy** (p. 1007) associated with the **DDS\_DomainParticipantQos** (p. 741).

By default, the list of addresses is populated automatically with values obtained from the enabled transport plug-ins allowed to be used by the Entity (see **DDS\_TransportBuiltinQosPolicy** (p. 1144) and **DDS\_TransportSelection↔QosPolicy** (p. 1157)). Also, the associated ports are automatically determined (see **DDS\_RtpsWellKnownPorts\_t** (p. 1076)).

Use this QoS policy to manually set the receive address list for an Entity. You may optionally set a port to use a non-default receive port as well. Only the first 16 addresses will be used.

RTI Connext will create a receive thread for every unique port number that it encounters (on a per transport basis).

- For a **DDSDomainParticipant** (p. 1351), this QoS policy sets the default list of addresses used by other applications to send user data for local DataReaders.
- For a **DDSDataReader** (p. 1288), if set, then other applications will use the specified list of addresses to send user data (and reliable protocol packets for reliable DataReaders). Otherwise, if not set, the other applications will use the addresses set by the **DDSDomainParticipant** (p. 1351).
- For a reliable **DDSDataWriter** (p. 1321), if set, then other applications will use the specified list of addresses to send reliable protocol packets (ACKS/NACKS) on the behalf of reliable DataReaders. Otherwise, if not set, the other applications will use the addresses set by the **DDSDomainParticipant** (p. 1351).

## 9.209.3 Member Data Documentation

### 9.209.3.1 value

```
struct DDS_TransportUnicastSettingsSeq DDS_TransportUnicastQosPolicy::value
```

A sequence of unicast communication settings.

An empty sequence means that applicable defaults specified by elsewhere (e.g. **DDS\_DomainParticipantQos**↔  
::**default\_unicast** (p. 744)) should be used.

The RTPS wire protocol currently limits the maximum number of unicast locators to

1. Note that this is a hard limit that cannot be increased. However, this limit can be decreased by configuring the 'dds.domain\_participant.max\_announced\_locator\_list\_size' property in the **DDS\_PropertyQosPolicy** (p. 1007) associated with the **DDS\_DomainParticipantQos** (p. 741).

**[default]** Empty sequence.

See also

**DDS\_DomainParticipantQos::default\_unicast** (p. 744)

## 9.210 DDS\_TransportUnicastSettings\_t Struct Reference

Type representing a list of unicast locators.

### Public Attributes

- struct **DDS\_StringSeq transports**  
*A sequence of transport aliases that specifies the unicast interfaces on which to receive unicast traffic for the entity.*
- **DDS\_Long receive\_port**  
*The unicast port on which the entity can receive data.*

### 9.210.1 Detailed Description

Type representing a list of unicast locators.

A unicast locator specifies a transport class, a unicast address, and a unicast port number on which messages can be received by an entity.

QoS:

**DDS\_TransportUnicastQosPolicy** (p. 1158)

## 9.210.2 Member Data Documentation

### 9.210.2.1 transports

```
struct DDS_StringSeq DDS_TransportUnicastSettings_t::transports
```

A sequence of transport aliases that specifies the unicast interfaces on which to receive *unicast* traffic for the entity.

Of the transport instances available to the entity, only those with aliases matching an alias on this sequence are used to determine the unicast interfaces used by the entity.

Thus, this list of aliases sub-selects from the transports available to the entity.

Each unicast interface on a transport results in a unicast locator for the entity.

An empty sequence is a special value that specifies all the transports available to the entity.

The memory for the strings in this sequence is managed according to the conventions described in **String Conventions** (p. 552). In particular, be careful to avoid a situation in which RTI Connex allocates a string on your behalf and you then reuse that string in such a way that RTI Connex believes it to have more memory allocated to it than it actually does.

Alias names for the builtin transports are defined in **TRANSPORT\_BUILTIN** (p. 443).

**[default]** Empty sequence; i.e. all the transports available to the entity.

**[range]** Any sequence of non-null, non-empty strings.

### 9.210.2.2 receive\_port

```
DDS_Long DDS_TransportUnicastSettings_t::receive_port
```

The unicast port on which the entity can receive data.

Must be an *unused* unicast port on the system.

**[default]** 0, which implies that the actual port number is determined by a formula as a function of the `domain_id`, and the `DDS_WireProtocolQosPolicy::participant_id` (p. 1247).

**[range]** [0,0xffffffff]

See also

`DDS_WireProtocolQosPolicy::participant_id` (p. 1247).

## 9.211 DDS\_TransportUnicastSettingsSeq Struct Reference

Declares IDL `sequence< DDS_TransportUnicastSettings_t` (p. 1160) >

### 9.211.1 Detailed Description

Declares IDL `sequence< DDS_TransportUnicastSettings_t (p. 1160) >`

Instantiates:

`<<generic>> (p. 237) FooSeq (p. 1697)`

See also

`DDS_TransportUnicastSettings_t (p. 1160)`

## 9.212 DDS\_TrustAlgorithmRequirements Struct Reference

Type to describe Trust Plugins algorithm requirements for an entity.

### Public Attributes

- **DDS\_TrustAlgorithmSet supported\_mask**  
*Trust Plugins algorithms that an entity supports.*
- **DDS\_TrustAlgorithmSet required\_mask**  
*Trust Plugins algorithms that an entity uses.*

### 9.212.1 Detailed Description

Type to describe Trust Plugins algorithm requirements for an entity.

### 9.212.2 Member Data Documentation

#### 9.212.2.1 supported\_mask

`DDS_TrustAlgorithmSet DDS_TrustAlgorithmRequirements::supported_mask`

Trust Plugins algorithms that an entity supports.



### 9.212.2.2 required\_mask

```
DDS_TrustAlgorithmSet DDS_TrustAlgorithmRequirements::required_mask
```

Trust Plugins algorithms that an entity uses.

## 9.213 DDS\_TypeAllocationParams\_t Struct Reference

Configures whether or not to allocate pointer and optional members.

### Public Member Functions

- struct **DDS\_TypeAllocationParams\_t** & **set\_allocate\_pointers** ( **DDS\_Boolean** allocate)
- struct **DDS\_TypeAllocationParams\_t** & **set\_allocate\_optional\_members** ( **DDS\_Boolean** allocate)

### Public Attributes

- **DDS\_Boolean** **allocate\_pointers**  
*Whether to allocate pointer members or not.*
- **DDS\_Boolean** **allocate\_optional\_members**  
*Whether to allocate optional members or not.*

### 9.213.1 Detailed Description

Configures whether or not to allocate pointer and optional members.

By default pointers are allocated and optional members are not.

This structure is also defined in `xcdr.1.0/srcC/typeObject/TypeObjectInfrastructure.h`. If changes are made, please ensure they are made in both locations.

#### Examples

**HelloWorld.cxx**, and **HelloWorldPlugin.cxx**.

### 9.213.2 Member Function Documentation

### 9.213.2.1 set\_allocate\_pointers()

```
struct DDS_TypeAllocationParams_t & DDS_TypeAllocationParams_t::set_allocate_pointers (
    DDS_Boolean allocate ) [inline]
```

Whether to allocate pointer members or not

### 9.213.2.2 set\_allocate\_optional\_members()

```
struct DDS_TypeAllocationParams_t & DDS_TypeAllocationParams_t::set_allocate_optional_members (
    DDS_Boolean allocate ) [inline]
```

Whether to allocate optional members or not

## 9.213.3 Member Data Documentation

### 9.213.3.1 allocate\_pointers

```
DDS_Boolean DDS_TypeAllocationParams_t::allocate_pointers
```

Whether to allocate pointer members or not.

#### Examples

**HelloWorld.cxx**, and **HelloWorldPlugin.cxx**.

### 9.213.3.2 allocate\_optional\_members

```
DDS_Boolean DDS_TypeAllocationParams_t::allocate_optional_members
```

Whether to allocate optional members or not.

## 9.214 DDS\_TypeCode Struct Reference

The definition of a particular data type, which you can use to inspect the name, members, and other properties of types generated with rtiddsgen (see the [Code Generator User's Manual](#)) or to modify types you define yourself at runtime.

## Public Member Functions

- **DDS\_TCKind kind** ( **DDS\_ExceptionCode\_t** &ex) const  
*Gets the **DDS\_TCKind** (p. 86) value of a type code.*
- **DDS\_ExtensibilityKind extensibility\_kind** ( **DDS\_ExceptionCode\_t** &ex) const  
*Gets the **DDS\_ExtensibilityKind** (p. 86) value of a type code.*
- **DDS\_Boolean equal** (const **DDS\_TypeCode** \*tc, **DDS\_ExceptionCode\_t** &ex) const  
*Compares two **DDS\_TypeCode** (p. 1164) objects for equality.*
- const char \* **name** ( **DDS\_ExceptionCode\_t** &ex) const  
*Retrieves the simple name identifying this **DDS\_TypeCode** (p. 1164) object within its enclosing scope.*
- **DDS\_UnsignedLong member\_count** ( **DDS\_ExceptionCode\_t** &ex) const  
*Returns the number of members of the type code.*
- const char \* **member\_name** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Returns the name of a type code member identified by the given index.*
- **DDS\_UnsignedLong find\_member\_by\_name** (const char \* name, **DDS\_ExceptionCode\_t** &ex) const  
*Get the index of the member of the given name.*
- **DDS\_TypeCode** \* **member\_type** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Retrieves the **DDS\_TypeCode** (p. 1164) object describing the type of the member identified by the given index.*
- **DDS\_UnsignedLong member\_label\_count** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Returns the number of labels associated to the index-th union member.*
- **DDS\_Long member\_label** ( **DDS\_UnsignedLong** member\_index, **DDS\_UnsignedLong** label\_index, **DDS\_↔\_ExceptionCode\_t** &ex) const  
*Return the label\_index-th label associated to the member\_index-th member.*
- **DDS\_Long member\_ordinal** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Returns the ordinal that corresponds to the index-th enum value.*
- **DDS\_Boolean is\_member\_key** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Function that tells if a member is a key or not.*
- **DDS\_Boolean is\_member\_required** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Indicates whether a given member of a type is required to be present in every sample of that type.*
- **DDS\_Boolean is\_member\_pointer** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Function that tells if a member is a pointer or not.*
- **DDS\_Boolean is\_member\_bitfield** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Function that tells if a member is a bitfield or not.*
- **DDS\_Short member\_bitfield\_bits** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Returns the number of bits of a bitfield member.*
- **DDS\_Visibility member\_visibility** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*Returns the constant that indicates the visibility of the index-th member.*
- **DDS\_TypeCode** \* **discriminator\_type** ( **DDS\_ExceptionCode\_t** &ex) const  
*Returns the discriminator type code.*
- **DDS\_UnsignedLong length** ( **DDS\_ExceptionCode\_t** &ex) const  
*Returns the number of elements in the type described by this type code.*
- **DDS\_UnsignedLong array\_dimension\_count** ( **DDS\_ExceptionCode\_t** &ex) const  
*This function returns the number of dimensions of an array type code.*
- **DDS\_UnsignedLong array\_dimension** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex) const  
*This function returns the index-th dimension of an array type code.*
- **DDS\_UnsignedLong element\_count** ( **DDS\_ExceptionCode\_t** &ex) const

The number of elements in an array.

- **DDS\_TypeCode \* content\_type** ( DDS\_ExceptionCode\_t &ex) const  
Returns the **DDS\_TypeCode** (p. 1164) object representing the type for the members of the object described by this **DDS\_TypeCode** (p. 1164) object.
- **DDS\_Boolean is\_alias\_pointer** ( DDS\_ExceptionCode\_t &ex) const  
Function that tells if an alias is a pointer or not.
- **DDS\_Long default\_index** ( DDS\_ExceptionCode\_t &ex) const  
Returns the index of the default member, or -1 if there is no default member.
- **DDS\_TypeCode \* concrete\_base\_type** ( DDS\_ExceptionCode\_t &ex) const  
Returns the **DDS\_TypeCode** (p. 1164) that describes the concrete base type of the value type that this **DDS\_TypeCode** (p. 1164) object describes.
- **DDS\_ValueModifier type\_modifier** ( DDS\_ExceptionCode\_t &ex) const  
Returns a constant indicating the modifier of the value type that this **DDS\_TypeCode** (p. 1164) object describes.
- **DDS\_Long member\_id** ( DDS\_UnsignedLong index, DDS\_ExceptionCode\_t &ex) const  
Returns the ID of the **TypeCode** member identified by the given index.
- **DDS\_UnsignedLong find\_member\_by\_id** ( DDS\_Long id, DDS\_ExceptionCode\_t &ex) const  
Get the index of the member of the given ID.
- **DDS\_UnsignedLong get\_type\_object\_serialized\_size** ( DDS\_ExceptionCode\_t &ex) const  
Gets the serialized size of the **TypeObject** created from this **DDS\_TypeCode** (p. 1164).
- **DDS\_UnsignedLong get\_cdr\_serialized\_sample\_max\_size** ( DDS\_DataRepresentationId\_t representation\_id, DDS\_ExceptionCode\_t &ex) const  
**[DEPRECATED]** Gets the maximum serialized size of samples of this type
- **DDS\_UnsignedLong cdr\_serialized\_sample\_max\_size** ( DDS\_DataRepresentationId\_t representation\_id, DDS\_ExceptionCode\_t &ex) const  
Gets the maximum serialized size of samples of this type.
- **DDS\_UnsignedLong cdr\_serialized\_sample\_min\_size** ( DDS\_DataRepresentationId\_t representation\_id, DDS\_ExceptionCode\_t &ex) const  
Gets the minimum serialized size of samples of this type.
- **DDS\_UnsignedLong cdr\_serialized\_sample\_key\_max\_size** ( DDS\_DataRepresentationId\_t representation\_id, DDS\_ExceptionCode\_t &ex) const  
Gets the maximum serialized size of sample keys of this type.
- **DDS\_UnsignedLong cdr\_serialized\_sample\_max\_size** ( DDS\_ExceptionCode\_t &ex) const  
Gets the maximum serialized size of samples of this type.
- **DDS\_UnsignedLong cdr\_serialized\_sample\_min\_size** ( DDS\_ExceptionCode\_t &ex) const  
Gets the minimum serialized size of samples of this type.
- **DDS\_UnsignedLong cdr\_serialized\_sample\_key\_max\_size** ( DDS\_ExceptionCode\_t &ex) const  
Gets the maximum serialized size of sample keys of this type.
- **DDS\_UnsignedLong add\_member\_to\_enum** (const char \* name, DDS\_Long ordinal, DDS\_ExceptionCode\_t &ex)  
Add a new enumerated constant to this enum **DDS\_TypeCode** (p. 1164).
- **DDS\_UnsignedLong add\_member\_to\_union** (const char \* name, DDS\_Long id, const DDS\_LongSeq &labels, const DDS\_TypeCode \*tc, DDS\_Boolean is\_pointer, DDS\_ExceptionCode\_t &ex)  
Add a new member to a union **DDS\_TypeCode** (p. 1164).
- **DDS\_UnsignedLong add\_member** (const char \* name, DDS\_Long id, const DDS\_TypeCode \*tc, DDS\_Octet member\_flags, DDS\_ExceptionCode\_t &ex)  
Add a new member to this **DDS\_TypeCode** (p. 1164).
- **DDS\_UnsignedLong add\_member\_ex** (const char \* name, DDS\_Long id, const DDS\_TypeCode \*tc, DDS\_Octet member\_flags, DDS\_Visibility visibility, DDS\_Boolean is\_pointer, DDS\_Short bits, DDS\_ExceptionCode\_t &ex)

Add a new member to this **DDS\_TypeCode** (p. 1164).

- const **DDS\_AnnotationParameterValue** \* **default\_value** ( **DDS\_ExceptionCode\_t** &ex)  
Returns the default annotation for this **DDS\_TypeCode** (p. 1164).
- const **DDS\_AnnotationParameterValue** \* **min\_value** ( **DDS\_ExceptionCode\_t** &ex)  
Returns the min annotation for this **DDS\_TypeCode** (p. 1164).
- const **DDS\_AnnotationParameterValue** \* **max\_value** ( **DDS\_ExceptionCode\_t** &ex)  
Returns the max annotation for this **DDS\_TypeCode** (p. 1164).
- const **DDS\_AnnotationParameterValue** \* **member\_default\_value** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex)  
Returns the member default annotation for this **DDS\_TypeCode** (p. 1164).
- const **DDS\_AnnotationParameterValue** \* **member\_min\_value** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex)  
Returns the member min annotation for this **DDS\_TypeCode** (p. 1164).
- const **DDS\_AnnotationParameterValue** \* **member\_max\_value** ( **DDS\_UnsignedLong** index, **DDS\_ExceptionCode\_t** &ex)  
Returns the member max annotation for this **DDS\_TypeCode** (p. 1164).
- void **print\_IDL** ( **DDS\_UnsignedLong** indent, **DDS\_ExceptionCode\_t** &ex) const  
Prints a **DDS\_TypeCode** (p. 1164) in IDL notation.
- void **print** (const **DDS\_TypeCodePrintFormatProperty** &format, **DDS\_ExceptionCode\_t** &ex) const  
Prints a **DDS\_TypeCode** (p. 1164).
- void **to\_string** (char \*str, **DDS\_UnsignedLong** &str\_size, **DDS\_ExceptionCode\_t** &ex) const  
Get a string representation of this **DDS\_TypeCode** (p. 1164) object using the default values for **DDS\_TypeCodePrintFormatProperty** (p. 1224).
- void **to\_string** (char \*str, **DDS\_UnsignedLong** &str\_size, const **DDS\_TypeCodePrintFormatProperty** &format, **DDS\_ExceptionCode\_t** &ex) const  
Get a string representation of this **DDS\_TypeCode** (p. 1164) object using the format described by **DDS\_TypeCodePrintFormatProperty** (p. 1224).

### 9.214.1 Detailed Description

The definition of a particular data type, which you can use to inspect the name, members, and other properties of types generated with `rtiddsgen` (see the `Code Generator User's Manual`) or to modify types you define yourself at runtime.

You create **DDS\_TypeCode** (p. 1164) objects using the **DDS\_TypeCodeFactory** (p. 1210) singleton. Then you can use the methods on *this* class to inspect and modify the data type definition.

This class is based on a similar class from CORBA.

#### MT Safety:

SAFE for read-only access, UNSAFE for modification. Modifying a single **DDS\_TypeCode** (p. 1164) object concurrently from multiple threads is *unsafe*. Modifying a **DDS\_TypeCode** (p. 1164) from a single thread while concurrently reading the state of that **DDS\_TypeCode** (p. 1164) from another thread is also *unsafe*. However, reading the state of a **DDS\_TypeCode** (p. 1164) concurrently from multiple threads, without any modification, is *safe*.

#### Examples

**HelloWorld.cxx**, and **HelloWorldPlugin.cxx**.

## 9.214.2 Member Function Documentation

### 9.214.2.1 kind()

```
DDS_TCKind DDS_TypeCode::kind (
    DDS_ExceptionCode_t & ex ) const
```

Gets the **DDS\_TCKind** (p. 86) value of a type code.

#### Parameters

<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications. The values that it can take are: <ul style="list-style-type: none"><li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li><li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li></ul>
-----------	--

Retrieves the kind of this **DDS\_TypeCode** (p. 1164) object. The kind of a type code determines which **DDS\_TypeCode** (p. 1164) methods may legally be invoked on it.

#### MT Safety:

SAFE.

#### Returns

The type code kind.

### 9.214.2.2 extensibility\_kind()

```
DDS_ExtensibilityKind DDS_TypeCode::extensibility_kind (
    DDS_ExceptionCode_t & ex ) const
```

Gets the **DDS\_ExtensibilityKind** (p. 86) value of a type code.

## Parameters

<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that it can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

Retrieves the extensibility kind of this **DDS\_TypeCode** (p. 1164) object.

In some cases, it is desirable for types to evolve without breaking interoperability with deployed components already using those types. For example:

- A new set of applications to be integrated into an existing system may want to introduce additional fields into a structure. These new fields can be safely ignored by already deployed applications, but applications that do understand the new fields can benefit from their presence.
- A new set of applications to be integrated into an existing system may want to increase the maximum size of some sequence or string in a Type. Existing applications can receive data samples from these new applications as long as the actual number of elements (or length of the strings) in the received data sample does not exceed what the receiving applications expects. If a received data sample exceeds the limits expected by the receiving application, then the sample can be safely ignored (filtered out) by the receiver.

In order to support use cases such as these, the type system introduces the concept of appendable and mutable types.

- A type may be final, indicating that the range of its possible data values is strictly defined. In particular, it is not possible to add elements to members of collection or aggregated types while maintaining type assignability.
- A type may be appendable, indicating that two types, where one contains all of the elements/members of the other plus additional elements/members appended to the end, may remain assignable.
- A type may be mutable, indicating that two types may differ from one another in the additional, removal, and/or transposition of elements/members while remaining assignable.

The extensibility of **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_UNION** (p. 86), **DDS\_TK\_VALUE** (p. 86), and **DDS\_TK\_ENUM** (p. 86) can be change using the built-in "Extensibility" annotation when the type is declared.

## IDL examples:

```

@final
struct MyType {
    long member_1;
}
@appendable
struct MyType {
    long member_1;
}
@mutable
struct MyType {

```

```

    long member_1;
}

```

#### XML example:

```

<struct name="MyType" extensibility="final">
    <member name="member_1" type="long"/>
</struct>
<struct name="MyType" extensibility="appendable">
    <member name="member_1" type="long"/>
</struct>
<struct name="MyType" extensibility="mutable">
    <member name="member_1" type="long"/>
</struct>

```

#### XSD example:

```

<xsd:complexType name="MyType">
    <xsd:sequence>
        <xsd:element name="member_1" minOccurs="1" maxOccurs="1" type="xsd:int"/>
    </xsd:sequence>
</xsd:complexType>
<!-- @struct true -->
<!-- @extensibility FINAL_EXTENSIBILITY -->
<xsd:complexType name="MyType">
    <xsd:sequence>
        <xsd:element name="member_1" minOccurs="1" maxOccurs="1" type="xsd:int"/>
    </xsd:sequence>
</xsd:complexType>
<!-- @struct true -->
<!-- @extensibility EXTENSIBLE_EXTENSIBILITY -->
<xsd:complexType name="MyType">
    <xsd:sequence>
        <xsd:element name="member_1" minOccurs="1" maxOccurs="1" type="xsd:int"/>
    </xsd:sequence>
</xsd:complexType>
<!-- @struct true -->
<!-- @extensibility MUTABLE_EXTENSIBILITY -->

```

For TypeCodes built at run-time using the **DDS\_TypeCodeFactory** (p. 1210) API, the extensibility can be provided as a parameter of the following APIs:

- **DDS\_TypeCodeFactory::create\_struct\_tc** (p. 1214)
- **DDS\_TypeCodeFactory::create\_value\_tc** (p. 1215)
- **DDS\_TypeCodeFactory::create\_union\_tc** (p. 1217)
- **DDS\_TypeCodeFactory::create\_enum\_tc** (p. 1218)



See also

**DDS\_ExtensibilityKind** (p. 86)

MT Safety:

SAFE.

Returns

The type code extensibility kind.

### 9.214.2.3 equal()

```
DDS_Boolean DDS_TypeCode::equal (
    const DDS_TypeCode * tc,
    DDS_ExceptionCode_t & ex ) const
```

Compares two **DDS\_TypeCode** (p. 1164) objects for equality.

MT Safety:

SAFE.

For equality and assignability purposes, **DDS\_TK\_STRUCTURE** (p. 86) and **DDS\_TK\_VALUE** (p. 86) are considered equivalent.

The **DDS\_TypeCode** (p. 1164) of structs inheriting from other structs has a **DDS\_TK\_VALUE** (p. 86) kind.

For example:

```
struct MyStruct: MyBaseStruct {
    long member_1;
};
```

The code generation for the previous type will generate a **DDS\_TypeCode** (p. 1164) with **DDS\_TK\_VALUE** (p. 86) kind.

Parameters

<i>tc</i>	<< <i>in</i> >> (p. 238) Type code that will be compared with this <b>DDS_TypeCode</b> (p. 1164).
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the type codes are equal. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317).

## 9.214.2.4 name()

```
const char * DDS_TypeCode::name (
    DDS_ExceptionCode_t & ex ) const
```

Retrieves the simple name identifying this **DDS\_TypeCode** (p. 1164) object within its enclosing scope.

## Precondition

self kind is **DDS\_TK\_STRUCTURE** (p. 86), **DDS\_TK\_UNION** (p. 86), **DDS\_TK\_ENUM** (p. 86), **DDS\_TK\_VALUE** (p. 86), or **DDS\_TK\_ALIAS** (p. 86).

## MT Safety:

SAFE.

## Parameters

<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

## Returns

Name of the type code if no errors.

## 9.214.2.5 member\_count()

```
DDS_UnsignedLong DDS_TypeCode::member_count (
    DDS_ExceptionCode_t & ex ) const
```

Returns the number of members of the type code.

The method `member_count` can be invoked on structure, union, and enumeration **DDS\_TypeCode** (p. 1164) objects.

**Precondition**

self kind is **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_UNION** (p. 86), **DDS\_TK\_ENUM** (p. 86) or **DDS\_TK\_VALUE** (p. 86).

**MT Safety:**

SAFE.

**Parameters**

<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

**Returns**

The number of members constituting the type described by this **DDS\_TypeCode** (p. 1164) object if no errors.

**9.214.2.6 member\_name()**

```
const char * DDS_TypeCode::member_name (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const
```

Returns the name of a type code member identified by the given index.

The method `member_name` can be invoked on structure, union, and enumeration **DDS\_TypeCode** (p. 1164) objects.

**Precondition**

self kind is **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_UNION** (p. 86), **DDS\_TK\_ENUM** (p. 86) or **DDS\_TK\_VALUE** (p. 86).

The index param must be in the interval [0,(member count-1)].

**MT Safety:**

SAFE.

## Parameters

<i>index</i>	<< <i>in</i> >> (p. 238) Member index in the interval [0,(member count-1)].
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

Name of the member if no errors.

## 9.214.2.7 find\_member\_by\_name()

```
DDS_UnsignedLong DDS_TypeCode::find_member_by_name (
    const char * name,
    DDS_ExceptionCode_t & ex ) const
```

Get the index of the member of the given name.

This method is applicable to **DDS\_TypeCode** (p. 1164) objects representing structs (**DDS\_TK\_STRUCT** (p. 86)) and union (**DDS\_TK\_UNION** (p. 86)) types.

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) The member name.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

The index of the member of the given name or **DDS\_TYPECODE\_INDEX\_INVALID** (p. 81) if the member is not found.

MT Safety:

SAFE.

### 9.214.2.8 member\_type()

```
DDS_TypeCode * DDS_TypeCode::member_type (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const
```

Retrieves the **DDS\_TypeCode** (p. 1164) object describing the type of the member identified by the given index.

The method `member_type` can be invoked on structure and union type codes.

#### Precondition

self kind is **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_UNION** (p. 86) or **DDS\_TK\_VALUE** (p. 86).  
The index param must be in the interval [0,(member count-1)].

MT Safety:

SAFE.

#### Parameters

<i>index</i>	<< <i>in</i> >> (p. 238) Member index in the interval [0,(member count-1)].
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

#### Returns

The **DDS\_TypeCode** (p. 1164) object describing the member at the given index if no errors.

### 9.214.2.9 member\_label\_count()

```
DDS_UnsignedLong DDS_TypeCode::member_label_count (
    DDS_UnsignedLong index,
    DDS_StatusCode_t & ex ) const
```

Returns the number of labels associated to the index-th union member.

The method can be invoked on union **DDS\_TypeCode** (p. 1164) objects.

This function is an RTI Connex extension to the CORBA Type Code Specification.

#### Precondition

self kind is **DDS\_TK\_UNION** (p. 86).  
The index param must be in the interval [0,(member count-1)].

#### MT Safety:

SAFE.

#### Parameters

<i>index</i>	<< <i>in</i> >> (p. 238) Member index in the interval [0,(member count-1)].
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

#### Returns

Number of labels if no errors.

### 9.214.2.10 member\_label()

```
DDS_Long DDS_TypeCode::member_label (
    DDS_UnsignedLong member_index,
    DDS_UnsignedLong label_index,
    DDS_StatusCode_t & ex ) const
```

Return the `label_index`-th label associated to the `member_index`-th member.

This method has been modified for RTI Connex from the CORBA Type code Specification.

Example:

```
case 1: Label index 0
case 2: Label index 1
short short_member;
```

The method can be invoked on union **DDS\_TypeCode** (p. 1164) objects.

#### Precondition

self kind is **DDS\_TK\_UNION** (p. 86).  
 The `member_index` param must be in the interval `[0,(member count-1)]`.  
 The `label_index` param must be in the interval `[0,(member labels count-1)]`.

#### MT Safety:

SAFE.

#### Parameters

<code>member_index</code>	<< <i>in</i> >> (p. 238) Member index.
<code>label_index</code>	<< <i>in</i> >> (p. 238) Label index.
<code>ex</code>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

#### Returns

The evaluated value of the label if no errors.

#### 9.214.2.11 member\_ordinal()

```
DDS_Long DDS_TypeCode::member_ordinal (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const
```

Returns the ordinal that corresponds to the index-th enum value.

The method can be invoked on enum **DDS\_TypeCode** (p. 1164) objects.

This function is an RTI Connex extension to the CORBA Type Code Specification.

#### Precondition

self kind is **DDS\_TK\_ENUM** (p. 86).  
Member index in the interval [0,(member count-1)].

#### MT Safety:

SAFE.

#### Parameters

<i>index</i>	<< <b>in</b> >> (p. 238) Member index in the interval [0,(member count-1)].
<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

#### Returns

Ordinal that corresponds to the index-th enumerator if no errors.

#### 9.214.2.12 is\_member\_key()

```
DDS_Boolean DDS_TypeCode::is_member_key (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const
```

Function that tells if a member is a key or not.

This function is an RTI Connex extension to the CORBA Type Code Specification.



**Precondition**

self kind is **DDS\_TK\_STRUCT** (p. 86) or **DDS\_TK\_VALUE** (p. 86).  
The index param must be in the interval [0,(member count-1)].

**MT Safety:**

SAFE.

## Parameters

<i>index</i>	<< <i>in</i> >> (p. 238) Member index in the interval [0,(member count-1)].
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the member is a key. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317).

9.214.2.13 `is_member_required()`

```
DDS_Boolean DDS_TypeCode::is_member_required (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const
```

Indicates whether a given member of a type is required to be present in every sample of that type.

A non-key member is required if it has not been marked as optional. All key members are required.

## See also

**DDS\_TYPECODE\_NONKEY\_MEMBER** (p. 83)

**DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER** (p. 84)

## MT Safety:

SAFE.

### 9.214.2.14 is\_member\_pointer()

```
DDS_Boolean DDS_TypeCode::is_member_pointer (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const
```

Function that tells if a member is a pointer or not.

The method `is_member_pointer` can be invoked on union and structs type objects

This function is an RTI Connex extension to the CORBA Type Code Specification.

#### Precondition

self kind is **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_UNION** (p. 86) or **DDS\_TK\_VALUE** (p. 86).  
The index param must be in the interval [0,(member count-1)].

#### MT Safety:

SAFE.

#### Parameters

<i>index</i>	<< <i>in</i> >> (p. 238) Index of the member for which type information is begin requested.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the member is a pointer. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317).

### 9.214.2.15 is\_member\_bitfield()

```
DDS_Boolean DDS_TypeCode::is_member_bitfield (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const
```

Function that tells if a member is a bitfield or not.

The method can be invoked on struct type objects.

This function is an RTI Connex extension to the CORBA Type Code Specification.

**Precondition**

self kind is **DDS\_TK\_STRUCT** (p. 86) or **DDS\_TK\_VALUE** (p. 86).  
The index param must be in the interval [0,(member count-1)].

**MT Safety:**

SAFE.

**Parameters**

<i>index</i>	<< <i>in</i> >> (p. 238) Member index in the interval [0,(member count-1)].
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

**Returns**

**DDS\_BOOLEAN\_TRUE** (p. 317) if the member is a bitfield. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317).

**9.214.2.16 member\_bitfield\_bits()**

```

DDS_Short DDS_TypeCode::member_bitfield_bits (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const

```

Returns the number of bits of a bitfield member.

The method can be invoked on struct type objects.

This function is an RTI Connex extension to the CORBA Type Code Specification.

**Precondition**

self kind is **DDS\_TK\_STRUCT** (p. 86) or **DDS\_TK\_VALUE** (p. 86).  
The index param must be in the interval [0,(member count-1)].

**MT Safety:**

SAFE.

## Parameters

<i>index</i>	<< <i>in</i> >> (p. 238) Member index in the interval [0,(member count-1)].
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

The number of bits of the bitfield or **DDS\_TYPECODE\_NOT\_BITFIELD** (p. 81) if the member is not a bitfield.

## 9.214.2.17 member\_visibility()

```

DDS_Visibility DDS_TypeCode::member_visibility (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const

```

Returns the constant that indicates the visibility of the index-th member.

## Precondition

self kind is **DDS\_TK\_VALUE** (p. 86) or **DDS\_TK\_STRUCT** (p. 86). The index param must be in the interval [0,(member count-1)].

## MT Safety:

SAFE.

For **DDS\_TK\_STRUCT** (p. 86), this method always returns **DDS\_PUBLIC\_MEMBER** (p. 83).

## Parameters

<i>index</i>	<< <i>in</i> >> (p. 238) Member index in the interval [0,(member count-1)].
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
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## Returns

One of the following constants: **DDS\_PRIVATE\_MEMBER** (p. 82) or **DDS\_PUBLIC\_MEMBER** (p. 83).

### 9.214.2.18 discriminator\_type()

```
DDS_TypeCode * DDS_TypeCode::discriminator_type (
    DDS_ExceptionCode_t & ex ) const
```

Returns the discriminator type code.

The method `discriminator_type` can be invoked only on union **DDS\_TypeCode** (p. 1164) objects.

## Precondition

self kind is **DDS\_TK\_UNION** (p. 86).

## MT Safety:

SAFE.

## Parameters

<i>ex</i>	<p>&lt;&lt;<i>out</i>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

## Returns

**DDS\_TypeCode** (p. 1164) object describing the discriminator of the union type if no errors.

### 9.214.2.19 length()

```
DDS_UnsignedLong DDS_TypeCode::length (
    DDS_ExceptionCode_t & ex ) const
```

Returns the number of elements in the type described by this type code.

Length is:

- The maximum length of the string for string type codes.
- The maximum length of the sequence for sequence type codes.
- The first dimension of the array for array type codes.

**Precondition**

self kind is **DDS\_TK\_ARRAY** (p. 86), **DDS\_TK\_SEQUENCE** (p. 86), **DDS\_TK\_STRING** (p. 86) or **DDS\_TK\_WSTRING** (p. 86).

**MT Safety:**

SAFE.

**Parameters**

<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

**Returns**

The bound for strings and sequences, or the number of elements for arrays if no errors.

**9.214.2.20 array\_dimension\_count()**

```
DDS_UnsignedLong DDS_TypeCode::array_dimension_count (
    DDS_StatusCode_t & ex ) const
```

This function returns the number of dimensions of an array type code.

This function is an RTI Connex extension to the CORBA Type Code Specification.

**Precondition**

self kind is **DDS\_TK\_ARRAY** (p. 86).

**MT Safety:**

SAFE.

## Parameters

<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

## Returns

Number of dimensions if no errors.

## 9.214.2.21 array\_dimension()

```
DDS_UnsignedLong DDS_TypeCode::array_dimension (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const
```

This function returns the index-th dimension of an array type code.

This function is an RTI Connex extension to the CORBA Type Code Specification.

## Precondition

self kind is **DDS\_TK\_ARRAY** (p. 86).  
Dimension index in the interval [0,(dimensions count-1)].

## MT Safety:

SAFE.

## Parameters

<i>index</i>	<< <b>in</b> >> (p. 238) Dimension index in the interval [0,(dimensions count-1)].
<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>



**Returns**

Requested dimension if no errors.

**9.214.2.22 element\_count()**

```
DDS_UnsignedLong DDS_TypeCode::element_count (
    DDS_ExceptionCode_t & ex ) const
```

The number of elements in an array.

This operation isn't relevant for other kinds of types.

**MT Safety:**

SAFE.

**9.214.2.23 content\_type()**

```
DDS_TypeCode * DDS_TypeCode::content_type (
    DDS_ExceptionCode_t & ex ) const
```

Returns the **DDS\_TypeCode** (p. 1164) object representing the type for the members of the object described by this **DDS\_TypeCode** (p. 1164) object.

For sequences and arrays, it returns the element type. For aliases, it returns the original type.

**Precondition**

self kind is **DDS\_TK\_ARRAY** (p. 86), **DDS\_TK\_SEQUENCE** (p. 86) or **DDS\_TK\_ALIAS** (p. 86).

**MT Safety:**

SAFE.

## Parameters

<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

## Returns

A **DDS\_TypeCode** (p. 1164) object representing the element type for sequences and arrays, and the original type for aliases.

9.214.2.24 `is_alias_pointer()`

```
DDS_Boolean DDS_TypeCode::is_alias_pointer (
    DDS_ExceptionCode_t & ex ) const
```

Function that tells if an alias is a pointer or not.

This function is an RTI Connex extension to the CORBA Type Code Specification.

## Precondition

self kind is **DDS\_TK\_ALIAS** (p. 86).

## MT Safety:

SAFE.

## Parameters

<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if an alias is a pointer to the aliased type. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317).

## 9.214.2.25 default\_index()

```
DDS_Long DDS_TypeCode::default_index (
    DDS_ExceptionCode_t & ex ) const
```

Returns the index of the default member, or -1 if there is no default member.

The method `default_index` can be invoked only on union **DDS\_TypeCode** (p. 1164) objects.

## Precondition

self kind is **DDS\_TK\_UNION** (p. 86)

## MT Safety:

SAFE.

## Parameters

<i>ex</i>	<p>&lt;&lt;<i>out</i>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

## Returns

The index of the default member, or -1 if there is no default member.

## 9.214.2.26 concrete\_base\_type()

```
DDS_TypeCode * DDS_TypeCode::concrete_base_type (
    DDS_ExceptionCode_t & ex ) const
```

Returns the **DDS\_TypeCode** (p. 1164) that describes the concrete base type of the value type that this **DDS\_TypeCode** (p. 1164) object describes.

**Precondition**

self kind is **DDS\_TK\_VALUE** (p. 86) or **DDS\_TK\_STRUCT** (p. 86).

**MT Safety:**

SAFE.

For **DDS\_TK\_STRUCT** (p. 86), this method always returns **DDS\_TK\_NULL** (p. 86).

The **DDS\_TypeCode** (p. 1164) of structs inheriting from other structs has a **DDS\_TK\_VALUE** (p. 86) kind.

**For example:**

```
struct MyStruct: MyBaseStruct {
    long member_1;
};
```

The code generation for the previous type will generate a **DDS\_TypeCode** (p. 1164) with **DDS\_TK\_VALUE** (p. 86) kind.

**Parameters**

<b>ex</b>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

**Returns**

**DDS\_TypeCode** (p. 1164) that describes the concrete base type or NULL if there is no a concrete base type.

**9.214.2.27 type\_modifier()**

```
DDS_ValueModifier DDS_TypeCode::type_modifier (
    DDS_ExceptionCode_t & ex ) const
```

Returns a constant indicating the modifier of the value type that this **DDS\_TypeCode** (p. 1164) object describes.

**Precondition**

self kind is **DDS\_TK\_VALUE** (p. 86) or **DDS\_TK\_STRUCT** (p. 86).

For **DDS\_TK\_STRUCT** (p. 86), this method always returns **DDS\_VM\_NONE** (p. 81).

**MT Safety:**

SAFE.

## Parameters

<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	--

## Returns

One of the following type modifiers: **DDS\_VM\_NONE** (p. 81), **DDS\_VM\_ABSTRACT** (p. 82), **DDS\_VM\_CUSTOM** (p. 81) or **DDS\_VM\_TRUNCATABLE** (p. 82).

## 9.214.2.28 member\_id()

```
DDS_Long DDS_TypeCode::member_id (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex ) const
```

Returns the ID of the TypeCode member identified by the given index.

This function is an RTI Connex extension to the CORBA Type Code Specification.

The method can be invoked on aggregation **DDS\_TypeCode** (p. 1164) objects.

All members of aggregated types have an integral member ID that uniquely identifies them within their defining type.

In IDL, you can specify the member ID using the built-in annotation ID. For example:

```
struct MyType {
    long member_1; //@ID 200
} //@Extensibility MUTABLE_EXTENSIBILITY
```

In XML, you can specify the member ID using the attribute 'id':

```
<struct name="MyType" extensibility="mutable" id="200">
    <member name="member_1" type="long"/>
</struct>
```

In XSD, you can specify the member ID using the built-in annotation ID

```
<xsd:complexType name="MyType">
    <xsd:sequence>
        <xsd:element name="member_1" minOccurs="1" maxOccurs="1" type="xsd:int"/>
        <!-- @id 200 -->
    </xsd:sequence>
</xsd:complexType>
<!-- @extensibility MUTABLE_EXTENSIBILITY -->
```

**Precondition**

self kind is **DDS\_TK\_STRUCT** (p. 86), **DDS\_TK\_VALUE** (p. 86), or **DDS\_TK\_UNION** (p. 86)  
 Member index in the interval [0,(member count-1)].

**MT Safety:**

SAFE.

**Parameters**

<i>index</i>	<< <i>in</i> >> (p. 238) Member index in the interval [0,(member count-1)].
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

**Returns**

ID of the member if no errors.

**9.214.2.29 find\_member\_by\_id()**

```
DDS_UnsignedLong DDS_TypeCode::find_member_by_id (
    DDS_Long id,
    DDS_ExceptionCode_t & ex ) const
```

Get the index of the member of the given ID.

This method is applicable to **DDS\_TypeCode** (p. 1164) objects representing structs (**DDS\_TK\_STRUCT** (p. 86)) and union (**DDS\_TK\_UNION** (p. 86)) types.

**Parameters**

<i>id</i>	<< <i>in</i> >> (p. 238) The member ID.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

**Returns**

The index of the member of the given ID or **DDS\_TYPECODE\_INDEX\_INVALID** (p. 81) if the member is not found.

**MT Safety:**

SAFE.

**9.214.2.30 get\_type\_object\_serialized\_size()**

```
DDS_UnsignedLong DDS_TypeCode::get_type_object_serialized_size (
    DDS_StatusCode_t & ex ) const
```

Gets the serialized size of the TypeObject created from this **DDS\_TypeCode** (p. 1164).

**Parameters**

<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that it can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	---

The default buffer size used for storing a TypeObject is 8192 bytes. For a large TypeObject, this API can be used to determine the size that needs to be set in **DDS\_DomainParticipantResourceLimitsQosPolicy::type\_object\_max\_↔\_serialized\_length** (p. 760)

**MT Safety:**

SAFE.

**Returns**

The TypeObject serialized size.

**9.214.2.31 get\_cdr\_serialized\_sample\_max\_size()**

```
DDS_UnsignedLong DDS_TypeCode::get_cdr_serialized_sample_max_size (
    DDS_DataRepresentationId_t representation_id,
    DDS_StatusCode_t & ex ) const
```

**[DEPRECATED]** Gets the maximum serialized size of samples of this type

DEPRECATED: use **DDS\_TypeCode::cdr\_serialized\_sample\_max\_size** (p. 1194) instead.

Obtains the maximum possible size in bytes of any serialized data sample of this type.

**Precondition**

The type is an aggregation type (struct, union)

**Parameters**

<i>representation</i> <sub>↔</sub> <i>_id</i>	The serialized data representation for which we calculate the maximum size.
<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications.

**Returns**

The maximum size

**9.214.2.32 cdr\_serialized\_sample\_max\_size() [1/2]**

```
DDS_UnsignedLong DDS_TypeCode::cdr_serialized_sample_max_size (
    DDS_DataRepresentationId_t representation_id,
    DDS_StatusCode_t & ex ) const
```

Gets the maximum serialized size of samples of this type.

Obtains the maximum possible size in bytes of any serialized data sample of this type.

**Precondition**

The type is an aggregation type (struct, union)

**Parameters**

<i>representation</i> <sub>↔</sub> <i>_id</i>	The serialized data representation for which we calculate the maximum size.
<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications.

**Returns**

The maximum size

**9.214.2.33 cdr\_serialized\_sample\_min\_size() [1/2]**

```
DDS_UnsignedLong DDS_TypeCode::cdr_serialized_sample_min_size (
    DDS_DataRepresentationId_t representation_id,
    DDS_StatusCode_t & ex ) const
```



Gets the minimum serialized size of samples of this type.

Obtains the minimum possible size in bytes of any serialized data sample of this type.

#### Precondition

The type is an aggregation type (struct, union)

#### Parameters

<i>representation</i> <i>_id</i>	The serialized data representation for which we calculate the minimum size.
<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications.

#### Returns

The minimum size

#### 9.214.234 cdr\_serialized\_sample\_key\_max\_size() [1/2]

```
DDS_UnsignedLong DDS_TypeCode::cdr_serialized_sample_key_max_size (
    DDS_DataRepresentationId_t representation_id,
    DDS_StatusCode_t & ex ) const
```

Gets the maximum serialized size of sample keys of this type.

Obtains the maximum possible size in bytes of the serialized keys of any data sample of this type

#### Precondition

The type is an aggregation type (struct, union)

#### Parameters

<i>representation</i> <i>_id</i>	The serialized data representation for which we calculate the maximum key size.
<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications.

#### Returns

The maximum key size

### 9.214.2.35 cdr\_serialized\_sample\_max\_size() [2/2]

```
DDS_UnsignedLong DDS_TypeCode::cdr_serialized_sample_max_size (
    DDS_StatusCode_t & ex ) const
```

Gets the maximum serialized size of samples of this type.

Obtains the maximum possible size in bytes of any serialized data sample of this type.

Assumes the **DDS\_DataRepresentationId\_t** (p. 370) to be DDS\_AUTO\_DATA\_REPRESENTATION

#### Precondition

The type is an aggregation type (struct, union)

#### Parameters

<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications.
-----------	--

#### Returns

The maximum size

### 9.214.2.36 cdr\_serialized\_sample\_min\_size() [2/2]

```
DDS_UnsignedLong DDS_TypeCode::cdr_serialized_sample_min_size (
    DDS_StatusCode_t & ex ) const
```

Gets the minimum serialized size of samples of this type.

Obtains the minimum possible size in bytes of any serialized data sample of this type.

Assumes the **DDS\_DataRepresentationId\_t** (p. 370) to be DDS\_AUTO\_DATA\_REPRESENTATION

#### Precondition

The type is an aggregation type (struct, union)

#### Parameters

<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications.
-----------	--

**Returns**

The minimum size

**9.214.2.37 cdr\_serialized\_sample\_key\_max\_size() [2/2]**

```
DDS_UnsignedLong DDS_TypeCode::cdr_serialized_sample_key_max_size (
    DDS_ExceptionCode_t & ex ) const
```

Gets the maximum serialized size of sample keys of this type.

Obtains the maximum possible size in bytes of the serialized keys of any data sample of this type

Assumes the **DDS\_DataRepresentationId\_t** (p. 370) to be **DDS\_AUTO\_DATA\_REPRESENTATION**

**Precondition**

The type is an aggregation type (struct, union)

**Parameters**

<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications.
-----------	--

**Returns**

The maximum key size

**9.214.2.38 add\_member\_to\_enum()**

```
DDS_UnsignedLong DDS_TypeCode::add_member_to_enum (
    const char * name,
    DDS_Long ordinal,
    DDS_ExceptionCode_t & ex )
```

Add a new enumerated constant to this enum **DDS\_TypeCode** (p. 1164).

This method is applicable to **DDS\_TypeCode** (p. 1164) objects representing enumerations (**DDS\_TK\_ENUM** (p. 86)). To add a field to a structured type, see **DDS\_TypeCode::add\_member\_to\_enum** (p. 1197).

Modifying a **DDS\_TypeCode** (p. 1164) – such as by adding a member – is important if you are using the **Dynamic Data** (p. 99) APIs.

**MT Safety:**

UNSAFE.

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) The name of the new member. This string must be unique within this type and must not be NULL.
<i>ordinal</i>	<< <i>in</i> >> (p. 238) The relative order of the new member in this enum or a custom integer value. The value must be unique within the type.
<i>ex</i>	<< <i>out</i> >> (p. 238) If this method fails, this argument will contain information about the failure. Possible values include: <ul style="list-style-type: none"> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_MEMBER_NAME_USER_EXCEPTION_CODE</b> (p. 335)</li> <li>• <b>DDS_BAD_MEMBER_ID_USER_EXCEPTION_CODE</b> (p. 335)</li> </ul>

## Returns

The zero-based index of the new member relative to any other members that previously existed.

## See also

**DDS\_TypeCode::add\_member** (p. 1199)

**DDS\_TypeCode::add\_member\_ex** (p. 1201)

**DDS\_TypeCodeFactory** (p. 1210)

### 9.214.2.39 add\_member\_to\_union()

```

DDS_UnsignedLong DDS_TypeCode::add_member_to_union (
    const char * name,
    DDS_Long id,
    const DDS_LongSeq & labels,
    const DDS_TypeCode * tc,
    DDS_Boolean is_pointer,
    DDS_ExceptionCode_t & ex )

```

Add a new member to a union **DDS\_TypeCode** (p. 1164).

This method is applicable to **DDS\_TypeCode** (p. 1164) objects representing unions (**DDS\_TK\_UNION** (p. 86)).

Modifying a **DDS\_TypeCode** (p. 1164) – such as by adding a member – is important if you are using the **Dynamic Data** (p. 99) APIs.

**MT Safety:**

UNSAFE.

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) The name of the new member.
<i>id</i>	<< <i>in</i> >> (p. 238) The member ID. For automatic assignment of the member ID specify <b>DDS_TYPECODE_MEMBER_ID_INVALID</b> (p. 81).
<i>labels</i>	<< <i>in</i> >> (p. 238) A sequence of labels or case values associated with the member .
<i>tc</i>	<< <i>in</i> >> (p. 238) The type of the new member. You can get or create this <b>DDS_TypeCode</b> (p. 1164) with the <b>DDS_TypeCodeFactory</b> (p. 1210).
<i>is_pointer</i>	<< <i>in</i> >> (p. 238) Whether the data member, in its deserialized form, should be stored by pointer as opposed to by value.
<i>ex</i>	<< <i>out</i> >> (p. 238) If this method fails, this argument will contain information about the failure.

Possible values include:

- **DDS\_BADKIND\_USER\_EXCEPTION\_CODE** (p. 334)
- **DDS\_BAD\_MEMBER\_NAME\_USER\_EXCEPTION\_CODE** (p. 335)
- **DDS\_BAD\_MEMBER\_ID\_USER\_EXCEPTION\_CODE** (p. 335)

## Returns

The zero-based index of the new member relative to any other members that previously existed.

## See also

**DDS\_TypeCode::add\_member** (p. 1199)  
**DDS\_TypeCode::add\_member\_ex** (p. 1201)  
**DDS\_TypeCode::add\_member\_to\_enum** (p. 1197)  
**DDS\_TypeCode::add\_member\_to\_union** (p. 1198)  
**DDS\_TypeCodeFactory** (p. 1210)  
**DDS\_TYPECODE\_NONKEY\_MEMBER** (p. 83)  
**DDS\_TYPECODE\_KEY\_MEMBER** (p. 83)  
**DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER** (p. 84)

## 9.214.2.40 add\_member()

```
DDS_UnsignedLong DDS_TypeCode::add_member (
    const char * name,
    DDS_Long id,
    const DDS_TypeCode * tc,
    DDS_Octet member_flags,
    DDS_ExceptionCode_t & ex )
```

Add a new member to this **DDS\_TypeCode** (p. 1164).

This method is applicable to **DDS\_TypeCode** (p. 1164) objects representing structures (**DDS\_TK\_STRUCT** (p. 86)), value types (**DDS\_TK\_VALUE** (p. 86)), and unions (**DDS\_TK\_UNION** (p. 86)). To add a constant to an enumeration, see **DDS\_TypeCode::add\_member\_to\_enum** (p. 1197).

Calling this method clones the type code passed as the `tc` parameter if the type code is not a builtin one. To delete this cloned type code, call **DDS\_TypeCodeFactory::delete\_tc** (p. 1213).

The ability to modify a **DDS\_TypeCode** (p. 1164) – such as by adding a member – is important if you are using the **Dynamic Data** (p. 99) APIs.

Here's a simple code example that adds two fields to a data type, one an integer and another a sequence of integers.

```
// Integer:
myTypeCode->add_member (
    "myFieldName",
    DDS_TYPECODE_MEMBER_ID_INVALID,
    DDS_TheTypeCodeFactory->get_primitive_tc(DDS_TK_LONG),
    // New field is a required non-key member:
    DDS_TYPECODE_NONKEY_REQUIRED_MEMBER);

// Sequence of 10 or fewer integers:
myTypeCode.add_member (
    "myFieldName",
    DDS_TYPECODE_MEMBER_ID_INVALID,
    DDS_TheTypeCodeFactory->create_sequence_tc(
        10,
        DDS_TheTypeCodeFactory->get_primitive_tc(DDS_TK_LONG)),
    // New field is a required non-key member:
    DDS_TYPECODE_NONKEY_REQUIRED_MEMBER);
```

#### MT Safety:

UNSAFE.

#### Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) The name of the new member.
<i>id</i>	<< <i>in</i> >> (p. 238) Member ID or case value. <ul style="list-style-type: none"> <li>For <b>DDS_TK_STRUCT</b> (p. 86), and <b>DDS_TK_VALUE</b> (p. 86), this parameter is used to provide the member ID. For automatic assignment of the member ID specify <b>DDS_TYPECODE_MEMBER_ID_INVALID</b> (p. 81).</li> <li>For <b>DDS_TK_UNION</b> (p. 86), this parameter is used to provide the case value associated with the member. The member ID is assigned automatically. To explicitly assign the member ID, use the API <b>DDS_TypeCode::add_member_to_union</b> (p. 1198).</li> </ul>
<i>tc</i>	<< <i>in</i> >> (p. 238) The type of the new member. You can get or create this <b>DDS_TypeCode</b> (p. 1164) with the <b>DDS_TypeCodeFactory</b> (p. 1210).

## Parameters

<i>member_flags</i>	<< <i>in</i> >> (p. 238) Indicates whether the member is part of the key and whether it is required.
<i>ex</i>	<< <i>out</i> >> (p. 238) If this method fails, this argument will contain information about the failure. Possible values include: <ul style="list-style-type: none"> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_MEMBER_NAME_USER_EXCEPTION_CODE</b> (p. 335)</li> <li>• <b>DDS_BAD_MEMBER_ID_USER_EXCEPTION_CODE</b> (p. 335)</li> </ul>

## Returns

The zero-based index of the new member relative to any other members that previously existed.

## See also

**DDS\_TypeCode::add\_member\_ex** (p. 1201)  
**DDS\_TypeCode::add\_member\_to\_enum** (p. 1197)  
**DDS\_TypeCodeFactory** (p. 1210)  
**DDS\_TYPECODE\_NONKEY\_MEMBER** (p. 83)  
**DDS\_TYPECODE\_KEY\_MEMBER** (p. 83)  
**DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER** (p. 84)

## 9.214.2.41 add\_member\_ex()

```

DDS_UnsignedLong DDS_TypeCode::add_member_ex (
    const char * name,
    DDS_Long id,
    const DDS_TypeCode * tc,
    DDS_Octet member_flags,
    DDS_Visibility visibility,
    DDS_Boolean is_pointer,
    DDS_Short bits,
    DDS_ExceptionCode_t & ex )
  
```

Add a new member to this **DDS\_TypeCode** (p. 1164).

This method is applicable to **DDS\_TypeCode** (p. 1164) objects representing structures (**DDS\_TK\_STRUCT** (p. 86)), value types (**DDS\_TK\_VALUE** (p. 86)), and unions (**DDS\_TK\_UNION** (p. 86)). To add a constant to an enumeration, see **DDS\_TypeCode::add\_member\_to\_enum** (p. 1197).

Calling this method clones the type code passed in as the `tc` parameter if the type code is not a builtin one. To delete this cloned type code, call **DDS\_TypeCodeFactory::delete\_tc** (p. 1213).

The ability to modify a **DDS\_TypeCode** (p. 1164) – such as by adding a member – is important if you are using the **Dynamic Data** (p. 99) APIs.

## MT Safety:

UNSAFE.

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) The name of the new member.
<i>id</i>	<< <i>in</i> >> (p. 238) Member ID or case value. <ul style="list-style-type: none"> <li>• For <b>DDS_TK_STRUCT</b> (p. 86) and <b>DDS_TK_VALUE</b> (p. 86), this parameter is used to provide the member ID.</li> <li>• For <b>DDS_TK_STRUCT</b> (p. 86) and <b>DDS_TK_VALUE</b> (p. 86) only: For automatic assignment of the member ID, specify <b>DDS_TYPECODE_MEMBER_ID_INVALID</b> (p. 81).</li> <li>• For <b>DDS_TK_UNION</b> (p. 86), this parameter is used to provide the case value associated with the member. The member ID is assigned automatically. To explicitly assign the member ID, use the API <b>DDS_TypeCode::add_member_to_union</b> (p. 1198).</li> </ul>
<i>tc</i>	<< <i>in</i> >> (p. 238) The type of the new member. You can get or create this <b>DDS_TypeCode</b> (p. 1164) with the <b>DDS_TypeCodeFactory</b> (p. 1210).
<i>member_flags</i>	<< <i>in</i> >> (p. 238) Indicates whether the member is part of the key and whether it is required.
<i>visibility</i>	<< <i>in</i> >> (p. 238) Whether the new member is public or private. Non-public members are only relevant for types of kind <b>DDS_TK_VALUE</b> (p. 86). Possible values include: <ul style="list-style-type: none"> <li>• <b>DDS_PRIVATE_MEMBER</b> (p. 82)</li> <li>• <b>DDS_PUBLIC_MEMBER</b> (p. 83)</li> </ul>
<i>is_pointer</i>	<< <i>in</i> >> (p. 238) Whether the data member, in its deserialized form, should be stored by pointer as opposed to by value.
<i>bits</i>	<< <i>in</i> >> (p. 238) The number of bits, if this new member is a bit field, or <b>DDS_TYPECODE_NOT_BITFIELD</b> (p. 81).
<i>ex</i>	<< <i>out</i> >> (p. 238) If this method fails, this argument will contain information about the failure. Possible values include: <ul style="list-style-type: none"> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_MEMBER_NAME_USER_EXCEPTION_CODE</b> (p. 335)</li> <li>• <b>DDS_BAD_MEMBER_ID_USER_EXCEPTION_CODE</b> (p. 335)</li> </ul>

## Returns

The zero-based index of the new member relative to any other members that previously existed.

## See also

- DDS\_TypeCode::add\_member** (p. 1199)
- DDS\_TypeCode::add\_member\_to\_enum** (p. 1197)
- DDS\_TypeCode::add\_member\_to\_union** (p. 1198)
- DDS\_TypeCodeFactory** (p. 1210)
- DDS\_TYPECODE\_NONKEY\_MEMBER** (p. 83)
- DDS\_TYPECODE\_KEY\_MEMBER** (p. 83)
- DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER** (p. 84)



### 9.214.2.42 default\_value()

```
const DDS_AnnotationParameterValue * DDS_TypeCode::default_value (
    DDS_ExceptionCode_t & ex )
```

Returns the default annotation for this **DDS\_TypeCode** (p. 1164).

#### Precondition

self kind is **DDS\_TK\_ENUM** (p. 86), or **DDS\_TK\_ALIAS** (p. 86).

#### MT Safety:

SAFE

#### Parameters

<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"><li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li><li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li><li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li></ul>
-----------	---

#### Returns

the default annotation for this **DDS\_TypeCode** (p. 1164)

### 9.214.2.43 min\_value()

```
const DDS_AnnotationParameterValue * DDS_TypeCode::min_value (
    DDS_ExceptionCode_t & ex )
```

Returns the min annotation for this **DDS\_TypeCode** (p. 1164).

#### Precondition

self kind is **DDS\_TK\_ENUM** (p. 86), or **DDS\_TK\_ALIAS** (p. 86) of a numerical kind.

#### MT Safety:

SAFE

## Parameters

<i>ex</i>	<p>&lt;&lt;<b><i>out</i></b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	---

## Returns

the min annotation for this **DDS\_TypeCode** (p. 1164)

**9.214.2.44 max\_value()**

```
const DDS_AnnotationParameterValue * DDS_TypeCode::max_value (
    DDS_ExceptionCode_t & ex )
```

Returns the max annotation for this **DDS\_TypeCode** (p. 1164).

## Precondition

self kind is **DDS\_TK\_ENUM** (p. 86), or **DDS\_TK\_ALIAS** (p. 86) of a numerical kind.

## MT Safety:

SAFE

## Parameters

<i>ex</i>	<p>&lt;&lt;<b><i>out</i></b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>
-----------	---

**Returns**

the max annotation for this **DDS\_TypeCode** (p. 1164)

**9.214.2.45 member\_default\_value()**

```
const DDS_AnnotationParameterValue * DDS_TypeCode::member_default_value (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex )
```

Returns the member default annotation for this **DDS\_TypeCode** (p. 1164).

**Precondition**

self kind is **DDS\_TK\_STRUCT** (p. 86), or **DDS\_TK\_UNION** (p. 86).

**MT Safety:**

SAFE

**Parameters**

<i>index</i>	index of the target member
<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

**Returns**

the member default annotation for this **DDS\_TypeCode** (p. 1164)

**9.214.2.46 member\_min\_value()**

```
const DDS_AnnotationParameterValue * DDS_TypeCode::member_min_value (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex )
```

Returns the member min annotation for this **DDS\_TypeCode** (p. 1164).

**Precondition**

self kind is **DDS\_TK\_STRUCT** (p. 86), or **DDS\_TK\_UNION** (p. 86).  
 member pointed to by index of a numerical kind.

**MT Safety:**

SAFE

**Parameters**

<i>index</i>	index of the target member
<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

**Returns**

the member min annotation for this **DDS\_TypeCode** (p. 1164)

**9.214.2.47 member\_max\_value()**

```
const DDS_AnnotationParameterValue * DDS_TypeCode::member_max_value (
    DDS_UnsignedLong index,
    DDS_ExceptionCode_t & ex )
```

Returns the member max annotation for this **DDS\_TypeCode** (p. 1164).

**Precondition**

self kind is **DDS\_TK\_STRUCT** (p. 86), or **DDS\_TK\_UNION** (p. 86).  
 member pointed to by index of a numerical kind.

**MT Safety:**

SAFE

## Parameters

<i>index</i>	index of the target member
<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BADKIND_USER_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BOUNDS_USER_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

the member max annotation for this **DDS\_TypeCode** (p. 1164)

## 9.214.2.48 print\_IDL()

```
void DDS_TypeCode::print_IDL (
    DDS_UnsignedLong indent,
    DDS_ExceptionCode_t & ex ) const
```

Prints a **DDS\_TypeCode** (p. 1164) in IDL notation.

## MT Safety:

SAFE.

## Parameters

<i>indent</i>	<< <b>in</b> >> (p. 238) Indent.
<i>ex</i>	<p>&lt;&lt;<b>out</b>&gt;&gt; (p. 238) Parameter for error indications. The values that can take are:</p> <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

**9.214.2.49 print()**

```
void DDS_TypeCode::print (
    const DDS_TypeCodePrintFormatProperty & format,
    DDS_ExceptionCode_t & ex ) const
```

Prints a **DDS\_TypeCode** (p. 1164).

**MT Safety:**

SAFE.

**Parameters**

<i>format</i>	<< <i>in</i> >> (p. 238) Format.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

**9.214.2.50 to\_string() [1/2]**

```
void DDS_TypeCode::to_string (
    char * str,
    DDS_UnsignedLong & str_size,
    DDS_ExceptionCode_t & ex ) const
```

Get a string representation of this **DDS\_TypeCode** (p. 1164) object using the default values for **DDS\_TypeCodePrintFormatProperty** (p. 1224).

This function obtains a string representation of a **DDS\_TypeCode** (p. 1164) object, it creates this string using the default values of **DDS\_TypeCodePrintFormatProperty** (p. 1224).

In order to calculate the required length of the string, the user can call this function with the parameter *str* set to NULL. In this mode, the required length of the string will be stored into the value pointed to by the parameter *str\_size*.

If the parameter *str* is not equal to NULL, the string representation of the **DDS\_TypeCode** (p. 1164) will be stored into the parameter *str*. In this mode, if the size of the string is insufficient to hold the result, the parameter *\*ex* will be set to **DDS\_BAD\_PARAM\_SYSTEM\_EXCEPTION\_CODE** (p. 334) and the parameter *str\_size* will be updated to hold the required size of the string. All string lengths include the trailing NUL byte.

## Parameters

<i>str</i>	<< <b>out</b> >> (p. 238) The char buffer that will be used to store the string representation of the <b>DDS_TypeCode</b> (p. 1164). If NULL then this function will store the required length of the buffer into the value pointed to by the <i>str_size</i> parameter.
<i>str_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The length of the char buffer. If the supplied buffer is NULL or insufficiently long, the value pointed to by this parameter will be updated to contain the required length.
<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter used for error indications.

## See also

**DDS\_TypeCode::print\_IDL** (p. 1207)

**DDS\_TypeCode::print** (p. 1207)

**DDS\_TypeCode::to\_string** (p. 1208)

## 9.214.2.51 to\_string() [2/2]

```
void DDS_TypeCode::to_string (
    char * str,
    DDS_UnsignedLong & str_size,
    const DDS_TypeCodePrintFormatProperty & format,
    DDS_StatusCode_t & ex ) const
```

Get a string representation of this **DDS\_TypeCode** (p. 1164) object using the format described by **DDS\_TypeCodePrintFormatProperty** (p. 1224).

This function behaves in the same way as **DDS\_TypeCode::to\_string** (p. 1208) but allows the user to specify the format of the string using **DDS\_TypeCodePrintFormatProperty** (p. 1224).

## Parameters

<i>str</i>	<< <b>out</b> >> (p. 238) The char buffer which will hold the string representation of the <b>DDS_TypeCode</b> (p. 1164).
<i>str_size</i>	<< <b>inout</b> >> (p. 238) Cannot be NULL. The length of the char buffer pointed to by the <i>str</i> parameter. If the <i>str</i> parameter is NULL, or too small, this parameter will be updated to hold the required length of the buffer.
<i>format</i>	<< <b>in</b> >> (p. 238) The <b>DDS_TypeCodePrintFormatProperty</b> (p. 1224) used to define the format of the string representation of the <b>DDS_TypeCode</b> (p. 1164).
<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter used for error indications.

## See also

**DDS\_TypeCode::print\_IDL** (p. 1207)

**DDS\_TypeCode::print** (p. 1207)

**DDS\_TypeCode::to\_string** (p. 1208)

## 9.215 DDS\_TypeCodeFactory Struct Reference

A singleton factory for creating, copying, and deleting data type definitions dynamically.

### Public Member Functions

- **DDS\_TypeCode \* clone\_tc** (const **DDS\_TypeCode** \*tc, **DDS\_ExceptionCode\_t** &ex)  
*Creates and returns a copy of the input **DDS\_TypeCode** (p. 1164).*
- void **delete\_tc** (**DDS\_TypeCode** \*tc, **DDS\_ExceptionCode\_t** &ex)  
*Deletes the input **DDS\_TypeCode** (p. 1164).*
- const **DDS\_TypeCode** \* **get\_primitive\_tc** (**DDS\_TCKind** tc\_kind)  
*Get the **DDS\_TypeCode** (p. 1164) for a primitive type (integers, floating point values, etc.) identified by the given **DDS\_↔\_TCKind** (p. 86).*
- **DDS\_TypeCode** \* **create\_struct\_tc** (const char \*name, const **DDS\_StructMemberSeq** &members, **DDS\_↔\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_STRUCT** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_struct\_tc** (const char \*name, **DDS\_ExtensibilityKind** extensibility\_kind, const **DDS\_StructMemberSeq** &members, **DDS\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_STRUCT** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_value\_tc** (const char \*name, **DDS\_ValueModifier** type\_modifier, const **DDS\_↔\_TypeCode** \*concrete\_base, const **DDS\_ValueMemberSeq** &members, **DDS\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_VALUE** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_value\_tc** (const char \*name, **DDS\_ExtensibilityKind** extensibility\_kind, **DDS\_↔\_ValueModifier** type\_modifier, const **DDS\_TypeCode** \*concrete\_base, const **DDS\_ValueMemberSeq** &members, **DDS\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_VALUE** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_union\_tc** (const char \*name, const **DDS\_TypeCode** \*discriminator\_type, **DDS\_↔\_Long** default\_index, const **DDS\_UnionMemberSeq** &members, **DDS\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_UNION** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_union\_tc** (const char \*name, **DDS\_ExtensibilityKind** extensibility\_kind, const **DDS\_TypeCode** \*discriminator\_type, **DDS\_Long** default\_index, const **DDS\_UnionMemberSeq** &members, **DDS\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_UNION** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_enum\_tc** (const char \*name, const **DDS\_EnumMemberSeq** &members, **DDS\_↔\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_ENUM** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_enum\_tc** (const char \*name, **DDS\_ExtensibilityKind** extensibility\_kind, const **DDS\_EnumMemberSeq** &members, **DDS\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_ENUM** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_alias\_tc** (const char \*name, const **DDS\_TypeCode** \*original\_type, **DDS\_Boolean** is\_pointer, **DDS\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_ALIAS** (p. 86) (typedef) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_string\_tc** (**DDS\_UnsignedLong** bound, **DDS\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_STRING** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_wstring\_tc** (**DDS\_UnsignedLong** bound, **DDS\_ExceptionCode\_t** &ex)  
*Constructs a **DDS\_TK\_WSTRING** (p. 86) **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCode** \* **create\_sequence\_tc** (**DDS\_UnsignedLong** bound, const **DDS\_TypeCode** \*element\_type, **DDS\_ExceptionCode\_t** &ex)



Constructs a *DDS\_TK\_SEQUENCE* (p. 86) *DDS\_TypeCode* (p. 1164).

- **DDS\_TypeCode \* create\_array\_tc** (const **DDS\_UnsignedLongSeq** &dimensions, const **DDS\_TypeCode** \*element\_type, **DDS\_ExceptionCode\_t** &ex)

Constructs a *DDS\_TK\_ARRAY* (p. 86) *DDS\_TypeCode* (p. 1164).

- **DDS\_TypeCode \* create\_array\_tc** ( **DDS\_UnsignedLong** length, const **DDS\_TypeCode** \*element\_type, **DDS\_ExceptionCode\_t** &ex)

Constructs a *DDS\_TK\_ARRAY* (p. 86) *DDS\_TypeCode* (p. 1164) for a single-dimensional array.

## Static Public Member Functions

- static **DDS\_TypeCodeFactory \* get\_instance** ()

*Gets the singleton instance of this class.*

### 9.215.1 Detailed Description

A singleton factory for creating, copying, and deleting data type definitions dynamically.

You can access the singleton with the **DDS\_TypeCodeFactory::get\_instance** (p. 1212) method.

If you want to publish and subscribe to data of types that are not known to you at system design time, this class will be your starting point. After creating a data type definition with this class, you will modify that definition using the **DDS\_TypeCode** (p. 1164) class and then register it with the **Dynamic Data** (p. 99) API.

The methods of this class fall into several categories:

#### Getting definitions for primitive types:

Type definitions for primitive types (e.g. integers, floating point values, etc.) are pre-defined; your application only needs to *get* them, not *create* them.

- **DDS\_TypeCodeFactory::get\_primitive\_tc** (p. 1213)

#### Creating definitions for strings, arrays, and sequences:

Type definitions for strings, arrays, and sequences (i.e. variables-size lists) must be created as you need them, because the type definition includes the maximum length of those containers.

- **DDS\_TypeCodeFactory::create\_string\_tc** (p. 1221)
- **DDS\_TypeCodeFactory::create\_wstring\_tc** (p. 1222)
- **DDS\_TypeCodeFactory::create\_array\_tc** (p. 1223)
- **DDS\_TypeCodeFactory::create\_array\_tc** (p. 1223)
- **DDS\_TypeCodeFactory::create\_sequence\_tc** (p. 1222)

#### Creating definitions for structured types:

Structured types include structures, value types, and unions.

- **DDS\_TypeCodeFactory::create\_struct\_tc** (p. 1214)

- `DDS_TypeCodeFactory::create_value_tc` (p. 1215)
- `DDS_TypeCodeFactory::create_union_tc` (p. 1217)

#### Creating definitions for other types:

The type system also supports enumerations and aliases (i.e. `typedefs` in C and C++).

- `DDS_TypeCodeFactory::create_enum_tc` (p. 1218)
- `DDS_TypeCodeFactory::create_alias_tc` (p. 1221)

#### Deleting type definitions:

When you're finished using a type definition, you should delete it. (*Note* that you only need to delete a `DDS_TypeCode` (p. 1164) that you *created*; if you got the object from `DDS_TypeCodeFactory::get_primitive_tc` (p. 1213), you must *not* delete it.)

- `DDS_TypeCodeFactory::delete_tc` (p. 1213)

#### Copying type definitions:

You can also create deep copies of type definitions:

- `DDS_TypeCodeFactory::clone_tc` (p. 1212)

## 9.215.2 Member Function Documentation

### 9.215.2.1 `get_instance()`

```
static DDS_TypeCodeFactory * DDS_TypeCodeFactory::get_instance ( ) [static]
```

Gets the singleton instance of this class.

#### Returns

The `DDS_TypeCodeFactory` (p. 1210) instance if no errors. Otherwise, `NULL`.

#### MT Safety:

UNSAFE. In VxWorks, it is unsafe to call this method while another thread may be simultaneously calling `DDSDomainParticipantFactory::get_instance` (p. 1429), `DDSDomainParticipantFactory::finalize_instance` (p. 1429), `DDS_TypeCodeFactory::get_instance` (p. 1212), `NDDUtilityNetworkCapture::enable` (p. 1847), or `NDDUtilityNetworkCapture::disable` (p. 1848).

### 9.215.2.2 `clone_tc()`

```
DDS_TypeCode * DDS_TypeCodeFactory::clone_tc (
    const DDS_TypeCode * tc,
    DDS_ExceptionCode_t & ex )
```

Creates and returns a copy of the input `DDS_TypeCode` (p. 1164).

## Parameters

<i>tc</i>	<< <i>in</i> >> (p. 238) Type code that will be copied. Cannot be NULL.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A clone of *tc*.

## 9.215.2.3 delete\_tc()

```
void DDS_TypeCodeFactory::delete_tc (
    DDS_TypeCode * tc,
    DDS_ExceptionCode_t & ex )
```

Deletes the input **DDS\_TypeCode** (p. 1164).

All the type codes created through the **DDS\_TypeCodeFactory** (p. 1210) must be deleted using this method.

## Parameters

<i>tc</i>	<< <i>inout</i> >> (p. 238) Type code that will be deleted. Cannot be NULL.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## 9.215.2.4 get\_primitive\_tc()

```
const DDS_TypeCode * DDS_TypeCodeFactory::get_primitive_tc (
    DDS_TCKind tc_kind )
```

Get the **DDS\_TypeCode** (p. 1164) for a primitive type (integers, floating point values, etc.) identified by the given **DDS\_←\_TCKind** (p. 86).

This method is equivalent to, and replaces, the `DDS_g_tc_*` constants.

See also

**DDS\_g\_tc\_long** (p. 88)  
**DDS\_g\_tc\_ulong** (p. 88)  
**DDS\_g\_tc\_short** (p. 87)  
**DDS\_g\_tc\_ushort** (p. 88)  
**DDS\_g\_tc\_float** (p. 89)  
**DDS\_g\_tc\_double** (p. 89)  
**DDS\_g\_tc\_longdouble** (p. 91)  
**DDS\_g\_tc\_octet** (p. 90)  
**DDS\_g\_tc\_boolean** (p. 89)  
**DDS\_g\_tc\_char** (p. 90)  
**DDS\_g\_tc\_wchar** (p. 91)

### 9.215.2.5 create\_struct\_tc() [1/2]

```

DDS_TypeCode * DDS_TypeCodeFactory::create_struct_tc (
    const char * name,
    const DDS_StructMemberSeq & members,
    DDS_ExceptionCode_t & ex )
  
```

Constructs a **DDS\_TK\_STRUCTURE** (p. 86) **DDS\_TypeCode** (p. 1164).

Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the struct type. Cannot be NULL.
<i>members</i>	<< <i>in</i> >> (p. 238) Initial members of the structure. This list may be empty (that is, <b>FooSeq::length()</b> (p. 1705) may return zero). If the list is not empty, the elements must describe valid struct members. (For example, the names must be unique within the type.)
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a struct.

## 9.215.2.6 create\_struct\_tc() [2/2]

```
DDS_TypeCode * DDS_TypeCodeFactory::create_struct_tc (
    const char * name,
    DDS_ExtensibilityKind extensibility_kind,
    const DDS_StructMemberSeq & members,
    DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_STRUCTURE** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the struct type. Cannot be NULL.
<i>extensibility_kind</i>	<< <i>in</i> >> (p. 238) Type extensibility.
<i>members</i>	<< <i>in</i> >> (p. 238) Initial members of the structure. This list may be empty (that is, <b>FooSeq::length()</b> (p. 1705) may return zero). If the list is not empty, the elements must describe valid struct members. (For example, the names must be unique within the type.)
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a struct.

## 9.215.2.7 create\_value\_tc() [1/2]

```
DDS_TypeCode * DDS_TypeCodeFactory::create_value_tc (
    const char * name,
    DDS_ValueModifier type_modifier,
    const DDS_TypeCode * concrete_base,
    const DDS_ValueMemberSeq & members,
    DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_VALUE** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the value type. Cannot be NULL.
<i>type_modifier</i>	<< <i>in</i> >> (p. 238) One of the value type modifier constants: <b>DDS_VM_NONE</b> (p. 81), <b>DDS_VM_CUSTOM</b> (p. 81), <b>DDS_VM_ABSTRACT</b> (p. 82) or <b>DDS_VM_TRUNCATABLE</b> (p. 82).
<i>concrete_base</i>	<< <i>in</i> >> (p. 238) <b>DDS_TypeCode</b> (p. 1164) object describing the concrete valuetype base. It may be NULL if the valuetype does not have a concrete base.
<i>members</i>	<< <i>in</i> >> (p. 238) Initial members of the value type. This list may be empty. If the list is not empty, the elements must describe valid value type members. (For example, the names must be unique within the type.)
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a value.

## 9.215.2.8 create\_value\_tc() [2/2]

```
DDS_TypeCode * DDS_TypeCodeFactory::create_value_tc (
    const char * name,
    DDS_ExtensibilityKind extensibility_kind,
    DDS_ValueModifier type_modifier,
    const DDS_TypeCode * concrete_base,
    const DDS_ValueMemberSeq & members,
    DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_VALUE** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the value type. Cannot be NULL.
<i>extensibility_kind</i>	<< <i>in</i> >> (p. 238) Type extensibility.
<i>type_modifier</i>	<< <i>in</i> >> (p. 238) One of the value type modifier constants: <b>DDS_VM_NONE</b> (p. 81), <b>DDS_VM_CUSTOM</b> (p. 81), <b>DDS_VM_ABSTRACT</b> (p. 82) or <b>DDS_VM_TRUNCATABLE</b> (p. 82).
<i>concrete_base</i>	<< <i>in</i> >> (p. 238) <b>DDS_TypeCode</b> (p. 1164) object describing the concrete valuetype base. It may be NULL if the valuetype does not have a concrete base.

## Parameters

<i>members</i>	<< <i>in</i> >> (p. 238) Initial members of the value type. This list may be empty. If the list is not empty, the elements must describe valid value type members. (For example, the names must be unique within the type.)
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a value.

## 9.215.2.9 create\_union\_tc() [1/2]

```
DDS_TypeCode * DDS_TypeCodeFactory::create_union_tc (
    const char * name,
    const DDS_TypeCode * discriminator_type,
    DDS_Long default_index,
    const DDS_UnionMemberSeq & members,
    DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_UNION** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the union type. Cannot be NULL.
<i>discriminator_type</i>	<< <i>in</i> >> (p. 238) Discriminator Type Code. Cannot be NULL.
<i>default_index</i>	<< <i>in</i> >> (p. 238) Index of the default member, or -1 if there is no default member.
<i>members</i>	<< <i>in</i> >> (p. 238) Initial members of the union. This list may be empty. If the list is not empty, the elements must describe valid struct members. (For example, the names must be unique within the type.)
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a union.

## 9.215.2.10 create\_union\_tc() [2/2]

```
DDS_TypeCode * DDS_TypeCodeFactory::create_union_tc (
    const char * name,
    DDS_ExtensibilityKind extensibility_kind,
    const DDS_TypeCode * discriminator_type,
    DDS_Long default_index,
    const DDS_UnionMemberSeq & members,
    DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_UNION** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the union type. Cannot be NULL.
<i>extensibility_kind</i>	<< <i>in</i> >> (p. 238) Type extensibility.
<i>discriminator_type</i>	<< <i>in</i> >> (p. 238) Discriminator Type Code. Cannot be NULL.
<i>default_index</i>	<< <i>in</i> >> (p. 238) Index of the default member, or -1 if there is no default member.
<i>members</i>	<< <i>in</i> >> (p. 238) Initial members of the union. This list may be empty. If the list is not empty, the elements must describe valid struct members. (For example, the names must be unique within the type.)
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a union.

## 9.215.2.11 create\_enum\_tc() [1/2]

```
DDS_TypeCode * DDS_TypeCodeFactory::create_enum_tc (
    const char * name,
```



```
const DDS_EnumMemberSeq & members,  
      DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_ENUM** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the enum type. Cannot be NULL.
<i>members</i>	<< <i>in</i> >> (p. 238) Initial members of the enumeration. All members must have non-NULL names, and both names and ordinal values must be unique within the type. Note that it is also possible to add members later with <b>DDS_TypeCode::add_member_to_enum</b> (p. 1197).
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing an enumeration.

## 9.215.2.12 create\_enum\_tc() [2/2]

```
DDS_TypeCode * DDS_TypeCodeFactory::create_enum_tc (
    const char * name,
    DDS_ExtensibilityKind extensibility_kind,
    const DDS_EnumMemberSeq & members,
    DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_ENUM** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the enum type. Cannot be NULL.
<i>extensibility_kind</i>	<< <i>in</i> >> (p. 238) Type extensibility.
<i>members</i>	<< <i>in</i> >> (p. 238) Initial members of the enumeration. All members must have non-NULL names, and both names and ordinal values must be unique within the type. Note that it is also possible to add members later with <b>DDS_TypeCode::add_member_to_enum</b> (p. 1197).
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing an enumeration.

## 9.215.2.13 create\_alias\_tc()

```
DDS_TypeCode * DDS_TypeCodeFactory::create_alias_tc (
    const char * name,
    const DDS_TypeCode * original_type,
    DDS_Boolean is_pointer,
    DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_ALIAS** (p. 86) (typedef **DDS\_TypeCode** (p. 1164)).

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the alias. Cannot be NULL.
<i>original_type</i>	<< <i>in</i> >> (p. 238) Aliased type code. Cannot be NULL.
<i>is_pointer</i>	<< <i>in</i> >> (p. 238) Indicates if the alias is a pointer to the aliased type code.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing an alias.

## 9.215.2.14 create\_string\_tc()

```
DDS_TypeCode * DDS_TypeCodeFactory::create_string_tc (
    DDS_UnsignedLong bound,
    DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_STRING** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>bound</i>	<< <b>in</b> >> (p. 238) Maximum length of the string.
<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a string.

## 9.215.2.15 create\_wstring\_tc()

```
DDS_TypeCode * DDS_TypeCodeFactory::create_wstring_tc (
    DDS_UnsignedLong bound,
    DDS_StatusCode_t & ex )
```

Constructs a **DDS\_TK\_WSTRING** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>bound</i>	<< <b>in</b> >> (p. 238) Maximum length of the wide string.
<i>ex</i>	<< <b>out</b> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a wide string.

## 9.215.2.16 create\_sequence\_tc()

```
DDS_TypeCode * DDS_TypeCodeFactory::create_sequence_tc (
    DDS_UnsignedLong bound,
    const DDS_TypeCode * element_type,
    DDS_StatusCode_t & ex )
```

Constructs a **DDS\_TK\_SEQUENCE** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>bound</i>	<< <i>in</i> >> (p. 238) The bound for the sequence (> 0).
<i>element_type</i>	<< <i>in</i> >> (p. 238) <b>DDS_TypeCode</b> (p. 1164) object describing the sequence elements.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a sequence.

## 9.215.2.17 create\_array\_tc() [1/2]

```
DDS_TypeCode * DDS_TypeCodeFactory::create_array_tc (
    const DDS_UnsignedLongSeq & dimensions,
    const DDS_TypeCode * element_type,
    DDS_StatusCode_t & ex )
```

Constructs a **DDS\_TK\_ARRAY** (p. 86) **DDS\_TypeCode** (p. 1164).

## Parameters

<i>dimensions</i>	<< <i>in</i> >> (p. 238) Dimensions of the array. Each dimension has to be greater than 0.
<i>element_type</i>	<< <i>in</i> >> (p. 238) <b>DDS_TypeCode</b> (p. 1164) describing the array elements. Cannot be NULL.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>
Generated by Doxygen	• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a sequence.

### 9.215.2.18 create\_array\_tc() [2/2]

```
DDS_TypeCode * DDS_TypeCodeFactory::create_array_tc (
    DDS_UnsignedLong length,
    const DDS_TypeCode * element_type,
    DDS_ExceptionCode_t & ex )
```

Constructs a **DDS\_TK\_ARRAY** (p. 86) **DDS\_TypeCode** (p. 1164) for a single-dimensional array.

## Parameters

<i>length</i>	<< <i>in</i> >> (p. 238) Length of the single-dimensional array.
<i>element_type</i>	<< <i>in</i> >> (p. 238) <b>DDS_TypeCode</b> (p. 1164) describing the array elements. Cannot be NULL.
<i>ex</i>	<< <i>out</i> >> (p. 238) Parameter for error indications. The values that can take are: <ul style="list-style-type: none"> <li>• <b>DDS_NO_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_PARAM_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_NO_MEMORY_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> <li>• <b>DDS_BAD_TYPECODE_SYSTEM_EXCEPTION_CODE</b> (p. 334)</li> </ul>

## Returns

A newly-created **DDS\_TypeCode** (p. 1164) object describing a sequence.

## 9.216 DDS\_TypeCodePrintFormatProperty Struct Reference

A collection of attributes used to configure how a TypeCode appears when converted to a string.

### Public Attributes

- **DDS\_Long indent**  
*Configures how much indent should be added to the string representation of a **DDS\_TypeCode** (p. 1164).*
- **DDS\_Boolean print\_ordinals**  
*Configures whether or not to print the ordinal value of each enumerator within a **DDS\_TypeCode** (p. 1164).*
- **DDS\_TypeCodePrintFormatKind print\_kind**  
*Configures whether the type should be printed in XML or IDL format.*
- **DDS\_Boolean print\_complete\_type**  
*Configures whether or not to print the complete type.*

## 9.216.1 Detailed Description

A collection of attributes used to configure how a TypeCode appears when converted to a string.

To ensure that new objects are initialized to a known value, assign them with the static initializer `DDS_TypeCode_↔PrintFormat_INITIALIZER` (p. 84).

## 9.216.2 Member Data Documentation

### 9.216.2.1 indent

```
DDS_Long DDS_TypeCodePrintFormatProperty::indent
```

Configures how much indent should be added to the string representation of a `DDS_TypeCode` (p. 1164).

Configures how much additional indent is applied when converting a TypeCode to a string. This value acts as a total offset on the string, increasing the indent applied to all elements by the same amount. With an indent of 0, a string representation of a TypeCode may appear as:

```
struct myType {  
    long x;  
};
```

Using an indent of 1, the same TypeCode would be printed as:

```
    struct myType {  
        long x;  
    };
```

I.e., the entire structure is indented.

### 9.216.2.2 print\_ordinals

**DDS\_Boolean** DDS\_TypeCodePrintFormatProperty::print\_ordinals

Configures whether or not to print the ordinal value of each enumerator within a **DDS\_TypeCode** (p. 1164).

When set to true, the ordinal value of each enumerator within an enum will be printed, otherwise only non-default ordinals are printed. Take for example the following enum:

```
enum myEnum {  
    RED,  
    GREEN = 3,  
    BLUE,  
};
```

When print\_ordinals is set to false it would be printed as:

```
enum myEnum {  
    RED,  
    GREEN = 3,  
    BLUE,  
};
```

But with print\_ordinals set to true it would be printed as:

```
enum myEnum {  
    RED = 0,  
    GREEN = 3,  
    BLUE = 4,  
};
```

### 9.216.2.3 print\_kind

**DDS\_TypeCodePrintFormatKind** DDS\_TypeCodePrintFormatProperty::print\_kind

Configures whether the type should be printed in XML or IDL format.

When print\_kind is DDS\_TYPE\_CODE\_PRINT\_KIND\_IDL, the type will be printed in IDL format. For example:



```
struct Foo {  
    float32 bar;  
};
```

When `print_kind` is `DDS_TYPE_CODE_PRINT_KIND_XML`, the type will be printed in XML format. For example:

```
<struct name="Foo">  
    <member name="bar" type="float32"/>  
</struct>
```

#### 9.216.2.4 print\_complete\_type

**DDS\_Boolean** `DDS_TypeCodePrintFormatProperty::print_complete_type`

Configures whether or not to print the complete type.

When `print_complete_type` is true, the complete type will be printed. When `print_complete_type` is false, only the top level will be printed.

Take for example the following types:

```
struct Foo {  
    float32 member;  
};  
  
struct Bar {  
    Foo foo;  
};
```

When `print_complete_type` is false, this is printed as:

```
struct Bar {  
    Foo foo;  
};
```

When `print_complete_type` is true, this is printed as:

```
struct Foo {  
    float32 member;  
};  
  
struct Bar {  
    Foo foo;  
};
```

## 9.217 DDS\_TypeConsistencyEnforcementQosPolicy Struct Reference

Defines the rules for determining whether the type used to publish a given topic is consistent with that used to subscribe to it.

### Public Attributes

- **DDS\_TypeConsistencyKind kind**  
*Type consistency kind.*
- **DDS\_Boolean ignore\_sequence\_bounds**  
*Controls whether sequence bounds are taken into consideration for type assignability.*
- **DDS\_Boolean ignore\_string\_bounds**  
*Controls whether string bounds are taken into consideration for type assignability.*
- **DDS\_Boolean ignore\_member\_names**  
*Controls whether member names are taken into consideration for type assignability.*
- **DDS\_Boolean prevent\_type\_widening**  
*Controls whether type widening is allowed.*
- **DDS\_Boolean force\_type\_validation**  
*Controls whether type information must be available in order to complete matching between a **DDSDataWriter** (p. 1321) and a **DDSDataReader** (p. 1288).*
- **DDS\_Boolean ignore\_enum\_literal\_names**  
*Controls whether enumeration constant names are taken into consideration for type assignability.*

### 9.217.1 Detailed Description

Defines the rules for determining whether the type used to publish a given topic is consistent with that used to subscribe to it.

This policy defines a type consistency kind, which allows applications to select from among a set of predetermined behaviors. The following consistency kinds are specified: **DDS\_DISALLOW\_TYPE\_COERCION** (p. 453), **DDS\_ALLOW\_TYPE\_COERCION** (p. 453) and **DDS\_AUTO\_TYPE\_COERCION** (p. 453).

The type-consistency-enforcement rules consist of two steps:

**Step 1.** If both the DataWriter and DataReader specify a TypeObject, it is considered first. If the DataReader allows type coercion, then its type must be assignable from the DataWriter's type, taking into account the values of prevent\_type\_widening, ignore\_sequence\_bounds, ignore\_string\_bounds, ignore\_member\_names, and ignore\_enum\_literal\_names. If the DataReader does not allow type coercion, then its type must be equivalent to the type of the DataWriter.

**Step 2.** If either the DataWriter or the DataReader does not provide a TypeObject definition, then the registered type names are examined. The DataReader's and DataWriter's registered type names must match exactly, as was true in RTI Connext releases prior to 5.0.0.

If either Step 1 or Step 2 fails, the Topics associated with the DataReader and DataWriter are considered to be inconsistent and the **DDS\_InconsistentTopicStatus** (p. 921) is updated.

The default enforcement kind is **DDS\_AUTO\_TYPE\_COERCION** (p.453). This default kind translates to **DDS\_ALLOW\_TYPE\_COERCION** (p. 453) except in the following cases:

- When a **Zero Copy** (p. 70) DataReader is used, the kind is translated to **DDS\_DISALLOW\_TYPE\_COERCION** (p. 453).
- When the middleware is introspecting the built-in topic data declaration of a remote DataReader in order to determine whether it can match with a local DataWriter, if it observes that no TypeConsistencyEnforcement↔QosPolicy value is provided (as would be the case when communicating with a Service implementation not in conformance with this specification), it assumes a kind of **DDS\_DISALLOW\_TYPE\_COERCION** (p. 453).

For additional information on type consistency enforcement refer to the `Extensible Types Guide` and the `OMG Extensible and Dynamic Topic Types for DDS Specification`.

#### Entity:

**DDSDataReader** (p. 1288)

#### Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

## 9.217.2 Member Data Documentation

### 9.217.2.1 kind

**DDS\_TypeConsistencyKind** DDS\_TypeConsistencyEnforcementQosPolicy::kind

Type consistency kind.

**[default] DDS\_AUTO\_TYPE\_COERCION** (p. 453)

### 9.217.2.2 ignore\_sequence\_bounds

**DDS\_Boolean** DDS\_TypeConsistencyEnforcementQosPolicy::ignore\_sequence\_bounds

Controls whether sequence bounds are taken into consideration for type assignability.

If the option is set to **DDS\_BOOLEAN\_TRUE** (p. 317), then sequence bounds (maximum lengths) are not considered as part of the type assignability. This means that a T2 sequence type with maximum length L2 would be assignable to a T1 sequence type with maximum length L1, even if L2 is greater than L1. If the option is set to **DDS\_BOOLEAN\_FALSE** (p. 317), then sequence bounds are taken into consideration for type assignability, and in order for T1 to be assignable from T2, it is required that  $L1 \geq L2$ .

**[default] DDS\_BOOLEAN\_TRUE** (p. 317)

### 9.217.2.3 ignore\_string\_bounds

`DDS_Boolean DDS_TypeConsistencyEnforcementQosPolicy::ignore_string_bounds`

Controls whether string bounds are taken into consideration for type assignability.

If the option is set to **DDS\_BOOLEAN\_TRUE** (p. 317), then string bounds (maximum lengths) are not considered as part of the type assignability. This means that a T2 string type with maximum length L2 would be assignable to a T1 string type with maximum length L1, even if L2 is greater than L1. If the option is set to **DDS\_BOOLEAN\_FALSE** (p. 317), then string bounds are taken into consideration for type assignability, and in order for T1 to be assignable from T2, it is required that  $L1 \geq L2$ .

[default] **DDS\_BOOLEAN\_TRUE** (p. 317)

### 9.217.2.4 ignore\_member\_names

`DDS_Boolean DDS_TypeConsistencyEnforcementQosPolicy::ignore_member_names`

Controls whether member names are taken into consideration for type assignability.

If the option is set to **DDS\_BOOLEAN\_TRUE** (p. 317), then member names are not considered as part of the type assignability. If the option is set to **DDS\_BOOLEAN\_FALSE** (p. 317), then member names are taken into consideration for type assignability, and in order for members with the same ID to be assignable, the members must also have the same name.

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.217.2.5 prevent\_type\_widening

`DDS_Boolean DDS_TypeConsistencyEnforcementQosPolicy::prevent_type_widening`

Controls whether type widening is allowed.

If the option is set to **DDS\_BOOLEAN\_FALSE** (p. 317), then type widening is permitted. If the option is set to **DDS\_BOOLEAN\_TRUE** (p. 317), then a wider type may not be assignable from a narrower type.

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.217.2.6 force\_type\_validation

`DDS_Boolean DDS_TypeConsistencyEnforcementQosPolicy::force_type_validation`

Controls whether type information must be available in order to complete matching between a **DDSDataWriter** (p. 1321) and a **DDSDataReader** (p. 1288).

If the option is set to **DDS\_BOOLEAN\_TRUE** (p. 317), then type information must be available in order to complete matching between a **DDSDataWriter** (p. 1321) and a **DDSDataReader** (p. 1288). If the option is set to **DDS\_BOOLEAN\_FALSE** (p. 317), then matching can occur without complete type information as long as the type names match exactly. Note that if the types have the same name but are not assignable, DataReaders may fail to deserialize incoming data samples.

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.217.2.7 ignore\_enum\_literal\_names

`DDS_Boolean` DDS\_TypeConsistencyEnforcementQosPolicy::ignore\_enum\_literal\_names

Controls whether enumeration constant names are taken into consideration for type assignability.

If the option is set to `DDS_BOOLEAN_TRUE` (p.317), then enumeration constants may change their names, but not their values, and still maintain assignability. If the option is set to `DDS_BOOLEAN_FALSE` (p.317), then in order for enumerations to be assignable, any constant that has the same value in both enumerations must also have the same name.

[default] `DDS_BOOLEAN_FALSE` (p.317)

## 9.218 DDS\_TypeDeallocationParams\_t Struct Reference

Configures whether to release or not pointer and optional members.

### Public Member Functions

- struct `DDS_TypeDeallocationParams_t` & `set_delete_pointers` (`DDS_Boolean` do\_delete)
- struct `DDS_TypeDeallocationParams_t` & `set_delete_optional_members` (`DDS_Boolean` do\_delete)

### Public Attributes

- `DDS_Boolean` `delete_pointers`  
*Whether to delete pointer members or not.*
- `DDS_Boolean` `delete_optional_members`  
*Whether to delete optional members or not.*

### 9.218.1 Detailed Description

Configures whether to release or not pointer and optional members.

By default both pointers optional members are released when they are not null.

This structure is also defined in `xcdr.1.0/srcC/typeObject/TypeObjectInfrastructure.h`. If changes are made, please ensure they are made in both locations.

#### Examples

`HelloWorld.cxx`, and `HelloWorldPlugin.cxx`.

### 9.218.2 Member Function Documentation

### 9.218.2.1 set\_delete\_pointers()

```
struct DDS_TypeDeallocationParams_t & DDS_TypeDeallocationParams_t::set_delete_pointers (
    DDS_Boolean do_delete ) [inline]
```

Whether to delete pointer members or not

### 9.218.2.2 set\_delete\_optional\_members()

```
struct DDS_TypeDeallocationParams_t & DDS_TypeDeallocationParams_t::set_delete_optional_members (
    DDS_Boolean do_delete ) [inline]
```

Whether to delete optional members or not

## 9.218.3 Member Data Documentation

### 9.218.3.1 delete\_pointers

```
DDS_Boolean DDS_TypeDeallocationParams_t::delete_pointers
```

Whether to delete pointer members or not.

#### Examples

**HelloWorld.cxx**, and **HelloWorldPlugin.cxx**.

### 9.218.3.2 delete\_optional\_members

```
DDS_Boolean DDS_TypeDeallocationParams_t::delete_optional_members
```

Whether to delete optional members or not.

#### Examples

**HelloWorld.cxx**, and **HelloWorldPlugin.cxx**.

## 9.219 DDS\_TypeSupportQosPolicy Struct Reference

Allows you to attach application-specific values to a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288), which are passed to the serialization or deserialization routine of the associated data type and choose whether to set padding bytes to zero during serialization.

## Public Attributes

- void \* **plugin\_data**  
*Value to pass into the type plugin's de-/serialization function.*
- **DDS\_CdrPaddingKind cdr\_padding\_kind**  
*Determines whether or not the padding bytes will be set to zero during CDR serialization.*

### 9.219.1 Detailed Description

Allows you to attach application-specific values to a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288), which are passed to the serialization or deserialization routine of the associated data type and choose whether to set padding bytes to zero during serialization.

The purpose of this QoS is to allow a user application to pass data to a type plugin's support functions and choose whether or not to set the padding bytes to zero when serializing a sample using CDR encapsulation.

Entity:

**DDSDomainParticipant** (p. 1351), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = NO

**Changeable** (p. 360) = **UNTIL ENABLE** (p. 360)

### 9.219.2 Usage

The **DDS\_TypeSupportQosPolicy::plugin\_data** (p. 1234) allows you to associate a pointer to an object with a **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288). This object pointer is passed to the serialization routine of the data type associated with the **DDSDataWriter** (p. 1321) or the deserialization routine of the data type associated with the **DDSDataReader** (p. 1288).

You can modify the rttidsgen-generated code so that the de/serialization routines act differently depending on the information passed in via the object pointer. (The generated serialization and deserialization code does not use the pointer.)

This functionality can be used to change how data sent by a **DDSDataWriter** (p. 1321) or received by a **DDSDataReader** (p. 1288) is serialized or deserialized on a per DataWriter and DataReader basis.

It can also be used to dynamically change how serialization (or for a less common case, deserialization) occurs. For example, a data type could represent a table, including the names of the rows and columns. However, since the row/column names of an instance of the table (a Topic) don't change, they only need to be sent once. The information passed in through the TypeSupport QoS policy could be used to signal the serialization routine to send the row/column names the first time a **DDSDataWriter** (p. 1321) calls **FooDataWriter::write** (p. 1683), and then never again.

The **DDS\_TypeSupportQosPolicy::cdr\_padding\_kind** (p. 1234) allows you to choose whether or not the padding bytes are set to zero during CDR serialization.

## 9.219.3 Member Data Documentation

### 9.219.3.1 plugin\_data

void\* DDS\_TypeSupportQosPolicy::plugin\_data

Value to pass into the type plugin's de-/serialization function.

**[default]** NULL

### 9.219.3.2 cdr\_padding\_kind

DDS\_CdrPaddingKind DDS\_TypeSupportQosPolicy::cdr\_padding\_kind

Determines whether or not the padding bytes will be set to zero during CDR serialization.

In a DomainParticipant, this value configures how the padding bytes are set when serializing data for the Built-In Topic DataWriters and DataReaders. A value of **DDS\_AUTO\_CDR\_PADDING** (p. 454) defaults to **DDS\_NOT\_SET\_CDR\_↔PADDING** (p. 454).

For DataWriters and DataReaders, this value configures how padding bytes are set when serializing data for that entity. A value of **DDS\_AUTO\_CDR\_PADDING** (p. 454) means that the entity will inherit whatever value is set on the Domain↔Participant.

**[default]** **DDS\_AUTO\_CDR\_PADDING** (p. 454)

## 9.220 DDS\_UInt8Seq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_UInt8** (p. 318) >

### 9.220.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_UInt8** (p. 318) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_UInt8** (p. 318)

**FooSeq** (p. 1697)



## 9.221 DDS\_UnionMember Struct Reference

A description of a member of a union.

### Public Attributes

- char \* **name**  
*The name of the union member.*
- **DDS\_Boolean is\_pointer**  
*Indicates whether the union member is a pointer or not.*
- struct **DDS\_LongSeq labels**  
*The labels of the union member.*
- const **DDS\_TypeCode \* type**  
*The type of the union member.*

### 9.221.1 Detailed Description

A description of a member of a union.

See also

**DDS\_UnionMemberSeq** (p. 1236)

**DDS\_TypeCodeFactory::create\_union\_tc** (p. 1217)

### 9.221.2 Member Data Documentation

#### 9.221.2.1 name

```
char* DDS_UnionMember::name
```

The name of the union member.

Cannot be NULL.

#### 9.221.2.2 is\_pointer

```
DDS_Boolean DDS_UnionMember::is_pointer
```

Indicates whether the union member is a pointer or not.

### 9.221.2.3 labels

```
struct DDS_LongSeq DDS_UnionMember::labels
```

The labels of the union member.

Each union member should contain at least one label. If the union discriminator type is not **DDS\_Long** (p. 318) the label value should be evaluated to an integer value. For instance, 'a' would be evaluated to 97.

### 9.221.2.4 type

```
const DDS_TypeCode* DDS_UnionMember::type
```

The type of the union member.

Cannot be NULL.

## 9.222 DDS\_UnionMemberSeq Struct Reference

Defines a sequence of union members.

### 9.222.1 Detailed Description

Defines a sequence of union members.

See also

**DDS\_UnionMember** (p. 1235)

**FooSeq** (p. 1697)

**DDS\_TypeCodeFactory::create\_union\_tc** (p. 1217)

## 9.223 DDS\_UnsignedLongLongSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_UnsignedLongLong** (p. 319) >

### 9.223.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_UnsignedLongLong** (p. 319) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_UnsignedLongLong** (p. 319)

**FooSeq** (p. 1697)

## 9.224 DDS\_UnsignedLongSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_UnsignedLong** (p. 318) >

### 9.224.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_UnsignedLong** (p. 318) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_UnsignedLong** (p. 318)

**FooSeq** (p. 1697)

## 9.225 DDS\_UnsignedShortSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_UnsignedShort** (p. 318) >

### 9.225.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_UnsignedShort** (p. 318) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_UnsignedShort** (p. 318)

**FooSeq** (p. 1697)

## 9.226 DDS\_UserDataQosPolicy Struct Reference

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

## Public Attributes

- struct **DDS\_OctetSeq** value  
*a sequence of octets*

### 9.226.1 Detailed Description

Attaches a buffer of opaque data that is distributed by means of **Built-in Topics** (p. 59) during discovery.

Entity:

**DDSDomainParticipant** (p. 1351), **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321)

Properties:

**RxO** (p. 360) = NO;  
**Changeable** (p. 360) = YES (p. 360)

See also

**DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

### 9.226.2 Usage

The purpose of this QoS is to allow the application to attach additional information to the created **DDSEntity** (p. 1463) objects, so that when a remote application discovers their existence, it can access that information and use it for its own purposes. This information is not used by RTI Connex.

One possible use of this QoS is to attach security credentials or some other information that can be used by the remote application to authenticate the source.

In combination with operations such as **DDSDomainParticipant::ignore\_participant** (p. 1393), **DDSDomainParticipant::ignore\_publication** (p. 1396), **DDSDomainParticipant::ignore\_subscription** (p. 1396), and **DDSDomainParticipant::ignore\_topic** (p. 1395), this QoS policy can assist an application to define and enforce its own security policies.

The use of this QoS is not limited to security; it offers a simple, yet flexible extensibility mechanism.

*Important:* RTI Connex stores the data placed in this policy in pre-allocated pools. It is therefore necessary to configure RTI Connex with the maximum size of the data that will be stored in policies of this type. This size is configured with **DDS\_DomainParticipantResourceLimitsQosPolicy::participant\_user\_data\_max\_length** (p. 758), **DDS\_DomainParticipantResourceLimitsQosPolicy::writer\_user\_data\_max\_length** (p. 759), and **DDS\_DomainParticipantResourceLimitsQosPolicy::reader\_user\_data\_max\_length** (p. 759).

### 9.226.3 Member Data Documentation

### 9.226.3.1 value

```
struct DDS_OctetSeq DDS_UserDataQosPolicy::value
```

a sequence of octets

**[default]** empty (zero-length)

**[range]** Octet sequence of length [0,max\_length]

## 9.227 DDS\_ValueMember Struct Reference

A description of a member of a value type.

### Public Attributes

- **char \* name**  
*The name of the value member.*
- **const DDS\_TypeCode \* type**  
*The type of the value member.*
- **DDS\_Boolean is\_pointer**  
*Indicates whether the value member is a pointer or not.*
- **DDS\_Short bits**  
*Number of bits of a bitfield member.*
- **DDS\_Boolean is\_key**  
*Indicates if the value member is a key member or not.*
- **DDS\_Visibility access**  
*The type of access (public, private) for the value member.*
- **DDS\_Long id**  
*The member ID.*
- **DDS\_Boolean is\_optional**  
*Indicates if the value member is optional or required.*

### 9.227.1 Detailed Description

A description of a member of a value type.

See also

**DDS\_ValueMemberSeq** (p. 1241)

**DDS\_TypeCodeFactory::create\_value\_tc** (p. 1215)

## 9.227.2 Member Data Documentation

### 9.227.2.1 name

```
char* DDS_ValueMember::name
```

The name of the value member.

Cannot be NULL.

### 9.227.2.2 type

```
const DDS_TypeCode* DDS_ValueMember::type
```

The type of the value member.

Cannot be NULL.

### 9.227.2.3 is\_pointer

```
DDS_Boolean DDS_ValueMember::is_pointer
```

Indicates whether the value member is a pointer or not.

### 9.227.2.4 bits

```
DDS_Short DDS_ValueMember::bits
```

Number of bits of a bitfield member.

If the struct member is a bitfield, this field contains the number of bits of the bitfield. Otherwise, bits should contain **DDS\_TYPECODE\_NOT\_BITFIELD** (p. 81).

### 9.227.2.5 is\_key

```
DDS_Boolean DDS_ValueMember::is_key
```

Indicates if the value member is a key member or not.

### 9.227.2.6 access

`DDS_Visibility DDS_ValueMember::access`

The type of access (public, private) for the value member.

It can take the values: `DDS_PRIVATE_MEMBER` (p. 82) or `DDS_PUBLIC_MEMBER` (p. 83).

### 9.227.2.7 id

`DDS_Long DDS_ValueMember::id`

The member ID.

Use `DDS_TYPECODE_MEMBER_ID_INVALID` (p. 81) to have the member ID automatically assigned.

### 9.227.2.8 is\_optional

`DDS_Boolean DDS_ValueMember::is_optional`

Indicates if the value member is optional or required.

## 9.228 DDS\_ValueMemberSeq Struct Reference

Defines a sequence of value members.

### 9.228.1 Detailed Description

Defines a sequence of value members.

See also

`DDS_ValueMember` (p. 1239)

`FooSeq` (p. 1697)

`DDS_TypeCodeFactory::create_value_tc` (p. 1215)

## 9.229 DDS\_VendorId\_t Struct Reference

`<<extension>>` (p. 237) Type used to represent the vendor of the service implementing the RTPS protocol.

## Public Attributes

- **DDS\_Octet vendorId** [ **DDS\_VENDOR\_ID\_LENGTH\_MAX**]  
*The vendor Id.*

### 9.229.1 Detailed Description

<<*extension*>> (p. 237) Type used to represent the vendor of the service implementing the RTPS protocol.

### 9.229.2 Member Data Documentation

#### 9.229.2.1 vendorId

**DDS\_Octet** DDS\_VendorId\_t::vendorId[ **DDS\_VENDOR\_ID\_LENGTH\_MAX**]

The vendor Id.

## 9.230 DDS\_WaitSetProperty\_t Struct Reference

<<*extension*>> (p. 237) Specifies the **DDSWaitSet** (p. 1629) behavior for multiple trigger events.

## Public Attributes

- **DDS\_Long max\_event\_count**  
*Maximum number of trigger events to cause a **DDSWaitSet** (p. 1629) to awaken.*
- struct **DDS\_Duration\_t max\_event\_delay**  
*Maximum delay from occurrence of first trigger event to cause a **DDSWaitSet** (p. 1629) to awaken.*

### 9.230.1 Detailed Description

<<*extension*>> (p. 237) Specifies the **DDSWaitSet** (p. 1629) behavior for multiple trigger events.

In simple use, a **DDSWaitSet** (p. 1629) returns when a single trigger event occurs on one of its attached **DDSCondition** (p. 1276) (s), or when the `timeout` maximum wait duration specified in the **DDSWaitSet::wait** (p. 1634) call expires.

The **DDS\_WaitSetProperty\_t** (p. 1242) allows configuration of the waiting behavior of a **DDSWaitSet** (p. 1629). If no conditions are true at the time of the call to wait, then the `max_event_count` parameter may be used to configure the WaitSet to wait for `max_event_count` trigger events to occur before returning, or to wait for up to `max_event_↔delay` time from the occurrence of the first trigger event before returning.

The `timeout` maximum wait duration specified in the **DDSWaitSet::wait** (p. 1634) call continues to apply.

Entity:

**DDSWaitSet** (p. 1629)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **YES** (p. 360)



## 9.230.2 Member Data Documentation

### 9.230.2.1 max\_event\_count

```
DDS_Long DDS_WaitSetProperty_t::max_event_count
```

Maximum number of trigger events to cause a **DDSWaitSet** (p. 1629) to awaken.

The **DDSWaitSet** (p. 1629) will wait until up to `max_event_count` trigger events have occurred before returning. The **DDSWaitSet** (p. 1629) may return earlier if either the `timeout` duration has expired, or `max_event_delay` has elapsed since the occurrence of the first trigger event. `max_event_count` may be used to "collect" multiple trigger events for processing at the same time.

[default] 1

[range] >= 1

;

### 9.230.2.2 max\_event\_delay

```
struct DDS_Duration_t DDS_WaitSetProperty_t::max_event_delay
```

Maximum delay from occurrence of first trigger event to cause a **DDSWaitSet** (p. 1629) to awaken.

The **DDSWaitSet** (p. 1629) will return no later than `max_event_delay` after the first trigger event. `max_event_delay` may be used to establish a maximum latency for events reported by the **DDSWaitSet** (p. 1629).

Note that **DDS\_RETCODE\_TIMEOUT** (p. 337) is *not* returned if `max_event_delay` is exceeded. **DDS\_RETCODE\_TIMEOUT** (p. 337) is returned only if the `timeout` duration expires before any trigger events occur.

[default] **DDS\_DURATION\_INFINITE** (p. 326) ;

## 9.231 DDS\_WcharSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_Wchar** (p. 317) >

### 9.231.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_Wchar** (p. 317) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_Wchar** (p. 317)

**FooSeq** (p. 1697)

## 9.232 DDS\_WireProtocolQosPolicy Struct Reference

Specifies the wire-protocol-related attributes for the **DDSDomainParticipant** (p. 1351).

### Public Attributes

- **DDS\_Long participant\_id**  
*A value used to distinguish among different participants belonging to the same domain on the same host.*
- **DDS\_UnsignedLong rtps\_host\_id**  
*The RTPS Host ID of the domain participant.*
- **DDS\_UnsignedLong rtps\_app\_id**  
*The RTPS App ID of the domain participant.*
- **DDS\_UnsignedLong rtps\_instance\_id**  
*The RTPS Instance ID of the **DDSDomainParticipant** (p. 1351).*
- struct **DDS\_RtpsWellKnownPorts\_t rtps\_well\_known\_ports**  
*Configures the RTPS well-known port mappings.*
- **DDS\_RtpsReservedPortKindMask rtps\_reserved\_port\_mask**  
*Specifies which well-known ports to reserve when enabling the participant.*
- **DDS\_WireProtocolQosPolicyAutoKind rtps\_auto\_id\_kind**  
*Kind of auto mechanism used to calculate the GUID prefix.*
- **DDS\_Boolean compute\_crc**  
*Adds RTPS CRC submessage to every message when this field is set to **DDS\_BOOLEAN\_TRUE** (p. 317).*
- **DDS\_Boolean check\_crc**  
*Checks if the received RTPS message is valid by comparing the computed CRC with the received RTPS CRC submessage when this field is set to **DDS\_BOOLEAN\_TRUE** (p. 317).*

### 9.232.1 Detailed Description

Specifies the wire-protocol-related attributes for the **DDSDomainParticipant** (p. 1351).

Entity:

**DDSDomainParticipant** (p. 1351)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **NO** (p. 360)

### 9.232.2 Usage

This QoS policy configures some participant-wide properties of the DDS Real-Time Publish Subscribe (RTPS) on-the-wire protocol. (**DDS\_DataWriterProtocolQosPolicy** (p. 673) and **DDS\_DataReaderProtocolQosPolicy** (p. 630) configure RTPS and reliability properties on a per **DDSDataWriter** (p. 1321) or **DDSDataReader** (p. 1288) basis.)

**NOTE:** The default QoS policies returned by RTI Connexx contain the correctly initialized wire protocol attributes. The defaults are not normally expected to be modified, but are available to the advanced user customizing the implementation behavior.

The default values should not be modified without an understanding of the underlying Real-Time Publish Subscribe (RTPS) wire protocol.

In order for the discovery process to work correctly, each **DDSDomainParticipant** (p. 1351) must have a unique identifier. This QoS policy specifies how that identifier should be generated.

RTPS defines a 96-bit prefix to this identifier; each **DDSDomainParticipant** (p. 1351) must have a unique value for this prefix relative to all other participants in its domain.

If an application dies unexpectedly and is restarted, the IDs used by the new instance of DomainParticipants should be different than the ones used by the previous instances. A change in these values allows other DomainParticipants to know that they are communicating with a new instance of an application, and not the previous instance.

For legacy reasons, RTI Connexx divides the 96-bit prefix into three integers:

- The first integer is called host ID. The original purpose of this integer was to contain the identity of the machine on which the DomainParticipant is executing.
- The second integer is called an application ID. The original purpose of this integer was to contain a value that identifies the process or task in which the DomainParticipant is contained.
- The third integer is called instance ID. The original purpose was to contain a value that uniquely identifies a DomainParticipant within a task or process.

The **DDS\_WireProtocolQosPolicy::rtps\_auto\_id\_kind** (p. 1250) field can be used to configure the algorithm that RTI Connext uses to populate the 96-bit prefix. Then you can optionally overwrite specific parts of the 96-bit prefix by explicitly configuring the **DDS\_WireProtocolQosPolicy::rtps\_host\_id** (p. 1248) (first integer), **DDS\_WireProtocolQosPolicy::rtps\_app\_id** (p. 1248) (second integer), and **DDS\_WireProtocolQosPolicy::rtps\_instance\_id** (p. 1249) (third integer).

The **DDS\_WireProtocolQosPolicy::rtps\_auto\_id\_kind** (p.1250) field supports three different prefix generation algorithms:

1. In the default and most common scenario, **DDS\_WireProtocolQosPolicy::rtps\_auto\_id\_kind** (p. 1250) is set to **DDS RTPS\_AUTO\_ID\_FROM\_UUID** (p. 460). As the name suggests, this mechanism uses a unique, randomly generated UUID to fill the **rtps\_host\_id**, **rtps\_app\_id**, or **rtps\_instance\_id** fields. The first two bytes of the **rtps\_host\_id** are replaced with the RTI vendor ID (0x0101).
2. (Legacy) When **rtps\_auto\_id\_kind** is set to **DDS RTPS\_AUTO\_ID\_FROM\_IP** (p. 460), the 96-bit prefix is generated as follows:
  - **rtps\_host\_id**: The 32-bit value of the IPv4 of the first up and running interface of the host machine is assigned. If the host does not have an IPv4 address, the host-id will be automatically set to 0x7F000001.
  - **rtps\_app\_id**: The process (or task) ID is assigned.
  - **rtps\_instance\_id**: A counter is assigned that is incremented per new participant within a process.

**DDS RTPS\_AUTO\_ID\_FROM\_IP** is not a good algorithm to guarantee prefix uniqueness, because the process ID can be recycled by the OSs.

3. (Legacy) When **rtps\_auto\_id\_kind** is set to **DDS RTPS\_AUTO\_ID\_FROM\_MAC** (p. 460), the 96-bit prefix is generated as follows:
  - **rtps\_host\_id**: The first 32 bits of the MAC address of the first up and running interface of the host machine are assigned.
  - **rtps\_app\_id**: The last 32 bits of the MAC address of the first up and running interface of the host machine are assigned.
  - **rtps\_instance\_id**: This field is split into two different parts. The process (or task) ID is assigned to the first 24 bits. A counter is assigned to the last 8 bits. This counter is incremented per new participant.

**DDS RTPS\_AUTO\_ID\_FROM\_IP** is not a good algorithm to guarantee prefix uniqueness, because the process ID can be recycled by the OSs.

Some examples are provided to clarify the behavior of this QoS Policy in case you want to change the default behavior with **DDS RTPS\_AUTO\_ID\_FROM\_MAC** (p. 460).

First, get the participant QoS from the **DomainParticipantFactory**:

```
DDSDomainParticipantFactory *factory = NULL;

factory = DDSTheParticipantFactory->get_instance();

factory->get_default_participant_qos(participant_qos);
```

Second, change the **DDS\_WireProtocolQosPolicy** (p. 1244) using one of the options shown below.

Third, create the **DDSDomainParticipant** (p. 1351) as usual, using the modified QoS structure instead of the default one.

Option 1: Use **DDS\_RTSPS\_AUTO\_ID\_FROM\_MAC** (p. 460) to explicitly set just the application/task identifier portion of the **rtps\_instance\_id** field.

```
participant_qos.wire_protocol.rtps_auto_id_kind = DDS_RTSPS_AUTO_ID_FROM_MAC;
participant_qos.wire_protocol.rtps_host_id      = DDS_RTSPS_AUTO_ID;
participant_qos.wire_protocol.rtps_app_id      = DDS_RTSPS_AUTO_ID;
participant_qos.wire_protocol.rtps_instance_id = ( /* App ID */ (12 << 8) |
                                                /* Instance ID*/ (DDS_RTSPS_AUTO_ID));
```

Option 2: Handle only the per participant counter and let RTI Connexthandle the application/task identifier:

```
participant_qos.wire_protocol.rtps_auto_id_kind = DDS_RTSPS_AUTO_ID_FROM_MAC;
participant_qos.wire_protocol.rtps_host_id      = DDS_RTSPS_AUTO_ID;
participant_qos.wire_protocol.rtps_app_id      = DDS_RTSPS_AUTO_ID;
participant_qos.wire_protocol.rtps_instance_id = ( /* App ID */ (DDS_RTSPS_AUTO_ID) |
                                                /* Instance ID*/ (12));
```

Option 3: Handle the entire **rtps\_instance\_id** field yourself:

```
participant_qos.wire_protocol.rtps_auto_id_kind = DDS_RTSPS_AUTO_ID_FROM_MAC;
participant_qos.wire_protocol.rtps_host_id      = DDS_RTSPS_AUTO_ID;
participant_qos.wire_protocol.rtps_app_id      = DDS_RTSPS_AUTO_ID;
participant_qos.wire_protocol.rtps_instance_id = ( /* App ID */ (12 << 8) |
                                                /* Instance ID */ (9) )
```

**NOTE:** If you are using **DDS\_RTSPS\_AUTO\_ID\_FROM\_MAC** (p. 460) as **rtps\_auto\_id\_kind** and you decide to manually handle the **rtps\_instance\_id** field, you must ensure that both parts are non-zero (otherwise RTI Connexthandle will take responsibility for them). RTI recommends that you always specify the two parts separately in order to avoid errors.

Option 4: Let RTI Connexthandle the entire **rtps\_instance\_id** field:

```
participant_qos.wire_protocol.rtps_auto_id_kind = DDS_RTSPS_AUTO_ID_FROM_MAC;
participant_qos.wire_protocol.rtps_host_id      = DDS_RTSPS_AUTO_ID;
participant_qos.wire_protocol.rtps_app_id      = DDS_RTSPS_AUTO_ID;
participant_qos.wire_protocol.rtps_instance_id = DDS_RTSPS_AUTO_ID;
```

**NOTE:** If you are using **DDS\_RTSPS\_AUTO\_ID\_FROM\_MAC** (p. 460) as **rtps\_auto\_id\_kind** and you decide to manually handle the **rtps\_instance\_id** field, you must ensure that both parts are non-zero (otherwise RTI Connexthandle will take responsibility for them). RTI recommends that you always specify the two parts separately in order to clearly show the difference.

### 9.232.3 Member Data Documentation

### 9.232.3.1 participant\_id

`DDS_Long DDS_WireProtocolQosPolicy::participant_id`

A value used to distinguish among different participants belonging to the same domain on the same host.

Determines the unicast port on which meta-traffic is received. Also defines the *default* unicast port for receiving user-traffic for DataReaders and DataWriters (can be overridden by the `DDS_DataReaderQos::unicast` (p. 651) or `DDS_DataWriterQos::unicast` (p. 696)).

For more information on port mapping, please refer to `DDS_RtpsWellKnownPorts_t` (p. 1076).

Each `DDSDomainParticipant` (p. 1351) in the same domain and running on the same host, must have a unique `participant_id`. The participants may be in the same address space or in distinct address spaces.

A negative number (-1) means that RTI Connex will *automatically* resolve the participant ID as follows.

- RTI Connex will pick the *smallest* participant ID based on the unicast ports available on the transports enabled for discovery.
- RTI Connex will attempt to resolve an automatic port index either when a DomainParticipant is enabled, or when a DataReader or DataWriter is created. Therefore, all the transports enabled for discovery must have been registered by this time. Otherwise, the discovery transports registered after resolving the automatic port index may produce port conflicts when the DomainParticipant is enabled.

**[default]** -1 [automatic], i.e. RTI Connex will automatically pick the `participant_id`, as described above.

**[range]** [ $\geq 0$ ], or -1, and does not violate guidelines stated in `DDS_RtpsWellKnownPorts_t` (p. 1076).

See also

`DDSEntity::enable()` (p. 1466)

`NDDSTransportSupport::register_transport()` (p. 1834)

### 9.232.3.2 rtps\_host\_id

`DDS_UnsignedLong DDS_WireProtocolQosPolicy::rtps_host_id`

The RTPS Host ID of the domain participant.

A specific host ID that is unique in the domain.

**[default]** `DDS RTPS_AUTO_ID` (p. ??). The default value is interpreted as follows:

If `DDS_WireProtocolQosPolicy::rtps_auto_id_kind` (p. 1250) is equal to `DDS RTPS_AUTO_ID_FROM_IP` (p. 460), the value will be interpreted as the IPv4 address of the *first* up and running interface of the host machine.

If `DDS_WireProtocolQosPolicy::rtps_auto_id_kind` (p. 1250) is equal to `DDS RTPS_AUTO_ID_FROM_MAC` (p. 460), the value will be interpreted as the first 32 bits of the MAC address assigned to the *first* up and running interface of the host machine.

If `DDS_WireProtocolQosPolicy::rtps_auto_id_kind` (p. 1250) is equal to `DDS RTPS_AUTO_ID_FROM_UUID` (p. 460), the value will be the first 32 bits of the GUID prefix assigned by the UUID algorithm.

**[range]** [0,0xffffffff]

### 9.232.3.3 rtps\_app\_id

```
DDS_UnsignedLong DDS_WireProtocolQosPolicy::rtps_app_id
```

The RTPS App ID of the domain participant.

A participant specific ID that, together with the `rtps_instance_id`, is unique within the scope of the `rtps_host_id`.

If a participant dies and is restarted, it is recommended that it be given an app ID that is distinct from the previous one so that other participants in the domain can distinguish between them.

**[default]** `DDS RTPS_AUTO_ID` (p. ??). The default value is interpreted as follows:

If `DDS_WireProtocolQosPolicy::rtps_auto_id_kind` (p. 1250) is equal to `DDS RTPS_AUTO_ID_FROM_IP` (p. 460) the value will be the process (or task) ID.

If `DDS_WireProtocolQosPolicy::rtps_auto_id_kind` (p. 1250) is equal to `DDS RTPS_AUTO_ID_FROM_MAC` (p. 460) the value will be the last 32 bits of the MAC address assigned to the *first* up and running interface of the host machine.

If `DDS_WireProtocolQosPolicy::rtps_auto_id_kind` (p. 1250) is equal to `DDS RTPS_AUTO_ID_FROM_UUID` (p. 460), the value will be the middle 32 bits of the GUID prefix assigned by the UUID algorithm.

**[range]** [0,0xffffffff]

### 9.232.3.4 rtps\_instance\_id

```
DDS_UnsignedLong DDS_WireProtocolQosPolicy::rtps_instance_id
```

The RTPS Instance ID of the `DDSDomainParticipant` (p. 1351).

This is an instance-specific ID of a participant that, together with the `rtps_app_id`, is unique within the scope of the `rtps_host_id`.

If a participant dies and is restarted, it is recommended that it be given an instance ID that is distinct from the previous one so that other participants in the domain can distinguish between them.

**[default]** `DDS RTPS_AUTO_ID` (p. ??). The default value is interpreted as follows:

If `DDS_WireProtocolQosPolicy::rtps_auto_id_kind` (p. 1250) is equal to `DDS RTPS_AUTO_ID_FROM_IP` (p. 460), a counter is assigned that is incremented per new participant. For VxWorks-653, the first 8 bits are assigned to the partition id for the application.

If `DDS_WireProtocolQosPolicy::rtps_auto_id_kind` (p. 1250) is equal to `DDS RTPS_AUTO_ID_FROM_MAC` (p. 460), the first 24 bits are assigned to the application/task identifier and the last 8 bits are assigned to a counter that is incremented per new participant.

If `DDS_WireProtocolQosPolicy::rtps_auto_id_kind` (p. 1250) is equal to `DDS RTPS_AUTO_ID_FROM_UUID` (p. 460), the value will be the last 32 bits of the GUID prefix assigned by the UUID algorithm.

**[range]** [0,0xffffffff] **NOTE:** If you use `DDS RTPS_AUTO_ID_FROM_MAC` (p. 460) as `rtps_auto_id_kind` and you decide to manually handle the `rtps_instance_id` field, you must ensure that both the two parts are non-zero, otherwise the middleware will take responsibility for them. We recommend that you always specify the two parts separately in order to avoid errors. ( `examples` )

### 9.232.3.5 rtps\_well\_known\_ports

```
struct DDS_RtpsWellKnownPorts_t DDS_WireProtocolQosPolicy::rtps_well_known_ports
```

Configures the RTPS well-known port mappings.

Determines the well-known multicast and unicast port mappings for discovery (meta) traffic and user traffic.

[default] **DDS\_INTEROPERABLE\_RTPS\_WELL\_KNOWN\_PORTS** (p. 461)

### 9.232.3.6 rtps\_reserved\_port\_mask

```
DDS_RtpsReservedPortKindMask DDS_WireProtocolQosPolicy::rtps_reserved_port_mask
```

Specifies which well-known ports to reserve when enabling the participant.

Specifies which of the well-known multicast and unicast ports will be reserved when the DomainParticipant is enabled. Failure to allocate a port that is computed based on the **DDS\_RtpsWellKnownPorts\_t** (p. 1076) will be detected at this time, and the enable operation will fail.

[default] **DDS\_RTPS\_RESERVED\_PORT\_MASK\_DEFAULT** (p. 457)

### 9.232.3.7 rtps\_auto\_id\_kind

```
DDS_WireProtocolQosPolicyAutoKind DDS_WireProtocolQosPolicy::rtps_auto_id_kind
```

Kind of auto mechanism used to calculate the GUID prefix.

[default] **DDS\_RTPS\_AUTO\_ID\_FROM\_UUID** (p. 460)

### 9.232.3.8 compute\_crc

```
DDS_Boolean DDS_WireProtocolQosPolicy::compute_crc
```

Adds RTPS CRC submessage to every message when this field is set to **DDS\_BOOLEAN\_TRUE** (p. 317).

The computed CRC covers the entire RTPS message excluding the RTPS header.

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.232.3.9 check\_crc

```
DDS_Boolean DDS_WireProtocolQosPolicy::check_crc
```

Checks if the received RTPS message is valid by comparing the computed CRC with the received RTPS CRC submessage when this field is set to **DDS\_BOOLEAN\_TRUE** (p. 317).

**DDS\_WireProtocolQosPolicy::compute\_crc** (p. 1250) must be enabled at the publishing application for validating the message at the subscribing application.

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)



## 9.233 DDS\_WriteParams\_t Struct Reference

<<*extension*>> (p. 237) Input parameters for writing with `FooDataWriter::write_w_params` (p. 1688), `FooDataWriter::dispose_w_params` (p. 1691), `FooDataWriter::register_instance_w_params` (p. 1680), `FooDataWriter::unregister_instance_w_params` (p. 1683)

### Public Attributes

- **DDS\_Boolean** `replace_auto`  
*Allows retrieving the actual value of those fields that were automatic.*
- struct **DDS\_SampleIdentity\_t** `identity`  
*Identity of the sample.*
- struct **DDS\_SampleIdentity\_t** `related_sample_identity`  
*The identity of another sample related to this one.*
- struct **DDS\_Time\_t** `source_timestamp`  
*Source timestamp upon write.*
- struct **DDS\_Cookie\_t** `cookie`  
*Octet sequence identifying written data sample.*
- **DDS\_InstanceHandle\_t** `handle`  
*Instance handle.*
- **DDS\_Long** `priority`  
*Publication priority.*
- **DDS\_SampleFlag** `flag`  
*Flags associated with the sample.*
- struct **DDS\_GUID\_t** `source_guid`  
*Identifies the application logical data source associated with the sample being written.*
- struct **DDS\_GUID\_t** `related_source_guid`  
*Identifies the application logical data source that is related to the sample being written.*
- struct **DDS\_GUID\_t** `related_reader_guid`  
*Identifies a DataReader that is logically related to the sample that is being written.*

### 9.233.1 Detailed Description

<<*extension*>> (p. 237) Input parameters for writing with `FooDataWriter::write_w_params` (p. 1688), `FooDataWriter::dispose_w_params` (p. 1691), `FooDataWriter::register_instance_w_params` (p. 1680), `FooDataWriter::unregister_instance_w_params` (p. 1683)

### 9.233.2 Member Data Documentation

### 9.233.2.1 replace\_auto

```
DDS_Boolean DDS_WriteParams_t::replace_auto
```

Allows retrieving the actual value of those fields that were automatic.

When this field is set, the fields that were configured with an automatic value (for example, **DDS\_AUTO\_SAMPLE\_IDENTITY** (p. 478)) receive their actual value after **FooDataWriter::write\_w\_params** (p. 1688) is called.

To reset those fields to their automatic value after calling **FooDataWriter::write\_w\_params** (p. 1688), use **DDS\_WriteParams\_reset** (p. 478)

### 9.233.2.2 identity

```
struct DDS_SampleIdentity_t DDS_WriteParams_t::identity
```

Identity of the sample.

Identifies the sample being written. The identity consists of a pair (Virtual Writer GUID, Virtual Sequence Number).

Use the default value to let RTI Connexx determine the sample identity as follows:

- The Virtual Writer GUID is the virtual GUID associated with the writer writing the sample. This virtual GUID is configured using **DDS\_DataWriterProtocolQosPolicy::virtual\_guid** (p. 674).
- The sequence number is increased by one with respect to the previous value.

The virtual sequence numbers for a virtual writer must be strictly monotonically increasing. If the user tries to write a sample with a sequence number smaller or equal to the last sequence number, the write operation will fail.

A DataReader can access the identity of a received sample by using the fields **DDS\_SampleInfo::original\_publication\_virtual\_guid** (p. 1090) and **DDS\_SampleInfo::original\_publication\_virtual\_sequence\_number** (p. 1090) in the **DDS\_SampleInfo** (p. 1082).

[default] **DDS\_AUTO\_SAMPLE\_IDENTITY** (p. 478).

Referenced by **connexx::WriteSample< T >::identity()**, and **connexx::WriteSampleRef< T >::identity()**.

### 9.233.2.3 related\_sample\_identity

```
struct DDS_SampleIdentity_t DDS_WriteParams_t::related_sample_identity
```

The identity of another sample related to this one.

Identifies another sample that is logically related to the one that is written.

When this field is set, the related sample identity is propagated and subscribing applications can retrieve it from the **DDS\_SampleInfo** (p. 1082) (see **DDS\_SampleInfo\_get\_related\_sample\_identity** (p. 150)).

The default value is **DDS\_UNKNOWN\_SAMPLE\_IDENTITY** (p. 479), and is not propagated.

A DataReader can access the related identity of a received sample by using the fields **DDS\_SampleInfo::related\_original\_publication\_virtual\_guid** (p. 1090) and **DDS\_SampleInfo::related\_original\_publication\_virtual\_sequence\_number** (p. 1091) in the **DDS\_SampleInfo** (p. 1082).

[default] **DDS\_UNKNOWN\_SAMPLE\_IDENTITY** (p. 479)

#### 9.233.2.4 source\_timestamp

```
struct DDS_Time_t DDS_WriteParams_t::source_timestamp
```

Source timestamp upon write.

Specifies the source timestamp that will be available to the **DDSDataReader** (p. 1288) objects by means of the `source_timestamp` attribute within the **DDS\_SampleInfo** (p. 1082).

**[default]** **DDS\_TIME\_INVALID** (p. 326).

#### 9.233.2.5 cookie

```
struct DDS_Cookie_t DDS_WriteParams_t::cookie
```

Octet sequence identifying written data sample.

Used in the callback **DDSDataWriterListener::on\_sample\_removed** (p. 1348) to associate a removed sample with a written sample.

**[default]** Empty sequence (zero-length).

#### 9.233.2.6 handle

```
DDS_InstanceHandle_t DDS_WriteParams_t::handle
```

Instance handle.

Either the handle returned by a previous call to **FooDataWriter::register\_instance** (p. 1678), or else the special value **DDS\_HANDLE\_NIL** (p. 76).

**[default]** **DDS\_HANDLE\_NIL** (p. 76)

#### 9.233.2.7 priority

```
DDS_Long DDS_WriteParams_t::priority
```

Publication priority.

A positive integer value designating the relative priority of the sample, used to determine the transmission order of pending writes.

Use of publication priorities requires an asynchronous publisher (**DDS\_ASYNCHRONOUS\_PUBLISH\_MODE** ↔ **\_QOS** (p. 431)) with **DDS\_FlowControllerProperty\_t::scheduling\_policy** (p. 913) set to **DDS\_HPF\_FLOW** ↔ **CONTROLLER\_SCHED\_POLICY** (p. 121).

Larger numbers have higher priority.

For multi-channel DataWriters, the publication priority of a sample may be used as a filter criteria for determining channel membership.

If the publication priority of the parent DataWriter, or for multi-channel DataWriters, if the publication priority of the parent channel, is set to **DDS\_PUBLICATION\_PRIORITY\_AUTOMATIC** (p. 430), then the DataWriter or channel will be assigned the priority of the largest publication priority of all samples in the DataWriter or channel.

If the publication priority of the parent DataWriter, and for multi-channel DataWriters, if the publication priority of the parent channel, are set to **DDS\_PUBLICATION\_PRIORITY\_UNDEFINED** (p. 430), then the DataWriter or channel will be assigned the lowest priority, regardless of the value of the publication priorities of samples written to the DataWriter or channel.

The publication priority of each sample can be set in the **DDS\_WriteParams\_t** (p. 1251) of **FooDataWriter::write\_w←\_params** (p. 1688).

For dispose and unregister samples, use the **DDS\_WriteParams\_t** (p. 1251) of **FooDataWriter::dispose\_w\_params** (p. 1691) and **FooDataWriter::unregister\_instance\_w\_params** (p. 1683).

**[default]** 0 (lowest priority)

See also

**DDS\_ChannelSettings\_t::priority** (p. 611)

### 9.233.2.8 flag

**DDS\_SampleFlag** `DDS_WriteParams_t::flag`

Flags associated with the sample.

The flags are represented as a 32-bit integer, of which only the 16 least-significant bits are used.

RTI reserves least-significant bits [0-7] for middleware-specific usage.

The application can use least-significant bits [8-15].

The first bit (**DDS\_REDELIVERED\_SAMPLE** (p. 475)) is reserved for marking samples as redelivered when using RTI Queuing Service.

The second bit (**DDS\_INTERMEDIATE\_REPLY\_SEQUENCE\_SAMPLE** (p. 475)) is used to indicate that a response sample is not the last response sample for a given request. This bit is usually set by a Replier sending multiple responses for a request.

An application can inspect the flags associated with a received sample by checking the field **DDS\_SampleInfo::flag** (p. 1091).

**[default]** 0 (no flags are set)

### 9.233.2.9 source\_guid

```
struct DDS_GUID_t DDS_WriteParams_t::source_guid
```

Identifies the application logical data source associated with the sample being written.

When this field is set, the `source_guid` is propagated and subscribing applications can retrieve it from the `DDS_↔_SampleInfo` (p. 1082) (see `DDS_SampleInfo::source_guid` (p. 1091)).

The default value is `DDS_GUID_AUTO` (p. 331), and is not propagated.

The main use case for `source_guid` and `related_source_guid` is a request/reply scenario in which a reply has to be sent only to the Requester that issue the related request.

In this case, the Requester's DataWriter will send a request setting the `source_guid` to a unique value. This value must be the same value even after Requester restart.

The Replier's DataReader will get the request's `source_guid` from the `SampleInfo` and it will send it as the `related_↔_source_guid` of the reply using the Replier's DataWriter.

The Requester's DataReader will install a CFT on the `related_source_guid` using a filter expression. For example:  
`@related_source_guid.value = &hex(00000000000000000000000000000001)`

This way the reply will be send only to the right Requester.

The `source_guid` and `related_source_guid` fields are used by RTI Queuing Service in a request/reply scenario.

**[default]** `DDS_GUID_AUTO` (p.331) (the `source_guid` is automatically set to the `DDSDataWriter` (p.1321) virtual GUID).

See also

**DDS\_WriteParams\_t::related\_source\_guid** (p.1255)

### 9.233.2.10 related\_source\_guid

```
struct DDS_GUID_t DDS_WriteParams_t::related_source_guid
```

Identifies the application logical data source that is related to the sample being written.

When this field is set, the `related_source_guid` is propagated and subscribing applications can retrieve it from the `DDS_↔_SampleInfo` (p. 1082) (see `DDS_SampleInfo::related_source_guid` (p. 1091)).

The default value is `DDS_GUID_UNKNOWN` (p. 331), and is not propagated.

**[default]** `DDS_GUID_UNKNOWN` (p.331)

See also

**DDS\_WriteParams\_t::source\_guid** (p.1254)

### 9.233.2.11 related\_reader\_guid

```
struct DDS_GUID_t DDS_WriteParams_t::related_reader_guid
```

Identifies a DataReader that is logically related to the sample that is being written.

When this field is set, the `related_reader_guid` is propagated and subscribing applications can retrieve it from the `DDS_SampleInfo` (p. 1082) (see `DDS_SampleInfo::related_subscription_guid` (p. 1092)).

The default value is `DDS_GUID_UNKNOWN` (p. 331), and is not propagated.

The main use case for this field is point-to-point sample distribution using CFT. DataReaders install a CFT on the `related_reader_guid` using a unique GUID. For example, the filter for DataReader 'n' can be:

```
@related_reader_guid.value = &hex(00000000000000000000000000000001)
```

Then, a DataWriter that wants to send the sample to DataReader 'n' will use the `FooDataWriter::write_w_params` (p. 1688) method and set `related_reader_guid` to the value used by DataReader 'n' in its filter expression.

This field is currently used by RTI Queuing Service to distribute a sample to only one of the Consumer's DataReaders attached to a SharedReaderQueue.

[default] `DDS_GUID_UNKNOWN` (p. 331)

## 9.234 DDS\_WriterDataLifecycleQosPolicy Struct Reference

Controls how a `DDSDataWriter` (p. 1321) handles the lifecycle of the instances (keys) that it is registered to manage.

### Public Attributes

- **DDS\_Boolean autodispose\_unregister\_instances**  
*Boolean flag that controls the behavior when the `DDSDataWriter` (p. 1321) unregisters an instance by means of the unregister operations.*
- struct **DDS\_Duration\_t autopurge\_unregister\_instances\_delay**  
*<<extension>> (p. 237) Maximum duration for which the `DDSDataWriter` (p. 1321) will maintain information regarding an instance once it has unregistered the instance.*
- struct **DDS\_Duration\_t autopurge\_disposed\_instances\_delay**  
*<<extension>> (p. 237) Maximum duration for which the `DDSDataWriter` (p. 1321) will maintain information regarding an instance once it has disposed the instance.*

### 9.234.1 Detailed Description

Controls how a `DDSDataWriter` (p. 1321) handles the lifecycle of the instances (keys) that it is registered to manage.

Entity:

`DDSDataWriter` (p. 1321)

Properties:

**RxO** (p. 360) = N/A

**Changeable** (p. 360) = **YES** (p. 360)

## 9.234.2 Usage

This policy determines how the **DDSDataWriter** (p. 1321) acts with regards to the lifecycle of the data instances it manages (data instances that have been either explicitly registered with the **DDSDataWriter** (p. 1321) or implicitly registered by directly writing the data).

You may use **FooDataWriter::unregister\_instance** (p. 1680) to indicate that the **DDSDataWriter** (p. 1321) no longer wants to send data for a **DDSTopic** (p. 1617).

The behavior controlled by this QoS policy applies on a per instance (key) basis for keyed Topics, so that when a **DDSDataWriter** (p. 1321) unregisters an instance, RTI Connexant can automatically also dispose that instance. This is the default behavior.

In many cases where the ownership of a Topic is shared (see **DDS\_OwnershipQoSPolicy** (p. 973)), DataWriters may want to relinquish their ownership of a particular instance of the Topic to allow other DataWriters to send updates for the value of that instance regardless of Ownership Strength. In that case, you may only want a DataWriter to unregister an instance without disposing the instance. *Disposing* an instance is a statement that an instance no longer exists. User applications may be coded to trigger on the disposal of instances, thus the ability to unregister without disposing may be useful to properly maintain the semantic of disposal.

## 9.234.3 Member Data Documentation

### 9.234.3.1 autodispose\_unregistered\_instances

**DDS\_Boolean** DDS\_WriterDataLifecycleQoSPolicy::autodispose\_unregistered\_instances

Boolean flag that controls the behavior when the **DDSDataWriter** (p. 1321) unregisters an instance by means of the unregister operations.

- **DDS\_BOOLEAN\_TRUE** (p. 317)  
The **DDSDataWriter** (p. 1321) will dispose of the instance each time it is unregistered. The behavior is identical to explicitly calling one of the `dispose` operations on the instance prior to calling the `unregister` operation.
- **DDS\_BOOLEAN\_FALSE** (p. 317) (default)  
The **DDSDataWriter** (p. 1321) will not dispose of the instance. The application can still call one of the `dispose` operations prior to unregistering the instance and dispose of the instance that way.

[default] **DDS\_BOOLEAN\_FALSE** (p. 317)

### 9.234.3.2 autopurge\_unregistered\_instances\_delay

```
struct DDS_Duration_t DDS_WriterDataLifecycleQosPolicy::autopurge_unregistered_instances_delay
```

<<**extension**>> (p. 237) Maximum duration for which the **DDSDataWriter** (p. 1321) will maintain information regarding an instance once it has unregistered the instance.

Determines how long the **DDSDataWriter** (p. 1321) will maintain information regarding an instance that has been unregistered. By default, the **DDSDataWriter** (p. 1321) resources associated with an instance (e.g., the space needed to remember the Instance Key or KeyHash) are released lazily. This means the resources are only reclaimed when the space is needed for another instance because **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055) is exceeded. This behavior can be changed by setting `autopurge_unregistered_instances_delay` to a value other than **DDS\_DURATION\_INFINITE** (p. 326).

After this time elapses, the **DDSDataWriter** (p. 1321) will purge all internal information regarding the instance, including historical samples, even if **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055) has not been reached.

The purging of unregistered instances can be done based on the source timestamp of the unregister sample or the time where the unregister sample was added to the DataWriter queue by setting the following property to 1 or 0 respectively (default: 0): `dds.data_writer.history.source_timestamp_based_autopurge_instances_delay`.

For durable writer history, `autopurge_unregistered_instances_delay` supports only the **DDS\_DURATION\_INFINITE** (p. 326) value.

**[default]** **DDS\_DURATION\_INFINITE** (p. 326) (disabled) for all **DDSDataWriter** (p. 1321) except for the built-in discovery DataWriters

**DDS\_DURATION\_ZERO** (p.327) for built-in discovery DataWriters (see **DDS\_DiscoveryConfigQosPolicy::publication\_writer\_data\_lifecycle** (p. 719), **DDS\_DiscoveryConfigQosPolicy::subscription\_writer\_data\_lifecycle** (p. 720) and **DDS\_DiscoveryConfigQosPolicy::participant\_configuration\_writer\_data\_lifecycle** (p. 730)).

**[range]** [0, 1 year] or **DDS\_DURATION\_INFINITE** (p. 326)

### 9.234.3.3 autopurge\_disposed\_instances\_delay

```
struct DDS_Duration_t DDS_WriterDataLifecycleQosPolicy::autopurge_disposed_instances_delay
```

<<**extension**>> (p. 237) Maximum duration for which the **DDSDataWriter** (p. 1321) will maintain information regarding an instance once it has disposed the instance.

Determines how long the **DDSDataWriter** (p. 1321) will maintain information regarding an instance that has been disposed of. By default, disposing of an instance does not make it eligible to be purged. By setting `autopurge_disposed_instances_delay` to a value other than **DDS\_DURATION\_INFINITE** (p. 326), the DataWriter will delete the resources associated with an instance (including historical samples) once the time has elapsed and all matching DataReaders have acknowledged all the samples for this instance including the dispose sample.

The purging of disposed instances can be done based on the source timestamp of the dispose sample or the time when the dispose sample was added to the DataWriter queue by setting the following property to 1 or 0 respectively (default: 0): `dds.data_writer.history.source_timestamp_based_autopurge_instances_delay`.

This QoS value is supported with durable DataWriter queues only for **DDS\_DURATION\_ZERO** (p. 327) and **DDS\_DURATION\_INFINITE** (p. 326) values (finite values are not supported).

**[default]** **DDS\_DURATION\_INFINITE** (p. 326) (disabled)

**[range]** [0, 1 year] or **DDS\_DURATION\_INFINITE** (p. 326)



## 9.235 DDS\_WstringSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDS\_Wchar** (p. 317)\* >

### 9.235.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDS\_Wchar** (p. 317)\* >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDS\_Wchar** (p. 317)

**DDS\_StringSeq** (p. 1102)

**FooSeq** (p. 1697)

## 9.236 DDSAsyncWaitSet Class Reference

A class for dispatching **DDSCondition** (p. 1276) objects using separate threads of execution. You can see this class as an extension of a **DDSWaitSet** (p. 1629) that allows asynchronously waiting for the attached **DDSCondition** (p. 1276) objects to trigger and provide a notification by calling **DDSCondition::dispatch** (p. 1278).

### Public Member Functions

- virtual **DDS\_ReturnCode\_t** **start** ()  
*Initiates the asynchronous wait on this **DDSAsyncWaitSet** (p. 1259).*
- virtual **DDS\_ReturnCode\_t** **start\_with\_completion\_token** ( **DDSAsyncWaitSetCompletionToken** \*completion\_token)  
*Initiates the asynchronous wait on this **DDSAsyncWaitSet** (p. 1259).*
- virtual **DDS\_ReturnCode\_t** **stop** ()  
*Initiates the stop procedure on this **DDSAsyncWaitSet** (p. 1259) that will stop the asynchronous wait.*
- virtual **DDS\_ReturnCode\_t** **stop\_with\_completion\_token** ( **DDSAsyncWaitSetCompletionToken** \*completion\_token)  
*Initiates the stop procedure on this **DDSAsyncWaitSet** (p. 1259) that will stop the asynchronous wait.*
- virtual **DDS\_ReturnCode\_t** **attach\_condition** ( **DDSCondition** \*condition)  
*Attaches the specified **DDSCondition** (p. 1276) to this **DDSAsyncWaitSet** (p. 1259).*
- virtual **DDS\_ReturnCode\_t** **detach\_condition** ( **DDSCondition** \*condition)  
*Deaches the specified **DDSCondition** (p. 1276) from this **DDSAsyncWaitSet** (p. 1259).*
- virtual **DDS\_ReturnCode\_t** **attach\_condition\_with\_completion\_token** ( **DDSCondition** \*condition, **DDSAsyncWaitSetCompletionToken** \*completion\_token)  
*Attaches the specified **DDSCondition** (p. 1276) to this **DDSAsyncWaitSet** (p. 1259).*

- virtual **DDS\_ReturnCode\_t detach\_condition\_with\_completion\_token** (**DDSCondition** \*condition, **DDSAsyncWaitSetCompletionToken** \*completion\_token)  
*Detaches the specified **DDSCondition** (p. 1276) from this **DDSAsyncWaitSet** (p. 1259).*
- virtual **DDS\_ReturnCode\_t unlock\_condition** (**DDSCondition** \*condition)  
*Allows the **DDSCondition** (p. 1276) under dispatch to be available for concurrent dispatch from another thread from the pool.*
- virtual **DDS\_ReturnCode\_t get\_property** (**DDS\_AsyncWaitSetProperty\_t** &property)  
*Retrieves the **DDS\_AsyncWaitSetProperty\_t** (p. 594) configuration of the associated **DDSAsyncWaitSet** (p. 1259).*
- virtual **DDS\_ReturnCode\_t get\_conditions** (**DDSConditionSeq** &attached\_conditions)  
*Retrieves the list of attached **DDSCondition** (p. 1276) (s).*
- virtual **DDSAsyncWaitSetCompletionToken \* create\_completion\_token** ()  
*Creates a new **DDSAsyncWaitSetCompletionToken** (p. 1273).*
- virtual **DDS\_ReturnCode\_t delete\_completion\_token** (**DDSAsyncWaitSetCompletionToken** \*completion\_token)  
*Deletes a **DDSAsyncWaitSetCompletionToken** (p. 1273) previously created from this **DDSAsyncWaitSet** (p. 1259).*
- **DDSAsyncWaitSet** ()  
*Creates a **DDSAsyncWaitSet** (p. 1259) with default property.*
- **DDSAsyncWaitSet** (const **DDS\_AsyncWaitSetProperty\_t** &property)  
*Single-argument constructor that allows creating a **DDSAsyncWaitSet** (p. 1259) with custom behavior.*
- **DDSAsyncWaitSet** (const **DDS\_AsyncWaitSetProperty\_t** &property, **DDSAsyncWaitSetListener** \*listener)  
*Constructor that allows specifying a **DDSAsyncWaitSetListener** (p. 1275).*
- **DDSAsyncWaitSet** (const **DDS\_AsyncWaitSetProperty\_t** &property, **DDSAsyncWaitSetListener** \*listener, **DDSThreadFactory** \*thread\_factory)  
*Constructor with arguments that allow specifying behavior different than the default one, including specifying a **DDSThreadFactory** (p. 1615) for the creation and deletion of the threads within the thread pool.*
- virtual **~DDSAsyncWaitSet** ()  
*Deletes a **DDSAsyncWaitSet** (p. 1259).*

## Static Public Attributes

- static **DDSAsyncWaitSetCompletionToken \*const COMPLETION\_TOKEN\_USE\_IMPLICIT\_AND\_WAIT**  
*For the operations that allow an **DDSAsyncWaitSetCompletionToken** (p. 1273), this sentinel can be provided to indicate an **DDSAsyncWaitSet** (p. 1259) to use the implicit completion token and wait on it for request completion.*
- static **DDSAsyncWaitSetCompletionToken \*const COMPLETION\_TOKEN\_IGNORE**  
*For the operations that allow an **DDSAsyncWaitSetCompletionToken** (p. 1273), this sentinel can be provided to indicate an **DDSAsyncWaitSet** (p. 1259) to perform the action associating a 'null' completion token.*

### 9.236.1 Detailed Description

A class for dispatching **DDSCondition** (p. 1276) objects using separate threads of execution. You can see this class as an extension of a **DDSWaitSet** (p. 1629) that allows asynchronously waiting for the attached **DDSCondition** (p. 1276) objects to trigger and provide a notification by calling **DDSCondition::dispatch** (p. 1278).

**DDSAsyncWaitSet** (p. 1259) provides a proactive model to process application events through **DDSCondition** (p. 1276) objects. **DDSAsyncWaitSet** (p. 1259) owns a pool of threads to asynchronously wait for the attached **DDSCondition** (p. 1276) objects to trigger and dispatch them upon wakeup. The asynchronous behavior is the main key different with regards to the **DDSWaitSet** (p. 1629).

The class diagram and its collaborators is shown below:

## 9.236.2 AsyncWaitSet Thread Orchestration

**DDSAsyncWaitSet** (p. 1259) internally applies a leader-follower pattern for the orchestration of the thread pool. Once a **DDSAsyncWaitSet** (p. 1259) starts, it will create the thread pool of  $M$  threads from which only one thread will become the `Leader` thread, and remaining threads will become the `Followers`, where:

- The `Leader` thread is the one waiting for the attached **DDSCondition** (p. 1276) to trigger. Remaining threads in the pool, if any, are either idle awaiting to become the leader or busy while processing active **DDSCondition** (p. 1276).
- Upon wait wakeup, the `Leader` thread resigns its leader status to become a `Processor` thread and dispatch the next active **DDSCondition** (p. 1276) through the **DDSCondition::dispatch** (p. 1278) operation.
- One of the `Follower` threads wakes up and becomes the new leader to resume the wait for **DDSCondition** (p. 1276).

"Thread orchestration in a `::DDSAsyncWaitSet`"

This behavior implies the following considerations:

- Only one thread a time can wait for the attached **DDSCondition** (p. 1276) objects to trigger. From a pool of  $M$  threads, only one is the leader,  $P$  are processing active **DDSCondition** (p. 1276), and  $F$  are idle followers.
- A thread can dispatch only one active **DDSCondition** (p. 1276) at a time.
- **DDSAsyncWaitSet** (p. 1259) efficiently distributes threads to dispatch **DDSCondition** (p. 1276) objects on demand. This avoids underutilizing a thread if **DDSCondition** (p. 1276) objects do not trigger or trigger unfrequently.
- At a given time, all the threads in the pool could be in processing state. In this situation, the **DDSAsyncWaitSet** (p. 1259) is not able to wait for more **DDSCondition** (p. 1276) objects until one thread becomes the leader.

**DDSAsyncWaitSet** (p. 1259) has a built-in dispatcher that guarantees fairness and avoids starvation of **DDSCondition** (p. 1276) objects. By applying a round-robin distribution policy, each attached and active **DDSCondition** (p. 1276) is dispatched within a finite period of time, assuming the **DDSConditionHandler** (p. 1278) always return control after the **DDSCondition::dispatch** (p. 1278) operation.

## 9.236.3 AsyncWaitSet Thread Safety

A key aspect of the **DDSAsyncWaitSet** (p. 1259) is the thread safety. **DDSAsyncWaitSet** (p. 1259) interface is thread safe, so you can concurrently call any operation on the **DDSAsyncWaitSet** (p. 1259) object from multiple threads in your application.

Furthermore, **DDSAsyncWaitSet** (p. 1259) also safely interacts with its own thread pool. Internally, the **DDSAsync↔WaitSet** (p. 1259) applies the asynchronous completion token pattern to perform activities that involve synchronization with the thread pool.

For instance to detach a **DDSCondition** (p. 1276), the **DDSAsyncWaitSet** (p. 1259) generates an internal request to its thread pool to process it. As soon as the detachment completes, the thread pool provides the notification through an associated completion token.

## Note

The asynchronous completion token behavior only takes place if the **DDSAsyncWaitSet** (p. 1259) is started. Otherwise the internal request will be directly executed by the calling thread.

For a finer control on this behavior, each **DDSAsyncWaitSet** (p. 1259) operation where this applies comes in two flavors:

- **Default**: the operation hides all the details of the completion token and returns after the operation completes. Operations of this kind internally use an implicit **DDSAsyncWaitSetCompletionToken** (p. 1273). The **DDSAsyncWaitSet** (p. 1259) creates and reuses **DDSAsyncWaitSetCompletionToken** (p. 1273) objects as needed. This is the recommended flavor unless your application has special resource needs.
- **With completion token**: An overloaded version of the default one that also receives an **DDSAsyncWaitSetCompletionToken** (p. 1273) object on which you can wait on at any time for the actual operation to complete. This flavor is available to assist applications with resource constraints and that want more control on the interaction with the thread pool of the **DDSAsyncWaitSet** (p. 1259).

### 9.236.3.1 Condition Locking

**DDSAsyncWaitSet** (p. 1259) incorporates a safety mechanism that prevents calling **DDSCondition::dispatch** (p. 1278) concurrently. **DDSAsyncWaitSet** (p. 1259) locks the **DDSCondition** (p. 1276) while a processor thread is dispatching it so no other thread within the pool can dispatch it again.

This mechanism ensures not only unexpected concurrent dispatch of a **DDSCondition** (p. 1276) but also spurious thread activity. Because it is responsibility of your application to reset the Condition trigger, there is a period of time in which the dispatched condition may remain active, causing the **DDSAsyncWaitSet** (p. 1259) to enter in a continuous immediate wakeup from the wait. This behavior typically leads to thread hogging and high CPU usage.

Nevertheless, your application may still want to receive concurrent and controlled dispatch notifications. **DDSAsyncWaitSet** (p. 1259) will still allow you to unlock a **DDSCondition** (p. 1276) so any other available thread can dispatch the same condition concurrently while preventing the above mentioned problems. You can achieve this by calling **DDSAsyncWaitSet::unlock\_condition** (p. 1270) on the Condition being dispatched within the dispatch callback. Note that the AsyncWaitSet locks a Condition each time it dispatches it. Hence you need to unlock the Condition each time you want to enable a concurrent dispatch.

### 9.236.4 AsyncWaitSet Events and Resources

Besides **DDSCondition** (p. 1276) processing, you can listen to other kind of internal events related to the **DDSAsyncWaitSet** (p. 1259) and its thread pool by means of the **DDSAsyncWaitSetListener** (p. 1275).

**DDSAsyncWaitSet** (p. 1259) exposes operations to start and stop the asynchronous wait, which involves the creation and deletion of the thread pool respectively.

**DDSAsyncWaitSet** (p. 1259) relies on thread-specific storage to provide the described functionality. Each application thread that calls an operation on a **DDSAsyncWaitSet** (p. 1259) will generate resources that will be associated with such thread. You can free these resources upon thread termination by calling **DDSDomainParticipantFactory::unregister\_thread** (p. 1448).

MT Safety:

Safe.

See also

**DDSWaitSet** (p. 1629)

**DDSCondition** (p. 1276)

**DDSAsyncWaitSetListener** (p. 1275)

**DDSAsyncWaitSetCompletionToken** (p. 1273).

**DDS\_AsyncWaitSetProperty\_t** (p. 594)

## 9.236.5 Constructor & Destructor Documentation

### 9.236.5.1 DDSAsyncWaitSet() [1/4]

```
DDSAsyncWaitSet::DDSAsyncWaitSet ( )
```

Creates a **DDSAsyncWaitSet** (p. 1259) with default property.

### 9.236.5.2 DDSAsyncWaitSet() [2/4]

```
DDSAsyncWaitSet::DDSAsyncWaitSet (
    const DDS_AsyncWaitSetProperty_t & property )
```

Single-argument constructor that allows creating a **DDSAsyncWaitSet** (p. 1259) with custom behavior.

You can provide **DDS\_ASYNC\_WAITSET\_PROPERTY\_DEFAULT** (p. 293) as `property` to create an **DDSAsyncWaitSet** (p. 1259) with default behavior.

The **DDSAsyncWaitSet** (p. 1259) is created with no listener installed.

Parameters

<code>property</code>	<< <i>in</i> >> (p. 238) configuration <b>DDS_AsyncWaitSetProperty_t</b> (p. 594)
-----------------------	---

### 9.236.5.3 DDSAsyncWaitSet() [3/4]

```
DDSAsyncWaitSet::DDSAsyncWaitSet (
```

```
const DDS_AsyncWaitSetProperty_t & property,
      DDSAsyncWaitSetListener * listener )
```

Constructor that allows specifying a **DDSAsyncWaitSetListener** (p. 1275).

Creates a new **DDSAsyncWaitSet** (p. 1259) with the specified property **DDS\_AsyncWaitSetProperty\_t** (p. 594) and **DDSAsyncWaitSetListener** (p. 1275).

#### Parameters

<i>property</i>	<< <i>in</i> >> (p. 238) configuration <b>DDS_AsyncWaitSetProperty_t</b> (p. 594)
<i>listener</i>	<< <i>in</i> >> (p. 238) the <b>DDSAsyncWaitSetListener</b> (p. 1275). Cannot be NULL.

#### 9.236.5.4 DDSAsyncWaitSet() [4/4]

```
DDSAsyncWaitSet::DDSAsyncWaitSet (
    const DDS_AsyncWaitSetProperty_t & property,
    DDSAsyncWaitSetListener * listener,
    DDSThreadFactory * thread_factory )
```

Constructor with arguments that allow specifying behavior different than the default one, including specifying a **DDSThreadFactory** (p. 1615) for the creation and deletion of the threads within the thread pool.

This operation extends **DDSAsyncWaitSet::DDSAsyncWaitSet()** (p. 1263) by allowing to provide a **DDSThreadFactory** (p. 1615)

#### Parameters

<i>property</i>	<< <i>in</i> >> (p. 238) configuration <b>DDS_AsyncWaitSetProperty_t</b> (p. 594)
<i>listener</i>	<< <i>in</i> >> (p. 238) the <b>DDSAsyncWaitSetListener</b> (p. 1275). Cannot be NULL.
<i>thread_factory</i>	<< <i>in</i> >> (p. 238) <b>DDSThreadFactory</b> (p. 1615) for the creation and deletion of threads.

#### 9.236.5.5 ~DDSAsyncWaitSet()

```
virtual DDSAsyncWaitSet::~DDSAsyncWaitSet ( ) [virtual]
```

Deletes a **DDSAsyncWaitSet** (p. 1259).

If the **DDSAsyncWaitSet** (p. 1259) is started, this operation will initiate the stop procedure and block until it completes.

The deletion will fail if there are outstanding **DDSAsyncWaitSetCompletionToken** (p. 1273) that have not been deleted.

Any outstanding **DDSAsyncWaitSet** (p. 1259) must be deleted before finalizing the **DDSDomainParticipantFactory** (p. 1426). Otherwise undefined behavior may occur.

See also

**DDSAsyncWaitSet::DDSAsyncWaitSet()** (p. 1263)

## 9.236.6 Member Function Documentation

### 9.236.6.1 start()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::start ( ) [virtual]
```

Initiates the asynchronous wait on this **DDSAsyncWaitSet** (p. 1259).

This operation is equivalent to calling **DDSAsyncWaitSet::start\_with\_completion\_token** (p. 1265) providing **DDSAsyncWaitSet::COMPLETION\_TOKEN\_USE\_IMPLICIT\_AND\_WAIT** (p. 293) as a *completion\_token*.

This operation blocks until the start request completes. Upon successful return, it is guaranteed that this **DDSAsyncWaitSet** (p. 1259) has initiated the asynchronous wait and dispatch.

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDSAsyncWaitSet::start\_with\_completion\_token** (p. 1265)

**DDSAsyncWaitSet::stop** (p. 1266)

### 9.236.6.2 start\_with\_completion\_token()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::start_with_completion_token (
    DDSAsyncWaitSetCompletionToken * completion_token ) [virtual]
```

Initiates the asynchronous wait on this **DDSAsyncWaitSet** (p. 1259).

If this operation succeeds, a start request has been scheduled and your application can use the provided *completion\_token* to wait for this **DDSAsyncWaitSet** (p. 1259) to process the request. If the **DDSAsyncWaitSetCompletionToken::wait** (p. 1274) operation returns successfully, it is guaranteed that the thread pool has been created and the leader thread is waiting for the attached **DDSCondition** (p. 1276) to trigger.

Once this **DDSAsyncWaitSet** (p. 1259) is started, attached **DDSCondition** (p. 1276) will be dispatched through the **DDSCondition::dispatch** (p. 1278) operation when they trigger.

The start procedure causes the **DDSAsyncWaitSet** (p. 1259) to spawn all the threads within the thread pool, which involves the underlying operating system to allocate the associated thread stack and context for each thread. If a **DDSAsyncWaitSetListener** (p. 1275) is installed, this **DDSAsyncWaitSet** (p. 1259) will sequentially invoke the **DDSAsyncWaitSetListener::on\_thread\_spawned** (p. 1275) once per spawned thread.

A **DDSAsyncWaitSet** (p. 1259) can be restarted after a stop. If this **DDSAsyncWaitSet** (p. 1259) is already started, this operation will return immediately with success, and waiting on the `completion_token` will also return immediately with success.

#### Parameters

<i>completion_token</i>	<p>&lt;&lt;<i>inout</i>&gt;&gt; (p. 238) a valid <b>DDSAsyncWaitSetCompletionToken</b> (p. 1273) instance that can be used by your application to wait for the start request to complete. You can provide one of the special sentinels <b>DDSAsyncWaitSet::COMPLETION_TOKEN_USE_IMPLICIT_AND_WAIT</b> (p. 293) and <b>DDSAsyncWaitSet::COMPLETION_TOKEN_IGNORE</b> (p. 293).</p>
-------------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDSAsyncWaitSet::start** (p. 1265)

**DDSAsyncWaitSet::stop\_with\_completion\_token** (p. 1267)

**DDWaitSet::wait** (p. 1634)

### 9.236.6.3 stop()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::stop ( ) [virtual]
```

Initiates the stop procedure on this **DDSAsyncWaitSet** (p. 1259) that will stop the asynchronous wait.

This operation is equivalent to calling **DDSAsyncWaitSet::stop\_with\_completion\_token** (p. 1267) providing **DDSAsyncWaitSet::COMPLETION\_TOKEN\_USE\_IMPLICIT\_AND\_WAIT** (p. 293) as a `completion_token`.

This operation will block until the stop request completes. Upon successful return, it is guaranteed that this **DDSAsyncWaitSet** (p. 1259) stopped the asynchronous wait and dispatch.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--



See also

**DDSAsyncWaitSet::start\_with\_completion\_token** (p. 1265)

**DDSAsyncWaitSet::stop** (p. 1266)

#### 9.236.6.4 stop\_with\_completion\_token()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::stop_with_completion_token (
    DDSAsyncWaitSetCompletionToken * completion_token ) [virtual]
```

Initiates the stop procedure on this **DDSAsyncWaitSet** (p. 1259) that will stop the asynchronous wait.

If this operation succeeds, a stop request has been scheduled and your application can use the provided `completion_token` to wait for this **DDSAsyncWaitSet** (p. 1259) to process the request. If the **DDSAsyncWaitSetCompletionToken::wait** (p. 1274) operation returns successfully, it is guaranteed that the thread pool has been deleted and this **DDSAsyncWaitSet** (p. 1259) no longer process any of the attached **DDSCondition** (p. 1276) objects.

Once this **DDSAsyncWaitSet** (p. 1259) is stopped, the **DDSCondition::dispatch** (p. 1278) will no longer be called on any of the attached **DDSCondition** (p. 1276), no matter what their trigger value is.

The stop procedure causes the **DDSAsyncWaitSet** (p. 1259) to delete all the threads within the thread pool, which involves the underlying operating system to release the associated thread stack and context of each thread. If a **DDSAsyncWaitSetListener** (p. 1275) is installed, this **DDSAsyncWaitSet** (p. 1259) will sequentially invoke the **DDSAsyncWaitSetListener::on\_thread\_deleted** (p. 1275) once per deleted thread.

If this **DDSAsyncWaitSet** (p. 1259) is already stopped, this operation will return immediately with success, and waiting on the `completion_token` will also return immediately with success.

#### Parameters

<i>completion_token</i>	<p>&lt;&lt;<i>inout</i>&gt;&gt; (p. 238) a valid <b>DDSAsyncWaitSetCompletionToken</b> (p. 1273) instance that can be used by your application to wait for the stop request to complete. You can provide one of the special sentinels <b>DDSAsyncWaitSet::COMPLETION_TOKEN_USE_IMPLICIT_AND_WAIT</b> (p. 293) and <b>DDSAsyncWaitSet::COMPLETION_TOKEN_IGNORE</b> (p. 293).</p>
-------------------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDSAsyncWaitSet::stop** (p. 1266)

**DDSAsyncWaitSet::start\_with\_completion\_token** (p. 1265)

### 9.236.6.5 attach\_condition()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::attach_condition (
    DDSCondition * condition ) [virtual]
```

Attaches the specified **DDSCondition** (p. 1276) to this **DDSAsyncWaitSet** (p. 1259).

This operation is equivalent to calling **DDSAsyncWaitSet::attach\_condition\_with\_completion\_token** (p. 1269) providing **DDSAsyncWaitSet::COMPLETION\_TOKEN\_USE\_IMPLICIT\_AND\_WAIT** (p. 293) as a `completion_token`.

This operation will block until the attach request completes. Upon successful return, it is guaranteed that the specified **DDSCondition** (p. 1276) is attached.

#### Parameters

<i>condition</i>	<< <i>in</i> >> (p. 238) <b>DDSCondition</b> (p. 1276) to be attached.
------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDSAsyncWaitSet::attach\_condition\_with\_completion\_token** (p. 1269)

### 9.236.6.6 detach\_condition()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::detach_condition (
    DDSCondition * condition ) [virtual]
```

Deaches the specified **DDSCondition** (p. 1276) from this **DDSAsyncWaitSet** (p. 1259).

This operation is equivalent to call **DDSAsyncWaitSet::detach\_condition\_with\_completion\_token** (p. 1269) providing **DDSAsyncWaitSet::COMPLETION\_TOKEN\_USE\_IMPLICIT\_AND\_WAIT** (p. 293) as a `completion_token`.

This operation blocks until the detach request completes. Upon successful return, it is guaranteed that the specified **DDSCondition** (p. 1276) is detached.

#### Parameters

<i>condition</i>	<< <i>in</i> >> (p. 238) <b>DDSCondition</b> (p. 1276) to be detached.
------------------	--

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## See also

**DDSAsyncWaitSet::detach\_condition\_with\_completion\_token** (p. 1269)

## 9.236.6.7 attach\_condition\_with\_completion\_token()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::attach_condition_with_completion_token (
    DDSCondition * condition,
    DDSAsyncWaitSetCompletionToken * completion_token ) [virtual]
```

Attaches the specified **DDSCondition** (p. 1276) to this **DDSAsyncWaitSet** (p. 1259).

If this operation succeeds, an attach request has been scheduled and your application can use the output parameter `completion_token` to wait for this **DDSAsyncWaitSet** (p. 1259) to process the request. **DDSAsyncWaitSet**↔**CompletionToken::wait** (p. 1274) operation returns successfully, it is guaranteed that the **DDSCondition** (p. 1276) is attached to this **DDSAsyncWaitSet** (p. 1259).

Once the **DDSCondition** (p. 1276) is attached, its trigger value may cause the leader thread of the **DDSAsyncWaitSet** (p. 1259) to wake up call the **DDSCondition::dispatch** (p. 1278) operation.

**DDSCondition** (p. 1276) may be attached at any time independently of the state of the **DDSAsyncWaitSet** (p. 1259).

## Parameters

<i>condition</i>	<< <i>in</i> >> (p. 238) <b>DDSCondition</b> (p. 1276) to be attached.
<i>completion_token</i>	<< <i>inout</i> >> (p. 238) a valid <b>DDSAsyncWaitSetCompletionToken</b> (p. 1273) instance that can be used by your application to wait for the attach request to complete. You can provide one of the special sentinels <b>DDSAsyncWaitSet::COMPLETION_TOKEN_USE_IMPLICIT_AND_WAIT</b> (p. 293) and <b>DDSAsyncWaitSet::COMPLETION_TOKEN_IGNORE</b> (p. 293).

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## See also

**DDSAsyncWaitSet::attach\_condition** (p. 1267)

**DDSAsyncWaitSet::detach\_condition\_with\_completion\_token** (p. 1269)

**DDSAsyncWaitSetCompletionToken::wait** (p. 1274)

### 9.236.6.8 detach\_condition\_with\_completion\_token()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::detach_condition_with_completion_token (
    DDSCondition * condition,
    DDSAsyncWaitSetCompletionToken * completion_token ) [virtual]
```

Detaches the specified **DDSCondition** (p. 1276) from this **DDSAsyncWaitSet** (p. 1259).

If this operation succeeds, a detach request has been scheduled and your application can use the provided `completion_token` to wait for this **DDSAsyncWaitSet** (p. 1259) to process the request. If the **DDSAsyncWaitSetCompletionToken::wait** (p. 1274) operation returns successfully, it is guaranteed that the **DDSCondition** (p. 1276) is detached from this **DDSAsyncWaitSet** (p. 1259).

Once the **DDSCondition** (p. 1276) is detached, it is guaranteed that the **DDSAsyncWaitSet** (p. 1259) will no longer process it so it is safe for your application to release any resources associated with the detached **DDSCondition** (p. 1276).

**DDSCondition** (p. 1276) may be detached at any time independently of the state of the **DDSAsyncWaitSet** (p. 1259).

#### Parameters

<i>condition</i>	<< <i>in</i> >> (p. 238) <b>DDSCondition</b> (p. 1276) to be detached.
<i>completion_token</i>	<< <i>inout</i> >> (p. 238) a valid <b>DDSAsyncWaitSetCompletionToken</b> (p. 1273) instance that can be used by your application to wait for the detach request to complete. You can provide one of the special sentinels <b>DDSAsyncWaitSet::COMPLETION_TOKEN_USE_IMPLICIT_AND_WAIT</b> (p. 293) and <b>DDSAsyncWaitSet::COMPLETION_TOKEN_IGNORE</b> (p. 293).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDSAsyncWaitSet::detach\_condition** (p. 1268)

**DDSAsyncWaitSet::attach\_condition\_with\_completion\_token** (p. 1269)

**DDSAsyncWaitSetCompletionToken::wait** (p. 1274)

### 9.236.6.9 unlock\_condition()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::unlock_condition (
    DDSCondition * condition ) [virtual]
```

Allows the **DDSCondition** (p. 1276) under dispatch to be available for concurrent dispatch from another thread from the pool.

This operation can be called from the dispatch callback of the **DDSCondition** (p. 1276) this **DDSAsyncWaitSet** (p. 1259) is dispatching. After successfully calling this operation, if the **DDSCondition** (p. 1276) becomes active this **DDSAsyncWaitSet** (p. 1259) is allowed to dispatch it again from any available thread from the pool.

You may call this operation any time you need the same **DDSCondition** (p. 1276) to be dispatched concurrently.

This operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) if you call it from a different context than the dispatch callback or on a different **DDSCondition** (p. 1276).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### 9.236.6.10 get\_property()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::get_property (
    DDS_AsyncWaitSetProperty_t & property ) [virtual]
```

Retrieves the **DDS\_AsyncWaitSetProperty\_t** (p. 594) configuration of the associated **DDSAsyncWaitSet** (p. 1259).

#### Parameters

<i>property</i>	<< <i>out</i> >> (p. 238)
-----------------	---------------------------

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### 9.236.6.11 get\_conditions()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::get_conditions (
    DDSConditionSeq & attached_conditions ) [virtual]
```

Retrieves the list of attached **DDSCondition** (p. 1276) (s).

#### Parameters

<i>attached_conditions</i>	<< <i>inout</i> >> (p. 238) a <b>DDSConditionSeq</b> (p. 1279) object where the list of attached conditions will be returned.
----------------------------	---

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## See also

**DDSAsyncWaitSet::attach\_condition** (p. 1267)

**DDSAsyncWaitSet::detach\_condition** (p. 1268)

**9.236.6.12 create\_completion\_token()**

```
virtual DDSAsyncWaitSetCompletionToken * DDSAsyncWaitSet::create_completion_token ( ) [virtual]
```

Creates a new **DDSAsyncWaitSetCompletionToken** (p. 1273).

All the created **DDSAsyncWaitSetCompletionToken** (p. 1273) must be deleted by calling **DDSAsyncWaitSet::delete\_completion\_token** (p. 1272).

## Returns

A new **DDSAsyncWaitSetCompletionToken** (p. 1273) or NULL on error.

## See also

**DDSAsyncWaitSet::delete\_completion\_token** (p. 1272)

**DDSAsyncWaitSet::~DDSAsyncWaitSet()** (p. 1264)

**9.236.6.13 delete\_completion\_token()**

```
virtual DDS_ReturnCode_t DDSAsyncWaitSet::delete_completion_token (
    DDSAsyncWaitSetCompletionToken * completion_token ) [virtual]
```

Deletes a **DDSAsyncWaitSetCompletionToken** (p. 1273) previously created from this **DDSAsyncWaitSet** (p. 1259).

This operation will fail if the specified `completion_token` was not created from this **DDSAsyncWaitSet** (p. 1259).

This operation will fail if the specified `completion_token` is associated with a request that has not completed yet.

## Parameters

<i>completion_token</i>	<< <i>inout</i> >> (p. 238) a valid <b>DDSAsyncWaitSetCompletionToken</b> (p. 1273) created from this <b>DDSAsyncWaitSet</b> (p. 1259).
-------------------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDSAsyncWaitSet::create\_completion\_token** (p. 1272)

**DDSAsyncWaitSet::~~DDSAsyncWaitSet()** (p. 1264)

## 9.237 DDSAsyncWaitSetCompletionToken Class Reference

<<*interface*>> (p. 237) Implementation of the completion token role element of the asynchronous completion token pattern that is part of the **DDSAsyncWaitSet** (p. 1259) behavior.

### Public Member Functions

- virtual **DDS\_ReturnCode\_t wait** (const **DDS\_Duration\_t** &max\_wait)=0  
*Waits for the request associated to an operation made on the **DDSAsyncWaitSet** (p. 1259) to complete.*

### 9.237.1 Detailed Description

<<*interface*>> (p. 237) Implementation of the completion token role element of the asynchronous completion token pattern that is part of the **DDSAsyncWaitSet** (p. 1259) behavior.

A **DDSAsyncWaitSetCompletionToken** (p. 1273) can be in one of the following states:

- **READY**: The completion token can be used to associate a new request. Calling **DDSAsyncWaitSetCompletionToken::wait** (p. 1274) on a ready completion token will return immediately with success. A ready completion token can only transition to the queued state.
- **QUEUED**: The completion token has an associated request that is pending processing. Calling **DDSAsyncWaitSetCompletionToken::wait** (p. 1274) on a queued completion token will block until the request completes or times out. A queued completion token can only transition to the processed state.
- **PROCESS**: The completion token has an associated request that has been processed but the application did not call **DDSAsyncWaitSetCompletionToken::wait** (p. 1274) yet. Calling **DDSAsyncWaitSetCompletionToken::wait** (p. 1274) on a processed completion token will return immediately with the return code result of processing the associated request. A processed completion token can transition to both ready or queued states.

## 9.237.2 AsyncWaitSetCompletionToken management

The same **DDSAsyncWaitSetCompletionToken** (p. 1273) instance can be reused multiple times to associate a request and wait for its completion. Reusing is allowed only if the completion token is either in `READY` or `PROCESSED` state. Otherwise the **DDSAsyncWaitSet** (p. 1259) operation that associates the completion token will fail with **DDS\_↔  
RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

The completion token functionality can be viewed as a **DDSAsyncWaitSet** (p. 1259) internal detail from which your application should not need to know. In general, it is recommended to use the default flavor of **DDSAsyncWaitSet** (p. 1259) operations that handle the internals of the completion tokens for you.

Nevertheless, if a completion token represents an expensive resource in your environment, your application may want to have full control of how and when completion tokens are created. It's for these reasons why is exposed as a public collaborator of the **DDSAsyncWaitSet** (p. 1259).

### MT Safety:

Safe.

### See also

**DDSAsyncWaitSet** (p. 1259)

## 9.237.3 Member Function Documentation

### 9.237.3.1 wait()

```
virtual DDS_ReturnCode_t DDSAsyncWaitSetCompletionToken::wait (
    const DDS_Duration_t & max_wait ) [pure virtual]
```

Waits for the request associated to an operation made on the **DDSAsyncWaitSet** (p. 1259) to complete.

This operation will block the calling thread for a maximum amount of time specified by `max_wait` until the **DDSAsync↔  
WaitSet** (p. 1259) request associated with this completion token completes.

If there is no timeout, upon return it is guaranteed that the request associated with this token completed. This operation may fail due to an error during the wait or while processing the associated request.

If this operation is called from within the context of one the thread that conforms the thread pool of the **DDSAsyncWaitSet** (p. 1259), it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

If the operation failed with **DDS\_RETCODE\_TIMEOUT** (p. 337) your application can wait again on this completion token.



## Parameters

<i>max_wait</i>	<< <i>in</i> >> (p. 238) Cannot be NULL. Maximum time to wait for the request associated to this completion token to complete before timeout.
-----------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDSAsyncWaitSet** (p. 1259)

## 9.238 DDSAsyncWaitSetListener Class Reference

<<*interface*>> (p. 237) Listener for receiving event notifications related to the thread pool of the **DDSAsyncWaitSet** (p. 1259).

### Public Member Functions

- virtual void **on\_thread\_spawned** (RTI\_UINT64 thread\_id)  
*Handles the spawning of each thread conforming the thread pool of the **DDSAsyncWaitSet** (p. 1259).*
- virtual void **on\_thread\_deleted** (RTI\_UINT64 thread\_id)  
*Handles the deletion of each thread conforming the thread pool of the **DDSAsyncWaitSet** (p. 1259).*
- virtual void **on\_wait\_timeout** (RTI\_UINT64 thread\_id)  
*Handles the wait timeout generated by the leader thread of the **DDSAsyncWaitSet** (p. 1259).*

### 9.238.1 Detailed Description

<<*interface*>> (p. 237) Listener for receiving event notifications related to the thread pool of the **DDSAsyncWaitSet** (p. 1259).

### 9.238.2 Member Function Documentation

#### 9.238.2.1 on\_thread\_spawned()

```
virtual void DDSAsyncWaitSetListener::on_thread_spawned (
    RTI_UINT64 thread_id ) [virtual]
```

Handles the spawning of each thread conforming the thread pool of the **DDSAsyncWaitSet** (p. 1259).

### 9.238.2.2 on\_thread\_deleted()

```
virtual void DDSAsyncWaitSetListener::on_thread_deleted (
    RTI_UINT64 thread_id ) [virtual]
```

Handles the deletion of each thread conforming the thread pool of the **DDSAsyncWaitSet** (p. 1259).

### 9.238.2.3 on\_wait\_timeout()

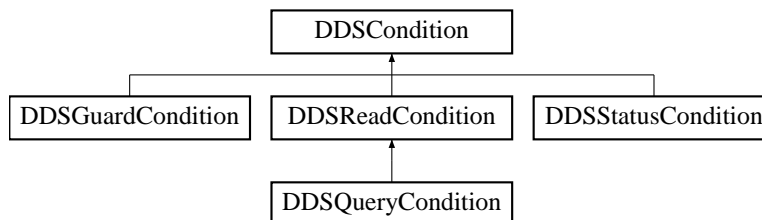
```
virtual void DDSAsyncWaitSetListener::on_wait_timeout (
    RTI_UINT64 thread_id ) [virtual]
```

Handles the wait timeout generated by the leader thread of the **DDSAsyncWaitSet** (p. 1259).

## 9.239 DDSCondition Class Reference

<<**interface**>> (p. 237) Root class for all the conditions that may be attached to a **DDSWaitSet** (p. 1629).

Inheritance diagram for DDSCondition:



### Public Member Functions

- virtual **DDS\_Boolean** **get\_trigger\_value** ()=0  
*Retrieve the `trigger_value`.*
- virtual **DDS\_ReturnCode\_t** **set\_handler** ( **DDSConditionHandler** \*handler)  
<<**extension**>> (p. 237) Registers a **DDSConditionHandler** (p. 1278) in this **DDSCondition** (p. 1276).
- virtual **DDSConditionHandler** \* **get\_handler** ()  
<<**extension**>> (p. 237) Returns the registered **DDSConditionHandler** (p. 1278).
- virtual void **dispatch** ()  
<<**extension**>> (p. 237) Calls **DDSConditionHandler::on\_condition\_triggered** (p. 1279) of the registered **DDSConditionHandler** (p. 1278).

## 9.239.1 Detailed Description

<<*interface*>> (p. 237) Root class for all the conditions that may be attached to a **DDSWaitSet** (p. 1629).

This basic class is specialised in three classes:

**DDSGuardCondition** (p. 1471), **DDSStatusCondition** (p. 1578), and **DDSReadCondition** (p. 1574).

A **DDSCondition** (p.1276) has a `trigger_value` that can be **DDS\_BOOLEAN\_TRUE** (p.317) or **DDS\_↔  
BOOLEAN\_FALSE** (p.317) and is set automatically by RTI Connex.

See also

**DDSWaitSet** (p. 1629)

## 9.239.2 Member Function Documentation

### 9.239.2.1 `get_trigger_value()`

```
virtual DDS_Boolean DDSCondition::get_trigger_value ( ) [pure virtual]
```

Retrieve the `trigger_value`.

Returns

the trigger value.

Implemented in **DDSGuardCondition** (p. 1473).

### 9.239.2.2 `set_handler()`

```
virtual DDS_ReturnCode_t DDSCondition::set_handler (
    DDSConditionHandler * handler ) [virtual]
```

<<*extension*>> (p. 237) Registers a **DDSConditionHandler** (p. 1278) in this **DDSCondition** (p. 1276).

This operation replaces any existing registered handler. If there is any resources associated with an existing registered handler that need to be released, you may first call **DDSCondition::get\_handler** (p. 1278) to retrieve the handler.

MT Safety:

It is not safe to call **DDSCondition::set\_handler** (p.1277), **DDSCondition::get\_handler** (p.1278) or **DDSCondition::dispatch** (p. 1278) concurrently.

## Parameters

<i>handler</i>	The <b>DDSConditionHandler</b> (p. 1278) to be called by <b>DDSCondition::dispatch</b> (p. 1278). If this parameter is null, an no-op handler implementation will be set.
----------------	---

**9.239.2.3 get\_handler()**

```
virtual DDSConditionHandler * DDSCondition::get_handler ( ) [virtual]
```

<<**extension**>> (p. 237) Returns the registered **DDSConditionHandler** (p. 1278).

If no **DDSConditionHandler** (p. 1278) is registered, this operation returns a no-op **DDSConditionHandler** (p. 1278) implementation.

**9.239.2.4 dispatch()**

```
virtual void DDSCondition::dispatch ( ) [virtual]
```

<<**extension**>> (p. 237) Calls **DDSConditionHandler::on\_condition\_triggered** (p. 1279) of the registered **DDSConditionHandler** (p. 1278).

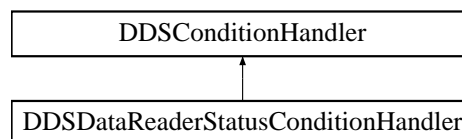
If the trigger value is true, calling this operation will call the registered.

If no **DDSConditionHandler** (p. 1278) is registered, this operation is a no-op.

**9.240 DDSConditionHandler Class Reference**

<<**extension**>> (p. 237) <<**interface**>> (p. 237) Handler called by the **DDSCondition::dispatch** (p. 1278).

Inheritance diagram for DDSConditionHandler:

**Public Member Functions**

- virtual void **on\_condition\_triggered** ( **DDSCondition** \*condition)=0  
Handles the dispatch of a **DDSCondition** (p. 1276).

## 9.240.1 Detailed Description

<<*extension*>> (p. 237) <<*interface*>> (p. 237) Handler called by the **DDSCondition::dispatch** (p. 1278).

Direct known implementations: **DDSDataReaderStatusConditionHandler** (p. 1318)

## 9.240.2 Member Function Documentation

### 9.240.2.1 on\_condition\_triggered()

```
virtual void DDSConditionHandler::on_condition_triggered (  
    DDSCondition * condition ) [pure virtual]
```

Handles the dispatch of a **DDSCondition** (p. 1276).

This callback is called by **DDSCondition::dispatch** (p. 1278).

Implemented in **DDSDataReaderStatusConditionHandler** (p. 1320).

## 9.241 DDSConditionSeq Struct Reference

Instantiates **FooSeq** (p. 1697) < **DDSCondition** (p. 1276) >

### 9.241.1 Detailed Description

Instantiates **FooSeq** (p. 1697) < **DDSCondition** (p. 1276) >

Instantiates:

<<*generic*>> (p. 237) **FooSeq** (p. 1697)

See also

**DDSWaitSet** (p. 1629)

**FooSeq** (p. 1697)

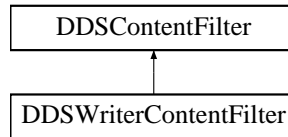
Examples

**HelloWorld\_subscriber.cxx.**

## 9.242 DDSContentFilter Class Reference

<<*interface*>> (p. 237) Interface to be used by a custom filter of a **DDSContentFilteredTopic** (p. 1283)

Inheritance diagram for DDSContentFilter:



### Public Member Functions

- virtual **DDS\_ReturnCode\_t compile** (void \*\*new\_compile\_data, const char \*expression, const **DDS\_String**↔**Seq** &parameters, const **DDS\_TypeCode** \*type\_code, const char \*type\_class\_name, void \*old\_compile\_data)=0  
*Compile an instance of the content filter according to the filter expression and parameters of the given data type.*
- virtual **DDS\_Boolean evaluate** (void \*compile\_data, const void \*sample, const struct **DDS\_FilterSampleInfo** \*meta\_data)=0  
*Evaluate whether the sample is passing the filter or not according to the sample content.*
- virtual void **finalize** (void \*compile\_data)=0  
*A previously compiled instance of the content filter is no longer in use and resources can now be cleaned up.*

### 9.242.1 Detailed Description

<<*interface*>> (p. 237) Interface to be used by a custom filter of a **DDSContentFilteredTopic** (p. 1283)

Entity:

**DDSContentFilteredTopic** (p. 1283)

This interface can be implemented by an application-provided class and then registered with the **DDSDomain**↔**Participant** (p. 1351) such that samples can be filtered for a **DDSContentFilteredTopic** (p. 1283) with the given filter name.

**Note:** the API for using a custom content filter is subject to change in a future release.

See also

**DDSContentFilteredTopic** (p. 1283)

**DDSDomainParticipant::register\_contentfilter** (p. 1364)

### 9.242.2 Member Function Documentation

## 9.242.2.1 compile()

```
virtual DDS_ReturnCode_t DDSContentFilter::compile (
    void ** new_compile_data,
    const char * expression,
    const DDS_StringSeq & parameters,
    const DDS_TypeCode * type_code,
    const char * type_class_name,
    void * old_compile_data ) [pure virtual]
```

Compile an instance of the content filter according to the filter expression and parameters of the given data type.

This method is called when an instance of the locally registered content filter is created or when the expression parameter for the locally registered content filter instance is changed.

An instance of the locally registered content filter is created every time a local **DDSContentFilteredTopic** (p. 1283) with the matching filter name is created, or when a **DDSDataReader** (p. 1288) with a matching filter name is discovered.

It is possible for multiple threads to be calling into this function at the same time. However, this function will never be called on a content filter that has been unregistered.

## Parameters

<i>new_compile_data</i>	<< <b>out</b> >> (p. 238) User specified opaque pointer of this instance of the content filter. This value is then passed to the <b>DDSContentFilter::evaluate</b> (p. 1282) and <b>DDSContentFilter::finalize</b> (p. 1282) functions for this instance of the content filter. Can be set to NULL .
<i>expression</i>	<< <b>in</b> >> (p. 238) An ASCIIZ string with the filter expression. The memory used by this string is owned by RTI Connex and <b>must</b> not be freed. If you want to manipulate this string, you <b>must</b> first make a copy of it.
<i>parameters</i>	<< <b>in</b> >> (p. 238) A string sequence with the expression parameters the <b>DDSContentFilteredTopic</b> (p. 1283) was created with. The string sequence is <b>equal</b> (but <b>not</b> identical) to the string sequence passed to <b>DDSDomainParticipant::create_contentfilteredtopic</b> (p. 1385). Note that the sequence passed to the compile function is <b>owned</b> by RTI Connex and <b>must not</b> be referenced outside the compile function.
<i>type_code</i>	<< <b>in</b> >> (p. 238) A pointer to the type code for the related <b>DDSTopic</b> (p. 1617) of the <b>DDSContentFilteredTopic</b> (p. 1283). A type_code is a description of a type in terms of which types it contains (such as long, string, etc.) and the corresponding member field names in the data type structure. The type code can be used to write custom content filters that can be used with any type.
<i>type_class_name</i>	<< <b>in</b> >> (p. 238) Fully qualified class name of the related <b>DDSTopic</b> (p. 1617).
<i>old_compile_data</i>	<< <b>in</b> >> (p. 238) The previous new_compile_data value from a previous call to this instance of a content filter. If the compile function is called more than once for an instance of a <b>DDSContentFilteredTopic</b> (p. 1283), e.g., if the expression parameters are changed, then the new_compile_data value returned by the previous invocation is passed in the old_compile_data parameter (which can be NULL ). If this is a new instance of the filter, NULL is passed. This parameter is useful for freeing or reusing previously allocated resources.

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

### 9.242.2.2 evaluate()

```
virtual DDS_Boolean DDSContentFilter::evaluate (
    void * compile_data,
    const void * sample,
    const struct DDS_FilterSampleInfo * meta_data ) [pure virtual]
```

Evaluate whether the sample is passing the filter or not according to the sample content.

This method is called when a sample for a locally created **DDSDataReader** (p. 1288) associated with the filter is received, or when a sample for a discovered **DDSDataReader** (p. 1288) associated with the filter needs to be sent.

It is possible for multiple threads to be calling into this function at the same time. However, this function will never be called on a content filter that has been unregistered.

#### Parameters

<i>compile_data</i>	<< <i>in</i> >> (p. 238) The last return value of the <b>DDSContentFilter::compile</b> (p. 1280) function for this instance of the content filter. Can be NULL .
<i>sample</i>	<< <i>in</i> >> (p. 238) Pointer to a deserialized sample to be filtered
<i>meta_data</i>	<< <i>in</i> >> (p. 238) Pointer to meta data associated with the sample.

#### Returns

The function must return 0 if the sample should be filtered out, non zero otherwise

### 9.242.2.3 finalize()

```
virtual void DDSContentFilter::finalize (
    void * compile_data ) [pure virtual]
```

A previously compiled instance of the content filter is no longer in use and resources can now be cleaned up.

This method is called when an instance of the locally registered content filter is deleted.

An instance of the locally registered content filter is deleted every time a local **DDSContentFilteredTopic** (p. 1283) with the matching filter name is deleted, or when a **DDSDataReader** (p. 1288) with a matching filter name is removed due to discovery.

This method is also called on all instances of the discovered **DDSDataReader** (p. 1288) with a matching filter name if the filter is unregistered with **DDSDomainParticipant::unregister\_contentfilter** (p. 1365).

It is possible for multiple threads to be calling into this function at the same time. However, this function will never be called on a content filter that has been unregistered.



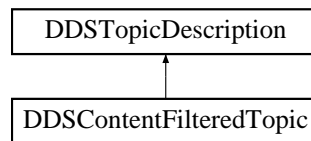
## Parameters

<i>compile_data</i>	<< <i>in</i> >> (p. 238) The last return value of the <b>DDSContentFilter::compile</b> (p. 1280) function for this instance of the content filter. Can be NULL
---------------------	--

## 9.243 DDSContentFilteredTopic Class Reference

<<*interface*>> (p. 237) Specialization of **DDSTopicDescription** (p. 1624) that allows for content-based subscriptions.

Inheritance diagram for DDSContentFilteredTopic:



### Public Member Functions

- virtual const char \* **get\_filter\_expression** ()=0  
*Get the filter\_expression.*
- virtual **DDS\_ReturnCode\_t** **get\_expression\_parameters** ( **DDS\_StringSeq** &parameters)=0  
*Get the expression\_parameters.*
- virtual **DDS\_ReturnCode\_t** **set\_expression\_parameters** (const **DDS\_StringSeq** &parameters)=0  
*Set the expression\_parameters.*
- virtual **DDS\_ReturnCode\_t** **set\_expression** (const char \*expression, const **DDS\_StringSeq** &parameters)=0  
*Set the filter\_expression and expression\_parameters.*
- virtual **DDS\_ReturnCode\_t** **append\_to\_expression\_parameter** (const **DDS\_Long** index, const char \*val)=0  
<<*extension*>> (p. 237) Appends a string term to the specified parameter string.
- virtual **DDS\_ReturnCode\_t** **remove\_from\_expression\_parameter** (const **DDS\_Long** index, const char \*val)=0  
<<*extension*>> (p. 237) Removes a string term from the specified parameter string.
- virtual **DDSTopic** \* **get\_related\_topic** ()=0  
*Get the related\_topic.*

### Static Public Member Functions

- static **DDSContentFilteredTopic** \* **narrow** ( **DDSTopicDescription** \*topic\_description)  
*Narrow the given DDSTopicDescription (p. 1624) pointer to a DDSContentFilteredTopic (p. 1283) pointer.*

### 9.243.1 Detailed Description

<<*interface*>> (p. 237) Specialization of **DDSTopicDescription** (p. 1624) that allows for content-based subscriptions.

It describes a more sophisticated subscription that indicates a **DDSDataReader** (p. 1288) does not want to necessarily see all values of each instance published under the **DDSTopic** (p. 1617). Rather, it wants to see only the values whose contents satisfy certain criteria. This class therefore can be used to request content-based subscriptions.

The selection of the content is done using the `filter_expression` with parameters `expression_↵` parameters.

- The `filter_expression` attribute is a string that specifies the criteria to select the data samples of interest. It is similar to the WHERE part of an SQL clause.
- The `expression_parameters` attribute is a sequence of strings that give values to the 'parameters' (i.e. "%n" tokens) in the `filter_expression`. The number of supplied parameters must fit with the requested values in the `filter_expression` (i.e. the number of n tokens).

**Queries and Filters Syntax** (p.179) describes the syntax of `filter_expression` and `expression_↵` parameters.

### 9.243.2 Member Function Documentation

#### 9.243.2.1 narrow()

```
static DDSContentFilteredTopic * DDSContentFilteredTopic::narrow (  
    DDSTopicDescription * topic_description ) [static]
```

Narrow the given **DDSTopicDescription** (p. 1624) pointer to a **DDSContentFilteredTopic** (p. 1283) pointer.

#### Returns

**DDSContentFilteredTopic** (p.1283) if this **DDSTopicDescription** (p.1624) is a **DDSContentFilteredTopic** (p. 1283). Otherwise, return NULL.

### 9.243.2.2 get\_filter\_expression()

```
virtual const char * DDSContentFilteredTopic::get_filter_expression ( ) [pure virtual]
```

Get the `filter_expression`.

Return the `filter_expression` associated with the **DDSContentFilteredTopic** (p.1283). `filter_expression` is either specified on the last successful call to **DDSContentFilteredTopic::set\_expression** (p.1286) or, if that method is never called, the expression specified when the **DDSContentFilteredTopic** (p.1283) was created.

#### Returns

the `filter_expression`.

### 9.243.2.3 get\_expression\_parameters()

```
virtual DDS_ReturnCode_t DDSContentFilteredTopic::get_expression_parameters (
    DDS_StringSeq & parameters ) [pure virtual]
```

Get the `expression_parameters`.

Return the `expression_parameters` associated with the **DDSContentFilteredTopic** (p.1283). `expression_parameters` is either specified on the last successful call to **DDSContentFilteredTopic::set\_expression\_parameters** (p.1285), **DDSContentFilteredTopic::set\_expression** (p.1286) or, if that method is never called, the parameters specified when the **DDSContentFilteredTopic** (p.1283) was created.

#### Parameters

<i>parameters</i>	<< <i>inout</i> >> (p.238) the filter expression parameters. The memory for the strings in this sequence is managed according to the conventions described in <b>String Conventions</b> (p.552). In particular, be careful to avoid a situation in which RTI Connexx allocates a string on your behalf and you then reuse that string in such a way that RTI Connexx believes it to have more memory allocated to it than it actually does.
-------------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p.336)
------------	---

#### See also

**DDSDomainParticipant::create\_contentfilteredtopic** (p.1385)

**DDSContentFilteredTopic::set\_expression\_parameters** (p.1285)

#### 9.243.2.4 set\_expression\_parameters()

```
virtual DDS_ReturnCode_t DDSContentFilteredTopic::set_expression_parameters (
    const DDS_StringSeq & parameters ) [pure virtual]
```

Set the `expression_parameters`.

Change the `expression_parameters` associated with the **DDSContentFilteredTopic** (p. 1283).

##### Parameters

<i>parameters</i>	<< <i>in</i> >> (p. 238) the filter expression parameters Length of sequence cannot be greater than 100.
-------------------	--

##### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### 9.243.2.5 set\_expression()

```
virtual DDS_ReturnCode_t DDSContentFilteredTopic::set_expression (
    const char * expression,
    const DDS_StringSeq & parameters ) [pure virtual]
```

Set the `filter_expression` and `expression_parameters`.

Changes the `filter_expression` and `expression_parameters` associated with the **DDSContentFilteredTopic** (p. 1283).

##### Parameters

<i>expression</i>	<< <i>in</i> >> (p. 238) the filter expression.
<i>parameters</i>	<< <i>in</i> >> (p. 238) the filter expression parameters Length of sequence cannot be greater than 100.

##### Returns

One of the **Standard Return Codes** (p. 336)

#### 9.243.2.6 append\_to\_expression\_parameter()

```
virtual DDS_ReturnCode_t DDSContentFilteredTopic::append_to_expression_parameter (
    const DDS_Long index,
    const char * val ) [pure virtual]
```

<<**extension**>> (p. 237) Appends a string term to the specified parameter string.

Appends the input string to the end of the specified parameter string, separated by a comma. If the original parameter string is enclosed in quotation marks ("), the resultant string will also be enclosed in quotation marks.

This method can be used in expression parameters associated with MATCH operators in order to add a pattern to the match pattern list. For example, if the filter expression parameter value is:

'IBM'

Then `append_to_expression_parameter(0, "MSFT")` would generate the new value:

'IBM,MSFT'

#### Parameters

<i>index</i>	<< <b>in</b> >> (p. 238) The index of the parameter string to be modified. The first index is index 0. When using the <b>DDS_STRINGMATCHFILTER_NAME</b> (p. 59) filter, <i>index</i> <i>must</i> be 0.
<i>val</i>	<< <b>in</b> >> (p. 238) The string term to be appended to the parameter string.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.243.2.7 `remove_from_expression_parameter()`

```
virtual DDS_ReturnCode_t DDSContentFilteredTopic::remove_from_expression_parameter (
    const DDS_Long index,
    const char * val ) [pure virtual]
```

<<**extension**>> (p. 237) Removes a string term from the specified parameter string.

Removes the input string from the specified parameter string. To be found and removed, the input string must exist as a complete term, bounded by comma separators or the string boundary. If the original parameter string is enclosed in quotation marks ("), the resultant string will also be enclosed in quotation marks. If the removed term was the last entry in the string, the result will be a string of empty quotation marks.

This method can be used in expression parameters associated with MATCH operators in order to remove a pattern from the match pattern list. For example, if the filter expression parameter value is:

'IBM,MSFT'

Then `remove_from_expression_parameter(0, "IBM")` would generate the expression:

'MSFT'

## Parameters

<i>index</i>	<< <i>in</i> >> (p. 238) The index of the parameter string to be modified. The first index is index 0. When using the <b>DDS_STRINGMATCHFILTER_NAME</b> (p. 59) filter, <i>index</i> <i>must</i> be 0.
<i>val</i>	<< <i>in</i> >> (p. 238) The string term to be removed from the parameter string.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

9.243.2.8 `get_related_topic()`

```
virtual DDSTopic * DDSContentFilteredTopic::get_related_topic ( ) [pure virtual]
```

Get the `related_topic`.

Return the **DDSTopic** (p. 1617) specified when the **DDSContentFilteredTopic** (p. 1283) was created.

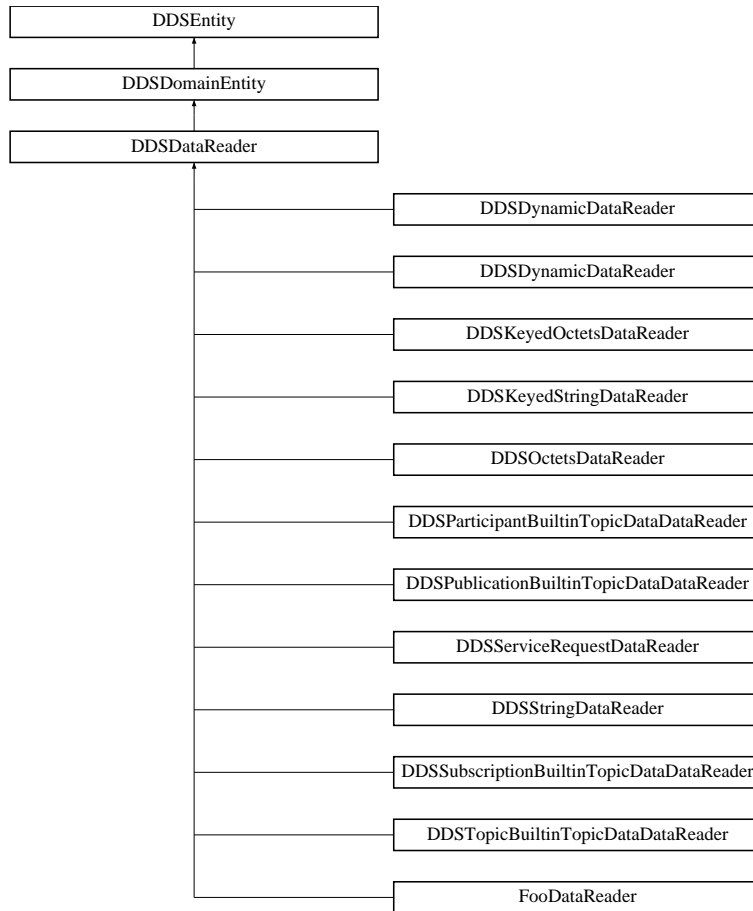
## Returns

The **DDSTopic** (p. 1617) associated with the **DDSContentFilteredTopic** (p. 1283).

9.244 **DDSDataReader Class Reference**

<<*interface*>> (p. 237) Allows the application to: (1) declare the data it wishes to receive (i.e. make a subscription) and (2) access the data received by the attached **DDSSubscriber** (p. 1592).

Inheritance diagram for DDSDataReader:



## Public Member Functions

- virtual **DDSReadCondition** \* **create\_readcondition** ( **DDS\_SampleStateMask** sample\_states, **DDS\_View↔StateMask** view\_states, **DDS\_InstanceStateMask** instance\_states)  
Creates a **DDSReadCondition** (p. 1574).
- virtual **DDSReadCondition** \* **create\_readcondition\_w\_params** ( **DDS\_ReadConditionParams** &params)  
<<extension>> (p. 237) Creates a **DDSReadCondition** (p. 1574) with parameters.
- virtual **DDSQueryCondition** \* **create\_querycondition** ( **DDS\_SampleStateMask** sample\_states, **DDS\_↔ViewStateMask** view\_states, **DDS\_InstanceStateMask** instance\_states, const char \*query\_expression, const struct **DDS\_StringSeq** &query\_parameters)  
Creates a **DDSQueryCondition** (p. 1573).
- virtual **DDSQueryCondition** \* **create\_querycondition\_w\_params** ( **DDS\_QueryConditionParams** &params)  
<<extension>> (p. 237) Creates a **DDSQueryCondition** (p. 1573) with parameters.
- virtual **DDS\_ReturnCode\_t** **delete\_readcondition** ( **DDSReadCondition** \*condition)  
Deletes a **DDSReadCondition** (p. 1574) or **DDSQueryCondition** (p. 1573) attached to the **DDSDataReader** (p. 1288).
- virtual **DDS\_ReturnCode\_t** **delete\_contained\_entities** ()  
Deletes all the entities that were created by means of the "create" operations on the **DDSDataReader** (p. 1288).
- virtual **DDS\_ReturnCode\_t** **wait\_for\_historical\_data** (const **DDS\_Duration\_t** &max\_wait)  
Waits until all "historical" data is received for **DDSDataReader** (p. 1288) entities that have a non-VOLATILE Durability Qos kind.

- virtual **DDS\_ReturnCode\_t** **acknowledge\_sample** (const **DDS\_SampleInfo** &sample\_info)  
 <<extension>> (p. 237) Acknowledges a single sample explicitly.
- virtual **DDS\_ReturnCode\_t** **acknowledge\_all** ()  
 <<extension>> (p. 237) Acknowledges all previously accessed samples.
- virtual **DDS\_ReturnCode\_t** **acknowledge\_sample** (const **DDS\_SampleInfo** &sample\_info, const **DDS\_AckResponseData\_t** &response\_data)  
 <<extension>> (p. 237) Acknowledges a single sample explicitly.
- virtual **DDS\_ReturnCode\_t** **acknowledge\_all** (const **DDS\_AckResponseData\_t** &response\_data)  
 <<extension>> (p. 237) Acknowledges all previously accessed samples.
- virtual **DDS\_ReturnCode\_t** **get\_matched\_publications** (**DDS\_InstanceHandleSeq** &publication\_handles)  
 Retrieves the list of publications currently "associated" with this **DDSDataReader** (p. 1288).
- virtual **DDS\_ReturnCode\_t** **get\_matched\_publication\_data** (**DDS\_PublicationBuiltinTopicData** &publication\_data, const **DDS\_InstanceHandle\_t** &publication\_handle)  
 Retrieves the information on a publication that is currently "associated" with the **DDSDataReader** (p. 1288).
- virtual **DDS\_ReturnCode\_t** **is\_matched\_publication\_alive** (**DDS\_Boolean** &is\_alive, const **DDS\_InstanceHandle\_t** &publication\_handle)  
 Check if a publication currently matched with a **DataReader** is alive.
- virtual **DDS\_ReturnCode\_t** **get\_matched\_publication\_participant\_data** (**DDS\_ParticipantBuiltinTopicData** &participant\_data, const **DDS\_InstanceHandle\_t** &publication\_handle)  
 <<extension>> (p. 237) Retrieves the information on the discovered **DDSDomainParticipant** (p. 1351) associated with the publication that is currently matching with the **DDSDataReader** (p. 1288).
- virtual **DDSTopicDescription** \* **get\_topicdescription** ()  
 Returns the **DDSTopicDescription** (p. 1624) associated with the **DDSDataReader** (p. 1288).
- virtual **DDSSubscriber** \* **get\_subscriber** ()  
 Returns the **DDSSubscriber** (p. 1592) to which the **DDSDataReader** (p. 1288) belongs.
- virtual **DDS\_ReturnCode\_t** **get\_sample\_rejected\_status** (**DDS\_SampleRejectedStatus** &status)  
 Accesses the **DDS\_SAMPLE\_REJECTED\_STATUS** (p. 345) communication status.
- virtual **DDS\_ReturnCode\_t** **get\_liveliness\_changed\_status** (**DDS\_LivelinessChangedStatus** &status)  
 Accesses the **DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346) communication status.
- virtual **DDS\_ReturnCode\_t** **get\_requested\_deadline\_missed\_status** (**DDS\_RequestedDeadlineMissedStatus** &status)  
 Accesses the **DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS** (p. 344) communication status.
- virtual **DDS\_ReturnCode\_t** **get\_requested\_incompatible\_qos\_status** (**DDS\_RequestedIncompatibleQosStatus** &status)  
 Accesses the **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) communication status.
- virtual **DDS\_ReturnCode\_t** **get\_sample\_lost\_status** (**DDS\_SampleLostStatus** &status)  
 Accesses the **DDS\_SAMPLE\_LOST\_STATUS** (p. 345) communication status.
- virtual **DDS\_ReturnCode\_t** **get\_subscription\_matched\_status** (**DDS\_SubscriptionMatchedStatus** &status)  
 Accesses the **DDS\_SUBSCRIPTION\_MATCHED\_STATUS** (p. 347) communication status.
- virtual **DDS\_ReturnCode\_t** **get\_datareader\_cache\_status** (**DDS\_DataReaderCacheStatus** &status)  
 <<extension>> (p. 237) Gets the datareader cache status for this reader.
- virtual **DDS\_ReturnCode\_t** **get\_datareader\_protocol\_status** (**DDS\_DataReaderProtocolStatus** &status)  
 <<extension>> (p. 237) Gets the datareader protocol status for this reader.
- virtual **DDS\_ReturnCode\_t** **get\_matched\_publication\_datareader\_protocol\_status** (**DDS\_DataReaderProtocolStatus** &status, const **DDS\_InstanceHandle\_t** &publication\_handle)  
 <<extension>> (p. 237) Gets the datareader protocol status for this reader, per matched publication identified by the **publication\_handle**.
- virtual **DDS\_ReturnCode\_t** **set\_qos** (const **DDS\_DataReaderQos** &qos)



- Sets the reader QoS.*

  - virtual **DDS\_ReturnCode\_t** **get\_qos** ( **DDS\_DataReaderQos** &qos)

*Gets the reader QoS.*
- virtual **DDS\_ReturnCode\_t** **set\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)
  - <<*extension*>> (p. 237) *Changes the QoS of this reader using the input XML QoS profile.*
- virtual **DDS\_ReturnCode\_t** **set\_property** (const char \*property\_name, const char \*value, bool propagate)
  - Set the value for a property that applies to a DataReader.*
- virtual **DDS\_ReturnCode\_t** **set\_listener** ( **DDSDataReaderListener** \*l, **DDS\_StatusMask** mask= **DDS\_↔STATUS\_MASK\_ALL**)
  - Sets the reader listener.*
- virtual **DDSDataReaderListener** \* **get\_listener** ()
  - Gets the reader listener.*
- virtual **DDSTopicQuery** \* **create\_topic\_query** (const **DDS\_TopicQuerySelection** &selection)
  - Creates a **DDSTopicQuery** (p. 1627).*
- virtual **DDS\_ReturnCode\_t** **delete\_topic\_query** ( **DDSTopicQuery** \*query)
  - Deletes a **DDSTopicQuery** (p. 1627).*
- virtual **DDSTopicQuery** \* **lookup\_topic\_query** (const **DDS\_GUID\_t** &guid)
  - Retrieves an existing **DDSTopicQuery** (p. 1627).*
- virtual **DDS\_ReturnCode\_t** **take\_discovery\_snapshot** ()
  - Take a snapshot of the compatible and incompatible remote writers matched by a local reader.*
- virtual **DDS\_ReturnCode\_t** **take\_discovery\_snapshot** (const char \*file\_name)
  - Take a snapshot of the compatible and incompatible remote writers matched by a local reader.*
- virtual **DDS\_ReturnCode\_t** **enable** ()
  - Enables the **DDSEntity** (p. 1463).*
- virtual **DDSStatusCondition** \* **get\_statuscondition** ()
  - Allows access to the **DDSStatusCondition** (p. 1578) associated with the **DDSEntity** (p. 1463).*
- virtual **DDS\_StatusMask** **get\_status\_changes** ()
  - Retrieves the list of communication statuses in the **DDSEntity** (p. 1463) that are triggered.*
- virtual **DDS\_InstanceHandle\_t** **get\_instance\_handle** ()
  - Allows access to the **DDS\_InstanceHandle\_t** (p. 74) associated with the **DDSEntity** (p. 1463).*

### 9.244.1 Detailed Description

<<*interface*>> (p. 237) Allows the application to: (1) declare the data it wishes to receive (i.e. make a subscription) and (2) access the data received by the attached **DDSSubscriber** (p. 1592).

QoS:

**DDS\_DataReaderQos** (p. 644)

## Status:

**DDS\_DATA\_AVAILABLE\_STATUS** (p. 345);  
**DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346), **DDS\_LivelinessChangedStatus** (p. 932);  
**DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS** (p. 344), **DDS\_RequestedDeadlineMissedStatus** (p. 1050);  
**DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_RequestedIncompatibleQosStatus**  
 (p. 1051);  
**DDS\_SAMPLE\_LOST\_STATUS** (p. 345), **DDS\_SampleLostStatus** (p. 1093);  
**DDS\_SAMPLE\_REJECTED\_STATUS** (p. 345), **DDS\_SampleRejectedStatus** (p. 1094);  
**DDS\_SUBSCRIPTION\_MATCHED\_STATUS** (p. 347), **DDS\_SubscriptionMatchedStatus** (p. 1117);

## Listener:

**DDSDataReaderListener** (p. 1315)

A **DDSDataReader** (p. 1288) refers to exactly one **DDSTopicDescription** (p. 1624) (either a **DDSTopic** (p. 1617), a **DDSContentFilteredTopic** (p. 1283) or a **DDSMultiTopic** (p. 1529)) that identifies the data to be read.

The subscription has a unique resulting type. The data-reader may give access to several instances of the resulting type, which can be distinguished from each other by their `key`.

**DDSDataReader** (p. 1288) is an abstract class. It must be specialised for each particular application data-type (see **USER\_DATA** (p. 455)). The additional methods or functions that must be defined in the auto-generated class for a hypothetical application type **Foo** (p. 1648) are specified in the generic type **FooDataReader** (p. 1649).

The following operations may be called even if the **DDSDataReader** (p. 1288) is not enabled. Other operations will fail with the value **DDS\_RETCODE\_NOT\_ENABLED** (p. 337) if called on a disabled **DDSDataReader** (p. 1288):

- The base-class operations **DDSDataReader::set\_qos** (p. 1306), **DDSDataReader::get\_qos** (p. 1307), **DDSDataReader::set\_listener** (p. 1309), **DDSDataReader::get\_listener** (p. 1309), **DDSEntity::enable** (p. 1466), **DDSEntity::get\_statuscondition** (p. 1467), **DDSEntity::get\_status\_changes** (p. 1467),
- **DDSDataReader::get\_liveliness\_changed\_status** (p. 1302), **DDSDataReader::get\_requested\_deadline\_mis↔  
missed\_status** (p. 1303), **DDSDataReader::get\_requested\_incompatible\_qos\_status** (p. 1303), **DDSDat↔  
Reader::get\_sample\_lost\_status** (p. 1304), **DDSDataReader::get\_sample\_rejected\_status** (p. 1302),  
**DDSDataReader::get\_subscription\_matched\_status** (p. 1304)

All sample-accessing operations, namely: **FooDataReader::read** (p. 1651), **FooDataReader::take** (p. 1652), **Foo↔  
DataReader::read\_w\_condition** (p. 1657), and **FooDataReader::take\_w\_condition** (p. 1658) may fail with the error **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) as described in **DDSSubscriber::begin\_access** (p. 1605).

## See also

**Operations Allowed in Listener Callbacks** (p. 1528)

**Access to data samples** (p. 125)

## Examples

**HelloWorldSupport.cxx**, and **HelloWorld\_subscriber.cxx**.

## 9.244.2 Member Function Documentation

### 9.244.2.1 create\_readcondition()

```
virtual DDSReadCondition * DDSDataReader::create_readcondition (
    DDS_SampleStateMask sample_states,
    DDS_ViewStateMask view_states,
    DDS_InstanceStateMask instance_states ) [inline], [virtual]
```

Creates a **DDSReadCondition** (p. 1574).

The returned **DDSReadCondition** (p. 1574) will be attached and belong to the **DDSDataReader** (p. 1288).

#### Parameters

<i>sample_states</i>	<< <b>in</b> >> (p. 238) sample state of the data samples that are of interest
<i>view_states</i>	<< <b>in</b> >> (p. 238) view state of the data samples that are of interest
<i>instance_states</i>	<< <b>in</b> >> (p. 238) instance state of the data samples that are of interest

#### Returns

return **DDSReadCondition** (p. 1574) created. Returns NULL in case of failure.

### 9.244.2.2 create\_readcondition\_w\_params()

```
virtual DDSReadCondition * DDSDataReader::create_readcondition_w_params (
    DDS_ReadConditionParams & params ) [inline], [virtual]
```

<<**extension**>> (p. 237) Creates a **DDSReadCondition** (p. 1574) with parameters.

The returned **DDSReadCondition** (p. 1574) will be attached and belong to the **DDSDataReader** (p. 1288).

#### Parameters

<i>params</i>	<< <b>in</b> >> (p. 238) creation parameters.
---------------	---

#### Returns

return **DDSReadCondition** (p. 1574) created. Returns NULL in case of failure.

### 9.244.2.3 create\_querycondition()

```
virtual DDSQueryCondition * DDSDataReader::create_querycondition (
    DDS_SampleStateMask sample_states,
    DDS_ViewStateMask view_states,
    DDS_InstanceStateMask instance_states,
    const char * query_expression,
    const struct DDS_StringSeq & query_parameters ) [inline], [virtual]
```

Creates a **DDSQueryCondition** (p. 1573).

The returned **DDSQueryCondition** (p. 1573) will be attached and belong to the **DDSDataReader** (p. 1288).

**Queries and Filters Syntax** (p. 179) describes the syntax of `query_expression` and `query_parameters`.

#### Parameters

<code>sample_states</code>	<< <i>in</i> >> (p. 238) sample state of the data samples that are of interest
<code>view_states</code>	<< <i>in</i> >> (p. 238) view state of the data samples that are of interest
<code>instance_states</code>	<< <i>in</i> >> (p. 238) instance state of the data samples that are of interest
<code>query_expression</code>	<< <i>in</i> >> (p. 238) Expression for the query. Cannot be NULL.
<code>query_parameters</code>	<< <i>in</i> >> (p. 238) Parameters for the query expression.

#### Returns

return **DDSQueryCondition** (p. 1573) created. Returns NULL in case of failure.

### 9.244.2.4 create\_querycondition\_w\_params()

```
virtual DDSQueryCondition * DDSDataReader::create_querycondition_w_params (
    DDS_QueryConditionParams & params ) [inline], [virtual]
```

<<*extension*>> (p. 237) Creates a **DDSQueryCondition** (p. 1573) with parameters.

The returned **DDSQueryCondition** (p. 1573) will be attached and belong to the **DDSDataReader** (p. 1288).

#### Parameters

<code>params</code>	<< <i>in</i> >> (p. 238) creation parameters.
---------------------	---

#### Returns

return **DDSQueryCondition** (p. 1573) created. Returns NULL in case of failure.

### 9.244.2.5 delete\_readcondition()

```
virtual DDS_ReturnCode_t DDSDataReader::delete_readcondition (
    DDSReadCondition * condition ) [inline], [virtual]
```

Deletes a **DDSReadCondition** (p. 1574) or **DDSQueryCondition** (p. 1573) attached to the **DDSDataReader** (p. 1288).

Since **DDSQueryCondition** (p. 1573) specializes **DDSReadCondition** (p. 1574), it can also be used to delete a **DDSQueryCondition** (p. 1573).

#### Precondition

The **DDSReadCondition** (p. 1574) must be attached to the **DDSDataReader** (p. 1288), or the operation will fail with the error **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

#### MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

#### Parameters

<i>condition</i>	<< <i>in</i> >> (p. 238) Condition to be deleted.
------------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
------------	---

### 9.244.2.6 delete\_contained\_entities()

```
virtual DDS_ReturnCode_t DDSDataReader::delete_contained_entities ( ) [inline], [virtual]
```

Deletes all the entities that were created by means of the "create" operations on the **DDSDataReader** (p. 1288).

Deletes all contained **DDSReadCondition** (p. 1574), **DDSQueryCondition** (p. 1573), and **DDSTopicQuery** (p. 1627) objects.

The operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) if the any of the contained entities is in a state where it cannot be deleted.

Once **DDSDataReader::delete\_contained\_entities** (p. 1295) completes successfully, the application may delete the **DDSDataReader** (p. 1288).

#### MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
------------	---

**9.244.2.7 wait\_for\_historical\_data()**

```
virtual DDS_ReturnCode_t DDSDataReader::wait_for_historical_data (
    const DDS_Duration_t & max_wait ) [inline], [virtual]
```

Waits until all "historical" data is received for **DDSDataReader** (p. 1288) entities that have a non-VOLATILE Durability Qos kind.

This operation is intended only for **DDSDataReader** (p. 1288) entities that have a non-VOLATILE Durability QoS kind.

As soon as an application enables a non-VOLATILE **DDSDataReader** (p. 1288), it will start receiving both "historical" data (i.e., the data that was written prior to the time the **DDSDataReader** (p. 1288) joined the domain) as well as any new data written by the **DDSDataWriter** (p. 1321) entities. There are situations where the application logic may require the application to wait until all "historical" data is received. This is the purpose of the **DDSDataReader::wait\_for\_historical\_data** (p. 1296) operations.

**DDSDataReader::wait\_for\_historical\_data()** (p. 1296) blocks the calling thread until either all "historical" data is received, or until the duration specified by the `max_wait` parameter elapses, whichever happens first. It will return immediately if no DataWriters have been discovered at the time the operation is called; therefore it is advisable to make sure at least one **DDSDataWriter** (p. 1321) has been discovered before calling this operation. (One way to do this is by using **DDSDataReader::get\_subscription\_matched\_status** (p. 1304).)

A successful completion indicates that all the "historical" data was "received"; timing out indicates that `max_wait` elapsed before all the data was received.

## Parameters

<i>max_wait</i>	<< <i>in</i> >> (p. 238) Timeout value.
-----------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_TIMEOUT</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	---

**9.244.2.8 acknowledge\_sample()** [1/2]

```
virtual DDS_ReturnCode_t DDSDataReader::acknowledge_sample (
    const DDS_SampleInfo & sample_info ) [inline], [virtual]
```

<<*extension*>> (p. 237) Acknowledges a single sample explicitly.

Applicable only when **DDS\_ReliabilityQoSPolicy::acknowledgment\_kind** (p. 1043) = **DDS\_APPLICATION\_↔EXPLICIT\_ACKNOWLEDGMENT\_MODE** (p. 436)

A call to this method does not necessarily trigger the sending of an AppAck RTPS message from the DataReader to the DataWriter. How and when AppAck messages are sent can be configured using the QoS values **DDS\_Rtps↔ReliableReaderProtocol\_t::samples\_per\_app\_ack** (p. 1060) and **DDS\_RtpsReliableReaderProtocol\_t::app\_ack↔\_period** (p. 1060).

#### Parameters

<i>sample_info</i>	<< <i>in</i> >> (p. 238) <b>DDS_SampleInfo</b> (p. 1082) identifying the sample being acknowledged.
--------------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.244.2.9 acknowledge\_all() [1/2]

```
virtual DDS_ReturnCode_t DDSDataReader::acknowledge_all ( ) [inline], [virtual]
```

<<*extension*>> (p. 237) Acknowledges all previously accessed samples.

Applicable only when **DDS\_ReliabilityQoSPolicy::acknowledgment\_kind** (p. 1043) = **DDS\_APPLICATION\_↔EXPLICIT\_ACKNOWLEDGMENT\_MODE** (p. 436)

A call to this method does not necessarily trigger the sending of an AppAck RTPS message from the DataReader to the DataWriter. How and when AppAck messages are sent can be configured using the QoS values **DDS\_Rtps↔ReliableReaderProtocol\_t::samples\_per\_app\_ack** (p. 1060) and **DDS\_RtpsReliableReaderProtocol\_t::app\_ack↔\_period** (p. 1060).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.244.2.10 acknowledge\_sample() [2/2]

```
virtual DDS_ReturnCode_t DDSDataReader::acknowledge_sample (
    const DDS_SampleInfo & sample_info,
    const DDS_AckResponseData_t & response_data ) [inline], [virtual]
```

<<*extension*>> (p. 237) Acknowledges a single sample explicitly.

Applicable only when **DDS\_ReliabilityQoSPolicy::acknowledgment\_kind** (p.1043) = **DDS\_APPLICATION\_EXPLICIT\_ACKNOWLEDGMENT\_MODE** (p. 436)

A call to this method does not necessarily trigger the sending of an AppAck RTPS message from the DataReader to the DataWriter. How and when AppAck messages are sent can be configured using the QoS values **DDS\_RtpsReliableReaderProtocol\_t::samples\_per\_app\_ack** (p. 1060) and **DDS\_RtpsReliableReaderProtocol\_t::app\_ack\_period** (p. 1060).

The maximum length of the response is configured using **DDS\_DataReaderResourceLimitsQoSPolicy::max\_app\_ack\_response\_length** (p. 664)

#### Parameters

<i>sample_info</i>	<< <i>in</i> >> (p. 238) <b>DDS_SampleInfo</b> (p. 1082) identifying the sample being acknowledged.
<i>response_data</i>	<< <i>in</i> >> (p. 238) Response data sent to <b>DDSDataWriter</b> (p. 1321) upon acknowledgment (via <b>DDSDataWriterListener::on_application_acknowledgment</b> (p. 1349))

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.244.2.11 acknowledge\_all() [2/2]

```
virtual DDS_ReturnCode_t DDSDataReader::acknowledge_all (
    const DDS_AckResponseData_t & response_data ) [inline], [virtual]
```

<<*extension*>> (p. 237) Acknowledges all previously accessed samples.

Applicable only when **DDS\_ReliabilityQoSPolicy::acknowledgment\_kind** (p.1043) = **DDS\_APPLICATION\_EXPLICIT\_ACKNOWLEDGMENT\_MODE** (p. 436)

A call to this method does not necessarily trigger the sending of an AppAck RTPS message from the DataReader to the DataWriter. How and when AppAck messages are sent can be configured using the QoS values **DDS\_RtpsReliableReaderProtocol\_t::samples\_per\_app\_ack** (p. 1060) and **DDS\_RtpsReliableReaderProtocol\_t::app\_ack\_period** (p. 1060).

The maximum length of the response is configured using **DDS\_DataReaderResourceLimitsQoSPolicy::max\_app\_ack\_response\_length** (p. 664).

#### Parameters

<i>response_data</i>	<< <i>in</i> >> (p. 238) Response data sent to <b>DDSDataWriter</b> (p. 1321) upon acknowledgment
----------------------	---



## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## 9.244.2.12 get\_matched\_publications()

```
virtual DDS_ReturnCode_t DDSDataReader::get_matched_publications (
    DDS_InstanceHandleSeq & publication_handles ) [inline], [virtual]
```

Retrieves the list of publications currently "associated" with this **DDSDataReader** (p. 1288).

A publication is considered to be matching if all of the following criteria are true:

- The publication is within the same domain as this subscription.
- The publication has a matching **DDSTopic** (p. 1617).
- The publication has compatible QoS.
- If the applications are using partitions, the publication shares a common partition with this subscription.
- The **DDSDomainParticipant** (p. 1351) has not indicated that the publication's **DDSDomainParticipant** (p. 1351) should be "ignored" by means of the **DDSDomainParticipant::ignore\_publication** (p. 1396) API.
- If the subscription is using a **DDSContentFilteredTopic** (p. 1283) and the publication is using the **DDS\_MultiChannelQoSPolicy** (p. 964), there is an intersection between at least one of the associated filters.
- If the endpoints need to exchange key material to communicate (i.e., they are securing their communications), the reader has completed the key exchange with the writer.

The handles returned in the `publication_handles` list are the ones that are used by the RTI Connext implementation to locally identify the corresponding matched **DDSDataWriter** (p. 1321) entities. These handles match the ones that appear in the `instance_handle` field of the **DDS\_SampleInfo** (p. 1082) when reading the **DDS\_PUBLICATION\_TOPIC\_NAME** (p. 298) builtin topic.

This API may return the publication handles of publications that are not alive. **DDSDataReader::is\_matched\_publication\_alive** (p. 1300) can be used to check the liveness of the remote publication.

## Parameters

<code>publication_handles</code>	<< <i>inout</i> >> (p. 238). The sequence will be grown if the sequence has ownership and the system has the corresponding resources. Use a sequence without ownership to avoid dynamic memory allocation. If the sequence is too small to store all of the matches and the system cannot resize the sequence, this method will fail with <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337). The maximum number of matches possible is configured with <b>DDS_DomainParticipantResourceLimitsQoSPolicy</b> (p. 746). You can use a zero-maximum sequence without ownership to quickly check whether there are any matches without allocating any memory.
----------------------------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) if the sequence is too small and the system cannot resize it, or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	--

**9.244.2.13 get\_matched\_publication\_data()**

```
virtual DDS_ReturnCode_t DDSDataReader::get_matched_publication_data (
    DDS_PublicationBuiltinTopicData & publication_data,
    const DDS_InstanceHandle_t & publication_handle ) [inline], [virtual]
```

Retrieves the information on a publication that is currently "associated" with the **DDSDataReader** (p. 1288).

The `publication_handle` must correspond to a publication currently associated with the **DDSDataReader** (p. 1288). Otherwise, the operation will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336). Use the operation **DDSDataReader::get\_matched\_publications** (p. 1299) to find the publications that are currently matched with the **DDSDataReader** (p. 1288).

Note: This operation does not retrieve the **DDS\_PublicationBuiltinTopicData::type\_code** (p. 1016). This information is available through **DDSDataReaderListener::on\_data\_available()** (p. 1317) (if a reader listener is installed on the **DDSPublicationBuiltinTopicDataDataReader** (p. 1549)).

## Parameters

<i>publication_data</i>	<< <i>inout</i> >> (p. 238). The information to be filled in on the associated publication. Cannot be NULL.
<i>publication_handle</i>	<< <i>in</i> >> (p. 238). Handle to a specific publication associated with the <b>DDSDataWriter</b> (p. 1321). Must correspond to a publication currently associated with the <b>DDSDataReader</b> (p. 1288).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

**9.244.2.14 is\_matched\_publication\_alive()**

```
virtual DDS_ReturnCode_t DDSDataReader::is_matched_publication_alive (
    DDS_Boolean & is_alive,
    const DDS_InstanceHandle_t & publication_handle ) [inline], [virtual]
```

Check if a publication currently matched with a DataReader is alive.

This API is used for querying the endpoint liveness of a matched publication. A matched publication will be marked as not alive if the liveness that it committed to through its **LIVELINESS** (p. 409) QoS policy was not respected. Note that if the participant associated with the matched publication loses liveness, the **DDS\_InstanceHandle\_t** (p. 74) will become invalid and this function will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336).

#### Parameters

<i>publication_handle</i>	<< <b>in</b> >> (p. 238) The <b>DDS_InstanceHandle_t</b> (p. 74) of the matched publication. See <b>DDSDataReader::get_matched_publications</b> (p. 1299) for a description of what is considered a matched publication.
<i>is_alive</i>	<< <b>out</b> >> (p. 238) Indicates whether or not the matched publication is alive.

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

#### 9.244.2.15 get\_matched\_publication\_participant\_data()

```
virtual DDS_ReturnCode_t DDSDataReader::get_matched_publication_participant_data (
    DDS_ParticipantBuiltinTopicData & participant_data,
    const DDS_InstanceHandle_t & publication_handle ) [inline], [virtual]
```

<<**extension**>> (p. 237) Retrieves the information on the discovered **DDSDomainParticipant** (p. 1351) associated with the publication that is currently matching with the **DDSDataReader** (p. 1288).

The *publication\_handle* must correspond to a publication currently associated with the **DDSDataReader** (p. 1288). Otherwise, the operation will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336). The operation may also fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) if the publication corresponds to the same **DDSDomainParticipant** (p. 1351) that the DataReader belongs to. Use the operation **DDSDataReader::get\_matched\_publications** (p. 1299) to find the publications that are currently matched with the **DDSDataReader** (p. 1288).

#### Parameters

<i>participant_data</i>	<< <b>inout</b> >> (p. 238). The information to be filled in on the associated participant. Cannot be NULL.
<i>publication_handle</i>	<< <b>in</b> >> (p. 238). Handle to a specific publication associated with a <b>DDSDataWriter</b> (p. 1321). Must correspond to a publication currently associated with the <b>DDSDataReader</b> (p. 1288).

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
-----	---

### 9.244.2.16 `get_topicdescription()`

```
virtual DDSTopicDescription * DDSDataReader::get_topicdescription ( ) [inline], [virtual]
```

Returns the **DDSTopicDescription** (p. 1624) associated with the **DDSDataReader** (p. 1288).

Returns that same **DDSTopicDescription** (p. 1624) that was used to create the **DDSDataReader** (p. 1288).

#### Returns

**DDSTopicDescription** (p. 1624) associated with the **DDSDataReader** (p. 1288).

### 9.244.2.17 `get_subscriber()`

```
virtual DDSSubscriber * DDSDataReader::get_subscriber ( ) [inline], [virtual]
```

Returns the **DDSSubscriber** (p. 1592) to which the **DDSDataReader** (p. 1288) belongs.

#### Returns

**DDSSubscriber** (p. 1592) to which the **DDSDataReader** (p. 1288) belongs.

### 9.244.2.18 `get_sample_rejected_status()`

```
virtual DDS_ReturnCode_t DDSDataReader::get_sample_rejected_status (
    DDS_SampleRejectedStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_SAMPLE\_REJECTED\_STATUS** (p. 345) communication status.

This also resets the status so that it is no longer considered changed.

#### Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_SampleRejectedStatus</b> (p. 1094) to be filled in.
---------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.244.2.19 get\_liveliness\_changed\_status()

```
virtual DDS_ReturnCode_t DDSDataReader::get_liveliness_changed_status (
    DDS_LivelinessChangedStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346) communication status.

This also resets the status so that it is no longer considered changed.

#### Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_LivelinessChangedStatus</b> (p. 932) to be filled in.
---------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.244.2.20 get\_requested\_deadline\_missed\_status()

```
virtual DDS_ReturnCode_t DDSDataReader::get_requested_deadline_missed_status (
    DDS_RequestedDeadlineMissedStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS** (p. 344) communication status.

This also resets the status so that it is no longer considered changed.

#### Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_RequestedDeadlineMissedStatus</b> (p. 1050) to be filled in.
---------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.244.2.21 get\_requested\_incompatible\_qos\_status()

```
virtual DDS_ReturnCode_t DDSDataReader::get_requested_incompatible_qos_status (
    DDS_RequestedIncompatibleQosStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) communication status.

This also resets the status so that it is no longer considered changed.

## Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_RequestedIncompatibleQosStatus</b> (p. 1051) to be filled in.
---------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.244.2.22 get\_sample\_lost\_status()**

```
virtual DDS_ReturnCode_t DDSDataReader::get_sample_lost_status (
    DDS_SampleLostStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_SAMPLE\_LOST\_STATUS** (p. 345) communication status.

This also resets the status so that it is no longer considered changed.

## Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_SampleLostStatus</b> (p. 1093) to be filled in.
---------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.244.2.23 get\_subscription\_matched\_status()**

```
virtual DDS_ReturnCode_t DDSDataReader::get_subscription_matched_status (
    DDS_SubscriptionMatchedStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_SUBSCRIPTION\_MATCHED\_STATUS** (p. 347) communication status.

## Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_SubscriptionMatchedStatus</b> (p. 1117) to be filled in.
---------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.244.2.24 get\_datareader\_cache\_status()

```
virtual DDS_ReturnCode_t DDSDataReader::get_datareader_cache_status (
    DDS_DataReaderCacheStatus & status ) [inline], [virtual]
```

<<**extension**>> (p. 237) Gets the datareader cache status for this reader.

#### Parameters

<i>status</i>	<< <b>inout</b> >> (p. 238) <b>DDS_DataReaderCacheStatus</b> (p. 623) to be filled in.
---------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

### 9.244.2.25 get\_datareader\_protocol\_status()

```
virtual DDS_ReturnCode_t DDSDataReader::get_datareader_protocol_status (
    DDS_DataReaderProtocolStatus & status ) [inline], [virtual]
```

<<**extension**>> (p. 237) Gets the datareader protocol status for this reader.

This also resets the status so that it is no longer considered changed.

#### Parameters

<i>status</i>	<< <b>inout</b> >> (p. 238) <b>DDS_DataReaderProtocolStatus</b> (p. 633) to be filled in.
---------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

### 9.244.2.26 get\_matched\_publication\_datareader\_protocol\_status()

```
virtual DDS_ReturnCode_t DDSDataReader::get_matched_publication_datareader_protocol_status (
    DDS_DataReaderProtocolStatus & status,
    const DDS_InstanceHandle_t & publication_handle ) [inline], [virtual]
```

<<*extension*>> (p. 237) Gets the datareader protocol status for this reader, per matched publication identified by the `publication_handle`.

This also resets the status so that it is no longer considered changed.

Note: Status for a remote entity is only kept while the entity is alive. Once a remote entity is no longer alive, its status is deleted.

#### Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238). The information to be filled in on the associated publication. Cannot be NULL.
<i>publication_handle</i>	<< <i>in</i> >> (p. 238). Handle to a specific publication associated with the <b>DDSDataWriter</b> (p. 1321). . Must correspond to a publication currently associated with the <b>DDSDataReader</b> (p. 1288).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

### 9.244.2.27 set\_qos()

```
virtual DDS_ReturnCode_t DDSDataReader::set_qos (
    const DDS_DataReaderQos & qos ) [inline], [virtual]
```

Sets the reader QoS.

Modifies the QoS of the **DDSDataReader** (p. 1288).

The **DDS\_DataReaderQos::user\_data** (p. 649), **DDS\_DataReaderQos::deadline** (p. 648), **DDS\_DataReaderQos::latency\_budget** (p. 648), **DDS\_DataReaderQos::time\_based\_filter** (p. 650), **DDS\_DataReaderQos::reader\_data\_lifecycle** (p. 650) can be changed. The other policies are immutable.

#### Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) The <b>DDS_DataReaderQos</b> (p. 644) to be set to. Policies must be consistent. Immutable policies cannot be changed after <b>DDSDataReader</b> (p. 1288) is enabled. The special value <b>DDS_DATAREADER_QOS_DEFAULT</b> (p. 132) can be used to indicate that the QoS of the <b>DDSDataReader</b> (p. 1288) should be changed to match the current default <b>DDS_DataReaderQos</b> (p. 644) set in the <b>DDSSubscriber</b> (p. 1592).
------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337).
------------	---



See also

**DDS\_DataReaderQos** (p. 644) for rules on consistency among QoS

**set\_qos (abstract)** (p. 1464)

**DDSDataReader::set\_qos** (p. 1306)

**Operations Allowed in Listener Callbacks** (p. 1528)

### 9.244.2.28 get\_qos()

```
virtual DDS_ReturnCode_t DDSDataReader::get_qos (
    DDS_DataReaderQos & qos ) [inline], [virtual]
```

Gets the reader QoS.

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

Parameters

<i>qos</i>	<< <i>inout</i> >> (p. 238) The <b>DDS_DataReaderQos</b> (p. 644) to be filled up.
------------	--

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**get\_qos (abstract)** (p. 1465)

### 9.244.2.29 set\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSDataReader::set_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [inline], [virtual]
```

<<*extension*>> (p. 237) Changes the QoS of this reader using the input XML QoS profile.

This operation modifies the QoS of the **DDSDataReader** (p. 1288).

The **DDS\_DataReaderQos::user\_data** (p. 649), **DDS\_DataReaderQos::deadline** (p. 648), **DDS\_DataReaderQos::latency\_budget** (p. 648), **DDS\_DataReaderQos::time\_based\_filter** (p. 650), **DDS\_DataReaderQos::reader\_data\_lifecycle** (p. 650) can be changed. The other policies are immutable.

## Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If <i>library_name</i> is null RTI Connexx will use the default library (see <b>DDSSubscriber::set_default_library</b> (p. 1597)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If <i>profile_name</i> is null RTI Connexx will use the default profile (see <b>DDSSubscriber::set_default_profile</b> (p. 1598)).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337).
------------	---

## See also

**DDS\_DataReaderQos** (p. 644) for rules on consistency among QoS

**DDSDataReader::set\_qos** (p. 1306)

**Operations Allowed in Listener Callbacks** (p. 1528)

**9.244.2.30 set\_property()**

```
virtual DDS_ReturnCode_t DDSDataReader::set_property (
    const char * property_name,
    const char * value,
    bool propagate ) [inline], [virtual]
```

Set the value for a property that applies to a DataReader.

## Warning

This method is not implemented in all APIs and it's intended only for testing purposes. You should use **DDSDataReader::set\_qos** (p. 1306) instead.

## Parameters

<i>property_name</i>	<< <i>in</i> >> (p. 238). Name of the property that you want to set.
<i>value</i>	<< <i>in</i> >> (p. 238). New value for the property.
<i>propagate</i>	<< <i>in</i> >> (p. 238). Indicates if the property will be propagated or not.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDSDomainParticipant::set\_property** (p. 1407)

**DDSDataWriter::set\_property** (p. 1337)

**DDSDataReader::set\_qos** (p. 1306)

### 9.244.2.31 set\_listener()

```
virtual DDS_ReturnCode_t DDSDataReader::set_listener (
    DDSDataReaderListener * l,
    DDS_StatusMask mask = DDS_STATUS_MASK_ALL ) [inline], [virtual]
```

Sets the reader listener.

Parameters

<i>l</i>	<< <i>in</i> >> (p. 238) <b>DDSDataReaderListener</b> (p. 1315) to set to
<i>mask</i>	<< <i>in</i> >> (p. 238) <b>DDS_StatusMask</b> (p. 341) associated with the <b>DDSDataReaderListener</b> (p. 1315).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**set\_listener (abstract)** (p. 1465)

### 9.244.2.32 get\_listener()

```
virtual DDSDataReaderListener * DDSDataReader::get_listener ( ) [inline], [virtual]
```

Gets the reader listener.

Returns

**DDSDataReaderListener** (p. 1315) of the **DDSDataReader** (p. 1288).

See also

**get\_listener (abstract)** (p. 1466)

**9.244.2.33 create\_topic\_query()**

```
virtual DDSTopicQuery * DDSDataReader::create_topic_query (
    const DDS_TopicQuerySelection & selection ) [inline], [virtual]
```

Creates a **DDSTopicQuery** (p. 1627).

The returned **DDSTopicQuery** (p. 1627) will have been issued if the **DDSDataReader** (p. 1288) is enabled. Otherwise, the **DDSTopicQuery** (p. 1627) will be issued once the **DDSDataReader** (p. 1288) is enabled

**Parameters**

<i>selection</i>	<< <i>in</i> >> (p. 238) The selection with which to create the <b>DDSTopicQuery</b> (p. 1627). The special values <b>DDS_TOPIC_QUERY_SELECTION_SELECT_ALL</b> (p. 155) and <b>DDS_TOPIC_QUERY_SELECTION_USE_READER_CONTENT_FILTER</b> (p. 155) can be used. The expression can start with the special condition "@instance_state = ALIVE AND" followed by the rest of the expression. This restricts the selection to samples of alive instances.
------------------	--

**Returns**

return Created **DDSTopicQuery** (p. 1627). Returns NULL in case of failure.

**9.244.2.34 delete\_topic\_query()**

```
virtual DDS_ReturnCode_t DDSDataReader::delete_topic_query (
    DDSTopicQuery * query ) [inline], [virtual]
```

Deletes a **DDSTopicQuery** (p. 1627).

Cancels an active **DDSTopicQuery** (p. 1627). After deleting a TopicQuery, new DataWriters won't discover it and existing DataWriters currently publishing cached samples may stop before delivering all of them.

**Parameters**

<i>query</i>	<< <i>in</i> >> (p. 238) The <b>DDSTopicQuery</b> (p. 1627) to delete.
--------------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.244.2.35 lookup\_topic\_query()**

```
virtual DDSTopicQuery * DDSDataReader::lookup_topic_query (
```

```
const DDS_GUID_t & guid ) [inline], [virtual]
```

Retrieves an existing **DDSTopicQuery** (p. 1627).

Retrieves the **DDSTopicQuery** (p. 1627) that corresponds to the input **DDS\_GUID\_t** (p. 918).

If no TopicQuery is found for the specified GUID or the TopicQuery is marked for deletion, this returns NULL.

To get the **DDS\_GUID\_t** (p. 918) associated with a **DDSTopicQuery** (p. 1627), use the method **DDSTopicQuery::get\_↵\_guid** (p. 1627).

#### Parameters

<i>guid</i>	<< <i>in</i> >> (p. 238) The <b>DDSTopicQuery</b> (p. 1627) GUID.
-------------	---

### 9.244.2.36 take\_discovery\_snapshot() [1/2]

```
virtual DDS_ReturnCode_t DDSDataReader::take_discovery_snapshot ( ) [inline], [virtual]
```

Take a snapshot of the compatible and incompatible remote writers matched by a local reader.

The snapshot will be printed through the **NDDConfigLogger** (p. 1822). A possible output may be the following:

```
Remote writers that match the local reader domain=0 name="readerTestName"
```

```
guid="0x0101542A,0x2C59B595,0xA1693BDF:0x80000004"
```

```
topic="FooTopic" type="FooType"
```

```
-----
```

```
Compatible writers:
```

```
1. 0x0101D8D1,0x20B83C0D,0x4495246E:0x80000003 name="writer1TestName"
```

```
kind="unkeyed user datareader"
```

```
unicastLocators="udpv4://192.168.1.170:7411"
```

```
liveliness="ALIVE"
```

```
Incompatible writers:
```

```
1. 0x0101D8D1,0x20B83C0D,0x4495246E:0x80000103 name="writer2TestName"
```

```
kind="unkeyed user datareader"
```

```
unicastLocators="udpv4://192.168.1.170:7411"
```

```
reason="Inconsistent QoS"
```

```
-----
```

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336).
------------	---

**9.244.2.37 take\_discovery\_snapshot()** [2/2]

```
virtual DDS_ReturnCode_t DDSDataReader::take_discovery_snapshot (
    const char * file_name ) [inline], [virtual]
```

Take a snapshot of the compatible and incompatible remote writers matched by a local reader.

The snapshot will be printed in the file specified by `file_name`. A possible output may be the following:

```
Remote writers that match the local reader domain=0 name="readerTestName"
```

```
guid="0x0101542A,0x2C59B595,0xA1693BDF:0x80000004"
```

```
topic="FooTopic" type="FooType"
```

```
-----
```

```
Compatible writers:
```

```
1. 0x0101D8D1,0x20B83C0D,0x4495246E:0x80000003 name="writer1TestName"
```

```
kind="unkeyed user datareader"
```

```
unicastLocators="udpv4://192.168.1.170:7411"
```

```
liveliness="ALIVE"
```

```
Incompatible writers:
```

```
1. 0x0101D8D1,0x20B83C0D,0x4495246E:0x80000103 name="writer2TestName"
```

```
kind="unkeyed user datareader"
```

```
unicastLocators="udpv4://192.168.1.170:7411"
```

```
reason="Inconsistent QoS"
```

```
-----
```

**Parameters**

<code>file_name</code>	<< <i>in</i> >> (p. 238) Name of the file where snapshot should be printed.
------------------------	---

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336).
------------	---

**9.244.2.38 enable()**

```
virtual DDS_ReturnCode_t DDSDataReader::enable ( ) [inline], [virtual]
```

Enables the **DDSEntity** (p. 1463).

This operation enables the Entity. Entity objects can be created either enabled or disabled. This is controlled by the value of the **ENTITY\_FACTORY** (p. 402) QoS policy on the corresponding factory for the **DDSEntity** (p. 1463).

By default, **ENTITY\_FACTORY** (p. 402) is set so that it is not necessary to explicitly call **DDSEntity::enable** (p. 1466) on newly created entities.

The **DDSEntity::enable** (p. 1466) operation is idempotent. Calling enable on an already enabled Entity returns OK and has no effect.

If a **DDSEntity** (p. 1463) has not yet been enabled, the following kinds of operations may be invoked on it:

- set or get the QoS policies (including default QoS policies) and listener
- **DDSEntity::get\_statuscondition** (p. 1467)
- 'factory' operations
- **DDSEntity::get\_status\_changes** (p. 1467) and other get status operations (although the status of a disabled entity never changes)
- 'lookup' operations

Other operations may explicitly state that they may be called on disabled entities; those that do not will return the error **DDS\_RETCODE\_NOT\_ENABLED** (p. 337).

It is legal to delete an **DDSEntity** (p. 1463) that has not been enabled by calling the proper operation on its factory .

Entities created from a factory Entity that is disabled are created disabled, regardless of the setting of the **DDS\_EntityFactoryQosPolicy** (p. 903).

Calling enable on an Entity whose factory Entity is not enabled will fail and return **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

If **DDS\_EntityFactoryQosPolicy::autoenable\_created\_entities** (p. 905) is TRUE, the enable operation on a factory will automatically enable all entities created from that factory (for example, enabling a **DDSPublisher** (p. 1550) will enable all its contained **DDSDataWriter** (p. 1321) objects)

Listeners associated with an entity are not called until the entity is enabled.

Conditions associated with a disabled entity are "inactive," that is, they have a `trigger_value == FALSE`.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--

Implements **DDSEntity** (p. 1466).

#### 9.244.2.39 get\_statuscondition()

```
virtual DDSStatusCondition * DDSDataReader::get_statuscondition ( ) [inline], [virtual]
```

Allows access to the **DDSStatusCondition** (p. 1578) associated with the **DDSEntity** (p. 1463).

The returned condition can then be added to a **DDSWaitSet** (p. 1629) so that the application can wait for specific status changes that affect the **DDSEntity** (p. 1463).

**Returns**

the status condition associated with this entity.

Implements **DDSEntity** (p. 1467).

**9.244.2.40 get\_status\_changes()**

```
virtual DDS_StatusMask DDSDataReader::get_status_changes ( ) [inline], [virtual]
```

Retrieves the list of communication statuses in the **DDSEntity** (p. 1463) that are triggered.

That is, the list of statuses whose value has changed since the last time the application read the status using the `get_*_status()` method.

When the entity is first created or if the entity is not enabled, all communication statuses are in the "untriggered" state so the list returned by the `get_status_changes` operation will be empty.

The list of statuses returned by the `get_status_changes` operation refers to the status that are triggered on the Entity itself and does not include statuses that apply to contained entities.

**Returns**

list of communication statuses in the **DDSEntity** (p. 1463) that are triggered.

**See also**

**Status Kinds** (p. 337)

Implements **DDSEntity** (p. 1467).

**9.244.2.41 get\_instance\_handle()**

```
virtual DDS_InstanceHandle_t DDSDataReader::get_instance_handle ( ) [inline], [virtual]
```

Allows access to the **DDS\_InstanceHandle\_t** (p. 74) associated with the **DDSEntity** (p. 1463).

This operation returns the **DDS\_InstanceHandle\_t** (p. 74) that represents the **DDSEntity** (p. 1463).

**Returns**

the instance handle associated with this entity.

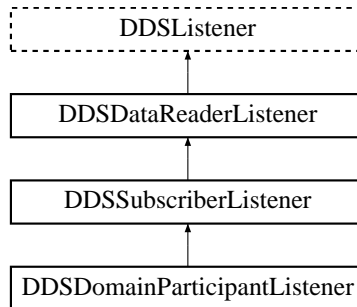
Implements **DDSEntity** (p. 1468).



## 9.245 DDSDataReaderListener Class Reference

<<*interface*>> (p. 237) **DDSListener** (p. 1526) for reader status.

Inheritance diagram for DDSDataReaderListener:



### Public Member Functions

- virtual void **on\_requested\_deadline\_missed** ( **DDSDataReader** \*reader, const **DDS\_RequestedDeadlineMissedStatus** &status)  
*Handles the **DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS** (p. 344) communication status.*
- virtual void **on\_liveliness\_changed** ( **DDSDataReader** \*reader, const **DDS\_LivelinessChangedStatus** &status)  
*Handles the **DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346) communication status.*
- virtual void **on\_requested\_incompatible\_qos** ( **DDSDataReader** \*reader, const **DDS\_RequestedIncompatibleQosStatus** &status)  
*Handles the **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) communication status.*
- virtual void **on\_sample\_rejected** ( **DDSDataReader** \*reader, const **DDS\_SampleRejectedStatus** &status)  
*Handles the **DDS\_SAMPLE\_REJECTED\_STATUS** (p. 345) communication status.*
- virtual void **on\_data\_available** ( **DDSDataReader** \*reader)  
*Handle the **DDS\_DATA\_AVAILABLE\_STATUS** (p. 345) communication status.*
- virtual void **on\_sample\_lost** ( **DDSDataReader** \*reader, const **DDS\_SampleLostStatus** &status)  
*Handles the **DDS\_SAMPLE\_LOST\_STATUS** (p. 345) communication status.*
- virtual void **on\_subscription\_matched** ( **DDSDataReader** \*reader, const **DDS\_SubscriptionMatchedStatus** &status)  
*Handles the **DDS\_SUBSCRIPTION\_MATCHED\_STATUS** (p. 347) communication status.*

### 9.245.1 Detailed Description

<<*interface*>> (p. 237) **DDSListener** (p. 1526) for reader status.

Entity:

**DDSDataReader** (p. 1288)

Status:

**DDS\_DATA\_AVAILABLE\_STATUS** (p. 345);  
**DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346), **DDS\_LivelinessChangedStatus** (p. 932);  
**DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS** (p. 344), **DDS\_RequestedDeadlineMissedStatus** (p. 1050);  
**DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_RequestedIncompatibleQosStatus** (p. 1051);  
**DDS\_SAMPLE\_LOST\_STATUS** (p. 345), **DDS\_SampleLostStatus** (p. 1093);  
**DDS\_SAMPLE\_REJECTED\_STATUS** (p. 345), **DDS\_SampleRejectedStatus** (p. 1094);  
**DDS\_SUBSCRIPTION\_MATCHED\_STATUS** (p. 347), **DDS\_SubscriptionMatchedStatus** (p. 1117);

See also

**Status Kinds** (p. 337)  
**Operations Allowed in Listener Callbacks** (p. 1528)

## 9.245.2 Member Function Documentation

### 9.245.2.1 on\_requested\_deadline\_missed()

```
virtual void DDSDataReaderListener::on_requested_deadline_missed (  
    DDSDataReader * reader,  
    const DDS_RequestedDeadlineMissedStatus & status ) [virtual]
```

Handles the **DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS** (p. 344) communication status.

### 9.245.2.2 on\_liveliness\_changed()

```
virtual void DDSDataReaderListener::on_liveliness_changed (  
    DDSDataReader * reader,  
    const DDS_LivelinessChangedStatus & status ) [virtual]
```

Handles the **DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346) communication status.

### 9.245.2.3 on\_requested\_incompatible\_qos()

```
virtual void DDSDataReaderListener::on_requested_incompatible_qos (  
    DDSDataReader * reader,  
    const DDS_RequestedIncompatibleQosStatus & status ) [virtual]
```

Handles the **DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) communication status.

#### 9.245.2.4 on\_sample\_rejected()

```
virtual void DDSDataReaderListener::on_sample_rejected (
    DDSDataReader * reader,
    const DDS_SampleRejectedStatus & status ) [virtual]
```

Handles the **DDS\_SAMPLE\_REJECTED\_STATUS** (p. 345) communication status.

#### 9.245.2.5 on\_data\_available()

```
virtual void DDSDataReaderListener::on_data_available (
    DDSDataReader * reader ) [virtual]
```

Handle the **DDS\_DATA\_AVAILABLE\_STATUS** (p. 345) communication status.

#### 9.245.2.6 on\_sample\_lost()

```
virtual void DDSDataReaderListener::on_sample_lost (
    DDSDataReader * reader,
    const DDS_SampleLostStatus & status ) [virtual]
```

Handles the **DDS\_SAMPLE\_LOST\_STATUS** (p. 345) communication status.

#### 9.245.2.7 on\_subscription\_matched()

```
virtual void DDSDataReaderListener::on_subscription_matched (
    DDSDataReader * reader,
    const DDS_SubscriptionMatchedStatus & status ) [virtual]
```

Handles the **DDS\_SUBSCRIPTION\_MATCHED\_STATUS** (p. 347) communication status.

## 9.246 DDSDataReaderSeq Class Reference

Declares IDL sequence < **DDSDataReader** (p. 1288) > .

### 9.246.1 Detailed Description

Declares IDL sequence < **DDSDataReader** (p. 1288) > .

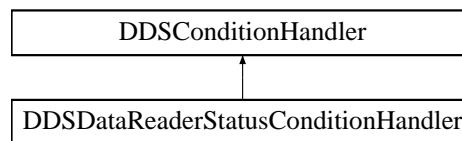
See also

**FooSeq** (p. 1697)

## 9.247 DDSDataReaderStatusConditionHandler Class Reference

<<*interface*>> (p. 237) Realization of a **DDSConditionHandler** (p. 1278) that handles the status of a **DDSData**↔  
**Reader** (p. 1288).

Inheritance diagram for DDSDataReaderStatusConditionHandler:



### Public Member Functions

- virtual void **on\_condition\_triggered** ( **DDSCondition** \*condition)  
*Handles the dispatch of a **DDSCondition** (p. 1276).*
- **DDSDataReaderStatusConditionHandler** ( **DDSDataReader** \*reader, **DDSDataReaderListener** \*listener, **DDS\_StatusMask** listener\_mask)  
*Creates a new **DDSDataReaderStatusConditionHandler** (p. 1318) instance.*
- virtual **~DDSDataReaderStatusConditionHandler** ()  
*Deletes a **DDSDataReaderStatusConditionHandler** (p. 1318) instance previously created with **DDSDataReader**↔  
**StatusConditionHandler::DDSDataReaderStatusConditionHandler** (p. 1319).*

### 9.247.1 Detailed Description

<<*interface*>> (p. 237) Realization of a **DDSConditionHandler** (p. 1278) that handles the status of a **DDSData**↔  
**Reader** (p. 1288).

A **DDSDataReaderStatusConditionHandler** (p. 1318) demultiplexes a **DDSDataReader** (p. 1288) status change into the corresponding callback of a provided **DDSDataReaderListener** (p. 1315) implementation.

Note that the **DDSDataReaderListener** (p. 1315) notifications have different considerations than if they were made by the **DDSDataReader** (p. 1288) directly:

- Context: The **DDSDataReaderListener** (p. 1315) callback context is the one of the thread that dispatches the **DDSCondition** (p. 1276) where this handler is set. For instance, if you attach the condition to a **DDSAsync**↔  
**WaitSet** (p. 1259), the context will be one of the threads within the pool.

- Status clearing: All the **DDSDataReader** (p. 1288)'s enabled statuses are cleared upon condition dispatch except the **DDS\_DATA\_AVAILABLE\_STATUS** (p. 345), which will not be cleared until your application reads the data.
- Exclusive Area: Restrictions depend on the context of the dispatching thread. For instance, if the **DDSAsyncWaitSet** (p. 1259) dispatches the condition, the listener notifications are free of any exclusive area restrictions.

The **DDSDataReaderStatusConditionHandler** (p.1318) is a convenience to handle the status changes of a **DDSDataReader** (p.1288). You can install a **DDSDataReaderStatusConditionHandler** (p.1318) as the handler of a reader's **DDSStatusCondition** (p. 1578). You can then attach it to a **DDSWaitSet** (p. 1629) or **DDSAsyncWaitSet** (p. 1259) and receive status changes notifications through a specific **DDSDataReaderListener** (p. 1315) implementation instance.

## 9.247.2 Constructor & Destructor Documentation

### 9.247.2.1 DDSDataReaderStatusConditionHandler()

```
DDSDataReaderStatusConditionHandler::DDSDataReaderStatusConditionHandler (
    DDSDataReader * reader,
    DDSDataReaderListener * listener,
    DDS_StatusMask listener_mask )
```

Creates a new **DDSDataReaderStatusConditionHandler** (p. 1318) instance.

The created DataReaderStatusConditionHandler can set as **DDSConditionHandler** (p. 1278) in any **DDSCondition** (p. 1276) and will demultiplex the specified status changes from the specified **DDSDataReader** (p. 1288)

#### Parameters

<i>reader</i>	<< <i>in</i> >> (p. 238) The <b>DDSDataReader</b> (p. 1288) for which the status changes are demultiplexed to the specified <i>listener</i>
<i>listener</i>	<< <i>in</i> >> (p. 238) that receives the status changes notifications from the specified <i>reader</i> .
<i>listener_mask</i>	<< <i>in</i> >> (p. 238) Specifies which status changes from the reader to demultiplex to the <i>listener</i> .

#### See also

- DDSDataReader** (p. 1288)
- DDSDataReader::set\_listener** (p. 1309)
- DDSStatusCondition** (p. 1578)
- DDSConditionHandler** (p. 1278)

### 9.247.2.2 ~DDSDataReaderStatusConditionHandler()

```
virtual DDSDataReaderStatusConditionHandler::~DDSDataReaderStatusConditionHandler ( ) [virtual]
```

Deletes a **DDSDataReaderStatusConditionHandler** (p. 1318) instance previously created with **DDSDataReader←StatusConditionHandler::DDSDataReaderStatusConditionHandler** (p. 1319).

## 9.247.3 Member Function Documentation

### 9.247.3.1 on\_condition\_triggered()

```
virtual void DDSDataReaderStatusConditionHandler::on_condition_triggered (
    DDSCondition * condition ) [virtual]
```

Handles the dispatch of a **DDSCondition** (p. 1276).

This callback is called by **DDSCondition::dispatch** (p. 1278).

Implements **DDSConditionHandler** (p. 1279).

## 9.248 DDSDataTagQosPolicyHelper Class Reference

Policy helpers that facilitate management of the data tags in the input policy.

### Static Public Member Functions

- static **DDS\_Long get\_number\_of\_tags** ( **DDS\_DataTagQosPolicy** &policy)
 

*Gets the number of data tags in the input policy.*
- static **DDS\_ReturnCode\_t assert\_tag** ( **DDS\_DataTagQosPolicy** &policy, const char \*name, const char \*value)
 

*Asserts the tag identified by name in the input policy.*
- static **DDS\_ReturnCode\_t add\_tag** ( **DDS\_DataTagQosPolicy** &policy, const char \*name, const char \*value)
 

*Adds a new tag to the input policy.*
- static struct **DDS\_Tag \* lookup\_tag** ( **DDS\_DataTagQosPolicy** &policy, const char \*name)
 

*Searches by tag name for a tag in the input policy.*
- static **DDS\_ReturnCode\_t remove\_tag** ( **DDS\_DataTagQosPolicy** &policy, const char \*name)
 

*Removes a tag from the input policy.*

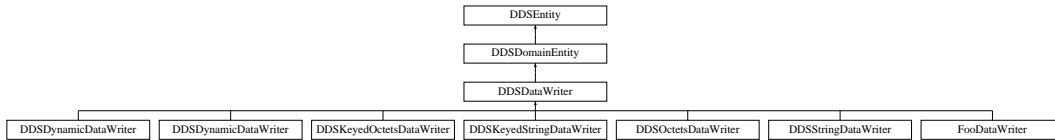
### 9.248.1 Detailed Description

Policy helpers that facilitate management of the data tags in the input policy.

## 9.249 DDSDataWriter Class Reference

<<**interface**>> (p. 237) Allows an application to set the value of the data to be published under a given **DDSTopic** (p. 1617).

Inheritance diagram for DDSDataWriter:



### Public Member Functions

- virtual **DDS\_ReturnCode\_t** **get\_liveliness\_lost\_status** ( **DDS\_LivelinessLostStatus** &status)  
*Accesses the **DDS\_LIVELINESS\_LOST\_STATUS** (p. 346) communication status.*
- virtual **DDS\_ReturnCode\_t** **get\_offered\_deadline\_missed\_status** ( **DDS\_OfferedDeadlineMissedStatus** &status)  
*Accesses the **DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343) communication status.*
- virtual **DDS\_ReturnCode\_t** **get\_offered\_incompatible\_qos\_status** ( **DDS\_OfferedIncompatibleQosStatus** &status)  
*Accesses the **DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) communication status.*
- virtual **DDS\_ReturnCode\_t** **get\_publication\_matched\_status** ( **DDS\_PublicationMatchedStatus** &status)  
*Accesses the **DDS\_PUBLICATION\_MATCHED\_STATUS** (p. 347) communication status.*
- virtual **DDS\_ReturnCode\_t** **get\_reliable\_writer\_cache\_changed\_status** ( **DDS\_ReliableWriterCache↔ChangedStatus** &status)  
 <<**extension**>> (p. 237) *Get the reliable cache status for this writer.*
- virtual **DDS\_ReturnCode\_t** **get\_reliable\_reader\_activity\_changed\_status** ( **DDS\_ReliableReaderActivity↔ChangedStatus** &status)  
 <<**extension**>> (p. 237) *Get the reliable reader activity changed status for this writer.*
- virtual **DDS\_ReturnCode\_t** **get\_datawriter\_cache\_status** ( **DDS\_DataWriterCacheStatus** &status)  
 <<**extension**>> (p. 237) *Get the datawriter cache status for this writer.*
- virtual **DDS\_ReturnCode\_t** **get\_datawriter\_protocol\_status** ( **DDS\_DataWriterProtocolStatus** &status)  
 <<**extension**>> (p. 237) *Get the datawriter protocol status for this writer.*
- virtual **DDS\_ReturnCode\_t** **get\_matched\_subscription\_datawriter\_protocol\_status** ( **DDS\_DataWriter↔ProtocolStatus** &status, const **DDS\_InstanceHandle\_t** &subscription\_handle)  
 <<**extension**>> (p. 237) *Get the datawriter protocol status for this writer, per matched subscription identified by the subscription\_handle.*
- virtual **DDS\_ReturnCode\_t** **is\_matched\_subscription\_active** ( **DDS\_Boolean** &is\_active, const **DDS\_↔InstanceHandle\_t** &subscription\_handle)  
*Check if a subscription currently matched with a DataWriter is active.*
- virtual **DDS\_ReturnCode\_t** **get\_service\_request\_accepted\_status** ( **DDS\_ServiceRequestAcceptedStatus** &status)  
*Accesses the **DDS\_SERVICE\_REQUEST\_ACCEPTED\_STATUS** (p. 348) communication status.*
- virtual **DDS\_ReturnCode\_t** **get\_matched\_subscription\_datawriter\_protocol\_status\_by\_locator** ( **DDS\_↔DataWriterProtocolStatus** &status, const **DDS\_Locator\_t** &locator)

- <<**extension**>> (p. 237) Get the datawriter protocol status for this writer, per matched subscription identified by the locator.
- virtual **DDS\_ReturnCode\_t assert\_liveliness** ()  
*This operation manually asserts the liveliness of this **DDSDataWriter** (p. 1321).*
  - virtual **DDS\_ReturnCode\_t get\_matched\_subscription\_locators** ( **DDS\_LocatorSeq** &locators)  
 <<**extension**>> (p. 237) Retrieve the list of locators for subscriptions currently "associated" with this **DDSDataWriter** (p. 1321).
  - virtual **DDS\_ReturnCode\_t get\_matched\_subscriptions** ( **DDS\_InstanceHandleSeq** &subscription\_handles)  
*Retrieve the list of subscriptions currently "associated" with this **DDSDataWriter** (p. 1321).*
  - virtual **DDS\_ReturnCode\_t get\_matched\_subscription\_data** ( **DDS\_SubscriptionBuiltinTopicData** &subscription\_data, const **DDS\_InstanceHandle\_t** &subscription\_handle)  
*This operation retrieves the information on a subscription that is currently "associated" with the **DDSDataWriter** (p. 1321).*
  - virtual **DDS\_ReturnCode\_t get\_matched\_subscription\_participant\_data** ( **DDS\_ParticipantBuiltinTopicData** &participant\_data, const **DDS\_InstanceHandle\_t** &subscription\_handle)  
*This operation retrieves the information on the discovered **DDSDomainParticipant** (p. 1351) associated with the subscription that is currently matching with the **DDSDataWriter** (p. 1321).*
  - virtual **DDSTopic \* get\_topic** ()  
*This operation returns the **DDSTopic** (p. 1617) associated with the **DDSDataWriter** (p. 1321).*
  - virtual **DDSPublisher \* get\_publisher** ()  
*This operation returns the **DDSPublisher** (p. 1550) to which the **DDSDataWriter** (p. 1321) belongs.*
  - virtual **DDS\_ReturnCode\_t wait\_for\_acknowledgments** (const **DDS\_Duration\_t** &max\_wait)  
*Blocks the calling thread until all data written by reliable **DDSDataWriter** (p. 1321) entity is acknowledged, or until timeout expires.*
  - virtual **DDS\_ReturnCode\_t is\_sample\_app\_acknowledged** ( **DDS\_Boolean** &is\_app\_ack, const struct **DDS\_SampleIdentity\_t** &identity)  
*This method can be used to see if a sample has been application acknowledged.*
  - virtual **DDS\_ReturnCode\_t wait\_for\_asynchronous\_publishing** (const **DDS\_Duration\_t** &max\_wait)  
 <<**extension**>> (p. 237) Blocks the calling thread until asynchronous sending is complete.
  - virtual **DDS\_ReturnCode\_t set\_qos** (const **DDS\_DataWriterQoS** &qos)  
*Sets the writer QoS.*
  - virtual **DDS\_ReturnCode\_t set\_property** (const char \*property\_name, const char \*value, bool propagate)  
*Set the value for a property that applies to a DataWriter.*
  - virtual **DDS\_ReturnCode\_t set\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)  
 <<**extension**>> (p. 237) Change the QoS of this writer using the input XML QoS profile.
  - virtual **DDS\_ReturnCode\_t get\_qos** ( **DDS\_DataWriterQoS** &qos)  
*Gets the writer QoS.*
  - virtual **DDS\_ReturnCode\_t set\_listener** ( **DDSDataWriterListener** \*, **DDS\_StatusMask** mask= **DDS\_STATUS\_MASK\_ALL**)  
*Sets the writer listener.*
  - virtual **DDSDataWriterListener \* get\_listener** ()  
*Get the writer listener.*
  - virtual **DDS\_ReturnCode\_t flush** ()  
 <<**extension**>> (p. 237) Flushes the batch in progress in the context of the calling thread.
  - virtual **DDS\_ReturnCode\_t take\_discovery\_snapshot** ()  
*Take a snapshot of the compatible and incompatible remote readers matched by a local writer.*
  - virtual **DDS\_ReturnCode\_t take\_discovery\_snapshot** (const char \*file\_name)  
*Take a snapshot of the compatible and incompatible remote readers matched by a local writer.*
  - virtual **DDS\_ReturnCode\_t enable** ()



Enables the *DDSEntity* (p. 1463).

- virtual **DDSStatusCondition \* get\_statuscondition** ()  
Allows access to the *DDSStatusCondition* (p. 1578) associated with the *DDSEntity* (p. 1463).
- virtual **DDS\_StatusMask get\_status\_changes** ()  
Retrieves the list of communication statuses in the *DDSEntity* (p. 1463) that are triggered.
- virtual **DDS\_InstanceHandle\_t get\_instance\_handle** ()  
Allows access to the *DDS\_InstanceHandle\_t* (p. 74) associated with the *DDSEntity* (p. 1463).

### 9.249.1 Detailed Description

<<*interface*>> (p. 237) Allows an application to set the value of the data to be published under a given **DDSTopic** (p. 1617).

QoS:

**DDS\_DataWriterQos** (p. 689)

Status:

**DDS\_LIVELINESS\_LOST\_STATUS** (p. 346), **DDS\_LivelinessLostStatus** (p. 934);  
**DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343), **DDS\_OfferedDeadlineMissedStatus** (p. 970);  
**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_OfferedIncompatibleQosStatus** (p. 971);  
**DDS\_PUBLICATION\_MATCHED\_STATUS** (p. 347), **DDS\_PublicationMatchedStatus** (p. 1020);  
**DDS\_RELIABLE\_READER\_ACTIVITY\_CHANGED\_STATUS** (p. 349), **DDS\_ReliableReaderActivity↔  
 ChangedStatus** (p. 1044);  
**DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS** (p. 349), **DDS\_ReliableWriterCache↔  
 Status** (p. 1046).

Listener:

**DDSDataWriterListener** (p. 1344)

A **DDSDataWriter** (p. 1321) is attached to exactly one **DDSPublisher** (p. 1550), that acts as a factory for it.

A **DDSDataWriter** (p. 1321) is bound to exactly one **DDSTopic** (p. 1617) and therefore to exactly one data type. The **DDSTopic** (p. 1617) must exist prior to the **DDSDataWriter** (p. 1321)'s creation.

**DDSDataWriter** (p. 1321) is an abstract class. It must be specialized for each particular application data-type (see **USER\_DATA** (p. 455)). The additional methods or functions that must be defined in the auto-generated class for a hypothetical application type **Foo** (p. 1648) are specified in the example type **DDSDataWriter** (p. 1321).

The following operations may be called even if the **DDSDataWriter** (p. 1321) is not enabled. Other operations will fail with **DDS\_RETCODE\_NOT\_ENABLED** (p. 337) if called on a disabled **DDSDataWriter** (p. 1321):

- The base-class operations **DDSDataWriter::set\_qos** (p. 1336), **DDSDataWriter::get\_qos** (p. 1338), **DDSData↔  
 Writer::set\_listener** (p. 1339), **DDSDataWriter::get\_listener** (p. 1339), **DDSEntity::enable** (p. 1466),  
**DDSEntity::get\_statuscondition** (p. 1467) and **DDSEntity::get\_status\_changes** (p. 1467)

- `DDSDataWriter::get_liveliness_lost_status` (p. 1324), `DDSDataWriter::get_offered_deadline_missed_status` (p. 1324), `DDSDataWriter::get_offered_incompatible_qos_status` (p. 1325), `DDSDataWriter::get_publication_matched_status` (p. 1325), `DDSDataWriter::get_reliable_writer_cache_changed_status` (p. 1326), `DDSDataWriter::get_reliable_reader_activity_changed_status` (p. 1326) `DDSDataWriter::get_service_request_accepted_status` (p. 1328)

Several `DDSDataWriter` (p. 1321) may operate in different threads. If they share the same `DDSPublisher` (p. 1550), the middleware guarantees that its operations are thread-safe.

See also

`FooDataWriter` (p. 1676)

`Operations Allowed in Listener Callbacks` (p. 1528)

Examples

`HelloWorldSupport.cxx`, and `HelloWorld_publisher.cxx`.

## 9.249.2 Member Function Documentation

### 9.249.2.1 `get_liveliness_lost_status()`

```
virtual DDS_ReturnCode_t DDSDataWriter::get_liveliness_lost_status (
    DDS_LivelinessLostStatus & status ) [inline], [virtual]
```

Accesses the `DDS_LIVELINESS_LOST_STATUS` (p. 346) communication status.

This also resets the status so that it is no longer considered changed.

Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <code>DDS_LivelinessLostStatus</code> (p. 934) to be filled in.
---------------	---

Exceptions

<i>One</i>	of the <code>Standard Return Codes</code> (p. 336)
------------	--

### 9.249.2.2 `get_offered_deadline_missed_status()`

```
virtual DDS_ReturnCode_t DDSDataWriter::get_offered_deadline_missed_status (
    DDS_OfferedDeadlineMissedStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343) communication status.

This also resets the status so that it is no longer considered changed.

#### Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_OfferedDeadlineMissedStatus</b> (p. 970) to be filled in.
---------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.249.2.3 get\_offered\_incompatible\_qos\_status()

```
virtual DDS_ReturnCode_t DDSDataWriter::get_offered_incompatible_qos_status (
    DDS_OfferedIncompatibleQosStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) communication status.

This also resets the status so that it is no longer considered changed.

#### Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_OfferedIncompatibleQosStatus</b> (p. 971) to be filled in.
---------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.249.2.4 get\_publication\_matched\_status()

```
virtual DDS_ReturnCode_t DDSDataWriter::get_publication_matched_status (
    DDS_PublicationMatchedStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_PUBLICATION\_MATCHED\_STATUS** (p. 347) communication status.

This also resets the status so that it is no longer considered changed.

#### Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_PublicationMatchedStatus</b> (p. 1020) to be filled in.
---------------	--

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

**9.249.2.5 get\_reliable\_writer\_cache\_changed\_status()**

```
virtual DDS_ReturnCode_t DDSDataWriter::get_reliable_writer_cache_changed_status (
    DDS_ReliableWriterCacheChangedStatus & status ) [inline], [virtual]
```

<<**extension**>> (p. 237) Get the reliable cache status for this writer.

This also resets the status so that it is no longer considered changed.

## Parameters

status	<< <b>inout</b> >> (p. 238) <b>DDS_ReliableWriterCacheChangedStatus</b> (p. 1046) to be filled in.
--------	--

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

**9.249.2.6 get\_reliable\_reader\_activity\_changed\_status()**

```
virtual DDS_ReturnCode_t DDSDataWriter::get_reliable_reader_activity_changed_status (
    DDS_ReliableReaderActivityChangedStatus & status ) [inline], [virtual]
```

<<**extension**>> (p. 237) Get the reliable reader activity changed status for this writer.

This also resets the status so that it is no longer considered changed.

## Parameters

status	<< <b>inout</b> >> (p. 238) <b>DDS_ReliableReaderActivityChangedStatus</b> (p. 1044) to be filled in.
--------	---

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

### 9.249.2.7 get\_datawriter\_cache\_status()

```
virtual DDS_ReturnCode_t DDSDataWriter::get_datawriter_cache_status (
    DDS_DataWriterCacheStatus & status ) [inline], [virtual]
```

<<**extension**>> (p. 237) Get the datawriter cache status for this writer.

This also resets the status so that it is no longer considered changed.

#### Parameters

<i>status</i>	<< <b>inout</b> >> (p. 238) <b>DDS_DataWriterCacheStatus</b> (p. 671) to be filled in.
---------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

### 9.249.2.8 get\_datawriter\_protocol\_status()

```
virtual DDS_ReturnCode_t DDSDataWriter::get_datawriter_protocol_status (
    DDS_DataWriterProtocolStatus & status ) [inline], [virtual]
```

<<**extension**>> (p. 237) Get the datawriter protocol status for this writer.

This also resets the status so that it is no longer considered changed.

#### Parameters

<i>status</i>	<< <b>inout</b> >> (p. 238) <b>DDS_DataWriterProtocolStatus</b> (p. 678) to be filled in.
---------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

### 9.249.2.9 get\_matched\_subscription\_datawriter\_protocol\_status()

```
virtual DDS_ReturnCode_t DDSDataWriter::get_matched_subscription_datawriter_protocol_status (
    DDS_DataWriterProtocolStatus & status,
    const DDS_InstanceHandle_t & subscription_handle ) [inline], [virtual]
```

<<**extension**>> (p. 237) Get the datawriter protocol status for this writer, per matched subscription identified by the `subscription_handle`.

This also resets the status so that it is no longer considered changed.

Note: Status for a remote entity is only kept while the entity is alive. Once a remote entity is no longer alive, its status is deleted.

#### Parameters

<code>status</code>	<< <b>inout</b> >> (p. 238) <b>DDS_DataWriterProtocolStatus</b> (p. 678) to be filled in.
<code>subscription_handle</code>	<< <b>in</b> >> (p. 238) Handle to a specific subscription associated with the <b>DDSDataReader</b> (p. 1288). Must correspond to a subscription currently associated with the <b>DDSDataWriter</b> (p. 1321).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

### 9.249.2.10 `is_matched_subscription_active()`

```
virtual DDS_ReturnCode_t DDSDataWriter::is_matched_subscription_active (
    DDS_Boolean & is_active,
    const DDS_InstanceHandle_t & subscription_handle ) [inline], [virtual]
```

Check if a subscription currently matched with a DataWriter is active.

This API is used for querying the endpoint liveness of a matched subscription. A matched subscription will be marked as inactive when it becomes nonprogressing (e.g., not responding to a DataWriter's heartbeats, or letting its internal queue fill up without taking the available data). Note that if the participant associated with the matched subscription loses liveness, the **DDS\_InstanceHandle\_t** (p. 74) will become invalid and this function will fail with **DDS\_RETCODE\_↵BAD\_PARAMETER** (p. 336).

#### Parameters

<code>subscription_handle</code>	<< <b>in</b> >> (p. 238) The <b>DDS_InstanceHandle_t</b> (p. 74) of the matched subscription. See <b>DDSDataWriter::get_matched_subscriptions</b> (p. 1331) for a description of what is considered a matched subscription.
<code>is_active</code>	<< <b>out</b> >> (p. 238) Indicates whether or not the matched subscription is active.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.249.2.11 get\_service\_request\_accepted\_status()**

```
virtual DDS_ReturnCode_t DDSDataWriter::get_service_request_accepted_status (
    DDS_ServiceRequestAcceptedStatus & status ) [inline], [virtual]
```

Accesses the **DDS\_SERVICE\_REQUEST\_ACCEPTED\_STATUS** (p. 348) communication status.

This also resets the status so that it is no longer considered changed.

**Parameters**

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_ServiceRequestAcceptedStatus</b> (p. 1099) to be filled in.
---------------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.249.2.12 get\_matched\_subscription\_datawriter\_protocol\_status\_by\_locator()**

```
virtual DDS_ReturnCode_t DDSDataWriter::get_matched_subscription_datawriter_protocol_status_by_←
locator (
    DDS_DataWriterProtocolStatus & status,
    const DDS_Locator_t & locator ) [inline], [virtual]
```

<<**extension**>> (p. 237) Get the datawriter protocol status for this writer, per matched subscription identified by the locator.

This also resets the status so that it is no longer considered changed.

Note: Status for a remote entity is only kept while the entity is alive. Once a remote entity is no longer alive, its status is deleted.

**Parameters**

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_DataWriterProtocolStatus</b> (p. 678) to be filled in
<i>locator</i>	<< <i>in</i> >> (p. 238) Locator to a specific locator associated with the <b>DDSDataReader</b> (p. 1288). Must correspond to a locator of one or more subscriptions currently associated with the <b>DDSDataWriter</b> (p. 1321).

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

### 9.249.2.13 assert\_liveliness()

```
virtual DDS_ReturnCode_t DDSDataWriter::assert_liveliness ( ) [inline], [virtual]
```

This operation manually asserts the liveliness of this **DDSDataWriter** (p. 1321).

This is used in combination with the **LIVELINESS** (p. 409) policy to indicate to RTI Connexx that the **DDSDataWriter** (p. 1321) remains active.

You only need to use this operation if the **LIVELINESS** (p. 409) setting is either **DDS\_MANUAL\_BY\_PARTICIPANT\_↔LIVELINESS\_QOS** (p. 410) or **DDS\_MANUAL\_BY\_TOPIC\_LIVELINESS\_QOS** (p. 410). Otherwise, it has no effect.

**Note:** writing data via the **FooDataWriter::write** (p. 1683) or **FooDataWriter::write\_w\_timestamp** (p. 1687) operation asserts liveliness on the **DDSDataWriter** (p. 1321) itself, and its **DDSDomainParticipant** (p. 1351). Consequently the use of **assert\_liveliness()** (p. 1329) is only needed if the application is not writing data regularly.

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
-----	---

#### See also

**DDS\_LivelinessQosPolicy** (p. 936)

### 9.249.2.14 get\_matched\_subscription\_locators()

```
virtual DDS_ReturnCode_t DDSDataWriter::get_matched_subscription_locators (
    DDS_LocatorSeq & locators ) [inline], [virtual]
```

<<**extension**>> (p. 237) Retrieve the list of locators for subscriptions currently "associated" with this **DDSDataWriter** (p. 1321).

The locators returned in the `locators` list are the ones that are used by the DDS implementation to communicate with the corresponding matched **DDSDataReader** (p. 1288) entities.

#### Parameters

<code>locators</code>	<< <b>inout</b> >> (p. 238). Handles of all the matched subscription locators.
-----------------------	--

The sequence will be grown if the sequence has ownership and the system has the corresponding resources. Use a sequence without ownership to avoid dynamic memory allocation. If the sequence is too small to store all the matches and the system can not resize the sequence, this method will fail with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).



## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) if the sequence is too small and the system can not resize it, or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

## 9.249.2.15 get\_matched\_subscriptions()

```
virtual DDS_ReturnCode_t DDSDataWriter::get_matched_subscriptions (
    DDS_InstanceHandleSeq & subscription_handles ) [inline], [virtual]
```

Retrieve the list of subscriptions currently "associated" with this **DDSDataWriter** (p. 1321).

A subscription is considered to be matching if all of the following criteria are true:

- The subscription is within the same domain as this publication.
- The subscription has a matching **DDSTopic** (p. 1617).
- The subscription has compatible QoS.
- If the applications are using partitions, the subscription shares a common partition with this publication.
- The **DDSDomainParticipant** (p. 1351) has not indicated that the subscription's **DDSDomainParticipant** (p. 1351) should be "ignored" by means of the **DDSDomainParticipant::ignore\_publication** (p. 1396) API.
- If the publication is using the **DDS\_MultiChannelQoSPolicy** (p.964) and the subscription is using a **DDSContentFilteredTopic** (p. 1283), there is an intersection between at least one of the associated filters.
- If the endpoints need to exchange key material to communicate (i.e., they are securing their communications), the writer has completed the key exchange with reader.

The handles returned in the `subscription_handles` list are the ones that RTI Connex uses to locally identify the corresponding matched **DDSDataReader** (p.1288) entities. These handles match the ones that appear in the **DDS\_SampleInfo::instance\_handle** (p.1087) field of the **DDS\_SampleInfo** (p.1082) when reading the **DDS\_↔SUBSCRIPTION\_TOPIC\_NAME** (p.300) builtin topic.

This API may return the subscription handles of subscriptions that are inactive. **DDSDataWriter::is\_matched\_↔subscription\_active** (p. 1328) can be used to check this.

## Parameters

<code>subscription_handles</code>	<< <i>inout</i> >> (p. 238). The handles of all the matched subscriptions.
-----------------------------------	--

The sequence will be grown if the sequence has ownership and the system has the corresponding resources. Use a sequence without ownership to avoid dynamic memory allocation. If the sequence is too small to store all of the matches and the system cannot resize the sequence, this method will fail with **DDS\_RETCODE\_OUT\_OF\_↔RESOURCES** (p. 337).

The maximum number of matches possible is configured with **DDS\_DomainParticipantResourceLimitsQosPolicy** (p. 746). You can use a zero-maximum sequence without ownership to quickly check whether there are any matches without allocating any memory. .

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) if the sequence is too small and the system cannot resize it, or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	--

#### 9.249.2.16 `get_matched_subscription_data()`

```
virtual DDS_ReturnCode_t DDSDataWriter::get_matched_subscription_data (
    DDS_SubscriptionBuiltinTopicData & subscription_data,
    const DDS_InstanceHandle_t & subscription_handle ) [inline], [virtual]
```

This operation retrieves the information on a subscription that is currently "associated" with the **DDSDataWriter** (p. 1321).

The `subscription_handle` must correspond to a subscription currently associated with the **DDSDataWriter** (p. 1321). Otherwise, the operation will fail and fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336). Use **DDSDataWriter::get\_matched\_subscriptions** (p. 1331) to find the subscriptions that are currently matched with the **DDSDataWriter** (p. 1321).

The above information is also available through **DDSDataReaderListener::on\_data\_available()** (p. 1317) (if a reader listener is installed on the **DDSSubscriptionBuiltinTopicDataDataReader** (p. 1614)).

When the subscription data is updated, for example when the content filter property changes, there is a small window of time in between when the DataWriter is made aware of these changes and when they actually take effect. Taking effect in this example means that the DataWriter will perform writer-side filtering using the new filter property values (filter expression and/or parameters).

When the DataWriter is made aware of the changes they will first be seen in the **DDSDataReaderListener::on\_data\_available()** (p. 1317) of the **DDSSubscriptionBuiltinTopicDataDataReader** (p. 1614). When these changes are applied, they will be seen in the output of this API because this API blocks until the most recent changes known to the DataWriter have taken effect. This API will only block when called outside of a listener callback, in order to not block the internal threads from making progress.

If application behavior depends on being made aware of information about a subscription only after it has taken effect on the DataWriter, the recommended pattern for usage of this API is to wait for subscription data to be received either through polling this API or by installing a listener on the **DDSSubscriptionBuiltinTopicDataDataReader** (p. 1614). When a new sample is received by the builtin DataReader, this API may be called in a separate thread and will return the expected matched subscription data once it has been applied to the DataWriter.

Because this API blocks, it is possible for this API to time out while waiting for the changes to be applied. A timeout may happen if the DataReader's subscription data is changing rapidly, preventing the DataWriter from returning valid information before newer data has been received, or if an application is performing a task in a listener callback, thereby preventing the middleware's threads from executing events in a timely manner.

Note: This operation does not retrieve the **DDS\_SubscriptionBuiltinTopicData::type\_code** (p. 1114). This information is available through **DDSDataReaderListener::on\_data\_available()** (p. 1317) (if a reader listener is installed on the **DDSSubscriptionBuiltinTopicDataDataReader** (p. 1614)).

## Parameters

<i>subscription_data</i>	<< <i>inout</i> >> (p. 238). The information to be filled in on the associated subscription. Cannot be NULL.
<i>subscription_handle</i>	<< <i>in</i> >> (p. 238). Handle to a specific subscription associated with the <b>DDSDataReader</b> (p. 1288). Must correspond to a subscription currently associated with the <b>DDSDataWriter</b> (p. 1321).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337), or <b>DDS_RETCODE_TIMEOUT</b> (p. 337)
------------	---

## 9.249.2.17 get\_matched\_subscription\_participant\_data()

```
virtual DDS_ReturnCode_t DDSDataWriter::get_matched_subscription_participant_data (
    DDS_ParticipantBuiltinTopicData & participant_data,
    const DDS_InstanceHandle_t & subscription_handle ) [inline], [virtual]
```

This operation retrieves the information on the discovered **DDSDomainParticipant** (p. 1351) associated with the subscription that is currently matching with the **DDSDataWriter** (p. 1321).

The *subscription\_handle* must correspond to a subscription currently associated with the **DDSDataWriter** (p. 1321). Otherwise, the operation will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336). The operation may also fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) if the subscription corresponds to the same **DDSDomainParticipant** (p. 1351) that the DataWriter belongs to. Use **DDSDataWriter::get\_matched\_subscriptions** (p. 1331) to find the subscriptions that are currently matched with the **DDSDataWriter** (p. 1321).

## Parameters

<i>participant_data</i>	<< <i>inout</i> >> (p. 238). The information to be filled in on the associated participant Cannot be NULL.
<i>subscription_handle</i>	<< <i>in</i> >> (p. 238). Handle to a specific subscription associated with the <b>DDSDataReader</b> (p. 1288). Must correspond to a subscription currently associated with the <b>DDSDataWriter</b> (p. 1321).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	--

## 9.249.2.18 get\_topic()

```
virtual DDS_Topic * DDSDataWriter::get_topic ( ) [inline], [virtual]
```

This operation returns the **DDSTopic** (p. 1617) associated with the **DDSDataWriter** (p. 1321).

This is the same **DDSTopic** (p. 1617) that was used to create the **DDSDataWriter** (p. 1321).

#### Returns

**DDSTopic** (p. 1617) that was used to create the **DDSDataWriter** (p. 1321).

### 9.249.2.19 get\_publisher()

```
virtual DDSPublisher * DDSDataWriter::get_publisher ( ) [inline], [virtual]
```

This operation returns the **DDSPublisher** (p. 1550) to which the **DDSDataWriter** (p. 1321) belongs.

#### Returns

**DDSPublisher** (p. 1550) to which the **DDSDataWriter** (p. 1321) belongs.

### 9.249.2.20 wait\_for\_acknowledgments()

```
virtual DDS_ReturnCode_t DDSDataWriter::wait_for_acknowledgments (
    const DDS_Duration_t & max_wait ) [inline], [virtual]
```

Blocks the calling thread until all data written by reliable **DDSDataWriter** (p. 1321) entity is acknowledged, or until timeout expires.

This operation blocks the calling thread until either all data written by the reliable **DDSDataWriter** (p. 1321) entity is acknowledged by (a) all reliable **DDSDataReader** (p. 1288) entities that are matched and alive and (b) by all required subscriptions, or until the duration specified by the `max_wait` parameter elapses, whichever happens first. A successful completion indicates that all the samples written have been acknowledged by all reliable matched data readers and by all required subscriptions; a timeout indicates that `max_wait` elapsed before all the data was acknowledged.

Note that if a thread is blocked in the call to `wait_for_acknowledgments` on a `DataWriter` and a different thread writes new samples on the same `DataWriter`, the new samples must be acknowledged before unblocking the thread waiting on `wait_for_acknowledgments`.

If the **DDSDataWriter** (p. 1321) does not have **DDS\_ReliabilityQosPolicy** (p. 1041) kind set to `RELIABLE`, this operation will succeed immediately.

#### Parameters

<code>max_wait</code>	<< <i>in</i> >> (p. 238) Specifies maximum time to wait for acknowledgements <b>DDS_Duration_t</b> (p. 774) .
-----------------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337), <b>DDS_RETCODE_TIMEOUT</b> (p. 337)
------------	--

## 9.249.2.21 is\_sample\_app\_acknowledged()

```
virtual DDS_ReturnCode_t DDSDataWriter::is_sample_app_acknowledged (
    DDS_Boolean & is_app_ack,
    const struct DDS_SampleIdentity_t & identity ) [inline], [virtual]
```

This method can be used to see if a sample has been application acknowledged.

This method can be used to see if a sample has been application acknowledged by all the matching DataReaders that were alive when the sample was written.

If a DataReader does not enable application acknowledgment (by setting **DDS\_ReliabilityQosPolicy::acknowledgment\_kind** (p. 1043) to a value other than **DDS\_PROTOCOL\_ACKNOWLEDGMENT\_MODE** (p. 435)), the sample is considered application acknowledged for that DataReader.

## Parameters

<i>is_app_ack</i>	<< <b>out</b> >> (p. 238) This value will be set to <b>DDS_BOOLEAN_TRUE</b> (p. 317) when the sample has been acknowledged.
<i>identity</i>	<< <b>in</b> >> (p. 238) Sample identity.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## 9.249.2.22 wait\_for\_asynchronous\_publishing()

```
virtual DDS_ReturnCode_t DDSDataWriter::wait_for_asynchronous_publishing (
    const DDS_Duration_t & max_wait ) [inline], [virtual]
```

<<**extension**>> (p. 237) Blocks the calling thread until asynchronous sending is complete.

This operation blocks the calling thread (up to `max_wait`) until all data written by the asynchronous **DDSDataWriter** (p. 1321) is sent and acknowledged (if reliable) by all matched **DDSDataReader** (p. 1288) entities. A successful completion indicates that all the samples written have been sent and acknowledged where applicable; a time out indicates that `max_wait` elapsed before all the data was sent and/or acknowledged.

In other words, this guarantees that sending to best effort **DDSDataReader** (p. 1288) is complete in addition to what **DDSDataWriter::wait\_for\_acks** (p. 1334) provides.

If the **DDSDataWriter** (p. 1321) does not have **DDS\_PublishModeQosPolicy** (p. 1025) kind set to **DDS\_↔ ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431) the operation will complete immediately with **DDS\_RETURN\_↔ CODE\_OK** (p. 336).

#### Parameters

<i>max_wait</i>	<< <i>in</i> >> (p. 238) Specifies maximum time to wait for acknowledgements <b>DDS_Duration_t</b> (p. 774) .
-----------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETURN_CODE_NOT_ENABLED</b> (p. 337), <b>DDS_RETURN_CODE_TIMEOUT</b> (p. 337)
------------	--

### 9.249.2.23 set\_qos()

```
virtual DDS_ReturnCode_t DDSDataWriter::set_qos (
    const DDS_DataWriterQos & qos ) [inline], [virtual]
```

Sets the writer QoS.

This operation modifies the QoS of the **DDSDataWriter** (p. 1321).

The **DDS\_DataWriterQos::user\_data** (p. 694), **DDS\_DataWriterQos::deadline** (p. 693), **DDS\_DataWriterQos::latency\_budget** (p. 693), **DDS\_DataWriterQos::ownership\_strength** (p. 694), **DDS\_DataWriterQos::transport\_priority** (p. 694), **DDS\_DataWriterQos::lifespan** (p. 694) and **DDS\_DataWriterQos::writer\_data\_lifecycle** (p. 695) can be changed. The other policies are immutable.

#### Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) The <b>DDS_DataWriterQos</b> (p. 689) to be set to. Policies must be consistent. Immutable policies cannot be changed after <b>DDSDataWriter</b> (p. 1321) is enabled. The special value <b>DDS_DATAWRITER_QOS_DEFAULT</b> (p. 110) can be used to indicate that the QoS of the <b>DDSDataWriter</b> (p. 1321) should be changed to match the current default <b>DDS_DataWriterQos</b> (p. 689) set in the <b>DDSPublisher</b> (p. 1550).
------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETURN_CODE_IMMUTABLE_POLICY</b> (p. 337) or <b>DDS_RETURN_CODE_INCONSISTENT_POLICY</b> (p. 337)
------------	---

See also

**DDS\_DataWriterQos** (p. 689) for rules on consistency among QoS

**set\_qos (abstract)** (p. 1464)

**Operations Allowed in Listener Callbacks** (p. 1528)

### 9.249.2.24 set\_property()

```
virtual DDS_ReturnCode_t DDSDataWriter::set_property (
    const char * property_name,
    const char * value,
    bool propagate ) [inline], [virtual]
```

Set the value for a property that applies to a DataWriter.

#### Warning

This method is not implemented in all APIs and it's intended only for testing purposes. You should use **DDSDataWriter::set\_qos** (p. 1336) instead.

#### Parameters

<i>property_name</i>	<< <i>in</i> >> (p. 238). Name of the property that you want to set.
<i>value</i>	<< <i>in</i> >> (p. 238). New value for the property.
<i>propagate</i>	<< <i>in</i> >> (p. 238). Indicates if the property will be propagated or not.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDSDomainParticipant::set\_property** (p. 1407)

**DDSDataReader::set\_property** (p. 1308)

**DDSDataWriter::set\_qos** (p. 1336)

### 9.249.2.25 set\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSDataWriter::set_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [inline], [virtual]
```

<<*extension*>> (p. 237) Change the QoS of this writer using the input XML QoS profile.

This operation modifies the QoS of the **DDSDataWriter** (p. 1321).

The **DDS\_DataWriterQos::user\_data** (p. 694), **DDS\_DataWriterQos::deadline** (p. 693), **DDS\_DataWriterQos::latency\_budget** (p. 693), **DDS\_DataWriterQos::ownership\_strength** (p. 694), **DDS\_DataWriterQos::transport\_priority** (p. 694), **DDS\_DataWriterQos::lifespan** (p. 694) and **DDS\_DataWriterQos::writer\_data\_lifecycle** (p. 695) can be changed. The other policies are immutable.

#### Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexx will use the default library (see <b>DDSPublisher::set_default_library</b> (p. 1555)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexx will use the default profile (see <b>DDSPublisher::set_default_profile</b> (p. 1556)).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337) or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	---

#### See also

**DDS\_DataWriterQos** (p. 689) for rules on consistency among QoS  
**Operations Allowed in Listener Callbacks** (p. 1528)

### 9.249.2.26 get\_qos()

```
virtual DDS_ReturnCode_t DDSDataWriter::get_qos (
    DDS_DataWriterQos & qos ) [inline], [virtual]
```

Gets the writer QoS.

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

#### Parameters

<i>qos</i>	<< <i>inout</i> >> (p. 238) The <b>DDS_DataWriterQos</b> (p. 689) to be filled up.
------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--



See also

**get\_qos (abstract)** (p. 1465)

### 9.249.2.27 set\_listener()

```
virtual DDS_ReturnCode_t DDSDataWriter::set_listener (
    DDSDataWriterListener * l,
    DDS_StatusMask mask = DDS_STATUS_MASK_ALL ) [inline], [virtual]
```

Sets the writer listener.

Parameters

<i>l</i>	<< <i>in</i> >> (p. 238) <b>DDSDataWriterListener</b> (p. 1344) to set to
<i>mask</i>	<< <i>in</i> >> (p. 238) <b>DDS_StatusMask</b> (p. 341) associated with the <b>DDSDataWriterListener</b> (p. 1344).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**set\_listener (abstract)** (p. 1465)

### 9.249.2.28 get\_listener()

```
virtual DDSDataWriterListener * DDSDataWriter::get_listener ( ) [inline], [virtual]
```

Get the writer listener.

Returns

**DDSDataWriterListener** (p. 1344) of the **DDSDataWriter** (p. 1321).

See also

**get\_listener (abstract)** (p. 1466)

### 9.249.2.29 flush()

```
virtual DDS_ReturnCode_t DDSDataWriter::flush ( ) [inline], [virtual]
```

<<*extension*>> (p. 237) Flushes the batch in progress in the context of the calling thread.

After being flushed, the batch is available to be sent on the network.

If the **DDSDataWriter** (p.1321) does not have **DDS\_PublishModeQosPolicy** (p.1025) kind set to **DDS\_↔ ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431), the batch will be sent on the network immediately (in the context of the calling thread).

If the **DDSDataWriter** (p. 1321) does have **DDS\_PublishModeQosPolicy** (p. 1025) kind set to **DDS\_ ASYNCHRONOUS\_↔ PUBLISH\_MODE\_QOS** (p. 431), the batch will be sent in the context of the asynchronous publishing thread.

This operation may block in the same conditions as **FooDataWriter::write** (p. 1683).

If this operation does block, the **RELIABILITY max\_blocking\_time** configures the maximum time the write operation may block (waiting for space to become available). If **max\_blocking\_time** elapses before the **DDS\_DataWriter** is able to store the modification without exceeding the limits, the operation will fail with **DDS\_RETCODE\_TIMEOUT**.

#### MT Safety:

**flush()** (p. 1339) is only thread-safe with batching if **DDS\_BatchQosPolicy::thread\_safe\_write** (p. 603) is **TRUE**.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_TIMEOUT</b> (p. 337), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	---

### 9.249.2.30 take\_discovery\_snapshot() [1/2]

```
virtual DDS_ReturnCode_t DDSDataWriter::take_discovery_snapshot ( ) [inline], [virtual]
```

Take a snapshot of the compatible and incompatible remote readers matched by a local writer.

The snapshot will be printed through the **NDDConfigLogger** (p. 1822). A possible output may be the following:  
Remote readers that match the local writer domain=0 name="writerTestName"

```
guid="0x0101D8D1,0x20B83C0D,0x4495246E:0x80000003"
```

```
topic="FooTopic" type="FooType"
```

```
-----
```

Compatible readers:

```
1. 0x0101542A,0x2C59B595,0xA1693BDF:0x80000004 name="reader1TestName"
```

```
kind="unkeyed user datareader"
```

```
unicastLocators="udpv4://192.168.1.170:7411"
```

```

liveliness="ALIVE"

Incompatible readers:

1. 0x0101542A,0x2C59B595,0xA1693BDF:0x80000104 name="reader2TestName"

kind="unkeyed user datareader"

unicastLocators="udpv4://192.168.1.170:7411"

reason="Inconsistent QoS"
-----

```

### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336).
------------	---

#### 9.249.2.31 take\_discovery\_snapshot() [2/2]

```

virtual DDS_ReturnCode_t DDSDataWriter::take_discovery_snapshot (
    const char * file_name ) [inline], [virtual]

```

Take a snapshot of the compatible and incompatible remote readers matched by a local writer.

The snapshot will be printed in the file specified by `file_name`. A possible output may be the following:

Remote readers that match the local writer domain=0 name="writerTestName"

```

guid="0x0101D8D1,0x20B83C0D,0x4495246E:0x80000003"

topic="FooTopic" type="FooType"
-----

```

Compatible readers:

```

1. 0x0101542A,0x2C59B595,0xA1693BDF:0x80000004 name="reader1TestName"

kind="unkeyed user datareader"

unicastLocators="udpv4://192.168.1.170:7411"

liveliness="ALIVE"

```

Incompatible readers:

```

1. 0x0101542A,0x2C59B595,0xA1693BDF:0x80000104 name="reader2TestName"

kind="unkeyed user datareader"

unicastLocators="udpv4://192.168.1.170:7411"

reason="Inconsistent QoS"
-----

```

### Parameters

<i>file_name</i>	<< <i>in</i> >> (p. 238) Name of the file where snapshot should be printed.
------------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336).
------------	---

**9.249.2.32 enable()**

```
virtual DDS_ReturnCode_t DDSDataWriter::enable ( ) [inline], [virtual]
```

Enables the **DDSEntity** (p. 1463).

This operation enables the Entity. Entity objects can be created either enabled or disabled. This is controlled by the value of the **ENTITY\_FACTORY** (p. 402) QoS policy on the corresponding factory for the **DDSEntity** (p. 1463).

By default, **ENTITY\_FACTORY** (p. 402) is set so that it is not necessary to explicitly call **DDSEntity::enable** (p. 1466) on newly created entities.

The **DDSEntity::enable** (p. 1466) operation is idempotent. Calling enable on an already enabled Entity returns OK and has no effect.

If a **DDSEntity** (p. 1463) has not yet been enabled, the following kinds of operations may be invoked on it:

- set or get the QoS policies (including default QoS policies) and listener
- **DDSEntity::get\_statuscondition** (p. 1467)
- 'factory' operations
- **DDSEntity::get\_status\_changes** (p. 1467) and other get status operations (although the status of a disabled entity never changes)
- 'lookup' operations

Other operations may explicitly state that they may be called on disabled entities; those that do not will return the error **DDS\_RETCODE\_NOT\_ENABLED** (p. 337).

It is legal to delete an **DDSEntity** (p. 1463) that has not been enabled by calling the proper operation on its factory .

Entities created from a factory Entity that is disabled are created disabled, regardless of the setting of the **DDS\_EntityFactoryQosPolicy** (p. 903).

Calling enable on an Entity whose factory Entity is not enabled will fail and return **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

If **DDS\_EntityFactoryQosPolicy::autoenable\_created\_entities** (p. 905) is TRUE, the enable operation on a factory will automatically enable all entities created from that factory (for example, enabling a **DDSPublisher** (p. 1550) will enable all its contained **DDSDataWriter** (p. 1321) objects)

Listeners associated with an entity are not called until the entity is enabled.

Conditions associated with a disabled entity are "inactive," that is, they have a `trigger_value == FALSE`.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--

Implements **DDSEntity** (p. 1466).

### 9.249.2.33 get\_statuscondition()

```
virtual DDSStatusCondition * DDSDataWriter::get_statuscondition ( ) [inline], [virtual]
```

Allows access to the **DDSStatusCondition** (p. 1578) associated with the **DDSEntity** (p. 1463).

The returned condition can then be added to a **DDSWaitSet** (p. 1629) so that the application can wait for specific status changes that affect the **DDSEntity** (p. 1463).

## Returns

the status condition associated with this entity.

Implements **DDSEntity** (p. 1467).

### 9.249.2.34 get\_status\_changes()

```
virtual DDS_StatusMask DDSDataWriter::get_status_changes ( ) [inline], [virtual]
```

Retrieves the list of communication statuses in the **DDSEntity** (p. 1463) that are triggered.

That is, the list of statuses whose value has changed since the last time the application read the status using the `get_*_status()` method.

When the entity is first created or if the entity is not enabled, all communication statuses are in the "untriggered" state so the list returned by the `get_status_changes` operation will be empty.

The list of statuses returned by the `get_status_changes` operation refers to the status that are triggered on the Entity itself and does not include statuses that apply to contained entities.

## Returns

list of communication statuses in the **DDSEntity** (p. 1463) that are triggered.

## See also

**Status Kinds** (p. 337)

Implements **DDSEntity** (p. 1467).

### 9.249.2.35 get\_instance\_handle()

```
virtual DDS_InstanceHandle_t DDSDataWriter::get_instance_handle ( ) [inline], [virtual]
```

Allows access to the **DDS\_InstanceHandle\_t** (p. 74) associated with the **DDSEntity** (p. 1463).

This operation returns the **DDS\_InstanceHandle\_t** (p. 74) that represents the **DDSEntity** (p. 1463).

#### Returns

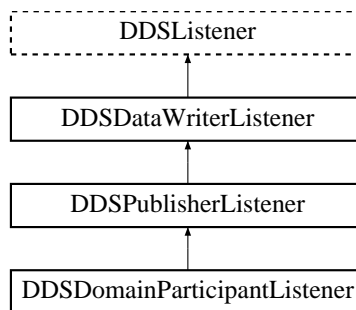
the instance handle associated with this entity.

Implements **DDSEntity** (p. 1468).

## 9.250 DDSDataWriterListener Class Reference

<<**interface**>> (p. 237) **DDSListener** (p. 1526) for writer status.

Inheritance diagram for DDSDataWriterListener:



### Public Member Functions

- virtual void **on\_offered\_deadline\_missed** ( **DDSDataWriter** \*writer, const **DDS\_OfferedDeadlineMissed**↔**Status** &status)  
*Handles the **DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343) status.*
- virtual void **on\_liveliness\_lost** ( **DDSDataWriter** \*writer, const **DDS\_LivelinessLostStatus** &status)  
*Handles the **DDS\_LIVELINESS\_LOST\_STATUS** (p. 346) status.*
- virtual void **on\_offered\_incompatible\_qos** ( **DDSDataWriter** \*writer, const **DDS\_OfferedIncompatibleQos**↔**Status** &status)  
*Handles the **DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) status.*
- virtual void **on\_publication\_matched** ( **DDSDataWriter** \*writer, const **DDS\_PublicationMatchedStatus** &status)  
*Handles the **DDS\_PUBLICATION\_MATCHED\_STATUS** (p. 347) status.*
- virtual void **on\_reliable\_writer\_cache\_changed** ( **DDSDataWriter** \*writer, const **DDS\_ReliableWriterCache**↔**ChangedStatus** &status)  
 <<**extension**>> (p. 237) *A change has occurred in the writer's cache of unacknowledged samples.*

- virtual void **on\_reliable\_reader\_activity\_changed** ( **DDSDataWriter** \*writer, const **DDS\_ReliableReader**↔  
**ActivityChangedStatus** &status)  
    <<*extension*>> (p. 237) *A matched reliable reader has become active or become inactive.*
- virtual void **on\_sample\_removed** ( **DDSDataWriter** \*writer, const **DDS\_Cookie\_t** &cookie)  
    <<*extension*>> (p. 237) *Called when a sample is removed from the DataWriter queue.*
- virtual void **on\_instance\_replaced** ( **DDSDataWriter** \*writer, const **DDS\_InstanceHandle\_t** &handle)  
    <<*extension*>> (p. 237) *Notifies when an instance is replaced in DataWriter queue.*
- virtual void **on\_application\_acknowledgment** ( **DDSDataWriter** \*writer, const **DDS\_AcknowledgmentInfo**  
&info)  
    <<*extension*>> (p. 237) *Called when a sample is application-acknowledged*
- virtual void **on\_service\_request\_accepted** ( **DDSDataWriter** \*writer, const **DDS\_ServiceRequestAccepted**↔  
**Status** &status)  
    <<*extension*>> (p. 237) *Called when a **DDS\_ServiceRequest** (p. 1097) for the **DDSTopicQuery** (p. 1627) service is  
    dispatched to this **DDSDataWriter** (p. 1321) for processing.*

### 9.250.1 Detailed Description

<<*interface*>> (p. 237) **DDSListener** (p. 1526) for writer status.

Entity:

**DDSDataWriter** (p. 1321)

Status:

**DDS\_LIVELINESS\_LOST\_STATUS** (p. 346), **DDS\_LivelinessLostStatus** (p. 934);  
**DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343), **DDS\_OfferedDeadlineMissedStatus** (p. 970);  
**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_OfferedIncompatibleQosStatus** (p. 971);  
**DDS\_PUBLICATION\_MATCHED\_STATUS** (p. 347), **DDS\_PublicationMatchedStatus** (p. 1020);  
**DDS\_RELIABLE\_READER\_ACTIVITY\_CHANGED\_STATUS** (p. 349), **DDS\_ReliableReaderActivity**↔  
**ChangedStatus** (p. 1044);  
**DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS** (p. 349), **DDS\_ReliableWriterCacheChanged**↔  
**Status** (p. 1046);

See also

**DDSListener** (p. 1526)

**Status Kinds** (p. 337)

**Operations Allowed in Listener Callbacks** (p. 1528)

### 9.250.2 Member Function Documentation

### 9.250.2.1 on\_offered\_deadline\_missed()

```
virtual void DDSDataWriterListener::on_offered_deadline_missed (
    DDSDataWriter * writer,
    const DDS_OfferedDeadlineMissedStatus & status ) [virtual]
```

Handles the **DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343) status.

This callback is called when the deadline that the **DDSDataWriter** (p. 1321) has committed through its **DEADLINE** (p. 385) qos policy was not respected for a specific instance. This callback is called for each deadline period elapsed during which the **DDSDataWriter** (p. 1321) failed to provide data for an instance.

#### Parameters

<i>writer</i>	<< <b>out</b> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>status</i>	<< <b>out</b> >> (p. 238) Current deadline missed status of locally created <b>DDSDataWriter</b> (p. 1321)

### 9.250.2.2 on\_liveliness\_lost()

```
virtual void DDSDataWriterListener::on_liveliness_lost (
    DDSDataWriter * writer,
    const DDS_LivelinessLostStatus & status ) [virtual]
```

Handles the **DDS\_LIVELINESS\_LOST\_STATUS** (p. 346) status.

This callback is called when the liveliness that the **DDSDataWriter** (p. 1321) has committed through its **LIVELINESS** (p. 409) qos policy was not respected; this **DDSDataReader** (p. 1288) entities will consider the **DDSDataWriter** (p. 1321) as no longer "alive/active". This callback will not be called when an already not alive **DDSDataWriter** (p. 1321) simply remains not alive for another liveliness period.

#### Parameters

<i>writer</i>	<< <b>out</b> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>status</i>	<< <b>out</b> >> (p. 238) Current liveliness lost status of locally created <b>DDSDataWriter</b> (p. 1321)

### 9.250.2.3 on\_offered\_incompatible\_qos()

```
virtual void DDSDataWriterListener::on_offered_incompatible_qos (
    DDSDataWriter * writer,
    const DDS_OfferedIncompatibleQosStatus & status ) [virtual]
```

Handles the **DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344) status.



This callback is called when the **DDS\_DataWriterQos** (p. 689) of the **DDSDataWriter** (p. 1321) was incompatible with what was requested by a **DDSDataReader** (p. 1288). This callback is called when a **DDSDataWriter** (p. 1321) has discovered a **DDSDataReader** (p. 1288) for the same **DDSTopic** (p. 1617) and common partition, but with a requested QoS that is incompatible with that offered by the **DDSDataWriter** (p. 1321).

#### Parameters

<i>writer</i>	<< <b>out</b> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>status</i>	<< <b>out</b> >> (p. 238) Current incompatible qos status of locally created <b>DDSDataWriter</b> (p. 1321)

#### 9.250.2.4 on\_publication\_matched()

```
virtual void DDSDataWriterListener::on_publication_matched (
    DDSDataWriter * writer,
    const DDS_PublicationMatchedStatus & status ) [virtual]
```

Handles the **DDS\_PUBLICATION\_MATCHED\_STATUS** (p. 347) status.

This callback is called when the **DDSDataWriter** (p. 1321) has found a **DDSDataReader** (p. 1288) that matches the **DDSTopic** (p. 1617), has a common partition and compatible QoS, or has ceased to be matched with a **DDSDataReader** (p. 1288) that was previously considered to be matched.

#### Parameters

<i>writer</i>	<< <b>out</b> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>status</i>	<< <b>out</b> >> (p. 238) Current publication match status of locally created <b>DDSDataWriter</b> (p. 1321)

#### 9.250.2.5 on\_reliable\_writer\_cache\_changed()

```
virtual void DDSDataWriterListener::on_reliable_writer_cache_changed (
    DDSDataWriter * writer,
    const DDS_ReliableWriterCacheChangedStatus & status ) [virtual]
```

<<**extension**>> (p. 237) A change has occurred in the writer's cache of unacknowledged samples.

This listener callback is triggered when:

- The cache is empty (contains no unacknowledged samples).
- The cache is full (the number of unacknowledged samples has reached the value specified in **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055)).
- The number of unacknowledged samples has reached **DDS\_RtpsReliableWriterProtocol\_t::high\_watermark** (p. 1063) or **DDS\_RtpsReliableWriterProtocol\_t::low\_watermark** (p. 1063).

## Parameters

<i>writer</i>	<< <b>out</b> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>status</i>	<< <b>out</b> >> (p. 238) Current reliable writer cache changed status of locally created <b>DDSDataWriter</b> (p. 1321)

## 9.250.2.6 on\_reliable\_reader\_activity\_changed()

```
virtual void DDSDataWriterListener::on_reliable_reader_activity_changed (
    DDSDataWriter * writer,
    const DDS_ReliableReaderActivityChangedStatus & status ) [virtual]
```

<<**extension**>> (p. 237) A matched reliable reader has become active or become inactive.

## Parameters

<i>writer</i>	<< <b>out</b> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>status</i>	<< <b>out</b> >> (p. 238) Current reliable reader activity changed status of locally created <b>DDSDataWriter</b> (p. 1321)

## 9.250.2.7 on\_sample\_removed()

```
virtual void DDSDataWriterListener::on_sample_removed (
    DDSDataWriter * writer,
    const DDS_Cookie_t & cookie ) [virtual]
```

<<**extension**>> (p. 237) Called when a sample is removed from the DataWriter queue.

This callback is called only if the sample was written with a **DDS\_Cookie\_t** (p. 618) with **FooDataWriter::write\_w←\_params** (p. 1688), or if this writer uses **Zero Copy** (p. 70) transfer over shared memory" or **FlatData Topic-Types** (p. 568) "FlatData language binding".

## Parameters

<i>writer</i>	<< <b>out</b> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>cookie</i>	<< <b>out</b> >> (p. 238) <ul style="list-style-type: none"> <li>• If this sample was written with <b>FooDataWriter::write_w_params</b> (p. 1688), this field contains a copy of the cookie set in <b>DDS_WriteParams_t</b> (p. 1251).</li> <li>• If this writer uses <b>Zero Copy transfer over shared memory</b> (p. 70) or <b>FlatData language binding</b> (p. 568), this field contains the absolute address of the sample that is removed. The address of the sample can be obtained by using <b>DDS_Cookie_t::to_pointer</b> (p. 473)</li> </ul>

See also

**FooDataWriter::get\_loan** (p. 1695)

### 9.250.2.8 on\_instance\_replaced()

```
virtual void DDSDataWriterListener::on_instance_replaced (
    DDSDataWriter * writer,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<**extension**>> (p. 237) Notifies when an instance is replaced in DataWriter queue.

This callback is called when an instance is replaced by the **DDSDataWriter** (p. 1321) due to instance resource limits being reached. This callback returns to the user the handle of the replaced instance, which can be used to get the key of the replaced instance using the **FooDataWriter::get\_key\_value** (p. 1691) API.

Because this callback can be called within the context of an in-progress write, dispose, or unregister call, most APIs on the DataWriter must not be used. The only DataWriter APIs that are safe to call within this callback are:

- **FooDataWriter::get\_key\_value** (p. 1691)
- **FooDataWriter::narrow** (p. 1678)
- **FooDataWriter::create\_data** (p. 1694)
- **FooDataWriter::delete\_data** (p. 1694)
- **DDSDataWriter::get\_matched\_subscriptions** (p. 1331)
- **DDSDataWriter::is\_matched\_subscription\_active** (p. 1328)
- **DDSDataWriter::get\_matched\_subscription\_participant\_data** (p. 1333)
- **DDSDataWriter::get\_topic** (p. 1333)
- **DDSDataWriter::get\_publisher** (p. 1334)
- **DDSDataWriter::is\_sample\_app\_acknowledged** (p. 1335)

#### Parameters

<i>writer</i>	<< <b>out</b> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>handle</i>	<< <b>out</b> >> (p. 238) Handle of the replaced instance

### 9.250.2.9 on\_application\_acknowledgment()

```
virtual void DDSDataWriterListener::on_application_acknowledgment (
```

```

    DDSDataWriter * writer,
    const DDS_AcknowledgmentInfo & info ) [virtual]

```

<<*extension*>> (p. 237) Called when a sample is application-acknowledged

Applicable only when **DDS\_ReliabilityQosPolicy::acknowledgment\_kind** (p. 1043) = **DDS\_APPLICATION\_AUTO\_←\_ACKNOWLEDGMENT\_MODE** (p. 435) or **DDS\_APPLICATION\_EXPLICIT\_ACKNOWLEDGMENT\_MODE** (p. 436)

Called when a sample is application-level acknowledged. Provides identities of the sample and the acknowledging **DDSDataReader** (p. 1288). Also provides user-specified response data sent from the **DDSDataReader** (p. 1288) by the acknowledgment message.

#### Parameters

<i>writer</i>	<< <i>out</i> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>info</i>	<< <i>out</i> >> (p. 238) <b>DDS_AcknowledgmentInfo</b> (p. 586) of the acknowledged sample

#### 9.250.2.10 on\_service\_request\_accepted()

```

virtual void DDSDataWriterListener::on_service_request_accepted (
    DDSDataWriter * writer,
    const DDS_ServiceRequestAcceptedStatus & status ) [virtual]

```

<<*extension*>> (p. 237) Called when a **DDS\_ServiceRequest** (p. 1097) for the **DDSTopicQuery** (p. 1627) service is dispatched to this **DDSDataWriter** (p. 1321) for processing.

#### Parameters

<i>writer</i>	<< <i>out</i> >> (p. 238) Locally created <b>DDSDataWriter</b> (p. 1321) that triggers the listener callback
<i>status</i>	<< <i>out</i> >> (p. 238) Current service request accepted status of locally created <b>DDSDataWriter</b> (p. 1321)

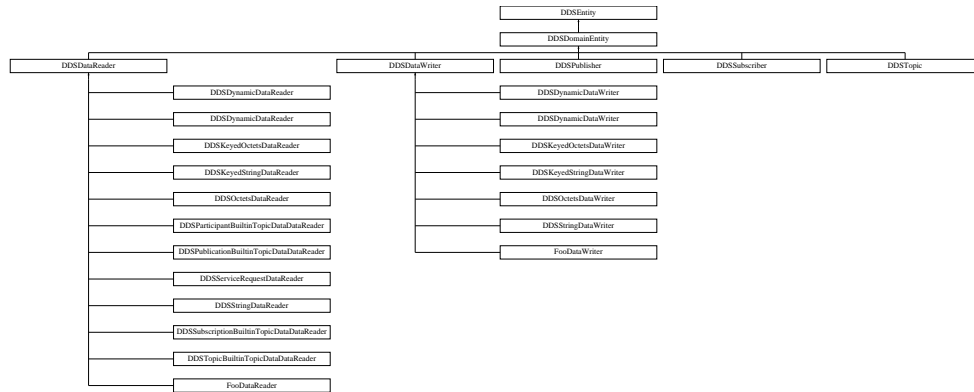
#### See also

**Topic Queries** (p. 151)

## 9.251 DDSDomainEntity Class Reference

<<*interface*>> (p. 237) Abstract base class for all DDS entities except for the **DDSDomainParticipant** (p. 1351).

Inheritance diagram for DDSDomainEntity:



## Additional Inherited Members

### 9.251.1 Detailed Description

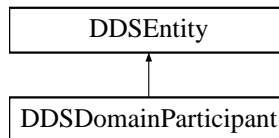
<<*interface*>> (p. 237) Abstract base class for all DDS entities except for the **DDSDomainParticipant** (p. 1351).

Its sole purpose is to *conceptually* express that **DDSDomainParticipant** (p. 1351) is a special kind of **DDSEntity** (p. 1463) that acts as a container of all other **DDSEntity** (p. 1463) but itself cannot contain other **DDSDomainParticipant** (p. 1351).

## 9.252 DDSDomainParticipant Class Reference

<<*interface*>> (p. 237) Container for all **DDSDomainEntity** (p. 1350) objects.

Inheritance diagram for DDSDomainParticipant:



## Public Member Functions

- virtual **DDS\_ReturnCode\_t** **get\_default\_datawriter\_qos** ( **DDS\_DataWriterQos** &qos)=0  
 <<*extension*>> (p. 237) Copy the default **DDS\_DataWriterQos** (p. 689) values into the provided **DDS\_DataWriterQos** (p. 689) instance.
- virtual **DDS\_ReturnCode\_t** **set\_default\_datawriter\_qos** (const **DDS\_DataWriterQos** &qos)=0  
 <<*extension*>> (p. 237) Set the default DataWriterQos values for this DomainParticipant.
- virtual **DDS\_ReturnCode\_t** **set\_default\_datawriter\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0

- <<extension>>* (p. 237) Set the default **DDS\_DataWriterQos** (p. 689) values for this domain participant based on the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t get\_default\_datareader\_qos** (**DDS\_DataReaderQos** &qos)=0

*<<extension>>* (p. 237) Copy the default **DDS\_DataReaderQos** (p. 644) values into the provided **DDS\_DataReaderQos** (p. 644) instance.
- virtual **DDS\_ReturnCode\_t set\_default\_datareader\_qos** (const **DDS\_DataReaderQos** &qos)=0

*<<extension>>* (p. 237) Set the default **DDS\_DataReaderQos** (p. 644) values for this domain participant.
- virtual **DDS\_ReturnCode\_t set\_default\_datareader\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0

*<<extension>>* (p. 237) Set the default **DDS\_DataReaderQos** (p. 644) values for this DomainParticipant based on the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t get\_default\_flowcontroller\_property** (**DDS\_FlowControllerProperty\_t** &prop)=0

*<<extension>>* (p. 237) Copies the default **DDS\_FlowControllerProperty\_t** (p. 912) values for this domain participant into the given **DDS\_FlowControllerProperty\_t** (p. 912) instance.
- virtual **DDS\_ReturnCode\_t set\_default\_flowcontroller\_property** (const **DDS\_FlowControllerProperty\_t** &prop)=0

*<<extension>>* (p. 237) Set the default **DDS\_FlowControllerProperty\_t** (p. 912) values for this domain participant.
- virtual **DDS\_ReturnCode\_t register\_contentfilter** (const char \*filter\_name, const **DDSContentFilter** \*contentfilter)=0

*<<extension>>* (p. 237) Register a content filter which can be used to create a **DDSContentFilteredTopic** (p. 1283).
- virtual **DDSContentFilter \* lookup\_contentfilter** (const char \*filter\_name)=0

*<<extension>>* (p. 237) Lookup a content filter previously registered with **DDSDomainParticipant::register\_contentfilter** (p. 1364).
- virtual **DDS\_ReturnCode\_t unregister\_contentfilter** (const char \*filter\_name)=0

*<<extension>>* (p. 237) Unregister a content filter previously registered with **DDSDomainParticipant::register\_contentfilter** (p. 1364).
- virtual const char \* **get\_default\_library** ()=0

*<<extension>>* (p. 237) Gets the default XML library associated with a **DDSDomainParticipant** (p. 1351).
- virtual const char \* **get\_default\_profile** ()=0

*<<extension>>* (p. 237) Gets the default XML profile associated with a **DDSDomainParticipant** (p. 1351).
- virtual const char \* **get\_default\_profile\_library** ()=0

*<<extension>>* (p. 237) Gets the library where the default XML QoS profile is contained for a **DDSDomainParticipant** (p. 1351).
- virtual **DDS\_ReturnCode\_t set\_default\_library** (const char \*library\_name)=0

*<<extension>>* (p. 237) Sets the default XML library for a **DDSDomainParticipant** (p. 1351).
- virtual **DDS\_ReturnCode\_t set\_default\_profile** (const char \*library\_name, const char \*profile\_name)=0

*<<extension>>* (p. 237) Sets the default XML profile for a **DDSDomainParticipant** (p. 1351).
- virtual **DDS\_ReturnCode\_t get\_default\_topic\_qos** (**DDS\_TopicQos** &qos)=0

Copies the default **DDS\_TopicQos** (p. 1135) values for this domain participant into the given **DDS\_TopicQos** (p. 1135) instance.
- virtual **DDS\_ReturnCode\_t set\_default\_topic\_qos** (const **DDS\_TopicQos** &qos)=0

Set the default **DDS\_TopicQos** (p. 1135) values for this domain participant.
- virtual **DDS\_ReturnCode\_t set\_default\_topic\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0

*<<extension>>* (p. 237) Set the default **DDS\_TopicQos** (p. 1135) values for this domain participant based on the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t get\_default\_publisher\_qos** (**DDS\_PublisherQos** &qos)=0

Copy the default **DDS\_PublisherQos** (p. 1022) values into the provided **DDS\_PublisherQos** (p. 1022) instance.
- virtual **DDS\_ReturnCode\_t set\_default\_publisher\_qos** (const **DDS\_PublisherQos** &qos)=0

Set the default **DDS\_PublisherQos** (p. 1022) values for this *DomainParticipant*.

- virtual **DDS\_ReturnCode\_t set\_default\_publisher\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0
 

*<<extension>>* (p. 237) Set the default **DDS\_PublisherQos** (p. 1022) values for this *DomainParticipant* based on the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t get\_default\_subscriber\_qos** ( **DDS\_SubscriberQos** &qos)=0
 

Copy the default **DDS\_SubscriberQos** (p. 1105) values into the provided **DDS\_SubscriberQos** (p. 1105) instance.
- virtual **DDS\_ReturnCode\_t set\_default\_subscriber\_qos** (const **DDS\_SubscriberQos** &qos)=0
 

Set the default **DDS\_SubscriberQos** (p. 1105) values for this *DomainParticipant*.
- virtual **DDS\_ReturnCode\_t set\_default\_subscriber\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0
 

*<<extension>>* (p. 237) Set the default **DDS\_SubscriberQos** (p. 1105) values for this *DomainParticipant* based on the input XML QoS profile.
- virtual **DDSPublisher \* create\_publisher** (const **DDS\_PublisherQos** &qos, **DDSPublisherListener** \*listener, **DDS\_StatusMask** mask)=0
 

Creates a **DDSPublisher** (p. 1550) with the desired QoS policies and attaches to it the specified **DDSPublisherListener** (p. 1571).
- virtual **DDSPublisher \* create\_publisher\_with\_profile** (const char \*library\_name, const char \*profile\_name, **DDSPublisherListener** \*listener, **DDS\_StatusMask** mask)=0
 

*<<extension>>* (p. 237) Creates a new **DDSPublisher** (p. 1550) object using the **DDS\_PublisherQos** (p. 1022) associated with the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t delete\_publisher** ( **DDSPublisher** \*p)=0
 

Deletes an existing **DDSPublisher** (p. 1550).
- virtual **DDSSubscriber \* create\_subscriber** (const **DDS\_SubscriberQos** &qos, **DDSSubscriberListener** \*listener, **DDS\_StatusMask** mask)=0
 

Creates a **DDSSubscriber** (p. 1592) with the desired QoS policies and attaches to it the specified **DDSSubscriberListener** (p. 1613).
- virtual **DDSSubscriber \* create\_subscriber\_with\_profile** (const char \*library\_name, const char \*profile\_name, **DDSSubscriberListener** \*listener, **DDS\_StatusMask** mask)=0
 

*<<extension>>* (p. 237) Creates a new **DDSSubscriber** (p. 1592) object using the **DDS\_PublisherQos** (p. 1022) associated with the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t delete\_subscriber** ( **DDSSubscriber** \*s)=0
 

Deletes an existing **DDSSubscriber** (p. 1592).
- virtual **DDS\_ReturnCode\_t get\_publishers** ( **DDSPublisherSeq** &publishers)=0
 

*<<extension>>* (p. 237) Allows the application to access all the publishers the participant has.
- virtual **DDS\_ReturnCode\_t get\_subscribers** ( **DDSSubscriberSeq** &subscribers)=0
 

*<<extension>>* (p. 237) Allows the application to access all the subscribers the participant has.
- virtual **DDSTopic \* create\_topic** (const char \*topic\_name, const char \*type\_name, const **DDS\_TopicQos** &qos, **DDSTopicListener** \*listener, **DDS\_StatusMask** mask)=0
 

Creates a **DDSTopic** (p. 1617) with the desired QoS policies and attaches to it the specified **DDSTopicListener** (p. 1626).
- virtual **DDSTopic \* create\_topic\_with\_profile** (const char \*topic\_name, const char \*type\_name, const char \*library\_name, const char \*profile\_name, **DDSTopicListener** \*listener, **DDS\_StatusMask** mask)=0
 

*<<extension>>* (p. 237) Creates a new **DDSTopic** (p. 1617) object using the **DDS\_PublisherQos** (p. 1022) associated with the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t delete\_topic** ( **DDSTopic** \*topic)=0
 

Deletes a **DDSTopic** (p. 1617).
- virtual **DDSContentFilteredTopic \* create\_contentfilteredtopic** (const char \*name, **DDSTopic** \*related\_topic, const char \*filter\_expression, const **DDS\_StringSeq** &expression\_parameters)=0
 

Creates a **DDSContentFilteredTopic** (p. 1283), that can be used to do content-based subscriptions.

- virtual **DDSContentFilteredTopic \* create\_contentfilteredtopic\_with\_filter** (const char \*name, **DDSTopic** \*related\_topic, const char \*filter\_expression, const **DDS\_StringSeq** &expression\_parameters, const char \*filter\_name=**DDS\_SQLFILTER\_NAME**)=0  
*<<extension>>* (p. 237) Creates a **DDSContentFilteredTopic** (p. 1283) using the specified filter to do content-based subscriptions.
- virtual **DDS\_ReturnCode\_t delete\_contentfilteredtopic** (**DDSContentFilteredTopic** \*a\_contentfilteredtopic)=0  
*Deletes a **DDSContentFilteredTopic** (p. 1283).*
- virtual **DDSMultiTopic \* create\_multitopic** (const char \*name, const char \*type\_name, const char \*subscription\_expression, const **DDS\_StringSeq** &expression\_parameters)=0  
**[Not supported (optional)]** Creates a **MultiTopic** that can be used to subscribe to multiple topics and combine/filter the received data into a resulting type.
- virtual **DDS\_ReturnCode\_t delete\_multitopic** (**DDSMultiTopic** \*a\_multitopic)=0  
**[Not supported (optional)]** Deletes a **DDSMultiTopic** (p. 1529).
- virtual **DDSTopic \* find\_topic** (const char \*topic\_name, const **DDS\_Duration\_t** &timeout)=0  
*Finds an existing (or ready to exist) **DDSTopic** (p. 1617), based on its name.*
- virtual **DDSTopicDescription \* lookup\_topicdescription** (const char \*topic\_name)=0  
*Looks up an existing, locally created **DDSTopicDescription** (p. 1624), based on its name.*
- virtual **DDSFlowController \* create\_flowcontroller** (const char \*name, const **DDS\_FlowController\_Property\_t** &prop)=0  
*<<extension>>* (p. 237) Creates a **DDSFlowController** (p. 1468) with the desired property.
- virtual **DDS\_ReturnCode\_t delete\_flowcontroller** (**DDSFlowController** \*fc)=0  
*<<extension>>* (p. 237) Deletes an existing **DDSFlowController** (p. 1468).
- virtual **DDSFlowController \* lookup\_flowcontroller** (const char \*name)=0  
*<<extension>>* (p. 237) Looks up an existing locally-created **DDSFlowController** (p. 1468), based on its name.
- virtual **DDSSubscriber \* get\_builtin\_subscriber** ()=0  
*Accesses the **built-in DDSSubscriber** (p. 1592).*
- virtual **DDS\_ReturnCode\_t ignore\_participant** (const **DDS\_InstanceHandle\_t** &handle)=0  
*Instructs RTI Connex to locally ignore a remote **DDSDomainParticipant** (p. 1351).*
- virtual **DDS\_ReturnCode\_t banish\_ignored\_participants** ()=0  
*<<extension>>* (p. 237) Prevents ignored remote **DomainParticipants** from receiving traffic from the local **DDSDomainParticipant** (p. 1351).
- virtual **DDS\_ReturnCode\_t ignore\_topic** (const **DDS\_InstanceHandle\_t** &handle)=0  
*Instructs RTI Connex to locally ignore a **DDSTopic** (p. 1617).*
- virtual **DDS\_ReturnCode\_t ignore\_publication** (const **DDS\_InstanceHandle\_t** &handle)=0  
*Instructs RTI Connex to locally ignore a publication.*
- virtual **DDS\_ReturnCode\_t ignore\_subscription** (const **DDS\_InstanceHandle\_t** &handle)=0  
*Instructs RTI Connex to locally ignore a subscription.*
- virtual **DDS\_DomainId\_t get\_domain\_id** ()=0  
*Get the unique domain identifier.*
- virtual **DDS\_ReturnCode\_t get\_current\_time** (**DDS\_Time\_t** &current\_time)=0  
*Returns the current value of the time.*
- virtual **DDS\_ReturnCode\_t register\_durable\_subscription** (const **DDS\_EndpointGroup\_t** &group, const char \*topic\_name)=0  
*<<extension>>* (p. 237) Registers a Durable Subscription on the specified **DDSTopic** (p. 1617) on all Persistence Services.
- virtual **DDS\_ReturnCode\_t delete\_durable\_subscription** (const **DDS\_EndpointGroup\_t** &group)=0  
*<<extension>>* (p. 237) Deletes an existing Durable Subscription on all Persistence Services.
- virtual **DDS\_ReturnCode\_t assert\_liveliness** ()=0



Manually asserts the liveness of this *DDSDomainParticipant* (p. 1351).

- virtual **DDS\_ReturnCode\_t resume\_endpoint\_discovery** (const **DDS\_InstanceHandle\_t** &remote\_↔ participant\_handle)=0  
 <<extension>> (p. 237) Initiates endpoint discovery with the specified remote *DDSDomainParticipant* (p. 1351).
- virtual **DDS\_ReturnCode\_t delete\_contained\_entities** ()=0  
 Delete all the entities that were created by means of the "create" operations on the *DDSDomainParticipant* (p. 1351).
- virtual **DDS\_ReturnCode\_t get\_discovered\_participants** ( **DDS\_InstanceHandleSeq** &participant\_↔ handles)=0  
 Returns a list of discovered *DDSDomainParticipant* (p. 1351) entities.
- virtual **DDS\_ReturnCode\_t get\_discovered\_participants\_from\_subject\_name** ( **DDS\_InstanceHandleSeq** &participant\_handles, const char \*subject\_name)=0  
 <<extension>> (p. 237) Returns a list of discovered *DDSDomainParticipant* (p. 1351) entities that have the given *DDS\_EntityNameQoSPolicy::name* (p. 906).
- virtual **DDS\_ReturnCode\_t get\_discovered\_participant\_data** (struct **DDS\_ParticipantBuiltinTopicData** &participant\_data, const **DDS\_InstanceHandle\_t** &participant\_handle)=0  
 Returns *DDS\_ParticipantBuiltinTopicData* (p. 979) for the specified *DDSDomainParticipant* (p. 1351).
- virtual **DDS\_ReturnCode\_t get\_discovered\_participant\_subject\_name** (char \*subject\_name, **DDS\_↔ UnsignedLong** &subject\_name\_size, const **DDS\_InstanceHandle\_t** &participant\_handle)=0  
 <<extension>> (p. 237) Returns *DDS\_EntityNameQoSPolicy::name* (p. 906) for the specified *DDSDomain↔ Participant* (p. 1351).
- virtual **DDS\_ReturnCode\_t get\_discovered\_topics** ( **DDS\_InstanceHandleSeq** &topic\_handles)=0  
 Returns list of discovered *DDSTopic* (p. 1617) objects.
- virtual **DDS\_ReturnCode\_t get\_discovered\_topic\_data** (struct **DDS\_TopicBuiltinTopicData** &topic\_data, const **DDS\_InstanceHandle\_t** &topic\_handle)=0  
 Returns *DDS\_TopicBuiltinTopicData* (p. 1128) for the specified *DDSTopic* (p. 1617).
- virtual **DDS\_Boolean contains\_entity** (const **DDS\_InstanceHandle\_t** &a\_handle)=0  
 Completes successfully with *DDS\_BOOLEAN\_TRUE* (p. 317) if the referenced *DDSEntity* (p. 1463) is contained by the *DDSDomainParticipant* (p. 1351).
- virtual **DDS\_ReturnCode\_t get\_participant\_protocol\_status** (struct **DDS\_DomainParticipantProtocol↔ Status** &status)=0  
 <<extension>> (p. 237) Get the domain participant protocol status for this participant.
- virtual **DDS\_ReturnCode\_t set\_property** (const char \*property\_name, const char \*value, bool propagate)=0  
 Set the value for a property that applies to a *DomainParticipant*.
- virtual **DDS\_ReturnCode\_t set\_qos** (const **DDS\_DomainParticipantQoS** &qos)=0  
 Change the QoS of this *DomainParticipant*.
- virtual **DDS\_ReturnCode\_t set\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0  
 <<extension>> (p. 237) Change the QoS of this domain participant using the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t get\_qos** ( **DDS\_DomainParticipantQoS** &qos)=0  
 Get the participant QoS.
- virtual **DDS\_ReturnCode\_t add\_peer** (const char \*peer\_desc\_string)=0  
 <<extension>> (p. 237) Attempt to contact one or more additional peer participants.
- virtual **DDS\_ReturnCode\_t remove\_peer** (const char \*peer\_desc\_string)=0  
 <<extension>> (p. 237) Remove one or more peer participants from the list of peers with which this *DDSDomain↔ Participant* (p. 1351) will try to communicate.
- virtual **DDS\_ReturnCode\_t get\_dns\_tracker\_polling\_period** ( **DDS\_Duration\_t** &polling\_period)=0  
 <<extension>> (p. 237) Retrieves the frequency used by the DNS tracker thread to query the DNS service.
- virtual **DDS\_ReturnCode\_t set\_dns\_tracker\_polling\_period** (const **DDS\_Duration\_t** &polling\_period)=0  
 <<extension>> (p. 237) Configures the frequency in which the DNS tracker queries the DNS service.

- virtual `DDS_ReturnCode_t set_listener ( DDSDomainParticipantListener *l, DDS_StatusMask mask=DDS_STATUS_MASK_ALL)=0`  
*Sets the participant listener.*
- virtual `DDSDomainParticipantListener * get_listener ()=0`  
*Get the participant listener.*
- virtual `DDSPublisher * get_implicit_publisher ()=0`  
 <<extension>> (p. 237) Returns the implicit *DDSPublisher* (p. 1550). If an implicit Publisher does not already exist, this creates one.
- virtual `DDSSubscriber * get_implicit_subscriber ()=0`  
 <<extension>> (p. 237) Returns the implicit *DDSSubscriber* (p. 1592). If an implicit Subscriber does not already exist, this creates one.
- virtual `DDSDataWriter * create_datawriter ( DDSTopic *topic, const DDS_DataWriterQos &qos, DDSDataWriterListener *listener, DDS_StatusMask mask)=0`  
 <<extension>> (p. 237) Creates a *DDSDataWriter* (p. 1321) that will be attached and belong to the implicit *DDSPublisher* (p. 1550).
- virtual `DDSDataWriter * create_datawriter_with_profile ( DDSTopic *topic, const char *library_name, const char *profile_name, DDSDataWriterListener *listener, DDS_StatusMask mask)=0`  
 <<extension>> (p. 237) Creates a *DDSDataWriter* (p. 1321) using a XML QoS profile that will be attached and belong to the implicit *DDSPublisher* (p. 1550).
- virtual `DDS_ReturnCode_t delete_datawriter ( DDSDataWriter *a_datawriter)=0`  
 <<extension>> (p. 237) Deletes a *DDSDataWriter* (p. 1321) that belongs to the implicit *DDSPublisher* (p. 1550).
- virtual `DDSDataReader * create_datareader ( DDSTopicDescription *topic, const DDS_DataReaderQos &qos, DDSDataReaderListener *listener, DDS_StatusMask mask)=0`  
 <<extension>> (p. 237) Creates a *DDSDataReader* (p. 1288) that will be attached and belong to the implicit *DDSSubscriber* (p. 1592).
- virtual `DDSDataReader * create_datareader_with_profile ( DDSTopicDescription *topic, const char *library_name, const char *profile_name, DDSDataReaderListener *listener, DDS_StatusMask mask)=0`  
 <<extension>> (p. 237) Creates a *DDSDataReader* (p. 1288) using a XML QoS profile that will be attached and belong to the implicit *DDSSubscriber* (p. 1592).
- virtual `DDS_ReturnCode_t delete_datareader ( DDSDataReader *a_datareader)=0`  
 <<extension>> (p. 237) Deletes a *DDSDataReader* (p. 1288) that belongs to the implicit *DDSSubscriber* (p. 1592).
- virtual `DDSPublisher * lookup_publisher_by_name (const char *publisher_name)=0`  
 <<extension>> (p. 237) Looks up a *DDSPublisher* (p. 1550) by its entity name within this *DDSDomainParticipant* (p. 1351).
- virtual `DDSSubscriber * lookup_subscriber_by_name (const char *subscriber_name)=0`  
 <<extension>> (p. 237) Retrieves a *DDSSubscriber* (p. 1592) by its entity name within this *DDSDomainParticipant* (p. 1351).
- virtual `DDSDataWriter * lookup_datawriter_by_name (const char *datawriter_full_name)=0`  
 <<extension>> (p. 237) Looks up a *DDSDataWriter* (p. 1321) by its entity name within this *DDSDomainParticipant* (p. 1351).
- virtual `DDSDataReader * lookup_datareader_by_name (const char *datareader_full_name)=0`  
 <<extension>> (p. 237) Retrieves up a *DDSDataReader* (p. 1288) by its entity name in this *DDSDomainParticipant* (p. 1351).
- virtual `DDS_ReturnCode_t take_discovery_snapshot ()=0`  
*Take a snapshot of the remote participants discovered by a local one.*
- virtual `DDS_ReturnCode_t take_discovery_snapshot (const char *file_name)=0`  
*Take a snapshot of the remote participants discovered by a local one.*

### 9.252.1 Detailed Description

<<*interface*>> (p. 237) Container for all **DDSDomainEntity** (p. 1350) objects.

The DomainParticipant object plays several roles:

- It acts as a container for all other **DDSEntity** (p. 1463) objects.
- It acts as a *factory* for the **DDSPublisher** (p.1550), **DDSSubscriber** (p.1592), **DDSTopic** (p.1617) and **DDSMultiTopic** (p. 1529) **DDSEntity** (p. 1463) objects.
- It represents the participation of the application on a communication plane that isolates applications running on the same set of physical computers from each other. A domain establishes a virtual network linking all applications that share the same `domainId` and isolating them from applications running on different domains. In this way, several independent distributed applications can coexist in the same physical network without interfering, or even being aware of each other.
- It provides administration services in the domain, offering operations that allow the application to ignore locally any information about a given participant (**DDSDomainParticipant::ignore\_participant** (p. 1393)), publication (**DDSDomainParticipant::ignore\_publication** (p. 1396)), subscription (**DDSDomainParticipant::ignore\_subscription()** (p. 1396)) or topic (**DDSDomainParticipant::ignore\_topic()** (p. 1395)).

The following operations may be called even if the **DDSDomainParticipant** (p. 1351) is not enabled. Operations NOT in this list will fail with **DDS\_RETCODE\_NOT\_ENABLED** (p. 337) \ if called on a disabled DomainParticipant.

- **DDSEntity::enable** (p. 1466),
- **DDSDomainParticipant::set\_qos** (p. 1408), **DDSDomainParticipant::set\_qos\_with\_profile** (p. 1408), **DDSDomainParticipant::get\_qos** (p. 1409),
- **DDSDomainParticipant::set\_listener** (p. 1413), **DDSDomainParticipant::get\_listener** (p. 1414),
- Factory operations: **DDSDomainParticipant::create\_flowcontroller** (p.1391), **DDSDomainParticipant::create\_topic** (p.1382), **DDSDomainParticipant::create\_topic\_with\_profile** (p.1383), **DDSDomainParticipant::create\_publisher** (p.1376), **DDSDomainParticipant::create\_publisher\_with\_profile** (p.1377), **DDSDomainParticipant::create\_subscriber** (p.1379), **DDSDomainParticipant::create\_subscriber\_with\_profile** (p.1380), **DDSDomainParticipant::delete\_flowcontroller** (p.1392), **DDSDomainParticipant::delete\_topic** (p.1385), **DDSDomainParticipant::delete\_publisher** (p.1378), **DDSDomainParticipant::delete\_subscriber** (p.1380), **DDSDomainParticipant::set\_default\_topic\_qos** (p.1369), **DDSDomainParticipant::set\_default\_topic\_qos\_with\_profile** (p.1370), **DDSDomainParticipant::get\_default\_topic\_qos** (p.1368), **DDSDomainParticipant::set\_default\_publisher\_qos** (p.1372), **DDSDomainParticipant::set\_default\_publisher\_qos\_with\_profile** (p.1372), **DDSDomainParticipant::get\_default\_publisher\_qos** (p.1371), **DDSDomainParticipant::set\_default\_subscriber\_qos** (p.1374), **DDSDomainParticipant::set\_default\_subscriber\_qos\_with\_profile** (p.1375), **DDSDomainParticipant::get\_default\_subscriber\_qos** (p.1373), **DDSDomainParticipant::delete\_contained\_entities** (p.1401), **DDSDomainParticipant::set\_default\_datareader\_qos** (p.1361), **DDSDomainParticipant::set\_default\_datareader\_qos\_with\_profile** (p.1362), **DDSDomainParticipant::get\_default\_datareader\_qos** (p.1360), **DDSDomainParticipant::set\_default\_datawriter\_qos** (p.1359), **DDSDomainParticipant::set\_default\_datawriter\_qos\_with\_profile** (p.1359), **DDSDomainParticipant::get\_default\_datawriter\_qos** (p.1358), **DDSDomainParticipant::set\_default\_library** (p.1367), **DDSDomainParticipant::set\_default\_profile** (p.1368) **DDSDomainParticipant::set\_default\_flowcontroller\_property** (p.1363), **DDSDomainParticipant::get\_default\_flowcontroller\_property** (p.1362), ;

- Operations for looking up topics: **DDSDomainParticipant::lookup\_topicdescription** (p. 1390);
- Operations that access status: **DDSEntity::get\_statuscondition** (p. 1467), **DDSEntity::get\_status\_changes** (p. 1467).

**QoS:****DDS\_DomainParticipantQos** (p. 741)**Status:****Status Kinds** (p. 337)**Listener:****DDSDomainParticipantListener** (p. 1454)**See also****Operations Allowed in Listener Callbacks** (p. 1528)**Examples****HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.

## 9.252.2 Member Function Documentation

### 9.252.2.1 `get_default_datawriter_qos()`

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_default_datawriter_qos (
    DDS_DataWriterQos & qos ) [pure virtual]
```

<<*extension*>> (p. 237) Copy the default **DDS\_DataWriterQos** (p. 689) values into the provided **DDS\_DataWriterQos** (p. 689) instance.

The retrieved `qos` will match the set of values specified on the last successful call to **DDSDomainParticipant::set\_default\_datawriter\_qos** (p. 1359), or **DDSDomainParticipant::set\_default\_datawriter\_qos\_with\_profile** (p. 1359), or else, if the call was never made, the default values listed in **DDS\_DataWriterQos** (p. 689).

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

**MT Safety:**

UNSAFE. It is not safe to retrieve the default DataWriterQoS from a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_datawriter\_qos** (p. 1359).

## Parameters

<i>qos</i>	<< <i>inout</i> >> (p. 238) Qos to be filled up.
------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## 9.252.2.2 set\_default\_datawriter\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_datawriter_qos (
    const DDS_DataWriterQos & qos ) [pure virtual]
```

<<*extension*>> (p. 237) Set the default DataWriterQos values for this DomainParticipant.

This set of default values will be inherited for a newly created **DDSPublisher** (p. 1550).

## Precondition

The specified QoS policies must be consistent, or else the operation will have no effect and fail with **DDS\_↔  
RETCODE\_INCONSISTENT\_POLICY** (p. 337)

## MT Safety:

UNSAFE. It is not safe to set the default DataWriter QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_datawriter\_qos** (p. 1359) or **DDSDomain↔  
Participant::get\_default\_datawriter\_qos** (p. 1358) or calling **DDSDomainParticipant::create\_datawriter** (p. 1415) with **DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110) as the *qos* parameter.

## Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) Default qos to be set. The special value <b>DDS_DATAWRITER_QOS_DEFAULT</b> (p. 110) may be passed as <i>qos</i> to indicate that the default QoS should be reset back to the initial values the factory would use if <b>DDSDomainParticipant::set_default_datawriter_qos</b> (p. 1359) had never been called.
------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

### 9.252.2.3 set\_default\_datawriter\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_datawriter_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Set the default **DDS\_DataWriterQos** (p. 689) values for this domain participant based on the input XML QoS profile.

This set of default values will be inherited for a newly created **DDSPublisher** (p. 1550).

#### Precondition

The **DDS\_DataWriterQos** (p. 689) contained in the specified XML QoS profile must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

#### MT Safety:

UNSAFE. It is not safe to set the default DataWriter QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_datawriter\_qos** (p. 1359) or **DDSDomainParticipant::get\_default\_datawriter\_qos** (p. 1358)

#### Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexx will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexx will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

### 9.252.2.4 get\_default\_datareader\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_default_datareader_qos (
    DDS_DataReaderQos & qos ) [pure virtual]
```

<<**extension**>> (p. 237) Copy the default **DDS\_DataReaderQos** (p. 644) values into the provided **DDS\_DataReaderQos** (p. 644) instance.

The retrieved qos will match the set of values specified on the last successful call to **DDSDomainParticipant::set\_default\_datareader\_qos** (p. 1361), or **DDSDomainParticipant::set\_default\_datareader\_qos\_with\_profile** (p. 1362), or else, if the call was never made, the default values listed in **DDS\_DataReaderQos** (p. 644).

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

**MT Safety:**

UNSAFE. It is not safe to retrieve the default DataReader QoS from a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_datareader\_qos** (p. 1361).

**Parameters**

<i>qos</i>	<< <i>inout</i> >> (p. 238) Qos to be filled up.
------------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.252.2.5 set\_default\_datareader\_qos()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_datareader_qos (
    const DDS_DataReaderQos & qos ) [pure virtual]
```

<<*extension*>> (p. 237) Set the default **DDS\_DataReaderQos** (p. 644) values for this domain participant.

This set of default values will be inherited for a newly created **DDSSubscriber** (p. 1592).

**Precondition**

The specified QoS policies must be consistent, or else the operation will have no effect and fail with **DDS\_↔  
RETCODE\_INCONSISTENT\_POLICY** (p. 337)

**MT Safety:**

UNSAFE. It is not safe to set the default DataReader QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_datareader\_qos** (p. 1361) or **DDSDomain↔  
Participant::get\_default\_datareader\_qos** (p. 1360).

**Parameters**

<i>qos</i>	<< <i>in</i> >> (p. 238) Default qos to be set. The special value <b>DDS_DATAREADER_QOS_DEFAULT</b> (p. 132) may be passed as <i>qos</i> to indicate that the default QoS should be reset back to the initial values the factory would use if <b>DDSDomainParticipant::set_default_datareader_qos</b> (p. 1361) had never been called.
------------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

### 9.252.2.6 set\_default\_datareader\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_datareader_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Set the default **DDS\_DataReaderQos** (p. 644) values for this DomainParticipant based on the input XML QoS profile.

This set of default values will be inherited for a newly created **DDSSubscriber** (p. 1592).

#### Precondition

The **DDS\_DataReaderQos** (p. 644) contained in the specified XML QoS profile must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

#### MT Safety:

UNSAFE. It is not safe to set the default DataReader QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_datareader\_qos** (p. 1361) or **DDSDomainParticipant::get\_default\_datareader\_qos** (p. 1360).

#### Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connex will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connex will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

### 9.252.2.7 get\_default\_flowcontroller\_property()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_default_flowcontroller_property (
    DDS_FlowControllerProperty_t & prop ) [pure virtual]
```

<<**extension**>> (p. 237) Copies the default **DDS\_FlowControllerProperty\_t** (p. 912) values for this domain participant into the given **DDS\_FlowControllerProperty\_t** (p. 912) instance.



The retrieved `property` will match the set of values specified on the last successful call to `DDSDomainParticipant::set_default_flowcontroller_property` (p. 1363), or else, if the call was never made, the default values listed in `DDS_FlowControllerProperty_t` (p. 912).

#### MT Safety:

UNSAFE. It is not safe to retrieve the default flow controller properties from a `DomainParticipant` while another thread may be simultaneously calling `DDSDomainParticipant::set_default_flowcontroller_property` (p. 1363)

#### Parameters

<code>prop</code>	<< <i>in</i> >> (p. 238) Default property to be retrieved.
-------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

`DDS_FLOW_CONTROLLER_PROPERTY_DEFAULT` (p. 58)

`DDSDomainParticipant::create_flowcontroller` (p. 1391)

### 9.252.2.8 set\_default\_flowcontroller\_property()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_flowcontroller_property (
    const DDS_FlowControllerProperty_t & prop ) [pure virtual]
```

<<*extension*>> (p. 237) Set the default `DDS_FlowControllerProperty_t` (p. 912) values for this domain participant.

This default value will be used for newly created `DDSFlowController` (p. 1468) if `DDS_FLOW_CONTROLLER_PROPERTY_DEFAULT` (p. 58) is specified as the `property` parameter when `DDSDomainParticipant::create_flowcontroller` (p. 1391) is called.

#### Precondition

The specified property values must be consistent, or else the operation will have no effect and fail with `DDS_RETCODE_INCONSISTENT_POLICY` (p. 337)

#### MT Safety:

UNSAFE. It is not safe to set the default flow controller properties for a `DomainParticipant` while another thread may be simultaneously calling `DDSDomainParticipant::set_default_flowcontroller_property` (p. 1363), `DDSDomainParticipant::get_default_flowcontroller_property` (p. 1362) or calling `DDSDomainParticipant::create_flowcontroller` (p. 1391) with `DDS_FLOW_CONTROLLER_PROPERTY_DEFAULT` (p. 58) as the `qos` parameter.

## Parameters

<i>prop</i>	<< <i>in</i> >> (p. 238) Default property to be set. The special value <b>DDS_FLOW_CONTROLLER_PROPERTY_DEFAULT</b> (p. 58) may be passed as <code>property</code> to indicate that the default property should be reset to the default values the factory would use if <b>DDSDomainParticipant::set_default_flowcontroller_property</b> (p. 1363) had never been called.
-------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

## See also

**DDS\_FLOW\_CONTROLLER\_PROPERTY\_DEFAULT** (p. 58)

**DDSDomainParticipant::create\_flowcontroller** (p. 1391)

## 9.252.2.9 register\_contentfilter()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::register_contentfilter (
    const char * filter_name,
    const DDSContentFilter * contentfilter ) [pure virtual]
```

<<*extension*>> (p. 237) Register a content filter which can be used to create a **DDSContentFilteredTopic** (p. 1283).

DDS specifies a SQL-like content filter for use by content filtered topics. If this filter does not meet your filtering requirements, you can register a custom filter.

To use a custom filter, it must be registered in the following places:

- In any application that uses the custom filter to create a **DDSContentFilteredTopic** (p. 1283) and the corresponding **DDSDataReader** (p. 1288).
- In each application that writes the data to the applications mentioned above.

For example, suppose Application A on the subscription side creates a Topic named X and a ContentFilteredTopic named filteredX (and a corresponding DataReader), using a previously registered content filter, myFilter. With only that, you will have filtering at the subscription side. If you also want to perform filtering in any application that publishes Topic X, then you also need to register the same definition of the ContentFilter myFilter in that application.

Each `filter_name` can only be used to registered a content filter once with a **DDSDomainParticipant** (p. 1351).

## Parameters

<i>filter_name</i>	<< <i>in</i> >> (p. 238) Name of the filter. The name must be unique within the <b>DDSDomainParticipant</b> (p. 1351) and must not exceed 255 characters. Cannot be NULL.
<i>contentfilter</i>	<< <i>in</i> >> (p. 238) Content filter to be registered. Cannot be NULL.

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## See also

**DDSDomainParticipant::unregister\_contentfilter** (p. 1365)

## 9.252.2.10 lookup\_contentfilter()

```
virtual DDSContentFilter * DDSDomainParticipant::lookup_contentfilter (
    const char * filter_name ) [pure virtual]
```

<<**extension**>> (p. 237) Lookup a content filter previously registered with **DDSDomainParticipant::register\_contentfilter** (p. 1364).

## Parameters

<i>filter_name</i>	<< <b>in</b> >> (p. 238) Name of the filter. Cannot be NULL.
--------------------	--

## Returns

NULL if the given *filter\_name* has not been previously registered to the **DDSDomainParticipant** (p. 1351) with **DDSDomainParticipant::register\_contentfilter** (p. 1364). Otherwise, return the **DDSContentFilter** (p. 1280) that has been previously registered with the given *filter\_name*.

## See also

**DDSDomainParticipant::register\_contentfilter** (p. 1364)

## 9.252.2.11 unregister\_contentfilter()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::unregister_contentfilter (
    const char * filter_name ) [pure virtual]
```

<<**extension**>> (p. 237) Unregister a content filter previously registered with **DDSDomainParticipant::register\_contentfilter** (p. 1364).

A *filter\_name* can be unregistered only if it has been previously registered to the **DDSDomainParticipant** (p. 1351) with **DDSDomainParticipant::register\_contentfilter** (p. 1364).

The unregistration of filter is not allowed if there are any existing **DDSContentFilteredTopic** (p. 1283) objects that are using the filter. If the operation is called on a filter with existing **DDSContentFilteredTopic** (p. 1283) objects attached to it, this operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

If there are still existing discovered **DDSDataReader** (p. 1288) s with the same `filter_name` and the filter's compile method of the filter have previously been called on the discovered **DDSDataReader** (p. 1288) s, `finalize` method of the filter will be called on those discovered **DDSDataReader** (p. 1288) s before the content filter is unregistered. This means filtering will now be performed on the application that is creating the **DDSDataReader** (p. 1288).

#### Parameters

<i>filter_name</i>	<< <i>in</i> >> (p. 238) Name of the filter. Cannot be NULL.
--------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
------------	--

#### See also

**DDSDomainParticipant::register\_contentfilter** (p. 1364)

#### 9.252.2.12 get\_default\_library()

```
virtual const char * DDSDomainParticipant::get_default_library ( ) [pure virtual]
```

<<*extension*>> (p. 237) Gets the default XML library associated with a **DDSDomainParticipant** (p. 1351).

#### Returns

The default library or null if the default library was not set.

#### See also

**DDSDomainParticipant::set\_default\_library** (p. 1367)

#### 9.252.2.13 get\_default\_profile()

```
virtual const char * DDSDomainParticipant::get_default_profile ( ) [pure virtual]
```

<<*extension*>> (p. 237) Gets the default XML profile associated with a **DDSDomainParticipant** (p. 1351).

#### Returns

The default profile or null if the default profile was not set.

#### See also

**DDSDomainParticipant::set\_default\_profile** (p. 1368)

### 9.252.2.14 get\_default\_profile\_library()

```
virtual const char * DDSDomainParticipant::get_default_profile_library ( ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the library where the default XML QoS profile is contained for a **DDSDomainParticipant** (p. 1351).

The default profile library is automatically set when **DDSDomainParticipant::set\_default\_profile** (p. 1368) is called.

This library can be different than the **DDSDomainParticipant** (p. 1351) default library (see **DDSDomainParticipant::get\_default\_library** (p. 1366)).

#### Returns

The default profile library or null if the default profile was not set.

#### See also

**DDSDomainParticipant::set\_default\_profile** (p. 1368)

### 9.252.2.15 set\_default\_library()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_library (
    const char * library_name ) [pure virtual]
```

<<**extension**>> (p. 237) Sets the default XML library for a **DDSDomainParticipant** (p. 1351).

This method specifies the library that will be used as the default the next time a default library is needed during a call to one of this DomainParticipant's operations.

Any API requiring a library\_name as a parameter can use null to refer to the default library.

If the default library is not set, the **DDSDomainParticipant** (p. 1351) inherits the default from the **DDSDomainParticipantFactory** (p. 1426) (see **DDSDomainParticipantFactory::set\_default\_library** (p. 1433)).

#### Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name. If library_name is null any previous default is unset.
---------------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDSDomainParticipant::get\_default\_library** (p. 1366)

### 9.252.2.16 set\_default\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Sets the default XML profile for a **DDSDomainParticipant** (p. 1351).

This method specifies the profile that will be used as the default the next time a default DomainParticipant profile is needed during a call to one of this DomainParticipant's operations. When calling a **DDSDomainParticipant** (p. 1351) method that requires a `profile_name` parameter, you can use NULL to refer to the default profile. (This same information applies to setting a default library.)

If the default profile is not set, the **DDSDomainParticipant** (p. 1351) inherits the default from the **DDSDomainParticipantFactory** (p. 1426) (see **DDSDomainParticipantFactory::set\_default\_profile** (p. 1434)).

This method does not set the default QoS for entities created by the **DDSDomainParticipant** (p. 1351); for this functionality, use the methods `set_default_<entity>_qos_with_profile` (you may pass in NULL after having called **set\_default\_profile**) (p. 1368)).

This method does not set the default QoS for newly created DomainParticipants; for this functionality, use **DDSDomainParticipantFactory::set\_default\_participant\_qos\_with\_profile** (p. 1431).

#### Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) The library name containing the profile.
<i>profile_name</i>	<< <b>in</b> >> (p. 238) The profile name. If <code>profile_name</code> is null any previous default is unset.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDSDomainParticipant::get\_default\_profile** (p. 1366)

**DDSDomainParticipant::get\_default\_profile\_library** (p. 1366)

### 9.252.2.17 get\_default\_topic\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_default_topic_qos (
    DDS_TopicQos & qos ) [pure virtual]
```

Copies the default **DDS\_TopicQos** (p. 1135) values for this domain participant into the given **DDS\_TopicQos** (p. 1135) instance.

The retrieved qos will match the set of values specified on the last successful call to **DDSDomainParticipant::set\_default\_topic\_qos** (p. 1369), or **DDSDomainParticipant::set\_default\_topic\_qos\_with\_profile** (p. 1370) or else, if the call was never made, the default values listed in **DDS\_TopicQos** (p. 1135).

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

#### MT Safety:

UNSAFE. It is not safe to retrieve the default Topic QoS from a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_topic\_qos** (p. 1369)

#### Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) Default qos to be retrieved.
------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDS\_TOPIC\_QOS\_DEFAULT** (p. 56)

**DDSDomainParticipant::create\_topic** (p. 1382)

### 9.252.2.18 set\_default\_topic\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_topic_qos (
    const DDS_TopicQos & qos ) [pure virtual]
```

Set the default **DDS\_TopicQos** (p. 1135) values for this domain participant.

This default value will be used for newly created **DDSTopic** (p. 1617) if **DDS\_TOPIC\_QOS\_DEFAULT** (p. 56) is specified as the qos parameter when **DDSDomainParticipant::create\_topic** (p. 1382) is called.

#### Precondition

The specified QoS policies must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

#### MT Safety:

UNSAFE. It is not safe to set the default topic QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_topic\_qos** (p. 1369), **DDSDomainParticipant::get\_default\_topic\_qos** (p. 1368) or calling **DDSDomainParticipant::create\_topic** (p. 1382) with **DDS\_TOPIC\_QOS\_DEFAULT** (p. 56) as the qos parameter.

## Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) Default qos to be set. The special value <b>DDS_TOPIC_QOS_DEFAULT</b> (p. 56) may be passed as <i>qos</i> to indicate that the default QoS should be reset back to the initial values the factory would use if <b>DDSDomainParticipant::set_default_topic_qos</b> (p. 1369) had never been called.
------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

## See also

**DDS\_TOPIC\_QOS\_DEFAULT** (p. 56)

**DDSDomainParticipant::create\_topic** (p. 1382)

**9.252.2.19 set\_default\_topic\_qos\_with\_profile()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_topic_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<*extension*>> (p. 237) Set the default **DDS\_TopicQos** (p. 1135) values for this domain participant based on the input XML QoS profile.

This default value will be used for newly created **DDSTopic** (p. 1617) if **DDS\_TOPIC\_QOS\_DEFAULT** (p. 56) is specified as the *qos* parameter when **DDSDomainParticipant::create\_topic** (p. 1382) is called.

## Precondition

The **DDS\_TopicQos** (p. 1135) contained in the specified XML QoS profile must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

## MT Safety:

UNSAFE. It is not safe to set the default topic QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_topic\_qos** (p. 1369), **DDSDomainParticipant::get\_default\_topic\_qos** (p. 1368) or calling **DDSDomainParticipant::create\_topic** (p. 1382) with **DDS\_TOPIC\_QOS\_DEFAULT** (p. 56) as the *qos* parameter.

## Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If <i>library_name</i> is null RTI Connexx will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If <i>profile_name</i> is null RTI Connexx will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).



If the input profile cannot be found the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

#### See also

**DDS\_TOPIC\_QOS\_DEFAULT** (p. 56)

**DDSDomainParticipant::create\_topic\_with\_profile** (p. 1383)

### 9.252.2.20 get\_default\_publisher\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_default_publisher_qos (
    DDS_PublisherQos & qos ) [pure virtual]
```

Copy the default **DDS\_PublisherQos** (p. 1022) values into the provided **DDS\_PublisherQos** (p. 1022) instance.

The retrieved `qos` will match the set of values specified on the last successful call to **DDSDomainParticipant::set\_default\_publisher\_qos** (p. 1372), or **DDSDomainParticipant::set\_default\_publisher\_qos\_with\_profile** (p. 1372), or else, if the call was never made, the default values listed in **DDS\_PublisherQos** (p. 1022).

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

If **DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57) is specified as the `qos` parameter when **DDSDomainParticipant::create\_topic** (p. 1382) is called, the default value of the QoS set in the factory, equivalent to the value obtained by calling **DDSDomainParticipant::get\_default\_publisher\_qos** (p. 1371), will be used to create the **DDSPublisher** (p. 1550).

#### MT Safety:

UNSAFE. It is not safe to retrieve the default publisher QoS from a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_publisher\_qos** (p. 1372)

#### Parameters

<i>qos</i>	<< <i>inout</i> >> (p. 238) Qos to be filled up.
------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57)

**DDSDomainParticipant::create\_publisher** (p. 1376)

### 9.252.2.21 set\_default\_publisher\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_publisher_qos (
    const DDS_PublisherQos & qos ) [pure virtual]
```

Set the default **DDS\_PublisherQos** (p. 1022) values for this DomainParticipant.

This set of default values will be used for a newly created **DDSPublisher** (p. 1550) if **DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57) is specified as the `qos` parameter when **DDSDomainParticipant::create\_publisher** (p. 1376) is called.

#### Precondition

The specified QoS policies must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

#### MT Safety:

UNSAFE. It is not safe to set the default publisher QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_publisher\_qos** (p. 1372), **DDSDomainParticipant::get\_default\_publisher\_qos** (p. 1371) or calling **DDSDomainParticipant::create\_publisher** (p. 1376) with **DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57) as the `qos` parameter.

#### Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) Default qos to be set. The special value <b>DDS_PUBLISHER_QOS_DEFAULT</b> (p. 57) may be passed as <code>qos</code> to indicate that the default QoS should be reset back to the initial values the factory would use if <b>DDSDomainParticipant::set_default_publisher_qos</b> (p. 1372) had never been called.
------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

See also

**DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57)

**DDSDomainParticipant::create\_publisher** (p. 1376)

## 9.252.2.22 set\_default\_publisher\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_publisher_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Set the default **DDS\_PublisherQos** (p. 1022) values for this DomainParticipant based on the input XML QoS profile.

This set of default values will be used for a newly created **DDSPublisher** (p. 1550) if **DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57) is specified as the `qos` parameter when **DDSDomainParticipant::create\_publisher** (p. 1376) is called.

## Precondition

The **DDS\_PublisherQos** (p. 1022) contained in the specified XML QoS profile must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

## MT Safety:

UNSAFE. It is not safe to set the default publisher QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_publisher\_qos** (p. 1372), **DDSDomainParticipant::get\_default\_publisher\_qos** (p. 1371) or calling **DDSDomainParticipant::create\_publisher** (p. 1376) with **DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57) as the `qos` parameter.

## Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If <code>library_name</code> is null RTI Connex will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If <code>profile_name</code> is null RTI Connex will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
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## See also

**DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57)

**DDSDomainParticipant::create\_publisher\_with\_profile** (p. 1377)

### 9.252.2.23 `get_default_subscriber_qos()`

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_default_subscriber_qos (
    DDS_SubscriberQos & qos ) [pure virtual]
```

Copy the default **DDS\_SubscriberQos** (p. 1105) values into the provided **DDS\_SubscriberQos** (p. 1105) instance.

The retrieved `qos` will match the set of values specified on the last successful call to **DDSDomainParticipant::set\_default\_subscriber\_qos** (p. 1374), or **DDSDomainParticipant::set\_default\_subscriber\_qos\_with\_profile** (p. 1375), or else, if the call was never made, the default values listed in **DDS\_SubscriberQos** (p. 1105).

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

If **DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57) is specified as the `qos` parameter when **DDSDomainParticipant::create\_subscriber** (p. 1379) is called, the default value of the QoS set in the factory, equivalent to the value obtained by calling **DDSDomainParticipant::get\_default\_subscriber\_qos** (p. 1373), will be used to create the **DDSSubscriber** (p. 1592).

#### MT Safety:

UNSAFE. It is not safe to retrieve the default Subscriber QoS from a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_subscriber\_qos** (p. 1374).

#### Parameters

<i>qos</i>	<< <i>inout</i> >> (p. 238) Qos to be filled up.
------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57)

**DDSDomainParticipant::create\_subscriber** (p. 1379)

### 9.252.2.24 `set_default_subscriber_qos()`

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_subscriber_qos (
    const DDS_SubscriberQos & qos ) [pure virtual]
```

Set the default **DDS\_SubscriberQos** (p. 1105) values for this DomainParticipant.

This set of default values will be used for a newly created **DDSSubscriber** (p. 1592) if **DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57) is specified as the `qos` parameter when **DDSDomainParticipant::create\_subscriber** (p. 1379) is called.

**Precondition**

The specified QoS policies must be consistent, or else the operation will have no effect and fail with **DDS\_↵  
RETCODE\_INCONSISTENT\_POLICY** (p. 337)

**MT Safety:**

UNSAFE. It is not safe to set the default Subscriber QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_subscriber\_qos** (p.1374), **DDSDomain↵  
Participant::get\_default\_subscriber\_qos** (p.1373) or calling **DDSDomainParticipant::create\_subscriber** (p. 1379) with **DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57) as the `qos` parameter.

**Parameters**

<i>qos</i>	<< <i>in</i> >> (p. 238) Default qos to be set. The special value <b>DDS_SUBSCRIBER_QOS_DEFAULT</b> (p. 57) may be passed as <code>qos</code> to indicate that the default QoS should be reset back to the initial values the factory would use if <b>DDSDomainParticipant::set_default_subscriber_qos</b> (p. 1374) had never been called.
------------	---

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

**9.252.2.25 set\_default\_subscriber\_qos\_with\_profile()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_default_subscriber_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<*extension*>> (p. 237) Set the default **DDS\_SubscriberQos** (p. 1105) values for this DomainParticipant based on the input XML QoS profile.

This set of default values will be used for a newly created **DDSSubscriber** (p. 1592) if **DDS\_SUBSCRIBER\_QOS\_↵  
\_DEFAULT** (p. 57) is specified as the `qos` parameter when **DDSDomainParticipant::create\_subscriber** (p. 1379) is called.

**Precondition**

The **DDS\_SubscriberQos** (p. 1105) contained in the specified XML QoS profile must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

**MT Safety:**

UNSAFE. It is not safe to set the default Subscriber QoS for a DomainParticipant while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_subscriber\_qos** (p.1374), **DDSDomain↵  
Participant::get\_default\_subscriber\_qos** (p.1373) or calling **DDSDomainParticipant::create\_subscriber** (p. 1379) with **DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57) as the `qos` parameter.

## Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If <i>library_name</i> is null RTI Connexx will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If <i>profile_name</i> is null RTI Connexx will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

## See also

**DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57)

**DDSDomainParticipant::create\_subscriber\_with\_profile** (p. 1380)

**9.252.2.26 create\_publisher()**

```
virtual DDSPublisher * DDSDomainParticipant::create_publisher (
    const DDS_PublisherQos & qos,
    DDSPublisherListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

Creates a **DDSPublisher** (p. 1550) with the desired QoS policies and attaches to it the specified **DDSPublisherListener** (p. 1571).

## Precondition

The specified QoS policies must be consistent, or the operation will fail and no **DDSPublisher** (p. 1550) will be created.

## MT Safety:

UNSAFE. If **DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57) is used for *qos*, it is not safe to create the publisher while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_publisher\_qos** (p. 1372).

## Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) QoS to be used for creating the new <b>DDSPublisher</b> (p. 1550). The special value <b>DDS_PUBLISHER_QOS_DEFAULT</b> (p. 57) can be used to indicate that the <b>DDSPublisher</b> (p. 1550) should be created with the default <b>DDS_PublisherQos</b> (p. 1022) set in the <b>DDSDomainParticipant</b> (p. 1351).
<i>listener</i>	<< <i>in</i> >> (p. 238). Listener to be attached to the newly created <b>DDSPublisher</b> (p. 1550).
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341). <span style="float: right;">Generated by Doxygen</span>

## Returns

newly created publisher object or NULL on failure.

## See also

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_PublisherQos** (p. 1022) for rules on consistency among QoS

**DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57)

**DDSDomainParticipant::create\_publisher\_with\_profile** (p. 1377)

**DDSDomainParticipant::get\_default\_publisher\_qos** (p. 1371)

**DDSPublisher::set\_listener** (p. 1570)

## Examples

**HelloWorld\_publisher.cxx.**

## 9.252.2.27 create\_publisher\_with\_profile()

```
virtual DDSPublisher * DDSDomainParticipant::create_publisher_with_profile (
    const char * library_name,
    const char * profile_name,
    DDSPublisherListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<**extension**>> (p. 237) Creates a new **DDSPublisher** (p. 1550) object using the **DDS\_PublisherQos** (p. 1022) associated with the input XML QoS profile.

## Precondition

The **DDS\_PublisherQos** (p. 1022) in the input profile must be consistent, or the operation will fail and no **DDSPublisher** (p. 1550) will be created.

## Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If <i>library_name</i> is null RTI Connexx will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If <i>profile_name</i> is null RTI Connexx will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).
<i>listener</i>	<< <b>in</b> >> (p. 238). Listener to be attached to the newly created <b>DDSPublisher</b> (p. 1550).
<i>mask</i>	<< <b>in</b> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

## Returns

newly created publisher object or NULL on failure.

## See also

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_PublisherQos** (p. 1022) for rules on consistency among QoS

**DDSDomainParticipant::create\_publisher** (p. 1376)

**DDSDomainParticipant::get\_default\_publisher\_qos** (p. 1371)

**DDSPublisher::set\_listener** (p. 1570)

**9.252.2.28 delete\_publisher()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::delete_publisher (
    DDSPublisher * p ) [pure virtual]
```

Deletes an existing **DDSPublisher** (p. 1550).

## Precondition

The **DDSPublisher** (p. 1550) must not have any attached **DDSDataWriter** (p. 1321) objects. If there are existing **DDSDataWriter** (p. 1321) objects, it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

**DDSPublisher** (p. 1550) must have been created by this **DDSDomainParticipant** (p. 1351), or else it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

## Postcondition

Listener installed on the **DDSPublisher** (p. 1550) will not be called after this method completes successfully.

## MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

## Parameters

<i>p</i>	<< <i>in</i> >> (p. 238) <b>DDSPublisher</b> (p. 1550) to be deleted.
----------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--



**9.252.2.29 create\_subscriber()**

```
virtual DDSSubscriber * DDSDomainParticipant::create_subscriber (
    const DDS_SubscriberQos & qos,
    DDSSubscriberListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

Creates a **DDSSubscriber** (p. 1592) with the desired QoS policies and attaches to it the specified **DDSSubscriber**↔  
**Listener** (p. 1613).

**Precondition**

The specified QoS policies must be consistent, or the operation will fail and no **DDSSubscriber** (p. 1592) will be created.

**MT Safety:**

UNSAFE. If **DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57) is used for `qos`, it is not safe to create the subscriber while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_subscriber**↔  
**\_qos** (p. 1374).

**Parameters**

<i>qos</i>	<< <i>in</i> >> (p. 238) QoS to be used for creating the new <b>DDSSubscriber</b> (p. 1592). The special value <b>DDS_SUBSCRIBER_QOS_DEFAULT</b> (p. 57) can be used to indicate that the <b>DDSSubscriber</b> (p. 1592) should be created with the default <b>DDS_SubscriberQos</b> (p. 1105) set in the <b>DDSDomainParticipant</b> (p. 1351).
<i>listener</i>	<< <i>in</i> >> (p. 238). Listener to be attached to the newly created <b>DDSSubscriber</b> (p. 1592).
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

**Returns**

newly created subscriber object or NULL on failure.

**See also**

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_SubscriberQos** (p. 1105) for rules on consistency among QoS

**DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57)

**DDSDomainParticipant::create\_subscriber\_with\_profile** (p. 1380)

**DDSDomainParticipant::get\_default\_subscriber\_qos** (p. 1373)

**DDSSubscriber::set\_listener** (p. 1611)

## Examples

**HelloWorld\_subscriber.cxx.**

### 9.252.2.30 create\_subscriber\_with\_profile()

```
virtual DDSSubscriber * DDSDomainParticipant::create_subscriber_with_profile (
    const char * library_name,
    const char * profile_name,
    DDSSubscriberListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<**extension**>> (p. 237) Creates a new **DDSSubscriber** (p. 1592) object using the **DDS\_PublisherQos** (p. 1022) associated with the input XML QoS profile.

## Precondition

The **DDS\_SubscriberQos** (p. 1105) in the input profile must be consistent, or the operation will fail and no **DDSSubscriber** (p. 1592) will be created.

## Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If <i>library_name</i> is null RTI Connexxt will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If <i>profile_name</i> is null RTI Connexxt will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).
<i>listener</i>	<< <b>in</b> >> (p. 238). Listener to be attached to the newly created <b>DDSSubscriber</b> (p. 1592).
<i>mask</i>	<< <b>in</b> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

## Returns

newly created subscriber object or NULL on failure.

## See also

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_SubscriberQos** (p. 1105) for rules on consistency among QoS

**DDSDomainParticipant::create\_subscriber** (p. 1379)

**DDSDomainParticipant::get\_default\_subscriber\_qos** (p. 1373)

**DDSSubscriber::set\_listener** (p. 1611)

**9.252.2.31 delete\_subscriber()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::delete_subscriber (
    DDSSubscriber * s ) [pure virtual]
```

Deletes an existing **DDSSubscriber** (p. 1592).

**Precondition**

The **DDSSubscriber** (p. 1592) must not have any attached **DDSDataReader** (p. 1288) objects. If there are existing **DDSDataReader** (p. 1288) objects, it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336)

The **DDSSubscriber** (p. 1592) must have been created by this **DDSDomainParticipant** (p. 1351), or else it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

**Postcondition**

A Listener installed on the **DDSSubscriber** (p. 1592) will not be called after this method completes successfully.

**MT Safety:**

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

**Parameters**

<i>s</i>	<< <i>in</i> >> (p. 238) <b>DDSSubscriber</b> (p. 1592) to be deleted.
----------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--

**9.252.2.32 get\_publishers()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_publishers (
    DDSPublisherSeq & publishers ) [pure virtual]
```

<<**extension**>> (p. 237) Allows the application to access all the publishers the participant has.

If the sequence doesn't own its buffer, and its maximum is less than the total number of publishers, it will be filled up to its maximum, and fail with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

**MT Safety:**

Safe.

## Parameters

<i>publishers</i>	<< <i>inout</i> >> (p. 238) a PublisherSeq object where the set or list of publishers will be returned
-------------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

**9.252.2.33 get\_subscribers()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_subscribers (
    DDSSubscriberSeq & subscribers ) [pure virtual]
```

<<**extension**>> (p. 237) Allows the application to access all the subscribers the participant has.

If the sequence doesn't own its buffer, and its maximum is less than the total number of subscribers, it will be filled up to its maximum, and fail with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

**MT Safety:**

Safe.

## Parameters

<i>subscribers</i>	<< <i>inout</i> >> (p. 238) a SubscriberSeq object where the set or list of subscribers will be returned
--------------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
------------	--

**9.252.2.34 create\_topic()**

```
virtual DDSTopic * DDSDomainParticipant::create_topic (
    const char * topic_name,
    const char * type_name,
    const DDS_TopicQos & qos,
    DDSTopicListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

Creates a **DDSTopic** (p. 1617) with the desired QoS policies and attaches to it the specified **DDSTopicListener** (p. 1626).

**Precondition**

The application is not allowed to create two **DDSTopic** (p. 1617) objects with the same `topic_name` attached to the same **DDSDomainParticipant** (p. 1351). If the application attempts this, this method will fail and return a NULL topic.

The specified QoS policies must be consistent, or the operation will fail and no **DDSTopic** (p. 1617) will be created. Prior to creating a **DDSTopic** (p. 1617), the type must have been registered with RTI Connex. This is done using the **FooTypeSupport::register\_type** (p. 1713) operation on a derived class of the **DDSTypeSupport** (p. 1629) interface.

**MT Safety:**

UNSAFE. It is not safe to create a topic while another thread is trying to lookup that topic description with **DDSDomainParticipant::lookup\_topicdescription** (p. 1390).

**MT Safety:**

UNSAFE. If **DDS\_TOPIC\_QOS\_DEFAULT** (p. 56) is used for `qos`, it is not safe to create the topic while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_topic\_qos** (p. 1369).

**Parameters**

<i>topic_name</i>	<< <i>in</i> >> (p. 238) Name for the new topic, must not exceed 255 characters. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) The type to which the new <b>DDSTopic</b> (p. 1617) will be bound. Cannot be NULL.
<i>qos</i>	<< <i>in</i> >> (p. 238) QoS to be used for creating the new <b>DDSTopic</b> (p. 1617). The special value <b>DDS_TOPIC_QOS_DEFAULT</b> (p. 56) can be used to indicate that the <b>DDSTopic</b> (p. 1617) should be created with the default <b>DDS_TopicQos</b> (p. 1135) set in the <b>DDSDomainParticipant</b> (p. 1351).
<i>listener</i>	<< <i>in</i> >> (p. 238). Listener to be attached to the newly created <b>DDSTopic</b> (p. 1617).
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

**Returns**

newly created topic, or NULL on failure

**See also**

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_TopicQos** (p. 1135) for rules on consistency among QoS

**DDS\_TOPIC\_QOS\_DEFAULT** (p. 56)

**DDSDomainParticipant::create\_topic\_with\_profile** (p. 1383)

**DDSDomainParticipant::get\_default\_topic\_qos** (p. 1368)

**DDSTopic::set\_listener** (p. 1621)

**Examples**

**HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.

### 9.252.2.35 create\_topic\_with\_profile()

```
virtual DDSTopic * DDSDomainParticipant::create_topic_with_profile (
    const char * topic_name,
    const char * type_name,
    const char * library_name,
    const char * profile_name,
    DDSTopicListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<**extension**>> (p. 237) Creates a new **DDSTopic** (p. 1617) object using the **DDS\_PublisherQos** (p. 1022) associated with the input XML QoS profile.

#### Precondition

The application is not allowed to create two **DDSTopicDescription** (p. 1624) objects with the same `topic_name` attached to the same **DDSDomainParticipant** (p. 1351). If the application attempts this, this method will fail and return a NULL topic.

The **DDS\_TopicQos** (p. 1135) in the input profile must be consistent, or the operation will fail and no **DDSTopic** (p. 1617) will be created.

Prior to creating a **DDSTopic** (p. 1617), the type must have been registered with RTI Connex. This is done using the **FooTypeSupport::register\_type** (p. 1713) operation on a derived class of the **DDSTypeSupport** (p. 1629) interface.

#### MT Safety:

UNSAFE. It is not safe to create a topic while another thread is trying to lookup that topic description with **DDSDomainParticipant::lookup\_topicdescription** (p. 1390).

#### Parameters

<i>topic_name</i>	<< <b>in</b> >> (p. 238) Name for the new topic, must not exceed 255 characters. Cannot be NULL.
<i>type_name</i>	<< <b>in</b> >> (p. 238) The type to which the new <b>DDSTopic</b> (p. 1617) will be bound. Cannot be NULL.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If <code>library_name</code> is null RTI Connex will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If <code>profile_name</code> is null RTI Connex will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).
<i>listener</i>	<< <b>in</b> >> (p. 238). Listener to be attached to the newly created <b>DDSTopic</b> (p. 1617).
<i>mask</i>	<< <b>in</b> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

#### Returns

newly created topic, or NULL on failure

See also

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_TopicQos** (p. 1135) for rules on consistency among QoS

**DDSDomainParticipant::create\_topic** (p. 1382)

**DDSDomainParticipant::get\_default\_topic\_qos** (p. 1368)

**DDSTopic::set\_listener** (p. 1621)

### 9.252.2.36 delete\_topic()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::delete_topic (
    DDSTopic * topic ) [pure virtual]
```

Deletes a **DDSTopic** (p. 1617).

#### Precondition

If the **DDSTopic** (p. 1617) does not belong to the application's **DDSDomainParticipant** (p. 1351), this operation fails with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

Make sure no objects are using the topic. More specifically, there must be no existing **DDSDataReader** (p. 1288), **DDSDataWriter** (p. 1321), **DDSContentFilteredTopic** (p. 1283), or **DDSMultiTopic** (p. 1529) objects belonging to the same **DDSDomainParticipant** (p. 1351) that are using the **DDSTopic** (p. 1617). If `delete_topic` is called on a **DDSTopic** (p. 1617) with any of these existing objects attached to it, it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

#### Postcondition

Listener installed on the **DDSTopic** (p. 1617) will not be called after this method completes successfully.

#### MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

#### Parameters

<i>topic</i>	<< <i>in</i> >> (p. 238) <b>DDSTopic</b> (p. 1617) to be deleted.
--------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
------------	---

### 9.252.2.37 create\_contentfilteredtopic()

```
virtual DDSContentFilteredTopic * DDSDomainParticipant::create_contentfilteredtopic (
    const char * name,
    DDSTopic * related_topic,
    const char * filter_expression,
    const DDS_StringSeq & expression_parameters ) [pure virtual]
```

Creates a **DDSContentFilteredTopic** (p. 1283), that can be used to do content-based subscriptions.

The **DDSContentFilteredTopic** (p. 1283) only relates to samples published under that **DDSTopic** (p. 1617), filtered according to their content. The filtering is done by means of evaluating a logical expression that involves the values of some of the data-fields in the sample. The logical expression derived from the `filter_expression` and `expression_parameters` arguments.

**Queries and Filters Syntax** (p.179) describes the syntax of `filter_expression` and `expression_← parameters`.

#### Precondition

The application is not allowed to create two **DDSContentFilteredTopic** (p. 1283) objects with the same `topic_← _name` attached to the same **DDSDomainParticipant** (p. 1351). If the application attempts this, this method will fail and returns NULL.

If `related_topic` does not belong to this **DDSDomainParticipant** (p. 1351), this operation returns NULL.

This function will create a content filter using the builtin SQL filter which implements a superset of the DDS specification. This filter **requires** that all IDL types have been compiled with typecodes. If this precondition is not met, this operation returns NULL.

#### Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name for the new content filtered topic, must not exceed 255 characters. Cannot be NULL.
<i>related_topic</i>	<< <i>in</i> >> (p. 238) <b>DDSTopic</b> (p. 1617) to be filtered. Cannot be NULL.
<i>filter_expression</i>	<< <i>in</i> >> (p. 238) Cannot be NULL
<i>expression_parameters</i>	<< <i>in</i> >> (p. 238) An empty sequence <b>must</b> be used if the filter expression does not contain any parameters. Length of sequence cannot be greater than 100.

#### Returns

newly created **DDSContentFilteredTopic** (p. 1283), or NULL on failure

### 9.252.2.38 create\_contentfilteredtopic\_with\_filter()

```
virtual DDSContentFilteredTopic * DDSDomainParticipant::create_contentfilteredtopic_with_filter (
    const char * name,
```



```

    DDSTopic * related_topic,
    const char * filter_expression,
    const DDS_StringSeq & expression_parameters,
    const char * filter_name = DDS_SQLFILTER_NAME ) [pure virtual]

```

<<**extension**>> (p. 237) Creates a **DDSContentFilteredTopic** (p. 1283) using the specified filter to do content-based subscriptions.

#### Parameters

<i>name</i>	<< <b>in</b> >> (p. 238) Name for the new content filtered topic. Cannot exceed 255 characters. Cannot be NULL.
<i>related_topic</i>	<< <b>in</b> >> (p. 238) <b>DDSTopic</b> (p. 1617) to be filtered. Cannot be NULL.
<i>filter_expression</i>	<< <b>in</b> >> (p. 238) Cannot be NULL.
<i>expression_parameters</i>	<< <b>in</b> >> (p. 238) . An empty sequence <b>must</b> be used if the filter expression does not contain any parameters. Length of the sequence cannot be greater than 100.
<i>filter_name</i>	<< <b>in</b> >> (p. 238) Name of content filter to use. Must previously have been registered with <b>DDSDomainParticipant::register_contentfilter</b> (p. 1364) on the same <b>DDSDomainParticipant</b> (p. 1351). Cannot be NULL. Builtin filter names are <b>DDS_SQLFILTER_NAME</b> (p. 59) and <b>DDS_STRINGMATCHFILTER_NAME</b> (p. 59)

#### Returns

newly created **DDSContentFilteredTopic** (p. 1283), or NULL on failure

#### 9.252.2.39 delete\_contentfilteredtopic()

```

virtual DDS_ReturnCode_t DDSDomainParticipant::delete_contentfilteredtopic (
    DDSContentFilteredTopic * a_contentfilteredtopic ) [pure virtual]

```

Deletes a **DDSContentFilteredTopic** (p. 1283).

#### Precondition

The deletion of a **DDSContentFilteredTopic** (p.1283) is not allowed if there are any existing **DDSDataReader** (p.1288) objects that are using the **DDSContentFilteredTopic** (p.1283). If the operation is called on a **DDSContentFilteredTopic** (p.1283) with existing **DDSDataReader** (p.1288) objects attached to it, it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p.336).

The **DDSContentFilteredTopic** (p.1283) must be created by this **DDSDomainParticipant** (p.1351), or else this operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p.336).

#### MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

## Parameters

<i>a_contentfilteredtopic</i>	<< <i>in</i> >> (p. 238)
-------------------------------	--------------------------

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
------------	--

**9.252.2.40 create\_multitopic()**

```
virtual DDSMultiTopic * DDSDomainParticipant::create_multitopic (
    const char * name,
    const char * type_name,
    const char * subscription_expression,
    const DDS_StringSeq & expression_parameters ) [pure virtual]
```

**[Not supported (optional)]** Creates a MultiTopic that can be used to subscribe to multiple topics and combine/filter the received data into a resulting type.

The resulting type is specified by the *type\_name* argument. The list of topics and the logic used to combine, filter, and rearrange the information from each **DDSTopic** (p. 1617) are specified using the *subscription\_expression* and *expression\_parameters* arguments.

**Queries and Filters Syntax** (p. 179) describes the syntax of *subscription\_expression* and *expression\_parameters*.

## Precondition

The application is not allowed to create two **DDSTopicDescription** (p. 1624) objects with the same *name* attached to the same **DDSDomainParticipant** (p. 1351). If the application attempts this, this method will fail and return NULL.

Prior to creating a **DDSMultiTopic** (p. 1529), the type must have been registered with RTI Connex. This is done using the **FooTypeSupport::register\_type** (p. 1713) operation on a derived class of the **DDSTypeSupport** (p. 1629) interface. Otherwise, this method will return NULL.

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of the newly create <b>DDSMultiTopic</b> (p. 1529). Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) Cannot be NULL.
<i>subscription_expression</i>	<< <i>in</i> >> (p. 238) Cannot be NULL.
<i>expression_parameters</i>	<< <i>in</i> >> (p. 238)

## Returns

NULL

## 9.252.2.41 delete\_multitopic()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::delete_multitopic (
    DDSMultiTopic * a_multitopic ) [pure virtual]
```

**[Not supported (optional)]** Deletes a **DDSMultiTopic** (p. 1529).

## Precondition

The deletion of a **DDSMultiTopic** (p. 1529) is not allowed if there are any existing **DDSDataReader** (p. 1288) objects that are using the **DDSMultiTopic** (p. 1529). If the `delete_multitopic` operation is called on a **DDSMultiTopic** (p. 1529) with existing **DDSDataReader** (p. 1288) objects attached to it, it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

The **DDSMultiTopic** (p. 1529) must be created by this **DDSDomainParticipant** (p. 1351), or else this operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

## MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

## Parameters

<i>a_multitopic</i>	<< <i>in</i> >> (p. 238)
---------------------	--------------------------

## 9.252.2.42 find\_topic()

```
virtual DDSTopic * DDSDomainParticipant::find_topic (
    const char * topic_name,
    const DDS_Duration_t & timeout ) [pure virtual]
```

Finds an existing (or ready to exist) **DDSTopic** (p. 1617), based on its name.

This call can be used to block for a specified duration to wait for the **DDSTopic** (p. 1617) to be created.

If the requested **DDSTopic** (p. 1617) already exists, it is returned. Otherwise, `find_topic()` (p. 1389) waits until another thread creates it or else returns when the specified timeout occurs.

**find\_topic()** (p. 1389) is useful when multiple threads are concurrently creating and looking up topics. In that case, one thread can call **find\_topic()** (p. 1389) and, if another thread has not yet created the topic being looked up, it can wait for some period of time for it to do so. In almost all other cases, it is more straightforward to call **DDSDomainParticipant**↔**::lookup\_topicdescription** (p. 1390).

The **DDSDomainParticipant** (p. 1351) must already be enabled.

**Note:** Each **DDSTopic** (p. 1617) obtained by **DDSDomainParticipant::find\_topic** (p. 1389) must also be deleted by means of **DDSDomainParticipant::delete\_topic** (p. 1385). If **DDSTopic** (p. 1617) is obtained multiple times by means of **DDSDomainParticipant::find\_topic** (p. 1389) or **DDSDomainParticipant::create\_topic** (p. 1382), it must also be deleted that same number of times using **DDSDomainParticipant::delete\_topic** (p. 1385).

#### Parameters

<i>topic_name</i>	<< <i>in</i> >> (p. 238) Name of the <b>DDSTopic</b> (p. 1617) to search for. Cannot be NULL.
<i>timeout</i>	<< <i>in</i> >> (p. 238) The time to wait if the <b>DDSTopic</b> (p. 1617) does not exist already.

#### Returns

the topic, if it exists, or NULL

### 9.252.2.43 lookup\_topicdescription()

```
virtual DDSTopicDescription * DDSDomainParticipant::lookup_topicdescription (
    const char * topic_name ) [pure virtual]
```

Looks up an existing, locally created **DDSTopicDescription** (p. 1624), based on its name.

**DDSTopicDescription** (p.1624) is the base class for **DDSTopic** (p.1617), **DDSMultiTopic** (p.1529) and **DDSContentFilteredTopic** (p.1283). So you can narrow the **DDSTopicDescription** (p.1624) returned from this operation to a **DDSTopic** (p. 1617) or **DDSContentFilteredTopic** (p. 1283) as appropriate.

Unlike **DDSDomainParticipant::find\_topic** (p. 1389), which logically returns a new **DDSTopic** (p. 1617) object that must be independently deleted, *this* operation returns a reference to the original local object.

The **DDSDomainParticipant** (p. 1351) does not have to be enabled when you call **lookup\_topicdescription()** (p. 1390).

The returned topic may be either enabled or disabled.

#### MT Safety:

UNSAFE. It is not safe to lookup a topic description while another thread is creating that topic.

#### Parameters

<i>topic_name</i>	<< <i>in</i> >> (p. 238) Name of <b>DDSTopicDescription</b> (p. 1624) to search for. This string must be no more than 255 characters; it cannot be NULL.
-------------------	--

## Returns

The topic description, if it has already been created locally, otherwise it returns NULL.

## 9.252.2.44 create\_flowcontroller()

```
virtual DDSFlowController * DDSDomainParticipant::create_flowcontroller (
    const char * name,
    const DDS_FlowControllerProperty_t & prop ) [pure virtual]
```

<<*extension*>> (p. 237) Creates a **DDSFlowController** (p. 1468) with the desired property.

The created **DDSFlowController** (p. 1468) is associated with a **DDSDataWriter** (p. 1321) via **DDS\_PublishModeQosPolicy::flow\_controller\_name** (p. 1027). A single FlowController may service multiple DataWriters instances, even if they belong to a different **DDSPublisher** (p. 1550). The `property` determines how the FlowController shapes the network traffic.

## Precondition

The specified `property` must be consistent, or the operation will fail and no **DDSFlowController** (p. 1468) will be created.

## MT Safety:

UNSAFE. If **DDS\_FLOW\_CONTROLLER\_PROPERTY\_DEFAULT** (p. 58) is used for `property`, it is not safe to create the flow controller while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_flowcontroller\_property** (p. 1363) or trying to lookup that flow controller with **DDSDomainParticipant::lookup\_flowcontroller** (p. 1392).

## Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) name of the <b>DDSFlowController</b> (p. 1468) to create. A <b>DDSDataWriter</b> (p. 1321) is associated with a <b>DDSFlowController</b> (p. 1468) by name. Limited to 255 characters.
<i>prop</i>	<< <i>in</i> >> (p. 238) property to be used for creating the new <b>DDSFlowController</b> (p. 1468). The special value <b>DDS_FLOW_CONTROLLER_PROPERTY_DEFAULT</b> (p. 58) can be used to indicate that the <b>DDSFlowController</b> (p. 1468) should be created with the default <b>DDS_FlowControllerProperty_t</b> (p. 912) set in the <b>DDSDomainParticipant</b> (p. 1351).

## Returns

Newly created flow controller object or NULL on failure.

See also

**DDS\_FlowControllerProperty\_t** (p. 912) for rules on consistency among property

**DDS\_FLOW\_CONTROLLER\_PROPERTY\_DEFAULT** (p. 58)

**DDSDomainParticipant::get\_default\_flowcontroller\_property** (p. 1362)

### 9.252.2.45 delete\_flowcontroller()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::delete_flowcontroller (
    DDSFlowController * fc ) [pure virtual]
```

<<*extension*>> (p. 237) Deletes an existing **DDSFlowController** (p. 1468).

#### Precondition

The **DDSFlowController** (p. 1468) must not have any attached **DDSDataWriter** (p. 1321) objects. If there are any attached **DDSDataWriter** (p. 1321) objects, it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

The **DDSFlowController** (p. 1468) must have been created by this **DDSDomainParticipant** (p. 1351), or else it will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

#### Postcondition

The **DDSFlowController** (p. 1468) is deleted if this method completes successfully.

#### MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

#### Parameters

<i>fc</i>	<< <i>in</i> >> (p. 238) The <b>DDSFlowController</b> (p. 1468) to be deleted.
-----------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--

### 9.252.2.46 lookup\_flowcontroller()

```
virtual DDSFlowController * DDSDomainParticipant::lookup_flowcontroller (
    const char * name ) [pure virtual]
```

<<*extension*>> (p. 237) Looks up an existing locally-created **DDSFlowController** (p. 1468), based on its name.

Looks up a previously created **DDSFlowController** (p. 1468), including the built-in ones. Once a **DDSFlowController** (p. 1468) has been deleted, subsequent lookups will fail.

#### MT Safety:

UNSAFE. It is not safe to lookup a flow controller description while another thread is creating that flow controller.

#### Parameters

<i>name</i>	<< <i>in</i> >> (p. 238) Name of <b>DDSFlowController</b> (p. 1468) to search for. Limited to 255 characters. Cannot be NULL.
-------------	---

#### Returns

The flow controller if it has already been created locally, or NULL otherwise.

### 9.252.2.47 get\_builtin\_subscriber()

```
virtual DDSSubscriber * DDSDomainParticipant::get_builtin_subscriber ( ) [pure virtual]
```

Accesses the **built-in DDSSubscriber** (p. 1592).

Each **DDSDomainParticipant** (p. 1351) contains several built-in **DDSTopic** (p. 1617) objects as well as corresponding **DDSDataReader** (p. 1288) objects to access them. All of these **DDSDataReader** (p. 1288) objects belong to a single built-in **DDSSubscriber** (p. 1592).

The built-in Topics are used to communicate information about other **DDSDomainParticipant** (p. 1351), **DDSTopic** (p. 1617), **DDSDataReader** (p. 1288), and **DDSDataWriter** (p. 1321) objects.

The built-in subscriber is created when this operation is called for the first time. The built-in subscriber is deleted automatically when the **DDSDomainParticipant** (p. 1351) is deleted.

#### Returns

The built-in **DDSSubscriber** (p. 1592) singleton.

#### See also

**DDS\_SubscriptionBuiltinTopicData** (p. 1108)

**DDS\_PublicationBuiltinTopicData** (p. 1010)

**DDS\_ParticipantBuiltinTopicData** (p. 979)

**DDS\_TopicBuiltinTopicData** (p. 1128)

### 9.252.2.48 ignore\_participant()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::ignore_participant (
    const DDS_InstanceHandle_t & handle ) [pure virtual]
```

Instructs RTI Connex to locally ignore a remote **DDSDomainParticipant** (p. 1351).

From the time of this call onwards, RTI Connex will locally behave as if the remote participant did not exist. This means it will ignore any topic, publication, or subscription that originates on that **DDSDomainParticipant** (p. 1351).

There is no way to reverse this operation.

This operation can be used in conjunction with the discovery of remote participants offered by means of the **DDS\_↔ParticipantBuiltinTopicData** (p. 979) to provide access control.

Application data can be associated with a **DDSDomainParticipant** (p. 1351) by means of the **USER\_DATA** (p. 455) policy. This application data is propagated as a field in the built-in topic and can be used by an application to implement its own access control policy.

The **DDSDomainParticipant** (p. 1351) to ignore is identified by the `handle` argument. This `handle` is the one that appears in the **DDS\_SampleInfo** (p. 1082) retrieved when reading the data-samples available for the built-in **DDSData↔Reader** (p. 1288) to the **DDSDomainParticipant** (p. 1351) topic. The built-in **DDSDataReader** (p. 1288) is read with the same **FooDataReader::read** (p. 1651) and **FooDataReader::take** (p. 1652) operations used for any **DDSDataReader** (p. 1288).

#### Parameters

<i>handle</i>	<< <i>in</i> >> (p. 238) <b>DDS_InstanceHandle_t</b> (p. 74) of the <b>DDSDomainParticipant</b> (p. 1351) to be ignored.
---------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337), <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

#### See also

- DDS\_ParticipantBuiltinTopicData** (p. 979)
- DDS\_PARTICIPANT\_TOPIC\_NAME** (p. 295)
- DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

### 9.252.2.49 banish\_ignored\_participants()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::banish_ignored_participants ( ) [pure virtual]
```

<<*extension*>> (p. 237) Prevents ignored remote DomainParticipants from receiving traffic from the local **DDSDomainParticipant** (p. 1351).



This method complements **DDSDomainParticipant::ignore\_participant** (p. 1393): `ignore_participant` prevents the local **DDSDomainParticipant** (p. 1351) from processing traffic from the remote `DomainParticipant`, while this method prevents already ignored remote `DomainParticipants` from processing traffic from the local `DomainParticipant`.

Note: this method is currently only supported when enabling the RTI Security Plugins. Please refer to the `RTI Security Plugins User's Manual` for more information.

#### MT Safety:

Safe.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

#### See also

**DDSDomainParticipant::ignore\_participant** (p. 1393)

### 9.252.2.50 ignore\_topic()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::ignore_topic (
    const DDS_InstanceHandle_t & handle ) [pure virtual]
```

Instructs RTI Connex to locally ignore a **DDSTopic** (p. 1617).

This means it will locally ignore any publication, or subscription to the **DDSTopic** (p. 1617).

There is no way to reverse this operation.

This operation can be used to save local resources when the application knows that it will never publish or subscribe to data under certain topics.

The **DDSTopic** (p. 1617) to ignore is identified by the `handle` argument. This is the handle of a **DDSTopic** (p. 1617) that appears in the **DDS\_SampleInfo** (p. 1082) retrieved when reading data samples from the built-in **DDSDataReader** (p. 1288) for the **DDSTopic** (p. 1617).

#### Parameters

<i>handle</i>	<< <i>in</i> >> (p. 238) Handle of the <b>DDSTopic</b> (p. 1617) to be ignored.
---------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

See also

- DDS\_TopicBuiltinTopicData** (p. 1128)
- DDS\_TOPIC\_TOPIC\_NAME** (p. 297)
- DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

### 9.252.2.51 ignore\_publication()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::ignore_publication (
    const DDS_InstanceHandle_t & handle ) [pure virtual]
```

Instructs RTI Connnext to locally ignore a publication.

A publication is defined by the association of a topic name, user data, and partition set on the **DDSPublisher** (p. 1550) (see **DDS\_PublicationBuiltinTopicData** (p. 1010)). After this call, any data written by that publication's **DDSDataWriter** (p. 1321) will be ignored.

This operation can be used to ignore local *and* remote DataWriters.

The publication (DataWriter) to ignore is identified by the `handle` argument.

- To ignore a *remote* DataWriter, the `handle` can be obtained from the **DDS\_SampleInfo** (p. 1082) retrieved when reading data samples from the built-in **DDSDataReader** (p. 1288) for the publication topic.
- To ignore a *local* DataWriter, the `handle` can be obtained by calling **DDSEntity::get\_instance\_handle** (p. 1468) for the local DataWriter.

There is no way to reverse this operation.

#### Parameters

<i>handle</i>	<< <i>in</i> >> (p. 238) Handle of the <b>DDSDataWriter</b> (p. 1321) to be ignored.
---------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

See also

- DDS\_PublicationBuiltinTopicData** (p. 1010)
- DDS\_PUBLICATION\_TOPIC\_NAME** (p. 298)
- DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

### 9.252.2.52 ignore\_subscription()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::ignore_subscription (
    const DDS_InstanceHandle_t & handle ) [pure virtual]
```

Instructs RTI Connex to locally ignore a subscription.

A subscription is defined by the association of a topic name, user data, and partition set on the **DDSSubscriber** (p. 1592) (see **DDS\_SubscriptionBuiltinTopicData** (p. 1108)). After this call, any data received related to that subscription's **DDSDataReader** (p. 1288) will be ignored.

This operation can be used to ignore local *and* remote DataReaders.

The subscription to ignore is identified by the `handle` argument.

- To ignore a *remote* DataReader, the `handle` can be obtained from the **DDS\_SampleInfo** (p. 1082) retrieved when reading data samples from the built-in **DDSDataReader** (p. 1288) for the subscription topic.
- To ignore a *local* DataReader, the `handle` can be obtained by calling **DDSEntity::get\_instance\_handle** (p. 1468) for the local DataReader.

There is no way to reverse this operation.

#### Parameters

<i>handle</i>	<< <i>in</i> >> (p. 238) Handle of the <b>DDSDataReader</b> (p. 1288) to be ignored.
---------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

#### See also

**DDS\_SubscriptionBuiltinTopicData** (p. 1108)  
**DDS\_SUBSCRIPTION\_TOPIC\_NAME** (p. 300)  
**DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

### 9.252.2.53 get\_domain\_id()

```
virtual DDS_DomainId_t DDSDomainParticipant::get_domain_id ( ) [pure virtual]
```

Get the unique domain identifier.

This operation retrieves the domain id used to create the **DDSDomainParticipant** (p. 1351). The domain id identifies the DDS domain to which the **DDSDomainParticipant** (p. 1351) belongs. Each DDS domain represents a separate data 'communication plane' isolated from other domains.

**Returns**

the unique `domainId` that was used to create the domain

**See also**

**DDSDomainParticipantFactory::create\_participant** (p. 1442)

**DDSDomainParticipantFactory::create\_participant\_with\_profile** (p. 1443)

**9.252.2.54 get\_current\_time()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_current_time (
    DDS_Time_t & current_time ) [pure virtual]
```

Returns the current value of the time.

The current value of the time that RTI Connexx uses to time-stamp **DDSDataWriter** (p. 1321) and to set the reception-timestamp for the data updates that it receives.

**Parameters**

<code>current_time</code>	<< <i>inout</i> >> (p. 238) Current time to be filled up.
---------------------------	---

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.252.2.55 register\_durable\_subscription()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::register_durable_subscription (
    const DDS_EndpointGroup_t & group,
    const char * topic_name ) [pure virtual]
```

<<*extension*>> (p. 237) Registers a Durable Subscription on the specified **DDSTopic** (p. 1617) on all Persistence Services.

If you need to receive all samples published on a **DDSTopic** (p. 1617), including the ones published while a **DDSDataReader** (p. 1288) is inactive or before it may be created, create a Durable Subscription using this method.

In this way, the Persistence Service will ensure that all the samples on that **DDSTopic** (p. 1617) are retained until they are acknowledged by at least *N* DataReaders belonging to the Durable Subscription where *N* is the quorum count.

If the same Durable Subscription is created on a different **DDSTopic** (p. 1617), the Persistence Service will implicitly delete the previous Durable Subscription and create a new one on the new **DDSTopic** (p. 1617).

## Parameters

<i>group</i>	<< <i>in</i> >> (p. 238) <b>DDS_EndpointGroup_t</b> (p. 900) The Durable Subscription name and quorum.
<i>topic_name</i>	<< <i>in</i> >> (p. 238) The topic name for which the Durable Subscription is created.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## 9.252.2.56 delete\_durable\_subscription()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::delete_durable_subscription (
    const DDS_EndpointGroup_t & group ) [pure virtual]
```

<<**extension**>> (p. 237) Deletes an existing Durable Subscription on all Persistence Services.

The Persistence Service will delete the Durable Subscription and the quorum of the existing samples will be considered satisfied.

## Parameters

<i>group</i>	<< <i>in</i> >> (p. 238) <b>DDS_EndpointGroup_t</b> (p. 900) specifying the Durable Subscription name. Quorum is not required for this operation.
--------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## 9.252.2.57 assert\_liveliness()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::assert_liveliness ( ) [pure virtual]
```

Manually asserts the liveliness of this **DDSDomainParticipant** (p. 1351).

This is used in combination with the **DDS\_LivelinessQosPolicy** (p. 936) to indicate to RTI Connext that the entity remains active.

You need to use this operation if the **DDSDomainParticipant** (p. 1351) contains **DDSDataWriter** (p. 1321) entities with the **DDS\_LivelinessQosPolicy::kind** (p. 938) set to **DDS\_MANUAL\_BY\_PARTICIPANT\_LIVELINESS\_QOS** (p. 410) and it only affects the liveliness of those **DDSDataWriter** (p. 1321) entities. Otherwise, it has no effect.

**Note:** writing data via the **FooDataWriter::write** (p. 1683) or **FooDataWriter::write\_w\_timestamp** (p. 1687) operation asserts liveliness on the **DDSDataWriter** (p. 1321) itself and its **DDSDomainParticipant** (p. 1351). Consequently the use of **assert\_liveliness()** (p. 1399) is only needed if the application is not writing data regularly.

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
-----	--

## See also

**DDS\_LivelinessQosPolicy** (p. 936)

**9.252.2.58 resume\_endpoint\_discovery()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::resume_endpoint_discovery (
    const DDS_InstanceHandle_t & remote_participant_handle ) [pure virtual]
```

<<**extension**>> (p. 237) Initiates endpoint discovery with the specified remote **DDSDomainParticipant** (p. 1351).

If the operation returns **DDS\_RETCODE\_OK** (p. 336), the **DDSDomainParticipant** (p. 1351) will initiate endpoint discovery with the remote **DDSDomainParticipant** (p. 1351) provided as a parameter.

When **DDS\_DiscoveryQosPolicy::enable\_endpoint\_discovery** (p. 734) is set to **DDS\_BOOLEAN\_FALSE** (p. 317), this operation allows the RTI Connex application to select for which remote DomainParticipants endpoint discovery is performed. By disabling endpoint discovery, the DomainParticipant will not store any state about remote endpoints and will not send local endpoint information to remote DomainParticipants.

If **DDS\_DiscoveryQosPolicy::enable\_endpoint\_discovery** (p. 734) is set to **DDS\_BOOLEAN\_TRUE** (p. 317), endpoint discovery will automatically occur for every discovered **DDSDomainParticipant** (p. 1351). In this case, invoking this operation will have no effect and will return **DDS\_RETCODE\_OK** (p. 336).

When **DDS\_DiscoveryQosPolicy::enable\_endpoint\_discovery** (p. 734) is set to **DDS\_BOOLEAN\_FALSE** (p. 317), you have two options after a remote **DDSDomainParticipant** (p. 1351) is discovered:

- Call this operation to enable endpoint discovery. After invoking this operation, the **DDSDomainParticipant** (p. 1351) will start to exchange endpoint information so that matching and communication can occur with the remote **DDSDomainParticipant** (p. 1351).
- Call the **DDSDomainParticipant::ignore\_participant** (p. 1393) operation to permanently ignore endpoint discovery with the remote **DDSDomainParticipant** (p. 1351).

Setting **DDS\_DiscoveryQosPolicy::enable\_endpoint\_discovery** (p. 734) to **DDS\_BOOLEAN\_FALSE** (p. 317) enables application-level authentication use cases, in which a **DDSDomainParticipant** (p. 1351) will initiate endpoint discovery with a remote **DDSDomainParticipant** (p. 1351) after successful authentication at the application level.

The `remote_participant_handle` parameter is the one that appears in the **DDS\_SampleInfo** (p. 1082) retrieved when reading the data samples available for the built-in **DDSParticipantBuiltinTopicDataDataReader** (p. 1548).

If the specified remote **DDSDomainParticipant** (p. 1351) is not in the database of discovered DomainParticipants or has been previously ignored, this operation will fail with **DDS\_RETCODE\_ERROR** (p. 336).

This operation can be called multiple times on the same remote participant. If endpoint discovery has already been resumed, successive calls will have no effect and will return **DDS\_RETCODE\_OK** (p. 336).

## Parameters

<i>remote_participant_handle</i>	<< <i>in</i> >> (p. 238) Handle of a discovered <b>DDSDomainParticipant</b> (p. 1351) for which endpoint discovery is to be resumed.
----------------------------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	--

## See also

**DDS\_DiscoveryQosPolicy** (p. 731)

## 9.252.2.59 delete\_contained\_entities()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::delete_contained_entities ( ) [pure virtual]
```

Delete all the entities that were created by means of the "create" operations on the **DDSDomainParticipant** (p. 1351).

This operation deletes all contained **DDSPublisher** (p. 1550) (including an implicit Publisher, if one exists), **DDSSubscriber** (p. 1592) (including implicit Subscriber), **DDSTopic** (p. 1617), **DDSContentFilteredTopic** (p. 1283), and **DDSMultiTopic** (p. 1529) objects.

Prior to deleting each contained entity, this operation will recursively call the corresponding **delete\_contained\_entities()** (p. 1401) operation on each contained entity (if applicable). This pattern is applied recursively. In this manner the operation **delete\_contained\_entities()** (p. 1401) on the **DDSDomainParticipant** (p. 1351) will end up recursively deleting all the entities contained in the **DDSDomainParticipant** (p. 1351), including the **DDSDataWriter** (p. 1321), **DDSDataReader** (p. 1288), as well as the **DDSQueryCondition** (p. 1573), **DDSReadCondition** (p. 1574), and **DDSTopicQuery** (p. 1627) objects belonging to the contained **DDSDataReader** (p. 1288).

The operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) if any of the contained entities is in a state where it cannot be deleted .

If **delete\_contained\_entities()** (p. 1401) completes successfully, the application may delete the **DDSDomainParticipant** (p. 1351).

## MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--

## Examples

**HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.

9.252.2.60 `get_discovered_participants()`

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_discovered_participants (
    DDS_InstanceHandleSeq & participant_handles ) [pure virtual]
```

Returns a list of discovered **DDSDomainParticipant** (p. 1351) entities.

This operation retrieves the list of **DDSDomainParticipant** (p. 1351) entities that have been discovered in the domain and that the application has not indicated should be "ignored" by means of the **DDSDomainParticipant::ignore\_participant** (p. 1393) operation. When using **DDS\_DISCOVERYCONFIG\_BUILTIN\_SPDP2** (p. 394), this list only includes **DDSDomainParticipant** (p. 1351) entities that the application has received configuration information from.

## Parameters

<i>participant_handles</i>	<< <i>inout</i> >> (p. 238) <b>DDS_InstanceHandleSeq</b> (p. 923) to be filled with handles of the discovered <b>DDSDomainParticipant</b> (p. 1351) entities.
----------------------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

9.252.2.61 `get_discovered_participants_from_subject_name()`

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_discovered_participants_from_subject_name (
    DDS_InstanceHandleSeq & participant_handles,
    const char * subject_name ) [pure virtual]
```

<<*extension*>> (p. 237) Returns a list of discovered **DDSDomainParticipant** (p. 1351) entities that have the given **DDS\_EntityNameQosPolicy::name** (p. 906).

This operation retrieves the same list as **DDSDomainParticipant::get\_discovered\_participants** (p. 1402), except this list contains only the participants that have the given **DDS\_EntityNameQosPolicy::name** (p. 906).

Note: this method has different functionality when enabling the RTI Security Plugins. Please refer to the **RTI Security Plugins User's Manual** for more information.

## MT Safety:

Safe.



## Parameters

<i>participant_handles</i>	<< <i>inout</i> >> (p. 238) <b>DDS_InstanceHandleSeq</b> (p. 923) to be filled with handles of the discovered <b>DDSDomainParticipant</b> (p. 1351) entities.
<i>subject_name</i>	<< <i>in</i> >> (p. 238) The <b>DDS_EntityNameQosPolicy::name</b> (p. 906) by which to filter the list.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

9.252.2.62 `get_discovered_participant_data()`

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_discovered_participant_data (
    struct DDS_ParticipantBuiltinTopicData & participant_data,
    const DDS_InstanceHandle_t & participant_handle ) [pure virtual]
```

Returns **DDS\_ParticipantBuiltinTopicData** (p. 979) for the specified **DDSDomainParticipant** (p. 1351).

This operation retrieves information on a **DDSDomainParticipant** (p. 1351) that has been discovered on the network. The participant must be in the same domain as the participant on which this operation is invoked and must not have been "ignored" by means of the **DDSDomainParticipant::ignore\_participant** (p. 1393) operation.

The *participant\_handle* must correspond to such a DomainParticipant. Otherwise, the operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

Use the operation **DDSDomainParticipant::get\_discovered\_participants** (p. 1402) to find the **DDSDomainParticipant** (p. 1351) entities that are currently discovered.

## MT Safety:

Safe.

## Parameters

<i>participant_data</i>	<< <i>inout</i> >> (p. 238) <b>DDS_ParticipantBuiltinTopicData</b> (p. 979) to be filled in with the data for the specified <b>DDSDomainParticipant</b> (p. 1351).
<i>participant_handle</i>	<< <i>in</i> >> (p. 238) <b>DDS_InstanceHandle_t</b> (p. 74) of <b>DDSDomainParticipant</b> (p. 1351).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

See also

**DDS\_ParticipantBuiltinTopicData** (p. 979)

**DDSDomainParticipant::get\_discovered\_participants** (p. 1402)

### 9.252.2.63 get\_discovered\_participant\_subject\_name()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_discovered_participant_subject_name (
    char * subject_name,
    DDS_UnsignedLong & subject_name_size,
    const DDS_InstanceHandle_t & participant_handle ) [pure virtual]
```

<<*extension*>> (p. 237) Returns **DDS\_EntityNameQosPolicy::name** (p. 906) for the specified **DDSDomainParticipant** (p. 1351).

This operation retrieves the **DDS\_EntityNameQosPolicy::name** (p. 906) of a **DDSDomainParticipant** (p. 1351) that has been discovered on the network. The participant must be in the same domain as the participant on which this operation is invoked and must not have been "ignored" by means of the **DDSDomainParticipant::ignore\_participant** (p. 1393) operation.

The `participant_handle` must correspond to such a DomainParticipant. If the `participant_handle` is **DDS\_HANDLE NIL** (p. 76) or is not a valid **DDS\_InstanceHandle\_t** (p. 74) for a DomainParticipant, then the operation will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336). If the `participant_handle` corresponds to a DomainParticipant that has not been discovered, then the operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

Use the operation **DDSDomainParticipant::get\_discovered\_participants** (p. 1402) to find the **DDSDomainParticipant** (p. 1351) entities that are currently discovered.

Note: this method has different functionality when enabling the RTI Security Plugins. Please refer to the **RTI Security Plugins User's Manual** for more information.

**MT Safety:**

Safe.

**Parameters**

<i>subject_name</i>	<< <i>out</i> >> (p. 238) The char buffer that will be used to store the <b>DDS_EntityNameQosPolicy::name</b> (p. 906) of the discovered <b>DDSDomainParticipant</b> (p. 1351). If NULL, this function will return the required length of this buffer through the <code>subject_name_size</code> parameter.
<i>subject_name_size</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL. The size of the supplied char buffer. If the supplied buffer is NULL, or if the supplied buffer is not large enough, this value will be updated with the required length of the buffer, which includes space for the NUL terminator. If the supplied buffer is not NULL but this value is not large enough, then this function will fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336). If the <b>DDS_EntityNameQosPolicy::name</b> (p. 906) is NULL, then this value will be set to 0.
<i>participant_handle</i>	<< <i>in</i> >> (p. 238) <b>DDS_InstanceHandle_t</b> (p. 74) of <b>DDSDomainParticipant</b> (p. 1351).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

## See also

**DDS\_EntityNameQosPolicy::name** (p. 906)

**DDSDomainParticipant::get\_discovered\_participants** (p. 1402)

## 9.252.2.64 get\_discovered\_topics()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_discovered_topics (
    DDS_InstanceHandleSeq & topic_handles ) [pure virtual]
```

Returns list of discovered **DDSTopic** (p. 1617) objects.

This operation retrieves the list of **DDSTopic** (p. 1617) s that have been discovered in the domain and that the application has not indicated should be "ignored" by means of the **DDSDomainParticipant::ignore\_topic** (p. 1395) operation.

## Parameters

<i>topic_handles</i>	<< <i>inout</i> >> (p. 238) <b>DDS_InstanceHandleSeq</b> (p. 923) to be filled with handles of the discovered <b>DDSTopic</b> (p. 1617) objects
----------------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

## 9.252.2.65 get\_discovered\_topic\_data()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_discovered_topic_data (
    struct DDS_TopicBuiltinTopicData & topic_data,
    const DDS_InstanceHandle_t & topic_handle ) [pure virtual]
```

Returns **DDS\_TopicBuiltinTopicData** (p. 1128) for the specified **DDSTopic** (p. 1617).

This operation retrieves information on a **DDSTopic** (p. 1617) that has been discovered by the local Participant and must not have been "ignored" by means of the **DDSDomainParticipant::ignore\_topic** (p. 1395) operation.

The *topic\_handle* must correspond to such a topic. Otherwise, the operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

This call is not supported for remote topics. If a remote `topic_handle` is used, the operation will fail with **DDS\_↔RETCODE\_UNSUPPORTED** (p. 336).

Use the operation **DDSDomainParticipant::get\_discovered\_topics** (p. 1405) to find the topics that are currently discovered.

#### Parameters

<code>topic_data</code>	<< <i>inout</i> >> (p. 238) <b>DDS_TopicBuiltinTopicData</b> (p. 1128) to be filled with the specified <b>DDSTopic</b> (p. 1617)'s data.
<code>topic_handle</code>	<< <i>in</i> >> (p. 238) <b>DDS_InstanceHandle_t</b> (p. 74) of <b>DDSTopic</b> (p. 1617).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	---

#### See also

**DDS\_TopicBuiltinTopicData** (p. 1128)

**DDSDomainParticipant::get\_discovered\_topics** (p. 1405)

### 9.252.2.66 contains\_entity()

```
virtual DDS_Boolean DDSDomainParticipant::contains_entity (
    const DDS_InstanceHandle_t & a_handle ) [pure virtual]
```

Completes successfully with **DDS\_BOOLEAN\_TRUE** (p. 317) if the referenced **DDSEntity** (p. 1463) is contained by the **DDSDomainParticipant** (p. 1351).

This operation checks whether or not the given `a_handle` represents an **DDSEntity** (p. 1463) that was created from the **DDSDomainParticipant** (p. 1351). The containment applies recursively. That is, it applies both to entities (**DDSTopicDescription** (p. 1624), **DDSPublisher** (p. 1550), or **DDSSubscriber** (p. 1592)) created directly using the **DDSDomainParticipant** (p. 1351) as well as entities created using a contained **DDSPublisher** (p. 1550), or **DDSSubscriber** (p. 1592) as the factory, and so forth.

The `instance` handle for an **DDSEntity** (p. 1463) may be obtained from built-in topic data, from various statuses, or from the operation **DDSEntity::get\_instance\_handle** (p. 1468).

#### Parameters

<code>a_handle</code>	<< <i>in</i> >> (p. 238) <b>DDS_InstanceHandle_t</b> (p. 74) of the <b>DDSEntity</b> (p. 1463) to be checked.
-----------------------	---

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if **DDSEntity** (p. 1463) is contained by the **DDSDomainParticipant** (p. 1351), or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

9.252.2.67 `get_participant_protocol_status()`

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_participant_protocol_status (
    struct DDS_DomainParticipantProtocolStatus & status ) [pure virtual]
```

<<*extension*>> (p. 237) Get the domain participant protocol status for this participant.

This also resets the status so that it is no longer considered changed.

## Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) <b>DDS_DomainParticipantProtocolStatus</b> (p. 740) to be filled in.
---------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

9.252.2.68 `set_property()`

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_property (
    const char * property_name,
    const char * value,
    bool propagate ) [pure virtual]
```

Set the value for a property that applies to a DomainParticipant.

## Warning

This method is not implemented in all APIs and it's intended only for testing purposes. You should use **DDSDomainParticipant::set\_qos** (p. 1408) instead.

## Parameters

<i>property_name</i>	<< <i>in</i> >> (p. 238). Name of the property that you want to set.
<i>value</i>	<< <i>in</i> >> (p. 238). New value for the property.
<i>propagate</i>	<< <i>in</i> >> (p. 238). Indicates if the property will be propagated or not.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDSDataWriter::set\_property** (p. 1337)

**DDSDataReader::set\_property** (p. 1308)

**DDSDomainParticipant::set\_qos** (p. 1408)

## 9.252.2.69 set\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_qos (
    const DDS_DomainParticipantQos & qos ) [pure virtual]
```

Change the QoS of this DomainParticipant.

The **DDS\_DomainParticipantQos::user\_data** (p. 743) and **DDS\_DomainParticipantQos::entity\_factory** (p. 744) can be changed. The other policies are immutable.

## Parameters

<i>qos</i>	<p>&lt;&lt;<i>in</i>&gt;&gt; (p. 238) Set of policies to be applied to <b>DDSDomainParticipant</b> (p. 1351). Policies must be consistent. Immutable policies cannot be changed after <b>DDSDomainParticipant</b> (p. 1351) is enabled. The special value <b>DDS_PARTICIPANT_QOS_DEFAULT</b> (p. 48) can be used to indicate that the QoS of the <b>DDSDomainParticipant</b> (p. 1351) should be changed to match the current default <b>DDS_DomainParticipantQos</b> (p. 741) set in the <b>DDSDomainParticipantFactory</b> (p. 1426).</p>
------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337) if an immutable policy is changed, or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337) if policies are inconsistent
------------	---

## See also

**DDS\_DomainParticipantQos** (p. 741) for rules on consistency among QoS policies

**set\_qos (abstract)** (p. 1464)

## 9.252.2.70 set\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Change the QoS of this domain participant using the input XML QoS profile.

The **DDS\_DomainParticipantQos::user\_data** (p. 743) and **DDS\_DomainParticipantQos::entity\_factory** (p. 744) can be changed. The other policies are immutable.

#### Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexx will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexx will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337) if immutable policy is changed, or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337) if policies are inconsistent
------------	--

#### See also

**DDS\_DomainParticipantQos** (p. 741) for rules on consistency among QoS

### 9.252.2.71 get\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_qos (
    DDS_DomainParticipantQos & qos ) [pure virtual]
```

Get the participant QoS.

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

#### Parameters

<i>qos</i>	<< <b>inout</b> >> (p. 238) QoS to be filled up.
------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**get\_qos (abstract)** (p. 1465)

**9.252.2.72 add\_peer()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::add_peer (
    const char * peer_desc_string ) [pure virtual]
```

<<*extension*>> (p. 237) Attempt to contact one or more additional peer participants.

Add the given peer description to the list of peers with which this **DDSDomainParticipant** (p. 1351) will try to communicate.

This method may be called at any time after this **DDSDomainParticipant** (p. 1351) has been created (before or after it has been enabled).

If this method is called after **DDSEntity::enable** (p. 1466), an attempt will be made to contact the new peer(s) immediately.

If this method is called *before* the DomainParticipant is enabled, the peer description will simply be added to the list that was populated by **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732); the first attempted contact will take place after this **DDSDomainParticipant** (p. 1351) is enabled.

Adding a peer description with this method does not guarantee that any peer(s) discovered as a result will exactly correspond to those described:

- This **DDSDomainParticipant** (p. 1351) will attempt to discover peer participants at the given locations but may not succeed if no such participants are available. In this case, this method will not wait for contact attempt(s) to be made and it will not report an error.
- If remote participants described by the given peer description *are* discovered, the distributed application is configured with asymmetric peer lists, and **DDS\_DiscoveryQosPolicy::accept\_unknown\_peers** (p. 734) is set to **DDS\_BOOLEAN\_TRUE** (p. 317). Thus, this **DDSDomainParticipant** (p. 1351) may actually discover *more* peers than are described in the given peer description.

To be informed of the exact remote participants that are discovered, regardless of which peers this **DDSDomainParticipant** (p. 1351) *attempts* to discover, use the built-in participant topic: **DDS\_PARTICIPANT\_TOPIC\_NAME** (p. 295).

To remove specific peer locators, you may use **DDSDomainParticipant::remove\_peer** (p. 1411). If a peer is removed, the `add_peer` operation will add it back to the list of peers.

To stop communicating with a peer **DDSDomainParticipant** (p. 1351) that has been discovered, use **DDSDomainParticipant::ignore\_participant** (p. 1393).

Adding a peer description with this method has no effect on the **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732) that may be subsequently retrieved with **DDSDomainParticipant::get\_qos()** (p. 1409) (because **DDS\_DiscoveryQosPolicy** (p. 731) is immutable).

**Parameters**

<i>peer_desc_string</i>	<< <i>in</i> >> (p. 238) New peer descriptor to be added. The format is specified in <b>Peer Descriptor Format</b> (p. 465).
-------------------------	--



## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## See also

**Peer Descriptor Format** (p. 465)  
**DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732)  
**DDS\_PARTICIPANT\_TOPIC\_NAME** (p. 295)  
**DDSDomainParticipant::get\_builtin\_subscriber** (p. 1393)

## 9.252.2.73 remove\_peer()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::remove_peer (
    const char * peer_desc_string ) [pure virtual]
```

<<**extension**>> (p. 237) Remove one or more peer participants from the list of peers with which this **DDSDomainParticipant** (p. 1351) will try to communicate.

This method may be called any time after this **DDSDomainParticipant** (p. 1351) has been enabled

Calling this method has the following effects:

- If a **DDSDomainParticipant** (p. 1351) was already discovered, it will be locally removed along with all its entities.
- Any further requests coming from a **DDSDomainParticipant** (p. 1351) located on any of the removed peers will be ignored.
- All the locators contained in the peer description will be removed from the peer list. The local **DDSDomainParticipant** (p. 1351) will stop sending announcement to those locators.

If remote participants located on a peer that was previously removed are discovered, they will be ignored until the related peer is added back by using **DDSDomainParticipant::add\_peer** (p. 1409).

Removing a peer description with this method has no effect on the **DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732) that may be subsequently retrieved with **DDSDomainParticipant::get\_qos()** (p. 1409) (because **DDS\_DiscoveryQosPolicy** (p. 731) is immutable).

## Parameters

<i>peer_desc_string</i>	<< <b>in</b> >> (p. 238) Peer descriptor to be removed. The format is specified in <b>Peer Descriptor Format</b> (p. 465).
-------------------------	--

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## See also

**Peer Descriptor Format** (p. 465)

**DDS\_DiscoveryQosPolicy::initial\_peers** (p. 732)

**DDSDomainParticipant::add\_peer** (p. 1409)

**9.252.2.74 get\_dns\_tracker\_polling\_period()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::get_dns_tracker_polling_period (
    DDS_Duration_t & polling_period ) [pure virtual]
```

<<**extension**>> (p. 237) Retrieves the frequency used by the DNS tracker thread to query the DNS service.

The DNS tracker queries the DNS for hostnames specified in the initial peers of a DomainParticipant. The frequency of these queries is defined by **DDS\_DiscoveryConfigQosPolicy::dns\_tracker\_polling\_period** (p. 728). If the value returned is **DDS\_DURATION\_INFINITE** (p. 326), the DNS tracker is disabled.

## Parameters

<i>polling_period</i>	<< <b>out</b> >> (p. 238) Duration that the API populates with the period of the DNS tracker.
-----------------------	---

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## See also

**DDS\_DiscoveryConfigQosPolicy::dns\_tracker\_polling\_period** (p. 728)

**9.252.2.75 set\_dns\_tracker\_polling\_period()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_dns_tracker_polling_period (
    const DDS_Duration_t & polling_period ) [pure virtual]
```

<<**extension**>> (p. 237) Configures the frequency in which the DNS tracker queries the DNS service.

This API allows you to change the frequency of the polling period for the DNS tracker. The range of accepted values, in seconds, goes from 1 second to 1 year. **DDS\_DURATION\_INFINITE** (p. 326) is also accepted as a valid value. If the duration is set to **DDS\_DURATION\_INFINITE** (p. 326), the DNS tracker is disabled.

Modifying the DNS tracker polling period through this has no effect on the **DDS\_DiscoveryConfigQosPolicy::dns\_tracker\_polling\_period** (p. 728) when it is retrieved with **DDSDomainParticipant::get\_qos()** (p. 1409).

#### Parameters

<i>polling_period</i>	<< <i>in</i> >> (p. 238) Duration that is set as the polling period for the DNS tracker.
-----------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDS\_DiscoveryConfigQosPolicy::dns\_tracker\_polling\_period** (p. 728)

**DDSDomainParticipant::add\_peer** (p. 1409)

### 9.252.2.76 set\_listener()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::set_listener (
    DDSDomainParticipantListener * l,
    DDS_StatusMask mask = DDS_STATUS_MASK_ALL ) [pure virtual]
```

Sets the participant listener.

#### Parameters

<i>l</i>	<< <i>in</i> >> (p. 238) Listener to be installed on the entity.
<i>mask</i>	<< <i>in</i> >> (p. 238) Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

#### MT Safety:

Unsafe. This method is not synchronized with the listener callbacks, so it is possible to set a new listener on a participant when the old listener is in a callback.

Care should therefore be taken not to delete any listener that has been set on an enabled participant unless some application-specific means are available of ensuring that the old listener cannot still be in use.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**set\_listener (abstract)** (p. 1465)

**9.252.2.77 get\_listener()**

```
virtual DDSDomainParticipantListener * DDSDomainParticipant::get_listener ( ) [pure virtual]
```

Get the participant listener.

## Returns

Existing listener attached to the **DDSDomainParticipant** (p. 1351).

## See also

**get\_listener (abstract)** (p. 1466)

**9.252.2.78 get\_implicit\_publisher()**

```
virtual DDSPublisher * DDSDomainParticipant::get_implicit_publisher ( ) [pure virtual]
```

<<**extension**>> (p. 237) Returns the implicit **DDSPublisher** (p. 1550). If an implicit Publisher does not already exist, this creates one.

There can only be one implicit Publisher per DomainParticipant.

The implicit Publisher is created with **DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57) and no Listener.

This implicit Publisher will be deleted automatically when the following methods are called: **DDSDomainParticipant**↔**::delete\_contained\_entities** (p. 1401), or **DDSDomainParticipant::delete\_publisher** (p. 1378) with the implicit publisher as a parameter. Additionally, when a DomainParticipant is deleted, if there are no attached DataWriters that belong to the implicit Publisher, the implicit Publisher will be implicitly deleted.

## Returns

The implicit publisher

## See also

**DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57)

**DDSDomainParticipant::create\_publisher** (p. 1376)

**9.252.2.79 get\_implicit\_subscriber()**

```
virtual DDSSubscriber * DDSDomainParticipant::get_implicit_subscriber ( ) [pure virtual]
```

<<**extension**>> (p. 237) Returns the implicit **DDSSubscriber** (p. 1592). If an implicit Subscriber does not already exist, this creates one.

There can only be one implicit Subscriber per DomainParticipant.

The implicit Subscriber is created with **DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57) and no Listener.

This implicit Subscriber will be deleted automatically when the following methods are called: **DDSDomainParticipant::delete\_contained\_entities** (p. 1401), or **DDSDomainParticipant::delete\_subscriber** (p. 1380) with the subscriber as a parameter. Additionally, when a DomainParticipant is deleted, if there are no attached DataReaders that belong to the implicit Subscriber, the implicit Subscriber will be implicitly deleted.

**MT Safety:**

UNSAFE. it is not safe to create the implicit subscriber while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_subscriber\_qos** (p. 1374).

**Returns**

The implicit subscriber

**See also**

**DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57)

**DDSDomainParticipant::create\_subscriber** (p. 1379)

**9.252.2.80 create\_datawriter()**

```
virtual DDSDataWriter * DDSDomainParticipant::create_datawriter (
    DDSTopic * topic,
    const DDS_DataWriterQos & qos,
    DDSDataWriterListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<**extension**>> (p. 237) Creates a **DDSDataWriter** (p. 1321) that will be attached and belong to the implicit **DDSPublisher** (p. 1550).

**Precondition**

The given **DDSTopic** (p. 1617) must have been created from the same DomainParticipant as the implicit Publisher. If it was created from a different DomainParticipant, this method will fail.

The **DDSDataWriter** (p. 1321) created using this method will be associated with the implicit Publisher. This Publisher is automatically created (if it does not exist) using **DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57) when the following methods are called: **DDSDomainParticipant::create\_datawriter** (p. 1415), **DDSDomainParticipant::create\_datawriter\_with\_profile** (p. 1416), or **DDSDomainParticipant::get\_implicit\_publisher** (p. 1414).

**MT Safety:**

UNSAFE. If **DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110) is used for the qos parameter, it is not safe to create the DataWriter while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_datawriter\_qos** (p. 1359).

## Parameters

<i>topic</i>	<< <i>in</i> >> (p. 238) The <b>DDSTopic</b> (p. 1617) that the <b>DDSDataWriter</b> (p. 1321) will be associated with.
<i>qos</i>	<< <i>in</i> >> (p. 238) QoS to be used for creating the new <b>DDSDataWriter</b> (p. 1321). The special value <b>DDS_DATAWRITER_QOS_DEFAULT</b> (p. 110) can be used to indicate that the <b>DDSDataWriter</b> (p. 1321) should be created with the default <b>DDS_DataWriterQos</b> (p. 689) set in the implicit <b>DDSPublisher</b> (p. 1550). The special value <b>DDS_DATAWRITER_QOS_USE_TOPIC_QOS</b> (p. 110) can be used to indicate that the <b>DDSDataWriter</b> (p. 1321) should be created with the combination of the default <b>DDS_DataWriterQos</b> (p. 689) set on the <b>DDSPublisher</b> (p. 1550) and the <b>DDS_TopicQos</b> (p. 1135) of the <b>DDSTopic</b> (p. 1617).
<i>listener</i>	<< <i>in</i> >> (p. 238) The listener of the <b>DDSDataWriter</b> (p. 1321).
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

## Returns

A **DDSDataWriter** (p. 1321) of a derived class specific to the data type associated with the **DDSTopic** (p. 1617) or NULL if an error occurred.

## See also

**FooDataWriter** (p. 1676)

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_DataWriterQos** (p. 689) for rules on consistency among QoS

**DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110)

**DDS\_DATAWRITER\_QOS\_USE\_TOPIC\_QOS** (p. 110)

**DDSDomainParticipant::create\_datawriter\_with\_profile** (p. 1416)

**DDSDomainParticipant::get\_default\_datawriter\_qos** (p. 1358)

**DDSDomainParticipant::get\_implicit\_publisher** (p. 1414)

**DDSTopic::set\_qos** (p. 1619)

**DDSDataWriter::set\_listener** (p. 1339)

### 9.252.2.81 create\_datawriter\_with\_profile()

```
virtual DDSDataWriter * DDSDomainParticipant::create_datawriter_with_profile (
    DDSTopic * topic,
    const char * library_name,
    const char * profile_name,
    DDSDataWriterListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<*extension*>> (p. 237) Creates a **DDSDataWriter** (p. 1321) using a XML QoS profile that will be attached and belong to the implicit **DDSPublisher** (p. 1550).

## Precondition

The given **DDSTopic** (p. 1617) must have been created from the same DomainParticipant as the implicit Publisher. If it was created from a different DomainParticipant, this method will return NULL.

The **DDSDataWriter** (p. 1321) created using this method will be associated with the implicit Publisher. This Publisher is automatically created (if it does not exist) using **DDS\_PUBLISHER\_QOS\_DEFAULT** (p. 57) when the following methods are called: **DDSDomainParticipant::create\_datawriter** (p. 1415), **DDSDomainParticipant::create\_datawriter←\_with\_profile** (p. 1416), or **DDSDomainParticipant::get\_implicit\_publisher** (p. 1414)

## Parameters

<i>topic</i>	<< <i>in</i> >> (p. 238) The <b>DDSTopic</b> (p. 1617) that the <b>DDSDataWriter</b> (p. 1321) will be associated with.
<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexx will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexx will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).
<i>listener</i>	<< <i>in</i> >> (p. 238) The listener of the <b>DDSDataWriter</b> (p. 1321).
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

## Returns

A **DDSDataWriter** (p. 1321) of a derived class specific to the data type associated with the **DDSTopic** (p. 1617) or NULL if an error occurred.

## See also

**FooDataWriter** (p. 1676)

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_DataWriterQos** (p. 689) for rules on consistency among QoS

**DDSDomainParticipant::create\_datawriter** (p. 1415)

**DDSDomainParticipant::get\_default\_datawriter\_qos** (p. 1358)

**DDSDomainParticipant::get\_implicit\_publisher** (p. 1414)

**DDSTopic::set\_qos** (p. 1619)

**DDSDataWriter::set\_listener** (p. 1339)

## 9.252.2.82 delete\_datawriter()

```
virtual DDS_ReturnCode_t DDSDomainParticipant::delete_datawriter (
    DDSDataWriter * a_datawriter ) [pure virtual]
```

<<*extension*>> (p. 237) Deletes a **DDSDataWriter** (p. 1321) that belongs to the implicit **DDSPublisher** (p. 1550).

The deletion of the **DDSDataWriter** (p. 1321) will automatically unregister all instances.

**Precondition**

If the **DDSDataWriter** (p. 1321) does not belong to the implicit **DDSPublisher** (p. 1550), the operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

**Postcondition**

Listener installed on the **DDSDataWriter** (p. 1321) will not be called after this method completes successfully.

**MT Safety:**

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

**Parameters**

<i>a_datawriter</i>	<< <i>in</i> >> (p. 238) The <b>DDSDataWriter</b> (p. 1321) to be deleted.
---------------------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	---

**See also**

**DDSDomainParticipant::get\_implicit\_publisher** (p. 1414)

**9.252.2.83 create\_datareader()**

```
virtual DDSDataReader * DDSDomainParticipant::create_datareader (
    DDSTopicDescription * topic,
    const DDS_DataReaderQos & qos,
    DDSDataReaderListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<*extension*>> (p. 237) Creates a **DDSDataReader** (p. 1288) that will be attached and belong to the implicit **DDSSubscriber** (p. 1592).

**Precondition**

The given **DDSTopicDescription** (p. 1624) must have been created from the same DomainParticipant as the implicit Subscriber. If it was created from a different DomainParticipant, this method will return NULL.

The **DDSDataReader** (p. 1288) created using this method will be associated with the implicit Subscriber. This Subscriber is automatically created (if it does not exist) using **DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57) when the following methods are called: **DDSDomainParticipant::create\_datareader** (p. 1418), **DDSDomainParticipant::create\_datareader\_with\_profile** (p. 1419), or **DDSDomainParticipant::get\_implicit\_subscriber** (p. 1414).



## MT Safety:

UNSAFE. If **DDS\_DATAREADER\_QOS\_DEFAULT** (p. 132) is used for the `qos` parameter, it is not safe to create the datareader while another thread may be simultaneously calling **DDSDomainParticipant::set\_default\_datareader\_qos** (p. 1361).

## Parameters

<i>topic</i>	<< <i>in</i> >> (p. 238) The <b>DDSTopicDescription</b> (p. 1624) that the <b>DDSDataReader</b> (p. 1288) will be associated with.
<i>qos</i>	<< <i>in</i> >> (p. 238) The qos of the <b>DDSDataReader</b> (p. 1288). The special value <b>DDS_DATAREADER_QOS_DEFAULT</b> (p. 132) can be used to indicate that the <b>DDSDataReader</b> (p. 1288) should be created with the default <b>DDS_DataReaderQos</b> (p. 644) set in the implicit <b>DDSSubscriber</b> (p. 1592). If <b>DDSTopicDescription</b> (p. 1624) is of type <b>DDSTopic</b> (p. 1617) or <b>DDSContentFilteredTopic</b> (p. 1283), the special value <b>DDS_DATAREADER_QOS_USE_TOPIC_QOS</b> (p. 133) can be used to indicate that the <b>DDSDataReader</b> (p. 1288) should be created with the combination of the default <b>DDS_DataReaderQos</b> (p. 644) set on the implicit <b>DDSSubscriber</b> (p. 1592) and the <b>DDS_TopicQos</b> (p. 1135) (in the case of a <b>DDSContentFilteredTopic</b> (p. 1283), the <b>DDS_TopicQos</b> (p. 1135) of the related <b>DDSTopic</b> (p. 1617)). if <b>DDS_DATAREADER_QOS_USE_TOPIC_QOS</b> (p. 133) is used, <i>topic</i> cannot be a <b>DDSMultiTopic</b> (p. 1529).
<i>listener</i>	<< <i>in</i> >> (p. 238) The listener of the <b>DDSDataReader</b> (p. 1288).
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

## Returns

A **DDSDataReader** (p. 1288) of a derived class specific to the data-type associated with the **DDSTopic** (p. 1617) or NULL if an error occurred.

## See also

**FooDataReader** (p. 1649)  
**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation  
**DDS\_DataReaderQos** (p. 644) for rules on consistency among QoS  
**DDSDomainParticipant::create\_datareader\_with\_profile** (p. 1419)  
**DDSDomainParticipant::get\_default\_datareader\_qos** (p. 1360)  
**DDSDomainParticipant::get\_implicit\_subscriber** (p. 1414)  
**DDSTopic::set\_qos** (p. 1619)  
**DDSDataReader::set\_listener** (p. 1309)

### 9.252.2.84 create\_datareader\_with\_profile()

```
virtual DDSDataReader * DDSDomainParticipant::create_datareader_with_profile (
    DDSTopicDescription * topic,
    const char * library_name,
    const char * profile_name,
    DDSDataReaderListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<**extension**>> (p. 237) Creates a **DDSDataReader** (p. 1288) using a XML QoS profile that will be attached and belong to the implicit **DDSSubscriber** (p. 1592).

#### Precondition

The given **DDSTopicDescription** (p. 1624) must have been created from the same DomainParticipant as the implicit subscriber. If it was created from a different DomainParticipant, this method will return NULL.

The **DDSDataReader** (p. 1288) created using this method will be associated with the implicit Subscriber. This Subscriber is automatically created (if it does not exist) using **DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p. 57) when the following methods are called: **DDSDomainParticipant::create\_datareader** (p. 1418), **DDSDomainParticipant::create\_datareader\_with\_profile** (p. 1419), or **DDSDomainParticipant::get\_implicit\_subscriber** (p. 1414)

#### Parameters

<i>topic</i>	<< <b>in</b> >> (p. 238) The <b>DDSTopicDescription</b> (p. 1624) that the <b>DDSDataReader</b> (p. 1288) will be associated with.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connex will use the default library (see <b>DDSDomainParticipant::set_default_library</b> (p. 1367)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connex will use the default profile (see <b>DDSDomainParticipant::set_default_profile</b> (p. 1368)).
<i>listener</i>	<< <b>in</b> >> (p. 238) The listener of the <b>DDSDataReader</b> (p. 1288).
<i>mask</i>	<< <b>in</b> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

#### Returns

A **DDSDataReader** (p. 1288) of a derived class specific to the data-type associated with the **DDSTopic** (p. 1617) or NULL if an error occurred.

#### See also

**FooDataReader** (p. 1649)

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_DataReaderQos** (p. 644) for rules on consistency among QoS

**DDSDomainParticipant::create\_datareader** (p. 1418)

**DDSDomainParticipant::get\_default\_datareader\_qos** (p. 1360)

**DDSDomainParticipant::get\_implicit\_subscriber** (p. 1414)

**DDSTopic::set\_qos** (p. 1619)

**DDSDataReader::set\_listener** (p. 1309)

**9.252.2.85 delete\_datareader()**

```
virtual DDS_ReturnCode_t DDSDomainParticipant::delete_datareader (
    DDSDataReader * a_datareader ) [pure virtual]
```

<<**extension**>> (p. 237) Deletes a **DDSDataReader** (p. 1288) that belongs to the implicit **DDSSubscriber** (p. 1592).

**Precondition**

If the **DDSDataReader** (p. 1288) does not belong to the implicit **DDSSubscriber** (p. 1592), or if there are any existing **DDSReadCondition** (p. 1574) or **DDSQueryCondition** (p. 1573) objects that are attached to the **DDSDataReader** (p. 1288), or if there are outstanding loans on samples (as a result of a call to `read()`, `take()`, or one of the variants thereof), the operation fails with the error **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

**Postcondition**

Listener installed on the **DDSDataReader** (p. 1288) will not be called after this method completes successfully.

**MT Safety:**

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

**Parameters**

<i>a_datareader</i>	<< <b>in</b> >> (p. 238) The <b>DDSDataReader</b> (p. 1288) to be deleted.
---------------------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	---

**See also**

**DDSDomainParticipant::get\_implicit\_subscriber** (p. 1414)

**9.252.2.86 lookup\_publisher\_by\_name()**

```
virtual DDSPublisher * DDSDomainParticipant::lookup_publisher_by_name (
    const char * publisher_name ) [pure virtual]
```

<<**extension**>> (p. 237) Looks up a **DDSPublisher** (p. 1550) by its entity name within this **DDSDomainParticipant** (p. 1351).

Every **DDSPublisher** (p. 1550) in the system has an entity name which is configured and stored in the EntityName policy, **ENTITY\_NAME** (p. 403).

This operation retrieves a **DDSPublisher** (p. 1550) within the **DDSDomainParticipant** (p. 1351) given the entity's name. If there are several **DDSPublisher** (p. 1550) with the same name within the **DDSDomainParticipant** (p. 1351), this function returns the first matching occurrence.

#### Parameters

<i>publisher_name</i>	<< <i>in</i> >> (p. 238) Entity name of the <b>DDSPublisher</b> (p. 1550).
-----------------------	--

#### Returns

The first **DDSPublisher** (p. 1550) found with the specified name or NULL if it is not found.

#### See also

**DDSDomainParticipant::lookup\_datawriter\_by\_name** (p. 1422)

### 9.252.2.87 lookup\_subscriber\_by\_name()

```
virtual DDSSubscriber * DDSDomainParticipant::lookup_subscriber_by_name (
    const char * subscriber_name ) [pure virtual]
```

<<*extension*>> (p. 237) Retrieves a **DDSSubscriber** (p. 1592) by its entity name within this **DDSDomainParticipant** (p. 1351).

Every **DDSSubscriber** (p. 1592) in the system has an entity name which is configured and stored in the EntityName policy, **ENTITY\_NAME** (p. 403).

This operation retrieves a **DDSSubscriber** (p. 1592) within the **DDSDomainParticipant** (p. 1351) given the entity's name. If there are several **DDSSubscriber** (p. 1592) with the same name within the **DDSDomainParticipant** (p. 1351), this function returns the first matching occurrence.

#### Parameters

<i>subscriber_name</i>	<< <i>in</i> >> (p. 238) Entity name of the <b>DDSSubscriber</b> (p. 1592).
------------------------	---

#### Returns

The first **DDSSubscriber** (p. 1592) found with the specified name or NULL if it is not found.

#### See also

**DDSDomainParticipant::lookup\_datareader\_by\_name** (p. 1423)

## 9.252.2.88 lookup\_datawriter\_by\_name()

```
virtual DDSDataWriter * DDSDomainParticipant::lookup_datawriter_by_name (
    const char * datawriter_full_name ) [pure virtual]
```

<<*extension*>> (p. 237) Looks up a **DDSDataWriter** (p. 1321) by its entity name within this **DDSDomainParticipant** (p. 1351).

Every **DDSDataWriter** (p. 1321) in the system has an entity name which is configured and stored in the EntityName policy, **ENTITY\_NAME** (p. 403).

Every **DDSPublisher** (p. 1550) in the system has an entity name which is also configured and stored in the EntityName policy.

This operation retrieves a **DDSDataWriter** (p. 1321) within a **DDSPublisher** (p. 1550) given the specified name which encodes both to the **DDSDataWriter** (p. 1321) and the **DDSPublisher** (p. 1550) name.

If there are several **DDSDataWriter** (p. 1321) with the same name within the corresponding **DDSPublisher** (p. 1550) this function returns the first matching occurrence.

The specified name might be given as a fully-qualified entity name or as a plain name.

The fully qualified entity name is a concatenation of the **DDSPublisher** (p. 1550) to which the **DDSDataWriter** (p. 1321) belongs and the entity name of of the **DDSDataWriter** (p. 1321) itself, separated by a double colon "::". For example: MyPublisherName::MyDataWriterName

The plain name contains the **DDSDataWriter** (p. 1321) name only. In this situation it is implied that the **DDSDataWriter** (p. 1321) belongs to the implicit **DDSPublisher** (p. 1550) so the use of a plain name is equivalent to specifying a fully qualified name with the **DDSPublisher** (p. 1550) name part being "implicit". For example: the plain name "MyDataWriterName" is equivalent to specifying the fully qualified name "implicit::MyDataWriterName"

The **DDSDataWriter** (p. 1321) is only looked up within the **DDSPublisher** (p. 1550) specified in the fully qualified name, or within the implicit **DDSPublisher** (p. 1550) if the name was not fully qualified.

## Parameters

<i>datawriter_full_name</i>	<< <i>in</i> >> (p. 238) Entity name or fully-qualified entity name of the <b>DDSDataWriter</b> (p. 1321).
-----------------------------	--

## Returns

The first **DDSDataWriter** (p. 1321) found with the specified name or NULL if it is not found.

## See also

**DDSPublisher::lookup\_datawriter\_by\_name** (p. 1571)

**DDSDomainParticipant::lookup\_publisher\_by\_name** (p. 1421)

**9.252.2.89 lookup\_datareader\_by\_name()**

```
virtual DDSDataReader * DDSDomainParticipant::lookup_datareader_by_name (
    const char * datareader_full_name ) [pure virtual]
```

<<*extension*>> (p. 237) Retrieves up a **DDSDataReader** (p. 1288) by its entity name in this **DDSDomainParticipant** (p. 1351).

Every **DDSDataReader** (p. 1288) in the system has an entity name which is configured and stored in the EntityName policy, **ENTITY\_NAME** (p. 403).

Every **DDSSubscriber** (p. 1592) in the system has an entity name which is also configured and stored in the EntityName policy, **ENTITY\_NAME** (p. 403).

This operation retrieves a **DDSDataReader** (p. 1288) within a **DDSSubscriber** (p. 1592) given the specified name which encodes both to the **DDSDataReader** (p. 1288) and the **DDSSubscriber** (p. 1592) name.

If there are several **DDSDataReader** (p. 1288) with the same name within the corresponding **DDSSubscriber** (p. 1592) this function returns the first matching occurrence.

The specified name might be given as a fully-qualified entity name or as a plain name.

The fully qualified entity name is a concatenation of the **DDSSubscriber** (p. 1592) to which the **DDSDataReader** (p. 1288) belongs and the entity name of of the **DDSDataReader** (p. 1288) itself, separated by a double colon ":". For example: MySubscriberName::MyDataReaderName

The plain name contains the **DDSDataReader** (p. 1288) name only. In this situation it is implied that the **DDSDataReader** (p. 1288) belongs to the implicit **DDSSubscriber** (p. 1592) so the use of a plain name is equivalent to specifying a fully qualified name with the **DDSSubscriber** (p. 1592) name part being "implicit". For example: the plain name "MyDataReaderName" is equivalent to specifying the fully qualified name "implicit::MyDataReaderName"

The **DDSDataReader** (p. 1288) is only looked up within the **DDSSubscriber** (p. 1592) specified in the fully qualified name, or within the implicit **DDSSubscriber** (p. 1592) if the name was not fully qualified.

**Parameters**

<i>datareader_full_name</i>	<< <i>in</i> >> (p. 238) Full entity name of the <b>DDSDataReader</b> (p. 1288).
-----------------------------	--

**Returns**

The first **DDSDataReader** (p. 1288) found with the specified name or NULL if it is not found.

**See also**

**DDSSubscriber::lookup\_datareader\_by\_name** (p. 1612)

**DDSDomainParticipant::lookup\_subscriber\_by\_name** (p. 1422)

**9.252.2.90 take\_discovery\_snapshot()** [1/2]

```
virtual DDS_ReturnCode_t DDSDomainParticipant::take_discovery_snapshot ( ) [pure virtual]
```

Take a snapshot of the remote participants discovered by a local one.

The snapshot will be printed through the **NDDConfigLogger** (p. 1822). A possible output may be the following:

```
Remote participants that match the local participant domain=0
```

```
name="participantTestName" role="participantTestRole" id="1"
```

```
guid_prefix="0x0101D8D1,0x20B83C0D,0x4495246E"
```

```
-----
```

```
1. 0x0101542A,0x2C59B595,0xA1693BDF name="participantTestName"
```

```
role="participantTestRole"
```

```
unicastLocators="udpv4://192.168.1.170:7411"
```

```
-----
```

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336).
------------	---

**9.252.2.91 take\_discovery\_snapshot()** [2/2]

```
virtual DDS_ReturnCode_t DDSDomainParticipant::take_discovery_snapshot (
    const char * file_name ) [pure virtual]
```

Take a snapshot of the remote participants discovered by a local one.

The snapshot will be printed in the file specified by `file_name`. A possible output may be the following:

```
Remote participants that match the local participant domain=0
```

```
name="participantTestName" role="participantTestRole" id="1"
```

```
guid_prefix="0x0101D8D1,0x20B83C0D,0x4495246E"
```

```
-----
```

```
1. 0x0101542A,0x2C59B595,0xA1693BDF name="participantTestName"
```

```
role="participantTestRole"
```

```
unicastLocators="udpv4://192.168.1.170:7411"
```

```
-----
```

**Parameters**

<i>file_name</i>	<< <i>in</i> >> (p. 238) Name of the file where snapshot should be printed.
------------------	---

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336).
-----	---

## 9.253 DDSDomainParticipantFactory Class Reference

<<**singleton**>> (p. 238) <<**interface**>> (p. 237) Allows creation and destruction of **DDSDomainParticipant** (p. 1351) objects.

### Public Member Functions

- virtual **DDS\_ReturnCode\_t set\_default\_participant\_qos** (const **DDS\_DomainParticipantQos** &qos)=0  
*Sets the default **DDS\_DomainParticipantQos** (p. 741) values for this domain participant factory.*
- virtual **DDS\_ReturnCode\_t set\_default\_participant\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0  
 <<**extension**>> (p. 237) *Sets the default **DDS\_DomainParticipantQos** (p. 741) values for this domain participant factory based on the input XML QoS profile.*
- virtual **DDS\_ReturnCode\_t get\_default\_participant\_qos** ( **DDS\_DomainParticipantQos** &qos)=0  
*Initializes the **DDS\_DomainParticipantQos** (p. 741) instance with default values.*
- virtual **DDS\_ReturnCode\_t set\_default\_library** (const char \*library\_name)=0  
 <<**extension**>> (p. 237) *Sets the default XML library for a **DDSDomainParticipantFactory** (p. 1426).*
- virtual const char \* **get\_default\_library** ()=0  
 <<**extension**>> (p. 237) *Gets the default XML library associated with a **DDSDomainParticipantFactory** (p. 1426).*
- virtual **DDS\_ReturnCode\_t set\_default\_profile** (const char \*library\_name, const char \*profile\_name)=0  
 <<**extension**>> (p. 237) *Sets the default XML profile for a **DDSDomainParticipantFactory** (p. 1426).*
- virtual const char \* **get\_default\_profile** ()=0  
 <<**extension**>> (p. 237) *Gets the default XML profile associated with a **DDSDomainParticipantFactory** (p. 1426).*
- virtual const char \* **get\_default\_profile\_library** ()=0  
 <<**extension**>> (p. 237) *Gets the library where the default XML profile is contained for a **DDSDomainParticipantFactory** (p. 1426).*
- virtual **DDS\_ReturnCode\_t get\_participant\_factory\_qos\_from\_profile** ( **DDS\_DomainParticipantFactory** &factory, **DDS\_DomainParticipantQos** &qos, const char \*library\_name, const char \*profile\_name)=0  
 <<**extension**>> (p. 237) *Gets the **DDS\_DomainParticipantFactoryQos** (p. 737) values associated with the input XML QoS profile.*
- virtual **DDS\_ReturnCode\_t get\_participant\_qos\_from\_profile** ( **DDS\_DomainParticipantQos** &qos, const char \*library\_name, const char \*profile\_name)=0  
 <<**extension**>> (p. 237) *Gets the **DDS\_DomainParticipantQos** (p. 741) values associated with the input XML QoS profile.*
- virtual **DDS\_ReturnCode\_t get\_publisher\_qos\_from\_profile** ( **DDS\_PublisherQos** &qos, const char \*library\_name, const char \*profile\_name)=0  
 <<**extension**>> (p. 237) *Gets the **DDS\_PublisherQos** (p. 1022) values associated with the input XML QoS profile.*
- virtual **DDS\_ReturnCode\_t get\_subscriber\_qos\_from\_profile** ( **DDS\_SubscriberQos** &qos, const char \*library\_name, const char \*profile\_name)=0  
 <<**extension**>> (p. 237) *Gets the **DDS\_SubscriberQos** (p. 1105) values associated with the input XML QoS profile.*



- virtual **DDS\_ReturnCode\_t** **get\_datawriter\_qos\_from\_profile** ( **DDS\_DataWriterQos** &qos, const char \*library\_name, const char \*profile\_name)=0  
 <<extension>> (p. 237) Gets the **DDS\_DataWriterQos** (p. 689) values associated with the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t** **get\_datawriter\_qos\_from\_profile\_w\_topic\_name** ( **DDS\_DataWriterQos** &qos, const char \*library\_name, const char \*profile\_name, const char \*topic\_name)=0  
 <<extension>> (p. 237) Gets the **DDS\_DataWriterQos** (p. 689) values associated with the input XML QoS profile while applying topic filters to the input topic name.
- virtual **DDS\_ReturnCode\_t** **get\_datareader\_qos\_from\_profile** ( **DDS\_DataReaderQos** &qos, const char \*library\_name, const char \*profile\_name)=0  
 <<extension>> (p. 237) Gets the **DDS\_DataReaderQos** (p. 644) values associated with the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t** **get\_datareader\_qos\_from\_profile\_w\_topic\_name** ( **DDS\_DataReaderQos** &qos, const char \*library\_name, const char \*profile\_name, const char \*topic\_name)=0  
 <<extension>> (p. 237) Gets the **DDS\_DataReaderQos** (p. 644) values associated with the input XML QoS profile while applying topic filters to the input topic name.
- virtual **DDS\_ReturnCode\_t** **get\_topic\_qos\_from\_profile** ( **DDS\_TopicQos** &qos, const char \*library\_name, const char \*profile\_name)=0  
 <<extension>> (p. 237) Gets the **DDS\_TopicQos** (p. 1135) values associated with the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t** **get\_topic\_qos\_from\_profile\_w\_topic\_name** ( **DDS\_TopicQos** &qos, const char \*library\_name, const char \*profile\_name, const char \*topic\_name)=0  
 <<extension>> (p. 237) Gets the **DDS\_TopicQos** (p. 1135) values associated with the input XML QoS profile while applying topic filters to the input topic name.
- virtual **DDS\_ReturnCode\_t** **get\_qos\_profile\_libraries** (struct **DDS\_StringSeq** &library\_names)=0  
 <<extension>> (p. 237) Gets the names of all XML QoS profile libraries associated with the **DDSDomainParticipantFactory** (p. 1426)
- virtual **DDS\_ReturnCode\_t** **get\_qos\_profiles** (struct **DDS\_StringSeq** &profile\_names, const char \*library\_name)=0  
 <<extension>> (p. 237) Gets the names of all XML QoS profiles associated with the input XML QoS profile library.
- virtual **DDSDomainParticipant \*** **create\_participant** ( **DDS\_DomainId\_t** domainId, const **DDS\_DomainParticipantQos** &qos, **DDSDomainParticipantListener** \*listener, **DDS\_StatusMask** mask)=0  
 Creates a new **DDSDomainParticipant** (p. 1351) object.
- virtual **DDSDomainParticipant \*** **create\_participant\_with\_profile** ( **DDS\_DomainId\_t** domainId, const char \*library\_name, const char \*profile\_name, **DDSDomainParticipantListener** \*listener, **DDS\_StatusMask** mask)=0  
 <<extension>> (p. 237) Creates a new **DDSDomainParticipant** (p. 1351) object using the **DDS\_DomainParticipantQos** (p. 741) associated with the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t** **delete\_participant** ( **DDSDomainParticipant** \*a\_participant)=0  
 Deletes an existing **DDSDomainParticipant** (p. 1351).
- virtual **DDSDomainParticipant \*** **lookup\_participant** ( **DDS\_DomainId\_t** domainId)=0  
 Locates an existing **DDSDomainParticipant** (p. 1351).
- virtual **DDS\_ReturnCode\_t** **set\_qos** (const **DDS\_DomainParticipantFactoryQos** &qos)=0  
 Sets the value for a participant factory QoS.
- virtual **DDS\_ReturnCode\_t** **get\_qos** ( **DDS\_DomainParticipantFactoryQos** &qos)=0  
 Gets the value for participant factory QoS.
- virtual **DDS\_ReturnCode\_t** **load\_profiles** ()=0  
 <<extension>> (p. 237) Loads the XML QoS profiles.
- virtual **DDS\_ReturnCode\_t** **reload\_profiles** ()=0  
 <<extension>> (p. 237) Reloads the XML QoS profiles.
- virtual **DDS\_ReturnCode\_t** **unload\_profiles** ()=0  
 <<extension>> (p. 237) Unloads the XML QoS profiles.

- virtual **DDS\_ReturnCode\_t unregister\_thread** ()=0  
 <<extension>> (p. 237) Allows the user to release thread specific resources kept by the middleware.
- virtual const **DDS\_TypeCode \* get\_typecode\_from\_config** (const char \*type\_name)=0  
 <<extension>> (p. 237) Gets a **DDS\_TypeCode** (p. 1164) from a definition provided in an XML configuration file.
- virtual **DDSDomainParticipant \* create\_participant\_from\_config** (const char \*configuration\_name)=0  
 <<extension>> (p. 237) Creates a **DDSDomainParticipant** (p. 1351) given its configuration name from a description provided in an XML configuration file.
- virtual **DDSDomainParticipant \* create\_participant\_from\_config\_w\_params** (const char \*configuration\_name, const **DDS\_DomainParticipantConfigParams\_t** &params)=0  
 <<extension>> (p. 237) Creates a **DDSDomainParticipant** (p. 1351) given its configuration name from a description provided in an XML configuration file and a set of parameters that allow changing some properties of such configuration.
- virtual **DDSDomainParticipant \* lookup\_participant\_by\_name** (const char \*participant\_name)=0  
 <<extension>> (p. 237) Looks up a **DDSDomainParticipant** (p. 1351) by its entity name in the **DDSDomainParticipantFactory** (p. 1426).
- virtual **DDS\_ReturnCode\_t register\_type\_support** ( **DDSDomainParticipantFactory\_RegisterTypeFunction** register\_type\_fcn, const char \*type\_name)=0  
 <<extension>> (p. 237) Registers a **DDSTypeSupport** (p. 1629) with the **DDSDomainParticipantFactory** (p. 1426) to enable automatic registration if the corresponding type, should it be needed by a **DDSDomainParticipant** (p. 1351).
- virtual **DDS\_ReturnCode\_t get\_participants** (**DDSDomainParticipantSeq** &participants)=0  
 <<extension>> (p. 237) Allows the application to access all the participants the **DomainParticipantFactory** has.
- virtual **DDS\_ReturnCode\_t set\_thread\_factory** ( **DDSThreadFactory** \*thread\_factory)=0  
 <<extension>> (p. 237) Sets a **DDSThreadFactory** (p. 1615) in the **DDSDomainParticipantFactory** (p. 1426) that will be used to create the internal threads of the DDS middleware.

## Static Public Member Functions

- static **DDSDomainParticipantFactory \* get\_instance** ()  
 Gets the singleton instance of this class.
- static **DDS\_ReturnCode\_t finalize\_instance** ()  
 <<extension>> (p. 237) Destroys the singleton instance of this class.

### 9.253.1 Detailed Description

<<singleton>> (p. 238) <<interface>> (p. 237) Allows creation and destruction of **DDSDomainParticipant** (p. 1351) objects.

The sole purpose of this class is to allow the creation and destruction of **DDSDomainParticipant** (p. 1351) objects. This class itself is a <<singleton>> (p. 238), and accessed via the **get\_instance()** (p. 1429) method, and destroyed with **finalize\_instance()** (p. 1429) method.

A single application can participate in multiple domains by instantiating multiple **DDSDomainParticipant** (p. 1351) objects.

An application may even instantiate multiple participants in the same domain. Participants in the same domain exchange data in the same way regardless of whether they are in the same application or different applications or on the same node or different nodes; their location is transparent.

There are two important caveats:

- When there are multiple participants on the same node (in the same application or different applications) in the same domain, the application(s) must make sure that the participants do not try to bind to the same port numbers. You must disambiguate between the participants by setting a participant ID for each participant (**DDS\_WireProtocolQosPolicy::participant\_id** (p. 1247)). The port numbers used by a participant are calculated based on both the participant index and the domain ID, so if all participants on the same node have different participant indexes, they can coexist in the same domain.
- You cannot mix entities from different participants. For example, you cannot delete a topic on a different participant than you created it from, and you cannot ask a subscriber to create a reader for a topic created from a participant different than the subscriber's own participant. (Note that it is permissible for an application built on top of RTI Connext to know about entities from different participants. For example, an application could keep references to a reader from one domain and a writer from another and then bridge the domains by writing the data received in the reader callback.)

See also

**DDSDomainParticipant** (p. 1351)

## 9.253.2 Member Function Documentation

### 9.253.2.1 get\_instance()

```
static DDSDomainParticipantFactory * DDSDomainParticipantFactory::get_instance ( ) [static]
```

Gets the singleton instance of this class.

**DDSTheParticipantFactory** (p. 41) can be used as an alias for the singleton factory returned by this operation.

Returns

The singleton **DDSDomainParticipantFactory** (p. 1426) instance.

MT Safety:

UNSAFE. In VxWorks, it is unsafe to call this method while another thread may be simultaneously calling **DDSDomainParticipantFactory::get\_instance** (p. 1429), **DDSDomainParticipantFactory::finalize\_instance** (p. 1429), **DDS\_TypeCodeFactory::get\_instance** (p. 1212), **DDSGuardCondition::DDSGuardCondition** (p. 1472), **DDSWaitSet::DDSWaitSet()** (p. 1633), **DDSWaitSet::DDSWaitSet(const DDS\_WaitSetProperty\_& t&)** (p. 1633), **DDSGuardCondition::~DDSGuardCondition** (p. 1472), **DDSWaitSet::~DDSWaitSet()** (p. 1632), **NDDUtilityNetworkCapture::enable** (p. 1847), or **NDDUtilityNetworkCapture::disable** (p. 1848).

See also

**DDSTheParticipantFactory** (p. 41)

### 9.253.2.2 finalize\_instance()

```
static DDS_ReturnCode_t DDSDomainParticipantFactory::finalize_instance ( ) [static]
```

<<*extension*>> (p. 237) Destroys the singleton instance of this class.

Only necessary to explicitly reclaim resources used by the participant factory singleton. Note that on many OSs, these resources are automatically reclaimed by the OS when the program terminates. However, some memory-check tools still flag these as unreclaimed. So this method provides a way to clean up memory used by the participant factory.

#### Precondition

All participants created from the factory have been deleted.

#### Postcondition

All resources belonging to the factory have been reclaimed. Another call to **DDSDomainParticipantFactory**↔**::get\_instance** (p. 1429) will return a new lifecycle of the singleton.

#### MT Safety:

UNSAFE. In VxWorks, it is unsafe to call this method while another thread may be simultaneously calling **DDSDomainParticipantFactory::get\_instance** (p. 1429), **DDSDomainParticipantFactory::finalize\_instance** (p. 1429), **DDS\_TypeCodeFactory::get\_instance** (p. 1212), **DDSGuardCondition::DDSGuardCondition** (p. 1472), **DDSWaitSet::DDSWaitSet()** (p. 1633), **DDSWaitSet::DDSWaitSet(const DDS\_WaitSetProperty\_↔t&)** (p. 1633), **DDSGuardCondition::~~DDSGuardCondition** (p. 1472), **DDSWaitSet::~~DDSWaitSet()** (p. 1632), **NDDUtilityNetworkCapture::enable** (p. 1847), or **NDDUtilityNetworkCapture::disable** (p. 1848).

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
-----	---

#### See also

**DDSTheParticipantFactory** (p. 41)

#### Examples

**HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.

### 9.253.2.3 set\_default\_participant\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::set_default_participant_qos (
    const DDS_DomainParticipantQos & qos ) [pure virtual]
```

Sets the default **DDS\_DomainParticipantQos** (p. 741) values for this domain participant factory.

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

## Parameters

<i>qos</i>	<< <i>inout</i> >> (p. 238) Qos to be filled up. The special value <b>DDS_PARTICIPANT_QOS_DEFAULT</b> (p. 48) may be passed as <i>qos</i> to indicate that the default QoS should be reset back to the initial values the factory would use if <b>DDSDomainParticipantFactory::set_default_participant_qos</b> (p. 1430) had never been called.
------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDS\_PARTICIPANT\_QOS\_DEFAULT** (p. 48)

**DDSDomainParticipantFactory::create\_participant** (p. 1442)

## 9.253.2.4 set\_default\_participant\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::set_default_participant_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<*extension*>> (p. 237) Sets the default **DDS\_DomainParticipantQos** (p. 741) values for this domain participant factory based on the input XML QoS profile.

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

This default value will be used for newly created **DDSDomainParticipant** (p. 1351) if **DDS\_PARTICIPANT\_QOS\_DEFAULT** (p. 48) is specified as the *qos* parameter when **DDSDomainParticipantFactory::create\_participant** (p. 1442) is called.

## Precondition

The **DDS\_DomainParticipantQos** (p. 741) contained in the specified XML QoS profile must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

## MT Safety:

UNSAFE. It is not safe to retrieve the default QoS value from a domain participant factory while another thread may be simultaneously calling **DDSDomainParticipantFactory::set\_default\_participant\_qos** (p. 1430)

## Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If <i>library_name</i> is null RTI Connexx will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If <i>profile_name</i> is null RTI Connexx will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).

If the input profile cannot be found the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

## See also

**DDS\_PARTICIPANT\_QOS\_DEFAULT** (p. 48)

**DDSDomainParticipantFactory::create\_participant\_with\_profile** (p. 1443)

9.253.2.5 **get\_default\_participant\_qos()**

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_default_participant_qos (
    DDS_DomainParticipantQos & qos ) [pure virtual]
```

Initializes the **DDS\_DomainParticipantQos** (p. 741) instance with default values.

The retrieved *qos* will match the set of values specified on the last successful call to **DDSDomainParticipantFactory::set\_default\_participant\_qos** (p. 1430), or **DDSDomainParticipantFactory::set\_default\_participant\_qos\_with\_profile** (p. 1431), or else, if the call was never made, the default values listed in **DDS\_DomainParticipantQos** (p. 741).

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

## Parameters

<i>qos</i>	<< <i>out</i> >> (p. 238) the domain participant's QoS
------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDS\_PARTICIPANT\_QOS\_DEFAULT** (p. 48)

**DDSDomainParticipantFactory::create\_participant** (p. 1442)

### 9.253.2.6 set\_default\_library()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::set_default_library (
    const char * library_name ) [pure virtual]
```

<<**extension**>> (p. 237) Sets the default XML library for a **DDSDomainParticipantFactory** (p. 1426).

Any API requiring a `library_name` as a parameter can use NULL to refer to the default library set with this function.

Note: if the library set with this function no longer exists after reloading the QoS profiles (for example, by changing **DDS\_DomainParticipantFactoryQos::profile** (p. 739)) the default library will be set to the last library containing a profile with the attribute `is_default_qos=true` or NULL no such library exists.

See also

**DDSDomainParticipantFactory::set\_default\_profile** (p. 1434) for more information.

#### Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name. If <code>library_name</code> is NULL any previous default is unset.
---------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDSDomainParticipantFactory::get\_default\_library** (p. 1433)

### 9.253.2.7 get\_default\_library()

```
virtual const char * DDSDomainParticipantFactory::get_default_library ( ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the default XML library associated with a **DDSDomainParticipantFactory** (p. 1426).

**Returns**

The returned library name is determined as follows:

- If it was previously set with **DDSDomainParticipantFactory::set\_default\_library** (p. 1433), this function returns that library name
- Otherwise, if one or more profiles have the XML attribute `is_default_qos="true"`, this function returns the library where the last one is contained.
- Otherwise, this function returns NULL.

**See also**

**DDSDomainParticipantFactory::set\_default\_library** (p. 1433)

**9.253.2.8 set\_default\_profile()**

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::set_default_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Sets the default XML profile for a **DDSDomainParticipantFactory** (p. 1426).

This method specifies the profile that will be used as the default the next time a default DomainParticipantFactory profile is needed during a call to a DomainParticipantFactory method. When calling a **DDSDomainParticipantFactory** (p. 1426) method that requires a `profile_name` parameter, you can use NULL to refer to the default profile. (This same information applies to setting a default library.)

This method does not set the default QoS for newly created DomainParticipants; for this functionality, use **DDSDomainParticipantFactory::set\_default\_participant\_qos\_with\_profile** (p. 1431) (you may pass in NULL after having called **set\_default\_profile()** (p. 1434)).

Note: if the profile set with this function no longer exists after reloading the QoS profiles (for example, by changing **DDS\_DomainParticipantFactoryQos::profile** (p. 739)) the default profile will be set to the last one marked with the attribute `is_default_qos=true` or NULL no such profile exists.

**Parameters**

<i>library_name</i>	<< <b>in</b> >> (p. 238) The library name containing the profile.
<i>profile_name</i>	<< <b>in</b> >> (p. 238) The profile name. If profile_name is NULL any previous default is unset.

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--



See also

**DDSDomainParticipantFactory::get\_default\_profile** (p. 1435)

**DDSDomainParticipantFactory::get\_default\_profile\_library** (p. 1435)

### 9.253.2.9 get\_default\_profile()

```
virtual const char * DDSDomainParticipantFactory::get_default_profile ( ) [pure virtual]
```

<<*extension*>> (p. 237) Gets the default XML profile associated with a **DDSDomainParticipantFactory** (p. 1426).

Returns

The returned profile name is determined as follows:

- If it was previously set with **DDSDomainParticipantFactory::set\_default\_profile** (p. 1434), this function returns that profile name
- Otherwise, if one or more profiles have the XML attribute `is_default_qos="true"`, this function returns the name of one of them
- Otherwise, this function returns NULL.

See also

**DDSDomainParticipantFactory::set\_default\_profile** (p. 1434)

### 9.253.2.10 get\_default\_profile\_library()

```
virtual const char * DDSDomainParticipantFactory::get_default_profile_library ( ) [pure virtual]
```

<<*extension*>> (p. 237) Gets the library where the default XML profile is contained for a **DDSDomainParticipantFactory** (p. 1426).

The default profile library is automatically set when **DDSDomainParticipantFactory::set\_default\_profile** (p. 1434) is called.

This library can be different than the **DDSDomainParticipantFactory** (p. 1426) default library (see **DDSDomainParticipantFactory::get\_default\_library** (p. 1433)).

Returns

The default profile library for the profile returned by **DDSDomainParticipantFactory::get\_default\_profile** (p. 1435), or NULL if that profile is NULL.

See also

**DDSDomainParticipantFactory::get\_default\_profile** (p. 1435)

### 9.253.2.11 get\_participant\_factory\_qos\_from\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_participant_factory_qos_from_profile (
    DDS_DomainParticipantFactoryQos & qos,
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<*extension*>> (p. 237) Gets the **DDS\_DomainParticipantFactoryQos** (p. 737) values associated with the input XML QoS profile.

#### Parameters

<i>qos</i>	<< <i>out</i> >> (p. 238) Qos to be filled up. Cannot be NULL.
<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexnt will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexnt will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.253.2.12 get\_participant\_qos\_from\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_participant_qos_from_profile (
    DDS_DomainParticipantQos & qos,
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<*extension*>> (p. 237) Gets the **DDS\_DomainParticipantQos** (p. 741) values associated with the input XML QoS profile.

#### Parameters

<i>qos</i>	<< <i>out</i> >> (p. 238) Qos to be filled up. Cannot be NULL.
<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexnt will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexnt will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## 9.253.2.13 get\_publisher\_qos\_from\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_publisher_qos_from_profile (
    DDS_PublisherQos & qos,
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the **DDS\_PublisherQos** (p. 1022) values associated with the input XML QoS profile.

## Parameters

<i>qos</i>	<< <b>out</b> >> (p. 238) Qos to be filled up. Cannot be NULL.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connex will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connex will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## 9.253.2.14 get\_subscriber\_qos\_from\_profile()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_subscriber_qos_from_profile (
    DDS_SubscriberQos & qos,
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the **DDS\_SubscriberQos** (p. 1105) values associated with the input XML QoS profile.

## Parameters

<i>qos</i>	<< <b>out</b> >> (p. 238) Qos to be filled up. Cannot be NULL.
------------	--

## Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexxt will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexxt will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.253.2.15 get\_datawriter\_qos\_from\_profile()**

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_datawriter_qos_from_profile (
    DDS_DataWriterQos & qos,
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the **DDS\_DataWriterQos** (p. 689) values associated with the input XML QoS profile.

## Parameters

<i>qos</i>	<< <b>out</b> >> (p. 238) Qos to be filled up. Cannot be NULL.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexxt will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexxt will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.253.2.16 get\_datawriter\_qos\_from\_profile\_w\_topic\_name()**

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_datawriter_qos_from_profile_w_topic_↵
name (
```

```

    DDS_DataWriterQos & qos,
    const char * library_name,
    const char * profile_name,
    const char * topic_name ) [pure virtual]

```

<<**extension**>> (p. 237) Gets the **DDS\_DataWriterQos** (p. 689) values associated with the input XML QoS profile while applying topic filters to the input topic name.

#### Parameters

<i>qos</i>	<< <b>out</b> >> (p. 238) Qos to be filled up. Cannot be NULL.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connex will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connex will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).
<i>topic_name</i>	<< <b>in</b> >> (p. 238) Topic name that will be evaluated against the topic_filter attribute in the XML QoS profile. If topic_name is null, RTI Connex will match only QoSs without explicit topic_filter expressions.

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

#### 9.253.2.17 get\_datareader\_qos\_from\_profile()

```

virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_datareader_qos_from_profile (
    DDS_DataReaderQos & qos,
    const char * library_name,
    const char * profile_name ) [pure virtual]

```

<<**extension**>> (p. 237) Gets the **DDS\_DataReaderQos** (p. 644) values associated with the input XML QoS profile.

#### Parameters

<i>qos</i>	<< <b>out</b> >> (p. 238) Qos to be filled up. Cannot be NULL.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connex will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connex will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

9.253.2.18 `get_datareader_qos_from_profile_w_topic_name()`

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_datareader_qos_from_profile_w_topic_↔
name (
    DDS_DataReaderQos & qos,
    const char * library_name,
    const char * profile_name,
    const char * topic_name ) [pure virtual]
```

<<*extension*>> (p. 237) Gets the **DDS\_DataReaderQos** (p. 644) values associated with the input XML QoS profile while applying topic filters to the input topic name.

## Parameters

<i>qos</i>	<< <i>out</i> >> (p. 238) Qos to be filled up. Cannot be NULL.
<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If <i>library_name</i> is null RTI Connex will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If <i>profile_name</i> is null RTI Connex will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).
<i>topic_name</i>	<< <i>in</i> >> (p. 238) Topic name that will be evaluated against the <i>topic_filter</i> attribute in the XML QoS profile. If <i>topic_name</i> is null, RTI Connex will match only QoSs without explicit <i>topic_filter</i> expressions.

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

9.253.2.19 `get_topic_qos_from_profile()`

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_topic_qos_from_profile (
    DDS_TopicQos & qos,
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<*extension*>> (p. 237) Gets the **DDS\_TopicQos** (p. 1135) values associated with the input XML QoS profile.

## Parameters

<i>qos</i>	<< <b>out</b> >> (p. 238) Qos to be filled up. Cannot be NULL.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexnt will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexnt will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## 9.253.2.20 get\_topic\_qos\_from\_profile\_w\_topic\_name()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_topic_qos_from_profile_w_topic_name (
    DDS_TopicQos & qos,
    const char * library_name,
    const char * profile_name,
    const char * topic_name ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the **DDS\_TopicQos** (p. 1135) values associated with the input XML QoS profile while applying topic filters to the input topic name.

## Parameters

<i>qos</i>	<< <b>out</b> >> (p. 238) Qos to be filled up. Cannot be NULL.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexnt will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexnt will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).
<i>topic_name</i>	<< <b>in</b> >> (p. 238) Topic name that will be evaluated against the topic_filter attribute in the XML QoS profile. If topic_name is null, RTI Connexnt will match only QoSs without explicit topic_filter expressions.

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

### 9.253.2.21 get\_qos\_profile\_libraries()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_qos_profile_libraries (
    struct DDS_StringSeq & library_names ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the names of all XML QoS profile libraries associated with the **DDSDomainParticipantFactory** (p. 1426)

#### Parameters

<i>library_names</i>	<< <b>out</b> >> (p. 238) <b>DDS_StringSeq</b> (p. 1102) to be filled with names of XML QoS profile libraries. Cannot be NULL.
----------------------	--

### 9.253.2.22 get\_qos\_profiles()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_qos_profiles (
    struct DDS_StringSeq & profile_names,
    const char * library_name ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the names of all XML QoS profiles associated with the input XML QoS profile library.

#### Parameters

<i>profile_names</i>	<< <b>out</b> >> (p. 238) <b>DDS_StringSeq</b> (p. 1102) to be filled with names of XML QoS profiles. Cannot be NULL.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connex will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).

### 9.253.2.23 create\_participant()

```
virtual DDSDomainParticipant * DDSDomainParticipantFactory::create_participant (
    DDS_DomainId_t domainId,
    const DDS_DomainParticipantQos & qos,
    DDSDomainParticipantListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

Creates a new **DDSDomainParticipant** (p. 1351) object.



**Precondition**

The specified QoS policies must be consistent or the operation will fail and no **DDSDomainParticipant** (p. 1351) will be created.

If you want to create multiple participants on a given host in the same domain, make sure each one has a different participant index (set in the **DDS\_WireProtocolQoSPolicy** (p. 1244)). This in turn will ensure each participant uses a different port number (since the unicast port numbers are calculated from the participant index and the domain ID).

Note that if there is a single participant per host in a given domain, the participant index can be left at the default value (-1).

**MT Safety:**

Safe.

**Parameters**

<i>domain↔ id</i>	<< <i>in</i> >> (p. 238) ID of the domain that the application intends to join. <b>[range]</b> [ $\geq 0$ ], and does not violate guidelines stated in <b>DDS_RtpsWellKnownPorts_t</b> (p. 1076).
<i>qos</i>	<< <i>in</i> >> (p. 238) the DomainParticipant's QoS. The special value <b>DDS_PARTICIPANT_QOS_DEFAULT</b> (p. 48) can be used to indicate that the <b>DDSDomainParticipant</b> (p. 1351) should be created with the default <b>DDS_DomainParticipantQos</b> (p. 741) set in the <b>DDSDomainParticipantFactory</b> (p. 1426).
<i>listener</i>	<< <i>in</i> >> (p. 238) the domain participant's listener.
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

**Returns**

domain participant or NULL on failure

**See also**

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_DomainParticipantQos** (p. 741) for rules on consistency among QoS

**DDS\_PARTICIPANT\_QOS\_DEFAULT** (p. 48)

**NDDS\_DISCOVERY\_PEERS** (p. 464)

**DDSDomainParticipantFactory::create\_participant\_with\_profile** (p. 1443)

**DDSDomainParticipantFactory::get\_default\_participant\_qos** (p. 1432)

**DDSDomainParticipant::set\_listener** (p. 1413)

### 9.253.2.24 create\_participant\_with\_profile()

```
virtual DDSDomainParticipant * DDSDomainParticipantFactory::create_participant_with_profile (
    DDS_DomainId_t domainId,
    const char * library_name,
    const char * profile_name,
    DDSDomainParticipantListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<*extension*>> (p. 237) Creates a new **DDSDomainParticipant** (p. 1351) object using the **DDS\_Domain**↔  
**ParticipantQos** (p. 741) associated with the input XML QoS profile.

#### Precondition

The **DDS\_DomainParticipantQos** (p. 741) in the input profile must be consistent, or the operation will fail and no **DDSDomainParticipant** (p. 1351) will be created.

If you want to create multiple participants on a given host in the same domain, make sure each one has a different participant index (set in the **DDS\_WireProtocolQoSPolicy** (p. 1244)). This in turn will ensure each participant uses a different port number (since the unicast port numbers are calculated from the participant index and the domain ID).

Note that if there is a single participant per host in a given domain, the participant index can be left at the default value (-1).

#### MT Safety:

Safe.

#### Parameters

<i>domainId</i>	<< <i>in</i> >> (p. 238) ID of the domain that the application intends to join. <b>[range]</b> [ $\geq 0$ ], and does not violate guidelines stated in <b>DDS_RtpsWellKnownPorts_t</b> (p. 1076).
<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexx will use the default library (see <b>DDSDomainParticipantFactory::set_default_library</b> (p. 1433)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexx will use the default profile (see <b>DDSDomainParticipantFactory::set_default_profile</b> (p. 1434)).
<i>listener</i>	<< <i>in</i> >> (p. 238) the DomainParticipant's listener.
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

#### Returns

domain participant or NULL on failure

See also

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_DomainParticipantQos** (p. 741) for rules on consistency among QoS

**DDS\_PARTICIPANT\_QOS\_DEFAULT** (p. 48)

**NDDS\_DISCOVERY\_PEERS** (p. 464)

**DDSDomainParticipantFactory::create\_participant()** (p. 1442)

**DDSDomainParticipantFactory::get\_default\_participant\_qos()** (p. 1432)

**DDSDomainParticipant::set\_listener()** (p. 1413)

### 9.253.2.25 delete\_participant()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::delete_participant (
    DDSDomainParticipant * a_participant ) [pure virtual]
```

Deletes an existing **DDSDomainParticipant** (p. 1351).

#### Precondition

All domain entities belonging to the participant must have already been deleted. Otherwise it fails with the error **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

#### Postcondition

Listener installed on the **DDSDomainParticipant** (p. 1351) will not be called after this method returns successfully.

#### MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

#### Parameters

<i>a_participant</i>	<< <i>in</i> >> (p. 238) <b>DDSDomainParticipant</b> (p. 1351) to be deleted.
----------------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--

### 9.253.2.26 lookup\_participant()

```
virtual DDSDomainParticipant * DDSDomainParticipantFactory::lookup_participant (
    DDS_DomainId_t domainId ) [pure virtual]
```

Locates an existing **DDSDomainParticipant** (p. 1351).

If no such **DDSDomainParticipant** (p. 1351) exists, the operation will return NULL value.

If multiple **DDSDomainParticipant** (p. 1351) entities belonging to that domainId exist, then the operation will return one of them. It is not specified which one.

#### Parameters

<i>domainId</i>	<< <i>in</i> >> (p. 238) ID of the domain participant to lookup.
-----------------	--

#### Returns

domain participant if it exists, or NULL

### 9.253.2.27 set\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::set_qos (
    const DDS_DomainParticipantFactoryQos & qos ) [pure virtual]
```

Sets the value for a participant factory QoS.

The **DDS\_DomainParticipantFactoryQos::entity\_factory** (p. 739) can be changed. The other policies are immutable.

Note that despite having QoS, the **DDSDomainParticipantFactory** (p. 1426) is not an **DDSEntity** (p. 1463).

#### Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) Set of policies to be applied to <b>DDSDomainParticipantFactory</b> (p. 1426). Policies must be consistent. Immutable policies can only be changed before calling any other RTI Connexnt methods except for <b>DDSDomainParticipantFactory::get_qos</b> (p. 1447)
------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337) if immutable policy is changed, or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337) if policies are inconsistent
------------	--

See also

**DDS\_DomainParticipantFactoryQos** (p. 737) for rules on consistency among QoS

### 9.253.2.28 get\_qos()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_qos (
    DDS_DomainParticipantFactoryQos & qos ) [pure virtual]
```

Gets the value for participant factory QoS.

Parameters

<i>qos</i>	<< <i>inout</i> >> (p. 238) QoS to be filled up.
------------	--

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.253.2.29 load\_profiles()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::load_profiles ( ) [pure virtual]
```

<<*extension*>> (p. 237) Loads the XML QoS profiles.

The XML QoS profiles are loaded implicitly after the first **DDSDomainParticipant** (p. 1351) is created or explicitly, after a call to this method.

This has the same effect as **DDSDomainParticipantFactory::reload\_profiles()** (p. 1447).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDS\_ProfileQosPolicy** (p. 1004)

### 9.253.2.30 reload\_profiles()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::reload_profiles ( ) [pure virtual]
```

<<**extension**>> (p. 237) Reloads the XML QoS profiles.

The XML QoS profiles are loaded implicitly after the first **DDSDomainParticipant** (p. 1351) is created or explicitly, after a call to this method.

This has the same effect as **DDSDomainParticipantFactory::load\_profiles()** (p. 1447).

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

#### See also

**DDS\_ProfileQosPolicy** (p. 1004)

### 9.253.2.31 unload\_profiles()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::unload_profiles ( ) [pure virtual]
```

<<**extension**>> (p. 237) Unloads the XML QoS profiles.

The resources associated with the XML QoS profiles are freed. Any reference to the profiles after calling this method will fail with an error.

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

#### See also

**DDS\_ProfileQosPolicy** (p. 1004)

### 9.253.2.32 unregister\_thread()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::unregister_thread ( ) [pure virtual]
```

<<**extension**>> (p. 237) Allows the user to release thread specific resources kept by the middleware.

This function should be called by the user right before exiting a thread where DDS API were used. In this way the middleware will be able to free all the resources related to this specific thread. The best approach is to call the function during the thread deletion after all the DDS related API have been called.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## 9.253.2.33 get\_typecode\_from\_config()

```
virtual const DDS_TypeCode * DDSDomainParticipantFactory::get_typecode_from_config (
    const char * type_name ) [pure virtual]
```

<<**extension**>> (p. 237) Gets a **DDS\_TypeCode** (p. 1164) from a definition provided in an XML configuration file.

## Parameters

<i>type_name</i>	<< <b>in</b> >> (p. 238) Name of the type in the configuration file.
------------------	--

## Returns

The **DDS\_TypeCode** (p. 1164) or NULL if a type with that name doesn't exist or an error occurs.

## 9.253.2.34 create\_participant\_from\_config()

```
virtual DDSDomainParticipant * DDSDomainParticipantFactory::create_participant_from_config (
    const char * configuration_name ) [pure virtual]
```

<<**extension**>> (p. 237) Creates a **DDSDomainParticipant** (p. 1351) given its configuration name from a description provided in an XML configuration file.

This operation creates a **DDSDomainParticipant** (p. 1351) registering all the necessary data types and creating all the contained entities (**DDSTopic** (p. 1617), **DDSPublisher** (p. 1550), **DDSSubscriber** (p. 1592), **DDSDataWriter** (p. 1321), **DDSDataReader** (p. 1288)) from a description given in an XML configuration file.

The configuration name is the fully qualified name of the XML participant object, consisting of the name of the participant library plus the name of participant configuration.

For example the name "MyParticipantLibrary::PublicationParticipant" can be used to create the domain participant from the description in an XML file with contents shown in the snippet below:

```
<participant_library name="MyParticipantLibrary">
    <domain_participant name="PublicationParticipant" domain_ref="MyDomainLibrary::HelloWorldDomain">
        <publisher name="MyPublisher">
            <data_writer name="HelloWorldWriter" topic_ref="HelloWorldTopic"/>
        </publisher>
    </domain_participant>
```

```
</participant_library>
```

The entities belonging to the newly created **DDSDomainParticipant** (p. 1351) can be retrieved with the help of lookup operations such as: **DDSDomainParticipant::lookup\_datareader\_by\_name** (p. 1423).

This operation is equivalent to call **DDSDomainParticipantFactory::create\_participant\_from\_config\_w\_params** (p. 1450) passing **DDS\_PARTICIPANT\_CONFIG\_PARAMS\_DEFAULT** (p. 48) as parameters.

#### MT Safety:

Safe.

#### Parameters

<i>configuration_name</i>	<< <i>in</i> >> (p. 238) Name of the participant configuration in the XML file.
---------------------------	---

#### Returns

The created **DDSDomainParticipant** (p. 1351) or NULL on error.

#### See also

**DDSDomainParticipantFactory::lookup\_participant\_by\_name** (p. 1451)

**DDSDomainParticipant::lookup\_topicdescription** (p. 1390)

**DDSDomainParticipant::lookup\_publisher\_by\_name** (p. 1421)

**DDSDomainParticipant::lookup\_subscriber\_by\_name** (p. 1422)

**DDSDomainParticipant::lookup\_datareader\_by\_name** (p. 1423)

**DDSDomainParticipant::lookup\_datawriter\_by\_name** (p. 1422)

**DDSPublisher::lookup\_datawriter\_by\_name** (p. 1571)

**DDSSubscriber::lookup\_datareader\_by\_name** (p. 1612)

### 9.253.2.35 create\_participant\_from\_config\_w\_params()

```
virtual DDSDomainParticipant * DDSDomainParticipantFactory::create_participant_from_config_w_↵
params (
    const char * configuration_name,
    const DDS_DomainParticipantConfigParams_t & params ) [pure virtual]
```

<<*extension*>> (p. 237) Creates a **DDSDomainParticipant** (p. 1351) given its configuration name from a description provided in an XML configuration file and a set of parameters that allow changing some properties of such configuration.

The operation will create a **DDSDomainParticipant** (p. 1351) the same way specified in **DDSDomainParticipant↵Factory::create\_participant\_from\_config** (p. 1449).

In addition, this operation allows overriding the domain ID, participant name, and entities QoS specified in the configuration.

#### MT Safety:

Safe.



## Parameters

<i>configuration_name</i>	<< <i>in</i> >> (p. 238) Name of the participant configuration in the XML file.
<i>params</i>	<< <i>in</i> >> (p. 238) input parameters that allow changing some properties of the configuration referred to by <i>configuration_name</i> .

## Returns

The created **DDSDomainParticipant** (p. 1351) or NULL on error.

## 9.253.2.36 lookup\_participant\_by\_name()

```
virtual DDSDomainParticipant * DDSDomainParticipantFactory::lookup_participant_by_name (
    const char * participant_name ) [pure virtual]
```

<<*extension*>> (p. 237) Looks up a **DDSDomainParticipant** (p. 1351) by its entity name in the **DDSDomainParticipantFactory** (p. 1426).

Every **DDSDomainParticipant** (p. 1351) in the system has an entity name which is configured and stored in the EntityName policy, **ENTITY\_NAME** (p. 403).

This operation retrieves a **DDSDomainParticipant** (p. 1351) within the **DDSDomainParticipantFactory** (p. 1426) given the entity's name. If there are several **DDSDomainParticipant** (p. 1351) with the same name within the **DDSDomainParticipantFactory** (p. 1426) this function returns the first matching occurrence.

## Parameters

<i>participant_name</i>	<< <i>in</i> >> (p. 238) Entity name of the <b>DDSDomainParticipant</b> (p. 1351). Cannot be NULL.
-------------------------	--

## Returns

The first **DDSDomainParticipant** (p. 1351) found with the specified name or NULL if it is not found.

## 9.253.2.37 register\_type\_support()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::register_type_support (
    DDSDomainParticipantFactory_RegisterTypeFunction register_type_fcn,
    const char * type_name ) [pure virtual]
```

<<*extension*>> (p. 237) Registers a **DDSTypeSupport** (p. 1629) with the **DDSDomainParticipantFactory** (p. 1426) to enable automatic registration if the corresponding type, should it be needed by a **DDSDomainParticipant** (p. 1351).

Types referred by the **DDSTopic** (p. 1617) entities within a **DDSDomainParticipant** (p. 1351) must be registered with the **DDSDomainParticipant** (p. 1351).

Type registration in a **DDSDomainParticipant** (p. 1351) is performed by a call to the **FooTypeSupport::register\_type** (p. 1713) operation. This can be done directly from the application code or indirectly by the RTI Connex infrastructure as a result of parsing an XML configuration file that refers to that type.

The **DDSDomainParticipantFactory::register\_type\_support** (p.1451) operation provides the **DDSDomainParticipantFactory** (p. 1426) with the information it needs to automatically call the **FooTypeSupport::register\_type** (p. 1713) operation and register the corresponding type if the type is needed as a result of parsing an XML configuration file.

Automatic type registration while parsing XML files can also be done by the RTI Connex infrastructure based on the type description provided in the XML files. If the **DDSTypeSupport** (p. 1629) has been registered with the **DDSDomainParticipantFactory** (p. 1426) this definition takes precedence over the description of the type given in the XML file.

The **DDSDomainParticipantFactory::register\_type\_support** (p.1451) operation receives a **FooTypeSupport::register\_type** (p.1713) function as a parameter. This function is normally generated using `rtiddsgen` from a description of the corresponding type in IDL, XML, or XSD.

The typical workflow when using this function is as follows: Define the data-type in IDL (or XML, or XSD) in a file. E.g. `Foo.idl` Run `rtiddsgen` in that file to generate the `TypeSupport` files, for the desired programming language. E.g. in C++ `FooTypeSupport.h` `FooTypeSupport.cxx` Include the proper header file (e.g. `FooTypeSupport.h`) in your program and call **DDSDomainParticipantFactory::register\_type\_support** (p. 1451) passing the function that was generated by `rtiddsgen`. E.g. **FooTypeSupport::register\_type** (p. 1713) Include the `TypeSupport` source file in your project such that it is compiled and linked. E.g. `FooTypeSupport.cxx`

You may refer to the [Getting Started Guide](#) for additional details in this process.

Note that only one register function is allowed per registered type name.

#### Parameters

<i>register_type_fcn</i>	<< <i>in</i> >> (p. 238) <b>DDSDomainParticipantFactory_RegisterTypeFunction</b> (p. 42) to be used for registering the type with a <b>DDSDomainParticipant</b> (p. 1351).
<i>type_name</i>	<< <i>in</i> >> (p. 238) Name the type is registered with.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.253.2.38 get\_participants()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::get_participants (
    DDSDomainParticipantSeq & participants ) [pure virtual]
```

<<**extension**>> (p. 237) Allows the application to access all the participants the `DomainParticipantFactory` has.

If the sequence doesn't own its buffer, and its maximum is less than the total number of participants, it will be filled up to its maximum, and fail with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

DomainParticipants are ordered in the output sequence from the most recently created to the oldest.

#### MT Safety:

Unsafe. Creating or deleting DomainParticipants at the same time as calling this operation is not safe.

#### Parameters

<i>participants</i>	<< <i>inout</i> >> (p. 238) a DomainParticipantSeq object where the set or list of participants will be returned
---------------------	--

#### Returns

One of the **Standard Return Codes** (p. 336) or **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337)

### 9.253.2.39 set\_thread\_factory()

```
virtual DDS_ReturnCode_t DDSDomainParticipantFactory::set_thread_factory (
    DDSThreadFactory * thread_factory ) [pure virtual]
```

<<*extension*>> (p. 237) Sets a **DDSThreadFactory** (p. 1615) in the **DDSDomainParticipantFactory** (p. 1426) that will be used to create the internal threads of the DDS middleware.

DDS threads are managed by the **DDSDomainParticipant** (p. 1351), which is responsible for creating and deleting threads throughout its lifecycle. Some threads are created when the **DDSDomainParticipant** (p. 1351) gets enabled (i.e., database, event, etc.) and others when special features are enabled (i.e., asynchronous publication thread).

DDS threads have **DDSDomainParticipant** (p. 1351) scope. This means every DomainParticipant creates all the necessary threads to operate and each **DDSDomainParticipant** (p. 1351) will create its own independent set of threads.

Each **DDSDomainParticipant** (p. 1351) creates an independent set of DDS threads and will use the **DDSThreadFactory** (p. 1615) that is held by the **DDSDomainParticipantFactory** (p. 1426) at the time the DomainParticipant is created. A **DDSThreadFactory** (p. 1615) is immutable from a **DDSDomainParticipant** (p. 1351) point of view. This means that a **DDSDomainParticipant** (p. 1351) will use throughout its lifecycle the same **DDSThreadFactory** (p. 1615) that was set when it was created, even if a new **DDSThreadFactory** (p. 1615) is set in the **DDSDomainParticipantFactory** (p. 1426) later. That is, if a new **DDSThreadFactory** (p. 1615) is set, a previously created **DDSDomainParticipant** (p. 1351) will not be affected.

ThreadFactory lifecycle: A **DDSThreadFactory** (p. 1615) instance must be alive while there are DomainParticipants using it. A **DDSThreadFactory** (p. 1615) instance can be deleted only after all DomainParticipants using it are deleted.

By default, the **DDSDomainParticipantFactory** (p. 1426) has an internal **DDSThreadFactory** (p. 1615) so threads are created automatically by the core product. These threads are usually created using the typical framework for the target platform (i.e., pthread for Linux systems).

#### MT Safety:

: Safe. Creation and deletion of a **DDSDomainParticipant** (p. 1351) can occur concurrently with setting a **DDSThreadFactory** (p. 1615).

## Parameters

<i>thread_factory</i>	<< <i>in</i> >> (p. 238) Instance of a <b>DDSThreadFactory</b> (p. 1615) to be used for creating the DDS threads. If null is specified, the current <b>DDSThreadFactory</b> (p. 1615) is removed and the internal default will be used.
-----------------------	---

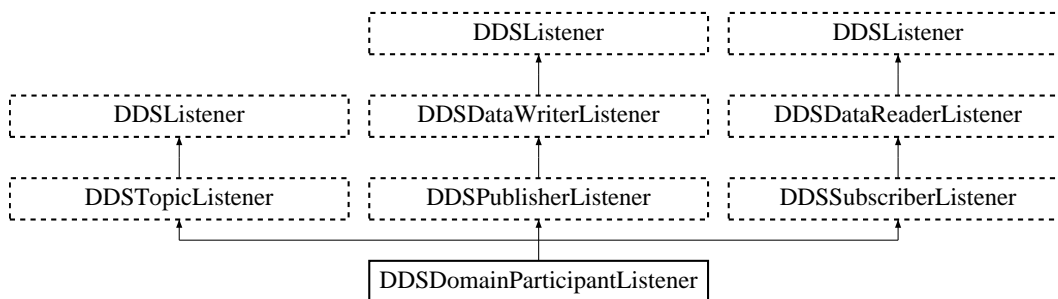
## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## 9.254 DDSDomainParticipantListener Class Reference

<<*interface*>> (p. 237) Listener for participant status.

Inheritance diagram for DDSDomainParticipantListener:



### Public Member Functions

- virtual void **on\_invalid\_local\_identity\_status\_advance\_notice** ( **DDSDomainParticipant** \*participant, const **DDS\_InvalidLocalIdentityAdvanceNoticeStatus** &status)

*Notifies the user that the identity of the local **DDSDomainParticipant** (p. 1351) is about to expire.*

### 9.254.1 Detailed Description

<<*interface*>> (p. 237) Listener for participant status.

Entity:

**DDSDomainParticipant** (p. 1351)

Status:

**Status Kinds** (p. 337)

This is the interface that can be implemented by an application-provided class and then registered with the **DDSDomainParticipant** (p. 1351) such that the application can be notified by RTI Connex of relevant status changes.

The **DDSDomainParticipantListener** (p. 1454) interface extends all other Listener interfaces and has no additional operation beyond the ones defined by the more general listeners.

The purpose of the **DDSDomainParticipantListener** (p. 1454) is to be the listener of last resort that is notified of all status changes not captured by more specific listeners attached to the **DDSDomainEntity** (p. 1350) objects. When a relevant status change occurs, RTI Connex will first attempt to notify the listener attached to the concerned **DDSDomainEntity** (p. 1350) if one is installed. Otherwise, RTI Connex will notify the Listener attached to the **DDSDomainParticipant** (p. 1351).

*Important:* Because a **DDSDomainParticipantListener** (p. 1454) may receive callbacks pertaining to many different entities, it is possible for the same listener to receive multiple callbacks simultaneously in different threads. (Such is not the case for listeners of other types.) It is therefore critical that users of this listener provide their own protection for any thread-unsafe activities undertaken in a **DDSDomainParticipantListener** (p. 1454) callback.

*Note:* Due to a thread-safety issue, the destruction of a DomainParticipantListener from an enabled DomainParticipant should be avoided – even if the DomainParticipantListener has been removed from the DomainParticipant. (This limitation does not affect the Java API.)

See also

**DDSListener** (p. 1526)

**DDSDomainParticipant::set\_listener** (p. 1413)

## 9.254.2 Member Function Documentation

### 9.254.2.1 on\_invalid\_local\_identity\_status\_advance\_notice()

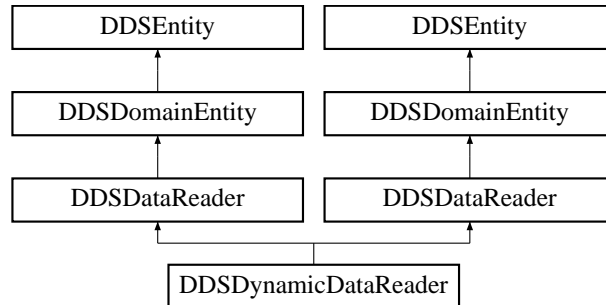
```
virtual void DDSDomainParticipantListener::on_invalid_local_identity_status_advance_notice (
    DDSDomainParticipant * participant,
    const DDS_InvalidLocalIdentityAdvanceNoticeStatus & status ) [virtual]
```

Notifies the user that the identity of the local **DDSDomainParticipant** (p. 1351) is about to expire.

## 9.255 DDSDynamicDataReader Class Reference

Reads (subscribes to) objects of type **DDS\_DynamicData** (p. 775).

Inheritance diagram for DDSDynamicDataReader:



### Additional Inherited Members

#### 9.255.1 Detailed Description

Reads (subscribes to) objects of type **DDS\_DynamicData** (p. 775).

Instantiates **DDSDataReader** (p. 1288) < **DDS\_DynamicData** (p. 775) > .

See also

**DDSDataReader** (p. 1288)

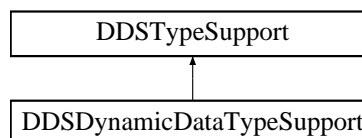
**FooDataReader** (p. 1649)

**DDS\_DynamicData** (p. 775)

## 9.256 DDSDynamicDataTypeSupport Class Reference

A factory for registering a dynamically defined type and creating **DDS\_DynamicData** (p. 775) objects.

Inheritance diagram for DDSDynamicDataTypeSupport:



## Public Member Functions

- **DDS\_Boolean is\_valid ()**  
*Indicates whether the object was constructed properly.*
- **DDS\_ReturnCode\_t register\_type ( DDSDomainParticipant \*participant, const char \*type\_name)**  
*Associate the **DDS\_TypeCode** (p. 1164) with the given **DDSDomainParticipant** (p. 1351) under the given logical name.*
- **DDS\_ReturnCode\_t unregister\_type ( DDSDomainParticipant \*participant, const char \*type\_name)**  
*Remove the definition of this type from the **DDSDomainParticipant** (p. 1351).*
- const char \* **get\_type\_name ()** const  
*Get the default name of this type.*
- const **DDS\_TypeCode** \* **get\_data\_type ()** const  
*Get the **DDS\_TypeCode** (p. 1164) wrapped by this **DDSDynamicDataTypeSupport** (p. 1456).*
- **DDS\_DynamicData** \* **create\_data ()**  
*Create a new **DDS\_DynamicData** (p. 775) sample initialized with the **DDS\_TypeCode** (p. 1164) and properties of this **DDSDynamicDataTypeSupport** (p. 1456).*
- **DDS\_ReturnCode\_t delete\_data ( DDS\_DynamicData \*a\_data)**  
*Finalize and deallocate the **DDS\_DynamicData** (p. 775) sample.*
- void **print\_data (const DDS\_DynamicData \*a\_data)** const  
*Print a string representation of the given sample to the given file.*
- **DDS\_ReturnCode\_t copy\_data ( DDS\_DynamicData \*dest, const DDS\_DynamicData \*source)** const  
*Deeply copy the given data samples.*
- **DDSDynamicDataTypeSupport (const DDS\_TypeCode \*type, const struct DDS\_DynamicDataType↔Property\_t &props)**  
*Construct a new **DDSDynamicDataTypeSupport** (p. 1456) object.*
- virtual **~DDSDynamicDataTypeSupport ()**  
*Delete a **DDSDynamicDataTypeSupport** (p. 1456) object.*

### 9.256.1 Detailed Description

A factory for registering a dynamically defined type and creating **DDS\_DynamicData** (p. 775) objects.

A **DDSDynamicDataTypeSupport** (p. 1456) has three roles:

1. It associates a **DDS\_TypeCode** (p. 1164) with policies for managing objects of that type. See the constructor, **DDSDynamicDataTypeSupport::DDSDynamicDataTypeSupport** (p. 1457).
2. It registers its type under logical names with a **DDSDomainParticipant** (p. 1351). See **DDSDynamicDataType↔Support::register\_type** (p. 1459).
3. It creates **DDS\_DynamicData** (p. 775) samples pre-initialized with the type and properties of the type support itself. See **DDSDynamicDataTypeSupport::create\_data** (p. 1460).

### 9.256.2 Constructor & Destructor Documentation

### 9.256.2.1 DDSDynamicDataTypeSupport()

```
DDSDynamicDataTypeSupport::DDSDynamicDataTypeSupport (
    const DDS_TypeCode * type,
    const struct DDS_DynamicDataTypeProperty_t & props )
```

Construct a new **DDSDynamicDataTypeSupport** (p. 1456) object.

This step is usually followed by type registration.

**NOTE** that RTI Connex does not explicitly generate any exceptions in this constructor, because C++ exception support is not consistent across all platforms on which RTI Connex runs. Therefore, to check whether construction succeeded, you must use the **DDSDynamicDataTypeSupport::is\_valid** (p. 1459) method.

The **DDS\_TypeCode** (p. 1164) object that is passed to this constructor is cloned and stored internally; no pointer is retained to the object passed in. It is therefore safe to delete the **DDS\_TypeCode** (p. 1164) after this method returns.

#### Parameters

<i>type</i>	The <b>DDS_TypeCode</b> (p. 1164) that describes the members of this type. The new object will contain a <i>copy</i> of this <b>DDS_TypeCode</b> (p. 1164); you may delete the argument after this constructor returns.
<i>props</i>	Policies that describe how to manage the memory and other properties of the data samples created by this factory. In most cases, the default values will be appropriate; see <b>DDS_DYNAMIC_DATA_TYPE_PROPERTY_DEFAULT</b> (p. 102).

#### See also

**DDSDynamicDataTypeSupport::is\_valid** (p. 1459)

**DDSDynamicDataTypeSupport::register\_type** (p. 1459)

**DDSDynamicDataTypeSupport::~~DDSDynamicDataTypeSupport** (p. 1458)

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.256.2.2 ~DDSDynamicDataTypeSupport()

```
virtual DDSDynamicDataTypeSupport::~~DDSDynamicDataTypeSupport ( ) [virtual]
```

Delete a **DDSDynamicDataTypeSupport** (p. 1456) object.

A **DDSDynamicDataTypeSupport** (p. 1456) cannot be deleted while it is still in use. For each **DDSDomainParticipant** (p. 1351) with which the **DDSDynamicDataTypeSupport** (p. 1456) is registered, either the type must be unregistered or the participant must be deleted.

#### See also

**DDSDynamicDataTypeSupport::unregister\_type** (p. 1459)

**DDSDynamicDataTypeSupport::DDSDynamicDataTypeSupport** (p. 1457)



### 9.256.3 Member Function Documentation

#### 9.256.3.1 is\_valid()

```
DDS_Boolean DDSDynamicDataTypeSupport::is_valid ( )
```

Indicates whether the object was constructed properly.

This method returns **DDS\_BOOLEAN\_TRUE** (p. 317) if the constructor succeeded; it returns **DDS\_BOOLEAN\_FALSE** (p. 317) if the constructor failed for any reason, which should also have resulted in a log message.

Possible failure reasons include passing an invalid type or invalid properties to the constructor.

This method is necessary because C++ exception support is not consistent across all of the platforms on which RTI Connex runs. Therefore, the implementation does not throw any exceptions in the constructor.

See also

**DDSDynamicDataTypeSupport::DDSDynamicDataTypeSupport** (p. 1457)

#### 9.256.3.2 register\_type()

```
DDS_ReturnCode_t DDSDynamicDataTypeSupport::register_type (
    DDSDomainParticipant * participant,
    const char * type_name )
```

Associate the **DDS\_TypeCode** (p. 1164) with the given **DDSDomainParticipant** (p. 1351) under the given logical name.

Once a type has been registered, it can be referenced by name when creating a topic. Statically and dynamically defined types behave the same way in this respect.

If the type cannot be registered, this function will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) or **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

See also

**FooTypeSupport::register\_type** (p. 1713)

**DDSDomainParticipant::create\_topic** (p. 1382)

**DDSDynamicDataTypeSupport::unregister\_type** (p. 1459)

### 9.256.3.3 unregister\_type()

```
DDS_ReturnCode_t DDSDynamicDataTypeSupport::unregister_type (
    DDSDomainParticipant * participant,
    const char * type_name )
```

Remove the definition of this type from the **DDSDomainParticipant** (p. 1351).

This operation is optional; all types are automatically unregistered when a **DDSDomainParticipant** (p. 1351) is deleted. Most application will not need to manually unregister types.

A type cannot be unregistered while it is still in use; that is, while any **DDSTopic** (p. 1617) is still referring to it.

If the type cannot be unregistered, this function will fail with **DDS\_RETCODE\_ERROR** (p. 336) or **DDS\_RETCODE\_↔BAD\_PARAMETER** (p. 336).

See also

**FooTypeSupport::unregister\_type** (p. 1714)

**DDSDynamicDataTypeSupport::register\_type** (p. 1459)

### 9.256.3.4 get\_type\_name()

```
const char * DDSDynamicDataTypeSupport::get_type_name ( ) const
```

Get the default name of this type.

The **DDS\_TypeCode** (p. 1164) that is wrapped by this **DDSDynamicDataTypeSupport** (p. 1456) includes a name; this operation returns that name.

This operation is useful when registering a type, because in most cases it is not necessary for the physical and logical names of the type to be different.

```
myTypeSupport->register_type(myParticipant, myTypeSupport->get_type_name());
```

See also

**FooTypeSupport::get\_type\_name** (p. 1720)

### 9.256.3.5 get\_data\_type()

```
const DDS_TypeCode * DDSDynamicDataTypeSupport::get_data_type ( ) const
```

Get the **DDS\_TypeCode** (p. 1164) wrapped by this **DDSDynamicDataTypeSupport** (p. 1456).

### 9.256.3.6 create\_data()

```
DDS_DynamicData * DDSDynamicDataTypeSupport::create_data ( )
```

Create a new **DDS\_DynamicData** (p. 775) sample initialized with the **DDS\_TypeCode** (p. 1164) and properties of this **DDSDynamicDataTypeSupport** (p. 1456).

You must delete your **DDS\_DynamicData** (p. 775) object when you are finished with it.

```
DDS_DynamicData* sample = myTypeSupport->create_data();
```

```
// Do something...
```

```
myTypeSupport->delete_data(sample);
```

See also

**DDSDynamicDataTypeSupport::delete\_data** (p. 1461)

**FooTypeSupport::create\_data** (p. 1715)

**DDS\_DynamicData::DDS\_DynamicData(const DDS\_TypeCode \*, const DDS\_DynamicDataProperty\_t &)**  
(p. 790)

**DDS\_DynamicDataTypeProperty\_t::data** (p. 897)

### 9.256.3.7 delete\_data()

```
DDS_ReturnCode_t DDSDynamicDataTypeSupport::delete_data (
    DDS_DynamicData * a_data )
```

Finalize and deallocate the **DDS\_DynamicData** (p. 775) sample.

See also

**FooTypeSupport::delete\_data** (p. 1716)

**DDSDynamicDataTypeSupport::create\_data** (p. 1460)

### 9.256.3.8 print\_data()

```
void DDSDynamicDataTypeSupport::print_data (
    const DDS_DynamicData * a_data ) const
```

Print a string representation of the given sample to the given file.

This method is equivalent to **DDS\_DynamicData::print** (p. 801).

See also

**DDS\_DynamicData::print** (p. 801)

### 9.256.3.9 copy\_data()

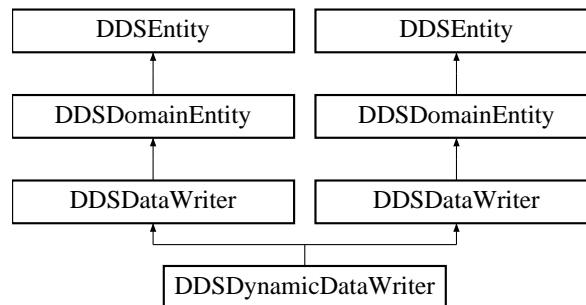
```
DDS_ReturnCode_t DDSDynamicDataTypeSupport::copy_data (
    DDS_DynamicData * dest,
    const DDS_DynamicData * source ) const
```

Deeply copy the given data samples.

## 9.257 DDSDynamicDataWriter Class Reference

Writes (publishes) objects of type **DDS\_DynamicData** (p. 775).

Inheritance diagram for DDSDynamicDataWriter:



### Additional Inherited Members

#### 9.257.1 Detailed Description

Writes (publishes) objects of type **DDS\_DynamicData** (p. 775).

Instantiates **DDSDataWriter** (p. 1321) < **DDS\_DynamicData** (p. 775) > .

See also

**DDSDataWriter** (p. 1321)

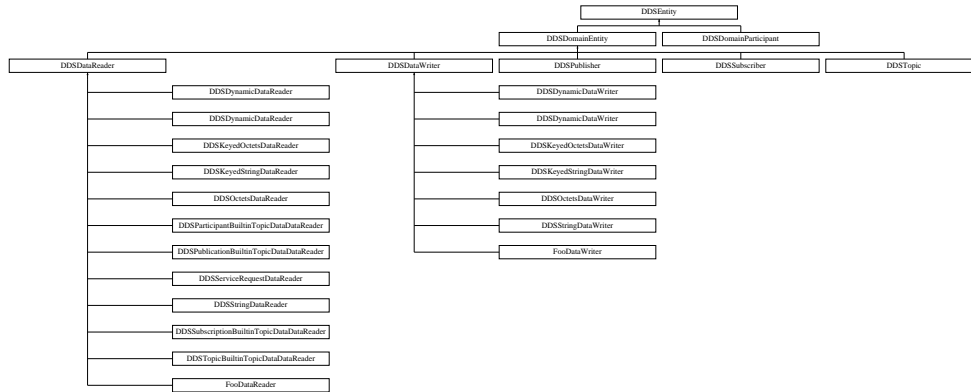
**FooDataWriter** (p. 1676)

**DDS\_DynamicData** (p. 775)

## 9.258 DDSEntity Class Reference

<<*interface*>> (p. 237) Abstract base class for all the DDS objects that support QoS policies, a listener, and a status condition.

Inheritance diagram for DDSEntity:



### Public Member Functions

- virtual **DDS\_ReturnCode\_t enable** ()=0  
*Enables the **DDSEntity** (p. 1463).*
- virtual **DDSStatusCondition \* get\_statuscondition** ()=0  
*Allows access to the **DDSStatusCondition** (p. 1578) associated with the **DDSEntity** (p. 1463).*
- virtual **DDS\_StatusMask get\_status\_changes** ()=0  
*Retrieves the list of communication statuses in the **DDSEntity** (p. 1463) that are triggered.*
- virtual **DDS\_InstanceHandle\_t get\_instance\_handle** ()=0  
*Allows access to the **DDS\_InstanceHandle\_t** (p. 74) associated with the **DDSEntity** (p. 1463).*

### 9.258.1 Detailed Description

<<*interface*>> (p. 237) Abstract base class for all the DDS objects that support QoS policies, a listener, and a status condition.

All operations except for `set_qos()`, `get_qos()`, `set_listener()`, `get_listener()` and **enable()** (p. 1466), may return the value **DDS\_RETCODE\_NOT\_ENABLED** (p. 337).

QoS:

**QoS Policies** (p. 353)

Status:

**Status Kinds** (p. 337)

Listener:

**DDSListener** (p. 1526)

## 9.258.2 Abstract operations

Each derived entity provides the following operations specific to its role in RTI Connex.

### 9.258.2.1 `set_qos` (abstract)

This operation sets the QoS policies of the **DDSEntity** (p.1463). Each of the derived entity classes provides this operation: **DDSEntity** (p.1463) classes (**DDSDomainParticipant** (p.1351), **DDSTopic** (p.1617), **DDSPublisher** (p.1550), **DDSDataWriter** (p.1321), **DDSSubscriber** (p.1592), and **DDSDataReader** (p.1288)) so that the policies that are meaningful to each **DDSEntity** (p.1463) can be set. For example, see **DDSDomainParticipant::set\_qos** (p.1408).

#### Precondition

Certain policies are immutable (see **QoS Policies** (p.353)): they can only be set at **DDSEntity** (p.1463) creation time or before the entity is enabled. If `set_qos()` is invoked after the **DDSEntity** (p.1463) is enabled and it attempts to change the value of an immutable policy, the operation will fail and return **DDS\_RETCODE\_IMMUTABLE\_POLICY** (p.337).

Certain values of QoS policies can be incompatible with the settings of the other policies. The `set_qos()` operation will also fail if it specifies a set of values that, once combined with the existing values, would result in an inconsistent set of policies. In this case, the operation will fail and return **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p.337).

If the application supplies a non-default value for a QoS policy that is not supported by the implementation of the service, the `set_qos` operation will fail and return **DDS\_RETCODE\_UNSUPPORTED** (p.336).

#### Postcondition

The existing set of policies is only changed if the `set_qos()` operation succeeds. This is indicated by a return code of **DDS\_RETCODE\_OK** (p.336). In all other cases, none of the policies are modified.

Each derived **DDSEntity** (p.1463) class (**DDSDomainParticipant** (p.1351), **DDSTopic** (p.1617), **DDSPublisher** (p.1550), **DDSDataWriter** (p.1321), **DDSSubscriber** (p.1592), **DDSDataReader** (p.1288)) has a corresponding special value of the QoS (**DDS\_PARTICIPANT\_QOS\_DEFAULT** (p.48), **DDS\_PUBLISHER\_QOS\_DEFAULT** (p.57), **DDS\_SUBSCRIBER\_QOS\_DEFAULT** (p.57), **DDS\_TOPIC\_QOS\_DEFAULT** (p.56), **DDS\_DATAWRITER\_QOS\_DEFAULT** (p.110), **DDS\_DATAREADER\_QOS\_DEFAULT** (p.132)). This special value may be used as a parameter to the `set_qos` operation to indicate that the QoS of the **DDSEntity** (p.1463) should be changed to match the current default QoS set in the **DDSEntity** (p.1463)'s factory. The operation `set_qos` cannot modify the immutable QoS, so a successful return of the operation indicates that the mutable QoS for the Entity has been modified to match the current default for the **DDSEntity** (p.1463)'s factory.

The set of policies specified in the `qos` parameter are applied on top of the existing QoS, replacing the values of any policies previously set.

Possible error codes returned in addition to **Standard Return Codes** (p.336) : **DDS\_RETCODE\_IMMUTABLE\_POLICY** (p.337), **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p.337).

### 9.258.2.2 get\_qos (abstract)

This operation allows access to the existing set of QoS policies for the **DDSEntity** (p. 1463). This operation must be provided by each of the derived **DDSEntity** (p. 1463) classes (**DDSDomainParticipant** (p. 1351), **DDSTopic** (p. 1617), **DDSPublisher** (p. 1550), **DDSDataWriter** (p. 1321), **DDSSubscriber** (p. 1592), and **DDSDataReader** (p. 1288)), so that the policies that are meaningful to each **DDSEntity** (p. 1463) can be retrieved. For example, see **DDSDomainParticipant::get\_qos** (p. 1409)

Possible error codes are **Standard Return Codes** (p. 336).

### 9.258.2.3 set\_listener (abstract)

This operation installs a **DDSListener** (p. 1526) on the **DDSEntity** (p. 1463). The listener will only be invoked on the changes of communication status indicated by the specified `mask`.

This operation must be provided by each of the derived **DDSEntity** (p. 1463) classes (**DDSDomainParticipant** (p. 1351), **DDSTopic** (p. 1617), **DDSPublisher** (p. 1550), **DDSDataWriter** (p. 1321), **DDSSubscriber** (p. 1592), and **DDSDataReader** (p. 1288)), so that the listener is of the concrete type suitable to the particular **DDSEntity** (p. 1463).

There are two components involved when setting up listeners: the listener itself and the mask. Both of these can be NULL.

Listeners for some Entities derive from the Connex DDS Listeners for related Entities. This means that the derived Listener has all of the methods of its parent class. You can install Listeners at all levels of the object hierarchy. At the top is the DomainParticipantListener; only one can be installed in a DomainParticipant. Then every Subscriber and Publisher can have their own Listener. Finally, each Topic, DataReader and DataWriter can have their own listeners. All are optional.

Suppose, however, that an Entity does not install a Listener, or installs a Listener that does not have particular communication status selected in the bitmask. In this case, if/when that particular status changes for that Entity, the corresponding Listener for that Entity's parent is called. Status changes are "propagated" from child Entity to parent Entity until a Listener is found that is registered for that status. Connex DDS will give up and drop the status-change event only if no Listeners have been installed in the object hierarchy to be called back for the specific status.

The following table describes the effect of different combinations of Listeners and Status Bit Masks considering the hierarchical processing.

**Table 9.672 Effect of Different Combinations of Listeners and Status Bit Masks**

	No Bits Set in Mask	Some/All Bits Set in Mask
Listener is Specified	Connex DDS finds the next most relevant listener for the changed status	For the statuses that are enabled in the mask, the most relevant listener will be called. The 'statusChangedFlag' for the relevant status is reset
Listener is NULL	Connex DDS behaves as if the listener is not installed and finds the next most relevant listener for that status	Connex DDS behaves as if the listener is installed, but the callback is doing nothing. This is called a "nil" listener

**Postcondition**

Only one listener can be attached to each **DDSEntity** (p. 1463). If a listener was already set, the operation `set_listener()` will replace it with the new one. Consequently, if the value NULL is passed for the listener parameter to the `set_listener` operation, any existing listener will be removed.

**9.258.2.4 get\_listener (abstract)**

This operation allows access to the existing **DDSListener** (p. 1526) attached to the **DDSEntity** (p. 1463).

This operation must be provided by each of the derived **DDSEntity** (p. 1463) classes (**DDSDomainParticipant** (p. 1351), **DDSTopic** (p. 1617), **DDSPublisher** (p. 1550), **DDSDataWriter** (p. 1321), **DDSSubscriber** (p. 1592), and **DDSDataReader** (p. 1288)) so that the listener is of the concrete type suitable to the particular **DDSEntity** (p. 1463).

If no listener is installed on the **DDSEntity** (p. 1463), this operation will return NULL.

**9.258.3 Member Function Documentation****9.258.3.1 enable()**

```
virtual DDS_ReturnCode_t DDSEntity::enable ( ) [pure virtual]
```

Enables the **DDSEntity** (p. 1463).

This operation enables the Entity. Entity objects can be created either enabled or disabled. This is controlled by the value of the **ENTITY\_FACTORY** (p. 402) QoS policy on the corresponding factory for the **DDSEntity** (p. 1463).

By default, **ENTITY\_FACTORY** (p. 402) is set so that it is not necessary to explicitly call **DDSEntity::enable** (p. 1466) on newly created entities.

The **DDSEntity::enable** (p. 1466) operation is idempotent. Calling enable on an already enabled Entity returns OK and has no effect.

If a **DDSEntity** (p. 1463) has not yet been enabled, the following kinds of operations may be invoked on it:

- set or get the QoS policies (including default QoS policies) and listener
- **DDSEntity::get\_statuscondition** (p. 1467)
- 'factory' operations
- **DDSEntity::get\_status\_changes** (p. 1467) and other get status operations (although the status of a disabled entity never changes)
- 'lookup' operations



Other operations may explicitly state that they may be called on disabled entities; those that do not will return the error **DDS\_RETCODE\_NOT\_ENABLED** (p. 337).

It is legal to delete an **DDSEntity** (p. 1463) that has not been enabled by calling the proper operation on its factory .

Entities created from a factory Entity that is disabled are created disabled, regardless of the setting of the **DDS\_EntityFactoryQosPolicy** (p. 903).

Calling `enable` on an Entity whose factory Entity is not enabled will fail and return **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

If **DDS\_EntityFactoryQosPolicy::autoenable\_created\_entities** (p. 905) is TRUE, the `enable` operation on a factory will automatically enable all entities created from that factory (for example, enabling a **DDSPublisher** (p. 1550) will enable all its contained **DDSDataWriter** (p. 1321) objects)

Listeners associated with an entity are not called until the entity is enabled.

Conditions associated with a disabled entity are "inactive," that is, they have a `trigger_value == FALSE`.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--

Implemented in **DDSDataWriter** (p. 1342), and **DDSDataReader** (p. 1312).

### 9.258.3.2 `get_statuscondition()`

```
virtual DDSStatusCondition * DDSEntity::get_statuscondition ( ) [pure virtual]
```

Allows access to the **DDSStatusCondition** (p. 1578) associated with the **DDSEntity** (p. 1463).

The returned condition can then be added to a **DDSWaitSet** (p. 1629) so that the application can wait for specific status changes that affect the **DDSEntity** (p. 1463).

#### Returns

the status condition associated with this entity.

Implemented in **DDSDataWriter** (p. 1343), and **DDSDataReader** (p. 1313).

### 9.258.3.3 `get_status_changes()`

```
virtual DDS_StatusMask DDSEntity::get_status_changes ( ) [pure virtual]
```

Retrieves the list of communication statuses in the **DDSEntity** (p. 1463) that are triggered.

That is, the list of statuses whose value has changed since the last time the application read the status using the `get_*_status()` method.

When the entity is first created or if the entity is not enabled, all communication statuses are in the "untriggered" state so the list returned by the `get_status_changes` operation will be empty.

The list of statuses returned by the `get_status_changes` operation refers to the status that are triggered on the Entity itself and does not include statuses that apply to contained entities.

#### Returns

list of communication statuses in the **DDSEntity** (p. 1463) that are triggered.

#### See also

**Status Kinds** (p. 337)

Implemented in **DDSDataWriter** (p. 1343), and **DDSDataReader** (p. 1314).

### 9.258.3.4 `get_instance_handle()`

```
virtual DDS_InstanceHandle_t DDSEntity::get_instance_handle ( ) [pure virtual]
```

Allows access to the **DDS\_InstanceHandle\_t** (p. 74) associated with the **DDSEntity** (p. 1463).

This operation returns the **DDS\_InstanceHandle\_t** (p. 74) that represents the **DDSEntity** (p. 1463).

#### Returns

the instance handle associated with this entity.

Implemented in **DDSDataWriter** (p. 1343), and **DDSDataReader** (p. 1314).

## 9.259 DDSFlowController Class Reference

<<**interface**>> (p. 237) A flow controller is the object responsible for shaping the network traffic by determining when attached asynchronous **DDSDataWriter** (p. 1321) instances are allowed to write data.

## Public Member Functions

- virtual **DDS\_ReturnCode\_t set\_property** (const struct **DDS\_FlowControllerProperty\_t** &prop)=0  
*Sets the **DDSFlowController** (p. 1468) property.*
- virtual **DDS\_ReturnCode\_t get\_property** (struct **DDS\_FlowControllerProperty\_t** &prop)=0  
*Gets the **DDSFlowController** (p. 1468) property.*
- virtual **DDS\_ReturnCode\_t trigger\_flow** ()=0  
*Provides an external trigger to the **DDSFlowController** (p. 1468).*
- virtual const char \* **get\_name** ()=0  
*Returns the name of the **DDSFlowController** (p. 1468).*
- virtual **DDSDomainParticipant \* get\_participant** ()=0  
*Returns the **DDSDomainParticipant** (p. 1351) to which the **DDSFlowController** (p. 1468) belongs.*

### 9.259.1 Detailed Description

<<**interface**>> (p. 237) A flow controller is the object responsible for shaping the network traffic by determining when attached asynchronous **DDSDataWriter** (p. 1321) instances are allowed to write data.

QoS:

**DDS\_FlowControllerProperty\_t** (p. 912)

### 9.259.2 Member Function Documentation

#### 9.259.2.1 set\_property()

```
virtual DDS_ReturnCode_t DDSFlowController::set_property (
    const struct DDS_FlowControllerProperty_t & prop ) [pure virtual]
```

Sets the **DDSFlowController** (p. 1468) property.

This operation modifies the property of the **DDSFlowController** (p. 1468).

Once a **DDSFlowController** (p. 1468) has been instantiated, only the **DDS\_FlowControllerProperty\_t::token\_bucket** (p. 913) can be changed. The **DDS\_FlowControllerProperty\_t::scheduling\_policy** (p. 913) is immutable.

A new **DDS\_FlowControllerTokenBucketProperty\_t::period** (p. 915) only takes effect at the next scheduled token distribution time (as determined by its previous value).

## Parameters

<i>prop</i>	<< <i>in</i> >> (p. 238) The new <b>DDS_FlowControllerProperty_t</b> (p. 912). Property must be consistent. Immutable fields cannot be changed after <b>DDSFlowController</b> (p. 1468) has been created. The special value <b>DDS_FLOW_CONTROLLER_PROPERTY_DEFAULT</b> (p. 58) can be used to indicate that the property of the <b>DDSFlowController</b> (p. 1468) should be changed to match the current default <b>DDS_FlowControllerProperty_t</b> (p. 912) set in the <b>DDSDomainParticipant</b> (p. 1351).
-------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337).
------------	---

## See also

**DDS\_FlowControllerProperty\_t** (p. 912) for rules on consistency among property values.

9.259.2.2 `get_property()`

```
virtual DDS_ReturnCode_t DDSFlowController::get_property (
    struct DDS_FlowControllerProperty_t & prop ) [pure virtual]
```

Gets the **DDSFlowController** (p. 1468) property.

## Parameters

<i>prop</i>	<< <i>in</i> >> (p. 238) <b>DDSFlowController</b> (p. 1468) to be filled in.
-------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

9.259.2.3 `trigger_flow()`

```
virtual DDS_ReturnCode_t DDSFlowController::trigger_flow ( ) [pure virtual]
```

Provides an external trigger to the **DDSFlowController** (p. 1468).

Typically, a **DDSFlowController** (p. 1468) uses an internal trigger to periodically replenish its tokens. The period by which this trigger is called is determined by the **DDS\_FlowControllerTokenBucketProperty\_t::period** (p. 915) property setting.

This function provides an additional, external trigger to the **DDSFlowController** (p. 1468). This trigger adds **DDS\_↔\_FlowControllerTokenBucketProperty\_t::tokens\_added\_per\_period** (p. 915) tokens each time it is called (subject to the other property settings of the **DDSFlowController** (p. 1468)).

An *on-demand* **DDSFlowController** (p. 1468) can be created with a **DDS\_DURATION\_INFINITE** (p. 326) as **DDS\_↔\_FlowControllerTokenBucketProperty\_t::period** (p. 915), in which case the only trigger source is external (i.e. the FlowController is solely triggered by the user on demand).

**DDSFlowController::trigger\_flow** (p. 1470) can be called on both strict *on-demand* FlowController and hybrid Flow↔Controller (internally and externally triggered).

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

#### 9.259.2.4 get\_name()

```
virtual const char * DDSFlowController::get_name ( ) [pure virtual]
```

Returns the name of the **DDSFlowController** (p. 1468).

#### Returns

The name of the **DDSFlowController** (p. 1468).

#### 9.259.2.5 get\_participant()

```
virtual DDSDomainParticipant * DDSFlowController::get_participant ( ) [pure virtual]
```

Returns the **DDSDomainParticipant** (p. 1351) to which the **DDSFlowController** (p. 1468) belongs.

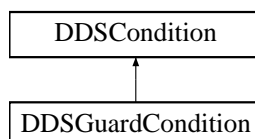
#### Returns

The **DDSDomainParticipant** (p. 1351) to which the **DDSFlowController** (p. 1468) belongs.

## 9.260 DDSGuardCondition Class Reference

<<**interface**>> (p. 237) A specific **DDSCondition** (p. 1276) whose `trigger_value` is completely under the control of the application.

Inheritance diagram for DDSGuardCondition:



## Public Member Functions

- virtual **DDS\_Boolean** `get_trigger_value` ()  
*Retrieve the `trigger_value`.*
- virtual **DDS\_ReturnCode\_t** `set_trigger_value` ( **DDS\_Boolean** value)  
*Set the guard condition trigger value.*
- **DDSGuardCondition** ()  
*No argument constructor.*
- virtual `~DDSGuardCondition` ()  
*Destructor.*

### 9.260.1 Detailed Description

<<*interface*>> (p. 237) A specific **DDSCondition** (p. 1276) whose `trigger_value` is completely under the control of the application.

The **DDSGuardCondition** (p. 1471) provides a way for an application to manually wake up a **DDSWaitSet** (p. 1629). This is accomplished by attaching the **DDSGuardCondition** (p. 1471) to the **DDSWaitSet** (p. 1629) and then setting the `trigger_value` by means of the **DDSGuardCondition::set\_trigger\_value** (p. 1473) operation.

See also

**DDSWaitSet** (p. 1629)

### 9.260.2 Constructor & Destructor Documentation

#### 9.260.2.1 DDSGuardCondition()

```
DDSGuardCondition::DDSGuardCondition ( )
```

No argument constructor.

The default constructor initializes the guard condition with trigger value **DDS\_BOOLEAN\_FALSE** (p. 317)

#### 9.260.2.2 ~DDSGuardCondition()

```
virtual DDSGuardCondition::~~DDSGuardCondition ( ) [virtual]
```

Destructor.

Releases the resources associated with this object.

MT Safety:

UNSAFE. In VxWorks, it is unsafe to call this method while another thread may be simultaneously calling **DDSDomainParticipantFactory::get\_instance** (p. 1429), **DDSDomainParticipantFactory::finalize\_instance** (p. 1429), **DDS\_TypeCodeFactory::get\_instance** (p. 1212), **DDSGuardCondition::DDSGuardCondition** (p. 1472), **DDSWaitSet::DDSWaitSet**() (p. 1633), **DDSWaitSet::DDSWaitSet(const DDS\_WaitSetProperty\_< t&)** (p. 1633), **DDSGuardCondition::~~DDSGuardCondition** (p. 1472), **DDSWaitSet::~~DDSWaitSet**() (p. 1632), **NDDUtilityNetworkCapture::enable** (p. 1847), or **NDDUtilityNetworkCapture::disable** (p. 1848).

Deleting a NULL condition is safe and has no effect.

### 9.260.3 Member Function Documentation

#### 9.260.3.1 get\_trigger\_value()

```
virtual DDS_Boolean DDSGuardCondition::get_trigger_value ( ) [virtual]
```

Retrieve the `trigger_value`.

#### Returns

the trigger value.

Implements **DDSCondition** (p. 1277).

#### 9.260.3.2 set\_trigger\_value()

```
virtual DDS_ReturnCode_t DDSGuardCondition::set_trigger_value (
    DDS_Boolean value ) [virtual]
```

Set the guard condition trigger value.

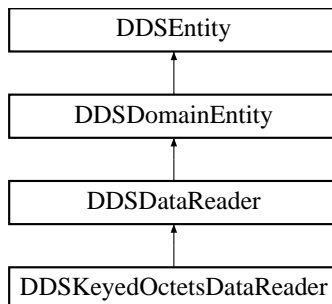
#### Parameters

<i>value</i>	<< <i>in</i> >> (p. 238) the new trigger value.
--------------	---

## 9.261 DDSKeyedOctetsDataReader Class Reference

<<*interface*>> (p. 237) Instantiates `DataReader` < **DDS\_KeyedOctets** (p. 924) >.

Inheritance diagram for `DDSKeyedOctetsDataReader`:



## Public Member Functions

- virtual `DDS_ReturnCode_t read ( DDS_KeyedOctetsSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data samples from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t take ( DDS_KeyedOctetsSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data-samples from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t read_w_condition ( DDS_KeyedOctetsSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples, DDSReadCondition *condition)`  
*Accesses via `DDSKeyedOctetsDataReader::read` (p. 1476) the samples that match the criteria specified in the `DDSReadCondition` (p. 1574).*
- virtual `DDS_ReturnCode_t take_w_condition ( DDS_KeyedOctetsSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples, DDSReadCondition *condition)`  
*Analogous to `DDSKeyedOctetsDataReader::read_w_condition` (p. 1476) except it accesses samples via the `DDSKeyedOctetsDataReader::take` (p. 1476) operation.*
- virtual `DDS_ReturnCode_t read_next_sample ( DDS_KeyedOctets &received_data, DDS_SampleInfo &sample_info)`  
*Copies the next not-previously-accessed data value from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t take_next_sample ( DDS_KeyedOctets &received_data, DDS_SampleInfo &sample_info)`  
*Copies the next not-previously-accessed data value from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t read_instance ( DDS_KeyedOctetsSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &a_handle= DDS_HANDLE_NIL, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data samples from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t take_instance ( DDS_KeyedOctetsSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &a_handle= DDS_HANDLE_NIL, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data samples from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t read_instance_w_condition ( DDS_KeyedOctetsSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &a_handle= DDS_HANDLE_NIL, DDSReadCondition *condition=NULL)`  
*Accesses via `DDSKeyedOctetsDataReader::read_instance` (p. 1477) the samples that match the criteria specified in the `DDSReadCondition` (p. 1574).*
- virtual `DDS_ReturnCode_t take_instance_w_condition ( DDS_KeyedOctetsSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &a_handle= DDS_HANDLE_NIL, DDSReadCondition *condition=NULL)`  
*Accesses via `DDSKeyedOctetsDataReader::take_instance` (p. 1478) the samples that match the criteria specified in the `DDSReadCondition` (p. 1574).*
- virtual `DDS_ReturnCode_t read_next_instance ( DDS_KeyedOctetsSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &previous_handle= DDS_HANDLE_NIL, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`



Access a collection of data samples from the *DDSDataReader* (p. 1288).

- virtual **DDS\_ReturnCode\_t** **take\_next\_instance** ( **DDS\_KeyedOctetsSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples= **DDS\_LENGTH\_UNLIMITED**, const **DDS\_InstanceHandle\_t** &previous\_handle= **DDS\_HANDLE\_NIL**, **DDS\_SampleStateMask** sample\_states= **DDS\_ANY\_SAMPLE\_STATE**, **DDS\_ViewStateMask** view\_states= **DDS\_ANY\_VIEW\_STATE**, **DDS\_InstanceStateMask** instance\_states= **DDS\_ANY\_INSTANCE\_STATE**)

Access a collection of data samples from the *DDSDataReader* (p. 1288).

- virtual **DDS\_ReturnCode\_t** **read\_next\_instance\_w\_condition** ( **DDS\_KeyedOctetsSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples= **DDS\_LENGTH\_UNLIMITED**, const **DDS\_InstanceHandle\_t** &previous\_handle= **DDS\_HANDLE\_NIL**, **DDSReadCondition** \*condition=NULL)

Accesses via *DDSKeyedOctetsDataReader::read\_next\_instance* (p. 1479) the samples that match the criteria specified in the *DDSReadCondition* (p. 1574).

- virtual **DDS\_ReturnCode\_t** **take\_next\_instance\_w\_condition** ( **DDS\_KeyedOctetsSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples= **DDS\_LENGTH\_UNLIMITED**, const **DDS\_InstanceHandle\_t** &previous\_handle= **DDS\_HANDLE\_NIL**, **DDSReadCondition** \*condition=NULL)

Accesses via *DDSKeyedOctetsDataReader::take\_next\_instance* (p. 1479) the samples that match the criteria specified in the *DDSReadCondition* (p. 1574).

- virtual **DDS\_ReturnCode\_t** **return\_loan** ( **DDS\_KeyedOctetsSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq)

Indicates to the *DDSDataReader* (p. 1288) that the application is done accessing the collection of *received\_data* and *info\_seq* obtained by some earlier invocation of *read* or *take* on the *DDSDataReader* (p. 1288).

- virtual **DDS\_ReturnCode\_t** **get\_key\_value** ( **DDS\_KeyedOctets** &key\_holder, const **DDS\_InstanceHandle\_t** &handle)

Retrieve the instance *key* that corresponds to an instance *handle*.

- virtual **DDS\_ReturnCode\_t** **get\_key\_value** (char \*key, const **DDS\_InstanceHandle\_t** &handle)

<<extension>> (p. 237) Retrieve the instance *key* that corresponds to an instance *handle*.

- virtual **DDS\_InstanceHandle\_t** **lookup\_instance** (const **DDS\_KeyedOctets** &key\_holder)

Retrieve the instance *handle* that corresponds to an instance *key\_holder*.

- virtual **DDS\_InstanceHandle\_t** **lookup\_instance** (const char \*key)

<<extension>> (p. 237) Retrieve the instance *handle* that corresponds to an instance *key*.

## Static Public Member Functions

- static **DDSKeyedOctetsDataReader** \* **narrow** ( **DDSDataReader** \*reader)

Narrow the given *DDSDataReader* (p. 1288) pointer to a *DDSKeyedOctetsDataReader* (p. 1473) pointer.

### 9.261.1 Detailed Description

<<*interface*>> (p. 237) Instantiates *DataReader* < **DDS\_KeyedOctets** (p. 924) >.

When reading or taking data with this reader, if you request a copy of the samples instead of a loan, and a string or byte array in a destination data sample is NULL, the middleware will allocate a new string or array for you of sufficient length to hold the received data. New strings will be allocated with **DDS\_String\_alloc** (p. 553); new arrays will be allocated with **DDS\_OcletBuffer\_alloc** (p. 548). The sample's destructor will delete them.

A non- NULL string or array is assumed to be allocated to sufficient length to store the incoming data. It will not be reallocated.

See also

**FooDataReader** (p. 1649)

**DDSDataReader** (p. 1288)

## 9.261.2 Member Function Documentation

### 9.261.2.1 read()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::read (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::read** (p. 1651)

### 9.261.2.2 take()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::take (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data-samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::take** (p. 1652)

### 9.261.2.3 read\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::read_w_condition (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [virtual]
```

Accesses via **DDSKeyedOctetsDataReader::read** (p. 1476) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::read\_w\_condition** (p. 1657)

#### 9.261.2.4 take\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::take_w_condition (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [virtual]
```

Analogous to **DDSKeyedOctetsDataReader::read\_w\_condition** (p.1476) except it accesses samples via the **DDSKeyedOctetsDataReader::take** (p.1476) operation.

See also

**FooDataReader::take\_w\_condition** (p.1658)

#### 9.261.2.5 read\_next\_sample()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::read_next_sample (
    DDS_KeyedOctets & received_data,
    DDS_SampleInfo & sample_info ) [virtual]
```

Copies the next not-previously-accessed data value from the **DDSDDataReader** (p.1288).

See also

**FooDataReader::read\_next\_sample** (p.1659)

#### 9.261.2.6 take\_next\_sample()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::take_next_sample (
    DDS_KeyedOctets & received_data,
    DDS_SampleInfo & sample_info ) [virtual]
```

Copies the next not-previously-accessed data value from the **DDSDDataReader** (p.1288).

See also

**FooDataReader::take\_next\_sample** (p.1660)

### 9.261.2.7 read\_instance()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::read_instance (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & a_handle = DDS_HANDLE_NIL,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::read\_instance** (p. 1661)

### 9.261.2.8 take\_instance()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::take_instance (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & a_handle = DDS_HANDLE_NIL,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::take\_instance** (p. 1663)

### 9.261.2.9 read\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::read_instance_w_condition (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & a_handle = DDS_HANDLE_NIL,
    DDSReadCondition * condition = NULL ) [virtual]
```

Accesses via **DDSKeyedOctetsDataReader::read\_instance** (p. 1477) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::read\_instance\_w\_condition** (p. 1664)

## 9.261.2.10 take\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::take_instance_w_condition (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & a_handle = DDS_HANDLE_NIL,
    DDSReadCondition * condition = NULL ) [virtual]
```

Accesses via `DDSKeyedOctetsDataReader::take_instance` (p. 1478) the samples that match the criteria specified in the `DDSReadCondition` (p. 1574).

See also

`FooDataReader::take_instance_w_condition` (p. 1665)

## 9.261.2.11 read\_next\_instance()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::read_next_instance (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & previous_handle = DDS_HANDLE_NIL,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the `DDSDataReader` (p. 1288).

See also

`FooDataReader::read_next_instance` (p. 1667)

## 9.261.2.12 take\_next\_instance()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::take_next_instance (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & previous_handle = DDS_HANDLE_NIL,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the `DDSDataReader` (p. 1288).

See also

`FooDataReader::take_next_instance` (p. 1668)

### 9.261.2.13 read\_next\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::read_next_instance_w_condition (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & previous_handle = DDS_HANDLE_NIL,
    DDSReadCondition * condition = NULL ) [virtual]
```

Accesses via **DDSKeyedOctetsDataReader::read\_next\_instance** (p. 1479) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::read\_next\_instance\_w\_condition** (p. 1670)

### 9.261.2.14 take\_next\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::take_next_instance_w_condition (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & previous_handle = DDS_HANDLE_NIL,
    DDSReadCondition * condition = NULL ) [virtual]
```

Accesses via **DDSKeyedOctetsDataReader::take\_next\_instance** (p. 1479) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::take\_next\_instance\_w\_condition** (p. 1671)

### 9.261.2.15 return\_loan()

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::return_loan (
    DDS_KeyedOctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq ) [virtual]
```

Indicates to the **DDSDataReader** (p. 1288) that the application is done accessing the collection of `received_data` and `info_seq` obtained by some earlier invocation of `read` or `take` on the **DDSDataReader** (p. 1288).

See also

**FooDataReader::return\_loan** (p. 1672)

### 9.261.2.16 get\_key\_value() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::get_key_value (
    DDS_KeyedOctets & key_holder,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Retrieve the instance `key` that corresponds to an instance handle.

See also

**FooDataReader::get\_key\_value** (p. 1673)

### 9.261.2.17 get\_key\_value() [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataReader::get_key_value (
    char * key,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<*extension*>> (p. 237) Retrieve the instance `key` that corresponds to an instance handle.

See also

**FooDataReader::get\_key\_value** (p. 1673)

### 9.261.2.18 lookup\_instance() [1/2]

```
virtual DDS_InstanceHandle_t DDSKeyedOctetsDataReader::lookup_instance (
    const DDS_KeyedOctets & key_holder ) [virtual]
```

Retrieve the instance `handle` that corresponds to an instance `key_holder`.

See also

**FooDataReader::lookup\_instance** (p. 1674)

### 9.261.2.19 lookup\_instance() [2/2]

```
virtual DDS_InstanceHandle_t DDSKeyedOctetsDataReader::lookup_instance (
    const char * key ) [virtual]
```

<<*extension*>> (p. 237) Retrieve the instance handle that corresponds to an instance key.

See also

**FooDataReader::lookup\_instance** (p. 1674)

### 9.261.2.20 narrow()

```
static DDSKeyedOctetsDataReader * DDSKeyedOctetsDataReader::narrow (
    DDSDataReader * reader ) [static]
```

Narrow the given **DDSDataReader** (p. 1288) pointer to a **DDSKeyedOctetsDataReader** (p. 1473) pointer.

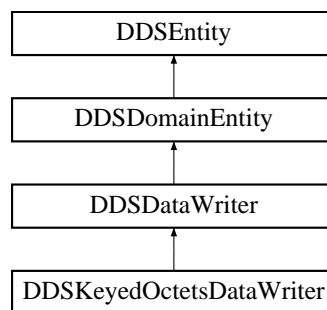
See also

**FooDataReader::narrow** (p. 1651)

## 9.262 DDSKeyedOctetsDataWriter Class Reference

<<*interface*>> (p. 237) Instantiates `DataWriter` < **DDS\_KeyedOctets** (p. 924) >.

Inheritance diagram for DDSKeyedOctetsDataWriter:





## Public Member Functions

- virtual **DDS\_InstanceHandle\_t register\_instance** (const **DDS\_KeyedOctets** &instance\_data)  
*Informs RTI Connexx that the application will be modifying a particular instance.*
- virtual **DDS\_InstanceHandle\_t register\_instance** (const char \*key)  
*<<extension>> (p. 237) Informs RTI Connexx that the application will be modifying a particular instance.*
- virtual **DDS\_InstanceHandle\_t register\_instance\_w\_timestamp** (const **DDS\_KeyedOctets** &instance\_data, const **DDS\_Time\_t** &source\_timestamp)  
*Performs the same functions as **DDSKeyedOctetsDataWriter::register\_instance** (p. 1485) except that the application provides the value for the *source\_timestamp*.*
- virtual **DDS\_InstanceHandle\_t register\_instance\_w\_timestamp** (const char \*key, const **DDS\_Time\_t** &source\_timestamp)  
*<<extension>> (p. 237) Performs the same functions as **DDSKeyedOctetsDataWriter::register\_instance** (p. 1485) except that the application provides the value for the *source\_timestamp*.*
- virtual **DDS\_ReturnCode\_t unregister\_instance** (const **DDS\_KeyedOctets** &instance\_data, const **DDS\_InstanceHandle\_t** &handle)  
*Reverses the action of **DDSKeyedOctetsDataWriter::register\_instance** (p. 1485).*
- virtual **DDS\_ReturnCode\_t unregister\_instance** (const char \*key, const **DDS\_InstanceHandle\_t** &handle)  
*<<extension>> (p. 237) Reverses the action of **DDSKeyedOctetsDataWriter::register\_instance** (p. 1485).*
- virtual **DDS\_ReturnCode\_t unregister\_instance\_w\_timestamp** (const **DDS\_KeyedOctets** &instance\_data, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*Performs the same function as **DDSKeyedOctetsDataWriter::unregister\_instance** (p. 1486) except that it also provides the value for the *source\_timestamp*.*
- virtual **DDS\_ReturnCode\_t unregister\_instance\_w\_timestamp** (const char \*key, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*Performs the same function as **DDSKeyedOctetsDataWriter::unregister\_instance** (p. 1486) except that it also provides the value for the *source\_timestamp*.*
- virtual **DDS\_KeyedOctets \* create\_data** (const **DDS\_TypeAllocationParams\_t** &alloc\_params)  
*Creates a keyed octet sequence.*
- virtual **DDS\_Boolean delete\_data** (**DDS\_KeyedOctets** \*sample, const **DDS\_TypeDeallocationParams\_t** &dealloc\_params)  
*Destroys a string data instance created by **DDSStringDataWriter::create\_data** (p. 1585).*
- virtual **DDS\_ReturnCode\_t write** (const **DDS\_KeyedOctets** &instance\_data, const **DDS\_InstanceHandle\_t** &handle)  
*Modifies the value of a **DDS\_KeyedOctets** (p. 924) data instance.*
- virtual **DDS\_ReturnCode\_t write** (const char \*key, const unsigned char \*octets, int length, const **DDS\_InstanceHandle\_t** &handle)  
*<<extension>> (p. 237) Modifies the value of a **DDS\_KeyedOctets** (p. 924) data instance.*
- virtual **DDS\_ReturnCode\_t write** (const char \*key, const **DDS\_OctetSeq** &octets, const **DDS\_InstanceHandle\_t** &handle)  
*<<extension>> (p. 237) Modifies the value of a **DDS\_KeyedOctets** (p. 924) data instance.*
- virtual **DDS\_ReturnCode\_t write\_w\_timestamp** (const **DDS\_KeyedOctets** &instance\_data, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also provides the value for the *source\_timestamp*.*
- virtual **DDS\_ReturnCode\_t write\_w\_timestamp** (const char \*key, const unsigned char \*octets, int length, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also provides the value for the *source\_timestamp*.*

- virtual **DDS\_ReturnCode\_t write\_w\_timestamp** (const char \*key, const **DDS\_OctetSeq** &octets, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)
 

*Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also provides the value for the `source_timestamp`.*
- virtual **DDS\_ReturnCode\_t write\_w\_params** (const **DDS\_KeyedOctets** &instance\_data, **DDS\_WriteParams\_t** &params)
 

*Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.*
- virtual **DDS\_ReturnCode\_t write\_w\_params** (const char \*key, const unsigned char \*octets, int length, **DDS\_WriteParams\_t** &params)
 

*Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.*
- virtual **DDS\_ReturnCode\_t write\_w\_params** (const char \*key, const **DDS\_OctetSeq** &octets, **DDS\_WriteParams\_t** &params)
 

*Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.*
- virtual **DDS\_ReturnCode\_t dispose** (const **DDS\_KeyedOctets** &instance\_data, const **DDS\_InstanceHandle\_t** &handle)
 

*Requests the middleware to delete the data.*
- virtual **DDS\_ReturnCode\_t dispose** (const char \*key, const **DDS\_InstanceHandle\_t** &instance\_handle)
 

*<<extension>> (p. 237) Requests the middleware to delete the data.*
- virtual **DDS\_ReturnCode\_t dispose\_w\_timestamp** (const **DDS\_KeyedOctets** &instance\_data, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)
 

*Performs the same functions as **DDSKeyedOctetsDataWriter::dispose** (p. 1493) except that the application provides the value for the `source_timestamp` that is made available to **DDSDataReader** (p. 1288) objects by means of the `source_timestamp` attribute inside the **DDS\_SampleInfo** (p. 1082).*
- virtual **DDS\_ReturnCode\_t dispose\_w\_timestamp** (const char \*key, const **DDS\_InstanceHandle\_t** &instance\_handle, const **DDS\_Time\_t** &source\_timestamp)
 

*<<extension>> (p. 237) Performs the same functions as **DDSKeyedOctetsDataWriter::dispose** (p. 1493) except that the application provides the value for the `source_timestamp` that is made available to **DDSDataReader** (p. 1288) objects by means of the `source_timestamp` attribute inside the **DDS\_SampleInfo** (p. 1082).*
- virtual **DDS\_ReturnCode\_t get\_key\_value** (**DDS\_KeyedOctets** &key\_holder, const **DDS\_InstanceHandle\_t** &handle)
 

*Retrieve the instance key that corresponds to an instance handle.*
- virtual **DDS\_ReturnCode\_t get\_key\_value** (char \*key, const **DDS\_InstanceHandle\_t** &handle)
 

*<<extension>> (p. 237) Retrieve the instance key that corresponds to an instance handle.*
- virtual **DDS\_InstanceHandle\_t lookup\_instance** (const **DDS\_KeyedOctets** &key\_holder)
 

*Retrieve the instance handle that corresponds to an instance key\_holder.*
- virtual **DDS\_InstanceHandle\_t lookup\_instance** (const char \*key)
 

*<<extension>> (p. 237) Retrieve the instance handle that corresponds to an instance key.*

## Static Public Member Functions

- static **DDSKeyedOctetsDataWriter \* narrow** (**DDSDataWriter** \*writer)
 

*Narrow the given **DDSDataWriter** (p. 1321) pointer to a **DDSKeyedOctetsDataWriter** (p. 1482) pointer.*

## 9.262.1 Detailed Description

<<*interface*>> (p. 237) Instantiates `DataWriter` < **DDS\_KeyedOctets** (p. 924) >.

See also

**FooDataWriter** (p. 1676)

**DDSDataWriter** (p. 1321)

## 9.262.2 Member Function Documentation

### 9.262.2.1 `narrow()`

```
static DDSKeyedOctetsDataWriter * DDSKeyedOctetsDataWriter::narrow (  
    DDSDataWriter * writer ) [static]
```

Narrow the given **DDSDataWriter** (p. 1321) pointer to a **DDSKeyedOctetsDataWriter** (p. 1482) pointer.

See also

**FooDataWriter::narrow** (p. 1678)

### 9.262.2.2 `register_instance()` [1/2]

```
virtual DDS_InstanceHandle_t DDSKeyedOctetsDataWriter::register_instance (  
    const DDS_KeyedOctets & instance_data ) [virtual]
```

Informs RTI Connexx that the application will be modifying a particular instance.

See also

**FooDataWriter::register\_instance** (p. 1678)

### 9.262.2.3 register\_instance() [2/2]

```
virtual DDS_InstanceHandle_t DDSKeyedOctetsDataWriter::register_instance (
    const char * key ) [virtual]
```

<<*extension*>> (p. 237) Informs RTI Connex that the application will be modifying a particular instance.

See also

**FooDataWriter::register\_instance** (p. 1678)

### 9.262.2.4 register\_instance\_w\_timestamp() [1/2]

```
virtual DDS_InstanceHandle_t DDSKeyedOctetsDataWriter::register_instance_w_timestamp (
    const DDS_KeyedOctets & instance_data,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same functions as **DDSKeyedOctetsDataWriter::register\_instance** (p. 1485) except that the application provides the value for the `source_timestamp`.

See also

**FooDataWriter::register\_instance\_w\_timestamp** (p. 1679)

### 9.262.2.5 register\_instance\_w\_timestamp() [2/2]

```
virtual DDS_InstanceHandle_t DDSKeyedOctetsDataWriter::register_instance_w_timestamp (
    const char * key,
    const DDS_Time_t & source_timestamp ) [virtual]
```

<<*extension*>> (p. 237) Performs the same functions as **DDSKeyedOctetsDataWriter::register\_instance** (p. 1485) except that the application provides the value for the `source_timestamp`.

See also

**FooDataWriter::register\_instance\_w\_timestamp** (p. 1679)

### 9.262.2.6 unregister\_instance() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::unregister_instance (
    const DDS_KeyedOctets & instance_data,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Reverses the action of `DDSKeyedOctetsDataWriter::register_instance` (p. 1485).

See also

`FooDataWriter::unregister_instance` (p. 1680)

### 9.262.2.7 unregister\_instance() [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::unregister_instance (
    const char * key,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<*extension*>> (p. 237) Reverses the action of `DDSKeyedOctetsDataWriter::register_instance` (p. 1485).

See also

`FooDataWriter::unregister_instance` (p. 1680)

### 9.262.2.8 unregister\_instance\_w\_timestamp() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::unregister_instance_w_timestamp (
    const DDS_KeyedOctets & instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same function as `DDSKeyedOctetsDataWriter::unregister_instance` (p. 1486) except that it also provides the value for the `source_timestamp`.

See also

`FooDataWriter::unregister_instance_w_timestamp` (p. 1682)

### 9.262.2.9 unregister\_instance\_w\_timestamp() [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::unregister_instance_w_timestamp (
    const char * key,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same function as `DDSKeyedOctetsDataWriter::unregister_instance` (p. 1486) except that it also provides the value for the `source_timestamp`.

See also

`FooDataWriter::unregister_instance_w_timestamp` (p. 1682)

### 9.262.2.10 create\_data()

```
virtual DDS_KeyedOctets * DDSKeyedOctetsDataWriter::create_data (
    const DDS_TypeAllocationParams_t & alloc_params ) [virtual]
```

Creates a keyed octet sequence.

The size of the instance is determined by the DataWriter property `dds.builtin_type.keyed_octets.alloc_size`.

Default size: `dds.builtin_type.keyed_octets.max_size` property of DomainParticipant if defined. Otherwise 2048.

Created instances must be deleted with `DDSKeyedOctetsDataWriter::delete_data` (p. 1488).

Returns

Newly created keyed octet sequence, or NULL on failure.

See also

BuiltinTypeMemoryManagement section of Built-in Types.

### 9.262.2.11 delete\_data()

```
virtual DDS_Boolean DDSKeyedOctetsDataWriter::delete_data (
    DDS_KeyedOctets * sample,
    const DDS_TypeDeallocationParams_t & dealloc_params ) [virtual]
```

Destroys a string data instance created by `DDSStringDataWriter::create_data` (p. 1585).

Returns

`DDS_BOOLEAN_TRUE` (p. 317) upon successful deletion.

**9.262.2.12 write()** [1/3]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::write (
    const DDS_KeyedOctets & instance_data,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Modifies the value of a **DDS\_KeyedOctets** (p. 924) data instance.

See also

**FooDataWriter::write** (p. 1683)

**9.262.2.13 write()** [2/3]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::write (
    const char * key,
    const unsigned char * octets,
    int length,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<**extension**>> (p. 237) Modifies the value of a **DDS\_KeyedOctets** (p. 924) data instance.

Parameters

<i>key</i>	<< <b>in</b> >> (p. 238) Instance key.
<i>octets</i>	<< <b>in</b> >> (p. 238) Array of octets to be published.
<i>length</i>	<< <b>in</b> >> (p. 238) Number of octets to be published.
<i>handle</i>	<< <b>in</b> >> (p. 238) Either the handle returned by a previous call to <b>DDSKeyedOctetsDataWriter::register_instance</b> (p. 1485), or else the special value <b>DDS_HANDLE_NIL</b> (p. 76). See <b>FooDataWriter::write</b> (p. 1683).

See also

**FooDataWriter::write** (p. 1683)

**9.262.2.14 write()** [3/3]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::write (
    const char * key,
    const DDS_OctetSeq & octets,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<**extension**>> (p. 237) Modifies the value of a **DDS\_KeyedOctets** (p. 924) data instance.

## Parameters

<i>key</i>	<< <i>in</i> >> (p. 238) Instance key.
<i>octets</i>	<< <i>in</i> >> (p. 238) Sequence of octets to be published.
<i>handle</i>	<< <i>in</i> >> (p. 238) Either the handle returned by a previous call to <b>DDSKeyedOctetsDataWriter::register_instance</b> (p. 1485), or else the special value <b>DDS_HANDLE_NIL</b> (p. 76). See <b>FooDataWriter::write</b> (p. 1683).

## See also

**FooDataWriter::write** (p. 1683)

## 9.262.2.15 write\_w\_timestamp() [1/3]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::write_w_timestamp (
    const DDS_KeyedOctets & instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also provides the value for the `source_timestamp`.

## See also

**FooDataWriter::write\_w\_timestamp** (p. 1687)

## 9.262.2.16 write\_w\_timestamp() [2/3]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::write_w_timestamp (
    const char * key,
    const unsigned char * octets,
    int length,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also provides the value for the `source_timestamp`.

## Parameters

<i>key</i>	<< <i>in</i> >> (p. 238) Instance key.
<i>octets</i>	<< <i>in</i> >> (p. 238) Array of octets to be published.
<i>length</i>	<< <i>in</i> >> (p. 238) Number of octets to be published.
<i>handle</i>	<< <i>in</i> >> (p. 238) Either the handle returned by a previous call to <b>DDSKeyedOctetsDataWriter::register_instance</b> (p. 1485), or else the special value <b>DDS_HANDLE_NIL</b> (p. 76). See <b>FooDataWriter::write</b> (p. 1683).
<i>source_timestamp</i>	<< <i>in</i> >> (p. 238) The timestamp value must be greater than or equal to the timestamp value used in the last writer operation. See <b>FooDataWriter::write_w_timestamp</b> (p. 1687).



See also

**FooDataWriter::write** (p. 1683)

### 9.262.2.17 write\_w\_timestamp() [3/3]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::write_w_timestamp (
    const char * key,
    const DDS_OctetSeq & octets,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also provides the value for the `source_timestamp`.

#### Parameters

<i>key</i>	<< <i>in</i> >> (p. 238) Instance key.
<i>octets</i>	<< <i>in</i> >> (p. 238) Sequence of octets to be published.
<i>handle</i>	<< <i>in</i> >> (p. 238) Either the handle returned by a previous call to <b>DDSKeyedOctetsDataWriter::register_instance</b> (p. 1485), or else the special value <b>DDS_HANDLE_NIL</b> (p. 76). See <b>FooDataWriter::write</b> (p. 1683).
<i>source_timestamp</i>	<< <i>in</i> >> (p. 238) The timestamp value must be greater than or equal to the timestamp value used in the last writer operation. See <b>FooDataWriter::write_w_timestamp</b> (p. 1687).

See also

**FooDataWriter::write** (p. 1683)

### 9.262.2.18 write\_w\_params() [1/3]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::write_w_params (
    const DDS_KeyedOctets & instance_data,
    DDS_WriteParams_t & params ) [virtual]
```

Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.

See also

**FooDataWriter::write\_w\_params** (p. 1688)

**9.262.2.19 write\_w\_params()** [2/3]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::write_w_params (
    const char * key,
    const unsigned char * octets,
    int length,
    DDS_WriteParams_t & params ) [virtual]
```

Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.

**Parameters**

<i>key</i>	<< <i>in</i> >> (p. 238) Instance key.
<i>octets</i>	<< <i>in</i> >> (p. 238) Array of octets to be published.
<i>length</i>	<< <i>in</i> >> (p. 238) Number of octets to be published.
<i>params</i>	<< <i>in</i> >> (p. 238) The <b>DDS_WriteParams_t</b> (p. 1251) parameter containing the instance handle, source timestamp, publication priority, and cookie to be used in write operation. See <b>FooDataWriter::write_w_params</b> (p. 1688).

**See also**

**FooDataWriter::write\_w\_params** (p. 1688)

**9.262.2.20 write\_w\_params()** [3/3]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::write_w_params (
    const char * key,
    const DDS_OctetSeq & octets,
    DDS_WriteParams_t & params ) [virtual]
```

Performs the same function as **DDSKeyedOctetsDataWriter::write** (p. 1488) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.

**Parameters**

<i>key</i>	<< <i>in</i> >> (p. 238) Instance key.
<i>octets</i>	<< <i>in</i> >> (p. 238) Sequence of octets to be published.
<i>params</i>	<< <i>in</i> >> (p. 238) The <b>DDS_WriteParams_t</b> (p. 1251) parameter containing the instance handle, source timestamp, publication priority, and cookie to be used in write operation. See <b>FooDataWriter::write_w_params</b> (p. 1688).

**See also**

**FooDataWriter::write\_w\_params** (p. 1688)

### 9.262.2.21 dispose() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::dispose (
    const DDS_KeyedOctets & instance_data,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Requests the middleware to delete the data.

See also

**FooDataWriter::dispose** (p. 1689)

### 9.262.2.22 dispose() [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::dispose (
    const char * key,
    const DDS_InstanceHandle_t & instance_handle ) [virtual]
```

<<*extension*>> (p. 237) Requests the middleware to delete the data.

See also

**FooDataWriter::dispose** (p. 1689)

### 9.262.2.23 dispose\_w\_timestamp() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::dispose_w_timestamp (
    const DDS_KeyedOctets & instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same functions as **DDSKeyedOctetsDataWriter::dispose** (p. 1493) except that the application provides the value for the `source_timestamp` that is made available to **DDSDataReader** (p. 1288) objects by means of the `source_timestamp` attribute inside the **DDS\_SampleInfo** (p. 1082).

See also

**FooDataWriter::dispose\_w\_timestamp** (p. 1690)

### 9.262.2.24 `dispose_w_timestamp()` [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::dispose_w_timestamp (
    const char * key,
    const DDS_InstanceHandle_t & instance_handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

<<*extension*>> (p. 237) Performs the same functions as `DDSKeyedOctetsDataWriter::dispose` (p. 1493) except that the application provides the value for the `source_timestamp` that is made available to `DDSDataReader` (p. 1288) objects by means of the `source_timestamp` attribute inside the `DDS_SampleInfo` (p. 1082).

See also

`FooDataWriter::dispose_w_timestamp` (p. 1690)

### 9.262.2.25 `get_key_value()` [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::get_key_value (
    DDS_KeyedOctets & key_holder,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Retrieve the instance key that corresponds to an instance handle.

See also

`FooDataWriter::get_key_value` (p. 1691)

### 9.262.2.26 `get_key_value()` [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedOctetsDataWriter::get_key_value (
    char * key,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<*extension*>> (p. 237) Retrieve the instance key that corresponds to an instance handle.

See also

`FooDataWriter::get_key_value` (p. 1691)

### 9.262.2.27 lookup\_instance() [1/2]

```
virtual DDS_InstanceHandle_t DDSKeyedOctetsDataWriter::lookup_instance (
    const DDS_KeyedOctets & key_holder ) [virtual]
```

Retrieve the instance handle that corresponds to an instance key\_holder.

See also

**FooDataWriter::lookup\_instance** (p. 1692)

### 9.262.2.28 lookup\_instance() [2/2]

```
virtual DDS_InstanceHandle_t DDSKeyedOctetsDataWriter::lookup_instance (
    const char * key ) [virtual]
```

<<*extension*>> (p. 237) Retrieve the instance handle that corresponds to an instance key.

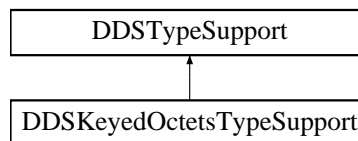
See also

**FooDataWriter::lookup\_instance** (p. 1692)

## 9.263 DDSKeyedOctetsTypeSupport Class Reference

<<*interface*>> (p. 237) **DDS\_KeyedOctets** (p. 924) type support.

Inheritance diagram for DDSKeyedOctetsTypeSupport:



## Static Public Member Functions

- static `DDS_ReturnCode_t register_type ( DDSDomainParticipant *participant, const char *type_name="DDS::KeyedOctets"`)  
*Allows an application to communicate to RTI Connexx the existence of the **DDS\_KeyedOctets** (p. 924) data type.*
- static `DDS_ReturnCode_t unregister_type ( DDSDomainParticipant *participant, const char *type_name="DDS::KeyedOctets"`)  
*Allows an application to unregister the **DDS\_KeyedOctets** (p. 924) data type from RTI Connexx. After calling `unregister_type`, no further communication using this type is possible.*
- static const char \* `get_type_name ()`  
*Get the default name for the **DDS\_KeyedOctets** (p. 924) type.*
- static void `print_data (const DDS_KeyedOctets *a_data)`  
*<<extension>> (p. 237) Print value of data type to standard out.*
- static `DDS_TypeCode * get_typecode ()`  
*<<extension>> (p. 237) Retrieves the TypeCode for the Type.*
- static `DDS_ReturnCode_t serialize_data_to_cdr_buffer (char *buffer, unsigned int &length, const DDS_KeyedOctets *a_data)`  
*<<extension>> (p. 237) Serializes the input sample into a CDR buffer of octets.*
- static `DDS_ReturnCode_t serialize_data_to_cdr_buffer_ex (char *buffer, unsigned int &length, const DDS_KeyedOctets *a_data, DDS_DataRepresentationId_t representation)`  
*<<extension>> (p. 237) Serializes the input sample into a buffer of octets.*
- static `DDS_ReturnCode_t deserialize_data_from_cdr_buffer ( DDS_KeyedOctets *a_data, const char *buffer, unsigned int length)`  
*<<extension>> (p. 237) Deserializes a sample from a buffer of octets.*
- static `DDS_ReturnCode_t data_to_string ( DDS_KeyedOctets *sample, char *str, DDS_UnsignedLong &str_size, const DDS_PrintFormatProperty &property)`  
*<<extension>> (p. 237) Get the string representation of an input sample.*

### 9.263.1 Detailed Description

<<interface>> (p. 237) **DDS\_KeyedOctets** (p. 924) type support.

### 9.263.2 Member Function Documentation

#### 9.263.2.1 register\_type()

```
static DDS_ReturnCode_t DDSKeyedOctetsTypeSupport::register_type (
    DDSDomainParticipant * participant,
    const char * type_name = "DDS::KeyedOctets" ) [static]
```

Allows an application to communicate to RTI Connexx the existence of the **DDS\_KeyedOctets** (p. 924) data type.

By default, The **DDS\_KeyedOctets** (p. 924) built-in type is automatically registered when a DomainParticipant is created using the `type_name` returned by **DDSKeyedOctetsTypeSupport::get\_type\_name** (p. 1499). Therefore, the usage of

this function is optional and it is only required when the automatic built-in type registration is disabled using the participant property "dds.builtin\_type.auto\_register".

This method can also be used to register the same **DDSKeyedOctetsTypeSupport** (p. 1495) with a **DDSDomain**↔**Participant** (p. 1351) using different values for the type\_name.

If `register_type` is called multiple times with the same **DDSDomainParticipant** (p. 1351) and `type_name`, the second (and subsequent) registrations are ignored by the operation.

## Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to register the data type <b>DDS_Octets</b> (p. 967) with. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) the type name under with the data type <b>DDS_KeyedOctets</b> (p. 924) is registered with the participant; this type name is used when creating a new <b>DDSTopic</b> (p. 1617). (See <b>DDSDomainParticipant::create_topic</b> (p. 1382).) The name may not be NULL or longer than 255 characters.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

## MT Safety:

UNSAFE on the FIRST call. It is not safe for two threads to simultaneously make the first call to register a type. Subsequent calls are thread safe.

## See also

**DDSDomainParticipant::create\_topic** (p. 1382)

## 9.263.2.2 unregister\_type()

```
static DDS_ReturnCode_t DDSKeyedOctetsTypeSupport::unregister_type (
    DDSDomainParticipant * participant,
    const char * type_name = "DDS::KeyedOctets" ) [static]
```

Allows an application to unregister the **DDS\_KeyedOctets** (p.924) data type from RTI Connex. After calling `unregister_type`, no further communication using this type is possible.

## Precondition

The **DDS\_KeyedOctets** (p.924) type with `type_name` is registered with the participant and all **DDSTopic** (p. 1617) objects referencing the type have been destroyed. If the type is not registered with the participant, or if any **DDSTopic** (p. 1617) is associated with the type, the operation will fail with **DDS\_RETCODE\_ERROR** (p. 336).

## Postcondition

All information about the type is removed from RTI Connex. No further communication using this type is possible.



## Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to unregister the data type <b>DDS_KeyedOctets</b> (p. 924) from. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) the type name under with the data type <b>DDS_KeyedOctets</b> (p. 924) is registered with the participant. The name should match a name that has been previously used to register a type with the participant. Cannot be NULL.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336) or <b>DDS_RETCODE_ERROR</b> (p. 336)
------------	--

## MT Safety:

SAFE.

## See also

**DDSKeyedOctetsTypeSupport::register\_type** (p. 1496)

## 9.263.2.3 get\_type\_name()

```
static const char * DDSKeyedOctetsTypeSupport::get_type_name ( ) [static]
```

Get the default name for the **DDS\_KeyedOctets** (p. 924) type.

Can be used for calling **DDSKeyedOctetsTypeSupport::register\_type** (p. 1496) or creating **DDSTopic** (p. 1617).

## Returns

default name for the **DDS\_KeyedOctets** (p. 924) type.

## See also

**DDSKeyedOctetsTypeSupport::register\_type** (p. 1496)

**DDSDomainParticipant::create\_topic** (p. 1382)

## 9.263.2.4 print\_data()

```
static void DDSKeyedOctetsTypeSupport::print_data (
    const DDS_KeyedOctets * a_data ) [static]
```

<<*extension*>> (p. 237) Print value of data type to standard out.

The *generated* implementation of the operation knows how to print value of a data type.

## Parameters

<i>a_data</i>	<< <i>in</i> >> (p. 238) <b>DDS_KeyedOctets</b> (p. 924) to be printed.
---------------	---

9.263.2.5 `get_typecode()`

```
static DDS_TypeCode * DDSKeyedOctetsTypeSupport::get_typecode ( ) [static]
```

<<*extension*>> (p. 237) Retrieves the TypeCode for the Type.

## See also

**FooTypeSupport::get\_typecode** (p. 1723)

9.263.2.6 `serialize_data_to_cdr_buffer()`

```
static DDS_ReturnCode_t DDSKeyedOctetsTypeSupport::serialize_data_to_cdr_buffer (
    char * buffer,
    unsigned int & length,
    const DDS_KeyedOctets * a_data ) [static]
```

<<*extension*>> (p. 237) Serializes the input sample into a CDR buffer of octets.

## See also

**FooTypeSupport::serialize\_data\_to\_cdr\_buffer** (p. 1721)

9.263.2.7 `serialize_data_to_cdr_buffer_ex()`

```
static DDS_ReturnCode_t DDSKeyedOctetsTypeSupport::serialize_data_to_cdr_buffer_ex (
    char * buffer,
    unsigned int & length,
    const DDS_KeyedOctets * a_data,
    DDS_DataRepresentationId_t representation ) [static]
```

<<*extension*>> (p. 237) Serializes the input sample into a buffer of octets.

## See also

**FooTypeSupport::serialize\_data\_to\_cdr\_buffer** (p. 1721)

### 9.263.2.8 deserialize\_data\_from\_cdr\_buffer()

```
static DDS_ReturnCode_t DDSKeyedOctetsTypeSupport::deserialize_data_from_cdr_buffer (
    DDS_KeyedOctets * a_data,
    const char * buffer,
    unsigned int length ) [static]
```

<<**extension**>> (p. 237) Deserializes a sample from a buffer of octets.

See also

**FooTypeSupport::deserialize\_data\_from\_cdr\_buffer** (p. 1722)

### 9.263.2.9 data\_to\_string()

```
static DDS_ReturnCode_t DDSKeyedOctetsTypeSupport::data_to_string (
    DDS_KeyedOctets * sample,
    char * str,
    DDS_UnsignedLong & str_size,
    const DDS_PrintFormatProperty & property ) [static]
```

<<**extension**>> (p. 237) Get the string representation of an input sample.

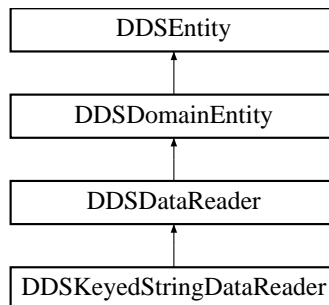
See also

**FooTypeSupport::data\_to\_string** (p. 1723)

## 9.264 DDSKeyedStringDataReader Class Reference

<<**interface**>> (p. 237) Instantiates `DataReader` < **DDS\_KeyedString** (p. 927) >.

Inheritance diagram for DDSKeyedStringDataReader:



## Public Member Functions

- virtual `DDS_ReturnCode_t read ( DDS_KeyedStringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data samples from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t take ( DDS_KeyedStringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data-samples from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t read_w_condition ( DDS_KeyedStringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples, DDSReadCondition *condition)`  
*Accesses via `DDSKeyedStringDataReader::read` (p. 1504) the samples that match the criteria specified in the `DDSReadCondition` (p. 1574).*
- virtual `DDS_ReturnCode_t take_w_condition ( DDS_KeyedStringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples, DDSReadCondition *condition)`  
*Analogous to `DDSKeyedStringDataReader::read_w_condition` (p. 1504) except it accesses samples via the `DDSKeyedStringDataReader::take` (p. 1504) operation.*
- virtual `DDS_ReturnCode_t read_next_sample ( DDS_KeyedString &received_data, DDS_SampleInfo &sample_info)`  
*Copies the next not-previously-accessed data value from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t take_next_sample ( DDS_KeyedString &received_data, DDS_SampleInfo &sample_info)`  
*Copies the next not-previously-accessed data value from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t read_instance ( DDS_KeyedStringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &a_handle= DDS_HANDLE_NIL, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data samples from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t take_instance ( DDS_KeyedStringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &a_handle= DDS_HANDLE_NIL, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data samples from the `DDSDataReader` (p. 1288).*
- virtual `DDS_ReturnCode_t read_instance_w_condition ( DDS_KeyedStringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &a_handle= DDS_HANDLE_NIL, DDSReadCondition *condition=NULL)`  
*Accesses via `DDSKeyedStringDataReader::read_instance` (p. 1505) the samples that match the criteria specified in the `DDSReadCondition` (p. 1574).*
- virtual `DDS_ReturnCode_t take_instance_w_condition ( DDS_KeyedStringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &a_handle= DDS_HANDLE_NIL, DDSReadCondition *condition=NULL)`  
*Accesses via `DDSKeyedStringDataReader::take_instance` (p. 1506) the samples that match the criteria specified in the `DDSReadCondition` (p. 1574).*
- virtual `DDS_ReturnCode_t read_next_instance ( DDS_KeyedStringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples= DDS_LENGTH_UNLIMITED, const DDS_InstanceHandle_t &previous_handle= DDS_HANDLE_NIL, DDS_SampleStateMask sample_states= DDS_ANY_SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`

Access a collection of data samples from the *DDSDataReader* (p. 1288).

- virtual **DDS\_ReturnCode\_t** **take\_next\_instance** ( **DDS\_KeyedStringSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples= **DDS\_LENGTH\_UNLIMITED**, const **DDS\_InstanceHandle\_t** &previous\_handle= **DDS\_HANDLE\_NIL**, **DDS\_SampleStateMask** sample\_states= **DDS\_ANY\_SAMPLE\_STATE**, **DDS\_ViewStateMask** view\_states= **DDS\_ANY\_VIEW\_STATE**, **DDS\_InstanceStateMask** instance\_states= **DDS\_ANY\_INSTANCE\_STATE**)

Access a collection of data samples from the *DDSDataReader* (p. 1288).

- virtual **DDS\_ReturnCode\_t** **read\_next\_instance\_w\_condition** ( **DDS\_KeyedStringSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples= **DDS\_LENGTH\_UNLIMITED**, const **DDS\_InstanceHandle\_t** &previous\_handle= **DDS\_HANDLE\_NIL**, **DDSReadCondition** \*condition=NULL)

Accesses via *DDSKeyedStringDataReader::read\_next\_instance* (p. 1507) the samples that match the criteria specified in the *DDSReadCondition* (p. 1574).

- virtual **DDS\_ReturnCode\_t** **take\_next\_instance\_w\_condition** ( **DDS\_KeyedStringSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples= **DDS\_LENGTH\_UNLIMITED**, const **DDS\_InstanceHandle\_t** &previous\_handle= **DDS\_HANDLE\_NIL**, **DDSReadCondition** \*condition=NULL)

Accesses via *DDSKeyedStringDataReader::take\_next\_instance* (p. 1507) the samples that match the criteria specified in the *DDSReadCondition* (p. 1574).

- virtual **DDS\_ReturnCode\_t** **return\_loan** ( **DDS\_KeyedStringSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq)

Indicates to the *DDSDataReader* (p. 1288) that the application is done accessing the collection of *received\_data* and *info\_seq* obtained by some earlier invocation of *read* or *take* on the *DDSDataReader* (p. 1288).

- virtual **DDS\_ReturnCode\_t** **get\_key\_value** ( **DDS\_KeyedString** &key\_holder, const **DDS\_InstanceHandle\_t** &handle)

Retrieve the instance *key* that corresponds to an instance *handle*.

- virtual **DDS\_ReturnCode\_t** **get\_key\_value** (char \*key, const **DDS\_InstanceHandle\_t** &handle)

<<extension>> (p. 237) Retrieve the instance *key* that corresponds to an instance *handle*.

- virtual **DDS\_InstanceHandle\_t** **lookup\_instance** (const **DDS\_KeyedString** &key\_holder)

Retrieve the instance *handle* that corresponds to an instance *key\_holder*.

- virtual **DDS\_InstanceHandle\_t** **lookup\_instance** (const char \*key)

<<extension>> (p. 237) Retrieve the instance *handle* that corresponds to an instance *key*.

## Static Public Member Functions

- static **DDSKeyedStringDataReader** \* **narrow** ( **DDSDataReader** \*reader)

Narrow the given *DDSDataReader* (p. 1288) pointer to a *DDSKeyedStringDataReader* (p. 1501) pointer.

### 9.264.1 Detailed Description

<<interface>> (p. 237) Instantiates *DataReader* < **DDS\_KeyedString** (p. 927) >.

When reading or taking data with this reader, if you request a copy of the samples instead of a loan, and a string in a destination data sample is NULL, the middleware will allocate a new string for you of sufficient length to hold the received string. The new string will be allocated with **DDS\_String\_alloc** (p. 553); the sample's destructor will delete it.

A non- NULL string is assumed to be allocated to sufficient length to store the incoming data. It will not be reallocated.

See also

**FooDataReader** (p. 1649)

**DDSDataReader** (p. 1288)

## 9.264.2 Member Function Documentation

### 9.264.2.1 read()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::read (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::read** (p. 1651)

### 9.264.2.2 take()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::take (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data-samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::take** (p. 1652)

### 9.264.2.3 read\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::read_w_condition (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [virtual]
```

Accesses via **DDSKeyedStringDataReader::read** (p. 1504) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::read\_w\_condition** (p. 1657)

#### 9.264.2.4 take\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::take_w_condition (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [virtual]
```

Analogous to **DDSKeyedStringDataReader::read\_w\_condition** (p.1504) except it accesses samples via the **DDSKeyedStringDataReader::take** (p.1504) operation.

See also

**FooDataReader::take\_w\_condition** (p.1658)

#### 9.264.2.5 read\_next\_sample()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::read_next_sample (
    DDS_KeyedString & received_data,
    DDS_SampleInfo & sample_info ) [virtual]
```

Copies the next not-previously-accessed data value from the **DDSDDataReader** (p.1288).

See also

**FooDataReader::read\_next\_sample** (p.1659)

#### 9.264.2.6 take\_next\_sample()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::take_next_sample (
    DDS_KeyedString & received_data,
    DDS_SampleInfo & sample_info ) [virtual]
```

Copies the next not-previously-accessed data value from the **DDSDDataReader** (p.1288).

See also

**FooDataReader::take\_next\_sample** (p.1660)

### 9.264.2.7 read\_instance()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::read_instance (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & a_handle = DDS_HANDLE_NIL,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::read\_instance** (p. 1661)

### 9.264.2.8 take\_instance()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::take_instance (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & a_handle = DDS_HANDLE_NIL,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::take\_instance** (p. 1663)

### 9.264.2.9 read\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::read_instance_w_condition (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & a_handle = DDS_HANDLE_NIL,
    DDSReadCondition * condition = NULL ) [virtual]
```

Accesses via **DDSKeyedStringDataReader::read\_instance** (p. 1505) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::read\_instance\_w\_condition** (p. 1664)



## 9.264.2.10 take\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::take_instance_w_condition (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & a_handle = DDS_HANDLE_NIL,
    DDSReadCondition * condition = NULL ) [virtual]
```

Accesses via `DDSKeyedStringDataReader::take_instance` (p. 1506) the samples that match the criteria specified in the `DDSReadCondition` (p. 1574).

See also

`FooDataReader::take_instance_w_condition` (p. 1665)

## 9.264.2.11 read\_next\_instance()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::read_next_instance (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & previous_handle = DDS_HANDLE_NIL,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the `DDSDataReader` (p. 1288).

See also

`FooDataReader::read_next_instance` (p. 1667)

## 9.264.2.12 take\_next\_instance()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::take_next_instance (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & previous_handle = DDS_HANDLE_NIL,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the `DDSDataReader` (p. 1288).

See also

`FooDataReader::take_next_instance` (p. 1668)

### 9.264.2.13 read\_next\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::read_next_instance_w_condition (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & previous_handle = DDS_HANDLE_NIL,
    DDSReadCondition * condition = NULL ) [virtual]
```

Accesses via **DDSKeyedStringDataReader::read\_next\_instance** (p. 1507) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::read\_next\_instance\_w\_condition** (p. 1670)

### 9.264.2.14 take\_next\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::take_next_instance_w_condition (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    const DDS_InstanceHandle_t & previous_handle = DDS_HANDLE_NIL,
    DDSReadCondition * condition = NULL ) [virtual]
```

Accesses via **DDSKeyedStringDataReader::take\_next\_instance** (p. 1507) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::take\_next\_instance\_w\_condition** (p. 1671)

### 9.264.2.15 return\_loan()

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::return_loan (
    DDS_KeyedStringSeq & received_data,
    DDS_SampleInfoSeq & info_seq ) [virtual]
```

Indicates to the **DDSDataReader** (p. 1288) that the application is done accessing the collection of `received_data` and `info_seq` obtained by some earlier invocation of `read` or `take` on the **DDSDataReader** (p. 1288).

See also

**FooDataReader::return\_loan** (p. 1672)

**9.264.2.16 get\_key\_value() [1/2]**

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::get_key_value (
    DDS_KeyedString & key_holder,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Retrieve the instance `key` that corresponds to an instance handle.

See also

**FooDataReader::get\_key\_value** (p. 1673)

**9.264.2.17 get\_key\_value() [2/2]**

```
virtual DDS_ReturnCode_t DDSKeyedStringDataReader::get_key_value (
    char * key,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<*extension*>> (p. 237) Retrieve the instance `key` that corresponds to an instance handle.

See also

**FooDataReader::get\_key\_value** (p. 1673)

**9.264.2.18 lookup\_instance() [1/2]**

```
virtual DDS_InstanceHandle_t DDSKeyedStringDataReader::lookup_instance (
    const DDS_KeyedString & key_holder ) [virtual]
```

Retrieve the instance `handle` that corresponds to an instance `key_holder`.

See also

**FooDataReader::lookup\_instance** (p. 1674)

**9.264.2.19 lookup\_instance()** [2/2]

```
virtual DDS_InstanceHandle_t DDSKeyedStringDataReader::lookup_instance (
    const char * key ) [virtual]
```

<<*extension*>> (p. 237) Retrieve the instance handle that corresponds to an instance key.

See also

**FooDataReader::lookup\_instance** (p. 1674)

**9.264.2.20 narrow()**

```
static DDSKeyedStringDataReader * DDSKeyedStringDataReader::narrow (
    DDSDataReader * reader ) [static]
```

Narrow the given **DDSDataReader** (p. 1288) pointer to a **DDSKeyedStringDataReader** (p. 1501) pointer.

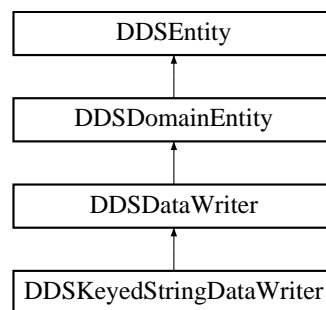
See also

**FooDataReader::narrow** (p. 1651)

**9.265 DDSKeyedStringDataWriter Class Reference**

<<*interface*>> (p. 237) Instantiates `DataWriter < DDS_KeyedString` (p. 927) >.

Inheritance diagram for DDSKeyedStringDataWriter:



## Public Member Functions

- virtual **DDS\_InstanceHandle\_t register\_instance** (const **DDS\_KeyedString** &instance\_data)  
*Informs RTI Connexx that the application will be modifying a particular instance.*
- virtual **DDS\_InstanceHandle\_t register\_instance** (const char \*key)  
*<<extension>> (p. 237) Informs RTI Connexx that the application will be modifying a particular instance.*
- virtual **DDS\_InstanceHandle\_t register\_instance\_w\_timestamp** (const **DDS\_KeyedString** &instance\_data, const **DDS\_Time\_t** &source\_timestamp)  
*Performs the same functions as **DDSKeyedStringDataWriter::register\_instance** (p. 1513) except that the application provides the value for the *source\_timestamp*.*
- virtual **DDS\_InstanceHandle\_t register\_instance\_w\_timestamp** (const char \*key, const **DDS\_Time\_t** &source\_timestamp)  
*<<extension>> (p. 237) Performs the same functions as **DDSKeyedStringDataWriter::register\_instance** (p. 1513) except that the application provides the value for the *source\_timestamp*.*
- virtual **DDS\_ReturnCode\_t unregister\_instance** (const **DDS\_KeyedString** &instance\_data, const **DDS\_InstanceHandle\_t** &handle)  
*Reverses the action of **DDSKeyedStringDataWriter::register\_instance** (p. 1513).*
- virtual **DDS\_ReturnCode\_t unregister\_instance** (const char \*key, const **DDS\_InstanceHandle\_t** &handle)  
*<<extension>> (p. 237) Reverses the action of **DDSKeyedStringDataWriter::register\_instance** (p. 1513).*
- virtual **DDS\_ReturnCode\_t unregister\_instance\_w\_timestamp** (const **DDS\_KeyedString** &instance\_data, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*Performs the same function as **DDSKeyedStringDataWriter::unregister\_instance** (p. 1514) except that it also provides the value for the *source\_timestamp*.*
- virtual **DDS\_ReturnCode\_t unregister\_instance\_w\_timestamp** (const char \*key, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*<<extension>> (p. 237) Performs the same function as **DDSKeyedStringDataWriter::unregister\_instance** (p. 1514) except that it also provides the value for the *source\_timestamp*.*
- virtual **DDS\_KeyedString \* create\_data** (const **DDS\_TypeAllocationParams\_t** &alloc\_params)  
*Creates a keyed string data instance.*
- virtual **DDS\_Boolean delete\_data** (**DDS\_KeyedString** \*sample, const **DDS\_TypeDeallocationParams\_t** &dealloc\_params)  
*Destroys a keyed string data instance created by **DDSKeyedStringDataWriter::create\_data** (p. 1515).*
- virtual **DDS\_ReturnCode\_t write** (const **DDS\_KeyedString** &instance\_data, const **DDS\_InstanceHandle\_t** &handle)  
*Modifies the value of a **DDS\_KeyedString** (p. 927) data instance.*
- virtual **DDS\_ReturnCode\_t write** (const char \*key, const char \*str, const **DDS\_InstanceHandle\_t** &handle)  
*<<extension>> (p. 237) Modifies the value of a **DDS\_KeyedString** (p. 927) data instance.*
- virtual **DDS\_ReturnCode\_t write\_w\_timestamp** (const **DDS\_KeyedString** &instance\_data, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*Performs the same function as **DDSKeyedStringDataWriter::write** (p. 1516) except that it also provides the value for the *source\_timestamp*.*
- virtual **DDS\_ReturnCode\_t write\_w\_timestamp** (const char \*key, const char \*str, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*<<extension>> (p. 237) Performs the same function as **DDSKeyedStringDataWriter::write** (p. 1516) except that it also provides the value for the *source\_timestamp*.*
- virtual **DDS\_ReturnCode\_t write\_w\_params** (const **DDS\_KeyedString** &instance\_data, **DDS\_WriteParams\_t** &params)  
*Performs the same function as **DDSKeyedStringDataWriter::write** (p. 1516) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.*

- virtual **DDS\_ReturnCode\_t write\_w\_params** (const char \*key, const char \*str, **DDS\_WriteParams\_t** &params)
 

*<<extension>> (p. 237) Performs the same function as **DDSKeyedStringDataWriter::write** (p. 1516) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.*
- virtual **DDS\_ReturnCode\_t dispose** (const **DDS\_KeyedString** &instance\_data, const **DDS\_InstanceHandle\_t** &handle)
 

*Requests the middleware to delete the data.*
- virtual **DDS\_ReturnCode\_t dispose** (const char \*key, const **DDS\_InstanceHandle\_t** &instance\_handle)
 

*<<extension>> (p. 237) Requests the middleware to delete the data.*
- virtual **DDS\_ReturnCode\_t dispose\_w\_timestamp** (const **DDS\_KeyedString** &instance\_data, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)
 

*Performs the same functions as **DDSKeyedStringDataWriter::dispose** (p. 1518) except that the application provides the value for the `source_timestamp` that is made available to **DDSDataReader** (p. 1288) objects by means of the `source_timestamp` attribute inside the **DDS\_SampleInfo** (p. 1082).*
- virtual **DDS\_ReturnCode\_t dispose\_w\_timestamp** (const char \*key, const **DDS\_InstanceHandle\_t** &instance\_handle, const **DDS\_Time\_t** &source\_timestamp)
 

*<<extension>> (p. 237) Performs the same functions as **DDSKeyedStringDataWriter::dispose** (p. 1518) except that the application provides the value for the `source_timestamp` that is made available to **DDSDataReader** (p. 1288) objects by means of the `source_timestamp` attribute inside the **DDS\_SampleInfo** (p. 1082).*
- virtual **DDS\_ReturnCode\_t get\_key\_value** (**DDS\_KeyedString** &key\_holder, const **DDS\_InstanceHandle\_t** &handle)
 

*Retrieve the instance key that corresponds to an instance handle.*
- virtual **DDS\_ReturnCode\_t get\_key\_value** (char \*key, const **DDS\_InstanceHandle\_t** &handle)
 

*<<extension>> (p. 237) Retrieve the instance key that corresponds to an instance handle.*
- virtual **DDS\_InstanceHandle\_t lookup\_instance** (const **DDS\_KeyedString** &key\_holder)
 

*Retrieve the instance handle that corresponds to an instance key\_holder.*
- virtual **DDS\_InstanceHandle\_t lookup\_instance** (const char \*key)
 

*<<extension>> (p. 237) Retrieve the instance handle that corresponds to an instance key.*

## Static Public Member Functions

- static **DDSKeyedStringDataWriter \* narrow** (**DDSDataReader** \*writer)
 

*Narrow the given **DDSDataReader** (p. 1321) pointer to a **DDSKeyedStringDataWriter** (p. 1510) pointer.*

### 9.265.1 Detailed Description

*<<interface>> (p. 237) Instantiates **DataWriter** < **DDS\_KeyedString** (p. 927) >.*

See also

**FooDataWriter** (p. 1676)

**DDSDataReader** (p. 1321)

### 9.265.2 Member Function Documentation

### 9.265.2.1 narrow()

```
static DDSKeyedStringDataWriter * DDSKeyedStringDataWriter::narrow (  
    DDSDataWriter * writer ) [static]
```

Narrow the given **DDSDataWriter** (p. 1321) pointer to a **DDSKeyedStringDataWriter** (p. 1510) pointer.

See also

**FooDataWriter::narrow** (p. 1678)

### 9.265.2.2 register\_instance() [1/2]

```
virtual DDS_InstanceHandle_t DDSKeyedStringDataWriter::register_instance (  
    const DDS_KeyedString & instance_data ) [virtual]
```

Informs RTI Connexxt that the application will be modifying a particular instance.

See also

**FooDataWriter::register\_instance** (p. 1678)

### 9.265.2.3 register\_instance() [2/2]

```
virtual DDS_InstanceHandle_t DDSKeyedStringDataWriter::register_instance (  
    const char * key ) [virtual]
```

<<**extension**>> (p. 237) Informs RTI Connexxt that the application will be modifying a particular instance.

See also

**FooDataWriter::register\_instance** (p. 1678)

### 9.265.2.4 register\_instance\_w\_timestamp() [1/2]

```
virtual DDS_InstanceHandle_t DDSKeyedStringDataWriter::register_instance_w_timestamp (  
    const DDS_KeyedString & instance_data,  
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same functions as **DDSKeyedStringDataWriter::register\_instance** (p. 1513) except that the application provides the value for the `source_timestamp`.

See also

**FooDataWriter::register\_instance\_w\_timestamp** (p. 1679)

### 9.265.2.5 register\_instance\_w\_timestamp() [2/2]

```
virtual DDS_InstanceHandle_t DDSKeyedStringDataWriter::register_instance_w_timestamp (
    const char * key,
    const DDS_Time_t & source_timestamp ) [virtual]
```

<<*extension*>> (p. 237) Performs the same functions as **DDSKeyedStringDataWriter::register\_instance** (p. 1513) except that the application provides the value for the `source_timestamp`.

See also

**FooDataWriter::register\_instance\_w\_timestamp** (p. 1679)

### 9.265.2.6 unregister\_instance() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::unregister_instance (
    const DDS_KeyedString & instance_data,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Reverses the action of **DDSKeyedStringDataWriter::register\_instance** (p. 1513).

See also

**FooDataWriter::unregister\_instance** (p. 1680)

### 9.265.2.7 unregister\_instance() [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::unregister_instance (
    const char * key,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<*extension*>> (p. 237) Reverses the action of **DDSKeyedStringDataWriter::register\_instance** (p. 1513).

See also

**FooDataWriter::unregister\_instance** (p. 1680)



**9.265.2.8 unregister\_instance\_w\_timestamp() [1/2]**

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::unregister_instance_w_timestamp (
    const DDS_KeyedString & instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same function as **DDSKeyedStringDataWriter::unregister\_instance** (p. 1514) except that it also provides the value for the `source_timestamp`.

See also

**FooDataWriter::unregister\_instance\_w\_timestamp** (p. 1682)

**9.265.2.9 unregister\_instance\_w\_timestamp() [2/2]**

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::unregister_instance_w_timestamp (
    const char * key,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

<<*extension*>> (p. 237) Performs the same function as **DDSKeyedStringDataWriter::unregister\_instance** (p. 1514) except that it also provides the value for the `source_timestamp`.

See also

**FooDataWriter::unregister\_instance\_w\_timestamp** (p. 1682)

**9.265.2.10 create\_data()**

```
virtual DDS_KeyedString * DDSKeyedStringDataWriter::create_data (
    const DDS_TypeAllocationParams_t & alloc_params ) [virtual]
```

Creates a keyed string data instance.

The size of the instance including the NULL terminated character is determined by the DataWriter property **dds.builtin\_type.keyed\_string.alloc\_size**.

Default size: **dds.builtin\_type.keyed\_string.max\_size** property of DomainParticipant if defined. Otherwise 1024.

Created instances must be deleted with **DDSKeyedStringDataWriter::delete\_data** (p. 1515).

Returns

Newly created keyed string data, or NULL on failure.

See also

BuiltinTypeMemoryManagement section of Built-in Types

### 9.265.2.11 delete\_data()

```
virtual DDS_Boolean DDSKeyedStringDataWriter::delete_data (
    DDS_KeyedString * sample,
    const DDS_TypeDeallocationParams_t & dealloc_params ) [virtual]
```

Destroys a keyed string data instance created by **DDSKeyedStringDataWriter::create\_data** (p. 1515).

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) upon successful deletion.

### 9.265.2.12 write() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::write (
    const DDS_KeyedString & instance_data,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Modifies the value of a **DDS\_KeyedString** (p. 927) data instance.

#### See also

**FooDataWriter::write** (p. 1683)

### 9.265.2.13 write() [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::write (
    const char * key,
    const char * str,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<*extension*>> (p. 237) Modifies the value of a **DDS\_KeyedString** (p. 927) data instance.

#### See also

**FooDataWriter::write** (p. 1683)

### 9.265.2.14 write\_w\_timestamp() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::write_w_timestamp (
    const DDS_KeyedString & instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same function as **DDSKeyedStringDataWriter::write** (p. 1516) except that it also provides the value for the `source_timestamp`.

See also

**FooDataWriter::write\_w\_timestamp** (p. 1687)

### 9.265.2.15 write\_w\_timestamp() [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::write_w_timestamp (
    const char * key,
    const char * str,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

<<**extension**>> (p. 237) Performs the same function as **DDSKeyedStringDataWriter::write** (p. 1516) except that it also provides the value for the `source_timestamp`.

See also

**FooDataWriter::write\_w\_timestamp** (p. 1687)

### 9.265.2.16 write\_w\_params() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::write_w_params (
    const DDS_KeyedString & instance_data,
    DDS_WriteParams_t & params ) [virtual]
```

Performs the same function as **DDSKeyedStringDataWriter::write** (p. 1516) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.

See also

**FooDataWriter::write\_w\_params** (p. 1688)

### 9.265.2.17 write\_w\_params() [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::write_w_params (
    const char * key,
    const char * str,
    DDS_WriteParams_t & params ) [virtual]
```

<<*extension*>> (p. 237) Performs the same function as **DDSKeyedStringDataWriter::write** (p. 1516) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.

See also

**FooDataWriter::write\_w\_params** (p. 1688)

### 9.265.2.18 dispose() [1/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::dispose (
    const DDS_KeyedString & instance_data,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Requests the middleware to delete the data.

See also

**FooDataWriter::dispose** (p. 1689)

### 9.265.2.19 dispose() [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::dispose (
    const char * key,
    const DDS_InstanceHandle_t & instance_handle ) [virtual]
```

<<*extension*>> (p. 237) Requests the middleware to delete the data.

See also

**FooDataWriter::dispose** (p. 1689)

**9.265.2.20 dispose\_w\_timestamp() [1/2]**

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::dispose_w_timestamp (
    const DDS_KeyedString & instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same functions as **DDSKeyedStringDataWriter::dispose** (p. 1518) except that the application provides the value for the `source_timestamp` that is made available to **DDSDataReader** (p. 1288) objects by means of the `source_timestamp` attribute inside the **DDS\_SampleInfo** (p. 1082).

See also

**FooDataWriter::dispose\_w\_timestamp** (p. 1690)

**9.265.2.21 dispose\_w\_timestamp() [2/2]**

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::dispose_w_timestamp (
    const char * key,
    const DDS_InstanceHandle_t & instance_handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

<<**extension**>> (p. 237) Performs the same functions as **DDSKeyedStringDataWriter::dispose** (p. 1518) except that the application provides the value for the `source_timestamp` that is made available to **DDSDataReader** (p. 1288) objects by means of the `source_timestamp` attribute inside the **DDS\_SampleInfo** (p. 1082).

See also

**FooDataWriter::dispose\_w\_timestamp** (p. 1690)

**9.265.2.22 get\_key\_value() [1/2]**

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::get_key_value (
    DDS_KeyedString & key_holder,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Retrieve the instance key that corresponds to an instance handle.

See also

**FooDataWriter::get\_key\_value** (p. 1691)

**9.265.2.23 get\_key\_value()** [2/2]

```
virtual DDS_ReturnCode_t DDSKeyedStringDataWriter::get_key_value (
    char * key,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<*extension*>> (p. 237) Retrieve the instance `key` that corresponds to an instance `handle`.

See also

**FooDataWriter::get\_key\_value** (p. 1691)

**9.265.2.24 lookup\_instance()** [1/2]

```
virtual DDS_InstanceHandle_t DDSKeyedStringDataWriter::lookup_instance (
    const DDS_KeyedString & key_holder ) [virtual]
```

Retrieve the instance `handle` that corresponds to an instance `key_holder`.

See also

**FooDataWriter::lookup\_instance** (p. 1692)

**9.265.2.25 lookup\_instance()** [2/2]

```
virtual DDS_InstanceHandle_t DDSKeyedStringDataWriter::lookup_instance (
    const char * key ) [virtual]
```

<<*extension*>> (p. 237) Retrieve the instance `handle` that corresponds to an instance `key`.

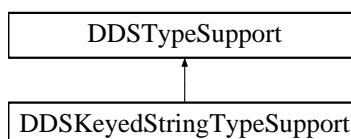
See also

**FooDataWriter::lookup\_instance** (p. 1692)

**9.266 DDSKeyedStringTypeSupport Class Reference**

<<*interface*>> (p. 237) Keyed string type support.

Inheritance diagram for DDSKeyedStringTypeSupport:



## Static Public Member Functions

- static `DDS_ReturnCode_t register_type ( DDSDomainParticipant *participant, const char *type_name="DDS::KeyedString")`  
*Allows an application to communicate to RTI Connexx the existence of the **DDS\_KeyedString** (p. 927) data type.*
- static `DDS_ReturnCode_t unregister_type ( DDSDomainParticipant *participant, const char *type_name="DDS::KeyedString")`  
*Allows an application to unregister the **DDS\_KeyedString** (p. 927) data type from RTI Connexx. After calling `unregister_type`, no further communication using this type is possible.*
- static `const char * get_type_name ()`  
*Get the default name for the **DDS\_KeyedString** (p. 927) type.*
- static `void print_data (const DDS_KeyedString *a_data)`  
*<<extension>> (p. 237) Print value of data type to standard out.*
- static `DDS_TypeCode * get_typecode ()`  
*<<extension>> (p. 237) Retrieves the TypeCode for the Type.*
- static `DDS_ReturnCode_t serialize_data_to_cdr_buffer (char *buffer, unsigned int &length, const DDS_KeyedString *a_data)`  
*<<extension>> (p. 237) Serializes the input sample into a CDR buffer of octets.*
- static `DDS_ReturnCode_t serialize_data_to_cdr_buffer_ex (char *buffer, unsigned int &length, const DDS_KeyedString *a_data, DDS_DataRepresentationId_t representation)`  
*<<extension>> (p. 237) Serializes the input sample into a buffer of octets.*
- static `DDS_ReturnCode_t deserialize_data_from_cdr_buffer ( DDS_KeyedString *a_data, const char *buffer, unsigned int length)`  
*<<extension>> (p. 237) Deserializes a sample from a buffer of octets.*
- static `DDS_ReturnCode_t data_to_string ( DDS_KeyedString *sample, char *str, DDS_UnsignedLong &str_size, const DDS_PrintFormatProperty &property)`  
*<<extension>> (p. 237) Get the string representation of an input sample.*

### 9.266.1 Detailed Description

<<*interface*>> (p. 237) Keyed string type support.

### 9.266.2 Member Function Documentation

#### 9.266.2.1 register\_type()

```
static DDS_ReturnCode_t DDSKeyedStringTypeSupport::register_type (
    DDSDomainParticipant * participant,
    const char * type_name = "DDS::KeyedString" ) [static]
```

Allows an application to communicate to RTI Connexx the existence of the **DDS\_KeyedString** (p. 927) data type.

By default, The **DDS\_KeyedString** (p. 927) built-in type is automatically registered when a DomainParticipant is created using the `type_name` returned by `DDSKeyedStringTypeSupport::get_type_name` (p. 1524). Therefore, the usage

of this function is optional and it is only required when the automatic built-in type registration is disabled using the participant property "dds.builtin\_type.auto\_register".

This method can also be used to register the same **DDSKeyedStringTypeSupport** (p. 1520) with a **DDSDomain**↔**Participant** (p. 1351) using different values for the `type_name`.

If `register_type` is called multiple times with the same **DDSDomainParticipant** (p. 1351) and `type_name`, the second (and subsequent) registrations are ignored by the operation.



## Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to register the data type <b>DDS_KeyedString</b> (p. 927) with. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) the type name under which the data type <b>DDS_KeyedString</b> (p. 927) is registered with the participant; this type name is used when creating a new <b>DDSTopic</b> (p. 1617). (See <b>DDSDomainParticipant::create_topic</b> (p. 1382).) The name may not be NULL or longer than 255 characters.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

## MT Safety:

UNSAFE on the FIRST call. It is not safe for two threads to simultaneously make the first call to register a type. Subsequent calls are thread safe.

## See also

**DDSDomainParticipant::create\_topic** (p. 1382)

## 9.266.2.2 unregister\_type()

```
static DDS_ReturnCode_t DDSKeyedStringTypeSupport::unregister_type (
    DDSDomainParticipant * participant,
    const char * type_name = "DDS::KeyedString" ) [static]
```

Allows an application to unregister the **DDS\_KeyedString** (p. 927) data type from RTI Connex. After calling `unregister_type`, no further communication using this type is possible.

## Precondition

The **DDS\_KeyedString** (p. 927) type with `type_name` is registered with the participant and all **DDSTopic** (p. 1617) objects referencing the type have been destroyed. If the type is not registered with the participant, or if any **DDSTopic** (p. 1617) is associated with the type, the operation will fail with **DDS\_RETCODE\_ERROR** (p. 336).

## Postcondition

All information about the type is removed from RTI Connex. No further communication using this type is possible.

## Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to unregister the data type <b>DDS_KeyedString</b> (p. 927) from. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) the type name under with the data type <b>DDS_KeyedString</b> (p. 927) is registered with the participant. The name should match a name that has been previously used to register a type with the participant. Cannot be NULL.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336) or <b>DDS_RETCODE_ERROR</b> (p. 336)
------------	--

## MT Safety:

SAFE.

## See also

**DDSKeyedStringTypeSupport::register\_type** (p. 1521)

9.266.2.3 `get_type_name()`

```
static const char * DDSKeyedStringTypeSupport::get_type_name ( ) [static]
```

Get the default name for the **DDS\_KeyedString** (p. 927) type.

Can be used for calling **DDSKeyedStringTypeSupport::register\_type** (p. 1521) or creating **DDSTopic** (p. 1617).

## Returns

default name for the **DDS\_KeyedString** (p. 927) type.

## See also

**DDSKeyedStringTypeSupport::register\_type** (p. 1521)

**DDSDomainParticipant::create\_topic** (p. 1382)

9.266.2.4 `print_data()`

```
static void DDSKeyedStringTypeSupport::print_data (
    const DDS_KeyedString * a_data ) [static]
```

<<*extension*>> (p. 237) Print value of data type to standard out.

The *generated* implementation of the operation knows how to print value of a data type.

## Parameters

<i>a_data</i>	<< <i>in</i> >> (p. 238) <b>DDS_KeyedString</b> (p. 927) to be printed.
---------------	---

9.266.2.5 `get_typecode()`

```
static DDS_TypeCode * DDSKeyedStringTypeSupport::get_typecode ( ) [static]
```

<<*extension*>> (p. 237) Retrieves the TypeCode for the Type.

## See also

**FooTypeSupport::get\_typecode** (p. 1723)

9.266.2.6 `serialize_data_to_cdr_buffer()`

```
static DDS_ReturnCode_t DDSKeyedStringTypeSupport::serialize_data_to_cdr_buffer (
    char * buffer,
    unsigned int & length,
    const DDS_KeyedString * a_data ) [static]
```

<<*extension*>> (p. 237) Serializes the input sample into a CDR buffer of octets.

## See also

**FooTypeSupport::serialize\_data\_to\_cdr\_buffer** (p. 1721)

9.266.2.7 `serialize_data_to_cdr_buffer_ex()`

```
static DDS_ReturnCode_t DDSKeyedStringTypeSupport::serialize_data_to_cdr_buffer_ex (
    char * buffer,
    unsigned int & length,
    const DDS_KeyedString * a_data,
    DDS_DataRepresentationId_t representation ) [static]
```

<<*extension*>> (p. 237) Serializes the input sample into a buffer of octets.

## See also

**FooTypeSupport::serialize\_data\_to\_cdr\_buffer** (p. 1721)

### 9.266.2.8 deserialize\_data\_from\_cdr\_buffer()

```
static DDS_ReturnCode_t DDSKeyedStringTypeSupport::deserialize_data_from_cdr_buffer (
    DDS_KeyedString * a_data,
    const char * buffer,
    unsigned int length ) [static]
```

<<**extension**>> (p. 237) Deserializes a sample from a buffer of octets.

See also

**FooTypeSupport::deserialize\_data\_from\_cdr\_buffer** (p. 1722)

### 9.266.2.9 data\_to\_string()

```
static DDS_ReturnCode_t DDSKeyedStringTypeSupport::data_to_string (
    DDS_KeyedString * sample,
    char * str,
    DDS_UnsignedLong & str_size,
    const DDS_PrintFormatProperty & property ) [static]
```

<<**extension**>> (p. 237) Get the string representation of an input sample.

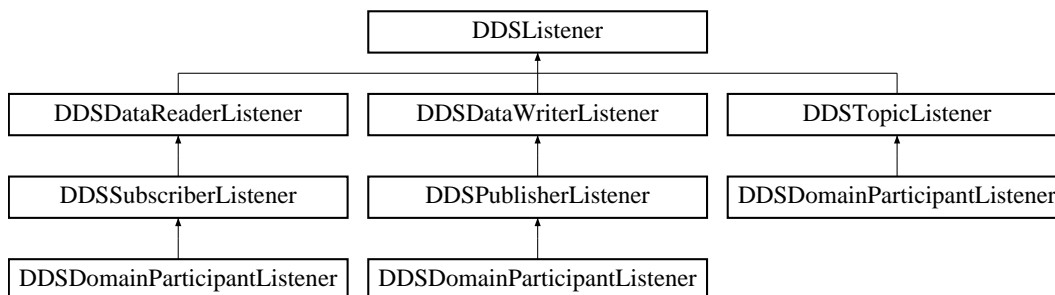
See also

**FooTypeSupport::data\_to\_string** (p. 1723)

## 9.267 DDSListener Class Reference

<<**interface**>> (p. 237) Abstract base class for all Listener interfaces.

Inheritance diagram for DDSListener:



### 9.267.1 Detailed Description

<<*interface*>> (p. 237) Abstract base class for all Listener interfaces.

Entity:

**DDSEntity** (p. 1463)

QoS:

**QoS Policies** (p. 353)

Status:

**Status Kinds** (p. 337)

All the supported kinds of concrete **DDSListener** (p. 1526) interfaces (one per concrete **DDSEntity** (p. 1463) type) derive from this root and add methods whose prototype depends on the concrete Listener.

Listeners provide a way for RTI Connext to asynchronously alert the application when there are relevant status changes.

Almost every application will have to implement listener interfaces.

Each dedicated listener presents a list of operations that correspond to the relevant communication status changes to which an application may respond.

The same **DDSListener** (p. 1526) instance may be shared among multiple entities if you so desire. Consequently, the provided parameter contains a reference to the concerned **DDSEntity** (p. 1463).

### 9.267.2 Access to Plain Communication Status

The general mapping between the plain communication statuses (see **Status Kinds** (p. 337)) and the listeners' operations is as follows:

- For each communication status, there is a corresponding operation whose name is `on_<communication_↔_status>()`, which takes a parameter of type `<communication_status>` as listed in **Status Kinds** (p. 337).
- `on_<communication_status>` is available on the relevant **DDSEntity** (p. 1463) as well as those that embed it, as expressed in the following figure:

listener processing. The most *specific* relevant enabled listener is called."

- When the application attaches a listener on an entity, it must set a mask. The mask indicates to RTI Connext which operations are enabled within the listener (cf. operation **DDSEntity** (p. 1463) `set_listener()` ).
- When a plain communication status changes, RTI Connext triggers the most specific relevant listener operation that is enabled. In case the most specific relevant listener operation corresponds to an application-installed 'nil' listener the operation will be considered handled by a NO-OP operation that does not reset the communication status.

This behavior allows the application to set a default behavior (e.g., in the listener associated with the **DDSDomain**↔**Participant** (p. 1351)) and to set dedicated behaviors only where needed.

### 9.267.3 Access to Read Communication Status

The two statuses related to data arrival are treated slightly differently. Since they constitute the core purpose of the Data Distribution Service, there is no need to provide a default mechanism (as is done for the plain communication statuses above).

The rule is as follows. Each time the read communication status changes:

- First, RTI Connext tries to trigger the **DDSSubscriberListener::on\_data\_on\_readers** (p. 1614) with a parameter of the related **DDSSubscriber** (p. 1592);
- If this does not succeed (there is no listener or the operation is not enabled), RTI Connext tries to trigger **DDSDataReaderListener::on\_data\_available** (p. 1317) on all the related **DDSDataReaderListener** (p. 1315) objects, with a parameter of the related **DDSDataReader** (p. 1288).

The rationale is that either the application is interested in relations among data arrivals and it must use the first option (and then get the corresponding **DDSDataReader** (p. 1288) objects by calling **DDSSubscriber::get\_datareaders** (p. 1606) on the related **DDSSubscriber** (p. 1592) and then get the data by calling **FooDataReader::read** (p. 1651) or **FooDataReader::take** (p. 1652) on the returned **DDSDataReader** (p. 1288) objects), or it wants to treat each **DDSDataReader** (p. 1288) independently and it may choose the second option (and then get the data by calling **FooDataReader::read** (p. 1651) or **FooDataReader::take** (p. 1652) on the related **DDSDataReader** (p. 1288)).

Note that if **DDSSubscriberListener::on\_data\_on\_readers** (p. 1614) is called, RTI Connext will *not* try to call **DDSDataReaderListener::on\_data\_available** (p. 1317). However, an application can force a call to the **DDSDataReader** (p. 1288) objects that have data by calling **DDSSubscriber::notify\_datareaders** (p. 1608).

### 9.267.4 Operations Allowed in Listener Callbacks

See `Restricted Operations in Listener Callbacks`, in the Core Libraries User's Manual.

### 9.267.5 Best Practices with Listeners

Note that all the issues described below are avoided by using **DDSWaitSet** (p. 1629).

#### Avoid blocking or performing a lot of processing in Listener callbacks

Listeners are invoked by internal threads that perform critical functions within the middleware and need to run in a timely manner. By default, Connext DDS creates a few threads to use to receive data and only a single thread to handle periodic events.

Because of this, user applications installing Listeners should never block in a Listener callback. There are several negative consequences of blocking in a listener callback:

- The application may lose data for the DataReader the listener is installed on, because the receive thread is not removing it from the socket buffer and it gets overwritten.

- The application may receive strictly reliable data with a delay, because the receive thread is not removing it from the socket buffer and if it gets overwritten it must be re-sent.
- The application may lose or delay data for other DataReaders, because by default all DataReaders created with the same DomainParticipant share the same threads.
- The application may not be notified of periodic events on time

If the application needs to make a blocking call when data is available, or when another event occurs, the application should use **DDSWaitSet** (p. 1629).

### Avoid taking application mutexes/semaphores in Listener callbacks

Taking application mutexes/semaphores within a Listener callback may lead to unexpected deadlock scenarios.

When a Listener callback is invoked the EA (Exclusive Area) of the Entity 'E' to which the callback applies is taken by the middleware.

If the application takes an application mutex 'M' within a critical section in which the application makes DDS calls affecting 'E', this may lead to following deadlock:

The middleware thread is within the entity EA trying to acquire the mutex 'M'. At the same time, the application thread has acquired 'M' and is blocked trying to acquire the entity EA.

### Do not write data with a DataWriter within the on\_data\_available callback

Avoid writing data with a DataWriter within the **DDSDataReaderListener::on\_data\_available()** (p. 1317) callback. If the write operation blocks because e.g. the send window is full, this will lead to a deadlock.

### Do not call wait\_for\_acknowledgements within the on\_data\_available callback

Do not call the **DDSDataWriter::wait\_for\_acknowledgments** (p. 1334) within the **DDSDataReaderListener::on\_data\_available()** (p. 1317) callback. This will lead to deadlock.

See also

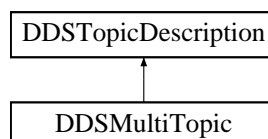
**Status Kinds** (p. 337)

**DDSWaitSet** (p. 1629), **DDSCondition** (p. 1276)

## 9.268 DDSMultiTopic Class Reference

**[Not supported (optional)]** <<*interface*>> (p. 237) A specialization of **DDSTopicDescription** (p. 1624) that allows subscriptions that combine/filter/rearrange data coming from several topics.

Inheritance diagram for DDSMultiTopic:



## Public Member Functions

- virtual const char \* **get\_subscription\_expression** ()=0  
*Get the expression for this **DDSMultiTopic** (p. 1529).*
- virtual **DDS\_ReturnCode\_t** **get\_expression\_parameters** ( **DDS\_StringSeq** &parameters)=0  
*Get the expression parameters.*
- virtual **DDS\_ReturnCode\_t** **set\_expression\_parameters** (const **DDS\_StringSeq** &parameters)=0  
*Set the expression\_parameters.*

## Static Public Member Functions

- static **DDSMultiTopic** \* **narrow** ( **DDSTopicDescription** \*topic\_description)  
*Narrow the given **DDSTopicDescription** (p. 1624) pointer to a **DDSMultiTopic** (p. 1529) pointer.*

### 9.268.1 Detailed Description

**[Not supported (optional)]** <<*interface*>> (p. 237) A specialization of **DDSTopicDescription** (p. 1624) that allows subscriptions that combine/filter/rearrange data coming from several topics.

**DDSMultiTopic** (p. 1529) allows a more sophisticated subscription that can select and combine data received from multiple topics into a single resulting type (specified by the inherited `type_name`). The data will then be filtered (selection) and possibly re-arranged (aggregation/projection) according to a `subscription_expression` with parameters `expression_parameters`.

- The `subscription_expression` is a string that identifies the selection and re-arrangement of data from the associated topics. It is similar to an SQL statement where the SELECT part provides the fields to be kept, the FROM part provides the names of the topics that are searched for those fields, and the WHERE clause gives the content filter. The Topics combined may have different types but they are restricted in that the type of the fields used for the NATURAL JOIN operation must be the same.
- The `expression_parameters` attribute is a sequence of strings that give values to the 'parameters' (i.e. "%n" tokens) in the `subscription_expression`. The number of supplied parameters must fit with the requested values in the `subscription_expression` (i.e. the number of n tokens).
- **DDSDataReader** (p. 1288) entities associated with a **DDSMultiTopic** (p. 1529) are alerted of data modifications by the usual **DDSListener** (p. 1526) or **DDSWaitSet** (p. 1629) / **DDSCondition** (p. 1276) mechanisms whenever modifications occur to the data associated with any of the topics relevant to the **DDSMultiTopic** (p. 1529).

Note that the source for data may not be restricted to a single topic.

**DDSDataReader** (p. 1288) entities associated with a **DDSMultiTopic** (p. 1529) may access instances that are "constructed" at the **DDSDataReader** (p. 1288) side from the instances written by multiple **DDSDataWriter** (p. 1321) entities. The **DDSMultiTopic** (p. 1529) access instance will begin to exist as soon as all the constituting **DDSTopic** (p. 1617) instances are in existence. The `view_state` and `instance_state` is computed from the corresponding states of the constituting instances:



- The `view_state` of the **DDSMultiTopic** (p. 1529) instance is **DDS\_NEW\_VIEW\_STATE** (p. 159) if at least one of the constituting instances has `view_state = DDS_NEW_VIEW_STATE` (p. 159). Otherwise, it will be **DDS\_NOT\_NEW\_VIEW\_STATE** (p. 159).
- The `instance_state` of the **DDSMultiTopic** (p. 1529) instance is **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161) if the `instance_state` of all the constituting **DDSTopic** (p. 1617) instances is **DDS\_ALIVE\_INSTANCE\_STATE** (p. 161). It is **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) if at least one of the constituting **DDSTopic** (p. 1617) instances is **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161). Otherwise, it is **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161).

**Queries and Filters Syntax** (p. 179) describes the syntax of `subscription_expression` and `expression` ← `_parameters`.

## 9.268.2 Member Function Documentation

### 9.268.2.1 narrow()

```
static DDSMultiTopic * DDSMultiTopic::narrow (
    DDSTopicDescription * topic_description ) [static]
```

Narrow the given **DDSTopicDescription** (p. 1624) pointer to a **DDSMultiTopic** (p. 1529) pointer.

Returns

**DDSMultiTopic** (p. 1529) if this **DDSTopicDescription** (p. 1624) is a **DDSMultiTopic** (p. 1529). Otherwise, return NULL.

### 9.268.2.2 get\_subscription\_expression()

```
virtual const char * DDSMultiTopic::get_subscription_expression ( ) [pure virtual]
```

Get the expression for this **DDSMultiTopic** (p. 1529).

The expressions syntax is described in the DDS specification. It is specified when the **DDSMultiTopic** (p. 1529) is created.

Returns

`subscription_expression` of the **DDSMultiTopic** (p. 1529).

### 9.268.2.3 get\_expression\_parameters()

```
virtual DDS_ReturnCode_t DDSMultiTopic::get_expression_parameters (
    DDS_StringSeq & parameters ) [pure virtual]
```

Get the expression parameters.

The expressions syntax is described in the DDS specification.

The `parameters` is either specified on the last successful call to **DDSMultiTopic::set\_expression\_parameters** (p. 1532), or if **DDSMultiTopic::set\_expression\_parameters** (p. 1532) was never called, the `parameters` specified when the **DDSMultiTopic** (p. 1529) was created.

## Parameters

<i>parameters</i>	<< <i>inout</i> >> (p. 238) Fill in this sequence with the expression parameters. The memory for the strings in this sequence is managed according to the conventions described in <b>String Conventions</b> (p. 552). In particular, be careful to avoid a situation in which RTI Connexx allocates a string on your behalf and you then reuse that string in such a way that RTI Connexx believes it to have more memory allocated to it than it actually does.
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## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.268.2.4 set\_expression\_parameters()**

```
virtual DDS_ReturnCode_t DDSMultiTopic::set_expression_parameters (
    const DDS_StringSeq & parameters ) [pure virtual]
```

Set the `expression_parameters`.

Changes the `expression_parameters` associated with the **DDSMultiTopic** (p. 1529).

## Parameters

<i>parameters</i>	<< <i>in</i> >> (p. 238) the filter expression parameters
-------------------	---

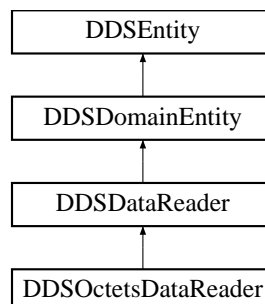
## Returns

One of the **Standard Return Codes** (p. 336).

**9.269 DDSOctetsDataReader Class Reference**

<<*interface*>> (p. 237) Instantiates `DataReader` < **DDS\_Octets** (p. 967) >.

Inheritance diagram for `DDSOctetsDataReader`:



## Public Member Functions

- virtual **DDS\_ReturnCode\_t** **read** ( **DDS\_OctetsSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_↵\_Long** max\_samples= **DDS\_LENGTH\_UNLIMITED**, **DDS\_SampleStateMask** sample\_states= **DDS\_ANY\_↵SAMPLE\_STATE**, **DDS\_ViewStateMask** view\_states= **DDS\_ANY\_VIEW\_STATE**, **DDS\_InstanceStateMask** instance\_states= **DDS\_ANY\_INSTANCE\_STATE**)  
*Access a collection of data samples from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **take** ( **DDS\_OctetsSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_↵\_Long** max\_samples= **DDS\_LENGTH\_UNLIMITED**, **DDS\_SampleStateMask** sample\_states= **DDS\_ANY\_↵SAMPLE\_STATE**, **DDS\_ViewStateMask** view\_states= **DDS\_ANY\_VIEW\_STATE**, **DDS\_InstanceStateMask** instance\_states= **DDS\_ANY\_INSTANCE\_STATE**)  
*Access a collection of data-samples from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **read\_w\_condition** ( **DDS\_OctetsSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, **DDSReadCondition** \*condition)  
*Accesses via **DDSOctetsDataReader::read** (p. 1534) the samples that match the criteria specified in the **DDSRead\_↵Condition** (p. 1574).*
- virtual **DDS\_ReturnCode\_t** **take\_w\_condition** ( **DDS\_OctetsSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, **DDSReadCondition** \*condition)  
*Analogous to **DDSOctetsDataReader::read\_w\_condition** (p. 1534) except it accesses samples via the **DDSOctets\_↵DataReader::take** (p. 1534) operation.*
- virtual **DDS\_ReturnCode\_t** **read\_next\_sample** ( **DDS\_Octets** &received\_data, **DDS\_SampleInfo** &sample\_↵\_info)  
*Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **take\_next\_sample** ( **DDS\_Octets** &received\_data, **DDS\_SampleInfo** &sample\_↵\_info)  
*Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **return\_loan** ( **DDS\_OctetsSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq)  
*Indicates to the **DDSDataReader** (p. 1288) that the application is done accessing the collection of *received\_data* and *info\_seq* obtained by some earlier invocation of *read* or *take* on the **DDSDataReader** (p. 1288).*

## Static Public Member Functions

- static **DDSOctetsDataReader** \* **narrow** ( **DDSDataReader** \*reader)  
*Narrow the given **DDSDataReader** (p. 1288) pointer to a **DDSOctetsDataReader** (p. 1532) pointer.*

### 9.269.1 Detailed Description

<<**interface**>> (p. 237) Instantiates **DataReader** < **DDS\_Octets** (p. 967) >.

When reading or taking data with this reader, if you request a copy of the samples instead of a loan, and the byte array in a destination data sample is NULL, the middleware will allocate a new array for you of sufficient length to hold the received data. The new array will be allocated with **DDS\_OctetBuffer\_alloc** (p. 548); the sample's destructor will delete it.

A non- NULL array is assumed to be allocated to sufficient length to store the incoming data. It will not be reallocated.

See also

**FooDataReader** (p. 1649)

**DDSDataReader** (p. 1288)

## 9.269.2 Member Function Documentation

### 9.269.2.1 read()

```
virtual DDS_ReturnCode_t DDSOctetsDataReader::read (
    DDS_OctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::read** (p. 1651)

### 9.269.2.2 take()

```
virtual DDS_ReturnCode_t DDSOctetsDataReader::take (
    DDS_OctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data-samples from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::take** (p. 1652)

### 9.269.2.3 read\_w\_condition()

```
virtual DDS_ReturnCode_t DDSOctetsDataReader::read_w_condition (
    DDS_OctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [virtual]
```

Accesses via **DDSOctetsDataReader::read** (p. 1534) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::read\_w\_condition** (p. 1657)

#### 9.269.2.4 take\_w\_condition()

```
virtual DDS_ReturnCode_t DDSOctetsDataReader::take_w_condition (
    DDS_OctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [virtual]
```

Analogous to **DDSOctetsDataReader::read\_w\_condition** (p. 1534) except it accesses samples via the **DDSOctetsDataReader::take** (p. 1534) operation.

See also

**FooDataReader::take\_w\_condition** (p. 1658)

#### 9.269.2.5 read\_next\_sample()

```
virtual DDS_ReturnCode_t DDSOctetsDataReader::read_next_sample (
    DDS_Octets & received_data,
    DDS_SampleInfo & sample_info ) [virtual]
```

Copies the next not-previously-accessed data value from the **DDSDDataReader** (p. 1288).

See also

**FooDataReader::read\_next\_sample** (p. 1659)

#### 9.269.2.6 take\_next\_sample()

```
virtual DDS_ReturnCode_t DDSOctetsDataReader::take_next_sample (
    DDS_Octets & received_data,
    DDS_SampleInfo & sample_info ) [virtual]
```

Copies the next not-previously-accessed data value from the **DDSDDataReader** (p. 1288).

See also

**FooDataReader::take\_next\_sample** (p. 1660)

### 9.269.2.7 return\_loan()

```
virtual DDS_ReturnCode_t DDSOctetsDataReader::return_loan (
    DDS_OctetsSeq & received_data,
    DDS_SampleInfoSeq & info_seq ) [virtual]
```

Indicates to the **DDSDataReader** (p. 1288) that the application is done accessing the collection of `received_data` and `info_seq` obtained by some earlier invocation of `read` or `take` on the **DDSDataReader** (p. 1288).

See also

**FooDataReader::return\_loan** (p. 1672)

### 9.269.2.8 narrow()

```
static DDSOctetsDataReader * DDSOctetsDataReader::narrow (
    DDSDataReader * reader ) [static]
```

Narrow the given **DDSDataReader** (p. 1288) pointer to a **DDSOctetsDataReader** (p. 1532) pointer.

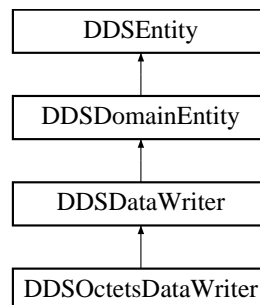
See also

**FooDataReader::narrow** (p. 1651)

## 9.270 DDSOctetsDataWriter Class Reference

<<**interface**>> (p. 237) Instantiates `DataWriter` < **DDS\_Octets** (p. 967) >.

Inheritance diagram for `DDSOctetsDataWriter`:



## Public Member Functions

- virtual **DDS\_Octets** \* **create\_data** (const **DDS\_TypeAllocationParams\_t** &alloc\_params)  
*Creates an octet data sequence.*
- virtual **DDS\_Boolean** **delete\_data** ( **DDS\_Octets** \*sample, const **DDS\_TypeDeallocationParams\_t** &dealloc\_params)  
*Destroys a octet data sequence created by **DDSOctetsDataWriter::create\_data** (p. 1538).*
- virtual **DDS\_ReturnCode\_t** **write** (const **DDS\_Octets** &instance\_data, const **DDS\_InstanceHandle\_t** &handle)  
*Modifies the value of a **DDS\_Octets** (p. 967) data instance.*
- virtual **DDS\_ReturnCode\_t** **write** (const unsigned char \*octets, int length, const **DDS\_InstanceHandle\_t** &handle)  
*<<extension>> (p. 237) Modifies the value of a **DDS\_Octets** (p. 967) data instance.*
- virtual **DDS\_ReturnCode\_t** **write** (const **DDS\_OctetSeq** &octets, const **DDS\_InstanceHandle\_t** &handle)  
*<<extension>> (p. 237) Modifies the value of a **DDS\_Octets** (p. 967) data instance.*
- virtual **DDS\_ReturnCode\_t** **write\_w\_timestamp** (const **DDS\_Octets** &instance\_data, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also provides the value for the **source\_timestamp**.*
- virtual **DDS\_ReturnCode\_t** **write\_w\_timestamp** (const unsigned char \*octets, int length, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*<<extension>> (p. 237) Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also provides the value for the **source\_timestamp**.*
- virtual **DDS\_ReturnCode\_t** **write\_w\_timestamp** (const **DDS\_OctetSeq** &octets, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)  
*<<extension>> (p. 237) Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also provides the value for the **source\_timestamp**.*
- virtual **DDS\_ReturnCode\_t** **write\_w\_params** (const **DDS\_Octets** &instance\_data, **DDS\_WriteParams\_t** &params)  
*Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.*
- virtual **DDS\_ReturnCode\_t** **write\_w\_params** (const unsigned char \*octets, int length, **DDS\_WriteParams\_t** &params)  
*<<extension>> (p. 237) Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.*
- virtual **DDS\_ReturnCode\_t** **write\_w\_params** (const **DDS\_OctetSeq** &octets, **DDS\_WriteParams\_t** &params)  
*<<extension>> (p. 237) Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.*

## Static Public Member Functions

- static **DDSOctetsDataWriter** \* **narrow** ( **DDSDataWriter** \*writer)  
*Narrow the given **DDSDataWriter** (p. 1321) pointer to a **DDSOctetsDataWriter** (p. 1536) pointer.*

### 9.270.1 Detailed Description

<<**interface**>> (p. 237) Instantiates **DataWriter** < **DDS\_Octets** (p. 967) >.

See also

**FooDataWriter** (p. 1676)

**DDSDataWriter** (p. 1321)

## 9.270.2 Member Function Documentation

### 9.270.2.1 narrow()

```
static DDSOctetsDataWriter * DDSOctetsDataWriter::narrow (  
    DDSDataWriter * writer ) [static]
```

Narrow the given **DDSDataWriter** (p. 1321) pointer to a **DDSOctetsDataWriter** (p. 1536) pointer.

See also

**FooDataWriter::narrow** (p. 1678)

### 9.270.2.2 create\_data()

```
virtual DDS_Octets * DDSOctetsDataWriter::create_data (  
    const DDS_TypeAllocationParams_t & alloc_params ) [virtual]
```

Creates an octet data sequence.

The size of the instance is determined by the DataWriter property **dds.builtin\_type.octets.alloc\_size**.

Default size: **dds.builtin\_type.octets.max\_size** property of DomainParticipant if defined. Otherwise 2048.

Created instances must be deleted with **DDSOctetsDataWriter::delete\_data** (p. 1538).

Returns

Newly created octet sequence data, or NULL on failure.

See also

BuiltinTypeMemoryManagement section of Built-in Types.



### 9.270.2.3 delete\_data()

```
virtual DDS_Boolean DDSOctetsDataWriter::delete_data (
    DDS_Octets * sample,
    const DDS_TypeDeallocationParams_t & dealloc_params ) [virtual]
```

Destroys a octet data sequence created by **DDSOctetsDataWriter::create\_data** (p. 1538).

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) upon successful deletion.

### 9.270.2.4 write() [1/3]

```
virtual DDS_ReturnCode_t DDSOctetsDataWriter::write (
    const DDS_Octets & instance_data,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Modifies the value of a **DDS\_Octets** (p. 967) data instance.

#### See also

**FooDataWriter::write** (p. 1683)

### 9.270.2.5 write() [2/3]

```
virtual DDS_ReturnCode_t DDSOctetsDataWriter::write (
    const unsigned char * octets,
    int length,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<**extension**>> (p. 237) Modifies the value of a **DDS\_Octets** (p. 967) data instance.

#### Parameters

<i>octets</i>	<< <b>in</b> >> (p. 238) Array of octets to be published.
<i>length</i>	<< <b>in</b> >> (p. 238) Number of octets to be published.
<i>handle</i>	<< <b>in</b> >> (p. 238) The special value <b>DDS_HANDLE_NIL</b> (p. 76) should be used always.

See also

**FooDataWriter::write** (p. 1683)

### 9.270.2.6 write() [3/3]

```
virtual DDS_ReturnCode_t DDSOctetsDataWriter::write (
    const DDS_OctetSeq & octets,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

<<**extension**>> (p. 237) Modifies the value of a **DDS\_Octets** (p. 967) data instance.

Parameters

<i>octets</i>	<< <b>in</b> >> (p. 238) Sequence of octets to be published.
<i>handle</i>	<< <b>in</b> >> (p. 238) The special value <b>DDS_HANDLE_NIL</b> (p. 76) should be used always.

See also

**FooDataWriter::write** (p. 1683)

### 9.270.2.7 write\_w\_timestamp() [1/3]

```
virtual DDS_ReturnCode_t DDSOctetsDataWriter::write_w_timestamp (
    const DDS_Octets & instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also provides the value for the `source_timestamp`.

See also

**FooDataWriter::write\_w\_timestamp** (p. 1687)

### 9.270.2.8 write\_w\_timestamp() [2/3]

```
virtual DDS_ReturnCode_t DDSOctetsDataWriter::write_w_timestamp (
    const unsigned char * octets,
    int length,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

<<**extension**>> (p. 237) Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also provides the value for the `source_timestamp`.

## Parameters

<i>octets</i>	<< <i>in</i> >> (p. 238) Array of octets to be published.
<i>length</i>	<< <i>in</i> >> (p. 238) Number of octets to be published.
<i>handle</i>	<< <i>in</i> >> (p. 238) The special value <b>DDS_HANDLE_NIL</b> (p. 76) should be used always.
<i>source_timestamp</i>	<< <i>in</i> >> (p. 238) The timestamp value must be greater than or equal to the timestamp value used in the last writer operation. See <b>FooDataWriter::write_w_timestamp</b> (p. 1687).

## See also

**FooDataWriter::write\_w\_timestamp** (p. 1687)

## 9.270.2.9 write\_w\_timestamp() [3/3]

```
virtual DDS_ReturnCode_t DDSOctetsDataWriter::write_w_timestamp (
    const DDS_OctetSeq & octets,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

<<*extension*>> (p. 237) Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also provides the value for the *source\_timestamp*.

## Parameters

<i>octets</i>	<< <i>in</i> >> (p. 238) Sequence of octets to be published.
<i>handle</i>	<< <i>in</i> >> (p. 238) The special value <b>DDS_HANDLE_NIL</b> (p. 76) should be used always.
<i>source_timestamp</i>	<< <i>in</i> >> (p. 238) The timestamp value must be greater than or equal to the timestamp value used in the last writer operation. See <b>FooDataWriter::write_w_timestamp</b> (p. 1687).

## See also

**FooDataWriter::write\_w\_timestamp** (p. 1687)

## 9.270.2.10 write\_w\_params() [1/3]

```
virtual DDS_ReturnCode_t DDSOctetsDataWriter::write_w_params (
    const DDS_Octets & instance_data,
    DDS_WriteParams_t & params ) [virtual]
```

Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.

See also

**FooDataWriter::write\_w\_params** (p. 1688)

### 9.270.2.11 write\_w\_params() [2/3]

```
virtual DDS_ReturnCode_t DDSOctetsDataWriter::write_w_params (
    const unsigned char * octets,
    int length,
    DDS_WriteParams_t & params ) [virtual]
```

<<*extension*>> (p. 237) Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.

Parameters

<i>octets</i>	<< <i>in</i> >> (p. 238) Array of octets to be published.
<i>length</i>	<< <i>in</i> >> (p. 238) Number of octets to be published.
<i>params</i>	<< <i>in</i> >> (p. 238) The <b>DDS_WriteParams_t</b> (p. 1251) parameter containing the instance handle, source timestamp, publication priority, and cookie to be used in write operation. See <b>FooDataWriter::write_w_params</b> (p. 1688).

See also

**FooDataWriter::write\_w\_params** (p. 1688)

### 9.270.2.12 write\_w\_params() [3/3]

```
virtual DDS_ReturnCode_t DDSOctetsDataWriter::write_w_params (
    const DDS_OctetSeq & octets,
    DDS_WriteParams_t & params ) [virtual]
```

<<*extension*>> (p. 237) Performs the same function as **DDSOctetsDataWriter::write** (p. 1539) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.

Parameters

<i>octets</i>	<< <i>in</i> >> (p. 238) Sequence of octets to be published.
<i>params</i>	<< <i>in</i> >> (p. 238) The <b>DDS_WriteParams_t</b> (p. 1251) parameter containing the instance handle, source timestamp, publication priority, and cookie to be used in write operation. See <b>FooDataWriter::write_w_params</b> (p. 1688).

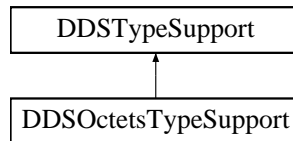
See also

`FooDataWriter::write_w_params` (p. 1688)

## 9.271 DDSOctetsTypeSupport Class Reference

<<*interface*>> (p. 237) `DDS_Octets` (p. 967) type support.

Inheritance diagram for DDSOctetsTypeSupport:



### Static Public Member Functions

- static `DDS_ReturnCode_t register_type ( DDSDomainParticipant *participant, const char *type_name="DDS::Octets")`  
*Allows an application to communicate to RTI Connext the existence of the `DDS_Octets` (p. 967) data type.*
- static `DDS_ReturnCode_t unregister_type ( DDSDomainParticipant *participant, const char *type_name="DDS::Octets")`  
*Allows an application to unregister the `DDS_Octets` (p. 967) data type from RTI Connext. After calling `unregister_type`, no further communication using this type is possible.*
- static const char \* `get_type_name ()`  
*Get the default name for the `DDS_Octets` (p. 967) type.*
- static void `print_data (const DDS_Octets *a_data)`  
 <<*extension*>> (p. 237) *Print value of data type to standard out.*
- static `DDS_TypeCode * get_typecode ()`  
 <<*extension*>> (p. 237) *Retrieves the TypeCode for the Type.*
- static `DDS_ReturnCode_t serialize_data_to_cdr_buffer (char *buffer, unsigned int &length, const DDS_Octets *a_data)`  
 <<*extension*>> (p. 237) *Serializes the input sample into a CDR buffer of octets.*
- static `DDS_ReturnCode_t serialize_data_to_cdr_buffer_ex (char *buffer, unsigned int &length, const DDS_Octets *a_data, DDS_DataRepresentationId_t representation)`  
 <<*extension*>> (p. 237) *Serializes the input sample into a buffer of octets.*
- static `DDS_ReturnCode_t deserialize_data_from_cdr_buffer ( DDS_Octets *a_data, const char *buffer, unsigned int length)`  
 <<*extension*>> (p. 237) *Deserializes a sample from a buffer of octets.*
- static `DDS_ReturnCode_t data_to_string ( DDS_Octets *sample, char *str, DDS_UnsignedLong &str_size, const DDS_PrintFormatProperty &property)`  
 <<*extension*>> (p. 237) *Get the string representation of an input sample.*

### 9.271.1 Detailed Description

<<*interface*>> (p. 237) `DDS_Octets` (p. 967) type support.

## 9.271.2 Member Function Documentation

### 9.271.2.1 register\_type()

```
static DDS_ReturnCode_t DDSOctetsTypeSupport::register_type (
    DDSDomainParticipant * participant,
    const char * type_name = "DDS::Octets" ) [static]
```

Allows an application to communicate to RTI Connexx the existence of the **DDS\_Octets** (p. 967) data type.

By default, The **DDS\_Octets** (p. 967) built-in type is automatically registered when a DomainParticipant is created using the type\_name returned by **DDSOctetsTypeSupport::get\_type\_name** (p. 1545). Therefore, the usage of this function is optional and it is only required when the automatic built-in type registration is disabled using the participant property "dds.builtin\_type.auto\_register".

This method can also be used to register the same **DDSOctetsTypeSupport** (p. 1543) with a **DDSDomainParticipant** (p. 1351) using different values for the type\_name.

If **register\_type** is called multiple times with the same **DDSDomainParticipant** (p. 1351) and type\_name, the second (and subsequent) registrations are ignored by the operation.

#### Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to register the data type <b>DDS_Octets</b> (p. 967) with. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) the type name under with the data type <b>DDS_Octets</b> (p. 967) is registered with the participant; this type name is used when creating a new <b>DDSTopic</b> (p. 1617). (See <b>DDSDomainParticipant::create_topic</b> (p. 1382).) The name may not be NULL or longer than 255 characters.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

#### MT Safety:

UNSAFE on the FIRST call. It is not safe for two threads to simultaneously make the first call to register a type. Subsequent calls are thread safe.

#### See also

**DDSDomainParticipant::create\_topic** (p. 1382)

### 9.271.2.2 unregister\_type()

```
static DDS_ReturnCode_t DDSOctetsTypeSupport::unregister_type (
    DDSDomainParticipant * participant,
    const char * type_name = "DDS::Octets" ) [static]
```

Allows an application to unregister the **DDS\_Octets** (p. 967) data type from RTI Connext. After calling `unregister_type`, no further communication using this type is possible.

#### Precondition

The **DDS\_Octets** (p. 967) type with `type_name` is registered with the participant and all **DDSTopic** (p. 1617) objects referencing the type have been destroyed. If the type is not registered with the participant, or if any **DDSTopic** (p. 1617) is associated with the type, the operation will fail with **DDS\_RETCODE\_ERROR** (p. 336).

#### Postcondition

All information about the type is removed from RTI Connext. No further communication using this type is possible.

#### Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to unregister the data type <b>DDS_Octets</b> (p. 967) from. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) the type name under which the data type <b>DDS_Octets</b> (p. 967) is registered with the participant. The name should match a name that has been previously used to register a type with the participant. Cannot be NULL.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336) or <b>DDS_RETCODE_ERROR</b> (p. 336)
------------	--

#### MT Safety:

SAFE.

#### See also

**DDSOctetsTypeSupport::register\_type** (p. 1544)

### 9.271.2.3 get\_type\_name()

```
static const char * DDSOctetsTypeSupport::get_type_name ( ) [static]
```

Get the default name for the **DDS\_Octets** (p. 967) type.

Can be used for calling **DDSOctetsTypeSupport::register\_type** (p. 1544) or creating **DDSTopic** (p. 1617).

**Returns**

default name for the **DDS\_Octets** (p. 967) type.

**See also**

**DDSOctetsTypeSupport::register\_type** (p. 1544)

**DDSDomainParticipant::create\_topic** (p. 1382)

**9.271.2.4 print\_data()**

```
static void DDSOctetsTypeSupport::print_data (
    const DDS_Octets * a_data ) [static]
```

<<**extension**>> (p. 237) Print value of data type to standard out.

The *generated* implementation of the operation knows how to print value of a data type.

**Parameters**

<i>a_data</i>	<< <b>in</b> >> (p. 238) <b>DDS_Octets</b> (p. 967) to be printed.
---------------	--

**9.271.2.5 get\_typecode()**

```
static DDS_TypeCode * DDSOctetsTypeSupport::get_typecode ( ) [static]
```

<<**extension**>> (p. 237) Retrieves the TypeCode for the Type.

**See also**

**FooTypeSupport::get\_typecode** (p. 1723)

**9.271.2.6 serialize\_data\_to\_cdr\_buffer()**

```
static DDS_ReturnCode_t DDSOctetsTypeSupport::serialize_data_to_cdr_buffer (
    char * buffer,
    unsigned int & length,
    const DDS_Octets * a_data ) [static]
```

<<**extension**>> (p. 237) Serializes the input sample into a CDR buffer of octets.

**See also**

**FooTypeSupport::serialize\_data\_to\_cdr\_buffer** (p. 1721)



### 9.271.2.7 serialize\_data\_to\_cdr\_buffer\_ex()

```
static DDS_ReturnCode_t DDSOctetsTypeSupport::serialize_data_to_cdr_buffer_ex (
    char * buffer,
    unsigned int & length,
    const DDS_Octets * a_data,
    DDS_DataRepresentationId_t representation ) [static]
```

<<**extension**>> (p. 237) Serializes the input sample into a buffer of octets.

See also

**FooTypeSupport::serialize\_data\_to\_cdr\_buffer** (p. 1721)

### 9.271.2.8 deserialize\_data\_from\_cdr\_buffer()

```
static DDS_ReturnCode_t DDSOctetsTypeSupport::deserialize_data_from_cdr_buffer (
    DDS_Octets * a_data,
    const char * buffer,
    unsigned int length ) [static]
```

<<**extension**>> (p. 237) Deserializes a sample from a buffer of octets.

See also

**FooTypeSupport::deserialize\_data\_from\_cdr\_buffer** (p. 1722)

### 9.271.2.9 data\_to\_string()

```
static DDS_ReturnCode_t DDSOctetsTypeSupport::data_to_string (
    DDS_Octets * sample,
    char * str,
    DDS_UnsignedLong & str_size,
    const DDS_PrintFormatProperty & property ) [static]
```

<<**extension**>> (p. 237) Get the string representation of an input sample.

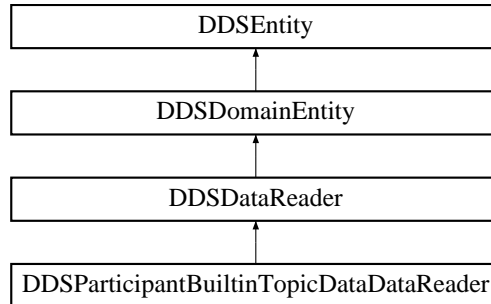
See also

**FooTypeSupport::data\_to\_string** (p. 1723)

## 9.272 DDSParticipantBuiltinTopicDataDataReader Class Reference

Instantiates `DataReader < DDS_ParticipantBuiltinTopicData (p. 979) >` .

Inheritance diagram for `DDSParticipantBuiltinTopicDataDataReader`:



### Additional Inherited Members

#### 9.272.1 Detailed Description

Instantiates `DataReader < DDS_ParticipantBuiltinTopicData (p. 979) >` .

`DDSDataReader` (p.1288) of topic `DDS_PARTICIPANT_TOPIC_NAME` (p.295) used for accessing `DDS_ParticipantBuiltinTopicData` (p. 979) of the remote `DDSDomainParticipant` (p. 1351).

Instantiates:

`<<generic>>` (p. 237) `FooDataReader` (p. 1649)

See also

`DDS_ParticipantBuiltinTopicData` (p. 979)

`DDS_PARTICIPANT_TOPIC_NAME` (p. 295)

## 9.273 DDSParticipantBuiltinTopicDataTypeSupport Class Reference

Instantiates `TypeSupport < DDS_ParticipantBuiltinTopicData (p. 979) >` .

#### 9.273.1 Detailed Description

Instantiates `TypeSupport < DDS_ParticipantBuiltinTopicData (p. 979) >` .

Instantiates:

`<<generic>>` (p. 237) `FooTypeSupport` (p. 1711)

See also

`DDS_ParticipantBuiltinTopicData` (p. 979)

## 9.274 DDSPropertyQosPolicyHelper Class Reference

Policy helpers that facilitate management of the properties in the input policy.

### Static Public Member Functions

- static **DDS\_Long** **get\_number\_of\_properties** ( **DDS\_PropertyQosPolicy** &policy)  
*Gets the number of properties in the input policy.*
- static **DDS\_ReturnCode\_t** **assert\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name, const char \*value, **DDS\_Boolean** propagate)  
*Asserts the property identified by name in the input policy.*
- static **DDS\_ReturnCode\_t** **add\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name, const char \*value, **DDS\_Boolean** propagate)  
*Adds a new property to the input policy.*
- static **DDS\_ReturnCode\_t** **assert\_pointer\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name, const void \*pointer)  
*Asserts the property identified by name in the input policy. Used when the property to store is a pointer.*
- static **DDS\_ReturnCode\_t** **add\_pointer\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name, const void \*pointer)  
*Adds a new property to the input policy. Used when the property to store is a pointer.*
- static struct **DDS\_Property\_t**\* **lookup\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name)  
*Searches for a property in the input policy given its name.*
- static **DDS\_ReturnCode\_t** **remove\_property** ( **DDS\_PropertyQosPolicy** &policy, const char \*name)  
*Removes a property from the input policy.*
- static **DDS\_ReturnCode\_t** **get\_properties** ( **DDS\_PropertyQosPolicy** &policy, struct **DDS\_PropertySeq** &properties, const char \*name\_prefix)  
*Retrieves a list of properties whose names match the input prefix.*

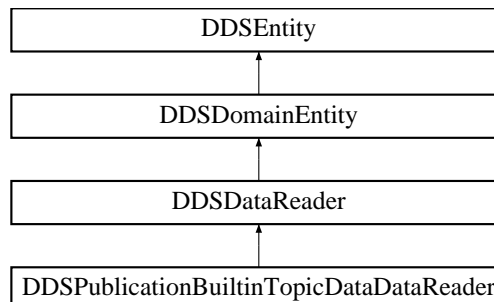
### 9.274.1 Detailed Description

Policy helpers that facilitate management of the properties in the input policy.

## 9.275 DDSPublicationBuiltinTopicDataDataReader Class Reference

Instantiates `DataReader < DDS_PublicationBuiltinTopicData (p. 1010) >` .

Inheritance diagram for `DDSPublicationBuiltinTopicDataDataReader`:



## Additional Inherited Members

### 9.275.1 Detailed Description

Instantiates `DataReader < DDS_PublicationBuiltinTopicData (p. 1010) >` .

**DDSDataReader** (p.1288) of topic **DDS\_PUBLICATION\_TOPIC\_NAME** (p.298) used for accessing **DDS\_↔PublicationBuiltinTopicData** (p.1010) of the remote **DDSDataWriter** (p.1321) and the associated **DDSPublisher** (p. 1550).

Instantiates:

`<<generic>>` (p. 237) **FooDataReader** (p. 1649)

See also

**DDS\_PublicationBuiltinTopicData** (p. 1010)

**DDS\_PUBLICATION\_TOPIC\_NAME** (p. 298)

## 9.276 DDSPublicationBuiltinTopicDataTypeSupport Class Reference

Instantiates `TypeSupport < DDS_PublicationBuiltinTopicData (p. 1010) >` .

### 9.276.1 Detailed Description

Instantiates `TypeSupport < DDS_PublicationBuiltinTopicData (p. 1010) >` .

Instantiates:

`<<generic>>` (p. 237) **FooTypeSupport** (p. 1711)

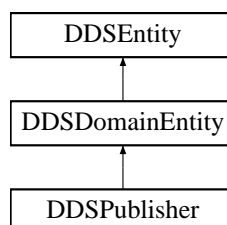
See also

**DDS\_PublicationBuiltinTopicData** (p. 1010)

## 9.277 DDSPublisher Class Reference

`<<interface>>` (p. 237) A publisher is the object responsible for the actual dissemination of publications.

Inheritance diagram for `DDSPublisher`:



## Public Member Functions

- virtual **DDS\_ReturnCode\_t** **get\_default\_datawriter\_qos** ( **DDS\_DataWriterQos** &qos)=0  
*Copies the default **DDS\_DataWriterQos** (p. 689) values into the provided **DDS\_DataWriterQos** (p. 689) instance.*
- virtual **DDS\_ReturnCode\_t** **set\_default\_datawriter\_qos** (const **DDS\_DataWriterQos** &qos)=0  
*Sets the default **DDS\_DataWriterQos** (p. 689) values for this publisher.*
- virtual **DDS\_ReturnCode\_t** **set\_default\_datawriter\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0  
 <<extension>> (p. 237) *Set the default **DDS\_DataWriterQos** (p. 689) values for this publisher based on the input XML QoS profile.*
- virtual **DDS\_ReturnCode\_t** **set\_default\_library** (const char \*library\_name)=0  
 <<extension>> (p. 237) *Sets the default XML library for a **DDSPublisher** (p. 1550).*
- virtual const char \* **get\_default\_library** ()=0  
 <<extension>> (p. 237) *Gets the default XML library associated with a **DDSPublisher** (p. 1550).*
- virtual **DDS\_ReturnCode\_t** **set\_default\_profile** (const char \*library\_name, const char \*profile\_name)=0  
 <<extension>> (p. 237) *Sets the default XML profile for a **DDSPublisher** (p. 1550).*
- virtual const char \* **get\_default\_profile** ()=0  
 <<extension>> (p. 237) *Gets the default XML profile associated with a **DDSPublisher** (p. 1550).*
- virtual const char \* **get\_default\_profile\_library** ()=0  
 <<extension>> (p. 237) *Gets the library where the default XML QoS profile is contained for a **DDSPublisher** (p. 1550).*
- virtual **DDSDataWriter** \* **create\_datawriter** ( **DDSTopic** \*topic, const **DDS\_DataWriterQos** &qos, **DDSDataWriterListener** \*listener, **DDS\_StatusMask** mask)=0  
*Creates a **DDSDataWriter** (p. 1321) that will be attached and belong to the **DDSPublisher** (p. 1550).*
- virtual **DDSDataWriter** \* **create\_datawriter\_with\_profile** ( **DDSTopic** \*topic, const char \*library\_name, const char \*profile\_name, **DDSDataWriterListener** \*listener, **DDS\_StatusMask** mask)=0  
 <<extension>> (p. 237) *Creates a **DDSDataWriter** (p. 1321) object using the **DDS\_DataWriterQos** (p. 689) associated with the input XML QoS profile.*
- virtual **DDS\_ReturnCode\_t** **delete\_datawriter** ( **DDSDataWriter** \*a\_datawriter)=0  
*Deletes a **DDSDataWriter** (p. 1321) that belongs to the **DDSPublisher** (p. 1550).*
- virtual **DDSDataWriter** \* **lookup\_datawriter** (const char \*topic\_name)=0  
*Retrieves the **DDSDataWriter** (p. 1321) for a specific **DDSTopic** (p. 1617).*
- virtual **DDS\_ReturnCode\_t** **get\_all\_datawriters** (**DDSDataWriterSeq** &writers)=0  
*Retrieve all the DataWriters created from this Publisher.*
- virtual **DDS\_ReturnCode\_t** **suspend\_publications** ()=0  
*Indicates to RTI Connext that the application is about to make multiple modifications using **DDSDataWriter** (p. 1321) objects belonging to the **DDSPublisher** (p. 1550).*
- virtual **DDS\_ReturnCode\_t** **resume\_publications** ()=0  
*Indicates to RTI Connext that the application has completed the multiple changes initiated by the previous **DDSPublisher::suspend\_publications** (p. 1562).*
- virtual **DDS\_ReturnCode\_t** **begin\_coherent\_changes** ()=0  
*Indicates that the application will begin a coherent set of modifications using **DDSDataWriter** (p. 1321) objects attached to the **DDSPublisher** (p. 1550).*
- virtual **DDS\_ReturnCode\_t** **end\_coherent\_changes** ()=0  
*Terminates the coherent set initiated by the matching call to **DDSPublisher::begin\_coherent\_changes** (p. 1564).*
- virtual **DDSDomainParticipant** \* **get\_participant** ()=0  
*Returns the **DDSDomainParticipant** (p. 1351) to which the **DDSPublisher** (p. 1550) belongs.*
- virtual **DDS\_ReturnCode\_t** **delete\_contained\_entities** ()=0  
*Deletes all the entities that were created by means of the "create" operation on the **DDSPublisher** (p. 1550).*

- virtual **DDS\_ReturnCode\_t copy\_from\_topic\_qos** ( **DDS\_DataWriterQos** &a\_datawriter\_qos, const **DDS\_↔  
TopicQos** &a\_topic\_qos)=0  
*Copies the policies in the **DDS\_TopicQos** (p. 1135) to the corresponding policies in the **DDS\_DataWriterQos** (p. 689).*
- virtual **DDS\_ReturnCode\_t wait\_for\_acknowledgments** (const **DDS\_Duration\_t** &max\_wait)=0  
*Blocks the calling thread until all data written by the Publisher's reliable DataWriters is acknowledged, or until timeout expires.*
- virtual **DDS\_ReturnCode\_t wait\_for\_asynchronous\_publishing** (const **DDS\_Duration\_t** &max\_wait)=0  
*<<extension>> (p. 237) Blocks the calling thread until asynchronous sending is complete.*
- virtual **DDS\_ReturnCode\_t set\_qos** (const **DDS\_PublisherQos** &qos)=0  
*Sets the publisher QoS.*
- virtual **DDS\_ReturnCode\_t set\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0  
*<<extension>> (p. 237) Change the QoS of this publisher using the input XML QoS profile.*
- virtual **DDS\_ReturnCode\_t get\_qos** ( **DDS\_PublisherQos** &qos)=0  
*Gets the publisher QoS.*
- virtual **DDS\_ReturnCode\_t set\_listener** ( **DDSPublisherListener** \*l, **DDS\_StatusMask** mask= **DDS\_↔  
STATUS\_MASK\_ALL**)=0  
*Sets the publisher listener.*
- virtual **DDSPublisherListener \* get\_listener** ()=0  
*Get the publisher listener.*
- virtual **DDSDataWriter \* lookup\_datawriter\_by\_name** (const char \*datawriter\_name)=0  
*<<extension>> (p. 237) Retrieves a **DDSDataWriter** (p. 1321) contained within the **DDSPublisher** (p. 1550) the **DDSDataWriter** (p. 1321) entity name.*

### 9.277.1 Detailed Description

<<**interface**>> (p. 237) A publisher is the object responsible for the actual dissemination of publications.

QoS:

**DDS\_PublisherQos** (p. 1022)

Listener:

**DDSPublisherListener** (p. 1571)

A publisher acts on the behalf of one or several **DDSDataWriter** (p. 1321) objects that belong to it. When it is informed of a change to the data associated with one of its **DDSDataWriter** (p. 1321) objects, it decides when it is appropriate to actually send the data-update message. In making this decision, it considers any extra information that goes with the data (timestamp, writer, etc.) as well as the QoS of the **DDSPublisher** (p. 1550) and the **DDSDataWriter** (p. 1321).

The following operations may be called even if the **DDSPublisher** (p. 1550) is not enabled. Other operations will fail with the value **DDS\_RETCODE\_NOT\_ENABLED** (p. 337) if called on a disabled **DDSPublisher** (p. 1550):

- **DDSEntity::enable** (p. 1466),
- **DDSPublisher::set\_qos** (p. 1568), **DDSPublisher::get\_qos** (p. 1569) , **DDSPublisher::set\_qos\_with\_profile** (p. 1569)

- `DDSPublisher::set_listener` (p. 1570), `DDSPublisher::get_listener` (p. 1570),
- `DDSEntity::get_statuscondition` (p. 1467), `DDSEntity::get_status_changes` (p. 1467)
- `DDSPublisher::create_datawriter` (p. 1558), `DDSPublisher::create_datawriter_with_profile` (p. 1559), `DDSPublisher::delete_contained_entities` (p. 1565), `DDSPublisher::delete_datawriter` (p. 1561),
- `DDSPublisher::set_default_datawriter_qos` (p. 1554), `DDSPublisher::set_default_datawriter_qos_with_profile` (p. 1555), `DDSPublisher::get_default_datawriter_qos` (p. 1553), `DDSPublisher::wait_for_acks` (p. 1567), `DDSPublisher::set_default_library` (p. 1555), `DDSPublisher::set_default_profile` (p. 1556),

See also

[Operations Allowed in Listener Callbacks](#) (p. 1528)

Examples

`HelloWorld_publisher.cxx`.

## 9.277.2 Member Function Documentation

### 9.277.2.1 `get_default_datawriter_qos()`

```
virtual DDS_ReturnCode_t DDSPublisher::get_default_datawriter_qos (
    DDS_DataWriterQos & qos ) [pure virtual]
```

Copies the default `DDS_DataWriterQos` (p. 689) values into the provided `DDS_DataWriterQos` (p. 689) instance.

The retrieved `qos` will match the set of values specified on the last successful call to `DDSPublisher::set_default_datawriter_qos` (p. 1554) or `DDSPublisher::set_default_datawriter_qos_with_profile` (p. 1555), or else, if the call was never made, the default values from its owning `DDSDomainParticipant` (p. 1351).

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

MT Safety:

UNSAFE. It is not safe to retrieve the default QoS value from a `DDSPublisher` (p. 1550) while another thread may be simultaneously calling `DDSPublisher::set_default_datawriter_qos` (p. 1554).

Parameters

<code>qos</code>	<< <i>inout</i> >> (p. 238) <code>DDS_DataWriterQos</code> (p. 689) to be filled-up.
------------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110)

**DDSPublisher::create\_datawriter** (p. 1558)

### 9.277.2.2 set\_default\_datawriter\_qos()

```
virtual DDS_ReturnCode_t DDSPublisher::set_default_datawriter_qos (
    const DDS_DataWriterQos & qos ) [pure virtual]
```

Sets the default **DDS\_DataWriterQos** (p. 689) values for this publisher.

This call causes the default values inherited from the owning **DDSDomainParticipant** (p. 1351) to be overridden.

This default value will be used for newly created **DDSDataWriter** (p. 1321) if **DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110) is specified as the `qos` parameter when **DDSPublisher::create\_datawriter** (p. 1558) is called.

## Precondition

The specified QoS policies must be consistent, or else the operation will have no effect and fail with **DDS\_↔  
RETCODE\_INCONSISTENT\_POLICY** (p. 337)

## MT Safety:

UNSAFE. It is not safe to set the default QoS value from a **DDSPublisher** (p. 1550) while another thread may be simultaneously calling **DDSPublisher::set\_default\_datawriter\_qos** (p. 1554), **DDSPublisher::get\_default\_↔  
\_datawriter\_qos** (p. 1553) or calling **DDSPublisher::create\_datawriter** (p. 1558) with **DDS\_DATAWRITER\_↔  
QOS\_DEFAULT** (p. 110) as the `qos` parameter.

## Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) Default qos to be set. The special value <b>DDS_DATAREADER_QOS_DEFAULT</b> (p. 132) may be passed as <code>qos</code> to indicate that the default QoS should be reset back to the initial values the factory would use if <b>DDSPublisher::set_default_datawriter_qos</b> (p. 1554) had never been called.
------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--



### 9.277.2.3 set\_default\_datawriter\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSPublisher::set_default_datawriter_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Set the default **DDS\_DataWriterQos** (p. 689) values for this publisher based on the input XML QoS profile.

This default value will be used for newly created **DDSDataWriter** (p. 1321) if **DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110) is specified as the `qos` parameter when **DDSPublisher::create\_datawriter** (p. 1558) is called.

#### Precondition

The **DDS\_DataWriterQos** (p. 689) contained in the specified XML QoS profile must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

#### MT Safety:

UNSAFE. It is not safe to set the default QoS value from a **DDSPublisher** (p. 1550) while another thread may be simultaneously calling **DDSPublisher::set\_default\_datawriter\_qos** (p. 1554), **DDSPublisher::get\_default\_datawriter\_qos** (p. 1553) or calling **DDSPublisher::create\_datawriter** (p. 1558) with **DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110) as the `qos` parameter.

#### Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If <code>library_name</code> is null RTI Connexx will use the default library (see <b>DDSPublisher::set_default_library</b> (p. 1555)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If <code>profile_name</code> is null RTI Connexx will use the default profile (see <b>DDSPublisher::set_default_profile</b> (p. 1556)).

If the input profile cannot be found, the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

#### See also

**DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110)

**DDSPublisher::create\_datawriter\_with\_profile** (p. 1559)

### 9.277.2.4 set\_default\_library()

```
virtual DDS_ReturnCode_t DDSPublisher::set_default_library (
    const char * library_name ) [pure virtual]
```

<<*extension*>> (p. 237) Sets the default XML library for a **DDSPublisher** (p. 1550).

This method specifies the library that will be used as the default the next time a default library is needed during a call to one of this Publisher's operations.

Any API requiring a library\_name as a parameter can use null to refer to the default library.

If the default library is not set, the **DDSPublisher** (p. 1550) inherits the default from the **DDSDomainParticipant** (p. 1351) (see **DDSDomainParticipant::set\_default\_library** (p. 1367)).

#### Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name. If library_name is null any previous default is unset.
---------------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDSPublisher::get\_default\_library** (p. 1556)

### 9.277.2.5 get\_default\_library()

```
virtual const char * DDSPublisher::get_default_library ( ) [pure virtual]
```

<<*extension*>> (p. 237) Gets the default XML library associated with a **DDSPublisher** (p. 1550).

#### Returns

The default library or null if the default library was not set.

#### See also

**DDSPublisher::set\_default\_library** (p. 1555)

### 9.277.2.6 set\_default\_profile()

```
virtual DDS_ReturnCode_t DDSPublisher::set_default_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Sets the default XML profile for a **DDSPublisher** (p. 1550).

This method specifies the profile that will be used as the default the next time a default Publisher profile is needed during a call to one of this Publisher's operations. When calling a **DDSPublisher** (p. 1550) method that requires a `profile_name` parameter, you can use NULL to refer to the default profile. (This same information applies to setting a default library.)

If the default profile is not set, the **DDSPublisher** (p.1550) inherits the default from the **DDSDomainParticipant** (p. 1351) (see **DDSDomainParticipant::set\_default\_profile** (p. 1368)).

This method does not set the default QoS for **DDSDataWriter** (p. 1321) objects created by the **DDSPublisher** (p. 1550); for this functionality, use **DDSPublisher::set\_default\_datawriter\_qos\_with\_profile** (p. 1555) (you may pass in NULL after having called **set\_default\_profile()** (p. 1556)).

This method does not set the default QoS for newly created Publishers; for this functionality, use **DDSDomainParticipant::set\_default\_publisher\_qos\_with\_profile** (p. 1372).

#### Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) The library name containing the profile.
<i>profile_name</i>	<< <b>in</b> >> (p. 238) The profile name. If profile_name is null any previous default is unset.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDSPublisher::get\_default\_profile** (p. 1557)

**DDSPublisher::get\_default\_profile\_library** (p. 1558)

### 9.277.2.7 get\_default\_profile()

```
virtual const char * DDSPublisher::get_default_profile ( ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the default XML profile associated with a **DDSPublisher** (p. 1550).

#### Returns

The default profile or null if the default profile was not set.

See also

**DDSPublisher::set\_default\_profile** (p. 1556)

### 9.277.2.8 get\_default\_profile\_library()

```
virtual const char * DDSPublisher::get_default_profile_library ( ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the library where the default XML QoS profile is contained for a **DDSPublisher** (p. 1550).

The default profile library is automatically set when **DDSPublisher::set\_default\_profile** (p. 1556) is called.

This library can be different than the **DDSPublisher** (p. 1550) default library (see **DDSPublisher::get\_default\_library** (p. 1556)).

Returns

The default profile library or null if the default profile was not set.

See also

**DDSPublisher::set\_default\_profile** (p. 1556)

### 9.277.2.9 create\_datawriter()

```
virtual DDSDataWriter * DDSPublisher::create_datawriter (
    DDSTopic * topic,
    const DDS_DataWriterQos & qos,
    DDSDataWriterListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

Creates a **DDSDataWriter** (p. 1321) that will be attached and belong to the **DDSPublisher** (p. 1550).

For each application-defined type, **Foo** (p. 1648), there is an implied, auto-generated class **FooDataWriter** (p. 1676) that extends **DDSDataWriter** (p. 1321) and contains the operations to write data of type **Foo** (p. 1648).

Note that a common application pattern to construct the QoS for the **DDSDataWriter** (p. 1321) is to:

- Retrieve the QoS policies on the associated **DDSTopic** (p. 1617) by means of the **DDSTopic::get\_qos** (p. 1621) operation.
- Retrieve the default **DDSDataWriter** (p. 1321) qos by means of the **DDSPublisher::get\_default\_datawriter\_qos** (p. 1553) operation.
- Combine those two QoS policies (for example, using **DDSPublisher::copy\_from\_topic\_qos** (p. 1566)) and selectively modify policies as desired.

When a **DDSDataWriter** (p. 1321) is created, only those transports already registered are available to the **DDSDataWriter** (p. 1321). See **Built-in Transport Plugins** (p. 177) for details on when a builtin transport is registered.

**Precondition**

If publisher is enabled, topic must have been enabled. Otherwise, this operation will fail and no **DDSDataWriter** (p. 1321) will be created.

The given **DDSTopic** (p. 1617) must have been created from the same participant as this publisher. If it was created from a different participant, this method will fail.

**MT Safety:**

UNSAFE. If **DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110) is used for the `qos` parameter, it is not safe to create the datawriter while another thread may be simultaneously calling **DDSPublisher::set\_default\_datawriter\_qos** (p. 1554).

**Parameters**

<i>topic</i>	<< <i>in</i> >> (p. 238) The <b>DDSTopic</b> (p. 1617) that the <b>DDSDataWriter</b> (p. 1321) will be associated with. Cannot be NULL.
<i>qos</i>	<< <i>in</i> >> (p. 238) QoS to be used for creating the new <b>DDSDataWriter</b> (p. 1321). The special value <b>DDS_DATAWRITER_QOS_DEFAULT</b> (p. 110) can be used to indicate that the <b>DDSDataWriter</b> (p. 1321) should be created with the default <b>DDS_DataWriterQos</b> (p. 689) set in the <b>DDSPublisher</b> (p. 1550). The special value <b>DDS_DATAWRITER_QOS_USE_TOPIC_QOS</b> (p. 110) can be used to indicate that the <b>DDSDataWriter</b> (p. 1321) should be created with the combination of the default <b>DDS_DataWriterQos</b> (p. 689) set on the <b>DDSPublisher</b> (p. 1550) and the <b>DDS_TopicQos</b> (p. 1135) of the <b>DDSTopic</b> (p. 1617).
<i>listener</i>	<< <i>in</i> >> (p. 238) The listener of the <b>DDSDataWriter</b> (p. 1321).
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

**Returns**

A **DDSDataWriter** (p. 1321) of a derived class specific to the data type associated with the **DDSTopic** (p. 1617) or NULL if an error occurred.

**See also**

**FooDataWriter** (p. 1676)

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_DataWriterQos** (p. 689) for rules on consistency among QoS

**DDS\_DATAWRITER\_QOS\_DEFAULT** (p. 110)

**DDS\_DATAWRITER\_QOS\_USE\_TOPIC\_QOS** (p. 110)

**DDSPublisher::create\_datawriter\_with\_profile** (p. 1559)

**DDSPublisher::get\_default\_datawriter\_qos** (p. 1553)

**DDSTopic::set\_qos** (p. 1619)

**DDSPublisher::copy\_from\_topic\_qos** (p. 1566)

**DDSDataWriter::set\_listener** (p. 1339)

**Examples**

**HelloWorld\_publisher.cxx.**

### 9.277.2.10 create\_datawriter\_with\_profile()

```
virtual DDSDataWriter * DDSPublisher::create_datawriter_with_profile (
    DDSTopic * topic,
    const char * library_name,
    const char * profile_name,
    DDSDataWriterListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<**extension**>> (p. 237) Creates a **DDSDataWriter** (p. 1321) object using the **DDS\_DataWriterQos** (p. 689) associated with the input XML QoS profile.

The **DDSDataWriter** (p. 1321) will be attached and belong to the **DDSPublisher** (p. 1550).

For each application-defined type, **Foo** (p. 1648), there is an implied, auto-generated class **FooDataWriter** (p. 1676) that extends **DDSDataWriter** (p. 1321) and contains the operations to write data of type **Foo** (p. 1648).

When a **DDSDataWriter** (p. 1321) is created, only those transports already registered are available to the **DDSDataWriter** (p. 1321). See **Built-in Transport Plugins** (p. 177) for details on when a builtin transport is registered.

#### Precondition

If publisher is enabled, topic must have been enabled. Otherwise, this operation will fail and no **DDSDataWriter** (p. 1321) will be created.

The given **DDSTopic** (p. 1617) must have been created from the same participant as this publisher. If it was created from a different participant, this method will return NULL.

#### Parameters

<i>topic</i>	<< <b>in</b> >> (p. 238) The <b>DDSTopic</b> (p. 1617) that the <b>DDSDataWriter</b> (p. 1321) will be associated with. Cannot be NULL.
<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexx will use the default library (see <b>DDSPublisher::set_default_library</b> (p. 1555)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexx will use the default profile (see <b>DDSPublisher::set_default_profile</b> (p. 1556)).
<i>listener</i>	<< <b>in</b> >> (p. 238) The listener of the <b>DDSDataWriter</b> (p. 1321).
<i>mask</i>	<< <b>in</b> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

#### Returns

A **DDSDataWriter** (p. 1321) of a derived class specific to the data type associated with the **DDSTopic** (p. 1617) or NULL if an error occurred.

#### See also

**FooDataWriter** (p. 1676)

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_DataWriterQos** (p. 689) for rules on consistency among QoS

**DDSPublisher::create\_datawriter** (p. 1558)  
**DDSPublisher::get\_default\_datawriter\_qos** (p. 1553)  
**DDSTopic::set\_qos** (p. 1619)  
**DDSPublisher::copy\_from\_topic\_qos** (p. 1566)  
**DDSDataWriter::set\_listener** (p. 1339)

### 9.277.2.11 delete\_datawriter()

```
virtual DDS_ReturnCode_t DDSPublisher::delete_datawriter (
    DDSDataWriter * a_datawriter ) [pure virtual]
```

Deletes a **DDSDataWriter** (p. 1321) that belongs to the **DDSPublisher** (p. 1550).

The deletion of the **DDSDataWriter** (p. 1321) will automatically unregister all instances.

#### Precondition

If the **DDSDataWriter** (p. 1321) does not belong to the **DDSPublisher** (p. 1550), the operation will fail with **DDS↔\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

#### Postcondition

Listener installed on the **DDSDataWriter** (p. 1321) will not be called after this method completes successfully.

#### MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

#### Parameters

<i>a_datawriter</i>	<< <i>in</i> >> (p. 238) The <b>DDSDataWriter</b> (p. 1321) to be deleted.
---------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	---

### 9.277.2.12 lookup\_datawriter()

```
virtual DDSDataWriter * DDSPublisher::lookup_datawriter (
```

```
const char * topic_name ) [pure virtual]
```

Retrieves the **DDSDataWriter** (p. 1321) for a specific **DDSTopic** (p. 1617).

This returned **DDSDataWriter** (p. 1321) is either enabled or disabled.

If more than one **DDSDataWriter** (p. 1321) is attached to the **DDSPublisher** (p. 1550) with the same `topic_name`, then this operation may return any one of them.

#### MT Safety:

UNSAFE. It is not safe to lookup a **DDSDataWriter** (p. 1321) in one thread while another thread is simultaneously creating or destroying that **DDSDataWriter** (p. 1321).

#### Parameters

<code>topic_name</code>	<< <i>in</i> >> (p. 238) Name of the <b>DDSTopic</b> (p. 1617) associated with the <b>DDSDataWriter</b> (p. 1321) that is to be looked up. Cannot be NULL.
-------------------------	--

#### Returns

A **DDSDataWriter** (p. 1321) that belongs to the **DDSPublisher** (p. 1550) attached to the **DDSTopic** (p. 1617) with `topic_name`. If no such **DDSDataWriter** (p. 1321) exists, this operation returns NULL.

### 9.277.2.13 get\_all\_datawriters()

```
virtual DDS_ReturnCode_t DDSPublisher::get_all_datawriters (
    DDSDataWriterSeq & writers ) [pure virtual]
```

Retrieve all the DataWriters created from this Publisher.

#### Parameters

<code>writers</code>	<< <i>inout</i> >> (p. 238) Sequence where the DataWriters will be added
----------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.277.2.14 suspend\_publications()

```
virtual DDS_ReturnCode_t DDSPublisher::suspend_publications ( ) [pure virtual]
```



Indicates to RTI Connex that the application is about to make multiple modifications using **DDSDataWriter** (p. 1321) objects belonging to the **DDSPublisher** (p. 1550).

It is a **hint** to RTI Connex so it can optimize its performance by e.g., holding the dissemination of the modifications and then batching them.

The use of this operation must be matched by a corresponding call to **DDSPublisher::resume\_publications** (p. 1563) indicating that the set of modifications has completed.

If the **DDSPublisher** (p. 1550) is deleted before **DDSPublisher::resume\_publications** (p. 1563) is called, any suspended updates yet to be published will be discarded.

RTI Connex is not required and does not currently make use of this hint in any way. However, similar results can be achieved by using *asynchronous publishing*. Combined with **DDSFlowController** (p. 1468), **DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431) **DDSDataWriter** (p. 1321) instances allow the user even finer control of traffic shaping and sample coalescing.

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
-----	--

#### See also

- DDSFlowController** (p. 1468)
- DDSFlowController::trigger\_flow** (p. 1470)
- DDS\_ON\_DEMAND\_FLOW\_CONTROLLER\_NAME** (p. 123)
- DDS\_PublishModeQosPolicy** (p. 1025)

### 9.277.2.15 resume\_publications()

```
virtual DDS_ReturnCode_t DDSPublisher::resume_publications ( ) [pure virtual]
```

Indicates to RTI Connex that the application has completed the multiple changes initiated by the previous **DDSPublisher::suspend\_publications** (p. 1562).

This is a **hint** to RTI Connex that can be used for example, to batch all the modifications made since the **DDSPublisher::suspend\_publications** (p. 1562).

RTI Connex is not required and does not currently make use of this hint in any way. However, similar results can be achieved by using *asynchronous publishing*. Combined with **DDSFlowController** (p. 1468), **DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431) **DDSDataWriter** (p. 1321) instances allow the user even finer control of traffic shaping and sample coalescing.

#### Precondition

A call to **DDSPublisher::resume\_publications** (p. 1563) must match a previous call to **DDSPublisher::suspend\_publications** (p. 1562). Otherwise the operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

## See also

**DDSFlowController** (p. 1468)

**DDSFlowController::trigger\_flow** (p. 1470)

**DDS\_ON\_DEMAND\_FLOW\_CONTROLLER\_NAME** (p. 123)

**DDS\_PublishModeQosPolicy** (p. 1025)

**9.277.2.16 begin\_coherent\_changes()**

```
virtual DDS_ReturnCode_t DDSPublisher::begin_coherent_changes ( ) [pure virtual]
```

Indicates that the application will begin a coherent set of modifications using **DDSDataWriter** (p. 1321) objects attached to the **DDSPublisher** (p. 1550).

A 'coherent set' is a set of modifications that must be propagated in such a way that they are interpreted at the receiver's side as a consistent set of modifications; that is, the receiver will only be able to access the data after all the modifications in the set are available at the receiver end.

A connectivity change may occur in the middle of a set of coherent changes; for example, the set of partitions used by the **DDSPublisher** (p. 1550) or one of its subscribers (**DDSSubscriber** (p. 1592)) may change, a late-joining **DDSData↔Reader** (p. 1288) may appear on the network, or a communication failure may occur. In the event that such a change prevents an entity from receiving the entire set of coherent changes, that entity must behave as if it had received none of the set.

These calls can be nested. In that case, the coherent set terminates only with the last call to **DDSPublisher::end\_↔coherent\_changes** (p. 1565). Publisher's samples (samples published by any of the DataWriters within the Publisher) that are not published within a `begin_coherent_changes/end_coherent_changes` block will not be provided to the Data↔Readers as a set.

The support for coherent changes enables a publishing application to change the value of several data-instances that could belong to the same or different topics and have those changes be seen *atomically* by the readers. This is useful in cases where the values are inter-related (for example, if there are two data-instances representing the altitude and velocity vector of the same aircraft and both are changed, it may be useful to communicate those values in a way the reader can see both together; otherwise, it may, e.g., erroneously interpret that the aircraft is on a collision course).

## Note

Coherent sets don't apply to Topic Queries. If a **DDSTopicQuery** (p. 1627) selects only a subset of samples that was published as a coherent set, the subscribing application will receive them regardless of their membership to the coherent set.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

## See also

**DDS\_PresentationQosPolicy** (p. 996)

**9.277.2.17 end\_coherent\_changes()**

```
virtual DDS_ReturnCode_t DDSPublisher::end_coherent_changes ( ) [pure virtual]
```

Terminates the coherent set initiated by the matching call to **DDSPublisher::begin\_coherent\_changes** (p. 1564).

## Precondition

If there is no matching call to **DDSPublisher::begin\_coherent\_changes** (p. 1564) the operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

**9.277.2.18 get\_participant()**

```
virtual DDSDomainParticipant * DDSPublisher::get_participant ( ) [pure virtual]
```

Returns the **DDSDomainParticipant** (p. 1351) to which the **DDSPublisher** (p. 1550) belongs.

## Returns

the **DDSDomainParticipant** (p. 1351) to which the **DDSPublisher** (p. 1550) belongs.

**9.277.2.19 delete\_contained\_entities()**

```
virtual DDS_ReturnCode_t DDSPublisher::delete_contained_entities ( ) [pure virtual]
```

Deletes all the entities that were created by means of the "create" operation on the **DDSPublisher** (p. 1550).

Deletes all contained **DDSDataWriter** (p. 1321) objects. Once **DDSPublisher::delete\_contained\_entities** (p. 1565) completes successfully, the application may delete the **DDSPublisher** (p. 1550), knowing that it has no contained **DDSDataWriter** (p. 1321) objects.

The operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) if any of the contained entities is in a state where it cannot be deleted.

**MT Safety:**

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	---

**9.277.2.20 copy\_from\_topic\_qos()**

```
virtual DDS_ReturnCode_t DDSPublisher::copy_from_topic_qos (
    DDS_DataWriterQos & a_datawriter_qos,
    const DDS_TopicQos & a_topic_qos ) [pure virtual]
```

Copies the policies in the **DDS\_TopicQos** (p. 1135) to the corresponding policies in the **DDS\_DataWriterQos** (p. 689).

Copies the policies in the **DDS\_TopicQos** (p. 1135) to the corresponding policies in the **DDS\_DataWriterQos** (p. 689) (replacing values in the **DDS\_DataWriterQos** (p. 689), if present).

This is a "convenience" operation most useful in combination with the operations **DDSPublisher::get\_default\_datawriter\_qos** (p. 1553) and **DDSTopic::get\_qos** (p. 1621). The operation **DDSPublisher::copy\_from\_topic\_qos** (p. 1566) can be used to merge the **DDSDataWriter** (p. 1321) default QoS policies with the corresponding ones on the **DDSTopic** (p. 1617). The resulting QoS can then be used to create a new **DDSDataWriter** (p. 1321), or set its QoS.

This operation does not check the resulting **DDS\_DataWriterQos** (p. 689) for consistency. This is because the 'merged' **DDS\_DataWriterQos** (p. 689) may not be the final one, as the application can still modify some policies prior to applying the policies to the **DDSDataWriter** (p. 1321).

**Parameters**

<i>a_datawriter_qos</i>	<< <i>inout</i> >> (p. 238) <b>DDS_DataWriterQos</b> (p. 689) to be filled-up.
<i>a_topic_qos</i>	<< <i>in</i> >> (p. 238) <b>DDS_TopicQos</b> (p. 1135) to be merged with <b>DDS_DataWriterQos</b> (p. 689).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.277.2.21 wait\_for\_acknowledgments()**

```
virtual DDS_ReturnCode_t DDSPublisher::wait_for_acknowledgments (
    const DDS_Duration_t & max_wait ) [pure virtual]
```

Blocks the calling thread until all data written by the Publisher's reliable DataWriters is acknowledged, or until timeout expires.

This operation blocks the calling thread until either all data written by the reliable DataWriters entities is acknowledged by (a) all reliable **DDSDataReader** (p. 1288) entities that are matched and alive and (b) by all required subscriptions, or until the duration specified by the `max_wait` parameter elapses, whichever happens first. A successful completion indicates that all the samples written have been acknowledged; a timeout indicates that `max_wait` elapsed before all the data was acknowledged.

Note that if a thread is blocked in the call to this operation on a **DDSPublisher** (p. 1550) and a different thread writes new samples on any of the reliable DataWriters that belong to this Publisher, the new samples must be acknowledged before unblocking the thread that is waiting on this operation.

If none of the **DDSDataWriter** (p. 1321) instances have **DDS\_ReliabilityQosPolicy** (p. 1041) kind set to RELIABLE, the operation will complete successfully.

## Parameters

<i>max_wait</i>	<< <i>in</i> >> (p. 238) Specifies maximum time to wait for acknowledgements <b>DDS_Duration_t</b> (p. 774) .
-----------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337), <b>DDS_RETCODE_TIMEOUT</b> (p. 337)
------------	--

**9.277.2.22 wait\_for\_asynchronous\_publishing()**

```
virtual DDS_ReturnCode_t DDSPublisher::wait_for_asynchronous_publishing (
    const DDS_Duration_t & max_wait ) [pure virtual]
```

<<*extension*>> (p. 237) Blocks the calling thread until asynchronous sending is complete.

This operation blocks the calling thread (up to `max_wait`) until all data written by the asynchronous **DDSDataWriter** (p. 1321) entities is sent and acknowledged (if reliable) by all matched **DDSDataReader** (p. 1288) entities. A successful

completion indicates that all the samples written have been sent and acknowledged where applicable; if it times out, this indicates that `max_wait` elapsed before all the data was sent and/or acknowledged.

In other words, this guarantees that sending to best effort **DDSDataReader** (p. 1288) is complete in addition to what **DDSPublisher::wait\_for\_acknowledgments** (p. 1567) provides.

If none of the **DDSDataWriter** (p. 1321) instances have **DDS\_PublishModeQosPolicy::kind** (p. 1027) set to **DDS\_↔ ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431), the operation will complete immediately, with **DDS\_RETCODE\_↔ \_OK** (p. 336).

#### Parameters

<code>max_wait</code>	<< <i>in</i> >> (p. 238) Specifies maximum time to wait for acknowledgements <b>DDS_Duration_t</b> (p. 774).
-----------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337), <b>DDS_RETCODE_TIMEOUT</b> (p. 337)
------------	--

### 9.277.2.23 set\_qos()

```
virtual DDS_ReturnCode_t DDSPublisher::set_qos (
    const DDS_PublisherQos & qos ) [pure virtual]
```

Sets the publisher QoS.

This operation modifies the QoS of the **DDSPublisher** (p. 1550).

The **DDS\_PublisherQos::group\_data** (p. 1024), **DDS\_PublisherQos::partition** (p. 1024) and **DDS\_PublisherQos\_↔ ::entity\_factory** (p. 1024) can be changed. The other policies are immutable.

#### Parameters

<code>qos</code>	<< <i>in</i> >> (p. 238) <b>DDS_PublisherQos</b> (p. 1022) to be set to. Policies must be consistent. Immutable policies cannot be changed after <b>DDSPublisher</b> (p. 1550) is enabled. The special value <b>DDS_PUBLISHER_QOS_DEFAULT</b> (p. 57) can be used to indicate that the QoS of the <b>DDSPublisher</b> (p. 1550) should be changed to match the current default <b>DDS_PublisherQos</b> (p. 1022) set in the <b>DDSDomainParticipant</b> (p. 1351).
------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337).
------------	---

See also

**DDS\_PublisherQos** (p. 1022) for rules on consistency among QoS

**set\_qos (abstract)** (p. 1464)

**Operations Allowed in Listener Callbacks** (p. 1528)

### 9.277.2.24 set\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSPublisher::set_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Change the QoS of this publisher using the input XML QoS profile.

This operation modifies the QoS of the **DDSPublisher** (p. 1550).

The **DDS\_PublisherQos::group\_data** (p. 1024), **DDS\_PublisherQos::partition** (p. 1024) and **DDS\_PublisherQos::entity\_factory** (p. 1024) can be changed. The other policies are immutable.

Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexx will use the default library (see <b>DDSPublisher::set_default_library</b> (p. 1555)).
<i>profile_name</i>	<< <b>in</b> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexx will use the default profile (see <b>DDSPublisher::set_default_profile</b> (p. 1556)).

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337).
------------	---

See also

**DDS\_PublisherQos** (p. 1022) for rules on consistency among QoS

**Operations Allowed in Listener Callbacks** (p. 1528)

### 9.277.2.25 get\_qos()

```
virtual DDS_ReturnCode_t DDSPublisher::get_qos (
    DDS_PublisherQos & qos ) [pure virtual]
```

Gets the publisher QoS.

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

## Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) <b>DDS_PublisherQos</b> (p. 1022) to be filled in.
------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**get\_qos (abstract)** (p. 1465)

**9.277.2.26 set\_listener()**

```
virtual DDS_ReturnCode_t DDSPublisher::set_listener (
    DDSPublisherListener * l,
    DDS_StatusMask mask = DDS_STATUS_MASK_ALL ) [pure virtual]
```

Sets the publisher listener.

## Parameters

<i>l</i>	<< <i>in</i> >> (p. 238) <b>DDSPublisherListener</b> (p. 1571) to set to.
<i>mask</i>	<< <i>in</i> >> (p. 238) <b>DDS_StatusMask</b> (p. 341) associated with the <b>DDSPublisherListener</b> (p. 1571).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**set\_listener (abstract)** (p. 1465)

**9.277.2.27 get\_listener()**

```
virtual DDSPublisherListener * DDSPublisher::get_listener ( ) [pure virtual]
```

Get the publisher listener.



## Returns

**DDSPublisherListener** (p. 1571) of the **DDSPublisher** (p. 1550).

## See also

**get\_listener (abstract)** (p. 1466)

## 9.277.2.28 lookup\_datawriter\_by\_name()

```
virtual DDSDataWriter * DDSPublisher::lookup_datawriter_by_name (
    const char * datawriter_name ) [pure virtual]
```

<<*extension*>> (p. 237) Retrieves a **DDSDataWriter** (p. 1321) contained within the **DDSPublisher** (p. 1550) the **DDSDataWriter** (p. 1321) entity name.

Every **DDSDataWriter** (p. 1321) in the system has an entity name which is configured and stored in the <<*extension*>> (p. 237) EntityName policy, **ENTITY\_NAME** (p. 403).

This operation retrieves the **DDSDataWriter** (p. 1321) within the **DDSPublisher** (p. 1550) whose name matches the one specified. If there are several **DDSDataWriter** (p. 1321) with the same name within the **DDSPublisher** (p. 1550), the operation returns the first matching occurrence.

## Parameters

<i>datawriter_name</i>	<< <i>in</i> >> (p. 238) Entity name of the <b>DDSDataWriter</b> (p. 1321).
------------------------	---

## Returns

The first **DDSDataWriter** (p. 1321) found with the specified name or NULL if it is not found.

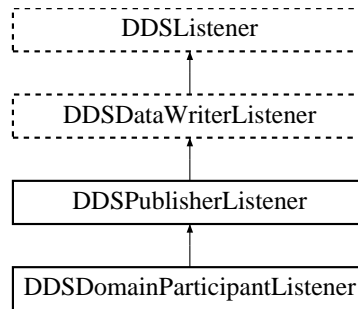
## See also

**DDSDomainParticipant::lookup\_datawriter\_by\_name** (p. 1422)

## 9.278 DDSPublisherListener Class Reference

<<*interface*>> (p. 237) **DDSListener** (p. 1526) for **DDSPublisher** (p. 1550) status.

Inheritance diagram for DDSPublisherListener:



## Additional Inherited Members

### 9.278.1 Detailed Description

<<*interface*>> (p. 237) **DDSListener** (p. 1526) for **DDSPublisher** (p. 1550) status.

Entity:

**DDSPublisher** (p. 1550)

Status:

**DDS\_LIVELINESS\_LOST\_STATUS** (p. 346), **DDS\_LivelinessLostStatus** (p. 934);  
**DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS** (p. 343), **DDS\_OfferedDeadlineMissedStatus** (p. 970);  
**DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_OfferedIncompatibleQosStatus** (p. 971);  
**DDS\_PUBLICATION\_MATCHED\_STATUS** (p. 347), **DDS\_PublicationMatchedStatus** (p. 1020);  
**DDS\_RELIABLE\_READER\_ACTIVITY\_CHANGED\_STATUS** (p. 349), **DDS\_ReliableReaderActivity**↔  
**ChangedStatus** (p. 1044);  
**DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS** (p. 349), **DDS\_ReliableWriterCacheChanged**↔  
**Status** (p. 1046)

See also

**DDSListener** (p. 1526)

**Status Kinds** (p. 337)

**Operations Allowed in Listener Callbacks** (p. 1528)

## 9.279 DDSPublisherSeq Class Reference

Declares IDL sequence < **DDSPublisher** (p. 1550) > .

### 9.279.1 Detailed Description

Declares IDL sequence < **DDSPublisher** (p. 1550) > .

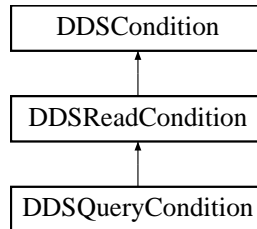
See also

**FooSeq** (p. 1697)

## 9.280 DDSQueryCondition Class Reference

<<**interface**>> (p. 237) These are specialised **DDSReadCondition** (p. 1574) objects that allow the application to also specify a filter on the locally available data.

Inheritance diagram for DDSQueryCondition:



### Public Member Functions

- virtual const char \* **get\_query\_expression** ()=0  
*Retrieves the query expression.*
- virtual **DDS\_ReturnCode\_t** **get\_query\_parameters** ( **DDS\_StringSeq** &query\_parameters)=0  
*Retrieves the query parameters.*
- virtual **DDS\_ReturnCode\_t** **set\_query\_parameters** (const **DDS\_StringSeq** &query\_parameters)=0  
*Sets the query parameters.*

### 9.280.1 Detailed Description

<<**interface**>> (p. 237) These are specialised **DDSReadCondition** (p. 1574) objects that allow the application to also specify a filter on the locally available data.

Each query condition filter is composed of a **DDSReadCondition** (p. 1574) state filter and a content filter expressed as a `query_expression` and `query_parameters`.

The query (`query_expression`) is similar to an SQL WHERE clause and can be parameterised by arguments that are dynamically changeable by the **set\_query\_parameters()** (p. 1574) operation.

Two query conditions that have the same `query_expression` will require unique query condition content filters if their `query_parameters` differ. Query conditions that differ only in their state masks will share the same query condition content filter.

**Queries and Filters Syntax** (p. 179) describes the syntax of `query_expression` and `query_parameters`.

## 9.280.2 Member Function Documentation

### 9.280.2.1 `get_query_expression()`

```
virtual const char * DDSQueryCondition::get_query_expression ( ) [pure virtual]
```

Retrieves the query expression.

### 9.280.2.2 `get_query_parameters()`

```
virtual DDS_ReturnCode_t DDSQueryCondition::get_query_parameters (
    DDS_StringSeq & query_parameters ) [pure virtual]
```

Retrieves the query parameters.

#### Parameters

<i>query_parameters</i>	<< <i>inout</i> >> (p. 238) the query parameters are returned here. The memory for the strings in this sequence is managed according to the conventions described in <b>String Conventions</b> (p. 552). In particular, be careful to avoid a situation in which RTI Connexx allocates a string on your behalf and you then reuse that string in such a way that RTI Connexx believes it to have more memory allocated to it than it actually does.
-------------------------	---

### 9.280.2.3 `set_query_parameters()`

```
virtual DDS_ReturnCode_t DDSQueryCondition::set_query_parameters (
    const DDS_StringSeq & query_parameters ) [pure virtual]
```

Sets the query parameters.

#### Parameters

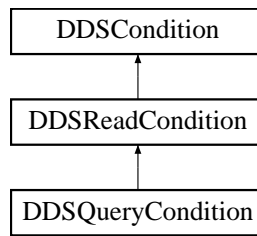
<i>query_parameters</i>	<< <i>in</i> >> (p. 238) the new query parameters
-------------------------	---

## 9.281 DDSReadCondition Class Reference

<<*interface*>> (p. 237) Conditions specifically dedicated to read operations and attached to one **DDSDataReader**

(p. 1288).

Inheritance diagram for DDSReadCondition:



## Public Member Functions

- virtual **DDS\_SampleStateMask** **get\_sample\_state\_mask** ()=0  
*Retrieves the set of `sample_states` for the condition.*
- virtual **DDS\_ViewStateMask** **get\_view\_state\_mask** ()=0  
*Retrieves the set of `view_states` for the condition.*
- virtual **DDS\_InstanceStateMask** **get\_instance\_state\_mask** ()=0  
*Retrieves the set of `instance_states` for the condition.*
- virtual **DDS\_StreamKindMask** **get\_stream\_kind\_mask** ()=0  
*Retrieves the set of `instance_states` for the condition.*
- virtual **DDSDataReader \*** **get\_datareader** ()=0  
*Returns the **DDSDataReader** (p. 1288) associated with the **DDSReadCondition** (p. 1574).*

### 9.281.1 Detailed Description

<<*interface*>> (p. 237) Conditions specifically dedicated to read operations and attached to one **DDSDataReader** (p. 1288).

**DDSReadCondition** (p. 1574) objects allow an application to specify the data samples it is interested in (by specifying the desired `sample_states`, `view_states` as well as `instance_states` in **FooDataReader::read** (p. 1651) and **FooDataReader::take** (p. 1652) variants.

This allows RTI Connext to enable the condition only when suitable information is available. They are to be used in conjunction with a WaitSet as normal conditions.

More than one **DDSReadCondition** (p. 1574) may be attached to the same **DDSDataReader** (p. 1288).

#### Examples

**HelloWorld\_subscriber.cxx.**

### 9.281.2 Member Function Documentation

### 9.281.2.1 `get_sample_state_mask()`

```
virtual DDS_SampleStateMask DDSReadCondition::get_sample_state_mask ( ) [pure virtual]
```

Retrieves the set of `sample_states` for the condition.

### 9.281.2.2 `get_view_state_mask()`

```
virtual DDS_ViewStateMask DDSReadCondition::get_view_state_mask ( ) [pure virtual]
```

Retrieves the set of `view_states` for the condition.

### 9.281.2.3 `get_instance_state_mask()`

```
virtual DDS_InstanceStateMask DDSReadCondition::get_instance_state_mask ( ) [pure virtual]
```

Retrieves the set of `instance_states` for the condition.

### 9.281.2.4 `get_stream_kind_mask()`

```
virtual DDS_StreamKindMask DDSReadCondition::get_stream_kind_mask ( ) [pure virtual]
```

Retrieves the set of `instance_states` for the condition.

### 9.281.2.5 `get_datareader()`

```
virtual DDSDataReader * DDSReadCondition::get_datareader ( ) [pure virtual]
```

Returns the **DDSDataReader** (p. 1288) associated with the **DDSReadCondition** (p. 1574).

There is exactly one **DDSDataReader** (p. 1288) associated with each **DDSReadCondition** (p. 1574).

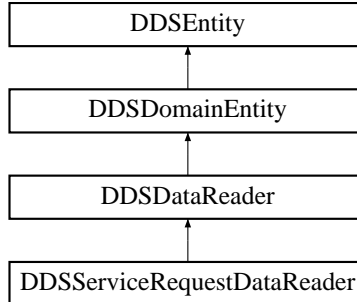
#### Returns

**DDSDataReader** (p. 1288) associated with the **DDSReadCondition** (p. 1574).

## 9.282 DDSServiceRequestDataReader Class Reference

Instantiates `DataReader < DDS_ServiceRequest (p. 1097) >` .

Inheritance diagram for DDSServiceRequestDataReader:



### Additional Inherited Members

#### 9.282.1 Detailed Description

Instantiates `DataReader < DDS_ServiceRequest (p. 1097) >` .

**DDSDataReader** (p. 1288) of topic **DDS\_SERVICE\_REQUEST\_TOPIC\_NAME** (p. 303) used for accessing **DDS\_↔ServiceRequest** (p. 1097) samples.

Instantiates:

`<<generic>>` (p. 237) **FooDataReader** (p. 1649)

See also

**DDS\_ServiceRequest** (p. 1097)

**DDS\_SERVICE\_REQUEST\_TOPIC\_NAME** (p. 303)

## 9.283 DDSServiceRequestTypeSupport Class Reference

Instantiates `TypeSupport < DDS_ServiceRequest (p. 1097) >` .

#### 9.283.1 Detailed Description

Instantiates `TypeSupport < DDS_ServiceRequest (p. 1097) >` .

Instantiates:

`<<generic>>` (p. 237) **FooTypeSupport** (p. 1711)

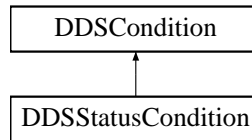
See also

**DDS\_ServiceRequest** (p. 1097)

## 9.284 DDSStatusCondition Class Reference

<<*interface*>> (p. 237) A specific **DDSCondition** (p. 1276) that is associated with each **DDSEntity** (p. 1463).

Inheritance diagram for DDSStatusCondition:



### Public Member Functions

- virtual **DDS\_StatusMask** **get\_enabled\_statuses** ()=0  
*Get the list of statuses enabled on an **DDSEntity** (p. 1463).*
- virtual **DDS\_ReturnCode\_t** **set\_enabled\_statuses** (**DDS\_StatusMask** mask)=0  
*This operation defines the list of communication statuses that determine the *trigger\_value* of the **DDSStatusCondition** (p. 1578).*
- virtual **DDSEntity** \* **get\_entity** ()=0  
*Get the **DDSEntity** (p. 1463) associated with the **DDSStatusCondition** (p. 1578).*

### 9.284.1 Detailed Description

<<*interface*>> (p. 237) A specific **DDSCondition** (p. 1276) that is associated with each **DDSEntity** (p. 1463).

The *trigger\_value* of the **DDSStatusCondition** (p. 1578) depends on the communication status of that entity (e.g., arrival of data, loss of information, etc.), 'filtered' by the set of *enabled\_statuses* on the **DDSStatusCondition** (p. 1578).

See also

- Status Kinds** (p. 337)
- DDSWaitSet** (p. 1629), **DDSCondition** (p. 1276)
- DDSListener** (p. 1526)

### 9.284.2 Member Function Documentation



**9.284.2.1 get\_enabled\_statuses()**

```
virtual DDS_StatusMask DDSStatusCondition::get_enabled_statuses ( ) [pure virtual]
```

Get the list of statuses enabled on an **DDSEntity** (p. 1463).

**Returns**

list of enabled statuses.

**9.284.2.2 set\_enabled\_statuses()**

```
virtual DDS_ReturnCode_t DDSStatusCondition::set_enabled_statuses (
    DDS_StatusMask mask ) [pure virtual]
```

This operation defines the list of communication statuses that determine the `trigger_value` of the **DDSStatusCondition** (p. 1578).

This operation may change the `trigger_value` of the **DDSStatusCondition** (p. 1578).

**DDSWaitSet** (p. 1629) objects' behavior depends on the changes of the `trigger_value` of their attached conditions. Therefore, any **DDSWaitSet** (p. 1629) to which the **DDSStatusCondition** (p. 1578) is attached is potentially affected by this operation.

If this function is not invoked, the default list of enabled statuses includes all the statuses.

**Parameters**

<i>mask</i>	<< <i>in</i> >> (p. 238) the list of enables statuses (see <b>Status Kinds</b> (p. 337))
-------------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

**9.284.2.3 get\_entity()**

```
virtual DDSEntity * DDSStatusCondition::get_entity ( ) [pure virtual]
```

Get the **DDSEntity** (p. 1463) associated with the **DDSStatusCondition** (p. 1578).

There is exactly one **DDSEntity** (p. 1463) associated with each **DDSStatusCondition** (p. 1578).

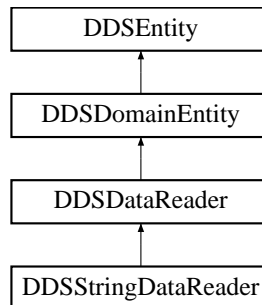
**Returns**

**DDSEntity** (p. 1463) associated with the **DDSStatusCondition** (p. 1578).

## 9.285 DDSStringDataReader Class Reference

<<**interface**>> (p. 237) Instantiates `DataReader < char* >`.

Inheritance diagram for `DDSStringDataReader`:



### Public Member Functions

- virtual `DDS_ReturnCode_t read ( DDS_StringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_↔_Long max_samples= DDS_LENGTH_UNLIMITED, DDS_SampleStateMask sample_states= DDS_ANY_↔SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data samples from the **DDSDataReader** (p. 1288).*
- virtual `DDS_ReturnCode_t take ( DDS_StringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_↔_Long max_samples= DDS_LENGTH_UNLIMITED, DDS_SampleStateMask sample_states= DDS_ANY_↔SAMPLE_STATE, DDS_ViewStateMask view_states= DDS_ANY_VIEW_STATE, DDS_InstanceStateMask instance_states= DDS_ANY_INSTANCE_STATE)`  
*Access a collection of data-samples from the **DDSDataReader** (p. 1288).*
- virtual `DDS_ReturnCode_t read_w_condition ( DDS_StringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples, DDSReadCondition *condition)`  
*Accesses via **DDSStringDataReader::read** (p. 1581) the samples that match the criteria specified in the **DDSRead\_↔Condition** (p. 1574).*
- virtual `DDS_ReturnCode_t take_w_condition ( DDS_StringSeq &received_data, DDS_SampleInfoSeq &info_seq, DDS_Long max_samples, DDSReadCondition *condition)`  
*Analogous to **DDSStringDataReader::read\_w\_condition** (p. 1581) except it accesses samples via the **DDSString\_↔DataReader::take** (p. 1581) operation.*
- virtual `DDS_ReturnCode_t read_next_sample (char *received_data, DDS_SampleInfo &sample_info)`  
*Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).*
- virtual `DDS_ReturnCode_t take_next_sample (char *received_data, DDS_SampleInfo &sample_info)`  
*Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).*
- virtual `DDS_ReturnCode_t return_loan ( DDS_StringSeq &received_data, DDS_SampleInfoSeq &info_seq)`  
*Indicates to the **DDSDataReader** (p. 1288) that the application is done accessing the collection of `received_data` and `info_seq` obtained by some earlier invocation of `read` or `take` on the **DDSDataReader** (p. 1288).*

### Static Public Member Functions

- static `DDSStringDataReader * narrow ( DDSDataReader *reader)`  
*Narrow the given **DDSDataReader** (p. 1288) pointer to a **DDSStringDataReader** (p. 1580) pointer.*

## 9.285.1 Detailed Description

<<*interface*>> (p. 237) Instantiates DataReader < char\* >.

See also

**FooDataReader** (p. 1649)  
**DDSDDataReader** (p. 1288)  
**String Support** (p. 551)

## 9.285.2 Member Function Documentation

### 9.285.2.1 read()

```
virtual DDS_ReturnCode_t DDSStringDataReader::read (
    DDS_StringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data samples from the **DDSDDataReader** (p. 1288).

See also

**FooDataReader::read** (p. 1651)

### 9.285.2.2 take()

```
virtual DDS_ReturnCode_t DDSStringDataReader::take (
    DDS_StringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples = DDS_LENGTH_UNLIMITED,
    DDS_SampleStateMask sample_states = DDS_ANY_SAMPLE_STATE,
    DDS_ViewStateMask view_states = DDS_ANY_VIEW_STATE,
    DDS_InstanceStateMask instance_states = DDS_ANY_INSTANCE_STATE ) [virtual]
```

Access a collection of data-samples from the **DDSDDataReader** (p. 1288).

See also

**FooDataReader::take** (p. 1652)

### 9.285.2.3 read\_w\_condition()

```
virtual DDS_ReturnCode_t DDSStringDataReader::read_w_condition (
    DDS_StringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [virtual]
```

Accesses via **DDSStringDataReader::read** (p. 1581) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

See also

**FooDataReader::read\_w\_condition** (p. 1657)

### 9.285.2.4 take\_w\_condition()

```
virtual DDS_ReturnCode_t DDSStringDataReader::take_w_condition (
    DDS_StringSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [virtual]
```

Analogous to **DDSStringDataReader::read\_w\_condition** (p. 1581) except it accesses samples via the **DDSStringDataReader::take** (p. 1581) operation.

See also

**FooDataReader::take\_w\_condition** (p. 1658)

### 9.285.2.5 read\_next\_sample()

```
virtual DDS_ReturnCode_t DDSStringDataReader::read_next_sample (
    char * received_data,
    DDS_SampleInfo & sample_info ) [virtual]
```

Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::read\_next\_sample** (p. 1659)

### 9.285.2.6 take\_next\_sample()

```
virtual DDS_ReturnCode_t DDSStringDataReader::take_next_sample (
    char * received_data,
    DDS_SampleInfo & sample_info ) [virtual]
```

Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).

See also

**FooDataReader::take\_next\_sample** (p. 1660)

### 9.285.2.7 return\_loan()

```
virtual DDS_ReturnCode_t DDSStringDataReader::return_loan (
    DDS_StringSeq & received_data,
    DDS_SampleInfoSeq & info_seq ) [virtual]
```

Indicates to the **DDSDataReader** (p. 1288) that the application is done accessing the collection of `received_data` and `info_seq` obtained by some earlier invocation of `read` or `take` on the **DDSDataReader** (p. 1288).

See also

**FooDataReader::return\_loan** (p. 1672)

### 9.285.2.8 narrow()

```
static DDSStringDataReader * DDSStringDataReader::narrow (
    DDSDataReader * reader ) [static]
```

Narrow the given **DDSDataReader** (p. 1288) pointer to a **DDSStringDataReader** (p. 1580) pointer.

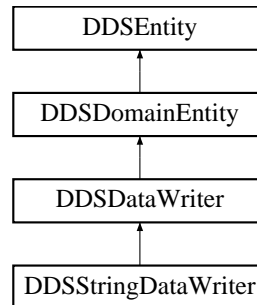
See also

**FooDataReader::narrow** (p. 1651)

## 9.286 DDSStringDataWriter Class Reference

<<*interface*>> (p. 237) Instantiates `DataWriter < char* >`.

Inheritance diagram for DDSStringDataWriter:



### Public Member Functions

- virtual `char *` **create\_data** (const `DDS_TypeAllocationParams_t` &alloc\_params)  
*Creates a string data instance.*
- virtual `DDS_Boolean` **delete\_data** (char \*sample, const `DDS_TypeDeallocationParams_t` &dealloc\_params)  
*Destroys a string data instance created by `DDSStringDataWriter::create_data` (p. 1585).*
- virtual `DDS_ReturnCode_t` **write** (const char \*instance\_data, const `DDS_InstanceHandle_t` &handle)  
*Modifies the value of a string data instance.*
- virtual `DDS_ReturnCode_t` **write\_w\_timestamp** (const char \*instance\_data, const `DDS_InstanceHandle_t` &handle, const `DDS_Time_t` &source\_timestamp)  
*Performs the same function as `DDSStringDataWriter::write` (p. 1586) except that it also provides the value for the `source_timestamp`.*
- virtual `DDS_ReturnCode_t` **write\_w\_params** (const char \*instance\_data, `DDS_WriteParams_t` &params)  
*Performs the same function as `DDSStringDataWriter::write` (p. 1586) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.*

### Static Public Member Functions

- static `DDSStringDataWriter *` **narrow** (`DDSDataWriter *`writer)  
*Narrow the given `DDSDataWriter` (p. 1321) pointer to a `DDSStringDataWriter` (p. 1584) pointer.*

#### 9.286.1 Detailed Description

<<*interface*>> (p. 237) Instantiates `DataWriter < char* >`.

See also

**FooDataWriter** (p. 1676)

**DDSDataWriter** (p. 1321)

**String Support** (p. 551)

## 9.286.2 Member Function Documentation

### 9.286.2.1 narrow()

```
static DDSStringDataWriter * DDSStringDataWriter::narrow (
    DDSDataWriter * writer ) [static]
```

Narrow the given **DDSDataWriter** (p. 1321) pointer to a **DDSStringDataWriter** (p. 1584) pointer.

See also

**FooDataWriter::narrow** (p. 1678)

### 9.286.2.2 create\_data()

```
virtual char * DDSStringDataWriter::create_data (
    const DDS_TypeAllocationParams_t & alloc_params ) [virtual]
```

Creates a string data instance.

The size of the instance including the NULL terminated character is determined by the DataWriter property **dds.builtin\_type.string.alloc\_size**.

Default size: **dds.builtin\_type.string.max\_size** property of DomainParticipant if defined. Otherwise 1024.

Created instances must be deleted with **DDSStringDataWriter::delete\_data** (p. 1585).

Returns

Newly created string data, or NULL on failure.

See also

BuiltinTypeMemoryManagement section of Built-in Types

### 9.286.2.3 delete\_data()

```
virtual DDS_Boolean DDSStringDataWriter::delete_data (
    char * sample,
    const DDS_TypeDeallocationParams_t & dealloc_params ) [virtual]
```

Destroys a string data instance created by **DDSStringDataWriter::create\_data** (p. 1585).

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) upon successful deletion.

### 9.286.2.4 write()

```
virtual DDS_ReturnCode_t DDSStringDataWriter::write (
    const char * instance_data,
    const DDS_InstanceHandle_t & handle ) [virtual]
```

Modifies the value of a string data instance.

#### See also

**FooDataWriter::write** (p. 1683)

### 9.286.2.5 write\_w\_timestamp()

```
virtual DDS_ReturnCode_t DDSStringDataWriter::write_w_timestamp (
    const char * instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [virtual]
```

Performs the same function as **DDSStringDataWriter::write** (p. 1586) except that it also provides the value for the `source_timestamp`.

#### See also

**FooDataWriter::write\_w\_timestamp** (p. 1687)



### 9.286.2.6 write\_w\_params()

```
virtual DDS_ReturnCode_t DDSStringDataWriter::write_w_params (
    const char * instance_data,
    DDS_WriteParams_t & params ) [virtual]
```

Performs the same function as **DDSStringDataWriter::write** (p. 1586) except that it also allows specification of the instance handle, source timestamp, publication priority, and cookie.

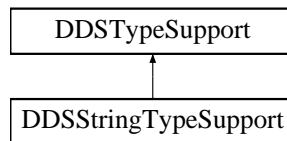
See also

**FooDataWriter::write\_w\_params** (p. 1688)

## 9.287 DDSStringTypeSupport Class Reference

<<**interface**>> (p. 237) String type support.

Inheritance diagram for DDSStringTypeSupport:



### Static Public Member Functions

- static **DDS\_ReturnCode\_t register\_type** ( **DDSDomainParticipant** \*participant, const char \*type\_↔ name="DDS::String")
 

*Allows an application to communicate to RTI Connext the existence of the char\* data type.*
- static **DDS\_ReturnCode\_t unregister\_type** ( **DDSDomainParticipant** \*participant, const char \*type\_↔ name="DDS::String")
 

*Allows an application to unregister the char\* data type from RTI Connext. After calling unregister\_type, no further communication using this type is possible.*
- static const char \* **get\_type\_name** ()
 

*Get the default name for the char\* type.*
- static void **print\_data** (const char \*a\_data)
 

<<**extension**>> (p. 237) Print value of data type to standard out.
- static **DDS\_TypeCode** \* **get\_typecode** ()
 

<<**extension**>> (p. 237) Retrieves the TypeCode for the Type.
- static **DDS\_ReturnCode\_t serialize\_data\_to\_cdr\_buffer** (char \*buffer, unsigned int &length, const char \*a\_↔ data)
 

<<**extension**>> (p. 237) Serializes the input sample into a CDR buffer of octets.
- static **DDS\_ReturnCode\_t serialize\_data\_to\_cdr\_buffer\_ex** (char \*buffer, unsigned int &length, const char \*a\_data, **DDS\_DataRepresentationId\_t** representation)
 

<<**extension**>> (p. 237) Serializes the input sample into a buffer of octets.
- static **DDS\_ReturnCode\_t deserialize\_data\_from\_cdr\_buffer** (char \*\*a\_data, const char \*buffer, unsigned int length)
 

<<**extension**>> (p. 237) Deserializes a sample from a buffer of octets.
- static **DDS\_ReturnCode\_t data\_to\_string** (char \*sample, char \*str, **DDS\_UnsignedLong** &str\_size, const **DDS\_PrintFormatProperty** &property)
 

<<**extension**>> (p. 237) Get the string representation of an input sample.

## 9.287.1 Detailed Description

<<*interface*>> (p. 237) String type support.

## 9.287.2 Member Function Documentation

### 9.287.2.1 register\_type()

```
static DDS_ReturnCode_t DDSStringTypeSupport::register_type (
    DDSDomainParticipant * participant,
    const char * type_name = "DDS::String" ) [static]
```

Allows an application to communicate to RTI Connexx the existence of the char\* data type.

By default, The char\* built-in type is automatically registered when a DomainParticipant is created using the type\_name returned by **DDSStringTypeSupport::get\_type\_name** (p. 1589). Therefore, the usage of this function is optional and it is only required when the automatic built-in type registration is disabled using the participant property "dds.builtin\_↔type.auto\_register".

This method can also be used to register the same **DDSStringTypeSupport** (p. 1587) with a **DDSDomainParticipant** (p. 1351) using different values for the type\_name.

If `register_type` is called multiple times with the same **DDSDomainParticipant** (p. 1351) and `type_name`, the second (and subsequent) registrations are ignored by the operation.

#### Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to register the data type char* with. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) the type name under with the data type char* is registered with the participant; this type name is used when creating a new <b>DDSTopic</b> (p. 1617). (See <b>DDSDomainParticipant::create_topic</b> (p. 1382).) The name may not be NULL or longer than 255 characters.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

#### MT Safety:

UNSAFE on the FIRST call. It is not safe for two threads to simultaneously make the first call to register a type. Subsequent calls are thread safe.

See also

**DDSDomainParticipant::create\_topic** (p. 1382)

### 9.287.2.2 unregister\_type()

```
static DDS_ReturnCode_t DDSStringTypeSupport::unregister_type (
    DDSDomainParticipant * participant,
    const char * type_name = "DDS::String" ) [static]
```

Allows an application to unregister the char\* data type from RTI Connex. After calling `unregister_type`, no further communication using this type is possible.

#### Precondition

The char\* type with `type_name` is registered with the participant and all **DDSTopic** (p. 1617) objects referencing the type have been destroyed. If the type is not registered with the participant, or if any **DDSTopic** (p. 1617) is associated with the type, the operation will fail with **DDS\_RETCODE\_ERROR** (p. 336).

#### Postcondition

All information about the type is removed from RTI Connex. No further communication using this type is possible.

#### Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to unregister the data type char* from. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) the type name under with the data type char* is registered with the participant. The name should match a name that has been previously used to register a type with the participant. Cannot be NULL.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336) or <b>DDS_RETCODE_ERROR</b> (p. 336)
------------	--

#### MT Safety:

SAFE.

See also

**DDSStringTypeSupport::register\_type** (p. 1588)

### 9.287.2.3 get\_type\_name()

```
static const char * DDSStringTypeSupport::get_type_name ( ) [static]
```

Get the default name for the char\* type.

Can be used for calling **DDSStringTypeSupport::register\_type** (p. 1588) or creating **DDSTopic** (p. 1617).

#### Returns

default name for the char\* type.

#### See also

**DDSStringTypeSupport::register\_type** (p. 1588)

**DDSDomainParticipant::create\_topic** (p. 1382)

### 9.287.2.4 print\_data()

```
static void DDSStringTypeSupport::print_data (
    const char * a_data ) [static]
```

<<**extension**>> (p. 237) Print value of data type to standard out.

The *generated* implementation of the operation knows how to print value of a data type.

#### Parameters

<i>a_data</i>	<< <b>in</b> >> (p. 238) String to be printed.
---------------	--

### 9.287.2.5 get\_typecode()

```
static DDS_TypeCode * DDSStringTypeSupport::get_typecode ( ) [static]
```

<<**extension**>> (p. 237) Retrieves the TypeCode for the Type.

#### See also

**FooTypeSupport::get\_typecode** (p. 1723)

### 9.287.2.6 serialize\_data\_to\_cdr\_buffer()

```
static DDS_ReturnCode_t DDSStringTypeSupport::serialize_data_to_cdr_buffer (
    char * buffer,
    unsigned int & length,
    const char * a_data ) [static]
```

<<*extension*>> (p. 237) Serializes the input sample into a CDR buffer of octets.

See also

**FooTypeSupport::serialize\_data\_to\_cdr\_buffer** (p. 1721)

### 9.287.2.7 serialize\_data\_to\_cdr\_buffer\_ex()

```
static DDS_ReturnCode_t DDSStringTypeSupport::serialize_data_to_cdr_buffer_ex (
    char * buffer,
    unsigned int & length,
    const char * a_data,
    DDS_DataRepresentationId_t representation ) [static]
```

<<*extension*>> (p. 237) Serializes the input sample into a buffer of octets.

See also

**FooTypeSupport::serialize\_data\_to\_cdr\_buffer** (p. 1721)

### 9.287.2.8 deserialize\_data\_from\_cdr\_buffer()

```
static DDS_ReturnCode_t DDSStringTypeSupport::deserialize_data_from_cdr_buffer (
    char ** a_data,
    const char * buffer,
    unsigned int length ) [static]
```

<<*extension*>> (p. 237) Deserializes a sample from a buffer of octets.

See also

**FooTypeSupport::deserialize\_data\_from\_cdr\_buffer** (p. 1722)

### 9.287.2.9 data\_to\_string()

```
static DDS_ReturnCode_t DDSStringTypeSupport::data_to_string (
    char * sample,
    char * str,
    DDS_UnsignedLong & str_size,
    const DDS_PrintFormatProperty & property ) [static]
```

<<*extension*>> (p. 237) Get the string representation of an input sample.

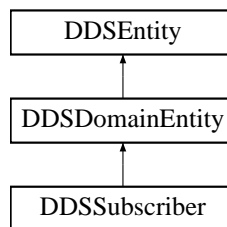
See also

**FooTypeSupport::data\_to\_string** (p. 1723)

## 9.288 DDSSubscriber Class Reference

<<*interface*>> (p. 237) A subscriber is the object responsible for actually receiving data from a subscription.

Inheritance diagram for DDSSubscriber:



### Public Member Functions

- virtual **DDS\_ReturnCode\_t get\_default\_datareader\_qos** ( **DDS\_DataReaderQos** &qos)=0  
Copies the default **DDS\_DataReaderQos** (p. 644) values into the provided **DDS\_DataReaderQos** (p. 644) instance.
- virtual **DDS\_ReturnCode\_t set\_default\_datareader\_qos** (const **DDS\_DataReaderQos** &qos)=0  
Sets the default **DDS\_DataReaderQos** (p. 644) values for this subscriber.
- virtual **DDS\_ReturnCode\_t set\_default\_datareader\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0  
<<*extension*>> (p. 237) Set the default **DDS\_DataReaderQos** (p. 644) values for this subscriber based on the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t set\_default\_library** (const char \*library\_name)=0  
<<*extension*>> (p. 237) Sets the default XML library for a **DDSSubscriber** (p. 1592).
- virtual const char \* **get\_default\_library** ()=0  
<<*extension*>> (p. 237) Gets the default XML library associated with a **DDSSubscriber** (p. 1592).
- virtual **DDS\_ReturnCode\_t set\_default\_profile** (const char \*library\_name, const char \*profile\_name)=0  
<<*extension*>> (p. 237) Sets the default XML profile for a **DDSSubscriber** (p. 1592).
- virtual const char \* **get\_default\_profile** ()=0  
<<*extension*>> (p. 237) Gets the default XML profile associated with a **DDSSubscriber** (p. 1592).

- virtual const char \* **get\_default\_profile\_library** ()=0  
 <<extension>> (p.237) Gets the library where the default XML QoS profile is contained for a **DDSSubscriber** (p.1592).
- virtual **DDSDataReader** \* **create\_datareader** ( **DDSTopicDescription** \*topic, const **DDS\_DataReaderQos** &qos, **DDSDataReaderListener** \*listener, **DDS\_StatusMask** mask)=0  
 Creates a **DDSDataReader** (p.1288) that will be attached and belong to the **DDSSubscriber** (p.1592).
- virtual **DDSDataReader** \* **create\_datareader\_with\_profile** ( **DDSTopicDescription** \*topic, const char \*library\_name, const char \*profile\_name, **DDSDataReaderListener** \*listener, **DDS\_StatusMask** mask)=0  
 <<extension>> (p.237) Creates a **DDSDataReader** (p.1288) object using the **DDS\_DataReaderQos** (p.644) associated with the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t** **delete\_datareader** ( **DDSDataReader** \*a\_datareader)=0  
 Deletes a **DDSDataReader** (p.1288) that belongs to the **DDSSubscriber** (p.1592).
- virtual **DDS\_ReturnCode\_t** **delete\_contained\_entities** ()=0  
 Deletes all the entities that were created by means of the "create" operation on the **DDSSubscriber** (p.1592).
- virtual **DDSDataReader** \* **lookup\_datareader** (const char \*topic\_name)=0  
 Retrieves an existing **DDSDataReader** (p.1288).
- virtual **DDS\_ReturnCode\_t** **begin\_access** ()=0  
 Indicates that the application is about to access the data samples in any of the **DDSDataReader** (p.1288) objects attached to the **DDSSubscriber** (p.1592).
- virtual **DDS\_ReturnCode\_t** **end\_access** ()=0  
 Indicates that the application has finished accessing the data samples in **DDSDataReader** (p.1288) objects managed by the **DDSSubscriber** (p.1592).
- virtual **DDS\_ReturnCode\_t** **get\_datareaders** ( **DDSDataReaderSeq** &readers, **DDS\_SampleStateMask** sample\_states, **DDS\_ViewStateMask** view\_states, **DDS\_InstanceStateMask** instance\_states)=0  
 Allows the application to access the **DDSDataReader** (p.1288) objects that contain samples with the specified *sample↔\_states, view\_states and instance\_states*.
- virtual **DDS\_ReturnCode\_t** **get\_all\_datareaders** ( **DDSDataReaderSeq** &readers)=0  
 Retrieve all the DataReaders created from this Subscriber.
- virtual **DDS\_ReturnCode\_t** **notify\_datareaders** ()=0  
 Invokes the operation **DDSDataReaderListener::on\_data\_available()** (p.1317) on the **DDSDataReaderListener** (p.1315) objects attached to contained **DDSDataReader** (p.1288) entities with **DDS\_DATA\_AVAILABLE\_STATUS** (p.345) that is considered changed as described in **Changes in read communication status** (p.340).
- virtual **DDSDomainParticipant** \* **get\_participant** ()=0  
 Returns the **DDSDomainParticipant** (p.1351) to which the **DDSSubscriber** (p.1592) belongs.
- virtual **DDS\_ReturnCode\_t** **copy\_from\_topic\_qos** ( **DDS\_DataReaderQos** &datareader\_qos, const **DDS\_↔TopicQos** &topic\_qos)=0  
 Copies the policies in the **DDS\_TopicQos** (p.1135) to the corresponding policies in the **DDS\_DataReaderQos** (p.644).
- virtual **DDS\_ReturnCode\_t** **set\_qos** (const **DDS\_SubscriberQos** &qos)=0  
 Sets the subscriber QoS.
- virtual **DDS\_ReturnCode\_t** **set\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0  
 <<extension>> (p.237) Change the QoS of this subscriber using the input XML QoS profile.
- virtual **DDS\_ReturnCode\_t** **get\_qos** ( **DDS\_SubscriberQos** &qos)=0  
 Gets the subscriber QoS.
- virtual **DDS\_ReturnCode\_t** **set\_listener** ( **DDSSubscriberListener** \*l, **DDS\_StatusMask** mask= **DDS\_↔STATUS\_MASK\_ALL**)=0  
 Sets the subscriber listener.
- virtual **DDSSubscriberListener** \* **get\_listener** ()=0  
 Get the subscriber listener.
- virtual **DDSDataReader** \* **lookup\_datareader\_by\_name** (const char \*datareader\_name)=0  
 <<extension>> (p.237) Retrieves a **DDSDataReader** (p.1288) contained within the **DDSSubscriber** (p.1592) the **DDSDataReader** (p.1288) entity name.

## 9.288.1 Detailed Description

<<*interface*>> (p. 237) A subscriber is the object responsible for actually receiving data from a subscription.

QoS:

**DDS\_SubscriberQos** (p. 1105)

Status:

**DDS\_DATA\_ON\_READERS\_STATUS** (p. 345)

Listener:

**DDSSubscriberListener** (p. 1613)

A subscriber acts on the behalf of one or several **DDSDataReader** (p. 1288) objects that are related to it. When it receives data (from the other parts of the system), it builds the list of concerned **DDSDataReader** (p. 1288) objects and then indicates to the application that data is available through its listener or by enabling related conditions.

The application can access the list of concerned **DDSDataReader** (p.1288) objects through the operation **DDSSubscriber::get\_datareaders** (p. 1606) and then access the data available through operations on the **DDSDataReader** (p. 1288).

The following operations may be called even if the **DDSSubscriber** (p. 1592) is not enabled. Other operations will the value **DDS\_RETCODE\_NOT\_ENABLED** (p. 337) if called on a disabled **DDSSubscriber** (p. 1592):

- **DDSEntity::enable** (p. 1466),
- **DDSSubscriber::set\_qos** (p. 1609), **DDSSubscriber::get\_qos** (p. 1611) , idref\_Subscriber\_set\_qos\_with\_↔profile
- **DDSSubscriber::set\_listener** (p. 1611), **DDSSubscriber::get\_listener** (p. 1612),
- **DDSEntity::get\_statuscondition** (p. 1467), **DDSEntity::get\_status\_changes** (p. 1467)
- **DDSSubscriber::create\_datareader** (p. 1599), **DDSSubscriber::create\_datareader\_with\_profile** (p. 1601), **DDSSubscriber::delete\_contained\_entities** (p. 1603), **DDSSubscriber::delete\_datareader** (p. 1602),
- **DDSSubscriber::set\_default\_datareader\_qos** (p. 1595), **DDSSubscriber::set\_default\_datareader\_qos↔\_with\_profile** (p. 1596), **DDSSubscriber::get\_default\_datareader\_qos** (p. 1595), **DDSSubscriber::set\_↔default\_library** (p. 1597), **DDSSubscriber::set\_default\_profile** (p. 1598)

All operations except for **DDSSubscriber::set\_qos** (p.1609), **DDSSubscriber::set\_qos\_with\_profile** (p.1610), **DDSSubscriber::get\_qos** (p.1611), **DDSSubscriber::set\_listener** (p.1611), **DDSSubscriber::get\_listener** (p.1612), **DDSEntity::enable** (p.1466) and **DDSSubscriber::create\_datareader** (p.1599) may fail with **DDS\_↔RETCODE\_NOT\_ENABLED** (p.337).

See also

**Operations Allowed in Listener Callbacks** (p. 1528)

Examples

**HelloWorld\_subscriber.cxx.**



## 9.288.2 Member Function Documentation

### 9.288.2.1 `get_default_datareader_qos()`

```
virtual DDS_ReturnCode_t DDSSubscriber::get_default_datareader_qos (
    DDS_DataReaderQos & qos ) [pure virtual]
```

Copies the default **DDS\_DataReaderQos** (p. 644) values into the provided **DDS\_DataReaderQos** (p. 644) instance.

The retrieved `qos` will match the set of values specified on the last successful call to **DDSSubscriber::set\_default\_datareader\_qos** (p. 1595), or **DDSSubscriber::set\_default\_datareader\_qos\_with\_profile** (p. 1596), or else, if the call was never made, the default values from its owning **DDSDomainParticipant** (p. 1351).

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

#### MT Safety:

UNSAFE. It is not safe to retrieve the default QoS value from a subscriber while another thread may be simultaneously calling **DDSSubscriber::set\_default\_datareader\_qos** (p. 1595)

#### Parameters

<code>qos</code>	<< <i>inout</i> >> (p. 238) <b>DDS_DataReaderQos</b> (p. 644) to be filled-up.
------------------	--

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDS\_DATAREADER\_QOS\_DEFAULT** (p. 132)

**DDSSubscriber::create\_datareader** (p. 1599)

### 9.288.2.2 `set_default_datareader_qos()`

```
virtual DDS_ReturnCode_t DDSSubscriber::set_default_datareader_qos (
    const DDS_DataReaderQos & qos ) [pure virtual]
```

Sets the default **DDS\_DataReaderQos** (p. 644) values for this subscriber.

This call causes the default values inherited from the owning **DDSDomainParticipant** (p. 1351) to be overridden.

This default value will be used for newly created **DDSDataReader** (p. 1288) if **DDS\_DATAREADER\_QOS\_DEFAULT** (p. 132) is specified as the `qos` parameter when **DDSSubscriber::create\_datareader** (p. 1599) is called.

**Precondition**

The specified QoS policies must be consistent, or else the operation will have no effect and fail with **DDS\_↵  
RETCODE\_INCONSISTENT\_POLICY** (p. 337)

**MT Safety:**

UNSAFE. It is not safe to set the default QoS value from a subscriber while another thread may be simultaneously calling **DDSSubscriber::set\_default\_datareader\_qos** (p. 1595), **DDSSubscriber::get\_default\_↵  
\_datareader\_qos** (p. 1595) or calling **DDSSubscriber::create\_datareader** (p. 1599) with **DDS\_DATAREADER\_↵  
\_QOS\_DEFAULT** (p. 132) as the `qos` parameter.

**Parameters**

<i>qos</i>	<< <i>in</i> >> (p. 238) The default <b>DDS_DataReaderQos</b> (p. 644) to be set to. The special value <b>DDS_DATAREADER_QOS_DEFAULT</b> (p. 132) may be passed as <code>qos</code> to indicate that the default QoS should be reset back to the initial values the factory would use if <b>DDSSubscriber::set_default_datareader_qos</b> (p. 1595) had never been called.
------------	--

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	---

**9.288.2.3 set\_default\_datareader\_qos\_with\_profile()**

```
virtual DDS_ReturnCode_t DDSSubscriber::set_default_datareader_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<*extension*>> (p. 237) Set the default **DDS\_DataReaderQos** (p. 644) values for this subscriber based on the input XML QoS profile.

This default value will be used for newly created **DDSDataReader** (p. 1288) if **DDS\_DATAREADER\_QOS\_DEFAULT** (p. 132) is specified as the `qos` parameter when **DDSSubscriber::create\_datareader** (p. 1599) is called.

**Precondition**

The **DDS\_DataReaderQos** (p. 644) contained in the specified XML QoS profile must be consistent, or else the operation will have no effect and fail with **DDS\_RETCODE\_INCONSISTENT\_POLICY** (p. 337)

**MT Safety:**

UNSAFE. It is not safe to set the default QoS value from a **DDSSubscriber** (p. 1592) while another thread may be simultaneously calling **DDSSubscriber::set\_default\_datareader\_qos** (p. 1595), **DDSSubscriber\_↵  
::get\_default\_datareader\_qos** (p. 1595) or calling **DDSSubscriber::create\_datareader** (p. 1599) with **DDS\_↵  
DATAREADER\_QOS\_DEFAULT** (p. 132) as the `qos` parameter.

## Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If <i>library_name</i> is null RTI Connexx will use the default library (see <b>DDSSubscriber::set_default_library</b> (p. 1597)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If <i>profile_name</i> is null RTI Connexx will use the default profile (see <b>DDSSubscriber::set_default_profile</b> (p. 1598)).

If the input profile cannot be found the method fails with **DDS\_RETCODE\_ERROR** (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337)
------------	--

## See also

**DDS\_DATAREADER\_QOS\_DEFAULT** (p. 132)

**DDSSubscriber::create\_datareader\_with\_profile** (p. 1601)

## 9.288.2.4 set\_default\_library()

```
virtual DDS_ReturnCode_t DDSSubscriber::set_default_library (
    const char * library_name ) [pure virtual]
```

<<*extension*>> (p. 237) Sets the default XML library for a **DDSSubscriber** (p. 1592).

This method specifies the library that will be used as the default the next time a default library is needed during a call to one of this Subscriber's operations.

Any API requiring a *library\_name* as a parameter can use null to refer to the default library.

If the default library is not set, the **DDSSubscriber** (p. 1592) inherits the default from the **DDSDomainParticipant** (p. 1351) (see **DDSDomainParticipant::set\_default\_library** (p. 1367)).

## Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name. If <i>library_name</i> is null any previous default is unset.
---------------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**DDSSubscriber::get\_default\_library** (p. 1598)

### 9.288.2.5 get\_default\_library()

```
virtual const char * DDSSubscriber::get_default_library ( ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the default XML library associated with a **DDSSubscriber** (p. 1592).

Returns

The default library or null if the default library was not set.

See also

**DDSSubscriber::set\_default\_library** (p. 1597)

### 9.288.2.6 set\_default\_profile()

```
virtual DDS_ReturnCode_t DDSSubscriber::set_default_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<**extension**>> (p. 237) Sets the default XML profile for a **DDSSubscriber** (p. 1592).

This method specifies the profile that will be used as the default the next time a default Subscriber profile is needed during a call to one of this Subscriber's operations. When calling a **DDSSubscriber** (p. 1592) method that requires a `profile_name` parameter, you can use NULL to refer to the default profile. (This same information applies to setting a default library.)

If the default profile is not set, the **DDSSubscriber** (p. 1592) inherits the default from the **DDSDomainParticipant** (p. 1351) (see **DDSDomainParticipant::set\_default\_profile** (p. 1368)).

This method does not set the default QoS for **DDSDataReader** (p. 1288) objects created by this **DDSSubscriber** (p. 1592); for this functionality, use **DDSSubscriber::set\_default\_datareader\_qos\_with\_profile** (p. 1596) (you may pass in NULL after having called **set\_default\_profile()** (p. 1598)).

This method does not set the default QoS for newly created Subscribers; for this functionality, use **DDSDomainParticipant::set\_default\_subscriber\_qos\_with\_profile** (p. 1375).

Parameters

<i>library_name</i>	<< <b>in</b> >> (p. 238) The library name containing the profile.
<i>profile_name</i>	<< <b>in</b> >> (p. 238) The profile name. If <code>profile_name</code> is null any previous default is unset.

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## See also

**DDSSubscriber::get\_default\_profile** (p. 1599)

**DDSSubscriber::get\_default\_profile\_library** (p. 1599)

**9.288.2.7 get\_default\_profile()**

```
virtual const char * DDSSubscriber::get_default_profile ( ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the default XML profile associated with a **DDSSubscriber** (p. 1592).

## Returns

The default profile or null if the default profile was not set.

## See also

**DDSSubscriber::set\_default\_profile** (p. 1598)

**9.288.2.8 get\_default\_profile\_library()**

```
virtual const char * DDSSubscriber::get_default_profile_library ( ) [pure virtual]
```

<<**extension**>> (p. 237) Gets the library where the default XML QoS profile is contained for a **DDSSubscriber** (p. 1592).

The default profile library is automatically set when **DDSSubscriber::set\_default\_profile** (p. 1598) is called.

This library can be different than the **DDSSubscriber** (p. 1592) default library (see **DDSSubscriber::get\_default\_library** (p. 1598)).

## Returns

The default profile library or null if the default profile was not set.

## See also

**DDSSubscriber::set\_default\_profile** (p. 1598)

### 9.288.2.9 create\_datareader()

```
virtual DDSDataReader * DDSSubscriber::create_datareader (
    DDSTopicDescription * topic,
    const DDS_DataReaderQos & qos,
    DDSDataReaderListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

Creates a **DDSDataReader** (p. 1288) that will be attached and belong to the **DDSSubscriber** (p. 1592).

For each application-defined type **Foo** (p. 1648), there is an implied, auto-generated class **FooDataReader** (p. 1649) (an incarnation of **FooDataReader** (p. 1649)) that extends **DDSDataReader** (p. 1288) and contains the operations to read data of type **Foo** (p. 1648).

Note that a common application pattern to construct the QoS for the **DDSDataReader** (p. 1288) is to:

- Retrieve the QoS policies on the associated **DDSTopic** (p. 1617) by means of the **DDSTopic::get\_qos** (p. 1621) operation.
- Retrieve the default **DDSDataReader** (p. 1288) qos by means of the **DDSSubscriber::get\_default\_datareader\_qos** (p. 1595) operation.
- Combine those two QoS policies (for example, using **DDSSubscriber::copy\_from\_topic\_qos** (p. 1608)) and selectively modify policies as desired
- Use the resulting QoS policies to construct the **DDSDataReader** (p. 1288).

When a **DDSDataReader** (p. 1288) is created, only those transports already registered are available to the **DDSDataReader** (p. 1288). See **Built-in Transport Plugins** (p. 177) for details on when a builtin transport is registered.

#### MT Safety:

UNSAFE. If **DDS\_DATAREADER\_QOS\_DEFAULT** (p. 132) is used for the `qos` parameter, it is not safe to create the datareader while another thread may be simultaneously calling **DDSSubscriber::set\_default\_datareader\_qos** (p. 1595).

#### Precondition

If subscriber is enabled, the topic must be enabled. If it is not, this operation will fail and no **DDSDataReader** (p. 1288) will be created.

The given **DDSTopicDescription** (p. 1624) must have been created from the same participant as this subscriber. If it was created from a different participant, this method will return NULL.

If `qos` is **DDS\_DATAREADER\_QOS\_USE\_TOPIC\_QOS** (p. 133), `topic` cannot be **DDSMultiTopic** (p. 1529), or else this method will return NULL.

#### Parameters

<i>topic</i>	<< <i>in</i> >> (p. 238) The <b>DDSTopicDescription</b> (p. 1624) that the <b>DDSDataReader</b> (p. 1288) will be associated with. Cannot be NULL.
--------------	--

## Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) The qos of the <b>DDSDataReader</b> (p. 1288). The special value <b>DDS_DATAREADER_QOS_DEFAULT</b> (p. 132) can be used to indicate that the <b>DDSDataReader</b> (p. 1288) should be created with the default <b>DDS_DataReaderQos</b> (p. 644) set in the <b>DDSSubscriber</b> (p. 1592). If <b>DDSTopicDescription</b> (p. 1624) is of type <b>DDSTopic</b> (p. 1617) or <b>DDSContentFilteredTopic</b> (p. 1283), the special value <b>DDS_DATAREADER_QOS_USE_TOPIC_QOS</b> (p. 133) can be used to indicate that the <b>DDSDataReader</b> (p. 1288) should be created with the combination of the default <b>DDS_DataReaderQos</b> (p. 644) set on the <b>DDSSubscriber</b> (p. 1592) and the <b>DDS_TopicQos</b> (p. 1135) (in the case of a <b>DDSContentFilteredTopic</b> (p. 1283), the <b>DDS_TopicQos</b> (p. 1135) of the related <b>DDSTopic</b> (p. 1617)). if <b>DDS_DATAREADER_QOS_USE_TOPIC_QOS</b> (p. 133) is used, <i>topic</i> cannot be a <b>DDSMultiTopic</b> (p. 1529).
<i>listener</i>	<< <i>in</i> >> (p. 238) The listener of the <b>DDSDataReader</b> (p. 1288).
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

## Returns

A **DDSDataReader** (p. 1288) of a derived class specific to the data-type associated with the **DDSTopic** (p. 1617) or NULL if an error occurred.

## See also

**FooDataReader** (p. 1649)

**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation

**DDS\_DataReaderQos** (p. 644) for rules on consistency among QoS

**DDSSubscriber::create\_datareader\_with\_profile** (p. 1601)

**DDSSubscriber::get\_default\_datareader\_qos** (p. 1595)

**DDSTopic::set\_qos** (p. 1619)

**DDSSubscriber::copy\_from\_topic\_qos** (p. 1608)

**DDSDataReader::set\_listener** (p. 1309)

## Examples

**HelloWorld\_subscriber.cxx.**

## 9.288.2.10 create\_datareader\_with\_profile()

```
virtual DDSDataReader * DDSSubscriber::create_datareader_with_profile (
    DDSTopicDescription * topic,
    const char * library_name,
    const char * profile_name,
    DDSDataReaderListener * listener,
    DDS_StatusMask mask ) [pure virtual]
```

<<*extension*>> (p. 237) Creates a **DDSDataReader** (p. 1288) object using the **DDS\_DataReaderQos** (p. 644) associated with the input XML QoS profile.

The **DDSDataReader** (p. 1288) will be attached and belong to the **DDSSubscriber** (p. 1592).

For each application-defined type **Foo** (p. 1648), there is an implied, auto-generated class **FooDataReader** (p. 1649) (an incarnation of **FooDataReader** (p. 1649)) that extends **DDSDataReader** (p. 1288) and contains the operations to read data of type **Foo** (p. 1648).

When a **DDSDataReader** (p. 1288) is created, only those transports already registered are available to the **DDSDataReader** (p. 1288). See **Built-in Transport Plugins** (p. 177) for details on when a builtin transport is registered.

#### Precondition

If subscriber is enabled, the topic must be enabled. If it is not, this operation will fail and no **DDSDataReader** (p. 1288) will be created.

The given **DDSTopicDescription** (p. 1624) must have been created from the same participant as this subscriber. If it was created from a different participant, this method will return NULL.

#### Parameters

<i>topic</i>	<< <i>in</i> >> (p. 238) The <b>DDSTopicDescription</b> (p. 1624) that the <b>DDSDataReader</b> (p. 1288) will be associated with. Cannot be NULL.
<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If library_name is null RTI Connexnt will use the default library (see <b>DDSSubscriber::set_default_library</b> (p. 1597)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If profile_name is null RTI Connexnt will use the default profile (see <b>DDSSubscriber::set_default_profile</b> (p. 1598)).
<i>listener</i>	<< <i>in</i> >> (p. 238) The listener of the <b>DDSDataReader</b> (p. 1288).
<i>mask</i>	<< <i>in</i> >> (p. 238). Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

#### Returns

A **DDSDataReader** (p. 1288) of a derived class specific to the data-type associated with the **DDSTopic** (p. 1617) or NULL if an error occurred.

#### See also

**FooDataReader** (p. 1649)  
**Specifying QoS on entities** (p. 359) for information on setting QoS before entity creation  
**DDS\_DataReaderQos** (p. 644) for rules on consistency among QoS  
**DDS\_DATAREADER\_QOS\_DEFAULT** (p. 132)  
**DDS\_DATAREADER\_QOS\_USE\_TOPIC\_QOS** (p. 133)  
**DDSSubscriber::create\_datareader** (p. 1599)  
**DDSSubscriber::get\_default\_datareader\_qos** (p. 1595)  
**DDSTopic::set\_qos** (p. 1619)  
**DDSSubscriber::copy\_from\_topic\_qos** (p. 1608)  
**DDSDataReader::set\_listener** (p. 1309)



### 9.288.2.11 delete\_datareader()

```
virtual DDS_ReturnCode_t DDSSubscriber::delete_datareader (
    DDSDataReader * a_datareader ) [pure virtual]
```

Deletes a **DDSDataReader** (p. 1288) that belongs to the **DDSSubscriber** (p. 1592).

#### Precondition

If the **DDSDataReader** (p. 1288) does not belong to the **DDSSubscriber** (p. 1592), or if there are any existing **DDSReadCondition** (p. 1574) or **DDSQueryCondition** (p. 1573) objects that are attached to the **DDSDataReader** (p. 1288), or if there are outstanding loans on samples (as a result of a call to `read()`, `take()`, or one of the variants thereof), the operation fails with the error **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

#### Postcondition

Listener installed on the **DDSDataReader** (p. 1288) will not be called after this method completes successfully.

#### MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

#### Parameters

<i>a_datareader</i>	<<in>> (p. 238) The <b>DDSDataReader</b> (p. 1288) to be deleted.
---------------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	---

### 9.288.2.12 delete\_contained\_entities()

```
virtual DDS_ReturnCode_t DDSSubscriber::delete_contained_entities ( ) [pure virtual]
```

Deletes all the entities that were created by means of the "create" operation on the **DDSSubscriber** (p. 1592).

Deletes all contained **DDSDataReader** (p. 1288) objects. This pattern is applied recursively. In this manner, the operation **DDSSubscriber::delete\_contained\_entities** (p. 1603) on the **DDSSubscriber** (p. 1592) will end up deleting all the entities recursively contained in the **DDSSubscriber** (p. 1592), including the **DDSQueryCondition** (p. 1573), **DDSReadCondition** (p. 1574), and **DDSTopicQuery** (p. 1627) objects belonging to the contained **DDSDataReader** (p. 1288).

The operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) if any of the contained entities is in a state where it cannot be deleted. This will occur, for example, if a contained **DDSDataReader** (p. 1288) cannot

be deleted because the application has called a **FooDataReader::read** (p. 1651) or **FooDataReader::take** (p. 1652) operation and has not called the corresponding **FooDataReader::return\_loan** (p. 1672) operation to return the loaned samples.

Once **DDSSubscriber::delete\_contained\_entities** (p. 1603) completes successfully, the application may delete the **DDSSubscriber** (p. 1592).

#### MT Safety:

UNSAFE. It is not safe to delete an entity while another thread may be simultaneously calling an API that uses the entity.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336)
------------	---

### 9.288.2.13 lookup\_datareader()

```
virtual DDSDataReader * DDSSubscriber::lookup_datareader (
    const char * topic_name ) [pure virtual]
```

Retrieves an existing **DDSDataReader** (p. 1288).

Use this operation on the built-in **DDSSubscriber** (p. 1592) (**Built-in Topics** (p. 59)) to access the built-in **DDSDataReader** (p. 1288) entities for the built-in topics.

The built-in **DDSDataReader** (p. 1288) is created when this operation is called on a built-in topic for the first time. The built-in **DDSDataReader** (p. 1288) is deleted automatically when the **DDSDomainParticipant** (p. 1351) is deleted.

To ensure that builtin **DDSDataReader** (p. 1288) entities receive all the discovery traffic, it is suggested that you lookup the builtin **DDSDataReader** (p. 1288) before the **DDSDomainParticipant** (p. 1351) is enabled. Looking up builtin **DDSDataReader** (p. 1288) may implicitly register builtin transports due to creation of **DDSDataReader** (p. 1288) (see **Built-in Transport Plugins** (p. 177) for details on when a builtin transport is registered). Therefore, if you are want to modify builtin transport properties, do so *before* using this operation.

Therefore the suggested sequence when looking up builtin DataReaders is:

- Create a disabled **DDSDomainParticipant** (p. 1351).
- (optional) Modify builtin transport properties
- Call **DDSDomainParticipant::get\_builtin\_subscriber()** (p. 1393).
- Call **DDSSubscriber::lookup\_datareader()** (p. 1604).
- Call **enable()** (p. 1466) on the DomainParticipant.

## Parameters

<i>topic_name</i>	<< <i>in</i> >> (p. 238) Name of the <b>DDSTopicDescription</b> (p. 1624) that the retrieved <b>DDSDataReader</b> (p. 1288) is attached to. Cannot be NULL.
-------------------	---

## Returns

A **DDSDataReader** (p. 1288) that belongs to the **DDSSubscriber** (p. 1592) attached to the **DDSTopicDescription** (p. 1624) with *topic\_name*. If no such **DDSDataReader** (p. 1288) exists, this operation returns NULL.

The returned **DDSDataReader** (p. 1288) may be enabled or disabled.

If more than one **DDSDataReader** (p. 1288) is attached to the **DDSSubscriber** (p. 1592), this operation may return any one of them.

## MT Safety:

UNSAFE. It is not safe to lookup a **DDSDataReader** (p. 1288) in one thread while another thread is simultaneously creating or destroying that **DDSDataReader** (p. 1288).

## 9.288.2.14 begin\_access()

```
virtual DDS_ReturnCode_t DDSSubscriber::begin_access ( ) [pure virtual]
```

Indicates that the application is about to access the data samples in any of the **DDSDataReader** (p. 1288) objects attached to the **DDSSubscriber** (p. 1592).

If the **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) of the **DDSSubscriber** (p. 1592) is **DDS\_GROUP\_PresentationQosPolicy::access\_scope** (p. 418) or **DDS\_HIGHEST\_OFFERED\_PRESENTATION\_QOS** (p. 418) and **DDS\_PresentationQosPolicy::ordered\_access** (p. 1000) is **DDS\_BOOLEAN\_TRUE** (p. 317), the application is required to use this operation to access the samples in order across DataWriters of the same group (**DDSPublisher** (p. 1550) with **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) set to **DDS\_GROUP\_PresentationQosPolicy::access\_scope** (p. 418)).

In the above case, this operation must be called prior to calling any of the sample-accessing operations, **DDSSubscriber::get\_datareaders** (p. 1606) on the **DDSSubscriber** (p. 1592), and **FooDataReader::read** (p. 1651), **FooDataReader::take** (p. 1652), **FooDataReader::read\_w\_condition** (p. 1657), and **FooDataReader::take\_w\_condition** (p. 1658) on any **DDSDataReader** (p. 1288).

Once the application has finished accessing the data samples, it must call **DDSSubscriber::end\_access** (p. 1606)

The application is not required to call **DDSSubscriber::begin\_access** (p. 1605) / **DDSSubscriber::end\_access** (p. 1606) to access the samples in order if the **PRESENTATION** (p. 417) policy in the **DDSPublisher** (p. 1550) has **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) set to something other than **DDS\_GROUP\_PresentationQosPolicy::access\_scope** (p. 418). In this case, calling **DDSSubscriber::begin\_access** (p. 1605) / **DDSSubscriber::end\_access** (p. 1606) is not considered an error and has no effect.

Calls to **DDSSubscriber::begin\_access** (p. 1605) / **DDSSubscriber::end\_access** (p. 1606) may be nested and must be balanced.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

## See also

**Access to data samples** (p. 125)

**DDSSubscriber::get\_datareaders** (p. 1606)

**PRESENTATION** (p. 417)

**9.288.2.15 end\_access()**

```
virtual DDS_ReturnCode_t DDSSubscriber::end_access ( ) [pure virtual]
```

Indicates that the application has finished accessing the data samples in **DDSDataReader** (p. 1288) objects managed by the **DDSSubscriber** (p. 1592).

This operation must be used to close a corresponding **begin\_access()** (p. 1605).

This call must close a previous call to **DDSSubscriber::begin\_access()** (p. 1605), otherwise the operation will fail with the error **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

**9.288.2.16 get\_datareaders()**

```
virtual DDS_ReturnCode_t DDSSubscriber::get_datareaders (
    DDSDataReaderSeq & readers,
    DDS_SampleStateMask sample_states,
    DDS_ViewStateMask view_states,
    DDS_InstanceStateMask instance_states ) [pure virtual]
```

Allows the application to access the **DDSDataReader** (p.1288) objects that contain samples with the specified `sample_states`, `view_states` and `instance_states`.

If the application is outside a **begin\_access()** (p. 1605)/**end\_access()** block, or if the **DDS\_PresentationQosPolicy**↔**::access\_scope** (p.1000) of the **DDSSubscriber** (p.1592) is **DDS\_INSTANCE\_PRESENTATION\_QOS** (p. 418) or **DDS\_TOPIC\_PRESENTATION\_QOS** (p. 418), or if the **DDS\_PresentationQosPolicy::ordered\_access** (p. 1000) of

the **DDSSubscriber** (p. 1592) is **DDS\_BOOLEAN\_FALSE** (p. 317), the returned collection is a 'set' containing each **DDSDataReader** (p. 1288) at most once, in no specified order.

If the application is within a **begin\_access()** (p. 1605)/**end\_access()** block, and the **PRESENTATION** (p. 417) policy of the **DDSSubscriber** (p. 1592) is **DDS\_GROUP\_PRESENTATION\_QOS** (p. 418) or **DDS\_HIGHEST\_OFFERED\_PRESENTATION\_QOS** (p. 418), and **DDS\_PresentationQosPolicy::ordered\_access** (p. 1000) in the **DDSSubscriber** (p. 1592) is **DDS\_BOOLEAN\_TRUE** (p. 317), the returned collection is a 'list' of DataReaders where a DataReader may appear more than one time.

To retrieve the samples in the order they were published across DataWriters of the same group (**DDSPublisher** (p. 1550) configured with **DDS\_GROUP\_PRESENTATION\_QOS** (p. 418)), the application should **read()/take()** from each DataReader in the same order as it appears in the output sequence. The application will move to the next DataReader when the **read()/take()** operation fails with **DDS\_RETCODE\_NO\_DATA** (p. 337).

#### Parameters

<i>readers</i>	<< <i>inout</i> >> (p. 238) a <b>DDSDataReaderSeq</b> (p. 1317) object where the set or list of readers will be returned.
<i>sample_states</i>	<< <i>in</i> >> (p. 238) the returned DataReader must contain samples that have one of these <i>sample_states</i> .
<i>view_states</i>	<< <i>in</i> >> (p. 238) the returned DataReader must contain samples that have one of these <i>view_states</i> .
<i>instance_states</i>	<< <i>in</i> >> (p. 238) the returned DataReader must contain samples that have one of these <i>instance_states</i> .

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

#### See also

- Access to data samples** (p. 125)
- DDSSubscriber::begin\_access** (p. 1605)
- DDSSubscriber::end\_access** (p. 1606)
- PRESENTATION** (p. 417)

### 9.288.2.17 get\_all\_datareaders()

```
virtual DDS_ReturnCode_t DDSSubscriber::get_all_datareaders (
    DDSDataReaderSeq & readers ) [pure virtual]
```

Retrieve all the DataReaders created from this Subscriber.

#### Parameters

<i>readers</i>	<< <i>inout</i> >> (p. 238) Sequence where the DataReaders will be added
----------------	--

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

**9.288.2.18 notify\_datareaders()**

```
virtual DDS_ReturnCode_t DDSSubscriber::notify_datareaders ( ) [pure virtual]
```

Invokes the operation **DDSDataReaderListener::on\_data\_available()** (p. 1317) on the **DDSDataReaderListener** (p. 1315) objects attached to contained **DDSDataReader** (p. 1288) entities with **DDS\_DATA\_AVAILABLE\_STATUS** (p. 345) that is considered changed as described in **Changes in read communication status** (p. 340).

This operation is typically invoked from the **DDSSubscriberListener::on\_data\_on\_readers** (p. 1614) operation in the **DDSSubscriberListener** (p. 1613). That way the **DDSSubscriberListener** (p. 1613) can delegate to the **DDSDataReaderListener** (p. 1315) objects the handling of the data.

The operation will notify the data readers that have a `sample_state` of **DDS\_NOT\_READ\_SAMPLE\_STATE** (p. 157), `view_state` of **DDS\_ANY\_SAMPLE\_STATE** (p. 157) and `instance_state` of **DDS\_ANY\_INSTANCE\_STATE** (p. 161).

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
-----	---

**9.288.2.19 get\_participant()**

```
virtual DDSDomainParticipant * DDSSubscriber::get_participant ( ) [pure virtual]
```

Returns the **DDSDomainParticipant** (p. 1351) to which the **DDSSubscriber** (p. 1592) belongs.

## Returns

the **DDSDomainParticipant** (p. 1351) to which the **DDSSubscriber** (p. 1592) belongs.

### 9.288.2.20 copy\_from\_topic\_qos()

```
virtual DDS_ReturnCode_t DDSSubscriber::copy_from_topic_qos (
    DDS_DataReaderQos & datareader_qos,
    const DDS_TopicQos & topic_qos ) [pure virtual]
```

Copies the policies in the **DDS\_TopicQos** (p. 1135) to the corresponding policies in the **DDS\_DataReaderQos** (p. 644).

Copies the policies in the **DDS\_TopicQos** (p. 1135) to the corresponding policies in the **DDS\_DataReaderQos** (p. 644) (replacing values in the **DDS\_DataReaderQos** (p. 644), if present).

This is a "convenience" operation most useful in combination with the operations **DDSSubscriber::get\_default\_datareader\_qos** (p. 1595) and **DDSTopic::get\_qos** (p. 1621). The operation **DDSSubscriber::copy\_from\_topic\_qos** (p. 1608) can be used to merge the **DDSDataReader** (p. 1288) default QoS policies with the corresponding ones on the **DDSTopic** (p. 1617). The resulting QoS can then be used to create a new **DDSDataReader** (p. 1288), or set its QoS.

This operation does not check the resulting **DDS\_DataReaderQos** (p. 644) for consistency. This is because the 'merged' **DDS\_DataReaderQos** (p. 644) may not be the final one, as the application can still modify some policies prior to applying the policies to the **DDSDataReader** (p. 1288).

#### Parameters

<i>datareader_qos</i>	<< <i>inout</i> >> (p. 238) <b>DDS_DataReaderQos</b> (p. 644) to be filled-up.
<i>topic_qos</i>	<< <i>in</i> >> (p. 238) <b>DDS_TopicQos</b> (p. 1135) to be merged with <b>DDS_DataReaderQos</b> (p. 644).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.288.2.21 set\_qos()

```
virtual DDS_ReturnCode_t DDSSubscriber::set_qos (
    const DDS_SubscriberQos & qos ) [pure virtual]
```

Sets the subscriber QoS.

This operation modifies the QoS of the **DDSSubscriber** (p. 1592).

The **DDS\_SubscriberQos::group\_data** (p. 1107), **DDS\_SubscriberQos::partition** (p. 1107) and **DDS\_SubscriberQos::entity\_factory** (p. 1107) can be changed. The other policies are immutable.

## Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) <b>DDS_SubscriberQos</b> (p. 1105) to be set to. Policies must be consistent. Immutable policies cannot be changed after <b>DDSSubscriber</b> (p. 1592) is enabled. The special value <b>DDS_SUBSCRIBER_QOS_DEFAULT</b> (p. 57) can be used to indicate that the QoS of the <b>DDSSubscriber</b> (p. 1592) should be changed to match the current default <b>DDS_SubscriberQos</b> (p. 1105) set in the <b>DDSDomainParticipant</b> (p. 1351).
------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337).
------------	---

## See also

**DDS\_SubscriberQos** (p. 1105) for rules on consistency among QoS

**set\_qos (abstract)** (p. 1464)

**Operations Allowed in Listener Callbacks** (p. 1528)

**9.288.2.22 set\_qos\_with\_profile()**

```
virtual DDS_ReturnCode_t DDSSubscriber::set_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<*extension*>> (p. 237) Change the QoS of this subscriber using the input XML QoS profile.

This operation modifies the QoS of the **DDSSubscriber** (p. 1592).

The **DDS\_SubscriberQos::group\_data** (p. 1107), **DDS\_SubscriberQos::partition** (p. 1107) and **DDS\_SubscriberQos::entity\_factory** (p. 1107) can be changed. The other policies are immutable.

## Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If <i>library_name</i> is null RTI Connexx will use the default library (see <b>DDSSubscriber::set_default_library</b> (p. 1597)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If <i>profile_name</i> is null RTI Connexx will use the default profile (see <b>DDSSubscriber::set_default_profile</b> (p. 1598)).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337), or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337).
------------	---



See also

**DDS\_SubscriberQos** (p. 1105) for rules on consistency among QoS  
**Operations Allowed in Listener Callbacks** (p. 1528)

### 9.288.2.23 get\_qos()

```
virtual DDS_ReturnCode_t DDSSubscriber::get_qos (
    DDS_SubscriberQos & qos ) [pure virtual]
```

Gets the subscriber QoS.

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) <b>DDS_SubscriberQos</b> (p. 1105) to be filled in.
------------	--

Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**get\_qos (abstract)** (p. 1465)

### 9.288.2.24 set\_listener()

```
virtual DDS_ReturnCode_t DDSSubscriber::set_listener (
    DDSSubscriberListener * l,
    DDS_StatusMask mask = DDS_STATUS_MASK_ALL ) [pure virtual]
```

Sets the subscriber listener.

Parameters

<i>l</i>	<< <i>in</i> >> (p. 238) <b>DDSSubscriberListener</b> (p. 1613) to set to.
<i>mask</i>	<< <i>in</i> >> (p. 238) <b>DDS_StatusMask</b> (p. 341) associated with the <b>DDSSubscriberListener</b> (p. 1613).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**set\_listener (abstract)** (p. 1465)

**9.288.2.25 get\_listener()**

```
virtual DDSSubscriberListener * DDSSubscriber::get_listener ( ) [pure virtual]
```

Get the subscriber listener.

## Returns

**DDSSubscriberListener** (p. 1613) of the **DDSSubscriber** (p. 1592).

## See also

**get\_listener (abstract)** (p. 1466)

**9.288.2.26 lookup\_datareader\_by\_name()**

```
virtual DDSDataReader * DDSSubscriber::lookup_datareader_by_name (
    const char * datareader_name ) [pure virtual]
```

<<*extension*>> (p. 237) Retrieves a **DDSDataReader** (p. 1288) contained within the **DDSSubscriber** (p. 1592) the **DDSDataReader** (p. 1288) entity name.

Every **DDSDataReader** (p. 1288) in the system has an entity name which is configured and stored in the <<*extension*>> (p. 237) EntityName policy, **ENTITY\_NAME** (p. 403).

This operation retrieves the **DDSDataReader** (p. 1288) within the **DDSSubscriber** (p. 1592) whose name matches the one specified. If there are several **DDSDataReader** (p. 1288) with the same name within the **DDSSubscriber** (p. 1592), the operation returns the first matching occurrence.

## Parameters

<i>datareader_name</i>	<< <i>in</i> >> (p. 238) Entity name of the <b>DDSDataReader</b> (p. 1288).
------------------------	---

## Returns

The first **DDSDataReader** (p. 1288) found with the specified name or NULL if it is not found.

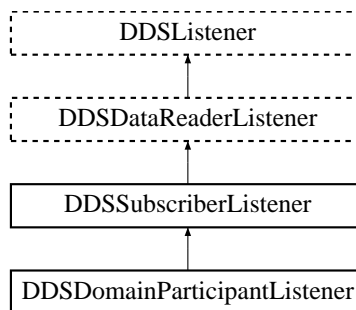
## See also

**DDSDomainParticipant::lookup\_datareader\_by\_name** (p. 1423)

## 9.289 DDSSubscriberListener Class Reference

<<*interface*>> (p. 237) **DDSListener** (p. 1526) for status about a subscriber.

Inheritance diagram for DDSSubscriberListener:



### Public Member Functions

- virtual void **on\_data\_on\_readers** (**DDSSubscriber** \*sub)  
*Handles the **DDS\_DATA\_ON\_READERS\_STATUS** (p. 345) communication status.*

#### 9.289.1 Detailed Description

<<*interface*>> (p. 237) **DDSListener** (p. 1526) for status about a subscriber.

## Entity:

**DDSSubscriber** (p. 1592)

## Status:

**DDS\_DATA\_AVAILABLE\_STATUS** (p. 345);  
**DDS\_DATA\_ON\_READERS\_STATUS** (p. 345);  
**DDS\_LIVELINESS\_CHANGED\_STATUS** (p. 346), **DDS\_LivelinessChangedStatus** (p. 932);  
**DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS** (p. 344), **DDS\_RequestedDeadlineMissedStatus** (p. 1050);  
**DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS** (p. 344), **DDS\_RequestedIncompatibleQosStatus**  
 (p. 1051);  
**DDS\_SAMPLE\_LOST\_STATUS** (p. 345), **DDS\_SampleLostStatus** (p. 1093);  
**DDS\_SAMPLE\_REJECTED\_STATUS** (p. 345), **DDS\_SampleRejectedStatus** (p. 1094);  
**DDS\_SUBSCRIPTION\_MATCHED\_STATUS** (p. 347), **DDS\_SubscriptionMatchedStatus** (p. 1117);

See also

**DDSListener** (p. 1526)

**Status Kinds** (p. 337)

**Operations Allowed in Listener Callbacks** (p. 1528)

## 9.289.2 Member Function Documentation

### 9.289.2.1 on\_data\_on\_readers()

```
virtual void DDSSubscriberListener::on_data_on_readers (
    DDSSubscriber * sub ) [virtual]
```

Handles the **DDS\_DATA\_ON\_READERS\_STATUS** (p. 345) communication status.

## 9.290 DDSSubscriberSeq Class Reference

Declares IDL sequence < **DDSSubscriber** (p. 1592) > .

### 9.290.1 Detailed Description

Declares IDL sequence < **DDSSubscriber** (p. 1592) > .

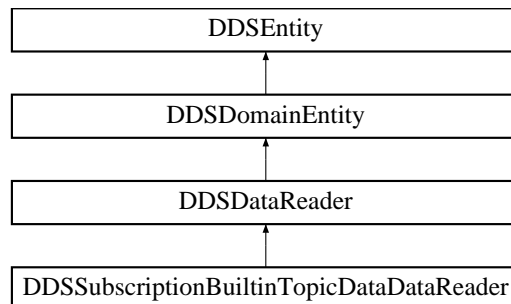
See also

**FooSeq** (p. 1697)

## 9.291 DDSSubscriptionBuiltinTopicDataDataReader Class Reference

Instantiates `DataReader` < **DDS\_SubscriptionBuiltinTopicData** (p. 1108) > .

Inheritance diagram for `DDSSubscriptionBuiltinTopicDataDataReader`:



## Additional Inherited Members

### 9.291.1 Detailed Description

Instantiates `DataReader` < `DDS_SubscriptionBuiltinTopicData` (p. 1108) > .

`DDSDataReader` (p.1288) of topic `DDS_SUBSCRIPTION_TOPIC_NAME` (p.300) used for accessing `DDS_↔SubscriptionBuiltinTopicData` (p. 1108) of the remote `DDSDataReader` (p. 1288) and the associated `DDSSubscriber` (p. 1592).

Instantiates:

<<*generic*>> (p. 237) `FooDataReader` (p. 1649)

See also

`DDS_SubscriptionBuiltinTopicData` (p. 1108)

`DDS_SUBSCRIPTION_TOPIC_NAME` (p. 300)

## 9.292 DDSSubscriptionBuiltinTopicDataTypeSupport Class Reference

Instantiates `TypeSupport` < `DDS_SubscriptionBuiltinTopicData` (p. 1108) > .

### 9.292.1 Detailed Description

Instantiates `TypeSupport` < `DDS_SubscriptionBuiltinTopicData` (p. 1108) > .

Instantiates:

<<*generic*>> (p. 237) `FooTypeSupport` (p. 1711)

See also

`DDS_SubscriptionBuiltinTopicData` (p. 1108)

## 9.293 DDSThreadFactory Class Reference

<<*extension*>> (p. 237) <<*interface*>> (p. 237) Interface for providing the threads needed by the middleware. It consists of operations to create and delete threads. The interface depends on the `DDSThreadFactory_OnSpawned↔Function` (p.519) that specifies the operation to run in the new thread.

Inherited by `NDDSSStackManagedThreadFactory`.

## Public Member Functions

- virtual void \* **create\_thread** (const char \*thread\_name, const struct **DDS\_ThreadSettings\_t** &settings, **DDSThreadFactory\_OnSpawnedFunction** on\_spawned, void \*thread\_param)=0

*Handles the creation of new threads.*

- virtual void **delete\_thread** (void \*thread)=0

*Handles the deletion of threads previously created by this factory.*

### 9.293.1 Detailed Description

<<**extension**>> (p. 237) <<**interface**>> (p. 237) Interface for providing the threads needed by the middleware. It consists of operations to create and delete threads. The interface depends on the **DDSThreadFactory\_OnSpawnedFunction** (p. 519) that specifies the operation to run in the new thread.

### 9.293.2 Member Function Documentation

#### 9.293.2.1 create\_thread()

```
virtual void * DDSThreadFactory::create_thread (
    const char * thread_name,
    const struct DDS_ThreadSettings_t & settings,
    DDSThreadFactory_OnSpawnedFunction on_spawned,
    void * thread_param ) [pure virtual]
```

Handles the creation of new threads.

This callback is called by the middleware whenever it needs to create a new thread. The operation creates a new thread of control that will call the function specified by **DDSThreadFactory\_OnSpawnedFunction** (p. 519). On success, this operation must guarantee that after return the new thread of control been spawned and its execution has started or will start some time after.

The **DDSThreadFactory\_OnSpawnedFunction** (p. 519), function must be called in the new thread and return its value on finalization. The function should be called as follows:

```
void * thread_out = on_spawned(thread_params);
```

...

```
return thread_out;
```

Some thread frameworks do this directly by just receiving the function and its parameters as arguments on thread creation. For instance, POSIX follows this model when creating a thread and the start\_routine function has the same signature as **DDSThreadFactory\_OnSpawnedFunction** (p. 519), so the parameter can be passed directly:

```
int result = pthread_create(&pthread_handle, &attr, on_spawned, thread_params);
```

...

```
return &pthread_handle;
```

### 9.293.2.2 delete\_thread()

```
virtual void DDSThreadFactory::delete_thread (
    void * thread ) [pure virtual]
```

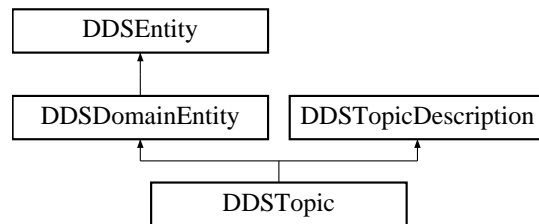
Handles the deletion of threads previously created by this factory.

This callback is called by the middleware whenever it needs to delete a thread. This operation deletes a thread previously created via a call to **DDSThreadFactory::create\_thread** (p. 1616) on the same factory object. On success, the thread must be deleted but it does not have to guarantee that the execution has finished. Likewise, resources associated with the underlying operating system may be still in use. Depending on the thread framework, resources allocated on thread creation are released upon thread finalization. POSIX follows this model so no actions are required on the thread handle returned by `pthread_create()`.

## 9.294 DDSTopic Class Reference

<<**interface**>> (p. 237) The most basic description of the data to be published and subscribed.

Inheritance diagram for DDSTopic:



### Public Member Functions

- virtual **DDS\_ReturnCode\_t** **get\_inconsistent\_topic\_status** ( **DDS\_InconsistentTopicStatus** &status)=0  
*Allows the application to retrieve the **DDS\_INCONSISTENT\_TOPIC\_STATUS** (p. 343) status of a **DDSTopic** (p. 1617).*
- virtual **DDS\_ReturnCode\_t** **set\_qos** (const **DDS\_TopicQos** &qos)=0  
*Set the topic QoS.*
- virtual **DDS\_ReturnCode\_t** **set\_qos\_with\_profile** (const char \*library\_name, const char \*profile\_name)=0  
*<<extension>> (p. 237) Change the QoS of this topic using the input XML QoS profile.*
- virtual **DDS\_ReturnCode\_t** **get\_qos** ( **DDS\_TopicQos** &qos)=0  
*Get the topic QoS.*
- virtual **DDS\_ReturnCode\_t** **set\_listener** ( **DDSTopicListener** \*l, **DDS\_StatusMask** mask= **DDS\_STATUS\_MASK\_ALL**)=0  
*Set the topic listener.*
- virtual **DDSTopicListener** \* **get\_listener** ()=0  
*Get the topic listener.*

## Static Public Member Functions

- static **DDSTopic** \* **narrow** (**DDSTopicDescription** \*topic\_description)  
*Narrow the given **DDSTopicDescription** (p. 1624) pointer to a **DDSTopic** (p. 1617) pointer.*

### 9.294.1 Detailed Description

<<**interface**>> (p. 237) The most basic description of the data to be published and subscribed.

QoS:

**DDS\_TopicQos** (p. 1135)

Status:

**DDS\_INCONSISTENT\_TOPIC\_STATUS** (p. 343), **DDS\_InconsistentTopicStatus** (p. 921)

Listener:

**DDSTopicListener** (p. 1626)

A **DDSTopic** (p. 1617) is identified by its name, which must be unique in the whole domain. In addition (by virtue of extending **DDSTopicDescription** (p. 1624)) it fully specifies the type of the data that can be communicated when publishing or subscribing to the **DDSTopic** (p. 1617).

**DDSTopic** (p. 1617) is the only **DDSTopicDescription** (p. 1624) that can be used for publications and therefore associated with a **DDSDataWriter** (p. 1321).

The following operations may be called even if the **DDSTopic** (p. 1617) is not enabled. Other operations will fail with the value **DDS\_RETCODE\_NOT\_ENABLED** (p. 337) if called on a disabled **DDSTopic** (p. 1617):

- **DDSEntity::enable** (p. 1466)
- **DDSTopic::set\_qos** (p. 1619), **DDSTopic::get\_qos** (p. 1621)
- **DDSTopic::set\_qos\_with\_profile** (p. 1620)
- **DDSTopic::set\_listener** (p. 1621), **DDSTopic::get\_listener** (p. 1622)
- **DDSEntity::get\_statuscondition** (p. 1467), **DDSEntity::get\_status\_changes** (p. 1467)
- **DDSTopic::get\_inconsistent\_topic\_status** (p. 1619)

See also

**Operations Allowed in Listener Callbacks** (p. 1528)

Examples

**HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.



## 9.294.2 Member Function Documentation

### 9.294.2.1 narrow()

```
static DDSTopic * DDSTopic::narrow (
    DDSTopicDescription * topic_description ) [static]
```

Narrow the given **DDSTopicDescription** (p. 1624) pointer to a **DDSTopic** (p. 1617) pointer.

#### Returns

**DDSTopic** (p. 1617) if this **DDSTopicDescription** (p. 1624) is a **DDSTopic** (p. 1617). Otherwise, return NULL.

### 9.294.2.2 get\_inconsistent\_topic\_status()

```
virtual DDS_ReturnCode_t DDSTopic::get_inconsistent_topic_status (
    DDS_InconsistentTopicStatus & status ) [pure virtual]
```

Allows the application to retrieve the **DDS\_INCONSISTENT\_TOPIC\_STATUS** (p. 343) status of a **DDSTopic** (p. 1617).

Retrieve the current **DDS\_InconsistentTopicStatus** (p. 921)

#### Parameters

<i>status</i>	<< <i>inout</i> >> (p. 238) Status to be retrieved.
---------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**DDS\_InconsistentTopicStatus** (p. 921)

### 9.294.2.3 set\_qos()

```
virtual DDS_ReturnCode_t DDSTopic::set_qos (
    const DDS_TopicQos & qos ) [pure virtual]
```

Set the topic QoS.

The `DDS_TopicQos::topic_data` (p. 1137) and `DDS_TopicQos::deadline` (p. 1138), `DDS_TopicQos::latency`↔`_budget` (p. 1138), `DDS_TopicQos::transport_priority` (p. 1139) and `DDS_TopicQos::lifespan` (p. 1139) can be changed. The other policies are immutable.

#### Parameters

<i>qos</i>	<< <i>in</i> >> (p. 238) Set of policies to be applied to <code>DDSTopic</code> (p. 1617).
------------	--

Policies must be consistent. Immutable policies cannot be changed after `DDSTopic` (p. 1617) is enabled. The special value `DDS_TOPIC_QOS_DEFAULT` (p. 56) can be used to indicate that the QoS of the `DDSTopic` (p. 1617) should be changed to match the current default `DDS_TopicQos` (p. 1135) set in the `DDSDomainParticipant` (p. 1351).

#### Exceptions

<i>One</i>	of the <code>Standard Return Codes</code> (p. 336), <code>DDS_RETCODE_IMMUTABLE_POLICY</code> (p. 337) if immutable policy is changed, or <code>DDS_RETCODE_INCONSISTENT_POLICY</code> (p. 337) if policies are inconsistent
------------	--

#### See also

`DDS_TopicQos` (p. 1135) for rules on consistency among QoS

`set_qos` (abstract) (p. 1464)

`Operations Allowed in Listener Callbacks` (p. 1528)

### 9.294.2.4 set\_qos\_with\_profile()

```
virtual DDS_ReturnCode_t DDSTopic::set_qos_with_profile (
    const char * library_name,
    const char * profile_name ) [pure virtual]
```

<<*extension*>> (p. 237) Change the QoS of this topic using the input XML QoS profile.

The `DDS_TopicQos::topic_data` (p. 1137) and `DDS_TopicQos::deadline` (p. 1138), `DDS_TopicQos::latency`↔`_budget` (p. 1138), `DDS_TopicQos::transport_priority` (p. 1139) and `DDS_TopicQos::lifespan` (p. 1139) can be changed. The other policies are immutable.

#### Parameters

<i>library_name</i>	<< <i>in</i> >> (p. 238) Library name containing the XML QoS profile. If <code>library_name</code> is null RTI Connexnt will use the default library (see <code>DDSDomainParticipant::set_default_library</code> (p. 1367)).
<i>profile_name</i>	<< <i>in</i> >> (p. 238) XML QoS Profile name. If <code>profile_name</code> is null RTI Connexnt will use the default profile (see <code>DDSDomainParticipant::set_default_profile</code> (p. 1368)).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_IMMUTABLE_POLICY</b> (p. 337) if immutable policy is changed, or <b>DDS_RETCODE_INCONSISTENT_POLICY</b> (p. 337) if policies are inconsistent
------------	--

## See also

**DDS\_TopicQoS** (p. 1135) for rules on consistency among QoS  
**Operations Allowed in Listener Callbacks** (p. 1528)

9.294.2.5 `get_qos()`

```
virtual DDS_ReturnCode_t DDSTopic::get_qos (
    DDS_TopicQoS & qos ) [pure virtual]
```

Get the topic QoS.

This method may potentially allocate memory depending on the sequences contained in some QoS policies.

## Parameters

<i>qos</i>	<< <i>inout</i> >> (p. 238) QoS to be filled up.
------------	--

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**get\_qos (abstract)** (p. 1465)

9.294.2.6 `set_listener()`

```
virtual DDS_ReturnCode_t DDSTopic::set_listener (
    DDSListener * l,
    DDS_StatusMask mask = DDS_STATUS_MASK_ALL ) [pure virtual]
```

Set the topic listener.

## Parameters

<i>l</i>	<< <i>in</i> >> (p. 238) Listener to be installed on entity.
<i>mask</i>	<< <i>in</i> >> (p. 238) Changes of communication status to be invoked on the listener. See <b>DDS_StatusMask</b> (p. 341).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**set\_listener (abstract)** (p. 1465)

## 9.294.2.7 get\_listener()

```
virtual DDSTopicListener * DDSTopic::get_listener ( ) [pure virtual]
```

Get the topic listener.

## Returns

Existing listener attached to the **DDSTopic** (p. 1617).

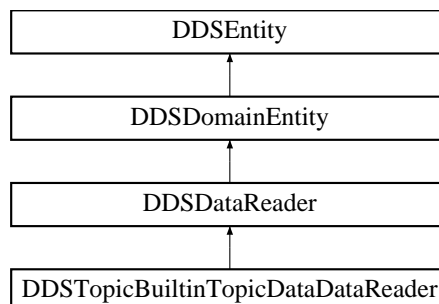
## See also

**get\_listener (abstract)** (p. 1466)

## 9.295 DDSTopicBuiltinTopicDataDataReader Class Reference

Instantiates `DataReader < DDS_TopicBuiltinTopicData (p. 1128) >` .

Inheritance diagram for `DDSTopicBuiltinTopicDataDataReader`:



## Additional Inherited Members

### 9.295.1 Detailed Description

Instantiates `DataReader` < **DDS\_TopicBuiltinTopicData** (p. 1128) > .

**DDSDataReader** (p. 1288) of topic **DDS\_TOPIC\_TOPIC\_NAME** (p. 297) used for accessing **DDS\_TopicBuiltinTopicData** (p. 1128) of the remote **DDSTopic** (p. 1617).

Note: The **DDS\_TopicBuiltinTopicData** (p. 1128) built-in topic is meant to convey information about discovered Topics. This Topic's samples are not propagated in a separate packet on the wire. Instead, the data is sent as part of the information carried by other built-in topics (**DDS\_PublicationBuiltinTopicData** (p. 1010) and **DDS\_SubscriptionBuiltinTopicData** (p. 1108)). Therefore `TopicBuiltinTopicData` `DataReaders` will not receive any data.

Instantiates:

<<*generic*>> (p. 237) **FooDataReader** (p. 1649)

See also

**DDS\_TopicBuiltinTopicData** (p. 1128)

**DDS\_TOPIC\_TOPIC\_NAME** (p. 297)

## 9.296 DDS**TopicBuiltinTopicData**TypeSupport Class Reference

Instantiates `TypeSupport` < **DDS\_TopicBuiltinTopicData** (p. 1128) > .

### 9.296.1 Detailed Description

Instantiates `TypeSupport` < **DDS\_TopicBuiltinTopicData** (p. 1128) > .

Instantiates:

<<*generic*>> (p. 237) **FooTypeSupport** (p. 1711)

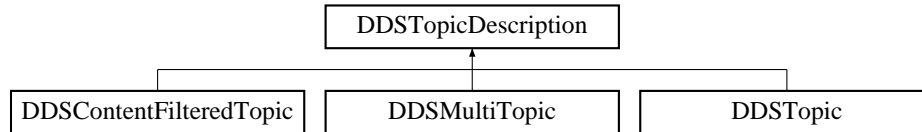
See also

**DDS\_TopicBuiltinTopicData** (p. 1128)

## 9.297 DDSTopicDescription Class Reference

<<*interface*>> (p. 237) Base class for **DDSTopic** (p. 1617), **DDSContentFilteredTopic** (p. 1283), and **DDSMultiTopic** (p. 1529).

Inheritance diagram for DDSTopicDescription:



### Public Member Functions

- virtual const char \* **get\_type\_name** ()=0  
Get the associated *type\_name*.
- virtual const char \* **get\_name** ()=0  
Get the name used to create this **DDSTopicDescription** (p. 1624) .
- virtual **DDSDomainParticipant** \* **get\_participant** ()=0  
Get the **DDSDomainParticipant** (p. 1351) to which the **DDSTopicDescription** (p. 1624) belongs.

### 9.297.1 Detailed Description

<<*interface*>> (p. 237) Base class for **DDSTopic** (p. 1617), **DDSContentFilteredTopic** (p. 1283), and **DDSMultiTopic** (p. 1529).

**DDSTopicDescription** (p. 1624) represents the fact that both publications and subscriptions are tied to a single data-type. Its attribute *type\_name* defines a unique resulting type for the publication or the subscription and therefore creates an implicit association with a **DDSTypeSupport** (p. 1629).

**DDSTopicDescription** (p. 1624) has also a *name* that allows it to be retrieved locally.

See also

**DDSTypeSupport** (p. 1629), **FooTypeSupport** (p. 1711)

### 9.297.2 Member Function Documentation

### 9.297.2.1 get\_type\_name()

```
virtual const char * DDSTopicDescription::get_type_name ( ) [pure virtual]
```

Get the associated `type_name`.

The type name defines a locally unique type for the publication or the subscription.

The `type_name` corresponds to a unique string used to register a type via the **FooTypeSupport::register\_type** (p. 1713) method.

Thus, the `type_name` implies an association with a corresponding **DDSTypeSupport** (p. 1629) and this **DDSTopicDescription** (p. 1624).

#### Returns

the type name. The returned type name is valid until the **DDSTopicDescription** (p. 1624) is deleted.

#### Postcondition

The result is non-NULL.

#### See also

**DDSTypeSupport** (p. 1629), **FooTypeSupport** (p. 1711)

### 9.297.2.2 get\_name()

```
virtual const char * DDSTopicDescription::get_name ( ) [pure virtual]
```

Get the name used to create this **DDSTopicDescription** (p. 1624) .

#### Returns

the name used to create this **DDSTopicDescription** (p.1624). The returned topic name is valid until the **DDSTopicDescription** (p. 1624) is deleted.

#### Postcondition

The result is non-NULL.

### 9.297.2.3 get\_participant()

```
virtual DDSDomainParticipant * DDSTopicDescription::get_participant ( ) [pure virtual]
```

Get the **DDSDomainParticipant** (p. 1351) to which the **DDSTopicDescription** (p. 1624) belongs.

#### Returns

The **DDSDomainParticipant** (p. 1351) to which the **DDSTopicDescription** (p. 1624) belongs.

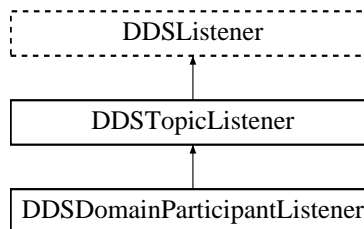
#### Postcondition

The result is non-NULL.

## 9.298 DDSTopicListener Class Reference

<<*interface*>> (p. 237) **DDSListener** (p. 1526) for **DDSTopic** (p. 1617) entities.

Inheritance diagram for DDSTopicListener:



### Public Member Functions

- virtual void **on\_inconsistent\_topic** ( **DDSTopic** \*topic, const **DDS\_InconsistentTopicStatus** &status)  
Handle the **DDS\_INCONSISTENT\_TOPIC\_STATUS** (p. 343) status.

### 9.298.1 Detailed Description

<<*interface*>> (p. 237) **DDSListener** (p. 1526) for **DDSTopic** (p. 1617) entities.

#### Entity:

**DDSTopic** (p. 1617)

#### Status:

**DDS\_INCONSISTENT\_TOPIC\_STATUS** (p. 343), **DDS\_InconsistentTopicStatus** (p. 921)

This is the interface that can be implemented by an application-provided class and then registered with the **DDSTopic** (p. 1617) such that the application can be notified by RTI Connex of relevant status changes.

#### See also

- Status Kinds** (p. 337)
- DDSListener** (p. 1526)
- DDSTopic::set\_listener** (p. 1621)
- Operations Allowed in Listener Callbacks** (p. 1528)



## 9.298.2 Member Function Documentation

### 9.298.2.1 on\_inconsistent\_topic()

```
virtual void DDSTopicListener::on_inconsistent_topic (
    DDSTopic * topic,
    const DDS_InconsistentTopicStatus & status ) [virtual]
```

Handle the **DDS\_INCONSISTENT\_TOPIC\_STATUS** (p. 343) status.

This callback is called when a remote **DDSTopic** (p. 1617) is discovered but is inconsistent with the locally created **DDSTopic** (p. 1617) of the same topic name.

#### Parameters

<i>topic</i>	<< <b>out</b> >> (p. 238) Locally created <b>DDSTopic</b> (p. 1617) that triggers the listener callback
<i>status</i>	<< <b>out</b> >> (p. 238) Current inconsistent status of locally created <b>DDSTopic</b> (p. 1617)

## 9.299 DDSTopicQuery Class Reference

<<**extension**>> (p. 237) Allows a **DDSDataReader** (p. 1288) to query the sample cache of its matching **DDSData**↔  
**Writer** (p. 1321).

### Public Member Functions

- virtual **DDS\_ReturnCode\_t** **get\_guid** ( **DDS\_GUID\_t** &guid)  
*Get the TopicQuery's GUID.*

### 9.299.1 Detailed Description

<<**extension**>> (p. 237) Allows a **DDSDataReader** (p. 1288) to query the sample cache of its matching **DDSData**↔  
**Writer** (p. 1321).

## 9.299.2 Member Function Documentation

### 9.299.2.1 get\_guid()

```
virtual DDS_ReturnCode_t DDSTopicQuery::get_guid (
    DDS_GUID_t & guid ) [inline], [virtual]
```

Get the TopicQuery's GUID.

## Parameters

<i>guid</i>	<< <b>out</b> >> (p. 238) The GUID of the <b>DDSTopicQuery</b> (p. 1627).
-------------	---

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## 9.300 DDSTopicQueryHelper Class Reference

Helpers to provide utility operations related to **DDSTopicQuery** (p. 1627).

### Static Public Member Functions

- static **DDS\_Boolean topic\_query\_data\_from\_service\_request** ( **DDS\_TopicQueryData** &topic\_query\_data, const **DDS\_ServiceRequest** &service\_request)

*Retrieves the **DDS\_TopicQueryData** (p. 1140) data contained in the specified **DDS\_ServiceRequest** (p. 1097).*

### 9.300.1 Detailed Description

Helpers to provide utility operations related to **DDSTopicQuery** (p. 1627).

### 9.300.2 Member Function Documentation

#### 9.300.2.1 topic\_query\_data\_from\_service\_request()

```
static DDS_Boolean DDSTopicQueryHelper::topic_query_data_from_service_request (
    DDS_TopicQueryData & topic_query_data,
    const DDS_ServiceRequest & service_request ) [static]
```

Retrieves the **DDS\_TopicQueryData** (p. 1140) data contained in the specified **DDS\_ServiceRequest** (p. 1097).

This operation will extract the content from the request body of the **DDS\_ServiceRequest** (p. 1097) and place it into the specified **DDS\_TopicQueryData** (p. 1140) object.

The specified **DDS\_ServiceRequest** (p. 1097) must be a valid sample associated with the service id **DDS\_TOPIC\_QUERY\_SERVICE\_REQUEST\_ID** (p. 302). Otherwise this operation will return **DDS\_BOOLEAN\_FALSE** (p. 317).

This operation can be called within the context of a **DDSDataWriterListener::on\_service\_request\_accepted** (p. 1350) to retrieve the **DDS\_TopicQueryData** (p. 1140) of a **DDS\_ServiceRequest** (p. 1097) that has been received with service id **DDS\_TOPIC\_QUERY\_SERVICE\_REQUEST\_ID** (p. 302)

## Parameters

<i>topic_query_data</i>	<< <i>inout</i> >> (p. 238) A <b>DDS_TopicQueryData</b> (p. 1140) object where the content from the service request is extracted.
<i>service_request</i>	<< <i>in</i> >> (p. 238) Input <b>DDS_ServiceRequest</b> (p. 1097) that contains the <b>DDS_TopicQueryData</b> (p. 1140) as part of its request body.

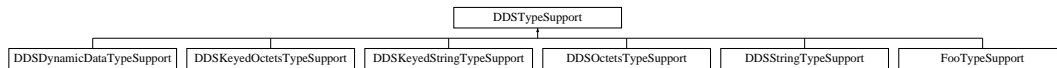
## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) on success.

## 9.301 DDSTypeSupport Class Reference

<<*interface*>> (p. 237) An abstract *marker* interface that has to be specialized for each concrete user data type that will be used by the application.

Inheritance diagram for DDSTypeSupport:



### 9.301.1 Detailed Description

<<*interface*>> (p. 237) An abstract *marker* interface that has to be specialized for each concrete user data type that will be used by the application.

The implementation provides an automatic means to generate a type-specific class, **FooTypeSupport** (p. 1711), from a description of the type in IDL.

A **DDSTypeSupport** (p. 1629) must be registered using the **FooTypeSupport::register\_type** (p. 1713) operation on this type-specific class before it can be used to create **DDSTopic** (p. 1617) objects.

## See also

**FooTypeSupport** (p. 1711)  
the Code Generator User's Manual

## Examples

**HelloWorldSupport.cxx.**

## 9.302 DDSWaitSet Class Reference

<<*interface*>> (p. 237) Allows an application to wait until one or more of the attached **DDSCondition** (p. 1276) objects has a `trigger_value` of **DDS\_BOOLEAN\_TRUE** (p. 317) or else until the timeout expires.

## Public Member Functions

- virtual **DDS\_ReturnCode\_t** **wait** (**DDSConditionSeq** &active\_conditions, const **DDS\_Duration\_t** &timeout)  
*Allows an application thread to wait for the occurrence of certain conditions.*
- virtual **DDS\_ReturnCode\_t** **attach\_condition** (**DDSCondition** \*cond)  
*Attaches a **DDSCondition** (p. 1276) to the **DDSWaitSet** (p. 1629).*
- virtual **DDS\_ReturnCode\_t** **detach\_condition** (**DDSCondition** \*cond)  
*Detaches a **DDSCondition** (p. 1276) from the **DDSWaitSet** (p. 1629).*
- virtual **DDS\_ReturnCode\_t** **get\_conditions** (**DDSConditionSeq** &attached\_conditions)  
*Retrieves the list of attached **DDSCondition** (p. 1276) (s).*
- virtual **DDS\_ReturnCode\_t** **set\_property** (const **DDS\_WaitSetProperty\_t** &prop)  
*<<extension>> (p. 237) Sets the **DDS\_WaitSetProperty\_t** (p. 1242), to configure the associated **DDSWaitSet** (p. 1629) to return after one or more trigger events have occurred.*
- virtual **DDS\_ReturnCode\_t** **get\_property** (**DDS\_WaitSetProperty\_t** &prop)  
*<<extension>> (p. 237) Retrieves the **DDS\_WaitSetProperty\_t** (p. 1242) configuration of the associated **DDSWaitSet** (p. 1629).*
- virtual **~DDSWaitSet** ()  
*Destructor.*
- **DDSWaitSet** ()  
*Default no-argument constructor.*
- **DDSWaitSet** (const **DDS\_WaitSetProperty\_t** &prop)  
*<<extension>> (p. 237) Constructor for a **DDSWaitSet** (p. 1629) that may delay for more while specifying that will be woken up after the given number of events or delay period, whichever happens first*

### 9.302.1 Detailed Description

<<**interface**>> (p. 237) Allows an application to wait until one or more of the attached **DDSCondition** (p. 1276) objects has a `trigger_value` of **DDS\_BOOLEAN\_TRUE** (p. 317) or else until the timeout expires.

### 9.302.2 Usage

**DDSCondition** (p. 1276) (s) (in conjunction with wait-sets) provide an alternative mechanism to allow the middleware to communicate communication status changes (including arrival of data) to the application.

"::DDSWaitSet and ::DDSCondition (s)"

This mechanism is wait-based. Its general use pattern is as follows:

- The application indicates which relevant information it wants to get by creating **DDSCondition** (p. 1276) objects (**DDSStatusCondition** (p. 1578), **DDSReadCondition** (p. 1574) or **DDSQueryCondition** (p. 1573)) and attaching them to a **DDSWaitSet** (p. 1629).
- It then waits on that **DDSWaitSet** (p. 1629) until the `trigger_value` of one or several **DDSCondition** (p. 1276) objects become **DDS\_BOOLEAN\_TRUE** (p. 317).

- It then uses the result of the wait (i.e., `active_conditions`, the list of **DDSCondition** (p. 1276) objects with `trigger_value == DDS_BOOLEAN_TRUE` (p. 317)) to actually get the information:
  - by calling **DDSEntity::get\_status\_changes** (p. 1467) and then `get_<communication_status>()` on the relevant **DDSEntity** (p. 1463), if the condition is a **DDSStatusCondition** (p. 1578) and the status changes, refer to plain communication status;
  - by calling **DDSEntity::get\_status\_changes** (p. 1467) and then **DDSSubscriber::get\_datareaders** (p. 1606) on the relevant **DDSSubscriber** (p. 1592) (and then **FooDataReader::read()** (p. 1651) or **Foo←DataReader::take** (p. 1652) on the returned **DDSDataReader** (p. 1288) objects), if the condition is a **DDSStatusCondition** (p. 1578) and the status changes refers to **DDS\_DATA\_ON\_READERS\_STATUS** (p. 345);
  - by calling **DDSEntity::get\_status\_changes** (p. 1467) and then **FooDataReader::read()** (p. 1651) or **Foo←DataReader::take** (p. 1652) on the relevant **DDSDataReader** (p. 1288), if the condition is a **DDSStatus←Condition** (p. 1578) and the status changes refers to **DDS\_DATA\_AVAILABLE\_STATUS** (p. 345);
  - by calling directly **FooDataReader::read\_w\_condition** (p. 1657) or **FooDataReader::take\_w\_condition** (p. 1658) on a **DDSDataReader** (p. 1288) with the **DDSCondition** (p. 1276) as a parameter if it is a **DDSReadCondition** (p. 1574) or a **DDSQueryCondition** (p. 1573).

Usually the first step is done in an initialization phase, while the others are put in the application main loop.

As there is no extra information passed from the middleware to the application when a wait returns (only the list of triggered **DDSCondition** (p. 1276) objects), **DDSCondition** (p. 1276) objects are meant to embed all that is needed to react properly when enabled. In particular, **DDSEntity** (p. 1463)-related conditions are related to exactly one **DDSEntity** (p. 1463) and cannot be shared.

The blocking behavior of the **DDSWaitSet** (p. 1629) is illustrated below.

blocking behavior"

The result of a **DDSWaitSet::wait** (p. 1634) operation depends on the state of the **DDSWaitSet** (p. 1629), which in turn depends on whether at least one attached **DDSCondition** (p. 1276) has a `trigger_value` of **DDS\_BOOLEAN←\_TRUE** (p. 317). If the wait operation is called on **DDSWaitSet** (p. 1629) with state `BLOCKED`, it will block the calling thread. If wait is called on a **DDSWaitSet** (p. 1629) with state `UNBLOCKED`, it will return immediately. In addition, when the **DDSWaitSet** (p. 1629) transitions from `BLOCKED` to `UNBLOCKED` it wakes up any threads that had called wait on it.

A key aspect of the Condition and WaitSet mechanism is the setting of the `trigger_value` of each **DDSCondition** (p. 1276).

The **DDSWaitSet** (p. 1629) cannot be used after calling **DDSDomainParticipantFactory::finalize\_instance** (p. 1429).

### 9.302.3 Trigger State of a ::DDSStatusCondition

The `trigger_value` of a **DDSStatusCondition** (p. 1578) is the boolean OR of the `ChangedStatusFlag` of all the communication statuses (see **Status Kinds** (p. 337)) to which it is sensitive. That is, `trigger_value == DDS_←BOOLEAN_FALSE` (p. 317) only if all the values of the `ChangedStatusFlags` are **DDS\_BOOLEAN\_FALSE** (p. 317).

The sensitivity of the **DDSStatusCondition** (p. 1578) to a particular communication status is controlled by the list of `enabled_statuses` set on the condition by means of the **DDSStatusCondition::set\_enabled\_statuses** (p. 1579) operation.

Once the `trigger_value` of a StatusCondition becomes true, it remains true until the status that changed is reset. To reset a status, call the related `get_*_status()` operation. Or, in the case of the data available status, call `read()`, `take()`, or one of their variants. Therefore, if you are using a **DDSStatusCondition** (p. 1578) on a **DDSWaitSet** (p. 1629) to be notified of events, your thread will wake up when one of the statuses associated with the StatusCondition becomes true. If you do not reset the status, the StatusCondition `trigger_value` remains true and your WaitSet will not block again; it will immediately wake up when you call **DDSWaitSet::wait** (p. 1634).

### 9.302.4 Trigger State of a `::DDSReadCondition`

Similar to the `DDSStatusCondition` (p. 1578), a `DDSReadCondition` (p. 1574) also has a `trigger_value` that determines whether the attached `DDSWaitSet` (p. 1629) is `BLOCKED` or `UNBLOCKED`. However, unlike the `DDSStatusCondition` (p. 1578), the `trigger_value` of the `DDSReadCondition` (p. 1574) is tied to the presence of *at least a sample* managed by RTI Connext with `DDS_SampleStateKind` (p. 156) and `DDS_ViewStateKind` (p. 158) matching those of the `DDSReadCondition` (p. 1574). Furthermore, for the `DDSQueryCondition` (p. 1573) to have a `trigger_value == DDS_BOOLEAN_TRUE` (p. 317), the data associated with the sample must be such that the `query_expression` evaluates to `DDS_BOOLEAN_TRUE` (p. 317).

The fact that the `trigger_value` of a `DDSReadCondition` (p. 1574) depends on the presence of samples on the associated `DDSDataReader` (p. 1288) implies that a single take operation can potentially change the `trigger_value` of several `DDSReadCondition` (p. 1574) or `DDSQueryCondition` (p. 1573) conditions. For example, if all samples are taken, any `DDSReadCondition` (p. 1574) and `DDSQueryCondition` (p. 1573) conditions associated with the `DDSDataReader` (p. 1288) that had their `trigger_value==TRUE` before will see the `trigger_value` change to `FALSE`. Note that this does not guarantee that `DDSWaitSet` (p. 1629) objects that were separately attached to those conditions will not be woken up. Once we have `trigger_value==TRUE` on a condition, it may wake up the attached `DDSWaitSet` (p. 1629), the condition transitioning to `trigger_value==FALSE` does not necessarily 'unwake up' the `WaitSet` as 'unwakening' may not be possible in general.

The consequence is that an application blocked on a `DDSWaitSet` (p. 1629) may return from the wait with a list of conditions, some of which are not no longer 'active'. This is unavoidable if multiple threads are concurrently waiting on separate `DDSWaitSet` (p. 1629) objects and taking data associated with the same `DDSDataReader` (p. 1288) entity.

To elaborate further, consider the following example: A `DDSReadCondition` (p. 1574) that has a `sample_state_mask = {DDS_NOT_READ_SAMPLE_STATE (p. 157)}` will have `trigger_value` of `DDS_BOOLEAN_TRUE` (p. 317) whenever a new sample arrives and will transition to `DDS_BOOLEAN_FALSE` (p. 317) as soon as all the newly-arrived samples are either read (so their sample state changes to `READ`) or taken (so they are no longer managed by RTI Connext). However if the same `DDSReadCondition` (p. 1574) had a `sample_state_mask = { DDS_READ_SAMPLE_STATE (p. 157), DDS_NOT_READ_SAMPLE_STATE (p. 157) }`, then the `trigger_value` would only become `DDS_BOOLEAN_FALSE` (p. 317) once all the newly-arrived samples are taken (it is not sufficient to read them as that would only change the sample state to `READ`), which overlaps the mask on the `DDSReadCondition` (p. 1574).

### 9.302.5 Trigger State of a `::DDSGuardCondition`

The `trigger_value` of a `DDSGuardCondition` (p. 1471) is completely controlled by the application via the operation `DDSGuardCondition::set_trigger_value` (p. 1473).

See also

- `Status Kinds` (p. 337)
- `DDSStatusCondition` (p. 1578), `DDSGuardCondition` (p. 1471)
- `DDSListener` (p. 1526)

Examples

`HelloWorld_subscriber.cxx`.

### 9.302.6 Constructor & Destructor Documentation

### 9.302.6.1 ~DDSWaitSet()

```
virtual DDSWaitSet::~DDSWaitSet ( ) [virtual]
```

Destructor.

Releases the resources associated with this **DDSWaitSet** (p. 1629).

Freeing a null pointer is safe and does nothing.

#### MT Safety:

UNSAFE. It is not safe to delete a **DDSWaitSet** (p.1629) while another thread is calling an API that uses the entity. For instance, a thread must not delete a WaitSet while another thread is blocked with **DDSWaitSet::wait** (p.1634). To properly handle this scenario, you can use a **DDSGuardCondition** (p.1471) to wake up the WaitSet and then wait for the finalization of the thread. In VxWorks, it is unsafe to call this method while another thread may be simultaneously calling **DDSDomainParticipantFactory::get\_instance** (p. 1429), **DDSDomainParticipantFactory::finalize\_instance** (p. 1429), **DDS\_TypeCodeFactory::get\_instance** (p. 1212), **DDSGuardCondition::DDSGuardCondition** (p. 1472), **DDSWaitSet::DDSWaitSet()** (p. 1633), **DDSWaitSet::DDSWaitSet(const DDS\_WaitSetProperty\_t&)** (p. 1633), **DDSGuardCondition::~~DDSGuardCondition** (p. 1472), **DDSWaitSet::~~DDSWaitSet()** (p. 1632), **NDDUtilityNetworkCapture::enable** (p. 1847), or **NDDUtilityNetworkCapture::disable** (p. 1848).

### 9.302.6.2 DDSWaitSet() [1/2]

```
DDSWaitSet::DDSWaitSet ( )
```

Default no-argument constructor.

Construct a new **DDSWaitSet** (p. 1629).

#### MT Safety:

UNSAFE. In VxWorks, it is unsafe to call this method while another thread may be simultaneously calling **DDSDomainParticipantFactory::get\_instance** (p. 1429), **DDSDomainParticipantFactory::finalize\_instance** (p. 1429), **DDS\_TypeCodeFactory::get\_instance** (p. 1212), **DDSGuardCondition::DDSGuardCondition** (p. 1472), **DDSWaitSet::DDSWaitSet()** (p. 1633), **DDSWaitSet::DDSWaitSet(const DDS\_WaitSetProperty\_t&)** (p. 1633), **DDSGuardCondition::~~DDSGuardCondition** (p. 1472), **DDSWaitSet::~~DDSWaitSet()** (p. 1632), **NDDUtilityNetworkCapture::enable** (p. 1847), or **NDDUtilityNetworkCapture::disable** (p. 1848).

### 9.302.6.3 DDSWaitSet() [2/2]

```
DDSWaitSet::DDSWaitSet (
    const DDS_WaitSetProperty_t & prop )
```

<<**extension**>> (p. 237) Constructor for a **DDSWaitSet** (p. 1629) that may delay for more while specifying that will be woken up after the given number of events or delay period, whichever happens first

Constructs a new **DDSWaitSet** (p. 1629).

MT Safety:

UNSAFE. In VxWorks, it is unsafe to call this method while another thread may be simultaneously calling **DDSDomainParticipantFactory::get\_instance** (p. 1429), **DDSDomainParticipantFactory::finalize\_instance** (p. 1429), **DDS\_TypeCodeFactory::get\_instance** (p. 1212), **DDSGuardCondition::DDSGuardCondition** (p. 1472), **DDSWaitSet::DDSWaitSet()** (p. 1633), **DDSWaitSet::DDSWaitSet(const DDS\_WaitSetProperty\_t&)** (p. 1633), **DDSGuardCondition::~DDSGuardCondition** (p. 1472), **DDSWaitSet::~DDSWaitSet()** (p. 1632), **NDDUtilityNetworkCapture::enable** (p. 1847), or **NDDUtilityNetworkCapture::disable** (p. 1848).

## 9.302.7 Member Function Documentation

### 9.302.7.1 wait()

```
virtual DDS_ReturnCode_t DDSWaitSet::wait (
    DDSConditionSeq & active_conditions,
    const DDS_Duration_t & timeout ) [virtual]
```

Allows an application thread to wait for the occurrence of certain conditions.

If none of the conditions attached to the **DDSWaitSet** (p. 1629) have a `trigger_value` of **DDS\_BOOLEAN\_TRUE** (p. 317), the wait operation will block, suspending the calling thread.

The result of the wait operation is the list of all the attached conditions that have a `trigger_value` of **DDS\_BOOLEAN\_TRUE** (p. 317) (i.e., the conditions that unblocked the wait).

The wait operation takes a `timeout` argument that specifies the maximum duration for the wait. If this duration is exceeded and none of the attached **DDSCondition** (p. 1276) objects are **DDS\_BOOLEAN\_TRUE** (p. 317), wait fails with **DDS\_RETCODE\_TIMEOUT** (p. 337). In this case, the resulting list of conditions will be empty. If a negative duration is passed, wait fails with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336).

Note: The resolution of the `timeout` period is constrained by the resolution of the system clock.

When the **DDSWaitSet** (p. 1629) is configured to wait for more than one trigger event and the timeout is exceeded before that number is reached, this function returns normally as long as at least one trigger event has occurred.

It is not allowable for more than one application thread to be waiting on the same **DDSWaitSet** (p. 1629). If the wait operation is invoked on a **DDSWaitSet** (p. 1629) that already has a thread blocking on it, the operation will return immediately with the value **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).



## Parameters

<i>active_conditions</i>	<< <i>inout</i> >> (p. 238) a valid non-NULL <b>DDSConditionSeq</b> (p. 1279) object. Note that RTI Connexit will not allocate a new object if <i>active_conditions</i> is NULL; the method will return <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
<i>timeout</i>	<< <i>in</i> >> (p. 238) a wait timeout

## Returns

One of the **Standard Return Codes** (p. 336) or **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) or **DDS↔\_RETCODE\_TIMEOUT** (p. 337).

## Examples

**HelloWorld\_subscriber.cxx.**

## 9.302.7.2 attach\_condition()

```
virtual DDS_ReturnCode_t DDSWaitSet::attach_condition (
    DDSCondition * cond ) [virtual]
```

Attaches a **DDSCondition** (p. 1276) to the **DDSWaitSet** (p. 1629).

It is possible to attach a **DDSCondition** (p. 1276) on a **DDSWaitSet** (p. 1629) that is currently being waited upon (via the wait operation). In this case, if the **DDSCondition** (p. 1276) has a *trigger\_value* of **DDS\_BOOLEAN\_TRUE** (p. 317), then attaching the condition will unblock the **DDSWaitSet** (p. 1629).

## Parameters

<i>cond</i>	<< <i>in</i> >> (p. 238) Condition to be attached.
-------------	--

## Returns

One of the **Standard Return Codes** (p. 336), or **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

## Examples

**HelloWorld\_subscriber.cxx.**

## 9.302.7.3 detach\_condition()

```
virtual DDS_ReturnCode_t DDSWaitSet::detach_condition (
    DDSCondition * cond ) [virtual]
```

Detaches a **DDSCondition** (p. 1276) from the **DDSWaitSet** (p. 1629).

It is possible to detach a **DDSCondition** (p. 1276) on a **DDSWaitSet** (p. 1629) that is currently being waited upon (via the wait operation). If the **DDSCondition** (p. 1276) was not attached to the **DDSWaitSet** (p. 1629), the operation will return **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336).

#### Parameters

<i>cond</i>	<< <i>in</i> >> (p. 238) Condition to be detached.
-------------	--

#### Returns

One of the **Standard Return Codes** (p. 336), or **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

### 9.302.7.4 get\_conditions()

```
virtual DDS_ReturnCode_t DDSWaitSet::get_conditions (
    DDSConditionSeq & attached_conditions ) [virtual]
```

Retrieves the list of attached **DDSCondition** (p. 1276) (s).

#### Parameters

<i>attached_conditions</i>	<< <i>inout</i> >> (p. 238) a <b>DDSConditionSeq</b> (p. 1279) object where the list of attached conditions will be returned
----------------------------	--

#### Returns

One of the **Standard Return Codes** (p. 336), or **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

### 9.302.7.5 set\_property()

```
virtual DDS_ReturnCode_t DDSWaitSet::set_property (
    const DDS_WaitSetProperty_t & prop ) [virtual]
```

<<**extension**>> (p. 237) Sets the **DDS\_WaitSetProperty\_t** (p. 1242), to configure the associated **DDSWaitSet** (p. 1629) to return after one or more trigger events have occurred.

#### Parameters

<i>prop</i>	<< <i>in</i> >> (p. 238)
-------------	--------------------------

## Returns

One of the **Standard Return Codes** (p. 336)

## 9.302.7.6 get\_property()

```
virtual DDS_ReturnCode_t DDSWaitSet::get_property (
    DDS_WaitSetProperty_t & prop ) [virtual]
```

<<*extension*>> (p. 237) Retrieves the **DDS\_WaitSetProperty\_t** (p. 1242) configuration of the associated **DDSWaitSet** (p. 1629).

## Parameters

<i>prop</i>	<< <i>out</i> >> (p. 238)
-------------	---------------------------

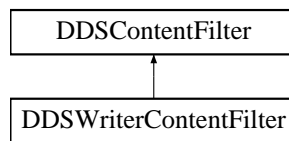
## Returns

One of the **Standard Return Codes** (p. 336)

## 9.303 DDSWriterContentFilter Class Reference

<<*interface*>> (p. 237) Interface to be used by a custom filter of a **DDSContentFilteredTopic** (p. 1283).

Inheritance diagram for DDSWriterContentFilter:



## Public Member Functions

- virtual **DDS\_ReturnCode\_t** **writer\_compile** (void \*writer\_filter\_data, **DDS\_ExpressionProperty** \*prop, const char \*expression, const **DDS\_StringSeq** \*parameters, const **DDS\_TypeCode** \*type\_code, const char \*type\_class\_name, const **DDS\_Cookie\_t** \*cookie)=0  
*A writer-side filtering API to compile an instance of the content filter according to the filter expression and parameters specified by a matching **DDSDataReader** (p. 1288).*
- virtual struct **DDS\_CookieSeq** \* **writer\_evaluate** (void \*writer\_filter\_data, const void \*sample, const **DDS\_FilterSampleInfo** \*meta\_data)=0  
*A writer-side filtering API to retrieve a list of DataReaders whose content filters pass the sample.*
- virtual void **writer\_finalize** (void \*writer\_filter\_data, const **DDS\_Cookie\_t** \*cookie)=0

- virtual **DDS\_ReturnCode\_t writer\_attach** (void \*\*writer\_filter\_data)=0  
A writer-side filtering API to clean up a previously compiled instance of the content filter.
- virtual void **writer\_detach** (void \*writer\_filter\_data)=0  
A writer-side filtering API to create some state that can facilitate filtering on the writer side.
- virtual void **writer\_return\_loan** (void \*writer\_filter\_data, **DDS\_CookieSeq** \*cookies)=0  
A writer-side filtering API to clean up a previously created state using **DDSWriterContentFilter::writer\_attach** (p. 1640).
- virtual void **writer\_return\_loan** (void \*writer\_filter\_data, **DDS\_CookieSeq** \*cookies)=0  
A writer-side filtering API to return the loan on the list of DataReaders returned by **DDSWriterContentFilter::writer\_← evaluate** (p. 1639).

### 9.303.1 Detailed Description

<<**interface**>> (p. 237) Interface to be used by a custom filter of a **DDSContentFilteredTopic** (p. 1283).

Entity:

**DDSContentFilteredTopic** (p. 1283)

This interface can be implemented by an application-provided class and then registered with the **DDSDomain**← **Participant** (p. 1351) such that samples can be filtered for a **DDSContentFilteredTopic** (p. 1283) with the given filter name.

**Note:** The API for using a custom content filter is subject to change in a future release.

See also

**DDSContentFilteredTopic** (p. 1283)

**DDSDomainParticipant::register\_contentfilter** (p. 1364)

### 9.303.2 Member Function Documentation

#### 9.303.2.1 writer\_compile()

```
virtual DDS_ReturnCode_t DDSWriterContentFilter::writer_compile (
    void * writer_filter_data,
    DDS_ExpressionProperty * prop,
    const char * expression,
    const DDS_StringSeq * parameters,
    const DDS_TypeCode * type_code,
    const char * type_class_name,
    const DDS_Cookie_t * cookie ) [pure virtual]
```

A writer-side filtering API to compile an instance of the content filter according to the filter expression and parameters specified by a matching **DDSDataReader** (p. 1288).

This method is called when the **DDSDataWriter** (p. 1321) discovers a **DDSDataReader** (p. 1288) with a **DDSContent**← **FilteredTopic** (p. 1283) or when a **DDSDataWriter** (p. 1321) is notified of a change in a DataReader's filter parameter for the locally registered content filter instance.

It is possible for multiple threads to be calling into this function at the same time.

## Parameters

<i>writer_filter_data</i>	<< <i>in</i> >> (p. 238) A pointer to the state created using <b>DDSWriterContentFilter::writer_attach</b> (p. 1640) .
<i>prop</i>	<< <i>out</i> >> (p. 238) A pointer to <b>DDS_ExpressionProperty</b> (p. 910) that allows you to indicate to RTI Connex if a filter expression can be optimized.
<i>expression</i>	<< <i>in</i> >> (p. 238) An ASCII string with the filter expression. The memory used by this string is owned by RTI Connex and <b>must</b> not be freed. If you want to manipulate this string, you <b>must</b> first make a copy of it.
<i>parameters</i>	<< <i>in</i> >> (p. 238) A string sequence with the expression parameters with which the <b>DDSContentFilteredTopic</b> (p. 1283) was created. The string sequence is <b>equal</b> (but <b>not</b> identical) to the string sequence passed to <b>DDSDomainParticipant::create_contentfilteredtopic</b> (p. 1385). Note that the sequence passed to the compile function is <b>owned</b> by RTI Connex and <b>must not</b> be referenced outside the compile function.
<i>type_code</i>	<< <i>in</i> >> (p. 238) A pointer to the type code for the related <b>DDSTopic</b> (p. 1617) of the <b>DDSContentFilteredTopic</b> (p. 1283). A type_code is a description of a type in terms of which types it contains (such as long, string, etc.) and the corresponding member field names in the data type structure. The type code can be used to write custom content filters that can be used with any type.
<i>type_class_name</i>	<< <i>in</i> >> (p. 238) Fully qualified class name of the related <b>DDSTopic</b> (p. 1617).
<i>cookie</i>	<< <i>in</i> >> (p. 238) <b>DDS_Cookie_t</b> (p. 618) to uniquely identify <b>DDSDataReader</b> (p. 1288) for which <b>DDSWriterContentFilter::writer_compile</b> (p. 1638) was called.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## 9.303.2.2 writer\_evaluate()

```
virtual struct DDS_CookieSeq * DDSWriterContentFilter::writer_evaluate (
    void * writer_filter_data,
    const void * sample,
    const DDS_FilterSampleInfo * meta_data ) [pure virtual]
```

A writer-side filtering API to retrieve a list of DataReaders whose content filters pass the sample.

This method is called every time a **DDSDataWriter** (p. 1321) writes a new sample. Its purpose is to evaluate the sample for all the readers for which the **DDSDataWriter** (p. 1321) is performing writer-side filtering and return the list of **DDS\_Cookie\_t** (p. 618) structures associated with the DataReaders whose filters pass the sample.

It is possible for multiple threads to be calling into this function at the same time

## Parameters

<i>writer_filter_data</i>	<< <i>in</i> >> (p. 238) A pointer to the state created using <b>DDSWriterContentFilter::writer_attach</b> (p. 1640) .
<i>sample</i>	<< <i>in</i> >> (p. 238) Pointer to a deserialized sample to be filtered.
<i>meta_data</i>	<< <i>in</i> >> (p. 238) Pointer to meta data associated with the sample.

## Returns

The function returns **DDS\_CookieSeq** (p. 619) which identifies the set of DataReaders whose filters pass the sample.

9.303.2.3 `writer_finalize()`

```
virtual void DDSWriterContentFilter::writer_finalize (
    void * writer_filter_data,
    const DDS_Cookie_t * cookie ) [pure virtual]
```

A writer-side filtering API to clean up a previously compiled instance of the content filter.

This method is called to notify the filter implementation that the **DDSDataWriter** (p. 1321) is no longer matching with a **DDSDataReader** (p. 1288) for which it was previously performing writer-side filtering. This will allow the filter to purge any state it was maintaining for the **DDSDataReader** (p. 1288).

It is possible for multiple threads to be calling into this function at the same time.

## Parameters

<i>writer_filter_data</i>	<< <i>in</i> >> (p. 238) A pointer to the state created using <b>DDSWriterContentFilter::writer_attach</b> (p. 1640).
<i>cookie</i>	<b>DDS_Cookie_t</b> (p. 618) to uniquely identify <b>DDSDataReader</b> (p. 1288) for which <b>DDSWriterContentFilter::writer_finalize</b> (p. 1640) was called.

9.303.2.4 `writer_attach()`

```
virtual DDS_ReturnCode_t DDSWriterContentFilter::writer_attach (
    void ** writer_filter_data ) [pure virtual]
```

A writer-side filtering API to create some state that can facilitate filtering on the writer side.

This method is called to create some state required to perform filtering on the writer side using writer-side filtering APIs. This method will be called for every **DDSDataWriter** (p. 1321); it will be called only the first time the **DDSDataWriter** (p. 1321) matches a **DDSDataReader** (p. 1288) using the specified filter. This function will not be called for any subsequent DataReaders that match the DataWriter and are using the same filter.

## Parameters

<i>writer_filter_data</i>	<< <i>out</i> >> (p. 238) A user-specified opaque pointer to some state created on the <b>DDSDataWriter</b> (p. 1321) that will help perform writer-side filtering efficiently.
---------------------------	---

### 9.303.2.5 writer\_detach()

```
virtual void DDSWriterContentFilter::writer_detach (
    void * writer_filter_data ) [pure virtual]
```

A writer-side filtering API to clean up a previously created state using **DDSWriterContentFilter::writer\_attach** (p. 1640).

This method is called to delete any state created using the **DDSWriterContentFilter::writer\_attach** (p. 1640) function. This method will be called when the **DDSDataWriter** (p. 1321) is deleted.

#### Parameters

<i>writer_filter_data</i>	<< <i>in</i> >> (p. 238) A pointer to the state created using <b>DDSWriterContentFilter::writer_attach</b> (p. 1640).
---------------------------	---

### 9.303.2.6 writer\_return\_loan()

```
virtual void DDSWriterContentFilter::writer_return_loan (
    void * writer_filter_data,
    DDS_CookieSeq * cookies ) [pure virtual]
```

A writer-side filtering API to return the loan on the list of DataReaders returned by **DDSWriterContentFilter::writer\_↔evaluate** (p. 1639).

This method is called to return the loan on **DDS\_CookieSeq** (p. 619) returned by **DDSWriterContentFilter::writer\_↔return\_loan** (p. 1641). It is possible for multiple threads to be calling into this function at the same time.

#### Parameters

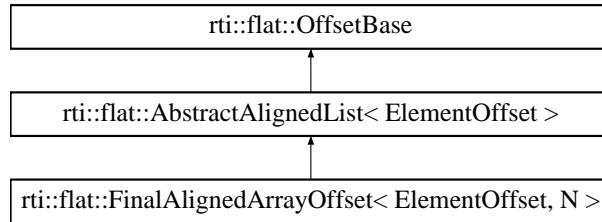
<i>writer_filter_data</i>	<< <i>in</i> >> (p. 238) A pointer to the state created using <b>DDSWriterContentFilter::writer_attach</b> (p. 1640).
<i>cookies</i>	<< <i>in</i> >> (p. 238) <b>DDS_CookieSeq</b> (p. 619) for which the <b>DDSWriterContentFilter::writer_return_loan</b> (p. 1641). was invoked.

## 9.304 rti::flat::FinalAlignedArrayOffset< ElementOffset, N > Class Template Reference

Offset to an array of final elements.

```
#include <SequenceOffsets.hpp>
```

Inheritance diagram for `rti::flat::FinalAlignedArrayOffset< ElementOffset, N >`:



## Public Member Functions

- `ElementOffset` **get\_element** (unsigned int i)  
*Gets the Offset to an element.*

## Additional Inherited Members

### 9.304.1 Detailed Description

```
template<typename ElementOffset, unsigned int N>
class rti::flat::FinalAlignedArrayOffset< ElementOffset, N >
```

Offset to an array of final elements.

#### Template Parameters

<i>ElementOffset</i>	A final struct Offset, such as <b>MyFlatFinalOffset</b> (p. 1746).
<i>N</i>	The array bound. For multidimensional arrays, <i>N</i> is the product of each dimension bound.

Represents an Offset to an array member and allows getting an Offset to each of its elements.

The following code shows how to use a **FinalAlignedArrayOffset** (p. 1641) to initialize an array member with **MyFlat**↔  
**MutableBuilder** (p. 1750):

```
MyFlatMutableBuilder builder = rti::flat::build_data(writer);
auto array_offset = builder.add_my_final_array();
for (MyFlatFinalOffset element_offset : array_offset) {
    element_offset.my_primitive(3);
    // ...
}
// Or access an element directly:
auto element_offset = array_offset.get_element(3);
element_offset.my_primitive(3);
```

A more efficient way to access a final array, provided it complies with the required preconditions, is through **rti::flat**↔  
**::plain\_cast()** (p. 566).

**FinalArrayOffset** (p. 1643) and **FinalAlignedArrayOffset** (p. 1641) provide the same interface, but have different implementation details. **FinalArrayOffset** (p. 1643) is used when the array member is part of a final type too, whereas **FinalAlignedArrayOffset** (p. 1641) corresponds to an array inside a mutable type.

A **FinalAlignedArrayOffset** (p. 1641) may meet the requirements to be cast to an array of the equivalent plain C++ element type (see **rti::flat::plain\_cast()** (p. 566)).



See also

**MutableArrayOffset** (p. 1742) encapsulates arrays of variable-size elements

## 9.304.2 Member Function Documentation

### 9.304.2.1 get\_element()

```
template<typename ElementOffset , unsigned int N>
ElementOffset rti::flat::FinalAlignedArrayOffset< ElementOffset, N >::get_element (
    unsigned int i ) [inline]
```

Gets the Offset to an element.

Parameters

<i>i</i>	The zero-based index to the element
----------	-------------------------------------

Returns

The Offset to the element in the i-th position

See also

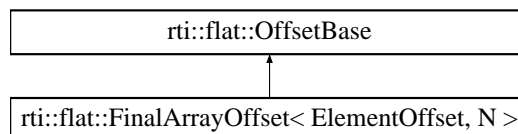
**rti::flat::plain\_cast()** (p. 566) for a method to access all the elements at once

## 9.305 rti::flat::FinalArrayOffset< ElementOffset, N > Class Template Reference

Offset to an array of final elements.

```
#include <SequenceOffsets.hpp>
```

Inheritance diagram for rti::flat::FinalArrayOffset< ElementOffset, N >:



## Public Member Functions

- ElementOffset **get\_element** (unsigned int i)  
*Gets the Offset to an element.*

### 9.305.1 Detailed Description

```
template<typename ElementOffset, unsigned int N>
class rti::flat::FinalArrayOffset< ElementOffset, N >
```

Offset to an array of final elements.

#### Template Parameters

<i>ElementOffset</i>	A final struct Offset, such as <b>MyFlatFinalOffset</b> (p. 1746).
<i>N</i>	The array bound. For multidimensional arrays, N is the product of each dimension bound.

Represents an Offset to an array member and allows getting an Offset to each of its elements.

**FinalArrayOffset** (p. 1643) and **FinalAlignedArrayOffset** (p. 1641) provide the same interface, but have different implementation details. **FinalArrayOffset** (p. 1643) is used when the array member is part of a final type too, whereas **FinalAlignedArrayOffset** (p. 1641) corresponds to an array inside a mutable type.

A **FinalArrayOffset** (p. 1643) may meet the requirements to be cast to an array of the equivalent plain C++ element type (see **rti::flat::plain\_cast()** (p. 566)).

### 9.305.2 Member Function Documentation

#### 9.305.2.1 get\_element()

```
template<typename ElementOffset , unsigned int N>
ElementOffset rti::flat::FinalArrayOffset< ElementOffset, N >::get_element (
    unsigned int i ) [inline]
```

Gets the Offset to an element.

#### Parameters

<i>i</i>	The zero-based index to the element
----------	-------------------------------------

**Returns**

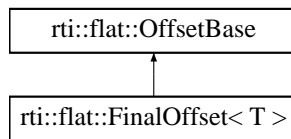
The Offset to the element in the i-th position

**9.306 rti::flat::FinalOffset< T > Class Template Reference**

The base class of all Offsets to a final struct type.

```
#include <Offset.hpp>
```

Inheritance diagram for rti::flat::FinalOffset< T >:

**Additional Inherited Members****9.306.1 Detailed Description**

```
template<typename T>
class rti::flat::FinalOffset< T >
```

The base class of all Offsets to a final struct type.

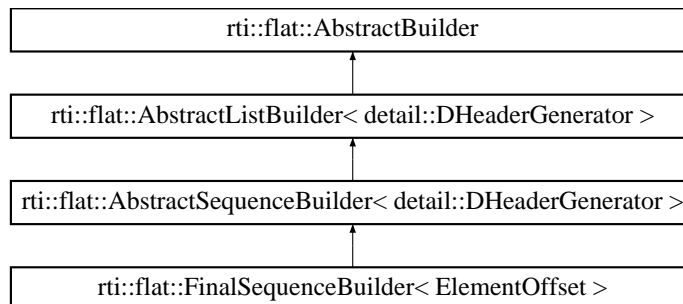
This class contains only implementation details; all the public accessors are defined in the generated type (**MyFlat**↔**FinalOffset** (p. 1746)).

**9.307 rti::flat::FinalSequenceBuilder< ElementOffset > Class Template Reference**

Builds a sequence member of fixed-size elements.

```
#include <SequenceBuilders.hpp>
```

Inheritance diagram for rti::flat::FinalSequenceBuilder< ElementOffset >:



## Public Member Functions

- ElementOffset **add\_next** ()  
*Adds the next element.*
- **FinalSequenceBuilder** & **add\_n** (unsigned int count)  
*Adds a number of elements at once.*
- Offset **finish** ()  
*Finishes building the sequence.*

## Additional Inherited Members

### 9.307.1 Detailed Description

```
template<typename ElementOffset>
class rti::flat::FinalSequenceBuilder< ElementOffset >
```

Builds a sequence member of fixed-size elements.

#### Template Parameters

<i>ElementOffset</i>	The Offset type for the elements of the sequence
----------------------	--

To add an element, call **add\_next()** (p. 1646) and use the ElementOffset it returns to initialize the element's values. An empty sequence can be built by calling **finish()** (p. 1647) without any call to **add\_next()** (p. 1646).

This class doesn't enforce the sequence bound set in IDL.

The following example uses a **FinalSequenceBuilder** (p. 1645) to initialize a sequence member of **MyFlatMutableBuilder** (p. 1750) with two elements:

```
MyFlatMutableBuilder builder = rti::flat::build_data(writer);
auto seq_builder = builder.build_my_final_seq();
MyFlatFinalOffset element = seq_builder.add_next();
element.my_primitive(1);
// ... continue initializing the first element
element = seq_builder.add_next();
element.my_primitive(2);
// ... continue initializing the second element

seq_builder.finish();
```

If the element type meets certain requirements, **rti::flat::plain\_cast()** (p. 566) provides a more efficient way to initialize a sequence of final elements.

### 9.307.2 Member Function Documentation

### 9.307.2.1 add\_next()

```
template<typename ElementOffset >
ElementOffset rti::flat::FinalSequenceBuilder< ElementOffset >::add_next ( ) [inline]
```

Adds the next element.

#### Returns

The Offset that can be used to set the element values

### 9.307.2.2 add\_n()

```
template<typename ElementOffset >
FinalSequenceBuilder & rti::flat::FinalSequenceBuilder< ElementOffset >::add_n (
    unsigned int count ) [inline]
```

Adds a number of elements at once.

This is an alternative to **add\_next()** (p. 1646).

To initialize the elements, call **finish()** (p. 1647) and use the Offset it returns to access the elements.

### 9.307.2.3 finish()

```
template<typename ElementOffset >
Offset rti::flat::FinalSequenceBuilder< ElementOffset >::finish ( ) [inline]
```

Finishes building the sequence.

#### Returns

An Offset to the member that has been built.

#### See also

**discard()** (p. 580)

## 9.308 rti::flat::flat\_type\_traits< T > Struct Template Reference

Given a **Sample** (p. 1916), an Offset or a Builder, it allows obtaining the other types.

### 9.308.1 Detailed Description

```
template<typename T>
struct rti::flat::flat_type_traits< T >
```

Given a **Sample** (p. 1916), an Offset or a Builder, it allows obtaining the other types.

### Template Parameters

<i>T</i>	<p>One of the following:</p> <ul style="list-style-type: none"> <li>• A <b>Sample</b> (p. 1916) type, such as <b>MyFlatMutable</b> (p. 562)</li> <li>• An Offset type, such as <b>MyFlatMutableOffset</b> (p. 1757)</li> <li>• A Builder type, such as <b>MyFlatMutableBuilder</b> (p. 1750)</li> </ul>
----------	---

Given *T*, this type provides the following typedefs:

- `flat_type_traits<T>::offset`, *T*'s related offset type (undefined if *T* itself is an Offset)
- `flat_type_traits<T>::builder`, *T*'s related builder type (undefined if *T* itself is a Builder, or the topic-type is not mutable)
- `flat_type_traits<T>::flat_type`, *T*'s related **Sample** (p. 1916) type (undefined if *T* itself is a **Sample** (p. 1916) type)
- `flat_type_traits<T>::plain_type`, *T*'s equivalent definition as a plain (non-FlatData) type.

For example, for *T* = **MyFlatMutable** (p. 562), `flat_type_traits` (p. 1647) is defined as follows:

```
template <>
struct flat_type_traits<MyFlatMutable> {
    typedef MyFlatMutablePlainHelper plain_type;
    typedef MyFlatMutableOffset offset;
    typedef MyFlatMutableBuilder builder;
};
```

Or if *T* = **MyFlatMutableOffset** (p. 1757):

```
template <>
struct flat_type_traits<MyFlatMutableOffset> {
    typedef MyFlatMutable flat_type;
    typedef MyFlatMutablePlainHelper plain_type;
    typedef MyFlatMutableBuilder builder;
};
```

See also

`rti::flat::plain_cast()` (p. 566)

## 9.309 Foo Struct Reference

A representative user-defined data type.

### 9.309.1 Detailed Description

A representative user-defined data type.

**Foo** (p. 1648) represents a user-defined data-type that is intended to be distributed using DDS.

The type **Foo** (p. 1648) is usually defined using IDL syntax and placed in a ".idl" file that is then processed using `rtiddsgen`. The `rtiddsgen` utility generates the helper classes **FooSeq** (p. 1697) as well as the necessary code for DDS to manipulate the type (serialize it so that it can be sent over the network) as well as the implied **FooDataReader** (p. 1649) and **FooDataWriter** (p. 1676) types that allow the application to send and receive data of this type.

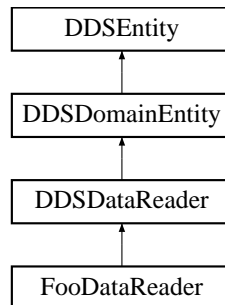
See also

**FooSeq** (p. 1697), **FooDataWriter** (p. 1676), **FooDataReader** (p. 1649), **FooTypeSupport** (p. 1711), the `Code Generator User's Manual`

## 9.310 FooDataReader Class Reference

<<*interface*>> (p. 237) <<*generic*>> (p. 237) User data type-specific data reader.

Inheritance diagram for FooDataReader:



### Public Member Functions

- virtual **DDS\_ReturnCode\_t** **read** ( **FooSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, **DDS\_SampleStateMask** sample\_states, **DDS\_ViewStateMask** view\_states, **DDS\_InstanceStateMask** instance\_states)=0  
*Access a collection of data samples from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **take** ( **FooSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, **DDS\_SampleStateMask** sample\_states, **DDS\_ViewStateMask** view\_states, **DDS\_InstanceStateMask** instance\_states)=0  
*Access a collection of data-samples from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **read\_w\_condition** ( **FooSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, **DDSReadCondition** \*condition)=0  
*Accesses via **FooDataReader::read** (p. 1651) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).*
- virtual **DDS\_ReturnCode\_t** **take\_w\_condition** ( **FooSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, **DDSReadCondition** \*condition)=0  
*Analogous to **FooDataReader::read\_w\_condition** (p. 1657) except it accesses samples via the **FooDataReader::take** (p. 1652) operation.*
- virtual **DDS\_ReturnCode\_t** **read\_next\_sample** ( **Foo** &received\_data, **DDS\_SampleInfo** &sample\_info)=0  
*Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **take\_next\_sample** ( **Foo** &received\_data, **DDS\_SampleInfo** &sample\_info)=0  
*Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **read\_instance** ( **FooSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, const **DDS\_InstanceHandle\_t** &a\_handle, **DDS\_SampleStateMask** sample\_states, **DDS\_ViewStateMask** view\_states, **DDS\_InstanceStateMask** instance\_states)=0  
*Access a collection of data samples from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **take\_instance** ( **FooSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, const **DDS\_InstanceHandle\_t** &a\_handle, **DDS\_SampleStateMask** sample\_states, **DDS\_ViewStateMask** view\_states, **DDS\_InstanceStateMask** instance\_states)=0  
*Access a collection of data samples from the **DDSDataReader** (p. 1288).*
- virtual **DDS\_ReturnCode\_t** **read\_instance\_w\_condition** ( **FooSeq** &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, const **DDS\_InstanceHandle\_t** &previous\_handle, **DDSReadCondition** \*condition)=0

<<**extension**>> (p. 237) Accesses via *FooDataReader::read\_instance* (p. 1661) the samples that match the criteria specified in the *DDSReadCondition* (p. 1574).

- virtual **DDS\_ReturnCode\_t** *take\_instance\_w\_condition* ( *FooSeq* &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, const **DDS\_InstanceHandle\_t** &previous\_handle, **DDSReadCondition** \*condition)=0

<<**extension**>> (p. 237) Accesses via *FooDataReader::take\_instance* (p. 1663) the samples that match the criteria specified in the *DDSReadCondition* (p. 1574).

- virtual **DDS\_ReturnCode\_t** *read\_next\_instance* ( *FooSeq* &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, const **DDS\_InstanceHandle\_t** &previous\_handle, **DDS\_SampleStateMask** sample\_states, **DDS\_ViewStateMask** view\_states, **DDS\_InstanceStateMask** instance\_states)=0

Access a collection of data samples from the *DDSDataReader* (p. 1288).

- virtual **DDS\_ReturnCode\_t** *take\_next\_instance* ( *FooSeq* &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, const **DDS\_InstanceHandle\_t** &previous\_handle, **DDS\_SampleStateMask** sample\_states, **DDS\_ViewStateMask** view\_states, **DDS\_InstanceStateMask** instance\_states)=0

Access a collection of data samples from the *DDSDataReader* (p. 1288).

- virtual **DDS\_ReturnCode\_t** *read\_next\_instance\_w\_condition* ( *FooSeq* &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, const **DDS\_InstanceHandle\_t** &previous\_handle, **DDSReadCondition** \*condition)=0

Accesses via *FooDataReader::read\_next\_instance* (p. 1667) the samples that match the criteria specified in the *DDSReadCondition* (p. 1574).

- virtual **DDS\_ReturnCode\_t** *take\_next\_instance\_w\_condition* ( *FooSeq* &received\_data, **DDS\_SampleInfoSeq** &info\_seq, **DDS\_Long** max\_samples, const **DDS\_InstanceHandle\_t** &previous\_handle, **DDSReadCondition** \*condition)=0

Accesses via *FooDataReader::take\_next\_instance* (p. 1668) the samples that match the criteria specified in the *DDSReadCondition* (p. 1574).

- virtual **DDS\_ReturnCode\_t** *return\_loan* ( *FooSeq* &received\_data, **DDS\_SampleInfoSeq** &info\_seq)=0

Indicates to the *DDSDataReader* (p. 1288) that the application is done accessing the collection of *received\_data* and *info\_seq* obtained by some earlier invocation of *read* or *take* on the *DDSDataReader* (p. 1288).

- virtual **DDS\_ReturnCode\_t** *get\_key\_value* ( *Foo* &key\_holder, const **DDS\_InstanceHandle\_t** handle)=0

Retrieve the instance *key* that corresponds to an instance *handle*.

- virtual **DDS\_InstanceHandle\_t** *lookup\_instance* (const *Foo* &key\_holder)=0

Retrieves the instance *handle* that corresponds to an instance *key\_holder*.

- virtual **DDS\_ReturnCode\_t** *is\_data\_consistent* ( **DDS\_Boolean** &is\_data\_consistent, const *TData* \*sample, const **DDS\_SampleInfo** \*sample\_info)=0

When using Zero Copy transfer over shared memory, checks if the sample has been overwritten by the *DataWriter*.

## Static Public Member Functions

- static **FooDataReader** \* *narrow* ( **DDSDataReader** \*reader)

Narrow the given *DDSDataReader* (p. 1288) pointer to a *FooDataReader* (p. 1649) pointer.

### 9.310.1 Detailed Description

<<**interface**>> (p. 237) <<**generic**>> (p. 237) User data type-specific data reader.

Defines the user data type specific reader interface generated for each application class.

The concrete user data type reader automatically generated by the implementation is an incarnation of this class.



See also

**DDSDataReader** (p. 1288)

**Foo** (p. 1648)

**FooDataWriter** (p. 1676)

the Code Generator User's Manual

## 9.310.2 Member Function Documentation

### 9.310.2.1 narrow()

```
static FooDataReader * FooDataReader::narrow (
    DDSDataReader * reader ) [static]
```

Narrow the given **DDSDataReader** (p. 1288) pointer to a **FooDataReader** (p. 1649) pointer.

### 9.310.2.2 read()

```
virtual DDS_ReturnCode_t FooDataReader::read (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDS_SampleStateMask sample_states,
    DDS_ViewStateMask view_states,
    DDS_InstanceStateMask instance_states ) [pure virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

This operation offers the same functionality and API as **FooDataReader::take** (p. 1652) except that the samples returned remain in the **DDSDataReader** (p. 1288) such that they can be retrieved again by means of a read or take operation.

Please refer to the documentation of **FooDataReader::take()** (p. 1652) for details on the number of samples returned within the `received_data` and `info_seq` as well as the order in which the samples appear in these sequences.

The act of reading a sample changes its `sample_state` to **DDS\_READ\_SAMPLE\_STATE** (p. 157). If the sample belongs to the most recent generation of the instance, it will also set the `view_state` of the instance to be **DDS\_↔ NOT\_NEW\_VIEW\_STATE** (p. 159). It will not affect the `instance_state` of the instance.

Once the application completes its use of the samples, it must 'return the loan' to the **DDSDataReader** (p. 1288) by calling the **FooDataReader::return\_loan** (p. 1672) operation.

**Important:** When you loan data from the middleware, you *must not* keep any pointers to any part of the data samples or the **DDS\_SampleInfo** (p. 1082) objects after the call to **FooDataReader::return\_loan** (p. 1672). Returning the loan places the objects back into a pool, allowing the middleware to overwrite them with new data.

*Note:* While the loan must be returned at some point, you do *not* have to do so before the next **FooDataReader::take** (p. 1652) call. However, failure to return the loan will eventually deplete the **DDSDataReader** (p. 1288) of the buffers it needs to receive new samples and eventually samples will start to be lost. The total number of buffers available to the **DDSDataReader** (p. 1288) is specified by the **DDS\_ResourceLimitsQosPolicy** (p. 1052) and the **DDS\_DataReaderResourceLimitsQosPolicy** (p. 654).

*Important:* If the samples "returned" by this method are loaned from RTI Connex (see **FooDataReader::take** (p. 1652) for more information on memory loaning), it is important that their contents not be changed. Because the memory in which the data is stored belongs to the middleware, any modifications made to the data will be seen the next time the same samples are read or taken; the samples will no longer reflect the state that was received from the network.

#### Parameters

<i>received_data</i>	<< <i>inout</i> >> (p. 238) User data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<i>info_seq</i>	<< <i>inout</i> >> (p. 238) A <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<i>max_samples</i>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<i>sample_states</i>	<< <i>in</i> >> (p. 238) Data samples matching one of these <i>sample_states</i> are returned.
<i>view_states</i>	<< <i>in</i> >> (p. 238) Data samples matching one of these <i>view_state</i> are returned.
<i>instance_states</i>	<< <i>in</i> >> (p. 238) Data samples matching ones of these <i>instance_state</i> are returned.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	---

#### See also

**FooDataReader::take** (p. 1652)  
**FooDataReader::read\_w\_condition** (p. 1657),  
**FooDataReader::take\_w\_condition** (p. 1658)  
**DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.310.2.3 take()

```
virtual DDS_ReturnCode_t FooDataReader::take (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDS_SampleStateMask sample_states,
    DDS_ViewStateMask view_states,
    DDS_InstanceStateMask instance_states ) [pure virtual]
```

Access a collection of data-samples from the **DDSDataReader** (p. 1288).

The operation will return the list of samples received by the **DDSDataReader** (p. 1288) since the last **FooDataReader**↔**::take** (p. 1652) operation that matches the specified **DDS\_SampleStateMask** (p. 156), **DDS\_ViewStateMask** (p. 158) and **DDS\_InstanceStateMask** (p. 160).

This operation may fail with **DDS\_RETCODE\_ERROR** (p. 336) if the **DDS\_DataReaderResourceLimitsQosPolicy**↔**::max\_outstanding\_reads** (p. 659) limit has been exceeded.

The actual number of samples returned depends on the information that has been received by the middleware as well as the **DDS\_HistoryQosPolicy** (p. 919), **DDS\_ResourceLimitsQosPolicy** (p. 1052), **DDS\_DataReader**↔**ResourceLimitsQosPolicy** (p. 654) and the characteristics of the data-type that is associated with the **DDSDataReader** (p. 1288):

- In the case where the **DDS\_HistoryQosPolicy::kind** (p. 921) is **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406), the call will return at most **DDS\_HistoryQosPolicy::depth** (p. 921) samples for each ALIVE instance and (**DDS**↔**HistoryQosPolicy::depth** (p. 921) +1) samples for each NOT\_ALIVE instance. The extra sample is an invalid sample (**DDS\_SampleInfo::valid\_data** (p. 1089) is FALSE) that is used to indicate the instance state transition from ALIVE to NOT\_ALIVE.
- The maximum number of samples returned is limited by **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055), and by **DDS\_DataReaderResourceLimitsQosPolicy::max\_samples\_per\_read** (p. 659).
- For multiple instances, the number of samples returned is additionally limited by the product (**DDS\_Resource**↔**LimitsQosPolicy::max\_samples\_per\_instance** (p. 1055)
  - **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055))
- If **DDS\_DataReaderResourceLimitsQosPolicy::max\_infos** (p. 657) is limited, the number of samples returned may also be limited if insufficient **DDS\_SampleInfo** (p. 1082) resources are available.

If the read or take succeeds and the number of samples returned has been limited (by means of a maximum limit, as listed above, or insufficient **DDS\_SampleInfo** (p. 1082) resources), the call will complete successfully and provide those samples the reader is able to return. The user may need to make additional calls, or return outstanding loaned buffers in the case of insufficient resources, in order to access remaining samples.

Note that in the case where the **DDSTopic** (p. 1617) associated with the **DDSDataReader** (p. 1288) is bound to a data-type that has no key definition, then there will be at most one instance in the **DDSDataReader** (p. 1288). So the per-sample limits will apply.

The act of *taking* a sample removes it from RTI Connex so it cannot be read or taken again. If the sample belongs to the most recent generation of the instance, it will also set the `view_state` of the sample's instance to **DDS\_NOT**↔**NEW\_VIEW\_STATE** (p. 159). It will not affect the `instance_state` of the sample's instance.

After **FooDataReader::take** (p. 1652) completes, `received_data` and `info_seq` will be of the same length and contain the received data.

If the sequences are empty (maximum size equals 0) when the **FooDataReader::take** (p. 1652) is called, the samples returned in the `received_data` and the corresponding `info_seq` are 'loaned' to the application from buffers provided by the **DDSDataReader** (p. 1288). The application can use them as desired and has guaranteed exclusive access to them.

Once the application completes its use of the samples it must 'return the loan' to the **DDSDataReader** (p. 1288) by calling the **FooDataReader::return\_loan** (p. 1672) operation.

**Important:** When you loan data from the middleware, you *must not* keep any pointers to any part of the data samples or the **DDS\_SampleInfo** (p. 1082) objects after the call to **FooDataReader::return\_loan** (p. 1672). Returning the loan places the objects back into a pool, allowing the middleware to overwrite them with new data.

*Note:* While you must call **FooDataReader::return\_loan** (p. 1672) at some point, you do *not* have to do so before the next **FooDataReader::take** (p. 1652) call. However, failure to return the loan will eventually deplete the **DDSDataReader** (p. 1288) of the buffers it needs to receive new samples and eventually samples will start to be lost. The total number of buffers available to the **DDSDataReader** (p. 1288) is specified by the **DDS\_ResourceLimitsQosPolicy** (p. 1052) and the **DDS\_DataReaderResourceLimitsQosPolicy** (p. 654).

If the sequences are not empty (maximum size not equal to 0 and length not equal to 0) when **FooDataReader::take** (p. 1652) is called, samples are copied to `received_data` and `info_seq`. The application will not need to call **FooDataReader::return\_loan** (p. 1672).

The order of the samples returned to the caller depends on the **DDS\_PresentationQosPolicy** (p. 996).

- If **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) is **DDS\_INSTANCE\_PRESENTATION\_QOS** (p. 418), the returned collection is a list where samples belonging to the same data instance are consecutive.
- If **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) is **DDS\_TOPIC\_PRESENTATION\_QOS** (p. 418) and **DDS\_PresentationQosPolicy::ordered\_access** (p. 1000) is set to **DDS\_BOOLEAN\_FALSE** (p. 317), then the returned collection is a list where samples belonging to the same data instance are consecutive.
- If **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) is **DDS\_TOPIC\_PRESENTATION\_QOS** (p. 418) and **DDS\_PresentationQosPolicy::ordered\_access** (p. 1000) is set to **DDS\_BOOLEAN\_TRUE** (p. 317), then the returned collection is a list where the relative order of samples as they were written by a DataWriter is preserved also across different instances. In other words, changes made by a single DataWriter are made available to subscribers in the same order in which they occur. Samples belonging to the same instance may or may not be consecutive. This is because, to preserve order within a single DataWriter, it may be necessary to mix samples from different instances.
- If **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) is **DDS\_GROUP\_PRESENTATION\_QOS** (p. 418) and **DDS\_PresentationQosPolicy::ordered\_access** (p. 1000) is set to **DDS\_BOOLEAN\_FALSE** (p. 317), then the returned collection is a list where samples belonging to the same data instance are consecutive.
- If **DDS\_PresentationQosPolicy::access\_scope** (p. 1000) is **DDS\_GROUP\_PRESENTATION\_QOS** (p. 418) and **DDS\_PresentationQosPolicy::ordered\_access** (p. 1000) is set to **DDS\_BOOLEAN\_TRUE** (p. 317), then changes made to instances by a set of DataWriters attached to a common Publisher are made available in the order in which they were written. For this to happen, the application must take the samples using the Subscriber's **DDSSubscriber::begin\_access** (p. 1605) and **DDSSubscriber::end\_access** (p. 1606) operations (see the "Ordered Access" section in the "PRESENTATION QosPolicy" section of the *Core Libraries User's Manual*).

In all of the above cases, the relative order between the samples of one instance is consistent with the **DESTINATION\_ORDER** (p. 386) policy:

- If `DDS_DestinationOrderQosPolicy::kind` (p. 711) is `DDS_BY_RECEPTION_TIMESTAMP_DESTINATIONORDER_QOS` (p. 387), samples belonging to the same instances will appear in the relative order in which there were received (FIFO, earlier samples ahead of the later samples).
- If `DDS_DestinationOrderQosPolicy::kind` (p. 711) is `DDS_BY_SOURCE_TIMESTAMP_DESTINATIONORDER_QOS` (p. 387), samples belonging to the same instances will appear in the relative order implied by the `source_timestamp` (FIFO, smaller values of `source_timestamp` ahead of the larger values).

If the `DDSDataReader` (p. 1288) has no samples that meet the constraints, the method will fail with `DDS_RETCODE_NO_DATA` (p. 337).

In addition to the collection of samples, the read and take operations also use a collection of `DDS_SampleInfo` (p. 1082) structures.

The initial (input) properties of the `received_data` and `info_seq` collections will determine the precise behavior of the read or take operation. For the purposes of this description, the collections are modeled as having these properties:

- whether the collection container owns the memory of the elements within (`owns`, see `FooSeq::has_ownership` (p. 1711))
- the current-length (`len`, see `FooSeq::length()` (p. 1705))
- the maximum length (`max_len`, see `FooSeq::maximum()` (p. 1707))

The initial values of the `owns`, `len` and `max_len` properties for the `received_data` and `info_seq` collections govern the behavior of the read and take operations as specified by the following rules:

1. The values of `owns`, `len` and `max_len` properties for the two collections must be identical. Otherwise read/take will fail with `DDS_RETCODE_PRECONDITION_NOT_MET` (p. 336).
2. On successful output, the values of `owns`, `len` and `max_len` will be the same for both collections.
3. If the initial `max_len==0`, then the `received_data` and `info_seq` collections will be filled with elements that are loaned by the `DDSDataReader` (p. 1288). On output, `owns` will be `FALSE`, `len` will be set to the number of values returned, and `max_len` will be set to a value verifying `max_len >= len`. The use of this variant allows for Zero Copy access to the data and the application will need to return the loan to the `DDSDataWriter` (p. 1321) using `FooDataReader::return_loan` (p. 1672).
4. If the initial `max_len>0` and `owns==FALSE`, then the read or take operation will fail with `DDS_RETCODE_PRECONDITION_NOT_MET` (p. 336). This avoids the potential hard-to-detect memory leaks caused by an application forgetting to return the loan.
5. If initial `max_len>0` and `owns==TRUE`, then the read or take operation will copy the `received_data` values and `DDS_SampleInfo` (p. 1082) values into the elements already inside the collections. On output, `owns` will be `TRUE`, `len` will be set to the number of values copied and `max_len` will remain unchanged. The use of this variant forces a copy but the application can control where the copy is placed and the application will not need to return the loan. The number of samples copied depends on the relative values of `max_len` and `max_samples`:
  - If `max_samples == LENGTH_UNLIMITED`, then at most `max_len` values will be copied. The use of this variant lets the application limit the number of samples returned to what the sequence can accommodate.

- If `max_samples <= max_len`, then at most `max_samples` values will be copied. The use of this variant lets the application limit the number of samples returned to fewer than what the sequence can accommodate.
- If `max_samples > max_len`, then the read or take operation will fail with **DDS\_RETCODE\_← PRECONDITION\_NOT\_MET** (p. 336). This avoids the potential confusion where the application expects to be able to access up to `max_samples`, but that number can never be returned, even if they are available in the **DDSDataReader** (p. 1288), because the output sequence cannot accommodate them.

As described above, upon completion, the `received_data` and `info_seq` collections may contain elements loaned from the **DDSDataReader** (p. 1288). If this is the case, the application will need to use **FooDataReader← ::return\_loan** (p. 1672) to return the loan once it is no longer using the `received_data` in the collection. When **FooDataReader← ::return\_loan** (p. 1672) completes, the collection will have `owns=FALSE` and `max_len=0`. The application can determine whether it is necessary to return the loan or not based on how the state of the collections when the read/take operation was called or by accessing the `owns` property. However, in many cases it may be simpler to always call **FooDataReader← ::return\_loan** (p. 1672), as this operation is harmless (i.e., it leaves all elements unchanged) if the collection does not have a loan. To avoid potential memory leaks, the implementation of the **Foo** (p. 1648) and **DDS\_SampleInfo** (p. 1082) collections should disallow changing the length of a collection for which `owns==FALSE`. Furthermore, deleting a collection for which `owns==FALSE` should be considered an error.

On output, the collection of **Foo** (p. 1648) values and the collection of **DDS\_SampleInfo** (p. 1082) structures are of the same length and are in a one-to-one correspondence. Each **DDS\_SampleInfo** (p. 1082) provides information, such as the `source_timestamp`, the `sample_state`, `view_state`, and `instance_state`, etc., about the corresponding sample. Some elements in the returned collection may not have valid data. If the `instance_state` in the **DDS\_SampleInfo** (p. 1082) is **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161) or **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_← STATE** (p. 161), then the last sample for that instance in the collection (that is, the one whose **DDS\_SampleInfo** (p. 1082) has `sample_rank==0`) does not contain valid data.

Samples that contain no data do not count towards the limits imposed by the **DDS\_ResourceLimitsQosPolicy** (p. 1052). The act of reading/taking a sample sets its `sample_state` to **DDS\_READ\_SAMPLE\_STATE** (p. 157).

If the sample belongs to the most recent generation of the instance, it will also set the `view_state` of the instance to **DDS\_NOT\_NEW\_VIEW\_STATE** (p. 159). It will not affect the `instance_state` of the instance.

This operation must be provided on the specialized class that is generated for the particular application data-type that is being read (**Foo** (p. 1648)).

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the operation fails with **DDS\_RETCODE\_← \_NO\_DATA** (p. 337). For an example on how `take` can be used, please refer to the **Access received data via a reader** (p. 211) "receive example".

#### Parameters

<code>received_data</code>	<< <i>inout</i> >> (p. 238) User data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<code>info_seq</code>	<< <i>inout</i> >> (p. 238) A <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<code>max_samples</code>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described above.
<code>sample_states</code>	<< <i>in</i> >> (p. 238) Data samples matching one of these <code>sample_states</code> are returned.
<code>view_states</code>	<< <i>in</i> >> (p. 238) Data samples matching one of these <code>view_state</code> are returned.
<code>instance_states</code>	<< <i>in</i> >> (p. 238) Data samples matching one of these <code>instance_state</code> are returned.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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## See also

**FooDataReader::read** (p. 1651)

**FooDataReader::read\_w\_condition** (p. 1657), **FooDataReader::take\_w\_condition** (p. 1658)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

## 9.310.2.4 read\_w\_condition()

```
virtual DDS_ReturnCode_t FooDataReader::read_w_condition (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [pure virtual]
```

Accesses via **FooDataReader::read** (p. 1651) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

This operation is especially useful in combination with **DDSQueryCondition** (p. 1573) to filter data samples based on the content.

The specified **DDSReadCondition** (p. 1574) must be attached to the **DDSDataReader** (p. 1288); otherwise the operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

In case the **DDSReadCondition** (p. 1574) is a plain **DDSReadCondition** (p. 1574) and not the specialized **DDSQueryCondition** (p. 1573), the operation is equivalent to calling **FooDataReader::read** (p. 1651) and passing as *sample\_states*, *view\_states* and *instance\_states* the value of the corresponding attributes in the *read\_w\_condition*. Using this operation, the application can avoid repeating the same parameters specified when creating the **DDSReadCondition** (p. 1574).

The samples are accessed with the same semantics as **FooDataReader::read** (p. 1651).

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the operation will fail with **DDS\_RETCODE\_NO\_DATA** (p. 337).

## Parameters

<i>received_data</i>	<< <i>inout</i> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<i>info_seq</i>	<< <i>inout</i> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<i>max_samples</i>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<i>condition</i>	<< <i>in</i> >> (p. 238) the <b>DDSReadCondition</b> (p. 1574) to select samples of interest. Cannot be NULL.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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## See also

**FooDataReader::read** (p. 1651)

**FooDataReader::take** (p. 1652), **FooDataReader::take\_w\_condition** (p. 1658)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

## 9.310.2.5 take\_w\_condition()

```
virtual DDS_ReturnCode_t FooDataReader::take_w_condition (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    DDSReadCondition * condition ) [pure virtual]
```

Analogous to **FooDataReader::read\_w\_condition** (p. 1657) except it accesses samples via the **FooDataReader::take** (p. 1652) operation.

This operation is analogous to **FooDataReader::read\_w\_condition** (p. 1657) except that it accesses samples via the **FooDataReader::take** (p. 1652) operation.

The specified **DDSReadCondition** (p. 1574) must be attached to the **DDSDataReader** (p. 1288); otherwise the operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

The samples are accessed with the same semantics as **FooDataReader::take** (p. 1652).

This operation is especially useful in combination with **DDSQueryCondition** (p. 1573) to filter data samples based on the content.

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the method will fail with **DDS\_RETCODE\_NO\_DATA** (p. 337).

## Parameters

<i>received_data</i>	<< <i>inout</i> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<i>info_seq</i>	<< <i>inout</i> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<i>max_samples</i>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<i>condition</i>	<< <i>in</i> >> (p. 238) the <b>DDSReadCondition</b> (p. 1574) to select samples of interest. Cannot be NULL.



## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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## See also

**FooDataReader::read\_w\_condition** (p. 1657), **FooDataReader::read** (p. 1651)

**FooDataReader::take** (p. 1652)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

## 9.310.2.6 read\_next\_sample()

```
virtual DDS_ReturnCode_t FooDataReader::read_next_sample (
    Foo & received_data,
    DDS_SampleInfo & sample_info ) [pure virtual]
```

Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).

This operation copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288). This operation also copies the corresponding **DDS\_SampleInfo** (p. 1082). The implied order among the samples stored in the **DDSDataReader** (p. 1288) is the same as for the **FooDataReader::read** (p. 1651) operation.

The **FooDataReader::read\_next\_sample** (p. 1659) operation is semantically equivalent to the **FooDataReader::read** (p. 1651) operation, where the input data sequences has `max_len=1`, the `sample_states=NOT_READ`, the `view_↔states=ANY_VIEW_STATE`, and the `instance_states=ANY_INSTANCE_STATE`.

The **FooDataReader::read\_next\_sample** (p. 1659) operation provides a simplified API to 'read' samples, avoiding the need for the application to manage sequences and specify states.

If there is no unread data in the **DDSDataReader** (p. 1288), the operation will fail with **DDS\_RETCODE\_NO\_DATA** (p. 337) and nothing is copied.

## Note

Calling **FooDataReader::read\_next\_sample** (p. 1659) from the **DDSDataReaderListener::on\_data\_available()** (p. 1317) callback reads only one sample of potentially many samples in the reader queue, because **DDSData↔ReaderListener::on\_data\_available()** (p. 1317) is triggered only once when new samples arrive in the queue. Therefore, it is recommended that you call **FooDataReader::read\_next\_sample** (p. 1659) in a loop within the `on_data_available` callback until **FooDataReader::read\_next\_sample** (p. 1659) returns **DDS\_RETCODE\_NO↔DATA** (p. 337) . This ensures that all samples in the reader queue are serviced by application logic. (You may also choose to use **FooDataReader::read** (p. 1651) rather than **FooDataReader::read\_next\_sample** (p. 1659) in order to read more than one sample at a time.)

## Parameters

<i>received_data</i>	<< <i>inout</i> >> (p. 238) user data type-specific <b>Foo</b> (p. 1648) object where the next received data sample will be returned. The <i>received_data</i> must have been fully allocated. Otherwise, this operation may fail.
<i>sample_info</i>	<< <i>inout</i> >> (p. 238) a <b>DDS_SampleInfo</b> (p. 1082) object where the next received sample info will be returned.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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## See also

**FooDataReader::read** (p. 1651)

## 9.310.2.7 take\_next\_sample()

```
virtual DDS_ReturnCode_t FooDataReader::take_next_sample (
    Foo & received_data,
    DDS_SampleInfo & sample_info ) [pure virtual]
```

Copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288).

This operation copies the next not-previously-accessed data value from the **DDSDataReader** (p. 1288) and 'removes' it from the **DDSDataReader** (p. 1288) so that it is no longer accessible. This operation also copies the corresponding **DDS\_SampleInfo** (p. 1082). This operation is analogous to the **FooDataReader::read\_next\_sample** (p. 1659) except for the fact that the sample is removed from the **DDSDataReader** (p. 1288).

The **FooDataReader::take\_next\_sample** (p. 1660) operation is semantically equivalent to the **FooDataReader::take** (p. 1652) operation, where the input data sequences has `max_len=1`, the `sample_states=NOT_READ`, the `view_↔states=ANY_VIEW_STATE`, and the `instance_states=ANY_INSTANCE_STATE`.

The **FooDataReader::take\_next\_sample** (p. 1660) operation provides a simplified API to 'take' samples, avoiding the need for the application to manage sequences and specify states.

If there is no unread data in the **DDSDataReader** (p. 1288), the operation will fail with **DDS\_RETCODE\_NO\_DATA** (p. 337) and nothing is copied.

## Note

Calling **FooDataReader::take\_next\_sample** (p. 1660) from the **DDSDataReaderListener::on\_data\_available()** (p. 1317) callback retrieves only one sample of potentially many samples in the reader queue, because **DDSDataReaderListener::on\_data\_available()** (p. 1317) is triggered only once when new samples arrive in the queue. Therefore, it is recommended that you call **FooDataReader::take\_next\_sample** (p. 1660) in a loop within the `on_data_available` callback until **FooDataReader::take\_next\_sample** (p. 1660) returns **DDS\_RETCODE\_NO\_DATA** (p. 337) . This ensures that all samples in the reader queue are serviced by application logic. (You may also choose to use the **FooDataReader::take** (p. 1652) rather than **FooDataReader::take\_next\_sample** (p. 1660) in order to take more than one sample at a time.)

## Parameters

<i>received_data</i>	<< <i>inout</i> >> (p. 238) user data type-specific <b>Foo</b> (p. 1648) object where the next received data sample will be returned. The <i>received_data</i> must have been fully allocated. Otherwise, this operation may fail.
<i>sample_info</i>	<< <i>inout</i> >> (p. 238) a <b>DDS_SampleInfo</b> (p. 1082) object where the next received sample info will be returned.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336),
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**DDS\_RETCODE\_NO\_DATA** (p. 337) or **DDS\_RETCODE\_NOT\_ENABLED** (p. 337).

## See also

**FooDataReader::take** (p. 1652)

## 9.310.2.8 read\_instance()

```
virtual DDS_ReturnCode_t FooDataReader::read_instance (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    const DDS_InstanceHandle_t & a_handle,
    DDS_SampleStateMask sample_states,
    DDS_ViewStateMask view_states,
    DDS_InstanceStateMask instance_states ) [pure virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

This operation accesses a collection of data values from the **DDSDataReader** (p. 1288). The behavior is identical to **FooDataReader::read** (p. 1651), except that all samples returned belong to the single specified instance whose handle is *a\_handle*.

Upon successful completion, the data collection will contain samples all belonging to the same instance. The corresponding **DDS\_SampleInfo** (p. 1082) verifies **DDS\_SampleInfo::instance\_handle** (p. 1087) == *a\_handle*.

The **FooDataReader::read\_instance** (p. 1661) operation is semantically equivalent to the **FooDataReader::read** (p. 1651) operation, except in building the collection, the **DDSDataReader** (p. 1288) will check that the sample belongs to the specified instance and otherwise it will not place the sample in the returned collection.

The behavior of the **FooDataReader::read\_instance** (p. 1661) operation follows the same rules as the **FooDataReader::read** (p. 1651) operation regarding the pre-conditions and post-conditions for the *received\_data* and *sample\_info*. Similar to the **FooDataReader::read** (p. 1651), the **FooDataReader::read\_instance** (p. 1661) operation may 'loan' elements to the output collections, which must then be returned by means of **FooDataReader::return\_loan** (p. 1672).

Similar to the **FooDataReader::read** (p. 1651), this operation must be provided on the specialized class that is generated for the particular application data-type that is being taken.

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the method will fail with **DDS\_RETCODE\_↔\_NO\_DATA** (p. 337).

This operation may fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336) if the **DDS\_InstanceHandle\_t** (p. 74) **a\_↔handle** does not correspond to an existing data-object known to the **DDSDataReader** (p. 1288).

## Parameters

<i>received_data</i>	<< <i>inout</i> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<i>info_seq</i>	<< <i>inout</i> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<i>max_samples</i>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<i>a_handle</i>	<< <i>in</i> >> (p. 238) The specified instance to return samples for. The method will fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336) if the <i>handle</i> does not correspond to an existing data-object known to the <b>DDSDataReader</b> (p. 1288).
<i>sample_states</i>	<< <i>in</i> >> (p. 238) data samples matching ones of these <i>sample_states</i> are returned.
<i>view_states</i>	<< <i>in</i> >> (p. 238) data samples matching ones of these <i>view_state</i> are returned.
<i>instance_states</i>	<< <i>in</i> >> (p. 238) data samples matching ones of these <i>instance_state</i> are returned.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	---

## See also

**FooDataReader::read** (p. 1651)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

## 9.310.2.9 take\_instance()

```
virtual DDS_ReturnCode_t FooDataReader::take_instance (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    const DDS_InstanceHandle_t & a_handle,
    DDS_SampleStateMask sample_states,
    DDS_ViewStateMask view_states,
    DDS_InstanceStateMask instance_states ) [pure virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

This operation accesses a collection of data values from the **DDSDataReader** (p. 1288). The behavior is identical to **FooDataReader::take** (p. 1652), except for that all samples returned belong to the single specified instance whose handle is *a\_handle*.

The semantics are the same for the **FooDataReader::take** (p. 1652) operation, except in building the collection, the **DDSDataReader** (p. 1288) will check that the sample belongs to the specified instance, and otherwise it will not place the sample in the returned collection.

The behavior of the **FooDataReader::take\_instance** (p. 1663) operation follows the same rules as the **FooDataReader::read** (p. 1651) operation regarding the pre-conditions and post-conditions for the `received_data` and `sample_info`. Similar to the **FooDataReader::read** (p. 1651), the **FooDataReader::take\_instance** (p. 1663) operation may 'loan' elements to the output collections, which must then be returned by means of **FooDataReader::return\_loan** (p. 1672).

Similar to the **FooDataReader::read** (p. 1651), this operation must be provided on the specialized class that is generated for the particular application data-type that is being taken.

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the method fails with **DDS\_RETCODE\_NO\_DATA** (p. 337).

This operation may fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336) if the **DDS\_InstanceHandle\_t** (p. 74) `a_handle` does not correspond to an existing data-object known to the **DDSDataReader** (p. 1288).

#### Parameters

<i>received_data</i>	<< <i>inout</i> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<i>info_seq</i>	<< <i>inout</i> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<i>max_samples</i>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<i>a_handle</i>	<< <i>in</i> >> (p. 238) The specified instance to return samples for. The method will fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336) if the <code>handle</code> does not correspond to an existing data-object known to the <b>DDSDataReader</b> (p. 1288).
<i>sample_states</i>	<< <i>in</i> >> (p. 238) data samples matching ones of these <code>sample_states</code> are returned.
<i>view_states</i>	<< <i>in</i> >> (p. 238) data samples matching ones of these <code>view_state</code> are returned.
<i>instance_states</i>	<< <i>in</i> >> (p. 238) data samples matching ones of these <code>instance_state</code> are returned.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	---

#### See also

**FooDataReader::take** (p. 1652)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.310.2.10 read\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t FooDataReader::read_instance_w_condition (
    FooSeq & received_data,
```

```

    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    const DDS_InstanceHandle_t & previous_handle,
    DDSReadCondition * condition ) [pure virtual]

```

<<**extension**>> (p. 237) Accesses via **FooDataReader::read\_instance** (p. 1661) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

This operation accesses a collection of data values from the **DDSDataReader** (p. 1288). The behavior is identical to **FooDataReader::read\_instance** (p. 1661), except that all returned samples satisfy the specified condition. In other words, on success, all returned samples belong to belong the single specified instance whose handle is `a_handle`, and for which the specified **DDSReadCondition** (p. 1574) evaluates to TRUE.

The behavior of the **FooDataReader::read\_instance\_w\_condition** (p. 1664) operation follows the same rules as the **FooDataReader::read** (p. 1651) operation regarding the pre-conditions and post-conditions for the `received_data` and `sample_info`. Similar to the **FooDataReader::read** (p. 1651), the **FooDataReader::read\_instance\_w\_condition** (p. 1664) operation may 'loan' elements to the output collections, which must then be returned by means of **FooDataReader::return\_loan** (p. 1672).

Similar to **FooDataReader::read** (p. 1651), this operation must be provided on the specialized class that is generated for the particular application data-type that is being taken.

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the method will fail with **DDS\_RETCODE\_NO\_DATA** (p. 337).

#### Parameters

<code>received_data</code>	<< <b>inout</b> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<code>info_seq</code>	<< <b>inout</b> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<code>max_samples</code>	<< <b>in</b> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<code>previous_handle</code>	<< <b>in</b> >> (p. 238) The 'next smallest' instance with a value greater than this value that has available samples will be returned.
<code>condition</code>	<< <b>in</b> >> (p. 238) the <b>DDSReadCondition</b> (p. 1574) to select samples of interest. Cannot be NULL.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

#### See also

**FooDataReader::read\_next\_instance** (p. 1667)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.310.2.11 take\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t FooDataReader::take_instance_w_condition (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    const DDS_InstanceHandle_t & previous_handle,
    DDSReadCondition * condition ) [pure virtual]
```

<<**extension**>> (p. 237) Accesses via **FooDataReader::take\_instance** (p. 1663) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

This operation accesses a collection of data values from the **DDSDataReader** (p. 1288) and 'removes' them from the **DDSDataReader** (p. 1288). The behavior is identical to **FooDataReader::take\_instance** (p. 1663), except that all returned samples satisfy the specified condition. In other words, on success, all returned samples belong to belong the single specified instance whose handle is `a_handle`, and for which the specified **DDSReadCondition** (p. 1574) evaluates to TRUE.

The operation has the same behavior as **FooDataReader::read\_instance\_w\_condition** (p. 1664), except that the samples are 'taken' from the **DDSDataReader** (p. 1288) such that they are no longer accessible via subsequent 'read' or 'take' operations.

The behavior of the **FooDataReader::take\_instance\_w\_condition** (p. 1665) operation follows the same rules as the **FooDataReader::read** (p. 1651) operation regarding the pre-conditions and post-conditions for the `received_data` and `sample_info`. Similar to the **FooDataReader::read** (p. 1651), the **FooDataReader::take\_instance\_w\_condition** (p. 1665) operation may 'loan' elements to the output collections, which must then be returned by means of **FooDataReader::return\_loan** (p. 1672).

Similar to the **FooDataReader::read** (p. 1651), this operation must be provided on the specialized class that is generated for the particular application data-type that is being taken.

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the method will fail with **DDS\_RETCODE\_NO\_DATA** (p. 337).

#### Parameters

<i>received_data</i>	<< <b>inout</b> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<i>info_seq</i>	<< <b>inout</b> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<i>max_samples</i>	<< <b>in</b> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<i>previous_handle</i>	<< <b>in</b> >> (p. 238) The 'next smallest' instance with a value greater than this value that has available samples will be returned.
<i>condition</i>	<< <b>in</b> >> (p. 238) the <b>DDSReadCondition</b> (p. 1574) to select samples of interest. Cannot be NULL.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), or <b>DDS_RETCODE_NO_DATA</b> (p. 337), <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--



See also

**FooDataReader::take\_next\_instance** (p. 1668)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

### 9.310.2.12 read\_next\_instance()

```
virtual DDS_ReturnCode_t FooDataReader::read_next_instance (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    const DDS_InstanceHandle_t & previous_handle,
    DDS_SampleStateMask sample_states,
    DDS_ViewStateMask view_states,
    DDS_InstanceStateMask instance_states ) [pure virtual]
```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

This operation accesses a collection of data values from the **DDSDataReader** (p. 1288) where all the samples belong to a single instance. The behavior is similar to **FooDataReader::read\_instance** (p. 1661), except that the actual instance is not directly specified. Rather, the samples will all belong to the 'next' instance with `instance_handle` 'greater' than the specified 'previous\_handle' that has available samples.

This operation implies the existence of a total order 'greater-than' relationship between the instance handles. The specifics of this relationship are not all important and are implementation specific. The important thing is that, according to the middleware, all instances are ordered relative to each other. This ordering is between the instance handles; It should not depend on the state of the instance (e.g. whether it has data or not) and must be defined even for instance handles that do not correspond to instances currently managed by the **DDSDataReader** (p. 1288). For the purposes of the ordering, it should be 'as if' each instance handle was represented as unique integer.

The behavior of **FooDataReader::read\_next\_instance** (p. 1667) is 'as if' the **DDSDataReader** (p. 1288) invoked **FooDataReader::read\_instance** (p. 1661), passing the smallest `instance_handle` among all the ones that: (a) are greater than `previous_handle`, and (b) have available samples (i.e. samples that meet the constraints imposed by the specified states).

The special value **DDS\_HANDLE\_NIL** (p. 76) is guaranteed to be 'less than' any valid `instance_handle`. So the use of the parameter value `previous_handle == DDS_HANDLE_NIL` (p. 76) will return the samples for the instance which has the smallest `instance_handle` among all the instances that contain available samples.

#### Note

The operation **FooDataReader::read\_next\_instance** (p. 1667) is intended to be used in an application-driven iteration, where the application starts by passing `previous_handle == DDS_HANDLE_NIL` (p. 76), examines the samples returned, and then uses the `instance_handle` returned in the **DDS\_SampleInfo** (p. 1082) as the value of the `previous_handle` argument to the next call to **FooDataReader::read\_next\_instance** (p. 1667). The iteration continues until **FooDataReader::read\_next\_instance** (p. 1667) fails with **DDS\_RETCODE\_NO\_DATA** (p. 337). This application-driven iteration is required to ensure that all samples on the reader queue are read.

Note that it is possible to call the `FooDataReader::read_next_instance` (p. 1667) operation with a `previous_handle` that does not correspond to an instance currently managed by the `DDSDataReader` (p. 1288). This is because as stated earlier the 'greater-than' relationship is defined even for handles not managed by the `DDSDataReader` (p. 1288). One practical situation where this may occur is when an application is iterating through all the instances, takes all the samples of a `DDS_NOT_ALIVE_NO_WRITERS_INSTANCE_STATE` (p. 161) instance, returns the loan (at which point the instance information may be removed, and thus the handle becomes invalid), and tries to read the next instance. The behavior of the `FooDataReader::read_next_instance` (p. 1667) operation follows the same rules as the `FooDataReader::read` (p. 1651) operation regarding the pre-conditions and post-conditions for the `received_data` and `sample_info`. Similar to the `FooDataReader::read` (p. 1651), the `FooDataReader::read_instance` (p. 1661) operation may 'loan' elements to the output collections, which must then be returned by means of `FooDataReader::return_loan` (p. 1672).

Similar to the `FooDataReader::read` (p. 1651), this operation must be provided on the specialized class that is generated for the particular application data-type that is being taken.

If the `DDSDataReader` (p. 1288) has no samples that meet the constraints, the method will fail with `DDS_RETCODE_NO_DATA` (p. 337).

#### Parameters

<code>received_data</code>	<< <i>inout</i> >> (p. 238) user data type-specific <code>FooSeq</code> (p. 1697) object where the received data samples will be returned.
<code>info_seq</code>	<< <i>inout</i> >> (p. 238) a <code>DDS_SampleInfoSeq</code> (p. 1093) object where the received sample info will be returned.
<code>max_samples</code>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <code>DDS_LENGTH_UNLIMITED</code> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <code>FooDataReader::take()</code> (p. 1652).
<code>previous_handle</code>	<< <i>in</i> >> (p. 238) The 'next smallest' instance with a value greater than this value that has available samples will be returned.
<code>sample_states</code>	<< <i>in</i> >> (p. 238) data samples matching ones of these <code>sample_states</code> are returned.
<code>view_states</code>	<< <i>in</i> >> (p. 238) data samples matching ones of these <code>view_state</code> are returned.
<code>instance_states</code>	<< <i>in</i> >> (p. 238) data samples matching ones of these <code>instance_state</code> are returned.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <code>DDS_RETCODE_PRECONDITION_NOT_MET</code> (p. 336) <code>DDS_RETCODE_NO_DATA</code> (p. 337) or <code>DDS_RETCODE_NOT_ENABLED</code> (p. 337).
------------	--

#### See also

`FooDataReader::read` (p. 1651)

`DDS_LENGTH_UNLIMITED` (p. 438)

#### 9.310.2.13 take\_next\_instance()

```
virtual DDS_ReturnCode_t FooDataReader::take_next_instance (
    FooSeq & received_data,
```

```

    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
const   DDS_InstanceHandle_t & previous_handle,
    DDS_SampleStateMask sample_states,
    DDS_ViewStateMask view_states,
    DDS_InstanceStateMask instance_states ) [pure virtual]

```

Access a collection of data samples from the **DDSDataReader** (p. 1288).

This operation accesses a collection of data values from the **DDSDataReader** (p. 1288) and 'removes' them from the **DDSDataReader** (p. 1288).

This operation has the same behavior as **FooDataReader::read\_next\_instance** (p. 1667), except that the samples are 'taken' from the **DDSDataReader** (p. 1288) such that they are no longer accessible via subsequent 'read' or 'take' operations.

#### Note

Like **FooDataReader::read\_next\_instance** (p. 1667), this operation is intended to be used in an application-driven iteration until all samples on the reader queue are taken. The iteration continues until **FooDataReader::take\_next\_instance** (p. 1668) fails with the value **DDS\_RETCODE\_NO\_DATA** (p. 337) .

Similar to the operation **FooDataReader::read\_next\_instance** (p. 1667), it is possible to call **FooDataReader::take\_next\_instance** (p. 1668) with a `previous_handle` that does not correspond to an instance currently managed by the **DDSDataReader** (p. 1288).

The behavior of the **FooDataReader::take\_next\_instance** (p. 1668) operation follows the same rules as the **FooDataReader::read** (p. 1651) operation regarding the pre-conditions and post-conditions for the `received_data` and `sample_info`. Similar to the **FooDataReader::read** (p. 1651), the **FooDataReader::take\_next\_instance** (p. 1668) operation may 'loan' elements to the output collections, which must then be returned by means of **FooDataReader::return\_loan** (p. 1672).

Similar to the **FooDataReader::read** (p. 1651), this operation must be provided on the specialized class that is generated for the particular application data-type that is being taken.

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the method will fail with **DDS\_RETCODE\_NO\_DATA** (p. 337).

#### Parameters

<code>received_data</code>	<< <i>inout</i> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<code>info_seq</code>	<< <i>inout</i> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<code>max_samples</code>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<code>previous_handle</code>	<< <i>in</i> >> (p. 238) The 'next smallest' instance with a value greater than this value that has available samples will be returned.
<code>sample_states</code>	<< <i>in</i> >> (p. 238) data samples matching ones of these <code>sample_states</code> are returned.
<code>view_states</code>	<< <i>in</i> >> (p. 238) data samples matching ones of these <code>view_state</code> are returned.
<code>instance_states</code>	<< <i>in</i> >> (p. 238) data samples matching ones of these <code>instance_state</code> are returned.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	---

## See also

**FooDataReader::take** (p. 1652)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

9.310.2.14 **read\_next\_instance\_w\_condition()**

```
virtual DDS_ReturnCode_t FooDataReader::read_next_instance_w_condition (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    const DDS_InstanceHandle_t & previous_handle,
    DDSReadCondition * condition ) [pure virtual]
```

Accesses via **FooDataReader::read\_next\_instance** (p. 1667) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

This operation accesses a collection of data values from the **DDSDataReader** (p. 1288). The behavior is identical to **FooDataReader::read\_next\_instance** (p. 1667), except that all returned samples satisfy the specified condition. In other words, on success, all returned samples belong to the same instance, and the instance is the instance with 'smallest' *instance\_handle* among the ones that verify: (a) *instance\_handle*  $\geq$  *previous\_handle*, and (b) have samples for which the specified **DDSReadCondition** (p. 1574) evaluates to TRUE.

Similar to the operation **FooDataReader::read\_next\_instance** (p. 1667), it is possible to call **FooDataReader::read\_next\_instance\_w\_condition** (p. 1670) with a *previous\_handle* that does not correspond to an instance currently managed by the **DDSDataReader** (p. 1288).

The behavior of the **FooDataReader::read\_next\_instance\_w\_condition** (p. 1670) operation follows the same rules as the **FooDataReader::read** (p. 1651) operation regarding the pre-conditions and post-conditions for the *received\_data* and *sample\_info*. Similar to the **FooDataReader::read** (p. 1651), the **FooDataReader::read\_next\_instance\_w\_condition** (p. 1670) operation may 'loan' elements to the output collections, which must then be returned by means of **FooDataReader::return\_loan** (p. 1672).

Similar to the **FooDataReader::read** (p. 1651), this operation must be provided on the specialized class that is generated for the particular application data-type that is being taken.

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the method will fail with **DDS\_RETCODE\_NO\_DATA** (p. 337).

## Parameters

<i>received_data</i>	<< <i>inout</i> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
----------------------	--

## Parameters

<i>info_seq</i>	<< <i>inout</i> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<i>max_samples</i>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<i>previous_handle</i>	<< <i>in</i> >> (p. 238) The 'next smallest' instance with a value greater than this value that has available samples will be returned.
<i>condition</i>	<< <i>in</i> >> (p. 238) the <b>DDSReadCondition</b> (p. 1574) to select samples of interest. Cannot be NULL.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) <b>DDS_RETCODE_NO_DATA</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

## See also

**FooDataReader::read\_next\_instance** (p. 1667)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

## 9.310.2.15 take\_next\_instance\_w\_condition()

```
virtual DDS_ReturnCode_t FooDataReader::take_next_instance_w_condition (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq,
    DDS_Long max_samples,
    const DDS_InstanceHandle_t & previous_handle,
    DDSReadCondition * condition ) [pure virtual]
```

Accesses via **FooDataReader::take\_next\_instance** (p. 1668) the samples that match the criteria specified in the **DDSReadCondition** (p. 1574).

This operation accesses a collection of data values from the **DDSDataReader** (p. 1288) and 'removes' them from the **DDSDataReader** (p. 1288).

The operation has the same behavior as **FooDataReader::read\_next\_instance\_w\_condition** (p. 1670), except that the samples are 'taken' from the **DDSDataReader** (p. 1288) such that they are no longer accessible via subsequent 'read' or 'take' operations.

Similar to the operation **FooDataReader::read\_next\_instance** (p. 1667), it is possible to call **FooDataReader::take←→\_next\_instance\_w\_condition** (p. 1671) with a *previous\_handle* that does not correspond to an instance currently managed by the **DDSDataReader** (p. 1288).

The behavior of the **FooDataReader::take\_next\_instance\_w\_condition** (p. 1671) operation follows the same rules as the **FooDataReader::read** (p. 1651) operation regarding the pre-conditions and post-conditions for the `received_data` and `sample_info`. Similar to **FooDataReader::read** (p. 1651), the **FooDataReader::take\_next\_instance\_w\_condition** (p. 1671) operation may 'loan' elements to the output collections, which must then be returned by means of **FooDataReader::return\_loan** (p. 1672).

Similar to the **FooDataReader::read** (p. 1651), this operation must be provided on the specialized class that is generated for the particular application data-type that is being taken.

If the **DDSDataReader** (p. 1288) has no samples that meet the constraints, the method will fail with **DDS\_RETCODE\_NO\_DATA** (p. 337).

#### Parameters

<code>received_data</code>	<< <i>inout</i> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples will be returned.
<code>info_seq</code>	<< <i>inout</i> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info will be returned.
<code>max_samples</code>	<< <i>in</i> >> (p. 238) The maximum number of samples to be returned. If the special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) is provided, as many samples will be returned as are available, up to the limits described in the documentation for <b>FooDataReader::take()</b> (p. 1652).
<code>previous_handle</code>	<< <i>in</i> >> (p. 238) The 'next smallest' instance with a value greater than this value that has available samples will be returned.
<code>condition</code>	<< <i>in</i> >> (p. 238) the <b>DDSReadCondition</b> (p. 1574) to select samples of interest. Cannot be NULL.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), or <b>DDS_RETCODE_NO_DATA</b> (p. 337), <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

#### See also

**FooDataReader::take\_next\_instance** (p. 1668)

**DDS\_LENGTH\_UNLIMITED** (p. 438)

#### 9.310.2.16 return\_loan()

```
virtual DDS_ReturnCode_t FooDataReader::return_loan (
    FooSeq & received_data,
    DDS_SampleInfoSeq & info_seq ) [pure virtual]
```

Indicates to the **DDSDataReader** (p. 1288) that the application is done accessing the collection of `received_data` and `info_seq` obtained by some earlier invocation of `read` or `take` on the **DDSDataReader** (p. 1288).

This operation indicates to the **DDSDataReader** (p. 1288) that the application is done accessing the collection of `received_data` and `info_seq` obtained by some earlier invocation of `read` or `take` on the **DDSDataReader** (p. 1288).

The `received_data` and `info_seq` must belong to a single related "pair"; that is, they should correspond to a pair returned from a single call to `read` or `take`. The `received_data` and `info_seq` must also have been obtained from the same **DDSDataReader** (p. 1288) to which they are returned. If either of these conditions is not met, the operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

The operation **FooDataReader::return\_loan** (p. 1672) allows implementations of the `read` and `take` operations to "loan" buffers from the **DDSDataReader** (p. 1288) to the application and in this manner provide "zerocopy" access to the data. During the loan, the **DDSDataReader** (p. 1288) will guarantee that the data and sample-information are not modified.

It is not necessary for an application to return the loans immediately after the `read` or `take` calls. However, as these buffers correspond to internal resources inside the **DDSDataReader** (p. 1288), the application should not retain them indefinitely.

The use of **FooDataReader::return\_loan** (p. 1672) is only necessary if the `read` or `take` calls "loaned" buffers to the application. This only occurs if the `received_data` and `info_seq` collections had `max_len=0` at the time `read` or `take` was called.

The application may also examine the "owns" property of the collection to determine where there is an outstanding loan. However, calling **FooDataReader::return\_loan** (p. 1672) on a collection that does not have a loan is safe and has no side effects.

If the collections had a loan, upon completion of **FooDataReader::return\_loan** (p. 1672), the collections will have `max_len=0`.

Similar to `read`, this operation must be provided on the specialized class that is generated for the particular application data-type that is being taken.

#### Parameters

<code>received_data</code>	<< <i>in</i> >> (p. 238) user data type-specific <b>FooSeq</b> (p. 1697) object where the received data samples was obtained from earlier invocation of <code>read</code> or <code>take</code> on the <b>DDSDataReader</b> (p. 1288).
----------------------------	---

#### Parameters

<code>info_seq</code>	<< <i>in</i> >> (p. 238) a <b>DDS_SampleInfoSeq</b> (p. 1093) object where the received sample info was obtained from earlier invocation of <code>read</code> or <code>take</code> on the <b>DDSDataReader</b> (p. 1288).
-----------------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

### 9.310.2.17 get\_key\_value()

```
virtual DDS_ReturnCode_t FooDataReader::get_key_value (
    Foo & key_holder,
    const DDS_InstanceHandle_t handle ) [pure virtual]
```

Retrieve the instance `key` that corresponds to an instance handle.

Useful for keyed data types.

The operation will only fill the fields that form the `key` inside the `key_holder` instance. If the type has no keys, this method has no effect and exits with no error.

For keyed data types, this operation may fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336) if the `handle` does not correspond to an existing data-object known to the **DDSDataReader** (p. 1288).

#### Parameters

<i>key_holder</i>	<< <i>inout</i> >> (p. 238) a user data type specific key holder, whose <code>key</code> fields are filled by this operation. If <b>Foo</b> (p. 1648) has no key, this method has no effect.
<i>handle</i>	<< <i>in</i> >> (p. 238) the <code>instance</code> whose key is to be retrieved. If <b>Foo</b> (p. 1648) has a key, <code>handle</code> must represent an existing instance of type <b>Foo</b> (p. 1648) known to the <b>DDSDataReader</b> (p. 1288). Otherwise, this method will fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).

If **Foo** (p. 1648) has a key and `handle` is **DDS\_HANDLE\_NIL** (p. 76), this method will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336).

If **Foo** (p. 1648) has a key and `handle` represents an instance of another type or an instance of type **Foo** (p. 1648) that has been unregistered, this method will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336). If **Foo** (p. 1648) has no key, this method has no effect.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

#### See also

**FooDataWriter::get\_key\_value** (p. 1691)

### 9.310.2.18 lookup\_instance()

```
virtual DDS_InstanceHandle_t FooDataReader::lookup_instance (
    const Foo & key_holder ) [pure virtual]
```

Retrieves the instance `handle` that corresponds to an instance `key_holder`.



Useful for keyed data types.

This operation takes as a parameter an instance and returns a handle that can be used in subsequent operations that accept an instance handle as an argument. The instance parameter is only used for the purpose of examining the fields that define the key. If the instance is unknown to the DataReader, or if for any other reason the Service is unable to provide an instance handle, the Service will return the special value **DDS\_HANDLE\_NIL** (p. 76).

#### Parameters

<i>key_holder</i>	<< <i>in</i> >> (p. 238) a user data type specific key holder.
-------------------	--

#### Returns

the instance handle associated with this instance. If **Foo** (p. 1648) has no key, this method has no effect and returns **DDS\_HANDLE\_NIL** (p. 76)

### 9.310.2.19 is\_data\_consistent()

```
virtual DDS_ReturnCode_t FooDataReader::is_data_consistent (
    DDS_Boolean & is_data_consistent,
    const TData * sample,
    const DDS_SampleInfo * sample_info ) [pure virtual]
```

When using Zero Copy transfer over shared memory, checks if the sample has been overwritten by the DataWriter.

When a sample is received via **Zero Copy transfer over shared memory** (p. 70), the sample can be reused by the DataWriter once it is removed from the DataWriter's send queue. Since there is no synchronization between the DataReader and the DataWriter, the sample could be overwritten by the DataWriter before it is processed by the DataReader. The **FooDataReader::is\_data\_consistent** (p. 1675) operation can be used after processing the sample to check if it was overwritten by the DataWriter.

A precondition for using this operation is to set **DDS\_DataWriterShmemRefTransferModeSettings::enable\_data\_consistency\_check** (p. 705) to true.

#### Warning

This operation cannot be used when the data type is annotated with `@language_binding(FLAT_DATA)`. Reading a FlatData sample delivered with Zero Copy transfer over shared memory while the DataWriter is overwriting it is undefined behavior. An application-level synchronization mechanism is required in this case.

#### Parameters

<i>is_data_consistent</i>	<< <i>inout</i> >> (p. 238) Set to true if the sample is consistent (i.e., the sample has not been overwritten by the DataWriter)
<i>sample</i>	<< <i>in</i> >> (p. 238) Sample to be validated
<i>sample_info</i>	<< <i>in</i> >> (p. 238) <b>DDS_SampleInfo</b> (p. 1082) object received with the sample

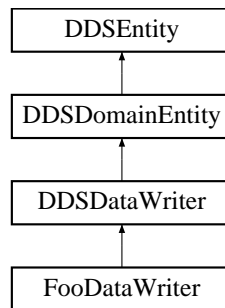
## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
-----	---

## 9.311 FooDataWriter Class Reference

<<**interface**>> (p. 237) <<**generic**>> (p. 237) User data type specific data writer.

Inheritance diagram for FooDataWriter:



### Public Member Functions

- virtual **DDS\_InstanceHandle\_t register\_instance** (const **Foo** &instance\_data)=0  
*Informs RTI Connexx that the application will be modifying a particular instance.*
- virtual **DDS\_InstanceHandle\_t register\_instance\_w\_timestamp** (const **Foo** &instance\_data, const **DDS\_↔**  
**Time\_t** &source\_timestamp)=0  
*Performs the same functions as register\_instance except that the application provides the value for the source\_↔  
timestamp.*
- virtual **DDS\_InstanceHandle\_t register\_instance\_w\_params** (const **Foo** &instance\_data, **DDS\_Write\_↔**  
**Params\_t** &params)=0  
*Performs the same function as **FooDataWriter::register\_instance** (p. 1678) and **FooDataWriter::register\_instance\_↔**  
**w\_timestamp** (p. 1679) except that it also provides the values contained in *params*.*
- virtual **DDS\_ReturnCode\_t unregister\_instance** (const **Foo** &instance\_data, const **DDS\_InstanceHandle\_t**  
&handle)=0  
*Reverses the action of **FooDataWriter::register\_instance** (p. 1678).*
- virtual **DDS\_ReturnCode\_t unregister\_instance\_w\_timestamp** (const **Foo** &instance\_data, const **DDS\_↔**  
**InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)=0  
*Performs the same function as **FooDataWriter::unregister\_instance** (p. 1680) except that it also provides the value for  
the *source\_timestamp*.*
- virtual **DDS\_ReturnCode\_t unregister\_instance\_w\_params** (const **Foo** &instance\_data, **DDS\_Write\_↔**  
**Params\_t** &params)=0  
*Performs the same function as **FooDataWriter::unregister\_instance** (p. 1680) and **FooDataWriter::unregister\_↔**  
**instance\_w\_timestamp** (p. 1682) except that it also provides the values contained in *params*.*
- virtual **DDS\_ReturnCode\_t write** (const **Foo** &instance\_data, const **DDS\_InstanceHandle\_t** &handle)=0  
*Modifies the value of a data instance.*

- virtual **DDS\_ReturnCode\_t write\_w\_timestamp** (const **Foo** &instance\_data, const **DDS\_InstanceHandle\_t** &handle, const **DDS\_Time\_t** &source\_timestamp)=0  
*Performs the same function as **FooDataWriter::write** (p. 1683) except that it also provides the value for the *source\_timestamp*.*
- virtual **DDS\_ReturnCode\_t write\_w\_params** (const **Foo** &instance\_data, **DDS\_WriteParams\_t** &params)=0  
*Performs the same function as **FooDataWriter::write** (p. 1683) and **FooDataWriter::write\_w\_timestamp** (p. 1687) except that it also provides the values contained in *params*.*
- virtual **DDS\_ReturnCode\_t dispose** (const **Foo** &instance\_data, const **DDS\_InstanceHandle\_t** &instance\_handle)=0  
*Requests the middleware to delete the instance.*
- virtual **DDS\_ReturnCode\_t dispose\_w\_timestamp** (const **Foo** &instance\_data, const **DDS\_InstanceHandle\_t** &instance\_handle, const **DDS\_Time\_t** &source\_timestamp)=0  
*Performs the same functions as **dispose** except that the application provides the value for the *source\_timestamp* that is made available to **DDSDataReader** (p. 1288) objects by means of the *source\_timestamp* attribute inside the **DDS\_SampleInfo** (p. 1082).*
- virtual **DDS\_ReturnCode\_t dispose\_w\_params** (const **Foo** &instance\_data, **DDS\_WriteParams\_t** &params)=0  
*Performs the same function as **FooDataWriter::dispose** (p. 1689) and **FooDataWriter::dispose\_w\_timestamp** (p. 1690) except that it also provides the values contained in *params*.*
- virtual **DDS\_ReturnCode\_t get\_key\_value** (**Foo** &key\_holder, const **DDS\_InstanceHandle\_t** &handle)=0  
*Retrieve the instance *key* that corresponds to an instance *handle*.*
- virtual **DDS\_InstanceHandle\_t lookup\_instance** (const **Foo** &key\_holder)=0  
*Retrieve the instance *handle* that corresponds to an instance *key\_holder*.*
- virtual void \* **create\_data** (const **DDS\_TypeAllocationParams\_t** &alloc\_params=DDS\_TYPE\_ALLOCATION\_PARAMS\_DEFAULT)  
*Creates a data sample and initializes it.*
- virtual **DDS\_Boolean delete\_data** (void \*sample, const **DDS\_TypeDeallocationParams\_t** &dealloc\_params=DDS\_TYPE\_DEALLOCATION\_PARAMS\_DEFAULT)  
*Destroys a user data type instance.*
- virtual **DDS\_ReturnCode\_t get\_loan** (TData \*&sample)  
*Gets a sample managed by the DataWriter.*
- virtual **DDS\_ReturnCode\_t discard\_loan** (TData &sample)  
*Returns a loaned sample back to the DataWriter.*

## Static Public Member Functions

- static **FooDataWriter \* narrow** (**DDSDataWriter** \*writer)  
*Narrow the given **DDSDataWriter** (p. 1321) pointer to a **FooDataWriter** (p. 1676) pointer.*

### 9.311.1 Detailed Description

<<**interface**>> (p. 237) <<**generic**>> (p. 237) User data type specific data writer.

Defines the user data type specific writer interface generated for each application class.

The concrete user data type writer automatically generated by the implementation is an incarnation of this class.

See also

**DDSDataWriter** (p. 1321)

**Foo** (p. 1648)

**FooDataReader** (p. 1649)

the Code Generator User's Manual

## 9.311.2 Member Function Documentation

### 9.311.2.1 narrow()

```
static FooDataWriter * FooDataWriter::narrow (
    DDSDataWriter * writer ) [static]
```

Narrow the given **DDSDataWriter** (p. 1321) pointer to a **FooDataWriter** (p. 1676) pointer.

Check if the given `writer` is of type **FooDataWriter** (p. 1676).

#### Parameters

<i>writer</i>	<< <i>in</i> >> (p. 238) Base-class <b>DDSDataWriter</b> (p. 1321) to be converted to the auto-generated class <b>FooDataWriter</b> (p. 1676) that extends <b>DDSDataWriter</b> (p. 1321).
---------------	--

#### Returns

**FooDataWriter** (p. 1676) if `writer` is of type **Foo** (p. 1648). Return NULL otherwise.

### 9.311.2.2 register\_instance()

```
virtual DDS_InstanceHandle_t FooDataWriter::register_instance (
    const Foo & instance_data ) [pure virtual]
```

Informs RTI Connexx that the application will be modifying a particular instance.

This operation is only useful for keyed data types. Using it for non-keyed types causes no effect and returns **DDS\_↔HANDLE\_NIL** (p. 76). The operation takes as a parameter an instance (of which only the key value is examined) and returns a `handle` that can be used in successive **write()** (p. 1683) or **dispose()** (p. 1689) operations.

The operation gives RTI Connexx an opportunity to pre-configure itself to improve performance.

The use of this operation by an application is optional even for keyed types. If an instance has not been pre-registered, the application can use the special value **DDS\_HANDLE\_NIL** (p. 76) as the **DDS\_InstanceHandle\_t** (p. 74) parameter to the write or dispose operation and RTI Connexx will auto-register the instance.

For best performance, the operation should be invoked prior to calling any operation that modifies the instance, such as **FooDataWriter::write** (p. 1683), **FooDataWriter::write\_w\_timestamp** (p. 1687), **FooDataWriter::dispose** (p. 1689) and **FooDataWriter::dispose\_w\_timestamp** (p. 1690) and the handle used in conjunction with the data for those calls.

When this operation is used, RTI Connexx will automatically supply the value of the `source_timestamp` that is used.

This operation may fail and return **DDS\_HANDLE\_NIL** (p. 76) if **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055) limit has been exceeded.

The operation is **idempotent**. If it is called for an already registered instance, it just returns the already allocated handle. This may be used to lookup and retrieve the handle allocated to a given instance.

This operation can only be called after **DDSDataWriter** (p. 1321) has been enabled. Otherwise, **DDS\_HANDLE\_NIL** (p. 76) will be returned.

## Parameters

<i>instance_data</i>	<< <i>in</i> >> (p. 238) The instance that should be registered. Of this instance, only the fields that represent the key are examined by the function.
----------------------	---

## Returns

For keyed data type, a handle that can be used in the calls that take a **DDS\_InstanceHandle\_t** (p. 74), such as `write`, `dispose`, `unregister_instance`, or return **DDS\_HANDLE\_NIL** (p. 76) on failure. If the `instance_data` is of a data type that has no keys, this function always returns **DDS\_HANDLE\_NIL** (p. 76).

## See also

**FooDataWriter::unregister\_instance** (p. 1680), **FooDataWriter::get\_key\_value** (p. 1691), **Relationship between registration, liveliness and ownership** (p. 975)

## 9.311.2.3 register\_instance\_w\_timestamp()

```
virtual DDS_InstanceHandle_t FooDataWriter::register_instance_w_timestamp (
    const Foo & instance_data,
    const DDS_Time_t & source_timestamp ) [pure virtual]
```

Performs the same functions as `register_instance` except that the application provides the value for the `source_↵ timestamp`.

The provided `source_timestamp` potentially affects the relative order in which readers observe events from multiple writers. Refer to **DESTINATION\_ORDER** (p. 386) QoS policy for details.

This operation may fail and return **DDS\_HANDLE\_NIL** (p. 76) if **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055) limit has been exceeded.

This operation can only be called after **DDSDataWriter** (p. 1321) has been enabled. Otherwise, **DDS\_HANDLE\_NIL** (p. 76) will be returned.

## Parameters

<i>instance_data</i>	<< <i>in</i> >> (p. 238) The instance that should be registered. Of this instance, only the fields that represent the key are examined by the function.
<i>source_timestamp</i>	<< <i>in</i> >> (p. 238) The timestamp value must be greater than or equal to the timestamp value used in the last writer operation (used in a <i>register</i> , <i>unregister</i> , <i>dispose</i> , or <i>write</i> , with either the automatically supplied timestamp or the application provided timestamp). This timestamp may potentially affect the order in which readers observe events from multiple writers.

**Returns**

For keyed data type, return a handle that can be used in the calls that take a **DDS\_InstanceHandle\_t** (p. 74), such as `write`, `dispose`, `unregister_instance`, or return **DDS\_HANDLE\_NIL** (p. 76) on failure. If the `instance_data` is of a data type that has no keys, this function always return **DDS\_HANDLE\_NIL** (p. 76).

**See also**

**FooDataWriter::unregister\_instance** (p. 1680), **FooDataWriter::get\_key\_value** (p. 1691)

**9.311.2.4 register\_instance\_w\_params()**

```
virtual DDS_InstanceHandle_t FooDataWriter::register_instance_w_params (
    const Foo & instance_data,
    DDS_WriteParams_t & params ) [pure virtual]
```

Performs the same function as **FooDataWriter::register\_instance** (p. 1678) and **FooDataWriter::register\_instance\_w\_timestamp** (p. 1679) except that it also provides the values contained in `params`.

**See also**

**FooDataWriter::write\_w\_params** (p. 1688)

**9.311.2.5 unregister\_instance()**

```
virtual DDS_ReturnCode_t FooDataWriter::unregister_instance (
    const Foo & instance_data,
    const DDS_InstanceHandle_t & handle ) [pure virtual]
```

Reverses the action of **FooDataWriter::register\_instance** (p. 1678).

This operation is useful only for keyed data types. Using it for non-keyed types causes no effect and reports no error. The operation takes as a parameter an instance (of which only the key value is examined) and a handle.

This operation should only be called on an instance that is currently registered. This includes instances that have been auto-registered by calling operations such as `write` or `dispose` as described in **FooDataWriter::register\_instance** (p. 1678). Otherwise, this operation may fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336).

This only need be called just once per instance, regardless of how many times `register_instance` was called for that instance.

When this operation is used, RTI Connexx will automatically supply the value of the `source_timestamp` that is used.

This operation informs RTI Connexx that the **DDSDataWriter** (p. 1321) is no longer going to provide any information about the instance. This operation also indicates that RTI Connexx can locally remove all information regarding that

instance. The application should not attempt to use the `handle` previously allocated to that instance after calling this function.

The special value **DDS\_HANDLE\_NIL** (p. 76) can be used for the parameter `handle`. This indicates that the identity of the instance should be automatically deduced from the `instance_data` (by means of the `key`).

If `handle` is any value other than **DDS\_HANDLE\_NIL** (p. 76), then it must correspond to an instance that has been registered. If there is no correspondence, the operation will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336).

RTI Connexx will not detect the error when the `handle` is any value other than **DDS\_HANDLE\_NIL** (p. 76), corresponds to an instance that has been registered, but does not correspond to the instance deduced from the `instance_data` (by means of the `key`). RTI Connexx will treat as if the **unregister\_instance()** (p. 1680) operation is for the instance as indicated by the `handle`.

If, after a **FooDataWriter::unregister\_instance** (p. 1680), the application wants to modify (**FooDataWriter::write** (p. 1683) or **FooDataWriter::dispose** (p. 1689)) an instance, it has to register it again, or else use the special `handle` value **DDS\_HANDLE\_NIL** (p. 76).

This operation does not indicate that the instance is deleted (that is the purpose of **FooDataWriter::dispose** (p. 1689)). The operation **FooDataWriter::unregister\_instance** (p. 1680) just indicates that the **DDSDataWriter** (p. 1321) no longer has anything to say about the instance. **DDSDataReader** (p. 1288) entities that are reading the instance may receive a sample with **DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE** (p. 161) for the instance, unless there are other **DDSDataWriter** (p. 1321) objects writing that same instance.

**DDS\_WriterDataLifecycleQosPolicy::autodispose\_unregistered\_instances** (p. 1257) controls whether instances are automatically disposed when they are unregistered.

This operation can affect the ownership of the data instance (see **OWNERSHIP** (p. 414)). If the **DDSDataWriter** (p. 1321) was the exclusive owner of the instance, then calling **unregister\_instance()** (p. 1680) will relinquish that ownership.

If **DDS\_ReliabilityQosPolicy::kind** (p. 1043) is set to **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) and the unregistration would overflow the resource limits of this writer or of a reader, this operation may block for up to **DDS\_↔ ReliabilityQosPolicy::max\_blocking\_time** (p. 1043); if this writer is still unable to unregister after that period, this method will fail with **DDS\_RETCODE\_TIMEOUT** (p. 337).

#### Parameters

<i>instance_data</i>	<< <i>in</i> >> (p. 238) The instance that should be unregistered. If <b>Foo</b> (p. 1648) has a key and <code>instance_handle</code> is <b>DDS_HANDLE_NIL</b> (p. 76), only the fields that represent the key are examined by the function. Otherwise, <code>instance_data</code> is not used. If <code>instance_data</code> is used, it must represent an instance that has been registered. Otherwise, this method may fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336) .
<i>handle</i>	<< <i>in</i> >> (p. 238) represents the <code>instance</code> to be unregistered. If <b>Foo</b> (p. 1648) has a key and <code>handle</code> is <b>DDS_HANDLE_NIL</b> (p. 76), <code>handle</code> is not used and <code>instance</code> is deduced from <code>instance_data</code> . If <b>Foo</b> (p. 1648) has no key, <code>handle</code> is not used. If <code>handle</code> is used, it must represent an instance that has been registered. Otherwise, this method may fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_TIMEOUT</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337)
------------	--

See also

**FooDataWriter::register\_instance** (p. 1678)

**FooDataWriter::unregister\_instance\_w\_timestamp** (p. 1682)

**FooDataWriter::get\_key\_value** (p. 1691)

**Relationship between registration, liveliness and ownership** (p. 975)

### 9.311.2.6 unregister\_instance\_w\_timestamp()

```
virtual DDS_ReturnCode_t FooDataWriter::unregister_instance_w_timestamp (
    const Foo & instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [pure virtual]
```

Performs the same function as **FooDataWriter::unregister\_instance** (p. 1680) except that it also provides the value for the `source_timestamp`.

The provided `source_timestamp` potentially affects the relative order in which readers observe events from multiple writers. Refer to **DESTINATION\_ORDER** (p. 386) QoS policy for details.

The constraints on the values of the `handle` parameter and the corresponding error behavior are the same specified for the **FooDataWriter::unregister\_instance** (p. 1680) operation.

This operation may block and may time out (**DDS\_RETCODE\_TIMEOUT** (p. 337)) under the same circumstances described for the `unregister_instance` operation.

#### Parameters

<i>instance_data</i>	<< <i>in</i> >> (p. 238) The instance that should be unregistered. If <b>Foo</b> (p. 1648) has a key and <code>instance_handle</code> is <b>DDS_HANDLE_NIL</b> (p. 76), only the fields that represent the key are examined by the function. Otherwise, <code>instance_data</code> is not used. If <code>instance_data</code> is used, it must represent an instance that has been registered. Otherwise, this method may fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).
<i>handle</i>	<< <i>in</i> >> (p. 238) represents the <code>instance</code> to be unregistered. If <b>Foo</b> (p. 1648) has a key and <code>handle</code> is <b>DDS_HANDLE_NIL</b> (p. 76), <code>handle</code> is not used and <code>instance</code> is deduced from <code>instance_data</code> . If <b>Foo</b> (p. 1648) has no key, <code>handle</code> is not used. If <code>handle</code> is used, it must represent an instance that has been registered. Otherwise, this method may fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).
<i>source_timestamp</i>	<< <i>in</i> >> (p. 238) The timestamp value must be greater than or equal to the timestamp value used in the last writer operation (used in a <i>register</i> , <i>unregister</i> , <i>dispose</i> , or <i>write</i> , with either the automatically supplied timestamp or the application provided timestamp). This timestamp may potentially affect the order in which readers observe events from multiple writers.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_TIMEOUT</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	---



See also

**FooDataWriter::register\_instance** (p. 1678)

**FooDataWriter::unregister\_instance** (p. 1680)

**FooDataWriter::get\_key\_value** (p. 1691)

### 9.311.2.7 unregister\_instance\_w\_params()

```
virtual DDS_ReturnCode_t FooDataWriter::unregister_instance_w_params (
    const Foo & instance_data,
    DDS_WriteParams_t & params ) [pure virtual]
```

Performs the same function as **FooDataWriter::unregister\_instance** (p. 1680) and **FooDataWriter::unregister\_instance\_w\_timestamp** (p. 1682) except that it also provides the values contained in `params`.

See also

**FooDataWriter::write\_w\_params** (p. 1688)

**FooDataWriter::dispose\_w\_params** (p. 1691)

### 9.311.2.8 write()

```
virtual DDS_ReturnCode_t FooDataWriter::write (
    const Foo & instance_data,
    const DDS_InstanceHandle_t & handle ) [pure virtual]
```

Modifies the value of a data instance.

When this operation is used, RTI Connexx will automatically supply the value of the `source_timestamp` that is made available to **DDSDDataReader** (p.1288) objects by means of the `source_timestamp` attribute inside the **DDS\_SampleInfo** (p.1082). (Refer to **DDS\_SampleInfo** (p.1082) and **DESTINATION\_ORDER** (p.386) QoS policy for details).

As a side effect, this operation asserts liveness on the **DDSDDataWriter** (p.1321) itself, the **DDSPublisher** (p.1550) and the **DDSDomainParticipant** (p.1351).

Note that the special value **DDS\_HANDLE\_NIL** (p.76) can be used for the parameter `handle`. This indicates the identity of the instance should be automatically deduced from the `instance_data` (by means of the `key`).

If `handle` is any value other than **DDS\_HANDLE\_NIL** (p.76), then it must correspond to an instance that has been registered. If there is no correspondence, the operation will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p.336).

RTI Connexx will not detect the error when the `handle` is any value other than **DDS\_HANDLE\_NIL** (p.76), corresponds to an instance that has been registered, but does not correspond to the instance deduced from the `instance_data`

(by means of the `key`). RTI Connex will treat as if the `write()` (p. 1683) operation is for the instance as indicated by the `handle`.

This operation may block if the **RELIABILITY** (p. 433) `kind` is set to **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) and the modification would cause data to be lost or else cause one of the limits specified in the **RESOURCE\_LIMITS** (p. 437) to be exceeded.

This operation will not block when using **DDS\_BEST\_EFFORT\_RELIABILITY\_QOS** (p. 435). If you are using **BEST\_EFFORT** Reliability in combination with **DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS** (p. 431), then instead of being blocked, samples that are queued to be sent by the asynchronous publishing thread will be overwritten when the number of DDS samples that are currently queued has reached the `depth` QoS value in the **DDS\_HistoryQosPolicy** (p. 919).

If **DDS\_ReliabilityQosPolicy::max\_blocking\_time** (p. 1043) elapses before the **DDSDataWriter** (p. 1321) can store the modification without exceeding the limits, the operation will fail and return **DDS\_RETCODE\_TIMEOUT** (p. 337) for **KEEP\_ALL** configurations.

Here is how the write operation behaves when **DDS\_KEEP\_LAST\_HISTORY\_QOS** (p. 406) and **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) are used:

- The send window size is determined by the **DDS\_RtpsReliableWriterProtocol\_t::max\_send\_window\_size** (p. 1073) and **DDS\_RtpsReliableWriterProtocol\_t::min\_send\_window\_size** (p. 1072) fields in the **DDS\_DataWriterProtocolQosPolicy** (p. 673). If a send window is specified (`max_send_window_size` is not **UNLIMITED**) and the window is full, the write operation will block until one of the samples in the send window is protocol-acknowledged (ACKed) (1) or until the **DDS\_ReliabilityQosPolicy::max\_blocking\_time** (p. 1043) expires.
- Then, the **DDSDataWriter** (p. 1321) will try to add the new sample to the writer history.
- If the instance associated with the sample is present in the writer history and there are `depth` (in the **HISTORY** (p. 405)) samples in the instance, the DataWriter will replace the oldest sample of that instance independently of that sample's acknowledged status, and the write operation will return **DDS\_RETCODE\_OK** (p. 336). Otherwise, no sample will be replaced and the write operation will continue.
- If the instance associated with the sample is not present in the writer history and **DDS\_ResourceLimitsQosPolicy::max\_instances** (p. 1055) is exceeded, the DataWriter will try to replace an existing instance (and its samples) according to the value of **DDS\_DataWriterResourceLimitsQosPolicy::instance\_replacement** (p. 701) (see **DDS\_DataWriterResourceLimitsInstanceReplacementKind** (p. 382)).
  - If no instance can be replaced, the write operation returns **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).
- If **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055) is exceeded, the DataWriter will try to drop a sample from a different instance as follows:
  - The DataWriter will try first to remove a fully ACKed (2) sample from a different instance 'I' as long as that sample is not the last remaining sample for the instance 'I'. To find this sample, the DataWriter starts iterating from the oldest sample in the writer history to the newest sample.
  - If no such sample is found, the DataWriter will replace the oldest sample in the writer history.
- The sample is added to the writer history, and the write operation returns **DDS\_RETCODE\_OK** (p. 336).

Here is how the write operation behaves when **DDS\_KEEP\_ALL\_HISTORY\_QOS** (p. 406) and **DDS\_RELIABLE\_RELIABILITY\_QOS** (p. 435) are used:

- The send window size is determined by the **DDS\_RtpsReliableWriterProtocol\_t::max\_send\_window\_size** (p. 1073) and **DDS\_RtpsReliableWriterProtocol\_t::min\_send\_window\_size** (p. 1072) fields in the **DATA\_↔WRITER\_PROTOCOL** (p. 381). If a send window is specified (`max_send_window_size` is not UNLIMITED) and the window is full, the write operation will block until one of the samples in the send window is protocol-acknowledged (ACKed) (1) or until the **DDS\_ReliabilityQosPolicy::max\_blocking\_time** (p. 1043) expires.
  - If the `max_blocking_time` expires, the write operation returns **DDS\_RETCODE\_TIMEOUT** (p. 337).
- When a sample is protocol-ACKed (1) before `max_blocking_time` expires, the DataWriter will try to add the sample to the writer history as follows:
  - If the instance associated with the sample is not present in the writer history and `max_instances` is exceeded, the DataWriter will try to replace an existing instance (and its samples) according to the value of **DDS\_DataWriterResourceLimitsQosPolicy::instance\_replacement** (p. 701) (see **DDS\_DataWriter↔ResourceLimitsInstanceReplacementKind** (p. 382)).
    - \* If no instance can be replaced, the write operation returns **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337).
  - If **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055) is exceeded, the DataWriter will go through the samples in the order in which they were added, and it will replace the first sample that is fully ACKed (2).
    - \* If no fully ACKed sample is found, the DataWriter will block (3) until a sample is fully ACKed and can be replaced or **DDS\_ReliabilityQosPolicy::max\_blocking\_time** (p. 1043) expires. If the `max_blocking_↔_time` expires, the write operation will return **DDS\_RETCODE\_TIMEOUT** (p. 337).
  - If **DDS\_ResourceLimitsQosPolicy::max\_samples\_per\_instance** (p. 1055) is exceeded, the DataWriter will go through the samples of the instance in the order in which they were added, and it will replace the first sample that is fully ACKed.
    - \* If no fully ACKed sample is found, the DataWriter will block (3) until a sample is fully ACKed and can be replaced or the `max_blocking_time` expires. If the `max_blocking_time` expires, the write operation will return **DDS\_RETCODE\_TIMEOUT** (p. 337).
  - The sample is added to the writer history, and the write operation returns **DDS\_RETCODE\_OK** (p. 336).

If there are no instance resources left, this operation may fail with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337). Calling **FooDataWriter::unregister\_instance** (p. 1680) may help freeing up some resources.

This operation will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) if the timestamp is less than the timestamp used in the last writer operation (*register*, *unregister*, *dispose*, or *write*, with either the automatically supplied timestamp or the application-provided timestamp).

If an instance obtained from **FooDataWriter::get\_loan** (p. 1695) is modified with this operation, then all instances modified thereafter should be from **FooDataWriter::get\_loan** (p. 1695).

See **DDS\_ReliabilityQosPolicyAcknowledgmentModeKind** (p. 435) for more information on the following notes:

(1) A sample in the writer history is considered "protocol ACKed" when the sample has been individually ACKed at the RTPS protocol level by each one of the DataReaders that matched the DataWriter at the moment the sample was added to the writer queue.

- Late joiners do not change the protocol ACK state of a sample. If a sample is marked as protocol ACKed because it has been acknowledged by all the matching DataReaders and a DataReader joins later on, the historical sample is still considered protocol ACKed even if it has not been received by the late joiner.

- If a sample 'S1' is protocol ACKed and a TopicQuery is received, triggering the publication of 'S1', the sample is still considered protocol ACKed. If a sample 'S1' is not ACKed and a TopicQuery is received triggering the publication of 'S1', the DataWriter will require that both the matching DataReaders on the live RTPS channel and the DataReader on the TopicQuery channel individually protocol ACK the sample in order to consider the sample protocol ACKed.

(2) A sample in the writer history is considered "fully ACKed" when all of the following conditions are met:

- The sample is protocol-ACKed.
- The sample has been "application-level ACKed" by all the DataReaders matching the DataWriter that have their **DDS\_ReliabilityQosPolicy::acknowledgment\_kind** (p. 1043) set to **DDS\_APPLICATION\_EXPLICIT\_↔ACKNOWLEDGMENT\_MODE** (p. 436) or **DDS\_APPLICATION\_AUTO\_ACKNOWLEDGMENT\_MODE** (p. 435). Once the sample is application-level ACKed, it cannot change its status to not ACKed after new DataReaders are matched. (Application-level ACK occurs when the application acknowledges receipt of a sample.)
- If required subscriptions are enabled (see **DDS\_AvailabilityQosPolicy** (p. 596)), the sample must also be ACKed by all the required subscriptions configured on the DataWriter.

(3) It is possible within a single call to the write operation for a DataWriter to block both when the send window is full and then again when **DDS\_ResourceLimitsQosPolicy::max\_samples** (p. 1055) or **DDS\_ResourceLimitsQos↔Policy::max\_samples\_per\_instance** (p. 1055) is exceeded. This can happen because blocking on the send window only considers protocol-ACKed samples, while blocking based on resource limits considers fully-ACKed samples. In any case, the total max blocking time of a single call to the write operation will not exceed **DDS\_ReliabilityQosPolicy↔::max\_blocking\_time** (p. 1043).

#### Parameters

<i>instance_data</i>	<< <i>in</i> >> (p. 238) The data to write.
----------------------	---

#### Parameters

<i>handle</i>	<< <i>in</i> >> (p. 238) Either the handle returned by a previous call to <b>FooDataWriter::register_instance</b> (p. 1678), or else the special value <b>DDS_HANDLE_NIL</b> (p. 76). If <b>Foo</b> (p. 1648) has a key and <i>handle</i> is not <b>DDS_HANDLE_NIL</b> (p. 76), <i>handle</i> must represent a registered instance of type <b>Foo</b> (p. 1648). Otherwise, this method may fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).
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#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_TIMEOUT</b> (p. 337), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337), or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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#### MT Safety:

It is UNSAFE to modify *instance\_data* before the operation has finished. The operation is otherwise SAFE.

See also

**DDSDataReader** (p. 1288)

**FooDataWriter::write\_w\_timestamp** (p. 1687)

**DESTINATION\_ORDER** (p. 386)

### 9.311.2.9 write\_w\_timestamp()

```
virtual DDS_ReturnCode_t FooDataWriter::write_w_timestamp (
    const Foo & instance_data,
    const DDS_InstanceHandle_t & handle,
    const DDS_Time_t & source_timestamp ) [pure virtual]
```

Performs the same function as **FooDataWriter::write** (p. 1683) except that it also provides the value for the `source_timestamp`.

Explicitly provides the timestamp that will be available to the **DDSDataReader** (p.1288) objects by means of the `source_timestamp` attribute inside the **DDS\_SampleInfo** (p.1082). (Refer to **DDS\_SampleInfo** (p.1082) and **DESTINATION\_ORDER** (p. 386) QoS policy for details)

The constraints on the values of the `handle` parameter and the corresponding error behavior are the same specified for the **FooDataWriter::write** (p. 1683) operation.

This operation may block and time out (**DDS\_RETCODE\_TIMEOUT** (p. 337)) under the same circumstances described for **FooDataWriter::write** (p. 1683).

If there are no instance resources left, this operation may fail with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337). Calling **FooDataWriter::unregister\_instance** (p. 1680) may help free up some resources.

This operation may fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336) under the same circumstances described for the write operation.

#### Parameters

<i>instance_data</i>	<< <i>in</i> >> (p. 238) The data to write.
<i>handle</i>	<< <i>in</i> >> (p. 238) Either the handle returned by a previous call to <b>FooDataWriter::register_instance</b> (p. 1678), or else the special value <b>DDS_HANDLE_NIL</b> (p. 76). If <b>Foo</b> (p. 1648) has a key and <code>handle</code> is not <b>DDS_HANDLE_NIL</b> (p. 76), <code>handle</code> must represent a registered instance of type <b>Foo</b> (p. 1648). Otherwise, this method may fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).
<i>source_timestamp</i>	<< <i>in</i> >> (p. 238) When using <b>DDS_BY_SOURCE_TIMESTAMP_DESTINATIONORDER_QOS</b> (p. 387) the timestamp value must be greater than or equal to the timestamp value used in the last writer operation ( <i>register</i> , <i>unregister</i> , <i>dispose</i> , or <i>write</i> , with either the automatically supplied timestamp or the application-provided timestamp) However, if it is less than the timestamp of the previous operation but the difference is less than the <b>DDS_DestinationOrderQosPolicy::source_timestamp_tolerance</b> (p. 711), the timestamp of the previous operation will be used as the source timestamp of this sample. Otherwise, if the difference is greater than <b>DDS_DestinationOrderQosPolicy::source_timestamp_tolerance</b> (p. 711), the function will return <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_TIMEOUT</b> (p. 337), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337), or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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## See also

**FooDataWriter::write** (p. 1683)  
**DDSDataReader** (p. 1288)  
**DESTINATION\_ORDER** (p. 386)

## 9.311.2.10 write\_w\_params()

```
virtual DDS_ReturnCode_t FooDataWriter::write_w_params (
    const Foo & instance_data,
    DDS_WriteParams_t & params ) [pure virtual]
```

Performs the same function as **FooDataWriter::write** (p. 1683) and **FooDataWriter::write\_w\_timestamp** (p. 1687) except that it also provides the values contained in `params`.

Allows provision of the sample identity, related sample identity, source timestamp, instance handle, and publication priority contained in `params`.

This operation may block and time out (**DDS\_RETCODE\_TIMEOUT** (p. 337)) under the same circumstances described for **FooDataWriter::write** (p. 1683).

If there are no instance resources left, this operation may fail with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337). Calling **FooDataWriter::unregister\_instance\_w\_params** (p. 1683) may help free up some resources.

This operation may fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336) under the same circumstances described for the **FooDataWriter::write** (p. 1683).

## Parameters

<i>instance_data</i>	<< <i>in</i> >> (p. 238) The data to write.
<i>params</i>	<< <i>inout</i> >> (p. 238) The write parameters. Note that this is an inout parameter if you activate <b>DDS_WriteParams_t::replace_auto</b> (p. 1251); otherwise it won't be modified.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_TIMEOUT</b> (p. 337), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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See also

**FooDataWriter::write** (p. 1683)

**DDSDataReader** (p. 1288)

### 9.311.2.11 dispose()

```
virtual DDS_ReturnCode_t FooDataWriter::dispose (
    const Foo & instance_data,
    const DDS_InstanceHandle_t & instance_handle ) [pure virtual]
```

Requests the middleware to delete the instance.

This operation is useful only for keyed data types. Using it for non-keyed types has no effect and reports no error.

When an instance is disposed, the **DDSDataWriter** (p. 1321) communicates this state change to **DDSDataReader** (p. 1288) objects by propagating a dispose sample. When the instance changes to a disposed state, you can see the state change on the DataReader by looking at **DDS\_SampleInfo::instance\_state** (p. 1086). Disposed instances have the value **DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE** (p. 161).

The resources allocated to dispose instances on the DataWriter are not removed by default. The removal of the resources allocated to a dispose instance on the DataWriter queue can be controlled by using the QoS **DDS\_Writer↔DataLifecycleQoSPolicy::autopurge\_disposed\_instances\_delay** (p. 1258).

Likewise, on the DataReader, the removal of the resources associated with an instance in the dispose state can be controlled by using the QoS **DDS\_ReaderDataLifecycleQoSPolicy::autopurge\_disposed\_instances\_delay** (p. 1037).

This operation does not modify the value of the instance. The `instance_data` parameter is passed just for the purposes of identifying the instance.

When this operation is used, RTI Connext will automatically supply the value of the `source_timestamp` that is made available to **DDSDataReader** (p. 1288) objects by means of the `source_timestamp` attribute inside the **DDS\_Sample↔Info** (p. 1082).

The constraints on the values of the handle parameter and the corresponding error behavior are the same specified for the **FooDataWriter::unregister\_instance** (p. 1680) operation.

The special value **DDS\_HANDLE\_NIL** (p. 76) can be used for the parameter `instance_handle`. This indicates the identity of the instance should be automatically deduced from the `instance_data` (by means of the `key`).

If `instance_handle` is any value other than **DDS\_HANDLE\_NIL** (p. 76), then it must correspond to an instance that has been registered. If there is no correspondence, the operation will fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336).

RTI Connext will not detect the error when the `instance_handle` is any value other than **DDS\_HANDLE\_NIL** (p. 76), and the `instance_handle` corresponds to an instance that has been registered but does not correspond to the instance deduced from the `instance_data` (by means of the `key`). In this case, the instance that will be disposed is the instance corresponding to the `instance_handle`, not to the `instance_data`.

This operation may block and time out (**DDS\_RETCODE\_TIMEOUT** (p. 337)) under the same circumstances described for **FooDataWriter::write** (p. 1683).

If there are no instance resources left, this operation may fail with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337). Calling **FooDataWriter::unregister\_instance** (p. 1680) may help free up some resources.

## Parameters

<i>instance_data</i>	<< <i>in</i> >> (p. 238) The data to dispose. If <b>Foo</b> (p. 1648) has a key and <i>instance_handle</i> is <b>DDS_HANDLE_NIL</b> (p. 76), only the fields that represent the key are examined by the function. Otherwise, <i>instance_data</i> is not used.
<i>instance_handle</i>	<< <i>in</i> >> (p. 238) Either the handle returned by a previous call to <b>FooDataWriter::register_instance</b> (p. 1678), or else the special value <b>DDS_HANDLE_NIL</b> (p. 76). If <b>Foo</b> (p. 1648) has a key and <i>instance_handle</i> is <b>DDS_HANDLE_NIL</b> (p. 76), <i>instance_handle</i> is not used and it is deduced from <i>instance_data</i> . If <b>Foo</b> (p. 1648) has no key, <i>instance_handle</i> is not used. If <i>instance_handle</i> is used, it must represent an instance of type <b>Foo</b> (p. 1648) that has been written or registered with this writer. Otherwise, this method fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336). If <b>Foo</b> (p. 1648) has a key, <i>instance_handle</i> cannot be <b>DDS_HANDLE_NIL</b> (p. 76) if <i>instance_data</i> is NULL. Otherwise, this method will fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_TIMEOUT</b> (p. 337), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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## See also

**FooDataWriter::dispose\_w\_timestamp** (p. 1690)

**Relationship between registration, liveness and ownership** (p. 975)

9.311.2.12 **dispose\_w\_timestamp()**

```
virtual DDS_ReturnCode_t FooDataWriter::dispose_w_timestamp (
    const Foo & instance_data,
    const DDS_InstanceHandle_t & instance_handle,
    const DDS_Time_t & source_timestamp ) [pure virtual]
```

Performs the same functions as **dispose** except that the application provides the value for the *source\_timestamp* that is made available to **DDSDataReader** (p. 1288) objects by means of the *source\_timestamp* attribute inside the **DDS\_SampleInfo** (p. 1082).

The constraints on the values of the *handle* parameter and the corresponding error behavior are the same specified for the **FooDataWriter::dispose** (p. 1689) operation.

This operation may block and time out (**DDS\_RETCODE\_TIMEOUT** (p. 337)) under the same circumstances described for **FooDataWriter::write** (p. 1683).

If there are no instance resources left, this operation may fail with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337). Calling **FooDataWriter::unregister\_instance** (p. 1680) may help freeing up some resources.



## Parameters

<i>instance_data</i>	<< <i>in</i> >> (p. 238) The data to dispose. If <b>Foo</b> (p. 1648) has a key and <i>instance_handle</i> is <b>DDS_HANDLE_NIL</b> (p. 76), only the fields that represent the key are examined by the function. Otherwise, <i>instance_data</i> is not used.
<i>instance_handle</i>	<< <i>in</i> >> (p. 238) Either the handle returned by a previous call to <b>FooDataWriter::register_instance</b> (p. 1678), or else the special value <b>DDS_HANDLE_NIL</b> (p. 76). If <b>Foo</b> (p. 1648) has a key and <i>handle</i> is not <b>DDS_HANDLE_NIL</b> (p. 76), <i>handle</i> must represent a registered instance of type <b>Foo</b> (p. 1648). Otherwise, this method may fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).
<i>source_timestamp</i>	<< <i>in</i> >> (p. 238) The timestamp value must be greater than or equal to the timestamp value used in the last writer operation (used in a <i>register</i> , <i>unregister</i> , <i>dispose</i> , or <i>write</i> , with either the automatically supplied timestamp or the application provided timestamp). This timestamp may potentially affect the order in which readers observe events from multiple writers. This timestamp will be available to the <b>DDSDataReader</b> (p. 1288) objects by means of the <i>source_timestamp</i> attribute inside the <b>DDS_SampleInfo</b> (p. 1082).

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_TIMEOUT</b> (p. 337), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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## See also

**FooDataWriter::dispose** (p. 1689)

## 9.311.2.13 dispose\_w\_params()

```
virtual DDS_ReturnCode_t FooDataWriter::dispose_w_params (
    const Foo & instance_data,
    DDS_WriteParams_t & params ) [pure virtual]
```

Performs the same function as **FooDataWriter::dispose** (p. 1689) and **FooDataWriter::dispose\_w\_timestamp** (p. 1690) except that it also provides the values contained in *params*.

## See also

**FooDataWriter::write\_w\_params** (p. 1688)

### 9.311.2.14 get\_key\_value()

```
virtual DDS_ReturnCode_t FooDataWriter::get_key_value (
    Foo & key_holder,
    const DDS_InstanceHandle_t & handle ) [pure virtual]
```

Retrieve the instance `key` that corresponds to an instance handle.

Useful for keyed data types.

The operation will only fill the fields that form the `key` inside the `key_holder` instance. If the type has no keys, this method has no effect and exits with no error.

For keyed data types, this operation may fail with **DDS\_RETCODE\_BAD\_PARAMETER** (p. 336) if the `handle` does not correspond to an existing data-object known to the **DDSDataWriter** (p. 1321).

#### Parameters

<i>key_holder</i>	<< <i>inout</i> >> (p. 238) a user data type specific key holder, whose <code>key</code> fields are filled by this operation. If <b>Foo</b> (p. 1648) has no key, this method has no effect.
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#### Parameters

<i>handle</i>	<< <i>in</i> >> (p. 238) the <code>instance</code> whose key is to be retrieved. If <b>Foo</b> (p. 1648) has a key, <code>handle</code> must represent a registered instance of type <b>Foo</b> (p. 1648). Otherwise, this method will fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336). If <b>Foo</b> (p. 1648) has a key and <code>handle</code> is <b>DDS_HANDLE_NIL</b> (p. 76), this method will fail with <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336).
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#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
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#### See also

**FooDataReader::get\_key\_value** (p. 1673)

### 9.311.2.15 lookup\_instance()

```
virtual DDS_InstanceHandle_t FooDataWriter::lookup_instance (
    const Foo & key_holder ) [pure virtual]
```

Retrieve the instance `handle` that corresponds to an instance `key_holder`.

Useful for keyed data types.

This operation takes as a parameter an instance and returns a handle that can be used in subsequent operations that accept an instance handle as an argument. The instance parameter is only used for the purpose of examining the fields that define the key. This operation does not register the instance in question. If the instance has not been previously registered, or if for any other reason RTI Connex is unable to provide an instance handle, RTI Connex will return the special value `HANDLE_NIL`.

## Parameters

<i>key_holder</i>	<< <i>in</i> >> (p. 238) a user data type specific key holder.
-------------------	--

## Returns

the instance handle associated with this instance. If **Foo** (p. 1648) has no key, this method has no effect and returns **DDS\_HANDLE\_NIL** (p. 76)

**9.311.2.16 create\_data()**

```
virtual void * FooDataWriter::create_data (
    const DDS_TypeAllocationParams_t & alloc_params = DDS_TYPE_ALLOCATION_PARAMS_DEFAULT
) [inline], [virtual]
```

Creates a data sample and initializes it.

The behavior of this API is identical to **FooTypeSupport::create\_data** (p. 1715).

## Parameters

<i>alloc_params</i>	<< <i>in</i> >> (p. 238) Whether or not to recursively allocate pointers and/or optional members
---------------------	--

## Returns

Newly created data type, or NULL on failure.

## See also

**FooDataWriter::delete\_data** (p. 1694)

**9.311.2.17 delete\_data()**

```
virtual DDS_Boolean FooDataWriter::delete_data (
    void * sample,
    const DDS_TypeDeallocationParams_t & dealloc_params = DDS_TYPE_DEALLOCATION_PARAMS↔
_DEFAULT ) [inline], [virtual]
```

Destroys a user data type instance.

The behavior of this API is identical to **FooTypeSupport::delete\_data** (p. 1716).

## Parameters

<i>sample</i>	<< <i>in</i> >> (p. 238) Cannot be NULL.
<i>dealloc_params</i>	<< <i>in</i> >> (p. 238) Whether or not to destroy pointers and/or optional members. By default they are destroyed (deleted).

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) on success.

## See also

**FooDataWriter::create\_data** (p. 1694)

**9.311.2.18 get\_loan()**

```
virtual DDS_ReturnCode_t FooDataWriter::get_loan (
    TData *& sample ) [inline], [virtual]
```

Gets a sample managed by the DataWriter.

This operation is supported while using **Zero Copy transfer** (p. 70) over shared memory" or \ref RTIFlatDataModule "FlatData language binding". For FlatData types, this function should be used directly if the type is final; if the type is mutable, **rti::flat::build\_data()** (p. 560) should be used to obtain a sample builder to work with the loaned sample.

The loaned sample is obtained from a DataWriter-managed sample pool and is uninitialized by default. An initialized sample can be obtained by setting **DDS\_DataWriterResourceLimitsQosPolicy::initialize\_writer\_loaned\_↔\_sample** (p. 704) to **DDS\_BOOLEAN\_TRUE** (p. 317). The **DDS\_DataWriterResourceLimitsQosPolicy::writer\_↔\_loaned\_sample\_allocation** (p. 704) settings can be used to configure the DataWriter-managed sample pool.

**FooDataWriter::get\_loan** (p. 1695) fails with **DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337) if **DDS\_Allocation\_↔\_Settings\_t::max\_count** (p. 589) samples have been loaned, and none of those samples has been written with **Foo\_↔\_DataWriter::write** (p. 1683) or discarded via **FooDataWriter::discard\_loan** (p. 1696).

Samples returned from **FooDataWriter::get\_loan** (p. 1695) have an associated state. Due to the optimized nature of the write operation while using Zero Copy transfer over shared memory or FlatData language binding, this sample state is used to control when a sample is available for reuse after the write operation. The possible sample states are free, allocated, removed or serialized. A sample that has never been allocated is "free". **FooDataWriter::get\_loan** (p. 1695) takes a "free" or "removed" sample and makes it "allocated". When a sample is written, its state transitions from "allocated" to "serialized", and the DataWriter takes responsibility for returning the sample back to its sample pool. The sample remains in the "serialized" state until it is removed from the DataWriter queue. For a reliable DataWriter, the sample is removed from the DataWriter's queue when the sample is acknowledged by all DataReaders. For a best-effort DataWriter, the sample is removed from the queue immediately after the write operation. After the sample is removed from the DataWriter queue, the sample is put back into the sample pool, and its state transitions from "serialized" to "removed". At this time, a new call to **FooDataWriter::get\_loan** (p. 1695) may return the same sample.

A loaned sample should not be reused to write a new value after the first write operation. Instead, a new sample from **FooDataWriter::get\_loan** (p. 1695) should be used to write the new value. A loaned sample that has not been written

can be returned to the DataWriter's sample pool by using **FooDataWriter::discard\_loan** (p. 1696). If the write operation fails, then the sample can be used again with a write or discard\_loan operation. Disposing or unregistering an instance with loaned samples follows the same pattern. A loaned sample used successfully with a dispose or unregister operation cannot be used again. But if the dispose or unregister operation fails, the sample is available for reuse.

A DataWriter cannot write managed samples (created with get\_loan) and unmanaged samples (created in any other way) at the same time. The first call to get\_loan automatically prepares this DataWriter to work with managed samples. Calls to get\_loan will fail with **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) if an unmanaged sample was written with this DataWriter earlier. Similarly, **FooDataWriter::write** (p. 1683) will fail to write an unmanaged sample if get\_loan was called.

#### Parameters

<i>sample</i>	<< <i>inout</i> >> (p. 238) reference to a user data type pointer. The loaned sample is returned via this sample.
---------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337) or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	---

#### See also

**FooDataWriter::discard\_loan** (p. 1696)

### 9.311.2.19 discard\_loan()

```
virtual DDS_ReturnCode_t FooDataWriter::discard_loan (
    TData & sample ) [inline], [virtual]
```

Returns a loaned sample back to the DataWriter.

This operation is supported while using **Zero Copy transfer** (p. 70) over shared memory" or the **FlatData language binding** (p. 568).

A loaned sample that hasn't been written can be returned to the DataWriter with this operation.

#### Parameters

<i>sample</i>	<< <i>in</i> >> (p. 238) loaned sample to be discarded.
---------------	---

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336) or <b>DDS_RETCODE_NOT_ENABLED</b> (p. 337).
------------	--

See also

`FooDataWriter::get_loan` (p. 1695)

## 9.312 FooSeq Struct Reference

<<*interface*>> (p. 237) <<*generic*>> (p. 237) A type-safe, ordered collection of elements. The type of these elements is referred to in this documentation as `Foo` (p. 1648).

### Public Member Functions

- `FooSeq & operator=` (const struct `FooSeq` &src\_seq)  
*Copy elements from another sequence, resizing the sequence if necessary.*
- bool `copy_no_alloc` (const struct `FooSeq` &src\_seq)  
*Copy elements from another sequence, only if the destination sequence has enough capacity.*
- bool `from_array` (const `Foo` array[], `DDS_Long` length)  
*Copy elements from an array of elements, resizing the sequence if necessary. The original contents of the sequence (if any) are replaced.*
- bool `to_array` (`Foo` array[], `DDS_Long` length)  
*Copy elements to an array of elements. The original contents of the array (if any) are replaced.*
- `Foo & operator[]` (`DDS_Long` i)  
*Set the *i*-th element of the sequence.*
- const `Foo & operator[]` (`DDS_Long` i) const  
*Get the *i*-th element for a const sequence.*
- `DDS_Long` `length` () const  
*Get the logical length of this sequence.*
- bool `length` (`DDS_Long` new\_length)  
*Set the sequence to the desired length, and resize the sequence if necessary.*
- bool `ensure_length` (`DDS_Long` length, `DDS_Long` max)  
*Set the sequence to the desired length, and resize the sequence if necessary.*
- `DDS_Long` `maximum` () const  
*Get the current maximum number of elements that can be stored in this sequence.*
- bool `maximum` (`DDS_Long` new\_max)  
*Resize this sequence to a new desired maximum.*
- bool `loan_contiguous` (`Foo` \*buffer, `DDS_Long` new\_length, `DDS_Long` new\_max)  
*Loan a contiguous buffer to this sequence.*
- bool `loan_discontiguous` (`Foo` \*\*buffer, `DDS_Long` new\_length, `DDS_Long` new\_max)  
*Loan a discontiguous buffer to this sequence.*
- bool `unloan` ()  
*Return the loaned buffer in the sequence and set the maximum to 0.*
- `Foo` \* `get_contiguous_buffer` () const  
*Return the contiguous buffer of the sequence.*
- `Foo` \*\* `get_discontiguous_buffer` () const  
*Return the discontiguous buffer of the sequence.*
- bool `has_ownership` ()  
*Return the value of the owned flag.*

- `~FooSeq ()`  
*Deallocate this sequence's buffer.*
- `FooSeq ( DDS_Long new_max=0)`  
*Create a sequence with the given maximum.*
- `FooSeq (const struct FooSeq &foo_seq)`  
*Create a sequence by copying from an existing sequence.*

### 9.312.1 Detailed Description

<<*interface*>> (p. 237) <<*generic*>> (p. 237) A type-safe, ordered collection of elements. The type of these elements is referred to in this documentation as **Foo** (p. 1648).

For users who define data types in OMG IDL, this type corresponds to the IDL `sequence<Foo>` (p. 1648).

For any user-data type **Foo** (p. 1648) that an application defines for the purpose of data-distribution with RTI Context, a **FooSeq** (p. 1697) is generated. The sequence offers a subset of the methods defined by the standard OMG IDL to C++ mapping for sequences. We refer to an IDL `sequence<Foo>` (p. 1648) as **FooSeq** (p. 1697).

The state of a sequence is described by the properties 'maximum', 'length' and 'owned'.

- The 'maximum' represents the size of the underlying buffer; this is the maximum number of elements it can possibly hold. It is returned by the **FooSeq::maximum()** (p. 1707) operation.
- The 'length' represents the actual number of elements it currently holds. It is returned by the **FooSeq::length()** (p. 1705) operation.
- The 'owned' flag represents whether the sequence owns the underlying buffer. It is returned by the **FooSeq::has\_ownership** (p. 1711) operation. If the sequence does not own the underlying buffer, the underlying buffer is loaned from somewhere else. This flag influences the lifecycle of the sequence and what operations are allowed on it. The general guidelines are provided below and more details are described in detail as pre-conditions and post-conditions of each of the sequence's operations:
  - If `owned == DDS_BOOLEAN_TRUE` (p. 317), the sequence has ownership on the buffer. It is then responsible for destroying the buffer when the sequence is destroyed.
  - If the `owned == DDS_BOOLEAN_FALSE` (p. 317), the sequence does not have ownership on the buffer. This implies that the sequence is loaning the buffer. The sequence cannot be destroyed until the loan is returned.
  - A sequence with a zero maximum always has `owned == DDS_BOOLEAN_TRUE` (p. 317)

See also

**FooDataWriter** (p. 1676), **FooDataReader** (p. 1649), **FooTypeSupport** (p. 1711), the `Code Generator User's Manual`

### 9.312.2 Constructor & Destructor Documentation



### 9.312.2.1 ~FooSeq()

```
FooSeq::~~FooSeq ( )
```

Deallocate this sequence's buffer.

#### Precondition

(owned == **DDS\_BOOLEAN\_TRUE** (p. 317)). If this precondition is not met, no memory will be freed and an error will be logged.

#### Postcondition

maximum == 0 and the underlying buffer is freed.

#### See also

**FooSeq::maximum()** (p. 1707), **FooSeq::unloan** (p. 1709)

### 9.312.2.2 FooSeq() [1/2]

```
FooSeq::FooSeq (
    DDS_Long new_max = 0 )
```

Create a sequence with the given maximum.

This is a constructor for the sequence. The constructor will automatically allocate memory to hold new\_max elements of type **Foo** (p. 1648).

This constructor will be used when the application creates a sequence using one of the following:

```
FooSeq mySeq(5);
```

```
// or
```

```
FooSeq mySeq;
```

```
// or
```

```
FooSeq* mySeqPtr = new FooSeq(5);
```

#### Postcondition

maximum == new\_max

length == 0

owned == **DDS\_BOOLEAN\_TRUE** (p. 317),

## Parameters

<code>new_max</code>	Must be $\geq 0$ . Otherwise the sequence will be initialized to a <code>new_max=0</code> .
----------------------	---

### 9.312.2.3 FooSeq() [2/2]

```
FooSeq::FooSeq (
    const struct FooSeq & foo_seq )
```

Create a sequence by copying from an existing sequence.

This is a constructor for the sequence. The constructor will automatically allocate memory to hold `foo_seq::maximum()` elements of type **Foo** (p. 1648) and will copy the current contents of `foo_seq` into the new sequence.

This constructor will be used when the application creates a sequence using one of the following:

```
FooSeq mySeq(foo_seq);
// or
FooSeq mySeq = foo_seq;
// or
FooSeq *mySeqPtr = new FooSeq(foo_seq);
```

## Postcondition

```
this::maximum == foo_seq::maximum
this::length == foo_seq::length
this[i] == foo_seq[i] for  $0 \leq i < \text{foo\_seq::length}$ 
this::owned == DDS_BOOLEAN_TRUE (p. 317)
```

## Note

If the pre-conditions are not met, or an error occurs during copying, the constructor will initialize the new sequence to a maximum of zero.

## 9.312.3 Member Function Documentation

### 9.312.3.1 operator=()

```
FooSeq & FooSeq::operator= (
    const struct FooSeq & src_seq )
```

Copy elements from another sequence, resizing the sequence if necessary.

This method invokes **FooSeq::copy\_no\_alloc** (p. 1702) after ensuring that the sequence has enough capacity to hold the elements to be copied.

This operator is invoked when the following expression appears in the code:  
`target_seq = src_seq`

*Important:* This method *will* allocate memory if `this::maximum < src_seq::length`.

Therefore, to programatically detect the successful completion of the operator it is recommended that the application first sets the length of this sequence to zero, makes the assignment, and then checks that the length of this sequence matches that of `src_seq`.

## Parameters

<code>src_seq</code>	<< <i>in</i> >> (p. 238) the sequence from which to copy
----------------------	--

## See also

**FooSeq::copy\_no\_alloc** (p. 1702)

## 9.312.3.2 copy\_no\_alloc()

```
bool FooSeq::copy_no_alloc (
    const struct FooSeq & src_seq )
```

Copy elements from another sequence, only if the destination sequence has enough capacity.

Fill the elements in this sequence by copying the corresponding elements in `src_seq`. The original contents in this sequence are replaced via the element assignment operation (`Foo_copy()` function). By default, elements are discarded; 'delete' is not invoked on the discarded elements.

## Precondition

```
this::maximum >= src_seq::length
this::owned == DDS_BOOLEAN_TRUE (p. 317)
```

## Postcondition

```
this::length == src_seq::length
this[i] == src_seq[i] for 0 <= i < target_seq::length
this::owned == DDS_BOOLEAN_TRUE (p. 317)
```

## Parameters

<code>src_seq</code>	<< <i>in</i> >> (p. 238) the sequence from which to copy
----------------------	--

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the sequence was successfully copied; **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

## Note

If the pre-conditions are not met, the operator will print a message to stdout and leave this sequence unchanged.

See also

**FooSeq::operator=** (p. 1700)

### 9.312.3.3 from\_array()

```
bool FooSeq::from_array (
    const Foo array[],
    DDS_Long length )
```

Copy elements from an array of elements, resizing the sequence if necessary. The original contents of the sequence (if any) are replaced.

Fill the elements in this sequence by copying the corresponding elements in `array`. The original contents in this sequence are replaced via the element assignment operation (`Foo_copy()` function). By default, elements are discarded; 'delete' is not invoked on the discarded elements.

**Precondition**

`this::owned == DDS_BOOLEAN_TRUE` (p. 317)

**Postcondition**

`this::length == length`

`this[i] == array[i]` for  $0 \leq i < \text{length}$

`this::owned == DDS_BOOLEAN_TRUE` (p. 317)

**Parameters**

<i>array</i>	<< <i>in</i> >> (p. 238) The array of elements to be copy elements from
<i>length</i>	<< <i>in</i> >> (p. 238) The length of the array.

**Returns**

**DDS\_BOOLEAN\_TRUE** (p. 317) if the array was successfully copied; **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise.

**Note**

If the pre-conditions are not met, the method will print a message to stdout and leave this sequence unchanged.

### 9.312.3.4 to\_array()

```
bool FooSeq::to_array (
    Foo array[],
    DDS_Long length )
```

Copy elements to an array of elements. The original contents of the array (if any) are replaced.

Copy the elements of this sequence to the corresponding elements in the array. The original contents of the array are replaced via the element assignment operation (Foo\_copy() function). By default, elements are discarded; 'delete' is not invoked on the discarded elements.

#### Parameters

<i>array</i>	<< <i>in</i> >> (p. 238) The array of elements to be filled with elements from this sequence
<i>length</i>	<< <i>in</i> >> (p. 238) The number of elements to be copied.

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the elements of the sequence were successfully copied; **DDS\_BOOLEAN\_↔  
FALSE** (p. 317) otherwise.

### 9.312.3.5 operator[]() [1/2]

```
Foo & FooSeq::operator[] (
    DDS_Long i )
```

Set the *i*-th element of the sequence.

This is the operator that is invoked when the application indexes into a non- const sequence:

```
myElement = mySequence[i];
```

```
mySequence[i] = myElement;
```

Note that a *reference* to the *i*-th element is returned (and not a copy).

#### Parameters

<i>i</i>	index of element to access, must be $\geq 0$ and less than <b>FooSeq::length()</b> (p. 1705)
----------	--

#### Returns

the *i*-th element

**9.312.3.6 operator[]()** [2/2]

```
const Foo & FooSeq::operator[] (
    DDS_Long i ) const
```

Get the *i*-th element for a `const` sequence.

This is the operator that is invoked when the application indexes into a `const` sequence:  
`myElement = mySequence[i];`

Note that a *reference* to the *i*-th element is returned (and not a copy).

**Parameters**

<i>i</i>	index of element to access, must be $\geq 0$ and less than <b>FooSeq::length()</b> (p. 1705)
----------	--

**Returns**

the *i*-th element

**9.312.3.7 length()** [1/2]

```
DDS_Long FooSeq::length ( ) const
```

Get the logical length of this sequence.

Get the length that was last set, or zero if the length has never been set.

**Returns**

the length of the sequence

**9.312.3.8 length()** [2/2]

```
bool FooSeq::length (
    DDS_Long new_length )
```

Set the sequence to the desired length, and resize the sequence if necessary.

If the current maximum is greater than the desired length, then sequence is not resized.

Otherwise, if this sequence owns its buffer, the sequence is resized to the new length by freeing and re-allocating the buffer. However, if the sequence does not own its buffer, this operation will fail.

For sequences that are part of a type declared in IDL, the length must not exceed the maximum established for the sequence in the IDL.

## Parameters

<i>new_length</i>	the new desired length. This value must be non-negative. Must be $\geq 0$ .
-------------------	---

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) on success or **DDS\_BOOLEAN\_FALSE** (p. 317) on failure

**9.312.3.9 ensure\_length()**

```
bool FooSeq::ensure_length (
    DDS_Long length,
    DDS_Long max )
```

Set the sequence to the desired length, and resize the sequence if necessary.

If the current maximum is greater than the new length, then the sequence is not resized.

Otherwise, if this sequence owns its buffer, the sequence is resized to the new maximum by freeing and re-allocating the buffer, and the length is set to the new length. However, if the sequence does not own its buffer, this operation will fail.

This function allows user to avoid unnecessary buffer re-allocation.

## Precondition

```
length <= max
max <= maximum size for IDL bounded sequences
owned == DDS_BOOLEAN_TRUE (p. 317) if sequence needs to be resized
```

## Postcondition

```
length == length
maximum == max if resized
```

## Parameters

<i>length</i>	<< <i>in</i> >> (p. 238) The new length that should be set. Must be $\geq 0$ .
<i>max</i>	<< <i>in</i> >> (p. 238) If sequence need to be resized, this is the maximum that should be set. $max \geq length$

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) on success, **DDS\_BOOLEAN\_FALSE** (p. 317) if the preconditions are not met. In that case the sequence is not modified.



### 9.312.3.10 maximum() [1/2]

```
DDS_Long FooSeq::maximum ( ) const
```

Get the current maximum number of elements that can be stored in this sequence.

The `maximum` of the sequence represents the maximum number of elements that the underlying buffer can hold. It does not represent the current number of elements.

The `maximum` is a non-negative number. It is initialized when the sequence is first created.

`maximum` can only be changed with the **FooSeq::maximum(DDS\_Long)** (p. 1707) operation.

#### Returns

the current maximum of the sequence.

#### See also

**FooSeq::length()** (p. 1705)

### 9.312.3.11 maximum() [2/2]

```
bool FooSeq::maximum (
    DDS_Long new_max )
```

Resize this sequence to a new desired maximum.

This operation does nothing if the new desired maximum matches the current maximum.

If this sequence owns its buffer and the new maximum is not equal to the old maximum, then the existing buffer will be freed and re-allocated.

#### Precondition

```
owned == DDS_BOOLEAN_TRUE (p. 317)
new_max <= maximum size for IDL bounded sequences.
```

#### Postcondition

```
owned == DDS_BOOLEAN_TRUE (p. 317)
length == MINIMUM(original length, new_max)
```

## Parameters

<i>new_max</i>	Must be $\geq 0$ .
----------------	--------------------

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) on success, **DDS\_BOOLEAN\_FALSE** (p. 317) if the preconditions are not met. In that case the sequence is not modified.

**9.312.3.12 loan\_contiguous()**

```
bool FooSeq::loan_contiguous (
    Foo * buffer,
    DDS_Long new_length,
    DDS_Long new_max )
```

Loan a contiguous buffer to this sequence.

This operation changes the `owned` flag of the sequence to **DDS\_BOOLEAN\_FALSE** (p. 317) and also sets the underlying buffer used by the sequence. See the `User's Manual` for more information about sequences and memory ownership.

Use this method if you want to manage the memory used by the sequence yourself. You must provide an array of elements and integers indicating how many elements are allocated in that array (i.e. the maximum) and how many elements are valid (i.e. the length). The sequence will subsequently use the memory you provide and will not permit it to be freed by a call to **FooSeq::maximum(DDS\_Long)** (p. 1707).

Once you have loaned a buffer to a sequence, make sure that you don't free it before calling **FooSeq::unloan** (p. 1709): the next time you access the sequence, you will be accessing freed memory!

You can use this method to wrap stack memory with a sequence interface, thereby avoiding dynamic memory allocation. Create a **FooSeq** (p. 1697) and an array of type **Foo** (p. 1648) and then loan the array to the sequence:

```
::Foo fooArray[10];

::FooSeq fooSeq;

fooSeq.loan_contiguous(fooArray, 0, 10);
```

By default, a sequence you create owns its memory unless you explicitly loan memory of your own to it. In a very few cases, RTI Connexx will return a sequence to you that has a loan; those cases are documented as such. For example, if you call **FooDataReader::read** (p. 1651) or **FooDataReader::take** (p. 1652) and pass in sequences with no loan and no memory allocated, RTI Connexx will loan memory to your sequences which must be unloaned with **FooDataReader::return\_loan** (p. 1672). See the documentation of those methods for more information.

## Precondition

**FooSeq::maximum()** (p. 1707) == 0; i.e. the sequence has no memory allocated to it.

**FooSeq::has\_ownership** (p. 1711) == **DDS\_BOOLEAN\_TRUE** (p. 317); i.e. the sequence does not already have an outstanding loan

## Postcondition

The sequence will store its elements in the buffer provided.

**FooSeq::has\_ownership** (p. 1711) == **DDS\_BOOLEAN\_FALSE** (p. 317)

**FooSeq::length()** (p. 1705) == `new_length`

**FooSeq::maximum()** (p. 1707) == `new_max`

## Parameters

<i>buffer</i>	The new buffer that the sequence will use. Must point to enough memory to hold <code>new_max</code> elements of type <b>Foo</b> (p. 1648). It may be NULL if <code>new_max == 0</code> .
<i>new_length</i>	The desired new length for the sequence. It must be the case that that $0 \leq \text{new\_length} \leq \text{new\_max}$ .
<i>new_max</i>	The allocated number of elements that could fit in the loaned buffer.

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if `buffer` is successfully loaned to this sequence or **DDS\_BOOLEAN\_FALSE** (p. 317) otherwise. Failure only occurs due to failing to meet the pre-conditions. Upon failure the sequence remains unmodified.

## See also

**FooSeq::unloan** (p. 1709) , **FooSeq::loan\_discontiguous** (p. 1709)

## 9.312.3.13 loan\_discontiguous()

```
bool FooSeq::loan_discontiguous (
    Foo ** buffer,
    DDS_Long new_length,
    DDS_Long new_max )
```

Loan a discontiguous buffer to this sequence.

This method is exactly like **FooSeq::loan\_contiguous** (p. 1708) except that the buffer loaned is an array of **Foo** (p. 1648) pointers, not an array of **Foo** (p. 1648).

## Parameters

<i>buffer</i>	The new buffer that the sequence will use. Must point to enough memory to hold <code>new_max</code> elements of type <code>Foo*</code> . It may be NULL if <code>new_max == 0</code> .
<i>new_length</i>	The desired new length for the sequence. It must be the case that that $0 \leq \text{new\_length} \leq \text{new\_max}$ .
<i>new_max</i>	The allocated number of elements that could fit in the loaned buffer.

## See also

**FooSeq::unloan** (p. 1709), **FooSeq::loan\_contiguous** (p. 1708)

### 9.312.3.14 `unloan()`

```
bool FooSeq::unloan ( )
```

Return the loaned buffer in the sequence and set the maximum to 0.

This method affects only the state of this sequence; it does not change the contents of the buffer in any way.

Only the user who originally loaned a buffer should return that loan, as the user may have dependencies on that memory known only to them. Unloaning someone else's buffer may cause unspecified problems. For example, suppose a sequence is loaning memory from a custom memory pool. A user of the sequence likely has no way to release the memory back into the pool, so unloaning the sequence buffer would result in a resource leak. If the user were to then re-loan a different buffer, the original creator of the sequence would have no way to discover, when freeing the sequence, that the loan no longer referred to its own memory and would thus not free the user's memory properly, exacerbating the situation and leading to undefined behavior.

#### Precondition

`owned == DDS_BOOLEAN_FALSE` (p. 317)

#### Postcondition

`owned == DDS_BOOLEAN_TRUE` (p. 317)

`maximum == 0`

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if the preconditions were met. Otherwise **DDS\_BOOLEAN\_FALSE** (p. 317). The function only fails if the pre-conditions are not met, in which case it leaves the sequence unmodified.

#### See also

**FooSeq::loan\_contiguous** (p. 1708), **FooSeq::loan\_discontiguous** (p. 1709), **FooSeq::maximum(DDS\_↔ Long)** (p. 1707)

### 9.312.3.15 `get_contiguous_buffer()`

```
Foo * FooSeq::get_contiguous_buffer ( ) const
```

Return the contiguous buffer of the sequence.

Get the underlying buffer where contiguous elements of the sequence are stored. The size of the buffer matches the maximum of the sequence, but only the elements up to the **FooSeq::length()** (p. 1705) of the sequence are valid.

This method provides almost no encapsulation of the sequence's underlying implementation. Certain operations, such as **FooSeq::maximum(DDS\_Long)** (p. 1707), may render the buffer invalid. In light of these caveats, this operation should be used with care.

#### Returns

buffer that stores contiguous elements in sequence.

**9.312.3.16 get\_discontiguous\_buffer()**

```
Foo ** FooSeq::get_discontiguous_buffer ( ) const
```

Return the discontiguous buffer of the sequence.

This operation returns the underlying buffer where discontiguous elements of the sequence are stored. The size of the buffer matches the maximum of this sequence, but only the elements up to the **FooSeq::length()** (p. 1705) of the sequence are valid.

The same caveats apply to this method as to **FooSeq::get\_contiguous\_buffer** (p. 1710).

The sequence will dereference pointers in the discontiguous buffer to provide access to its elements by value in C and by reference in C++. If you access the discontiguous buffer directly by means of this method, do not store any NULL values into it, as accessing those values will result in a segmentation fault.

**Returns**

buffer that stores discontiguous elements in sequence.

**9.312.3.17 has\_ownership()**

```
bool FooSeq::has_ownership ( )
```

Return the value of the owned flag.

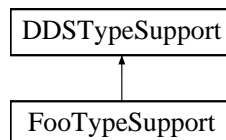
**Returns**

**DDS\_BOOLEAN\_TRUE** (p. 317) if sequence owns the underlying buffer, or **DDS\_BOOLEAN\_FALSE** (p. 317) if it has an outstanding loan.

**9.313 FooTypeSupport Class Reference**

<<*interface*>> (p. 237) <<*generic*>> (p. 237) User data type specific interface.

Inheritance diagram for FooTypeSupport:



## Static Public Member Functions

- static **DDS\_ReturnCode\_t register\_type** (**DDSDomainParticipant** \*participant, const char \*type\_name)  
*Allows an application to communicate to RTI Connexx the existence of a data type.*
- static **DDS\_ReturnCode\_t unregister\_type** (**DDSDomainParticipant** \*participant, const char \*type\_name)  
*<<extension>> (p. 237) Allows an application to unregister a data type from RTI Connexx. After calling unregister\_type, no further communication using that type is possible.*
- static **Foo \* create\_data** (const **DDS\_TypeAllocationParams\_t** &alloc\_params=DDS\_TYPE\_ALLOCATION\_PARAMS\_DEFAULT)  
*<<extension>> (p. 237) Create a data type and initialize it.*
- static **Foo \* create\_data\_ex** (**DDS\_Boolean** allocatePointers)  
*<<extension>> (p. 237) Create a data type and initialize it.*
- static **DDS\_ReturnCode\_t copy\_data** (**Foo** \*dst\_data, const **Foo** \*src\_data)  
*<<extension>> (p. 237) Copy data type.*
- static **DDS\_ReturnCode\_t delete\_data** (**Foo** \*a\_data, const **DDS\_TypeDeallocationParams\_t** &dealloc\_params=DDS\_TYPE\_DEALLOCATION\_PARAMS\_DEFAULT)  
*<<extension>> (p. 237) Destroy a user data type instance.*
- static **DDS\_ReturnCode\_t delete\_data\_ex** (**Foo** \*a\_data, **DDS\_Boolean** deletePointers)  
*<<extension>> (p. 237) Destroy a user data type instance.*
- static **DDS\_ReturnCode\_t initialize\_data** (**Foo** \*a\_data, const **DDS\_TypeAllocationParams\_t** &alloc\_params=DDS\_TYPE\_ALLOCATION\_PARAMS\_DEFAULT)  
*<<extension>> (p. 237) Initialize data type.*
- static **DDS\_ReturnCode\_t initialize\_data\_ex** (**Foo** \*a\_data, **DDS\_Boolean** allocatePointers)  
*<<extension>> (p. 237) Initialize data type.*
- static **DDS\_ReturnCode\_t finalize\_data** (**Foo** \*a\_data, const **DDS\_TypeDeallocationParams\_t** &dealloc\_params=DDS\_TYPE\_DEALLOCATION\_PARAMS\_DEFAULT)  
*<<extension>> (p. 237) Finalize data type.*
- static **DDS\_ReturnCode\_t finalize\_data\_ex** (**Foo** \*a\_data, **DDS\_Boolean** deletePointers)  
*<<extension>> (p. 237) Finalize data type.*
- static const char \* **get\_type\_name** ()  
*Get the default name for this type.*
- static void **print\_data** (const **Foo** \*a\_data)  
*<<extension>> (p. 237) Print value of data type to standard out.*
- static **DDS\_ReturnCode\_t serialize\_data\_to\_cdr\_buffer** (char \*buffer, unsigned int &length, const **Foo** \*a\_data)  
*<<extension>> (p. 237) Serializes the input sample into a CDR buffer of octets.*
- static **DDS\_ReturnCode\_t serialize\_data\_to\_cdr\_buffer\_ex** (char \*buffer, unsigned int &length, const **Foo** \*a\_data, **DDS\_DataRepresentationId\_t** representation)  
*<<extension>> (p. 237) Serializes the input sample into a buffer of octets.*
- static **DDS\_ReturnCode\_t deserialize\_data\_from\_cdr\_buffer** (**Foo** \*sample, const char \*buffer, unsigned int length)  
*<<extension>> (p. 237) Deserializes a sample from a buffer of octets.*
- static **DDS\_ReturnCode\_t data\_to\_string** (**Foo** \*sample, char \*str, **DDS\_UnsignedLong** &str\_size, **DDS\_PrintFormatProperty** &property)  
*<<extension>> (p. 237) Transforms a data sample into a human-readable string representation.*
- static **DDS\_TypeCode \* get\_typecode** ()  
*<<extension>> (p. 237) Retrieves the TypeCode for the Type.*

### 9.313.1 Detailed Description

<<*interface*>> (p. 237) <<*generic*>> (p. 237) User data type specific interface.

Defines the user data type specific interface generated for each application class.

The concrete user data type automatically generated by the implementation is an incarnation of this class.

See also

**DDS\_Typesupport\_Cpp** (p. 72)  
the Code Generator User's Manual

### 9.313.2 Member Function Documentation

#### 9.313.2.1 register\_type()

```
static DDS_ReturnCode_t FooTypeSupport::register_type (
    DDSDomainParticipant * participant,
    const char * type_name ) [static]
```

Allows an application to communicate to RTI Connext the existence of a data type.

The *generated* implementation of the operation embeds all the knowledge that has to be communicated to the middle-ware in order to make it able to manage the contents of data of that type. This includes in particular the key definition that will allow RTI Connext to distinguish different instances of the same type.

The same **DDSTypeSupport** (p. 1629) can be registered multiple times with a **DDSDomainParticipant** (p. 1351) using the same or different values for the `type_name`. If `register_type` is called multiple times on the same **DDSTypeSupport** (p. 1629) with the same **DDSDomainParticipant** (p. 1351) and `type_name`, the second (and subsequent) registrations are ignored but the operation returns **DDS\_RETCODE\_OK** (p. 336).

#### Precondition

Cannot use the same `type_name` to register two different **DDSTypeSupport** (p.1629) with the same **DDSDomainParticipant** (p.1351), or else the operation will fail and **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336) will be returned.

#### Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to register the data type <b>Foo</b> (p. 1648) with. Cannot be NULL.
<i>type_name</i>	<< <i>in</i> >> (p. 238) the type name under with the data type <b>Foo</b> (p. 1648) is registered with the participant; this type name is used when creating a new <b>DDSTopic</b> (p. 1617). (See <b>DDSDomainParticipant::create_topic</b> (p. 1382).) The name may not be NULL or longer than 255 characters.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336) or <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
------------	---

## MT Safety:

UNSAFE on the FIRST call. It is not safe for two threads to simultaneously make the first call to register a type. Subsequent calls are thread safe.

## See also

**DDSDomainParticipant::create\_topic** (p. 1382)

## 9.313.2.2 unregister\_type()

```
static DDS_ReturnCode_t FooTypeSupport::unregister_type (
    DDSDomainParticipant * participant,
    const char * type_name ) [static]
```

<<**extension**>> (p. 237) Allows an application to unregister a data type from RTI Connex. After calling unregister\_↵\_type, no further communication using that type is possible.

The *generated* implementation of the operation removes all the information about a type from RTI Connex. No further communication using that type is possible.

## Precondition

A type with `type_name` is registered with the participant and all **DDSTopic** (p. 1617) objects referencing the type have been destroyed. If any **DDSTopic** (p. 1617) is associated with the type, the operation will fail with **DDS\_RETCODE\_ERROR** (p. 336).

## Postcondition

All information about the type is removed from RTI Connex. No further communication using this type is possible.

## Parameters

<i>participant</i>	<< <b>in</b> >> (p. 238) the <b>DDSDomainParticipant</b> (p. 1351) to unregister the data type <b>Foo</b> (p. 1648) from. Cannot be NULL.
<i>type_name</i>	<< <b>in</b> >> (p. 238) the type name under with the data type <b>Foo</b> (p. 1648) is registered with the participant. The name should match a name that has been previously used to register a type with the participant. Cannot be NULL.



## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_BAD_PARAMETER</b> (p. 336) or <b>DDS_RETCODE_ERROR</b> (p. 336)
------------	--

## MT Safety:

SAFE.

## See also

**FooTypeSupport::register\_type** (p. 1713)

## 9.313.2.3 create\_data()

```
static Foo * FooTypeSupport::create_data (
    const DDS_TypeAllocationParams_t & alloc_params = DDS_TYPE_ALLOCATION_PARAMS_DEFAULT
) [static]
```

<<**extension**>> (p. 237) Create a data type and initialize it.

The *generated* implementation of the operation knows how to instantiate a data type and initialize it properly.

By default all memory for the type is deeply allocated, except for optional members.

## Parameters

<i>alloc_params</i>	<< <b>in</b> >> (p. 238) Whether or not to recursively allocate pointers and/or optional members
---------------------	--

## Returns

Newly created data type, or NULL on failure.

## See also

**FooTypeSupport::delete\_data\_ex** (p. 1717)

## 9.313.2.4 create\_data\_ex()

```
static Foo * FooTypeSupport::create_data_ex (
    DDS_Boolean allocatePointers ) [static]
```

<<*extension*>> (p. 237) Create a data type and initialize it.

The *generated* implementation of the operation knows how to instantiate a data type and initialize it properly.

When `allocatePointers` is `DDS_BOOLEAN_TRUE` (p. 317), all the references (pointers) in the type are recursively allocated.

#### Parameters

<code>allocatePointers</code>	<< <i>in</i> >> (p. 238) Whether or not to recursively allocate pointers.
-------------------------------	---

#### Returns

Newly created data type, or NULL on failure.

#### See also

`FooTypeSupport::delete_data_ex` (p. 1717)

### 9.313.2.5 copy\_data()

```
static DDS_ReturnCode_t FooTypeSupport::copy_data (
    Foo * dst_data,
    const Foo * src_data ) [static]
```

<<*extension*>> (p. 237) Copy data type.

The *generated* implementation of the operation knows how to copy value of a data type.

#### Parameters

<code>dst_data</code>	<< <i>inout</i> >> (p. 238) Data type to copy value to. Cannot be NULL.
<code>src_data</code>	<< <i>in</i> >> (p. 238) Data type to copy value from. Cannot be NULL.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.313.2.6 delete\_data()

```
static DDS_ReturnCode_t FooTypeSupport::delete_data (
    Foo * a_data,
```

```

        const DDS_TypeDeallocationParams_t & dealloc_params = DDS_TYPE_DEALLOCATION_PARAMS←
_DEFAULT ) [static]

```

<<**extension**>> (p. 237) Destroy a user data type instance.

The *generated* implementation of the operation knows how to destroy a data type and return all resources.

#### Parameters

<i>a_data</i>	<< <b>in</b> >> (p. 238) Cannot be NULL.
<i>dealloc_params</i>	<< <b>in</b> >> (p. 238) Whether or not to destroy pointers and/or optional members. By default they are deleted.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**FooTypeSupport::create\_data** (p. 1715)

### 9.313.2.7 delete\_data\_ex()

```

static DDS_ReturnCode_t FooTypeSupport::delete_data_ex (
    Foo * a_data,
    DDS_Boolean deletePointers ) [static]

```

<<**extension**>> (p. 237) Destroy a user data type instance.

The *generated* implementation of the operation knows how to destroy a data type and return all resources.

When *deletePointers* is **DDS\_BOOLEAN\_TRUE** (p. 317), all the references (pointers) are destroyed as well.

#### Parameters

<i>a_data</i>	<< <b>in</b> >> (p. 238) Cannot be NULL.
<i>deletePointers</i>	<< <b>in</b> >> (p. 238) Whether or not to destroy pointers.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**FooTypeSupport::create\_data\_ex** (p. 1715)

### 9.313.2.8 initialize\_data()

```
static DDS_ReturnCode_t FooTypeSupport::initialize_data (
    Foo * a_data,
    const DDS_TypeAllocationParams_t & alloc_params = DDS_TYPE_ALLOCATION_PARAMS_DEFAULT
) [static]
```

<<**extension**>> (p. 237) Initialize data type.

The *generated* implementation of the operation knows how to initialize a data type. This method is typically called to initialize a data type that is allocated on the stack. Calling this method more than once will cause a memory leak.

The `alloc_params` determine whether or not all of the references (pointers) and optional members in the type are recursively allocated.

#### Parameters

<code>a_data</code>	<< <b>inout</b> >> (p. 238) Cannot be NULL.
<code>alloc_params</code>	<< <b>in</b> >> (p. 238) Parameters that determine whether or not to recursively allocate pointers and optional members.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

See also

**FooTypeSupport::finalize\_data** (p. 1719)

### 9.313.2.9 initialize\_data\_ex()

```
static DDS_ReturnCode_t FooTypeSupport::initialize_data_ex (
    Foo * a_data,
    DDS_Boolean allocatePointers ) [static]
```

<<**extension**>> (p. 237) Initialize data type.

The *generated* implementation of the operation knows how to initialize a data type. This method is typically called to initialize a data type that is allocated on the stack. Calling this method more than once will cause a memory leak.

When `allocatePointers` is **DDS\_BOOLEAN\_TRUE** (p. 317), all the references (pointers) in the type are recursively allocated.

## Parameters

<i>a_data</i>	<< <i>inout</i> >> (p. 238) Cannot be NULL.
<i>allocatePointers</i>	<< <i>in</i> >> (p. 238) Whether or not to recursively allocate pointers.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**FooTypeSupport::finalize\_data\_ex** (p. 1719)

## 9.313.2.10 finalize\_data()

```
static DDS_ReturnCode_t FooTypeSupport::finalize_data (
    Foo * a_data,
    const DDS_TypeDeallocationParams_t & dealloc_params = DDS_TYPE_DEALLOCATION_PARAMS↔
_DEFAULT ) [static]
```

<<*extension*>> (p. 237) Finalize data type.

The *generated* implementation of the operation knows how to finalize a data type. This method is typically called to finalize a data type that has previously been initialized.

## Parameters

<i>a_data</i>	<< <i>in</i> >> (p. 238) Cannot be NULL.
<i>dealloc_params</i>	<< <i>in</i> >> (p. 238) Whether or not to destroy pointers and/or optional members. By default they are deleted.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

## See also

**FooTypeSupport::initialize\_data** (p. 1718)

### 9.313.2.11 finalize\_data\_ex()

```
static DDS_ReturnCode_t FooTypeSupport::finalize_data_ex (
    Foo * a_data,
    DDS_Boolean deletePointers ) [static]
```

<<*extension*>> (p. 237) Finalize data type.

The *generated* implementation of the operation knows how to finalize a data type. This method is typically called to finalize a data type that has previously been initialized.

When `deletePointers` is **DDS\_BOOLEAN\_TRUE** (p. 317), the memory required by the references (pointers) associated to the type is freed.

#### Parameters

<code>a_data</code>	<< <i>in</i> >> (p. 238) Cannot be NULL.
<code>deletePointers</code>	<< <i>in</i> >> (p. 238) Whether or not to free memory allocated by the pointers.

#### Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

#### See also

**FooTypeSupport::initialize\_data\_ex** (p. 1718)

### 9.313.2.12 get\_type\_name()

```
static const char * FooTypeSupport::get_type_name ( ) [static]
```

Get the default name for this type.

Can be used for calling **FooTypeSupport::register\_type** (p. 1713) or creating **DDSTopic** (p. 1617)

#### Returns

default name for this type

#### See also

**FooTypeSupport::register\_type** (p. 1713)

**DDSDomainParticipant::create\_topic** (p. 1382)

**9.313.2.13 print\_data()**

```
static void FooTypeSupport::print_data (
    const Foo * a_data ) [static]
```

<<**extension**>> (p. 237) Print value of data type to standard out.

The *generated* implementation of the operation knows how to print value of a data type.

**Parameters**

<i>a_data</i>	<< <b>in</b> >> (p. 238) Data type to be printed.
---------------	---

**9.313.2.14 serialize\_data\_to\_cdr\_buffer()**

```
static DDS_ReturnCode_t FooTypeSupport::serialize_data_to_cdr_buffer (
    char * buffer,
    unsigned int & length,
    const Foo * a_data ) [static]
```

<<**extension**>> (p. 237) Serializes the input sample into a CDR buffer of octets.

This method serializes a sample into a buffer of octets using Common Data Representation (CDR). Calling this method is equivalent to calling **FooTypeSupport::serialize\_data\_to\_cdr\_buffer\_ex** (p. 1722) with **DDS\_AUTO\_↔DATA\_REPRESENTATION** (p. 371) as the representation.

The input buffer must be big enough to store the serialized representation of the sample. Otherwise, the method will return an error.

To determine the minimum size of the input buffer, the user must call this method with the buffer set to NULL.

For more information about CDR in Connex, see [Data Representation](#) in the Core Libraries Extensible Types Guide.

**Parameters**

<i>a_data</i>	<< <b>in</b> >> (p. 238). Input sample. Cannot be NULL.
<i>buffer</i>	<< <b>out</b> >> (p. 238). Serialization buffer.
<i>length</i>	<< <b>inout</b> >> (p. 238). When <i>buffer</i> is set to NULL, after the method executes, <i>length</i> will contain a buffer size big enough to hold the serialized data. When <i>buffer</i> is not NULL, <i>length</i> must contain the size of the input buffer when the method is invoked. After the method executes, <i>length</i> will be updated to contain the actual size of the serialized content, which may be smaller than the size obtained when <i>buffer</i> is set to NULL.

**Exceptions**

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336)
------------	--

### 9.313.2.15 serialize\_data\_to\_cdr\_buffer\_ex()

```
static DDS_ReturnCode_t FooTypeSupport::serialize_data_to_cdr_buffer_ex (
    char * buffer,
    unsigned int & length,
    const Foo * a_data,
    DDS_DataRepresentationId_t representation ) [static]
```

<<**extension**>> (p. 237) Serializes the input sample into a buffer of octets.

This method serializes a sample into a buffer of octets using the input data representation. See **FooTypeSupport**↔  
::**serialize\_data\_to\_cdr\_buffer** (p. 1721) for details.

#### Parameters

<i>a_data</i>	<< <b>in</b> >> (p. 238). Input sample. Cannot be NULL.
<i>buffer</i>	<< <b>out</b> >> (p. 238). Serialization buffer.
<i>length</i>	<< <b>inout</b> >> (p. 238). Serialization buffer length.
<i>representation</i>	<< <b>in</b> >> (p. 238). Representation used to serialize the data.

#### Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

### 9.313.2.16 deserialize\_data\_from\_cdr\_buffer()

```
static DDS_ReturnCode_t FooTypeSupport::deserialize_data_from_cdr_buffer (
    Foo * sample,
    const char * buffer,
    unsigned int length ) [static]
```

<<**extension**>> (p. 237) Deserializes a sample from a buffer of octets.

This method deserializes a sample from a CDR buffer of octets.

The content of the buffer generated by the method **FooTypeSupport::serialize\_data\_to\_cdr\_buffer** (p. 1721) can be provided to this method to get the sample back.

#### Parameters

<i>sample</i>	<< <b>in</b> >> (p. 238). Output sample. Cannot be NULL.
<i>buffer</i>	<< <b>in</b> >> (p. 238). Deserialization buffer. Cannot be NULL.
<i>length</i>	<< <b>in</b> >> (p. 238). Length of the serialized representation of the sample in the buffer.



## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336)
-----	--

## 9.313.2.17 data\_to\_string()

```
static DDS_ReturnCode_t FooTypeSupport::data_to_string (
    Foo * sample,
    char * str,
    DDS_UnsignedLong & str_size,
    DDS_PrintFormatProperty & property ) [static]
```

<<**extension**>> (p. 237) Transforms a data sample into a human-readable string representation.

This method takes a data sample and creates a string representation of the data.

The input character buffer must be big enough to store the string representation of the sample. Otherwise, the method will return an error.

To determine the minimum size of the input character buffer, the user must call this method with the buffer set to NULL.

If the size of the output string is longer than the size of an unsigned 32-bit integer, this operation will fail with **DDS\_↵ RETCODE\_OUT\_OF\_RESOURCES** (p. 337).

This method is only provided for types that were generated with typecodes.

## Parameters

<i>sample</i>	<< <b>in</b> >> (p. 238). The sample to get the string representation for. Cannot be NULL.
<i>str</i>	<< <b>out</b> >> (p. 238). Output string representing the data sample.
<i>str_size</i>	<< <b>inout</b> >> (p. 238). When <i>str</i> is set to NULL, after the method executes, <i>str_size</i> will contain a buffer size big enough to hold the string representation of the data. When <i>str</i> is not NULL, <i>str_size</i> must contain the size of the input buffer when the method is invoked. If the size of the input buffer is too small, after the method executes, <i>str_size</i> will be updated to contain the required size of the string content and the method will return <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337).
<i>property</i>	<< <b>in</b> >> (p. 238). Properties describing what the format of the output string should be.

## Exceptions

One	of the <b>Standard Return Codes</b> (p. 336), <b>DDS_RETCODE_OUT_OF_RESOURCES</b> (p. 337)
-----	--

### 9.313.2.18 get\_typecode()

```
static DDS_TypeCode * FooTypeSupport::get_typecode ( ) [static]
```

<<*extension*>> (p. 237) Retrieves the TypeCode for the Type.

This method retrieves the **DDS\_TypeCode** (p. 1164) for the Type. A **DDS\_TypeCode** (p. 1164) is a mechanism for representing a type at runtime. RTI Connexx can use type codes to send type definitions on the network. A **DDS\_TypeCode** (p. 1164) value consists of a type code *kind* (represented by the **DDS\_TCKind** (p. 86) enumeration) and a list of *members* (that is, fields). These members are recursive: each one has its own **DDS\_TypeCode** (p. 1164), and in the case of complex types (structures, arrays, and so on), these contained type codes contain their own members.

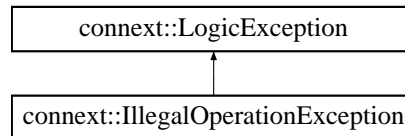
#### Returns

The TypeCode for this type

## 9.314 connexx::IllegalOperationException Class Reference

The operation was called under improper circumstances.

Inheritance diagram for connexx::IllegalOperationException:



### 9.314.1 Detailed Description

The operation was called under improper circumstances.

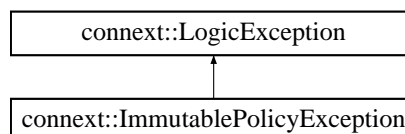
See also

**DDS\_RETCODE\_ILLEGAL\_OPERATION** (p. 337)

## 9.315 connexx::ImmutablePolicyException Class Reference

Application attempted to modify an immutable QoS policy.

Inheritance diagram for connexx::ImmutablePolicyException:



### 9.315.1 Detailed Description

Application attempted to modify an immutable QoS policy.

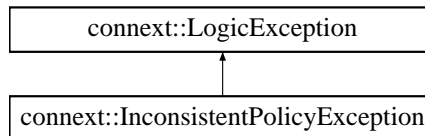
See also

`DDS_RETCODE_IMMUTABLE_POLICY` (p. 337)

## 9.316 connext::InconsistentPolicyException Class Reference

Application specified a set of QoS policies that are not consistent with each other.

Inheritance diagram for connext::InconsistentPolicyException:



### 9.316.1 Detailed Description

Application specified a set of QoS policies that are not consistent with each other.

See also

`DDS_RETCODE_INCONSISTENT_POLICY` (p. 337)

## 9.317 connext::IsInvalidSamplePredicate< T > Class Template Reference

Predicate-class to determine if a sample contains invalid data.

### 9.317.1 Detailed Description

```

template<typename T>
class connext::IsInvalidSamplePredicate< T >
  
```

Predicate-class to determine if a sample contains invalid data.

## 9.318 connext::IsReplyRelatedPredicate< T > Class Template Reference

Predicate-class to match replies by their related request.

## Public Member Functions

- **IsReplyRelatedPredicate** (const **DDS::SampleIdentity\_t** &related\_request\_id)  
*Creates the predicate with the request id to match.*
- bool **operator()** ( **SampleRef**< T > sample)  
*Determines if a reply is related to the request id this object contains.*

### 9.318.1 Detailed Description

```
template<typename T>
class connex::IsReplyRelatedPredicate< T >
```

Predicate-class to match replies by their related request.

Useful for C++ standard algorithms like `std::find_if()`

See also

**Correlating requests and replies** (p. 230)

### 9.318.2 Constructor & Destructor Documentation

#### 9.318.2.1 IsReplyRelatedPredicate()

```
template<typename T >
connex::IsReplyRelatedPredicate< T >::IsReplyRelatedPredicate (
    const DDS::SampleIdentity_t & related_request_id ) [inline]
```

Creates the predicate with the request id to match.

### 9.318.3 Member Function Documentation

#### 9.318.3.1 operator>()

```
template<typename T >
bool connex::IsReplyRelatedPredicate< T >::operator() (
    SampleRef< T > sample ) [inline]
```

Determines if a reply is related to the request id this object contains.

## 9.319 connext::IsValidSamplePredicate< T > Class Template Reference

Predicate-class to determine if a sample contains valid data.

### 9.319.1 Detailed Description

```
template<typename T>
class connext::IsValidSamplePredicate< T >
```

Predicate-class to determine if a sample contains valid data.

Useful for C++ standard algorithms like `std::copy()`

See also

**Taking samples by copy** (p. 229)

## 9.320 connext::LoanedSamples< T > Class Template Reference

Provides access to a collection of middleware-loaned samples.

### Classes

- struct **LoanMemento**  
*A simple value-type for the internal representation of the a **LoanedSamples** (p. 1727) object.*

### Public Types

- typedef **SampleIterator**< T, false > **iterator**  
*The iterator type.*
- typedef **SampleIterator**< T, true > **const\_iterator**  
*The const iterator type.*

## Public Member Functions

- **LoanedSamples** ()  
*Creates an empty **LoanedSamples** (p. 1727) object.*
- void **release** (TDataReader \* &reader\_ptr, TSeq &data\_seq, **SampleInfoSeq** &info\_seq)  
*Transfers the ownership of the underlying data and the **DDS\_SampleInfo** (p. 1082) sequences.*
- **LoanedSamples** ( **LoanMemento** loan\_memento) throw ()  
*Reconstruct a new **LoanedSamples** (p. 1727) object from an internal representation of another.*
- **~LoanedSamples** () throw ()  
*Automatically returns the loan to the middleware.*
- **value\_type operator[]** (size\_t index)  
*Provides access to the underlying **SampleRef** (p. 1920) object in array-like syntax.*
- **const\_value\_type operator[]** (size\_t index) const  
*Provides access to the underlying **SampleRef** (p. 1920) object in array-like syntax.*
- int **length** () const  
*Returns the number of samples.*
- void **return\_loan** ()  
*Returns the loaned samples to the middleware.*
- **operator LoanMemento** () throw ()  
*Release the ownership of the underlying loaned data and **SampleInfo** and returns an internal representation object.*
- **iterator begin** ()  
*Provides an iterator to the first element in the container.*
- **iterator end** ()  
*Provides an iterator to the past-the-end element in the container.*
- **const\_iterator begin** () const  
*Provides an iterator to the first element in the container.*
- **const\_iterator end** () const  
*Provides an iterator to the past-the-end element in the container.*

## Static Public Member Functions

- static **LoanedSamples move\_construct\_from\_loans** (TDataReader \*reader, TSeq &data\_seq, **SampleInfoSeq** &info\_seq)  
*Create a new **LoanedSamples** (p. 1727) object by moving the ownership of the data sequence and the **DDS\_SampleInfo** (p. 1082) sequences.*

### 9.320.1 Detailed Description

```
template<typename T>
class connex::LoanedSamples< T >
```

Provides access to a collection of middleware-loaned samples.

The samples in this container are loaned from the middleware and must be returned at some point.

The loan is automatically returned in the destructor. Alternatively **return\_loan** (p. 1734) can be used.

This is a move-only type. That is, The copy-construction and copy-assignment operations are explicitly disabled. In spite of that the objects of **LoanedSamples** (p. 1727) type can be passed to a function and returned from a function by-value very efficiently. The **connext::details::move()** (p. 190) should be used while passing **LoanedSamples** (p. 1727) by value in and out of a function. Moreover, as assignments are disabled, **connext::details::move()** (p. 190) must be used to transfer the ownership of the loaned samples from one object to another. **connext::details::move()** (p. 190) ensures that there exists exactly one owner of the loan.

Due to its move-only nature, instances of **LoanedSamples** (p. 1727) can't be stored in C++ standard library containers. There are two possible ways to achieve this. Both are not exception safe.

First, use dynamically allocated **LoanedSamples<T>** objects and the STL containers would store the pointers to the **LoanedSamples<T>** objects. The **LoanedSamples** (p. 1727) objects returned by the middleware can be moved in to the dynamically allocated **LoanedSamples<T>** objects using **connext::details::move()** (p. 190) . Using smart pointers for automatic memory management is highly recommended if this approach is chosen.

Second alternative is to use the **LoanMemento** (p. 1736) conversion operator. An STL container of **LoanedSamples<T>::LoanMemento** objects can be created from a **LoanedSamples<T>** object. **LoanedSamples<T>** object releases its ownership of the resources in this conversion. Therefore, when the **LoanMemento** (p. 1736) object is no longer required, the underlying resources must be returned by first creating a **LoanedSamples** (p. 1727) object from the **LoanMemento** (p. 1736). This technique does not require a dynamic allocation like the first alternative. However, this technique should be used very carefully because in case of exceptions, **LoanMemento** (p. 1736) object will not free the resources like the **LoanedSamples** (p. 1727) object does.

This container provides STL-compliant random-access iterators (**begin** (p. 1735) and **end** (p. 1735)).

The contained elements are of type **connext::SampleRef** (p. 1920) Therefore, dereferencing a **LoanedSamples** (p. 1727) iterator returns a **connext::SampleRef** (p. 1920) object, which in turn refer to the data and **DDS\_SampleInfo** (p. 1082).

The contents of this container should not be modified and references to the samples it contains are only valid before the loan is returned.

#### Template Parameters

<i>T</i>	The data type of the contained Samples
----------	--

#### See also

**connext::Requester::take\_replies(int)** (p. 1899)

**connext::Replier::take\_requests(int)** (p. 1878)

**Taking loaned samples** (p. 229)

**Taking samples by copy** (p. 229)

## 9.320.2 Member Typedef Documentation

### 9.320.2.1 iterator

```
template<typename T >
typedef SampleIterator<T, false> connext::LoanedSamples< T >::iterator
```

The iterator type.

### 9.320.2.2 const\_iterator

```
template<typename T >
typedef SampleIterator<T, true> connext::LoanedSamples< T >::const_iterator
```

The const iterator type.

## 9.320.3 Constructor & Destructor Documentation

### 9.320.3.1 **LoanedSamples**() [1/2]

```
template<typename T >
connext::LoanedSamples< T >::LoanedSamples ( ) [inline]
```

Creates an empty **LoanedSamples** (p. 1727) object.

Referenced by **connext::LoanedSamples**< T >::**move\_construct\_from\_loans**().

### 9.320.3.2 **LoanedSamples**() [2/2]

```
template<typename T >
connext::LoanedSamples< T >::LoanedSamples (
    LoanMemento loan_memento ) throw ( ) [inline]
```

Reconstruct a new **LoanedSamples** (p. 1727) object from an internal representation of another.

This constructor will regain the ownership of the underlying data and **::DDS\_SampleInfo** sequences.



## Parameters

<i>loan_memento</i>	The internal representation of another <b>LoanedSamples</b> (p. 1727) object.
---------------------	---

## See also

**connext::LoanedSamples** (p. 1727)

## 9.320.3.3 ~LoanedSamples()

```
template<typename T >
connext::LoanedSamples< T >::~~ LoanedSamples ( ) throw ( ) [inline]
```

Automatically returns the loan to the middleware.

## See also

**return\_loan** (p. 1734)

References **connext::LoanedSamples< T >::return\_loan()**.

## 9.320.4 Member Function Documentation

## 9.320.4.1 move\_construct\_from\_loans()

```
template<typename T >
static LoanedSamples connext::LoanedSamples< T >::move_construct_from_loans (
    TDataReader * reader,
    TSeq & data_seq,
    SampleInfoSeq & info_seq ) [inline], [static]
```

Create a new **LoanedSamples** (p. 1727) object by moving the ownership of the data sequence and the **DDS\_SampleInfo** (p. 1082) sequences.

## Precondition

The *data\_seq* and *info\_seq* parameters must contained loaned sample from the same DataReader.

## Parameters

<i>reader</i>	The DataReader from which the loan was taken.
<i>data_seq</i>	The <b>FooSeq</b> (p. 1697) object containing the loaned samples. After the call this sequence will be empty.
<i>info_seq</i>	The <b>DDS_SampleInfoSeq</b> (p. 1093) object containing the loaned SampleInfo. After this call the sequence will be empty.

## Postcondition

The new **LoanedSamples** (p. 1727) object will manage the ownership of the loans.

## Returns

void

## See also

**connext::LoanedSamples** (p. 1727)

References **DDS\_RETCODE\_BAD\_PARAMETER**, and **connext::LoanedSamples< T >::LoanedSamples()**.

**9.320.4.2 release()**

```
template<typename T >
void connext::LoanedSamples< T >::release (
    TDataReader *& reader_ptr,
    TSeq & data_seq,
    SampleInfoSeq & info_seq ) [inline]
```

Transfers the ownership of the underlying data and the **DDS\_SampleInfo** (p. 1082) sequences.

## Precondition

The *data\_seq* and *info\_seq* parameters must be default initialized prior to this call.

## Parameters

<i>reader_ptr</i>	The DataReader from which the loan was taken. After the call the pointer will be updated.
<i>data_seq</i>	The <b>FooSeq</b> (p. 1697) object that will contain the loan previously held by the <b>LoanedSamples</b> (p. 1727) object. After the call this sequence will loan the underlying data.
<i>info_seq</i>	The <b>DDS_SampleInfoSeq</b> (p. 1093) object that will contain the SampleInfo loan previously held by the <b>LoanedSamples</b> (p. 1727) object. After this call this sequence will loan the underlying <b>DDS_SampleInfoSeq</b> (p. 1093).

**Postcondition**

The `data_seq` and `info_seq` objects will contain the loan previously held by the **LoanedSamples** (p. 1727). The **LoanedSamples** (p. 1727) object will release its ownership.

**See also**

**connext::LoanedSamples** (p. 1727)

References **DDS\_RETCODE\_PRECONDITION\_NOT\_MET**.

**9.320.4.3 operator[]()** [1/2]

```
template<typename T >
value_type connext::LoanedSamples< T >::operator[] (
    size_t index ) [inline]
```

Provides access to the underlying **SampleRef** (p. 1920) object in array-like syntax.

**Parameters**

<i>index</i>	The index of the <b>Sample</b> (p. 1912). Allowed values are from 0 to <b>length()</b> (p. 1734)-1.
--------------	---

**Returns**

A **connext::SampleRef** (p. 1920) object that refers to data and **DDS\_SampleInfo** (p. 1082) at the specified `index`.

**See also**

**connext::LoanedSamples** (p. 1727)

**9.320.4.4 operator[]()** [2/2]

```
template<typename T >
const_value_type connext::LoanedSamples< T >::operator[] (
    size_t index ) const [inline]
```

Provides access to the underlying **SampleRef** (p. 1920) object in array-like syntax.

## Parameters

<i>index</i>	The index of the <b>Sample</b> (p. 1912). Allowed values are from 0 to <b>length()</b> (p. 1734)-1.
--------------	---

## Returns

A **connext::SampleRef** (p. 1920) object that refers to a constant data and constant **DDS\_SampleInfo** (p. 1082) at the specified *index*.

## See also

**connext::LoanedSamples** (p. 1727)

### 9.320.4.5 length()

```
template<typename T >  
int connext::LoanedSamples< T >::length ( ) const [inline]
```

Returns the number of samples.

### 9.320.4.6 return\_loan()

```
template<typename T >  
void connext::LoanedSamples< T >::return_loan ( ) [inline]
```

Returns the loaned samples to the middleware.

After calling this operation this object cannot be accessed again.

Calling this operation is optional, since the destructor will automatically do it.

## See also

**FooDataReader::return\_loan** (p. 1672) (for more information on how the middleware loans samples)

Referenced by **connext::LoanedSamples< T >::~~LoanedSamples()**.

### 9.320.4.7 operator LoanMemento()

```
template<typename T >
connext::LoanedSamples< T >::operator LoanMemento ( ) throw ( ) [inline]
```

Release the ownership of the underlying loaned data and SampleInfo and returns an internal representation object.

**LoanMemento** (p. 1736) object has trivial copy semantics. Therefore, it does not manage resources automatically like **LoanedSamples** (p. 1727) does. This conversion function should be used very carefully. This conversion can be used to store **LoanedSamples** (p. 1727) in a standard library containers. However, note that resource management must be handled manually.

See also

**connext::LoanedSamples** (p. 1727)

### 9.320.4.8 begin() [1/2]

```
template<typename T >
iterator connext::LoanedSamples< T >::begin ( ) [inline]
```

Provides an iterator to the first element in the container.

Returns

A STL-compliant random-access iterator to the first element in this container

See also

**connext::SampleIterator** (p. 1920)

**end** (p. 1735)

### 9.320.4.9 end() [1/2]

```
template<typename T >
iterator connext::LoanedSamples< T >::end ( ) [inline]
```

Provides an iterator to the past-the-end element in the container.

Returns

A STL-compliant random-access iterator indicating the end of the container.

See also

**connext::SampleIterator** (p. 1920)

**begin** (p. 1735)

### 9.320.4.10 begin() [2/2]

```
template<typename T >
const_iterator connext::LoanedSamples< T >::begin ( ) const [inline]
```

Provides an iterator to the first element in the container.

#### Returns

A STL-compliant random-access iterator to the first element in this container

#### See also

**connext::SampleIterator** (p. 1920)

**end** (p. 1735)

### 9.320.4.11 end() [2/2]

```
template<typename T >
const_iterator connext::LoanedSamples< T >::end ( ) const [inline]
```

Provides an iterator to the past-the-end element in the container.

#### Returns

A STL-compliant random-access iterator indicating the end of the container.

#### See also

**connext::SampleIterator** (p. 1920)

**begin** (p. 1735)

## 9.321 connext::LoanedSamples< T >::LoanMemento Struct Reference

A simple value-type for the internal representation of the a **LoanedSamples** (p. 1727) object.

### 9.321.1 Detailed Description

```
template<typename T>
struct connext::LoanedSamples< T >::LoanMemento
```

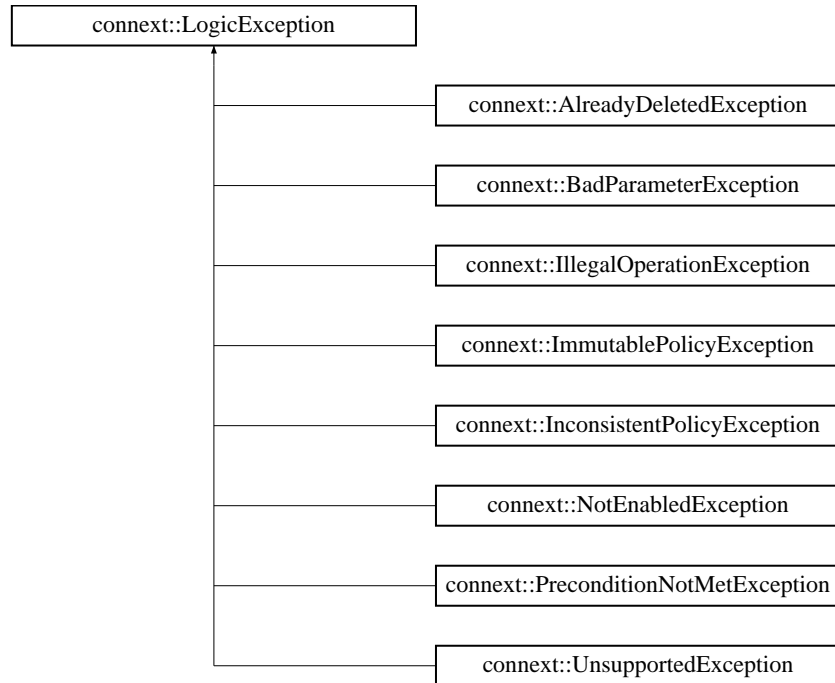
A simple value-type for the internal representation of the a **LoanedSamples** (p. 1727) object.

Objects of this type can be used to store **LoanedSamples** (p. 1727) in an STL container. Care be taken in case of exceptions because **LoanMemento** (p. 1736) does not offer support for exception-safe programming.

## 9.322 connext::LogicException Class Reference

Base class of all RTI Connex exceptions caused by a logic error.

Inheritance diagram for connext::LogicException:



### 9.322.1 Detailed Description

Base class of all RTI Connex exceptions caused by a logic error.

Its base class is `std::logic_error`, from which it inherits the `what()` method.

## 9.323 connext::MessagingLibraryVersion Class Reference

The Connex Messaging Library version.

### Public Member Functions

- **DDS\_Char major\_version () const**  
*Get the library major version digit.*
- **DDS\_Char minor\_version () const**  
*Get the library minor version digit.*
- **DDS\_Char release\_version () const**  
*Get the library release version digit.*
- **DDS\_Char build\_version () const**  
*Get the library revision version digit.*

### 9.323.1 Detailed Description

The Connex Messaging Library version.

This class represents the Connex Messaging library version. The version format is <major>.<minor>.<release>.<revision>.

### 9.323.2 Member Function Documentation

#### 9.323.2.1 major\_version()

```
DDS_Char connex::MessagingLibraryVersion::major_version ( ) const [inline]
```

Get the library major version digit.

#### 9.323.2.2 minor\_version()

```
DDS_Char connex::MessagingLibraryVersion::minor_version ( ) const [inline]
```

Get the library minor version digit.

#### 9.323.2.3 release\_version()

```
DDS_Char connex::MessagingLibraryVersion::release_version ( ) const [inline]
```

Get the library release version digit.

#### 9.323.2.4 build\_version()

```
DDS_Char connex::MessagingLibraryVersion::build_version ( ) const [inline]
```

Get the library revision version digit.

## 9.324 connex::MessagingVersion Class Reference

The Connex Messaging version.



## Static Public Member Functions

- static const **MessagingLibraryVersion** & **get\_api\_version** ()  
*Get the API version.*
- static const std::string & **get\_api\_version\_string** ()  
*Get the API version as a string.*
- static const std::string & **get\_api\_build\_version** ()  
*Get the build version as a string.*

### 9.324.1 Detailed Description

The Connex Messaging version.

### 9.324.2 Member Function Documentation

#### 9.324.2.1 get\_api\_version()

```
static const MessagingLibraryVersion & connext::MessagingVersion::get_api_version ( ) [static]
```

Get the API version.

#### 9.324.2.2 get\_api\_version\_string()

```
static const std::string & connext::MessagingVersion::get_api_version_string ( ) [static]
```

Get the API version as a string.

#### 9.324.2.3 get\_api\_build\_version()

```
static const std::string & connext::MessagingVersion::get_api_build_version ( ) [static]
```

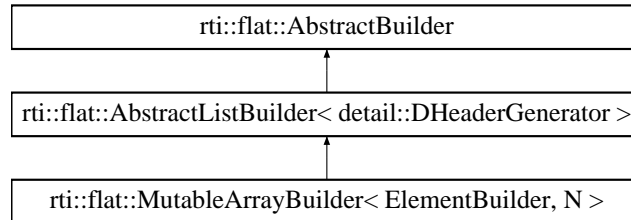
Get the build version as a string.

## 9.325 rti::flat::MutableArrayBuilder< ElementBuilder, N > Class Template Reference

Builds an array member of variable-size elements.

```
#include <SequenceBuilders.hpp>
```

Inheritance diagram for rti::flat::MutableArrayBuilder< ElementBuilder, N >:



### Public Types

- typedef **MutableArrayOffset**< typename ElementBuilder::Offset, N > **Offset**  
*The related Offset type.*

### Public Member Functions

- ElementBuilder **build\_next** ()  
*Begins building the next element.*
- **Offset finish** ()  
*Finishes building the array.*

### Additional Inherited Members

#### 9.325.1 Detailed Description

```
template<typename ElementBuilder, unsigned int N>
class rti::flat::MutableArrayBuilder< ElementBuilder, N >
```

Builds an array member of variable-size elements.

#### Template Parameters

<i>ElementBuilder</i>	The Builder type for the elements of the array
<i>N</i>	The array bound; the exact number of elements this array builder must build. For multidimensional arrays, <i>N</i> is the product of each dimension bound.

Each element of this array needs to be built using the ElementBuilder returned by **build\_next()** (p. 1741). N elements exactly must be built. Unlike a sequence Builder, it is not possible to finish an array with less than N elements.

This example shows how to use a **MutableArrayBuilder** (p. 1740) to build an array member of **MyFlatMutableBuilder** (p. 1750):

```
MyFlatMutableBuilder builder = rti::flat::build_data(writer);
auto array_builder = builder.build_my_mutable_array();
for (int i = 0; i < 10; i++) {
    FlatMutableBarBuilder element_builder = array_builder.build_next();
    // ... build element
    element_builder.finish();
}
array_builder.finish();
```

Note that Builder types are not necessary for arrays of fixed-size elements, since they are added at once (see **MyFlatMutableBuilder::add\_my\_final\_array()** (p. 1755)).

## 9.325.2 Member Typedef Documentation

### 9.325.2.1 Offset

```
template<typename ElementBuilder , unsigned int N>
typedef MutableArrayOffset<typename ElementBuilder::Offset, N> rti::flat::MutableArrayBuilder<
ElementBuilder, N >::Offset
```

The related Offset type.

## 9.325.3 Member Function Documentation

### 9.325.3.1 build\_next()

```
template<typename ElementBuilder , unsigned int N>
ElementBuilder rti::flat::MutableArrayBuilder< ElementBuilder, N >::build_next ( ) [inline]
```

Begins building the next element.

Before calling **build\_next()** (p. 1741) to create a new element, the element Builder returned by a previous call to **build\_next** must have been finished.

References **rti::flat::AbstractListBuilder**< **detail::DHeaderGenerator** >::**element\_count()**.

### 9.325.3.2 finish()

```
template<typename ElementBuilder , unsigned int N>
Offset rti::flat::MutableArrayBuilder< ElementBuilder, N >::finish ( ) [inline]
```

Finishes building the array.

#### Precondition

**build\_next()** (p. 1741) must have been successfully called  $N$  times exactly.

#### Returns

The Offset to the member that has been built.

#### See also

**discard()** (p. 580)

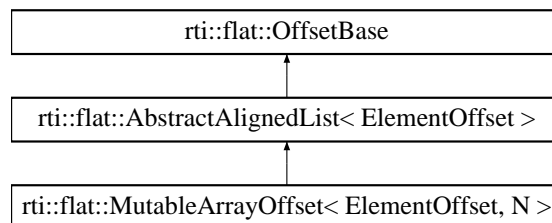
References `rti::flat::AbstractListBuilder< detail::DHeaderGenerator >::element_count()`.

## 9.326 rti::flat::MutableArrayOffset< ElementOffset, N > Class Template Reference

Offset to an array of variable-size elements.

```
#include <SequenceOffsets.hpp>
```

Inheritance diagram for `rti::flat::MutableArrayOffset< ElementOffset, N >`:



### Public Member Functions

- ElementOffset **get\_element** (unsigned int i)  
*Gets the Offset to an element.*

### Additional Inherited Members

#### 9.326.1 Detailed Description

```
template<typename ElementOffset, unsigned int N>
class rti::flat::MutableArrayOffset< ElementOffset, N >
```

Offset to an array of variable-size elements.

## Template Parameters

<i>ElementOffset</i>	An Offset for a type of variable size, such as a mutable struct ( <b>MyFlatMutableOffset</b> (p. 1757)), union, or <b>StringOffset</b> (p. 1945).
<i>N</i>	The array bound. For multidimensional arrays, <i>N</i> is the product of each dimension bound.

Represents an Offset to an array member and allows getting an Offset to each of its elements.

See also

**FinalArrayOffset** (p. 1643) encapsulates arrays of fixed-size elements

## 9.326.2 Member Function Documentation

### 9.326.2.1 get\_element()

```
template<typename ElementOffset , unsigned int N>
ElementOffset rti::flat::MutableArrayOffset< ElementOffset, N >::get_element (
    unsigned int i ) [inline]
```

Gets the Offset to an element.

## Parameters

<i>i</i>	The zero-based index to the element
----------	-------------------------------------

## Returns

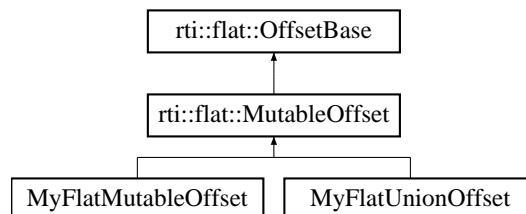
The Offset to the element in the *i*-th position

## 9.327 rti::flat::MutableOffset Class Reference

The base class of all Offsets to a final struct type.

```
#include <Offset.hpp>
```

Inheritance diagram for rti::flat::MutableOffset:



## Additional Inherited Members

### 9.327.1 Detailed Description

The base class of all Offsets to a final struct type.

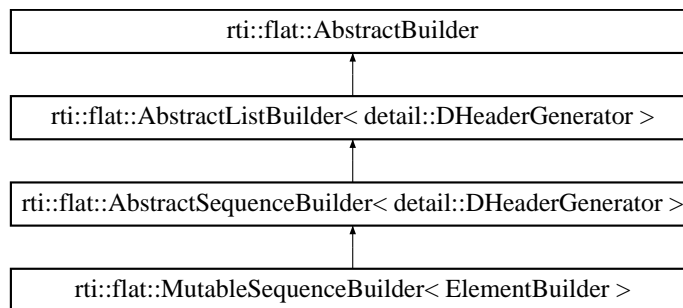
This class contains only implementation details; all the public accessors are defined in the generated type (**MyFlat**↔**MutableOffset** (p. 1757)).

## 9.328 rti::flat::MutableSequenceBuilder< ElementBuilder > Class Template Reference

Builds a sequence member of variable-size elements.

```
#include <SequenceBuilders.hpp>
```

Inheritance diagram for rti::flat::MutableSequenceBuilder< ElementBuilder >:



## Public Types

- typedef **SequenceOffset**< typename ElementBuilder::Offset > **Offset**  
*The related Offset type.*

## Public Member Functions

- ElementBuilder **build\_next** ()  
*Begins building the next element.*
- **Offset finish** ()  
*Finishes building the sequence.*

## Additional Inherited Members

### 9.328.1 Detailed Description

```
template<typename ElementBuilder>
class rti::flat::MutableSequenceBuilder< ElementBuilder >
```

Builds a sequence member of variable-size elements.

### Template Parameters

<i>ElementBuilder</i>	The Builder type for the elements of the sequence
-----------------------	---

To build the elements use the ElementBuilder returned by **build\_next()** (p. 1745). An empty sequence can be built by calling **finish()** (p. 1745) without any call to **build\_next()** (p. 1745).

This class doesn't enforce the sequence bound set in IDL.

The following example uses a **MutableSequenceBuilder** (p. 1744) to initialize a sequence member of **MyFlatMutableBuilder** (p. 1750) with two elements:

```
MyFlatMutableBuilder builder = rti::flat::build_data(writer);
auto seq_builder = builder.build_my_mutable_seq();
auto element_builder = seq_builder.build_next();
// ... build the first element
element_builder.finish();
element_builder = seq_builder.build_next();
// ... build the second element
element_builder.finish();

seq_builder.finish();
```

## 9.328.2 Member Typedef Documentation

### 9.328.2.1 Offset

```
template<typename ElementBuilder >
typedef SequenceOffset<typename ElementBuilder::Offset> rti::flat::MutableSequenceBuilder<
ElementBuilder >::Offset
```

The related Offset type.

## 9.328.3 Member Function Documentation

### 9.328.3.1 build\_next()

```
template<typename ElementBuilder >
ElementBuilder rti::flat::MutableSequenceBuilder< ElementBuilder >::build_next ( ) [inline]
```

Begins building the next element.

Before calling **build\_next()** (p. 1745) to create a new element, the application must have called **finish()** (p. 1745) on the previous element Builder.

### 9.328.3.2 finish()

```
template<typename ElementBuilder >
Offset rti::flat::MutableSequenceBuilder< ElementBuilder >::finish ( ) [inline]
```

Finishes building the sequence.

#### Returns

An Offset to the member that has been built.

#### See also

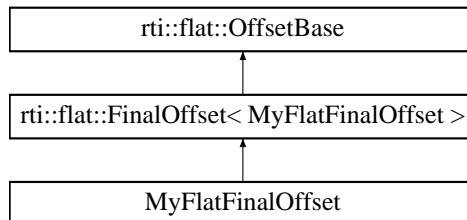
**discard()** (p. 580)

## 9.329 MyFlatFinalOffset Class Reference

Represents the Offset to an arbitrary user-defined FlatData final IDL struct.

```
#include <Offset.hpp>
```

Inheritance diagram for MyFlatFinalOffset:



### Public Types

- typedef MyFlatFinalConstOffset **ConstOffset**  
*The equivalent read-only Offset type.*



## Public Member Functions

- **MyFlatFinalOffset** ()  
*Creates a null Offset.*
- `int32_t my_primitive` () const  
*Retrieves the value for a primitive member.*
- `FlatFinalBar::ConstOffset my_complex` () const  
*Retrieves a const Offset to a complex member.*
- `const rti::flat::PrimitiveArrayOffset< int32_t, 10 > my_primitive_array` () const  
*Retrieves a const Offset to a primitive array.*
- `rti::flat::FinalArrayOffset< FlatFinalBar::ConstOffset, 10 > my_complex_array` () const  
*Retrieves a const Offset to a complex array.*
- `bool my_primitive` (int32\_t value)  
*Sets the value for a primitive member.*
- `FlatFinalBar::Offset my_complex` ()  
*Retrieves a non-const Offset to a complex member.*
- `rti::flat::PrimitiveArrayOffset< int32_t, 10 > my_primitive_array` ()  
*Retrieves a non-const Offset to a primitive array.*
- `rti::flat::FinalArrayOffset< FlatFinalBar::Offset, 10 > my_complex_array` ()  
*Retrieves a non-const Offset to a complex array.*

### 9.329.1 Detailed Description

Represents the Offset to an arbitrary user-defined FlatData final IDL struct.

This example type represents the Offset type that `rtiddsngen` would generate for **MyFlatFinal** (p. 562).

It provides accessors for each of its members. Accessors can return other Offsets or primitive values.

An Offset to a final type may meet the requirements to be cast to its equivalent plain C++ type (see `rti::flat::plain_cast()` (p. 566)).

### 9.329.2 Member Typedef Documentation

#### 9.329.2.1 ConstOffset

```
typedef MyFlatFinalConstOffset MyFlatFinalOffset::ConstOffset
```

The equivalent read-only Offset type.

Each Offset for a user type has an equivalent const Offset that doesn't provide the methods to modify the Sample.

### 9.329.3 Constructor & Destructor Documentation

#### 9.329.3.1 MyFlatFinalOffset()

```
MyFlatFinalOffset::MyFlatFinalOffset ( ) [inline]
```

Creates a null Offset.

Postcondition

`is_null()` (p. 1857)

### 9.329.4 Member Function Documentation

#### 9.329.4.1 my\_primitive() [1/2]

```
int32_t MyFlatFinalOffset::my_primitive ( ) const
```

Retrieves the value for a primitive member.

#### 9.329.4.2 my\_complex() [1/2]

```
FlatFinalBar::ConstOffset MyFlatFinalOffset::my_complex ( ) const
```

Retrieves a const Offset to a complex member.

FlatFinalBar is another arbitrary user-defined final FlatData type.

#### 9.329.4.3 my\_primitive\_array() [1/2]

```
const rti::flat::PrimitiveArrayOffset< int32_t, 10 > MyFlatFinalOffset::my_primitive_array ( )  
const
```

Retrieves a const Offset to a primitive array.

#### 9.329.4.4 my\_complex\_array() [1/2]

```
rti::flat::FinalArrayOffset< FlatFinalBar::ConstOffset, 10 > MyFlatFinalOffset::my_complex_array  
( ) const
```

Retrieves a const Offset to a complex array.

#### 9.329.4.5 my\_primitive() [2/2]

```
bool MyFlatFinalOffset::my_primitive (   
    int32_t value )
```

Sets the value for a primitive member.

#### 9.329.4.6 my\_complex() [2/2]

```
FlatFinalBar::Offset MyFlatFinalOffset::my_complex ( )
```

Retrieves a non-const Offset to a complex member.

FlatFinalBar is another arbitrary user-defined final FlatData type.

#### 9.329.4.7 my\_primitive\_array() [2/2]

```
rti::flat::PrimitiveArrayOffset< int32_t, 10 > MyFlatFinalOffset::my_primitive_array ( )
```

Retrieves a non-const Offset to a primitive array.

#### 9.329.4.8 my\_complex\_array() [2/2]

```
rti::flat::FinalArrayOffset< FlatFinalBar::Offset, 10 > MyFlatFinalOffset::my_complex_array ( )
```

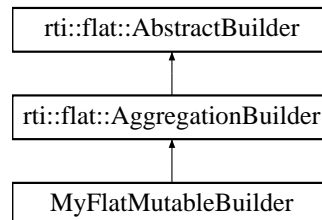
Retrieves a non-const Offset to a complex array.

## 9.330 MyFlatMutableBuilder Class Reference

Represents the Builder for an arbitrary user-defined mutable type.

```
#include <Builder.hpp>
```

Inheritance diagram for MyFlatMutableBuilder:



### Public Types

- typedef **MyFlatMutableOffset** **Offset**  
*The related offset type.*

### Public Member Functions

- **MyFlatMutableBuilder** ()  
*Creates an invalid Builder.*
- **MyFlatMutableBuilder** (unsigned char \*buffer, int32\_t size, bool initialize\_members=false)  
*Construct a Builder with an arbitrary buffer.*
- **Offset finish** ()  
*Finishes building a member.*
- **MyFlatMutable \* finish\_sample** ()  
*Finishes building a sample.*
- bool **add\_my\_primitive** (int32\_t value)  
*Adds a primitive member.*
- bool **add\_my\_optional\_primitive** (int32\_t value)  
*Adds a primitive member.*
- **rti::flat::PrimitiveArrayOffset**< int32\_t, 10 > **add\_my\_primitive\_array** ()  
*Adds a primitive array member.*
- **rti::flat::PrimitiveSequenceBuilder**< int32\_t > **build\_my\_primitive\_seq** ()  
*Begins building a primitive-sequence member.*
- **MyFlatFinalOffset add\_my\_final** ()  
*Adds a final complex member.*
- **rti::flat::FinalAlignedArrayOffset**< **MyFlatFinalOffset**, 10 > **add\_my\_final\_array** ()  
*Adds an array member of final complex elements.*
- **rti::flat::FinalSequenceBuilder**< **MyFlatFinalOffset** > **build\_my\_final\_seq** ()  
*Begins building a sequence member of final complex elements.*
- FlatMutableBarBuilder **build\_my\_mutable** ()

*Begins building a mutable complex member.*

- **rti::flat::MutableArrayBuilder**< FlatMutableBarBuilder, 10 > **build\_my\_mutable\_array** ()

*Begins building an array member of mutable complex elements.*

- **rti::flat::MutableSequenceBuilder**< FlatMutableBarBuilder > **build\_my\_mutable\_seq** ()

*Begins building a sequence member of mutable complex elements.*

- **rti::flat::StringBuilder** **build\_my\_string** ()

*Begins building a string member.*

- **rti::flat::MutableSequenceBuilder**< **rti::flat::StringBuilder** > **build\_my\_string\_seq** ()

*Begins building a sequence member of string elements.*

## Additional Inherited Members

### 9.330.1 Detailed Description

Represents the Builder for an arbitrary user-defined mutable type.

This example type represents the **Builder** (p. 558) type that **rtiddsgen** would generate for **MyFlatMutable** (p. 562) and allows creating a sample or a member of that type.

The most common way to create a Builder is **rti::flat::build\_data()** (p. 560), which obtains a managed sample from a **FooDataWriter** (p. 1676) as described in **Publishing FlatData** (p. 570). It is also possible to create a Builder with an arbitrary buffer using the constructor that receives the buffer and its size.

When a Builder is created, the type is empty—it doesn't contain any members. The Builder provides functions to create each member. There are two kind of functions: `add` functions and `build` functions.

#### 9.330.1.1 Adding fixed-size members

Fixed-size members are "added", and the corresponding function is called **add\_<member\_name>**. "Add" functions directly place the member in the buffer, and return an **Offset** (p. 564) that allows setting its values.

By default, after calling **add\_<member\_name>** the member values are uninitialized. This behavior can be changed by creating the writer with **DDS\_DataWriterResourceLimitsQosPolicy::initialize\_writer\_loaned\_sample** (p. 704); this is however not recommended in general because of the performance impact for large types.

```
MyFlatMutableBuilder builder = ...;
MyFinalFooOffset member_offset = builder.add_my_final();
member_offset.my_primitive(10);
// ... add/build more members
```

#### 9.330.1.2 Building variable-size members

Variable-size members are "built", and the function is called **build\_<member\_name>**. "Build" functions return another **Builder** (p. 558) to build the member.

```
MyFlatMutableBuilder builder = ...;
auto member_builder = builder.build_my_mutable();
// ... use member_builder
member_builder.finish();
// ... add/build more members
```

While a member is being built, the parent Builder is a **bound** state, which prevents any changes to it until the member has been finished by calling `member_builder.finish()`. In particular, the member Builder must be finished before adding or building any other member, or before finishing `builder`.

### 9.330.1.3 Choosing which members are included

The `add/build` function for each member can be called one or zero times. That is, all members are optional, even those without the `@optional` IDL annotation. However `@key` member must be added or `FooDataWriter::write` (p. 1683) will fail.

FlatData samples received by `DDSDataReader` (p. 1288) will not contain the members that were not added/built—the corresponding member getters return a null Offset. A `DDSDataReader` (p. 1288) for an equivalent non-FlatData (plain) definition of this type will assign default values to any non-optional members that were not present in the sample when written.

It is not permitted to add a member more than once, but builders don't enforce this. Trying to build/add a member more than once may cause the Builder to overflow (see **Builder Error Management** (p. 560)). If it doesn't, it may be possible to write and read the data samples, but the duplicate members will be ignored.

See also

**FlatData Builders** (p. 558)

## 9.330.2 Member Typedef Documentation

### 9.330.2.1 Offset

```
typedef MyFlatMutableOffset MyFlatMutableBuilder::Offset
```

The related offset type.

## 9.330.3 Constructor & Destructor Documentation

### 9.330.3.1 MyFlatMutableBuilder() [1/2]

```
MyFlatMutableBuilder::MyFlatMutableBuilder ( ) [inline]
```

Creates an invalid Builder.

**Postcondition**

```
!is_valid()
```

**Note**

Top-level builders are created with `rti::flat::build_data()` (p. 560), and member builders are created with the corresponding `build_<member>` function.

### 9.330.3.2 MyFlatMutableBuilder() [2/2]

```
MyFlatMutableBuilder::MyFlatMutableBuilder (
    unsigned char * buffer,
    int32_t size,
    bool initialize_members = false ) [inline]
```

Construct a Builder with an arbitrary buffer.

#### Note

The recommended way to create a Builder is `rti::flat::build_data()` (p. 560) as described in **Publishing FlatData** (p. 570). This constructor provides an alternative option to use an arbitrary data buffer.

#### Parameters

<i>buffer</i>	The buffer that will be used to build the data sample
<i>size</i>	The size of the buffer
<i>initialize_members</i>	Whether fixed-size elements added to this Builder will be initialized to their default values or will be left uninitialized (more efficient).

If the sample being built overflows the buffer size, the add/build operations will fail. See **Builder Error Management** (p. 560).

## 9.330.4 Member Function Documentation

### 9.330.4.1 finish()

```
Offset MyFlatMutableBuilder::finish ( )
```

Finishes building a member.

#### Returns

The Offset to the member (normally it can be ignored)

#### Precondition

**is\_nested()** (p. 580). That is, this object must be a member Builder, not a sample Builder.

### 9.330.4.2 finish\_sample()

```
MyFlatMutable * MyFlatMutableBuilder::finish_sample ( )
```

Finishes building a sample.

#### Precondition

**!is\_nested()** (p. 580). That is, this object must be a sample Builder, not a member Builder.

#### Postcondition

**!is\_valid()** (p. 580). That is, this Builder can no longer be used.

#### Returns

The sample, ready to be written.

This function completes and returns the sample built with this Builder.

#### See also

**rti::flat::build\_data()** (p. 560), the function to create a **FooDataWriter** (p. 1676)-managed sample Builder.

### 9.330.4.3 add\_my\_primitive()

```
bool MyFlatMutableBuilder::add_my_primitive (
    int32_t value )
```

Adds a primitive member.

### 9.330.4.4 add\_my\_optional\_primitive()

```
bool MyFlatMutableBuilder::add_my_optional_primitive (
    int32_t value )
```

Adds a primitive member.



#### 9.330.4.5 add\_my\_primitive\_array()

```
rti::flat::PrimitiveArrayOffset< int32_t, 10 > MyFlatMutableBuilder::add_my_primitive_array ( )
```

Adds a primitive array member.

##### Returns

The Offset to the array, which can be used to set its values.

#### 9.330.4.6 build\_my\_primitive\_seq()

```
rti::flat::PrimitiveSequenceBuilder< int32_t > MyFlatMutableBuilder::build_my_primitive_seq ( )
```

Begins building a primitive-sequence member.

#### 9.330.4.7 add\_my\_final()

```
MyFlatFinalOffset MyFlatMutableBuilder::add_my_final ( )
```

Adds a final complex member.

##### Returns

The Offset to the member, which can be used to set its values.

#### 9.330.4.8 add\_my\_final\_array()

```
rti::flat::FinalAlignedArrayOffset< MyFlatFinalOffset, 10 > MyFlatMutableBuilder::add_my_↵  
final_array ( )
```

Adds an array member of final complex elements.

##### Returns

The Offset to the array, which can be used to set its values.

#### 9.330.4.9 build\_my\_final\_seq()

```
rti::flat::FinalSequenceBuilder< MyFlatFinalOffset > MyFlatMutableBuilder::build_my_final_seq ( )
```

Begins building a sequence member of final complex elements.

#### 9.330.4.10 build\_my\_mutable()

```
FlatMutableBarBuilder MyFlatMutableBuilder::build_my_mutable ( )
```

Begins building a mutable complex member.

FlatMutableBar represents another arbitrary mutable FlatData type.

#### 9.330.4.11 build\_my\_mutable\_array()

```
rti::flat::MutableArrayBuilder< FlatMutableBarBuilder, 10 > MyFlatMutableBuilder::build_my_mutable_array ( )
```

Begins building an array member of mutable complex elements.

#### 9.330.4.12 build\_my\_mutable\_seq()

```
rti::flat::MutableSequenceBuilder< FlatMutableBarBuilder > MyFlatMutableBuilder::build_my_mutable_seq ( )
```

Begins building a sequence member of mutable complex elements.

#### 9.330.4.13 build\_my\_string()

```
rti::flat::StringBuilder MyFlatMutableBuilder::build_my_string ( )
```

Begins building a string member.

#### 9.330.4.14 build\_my\_string\_seq()

```
rti::flat::MutableSequenceBuilder< rti::flat::StringBuilder > MyFlatMutableBuilder::build_my_↔
string_seq ( )
```

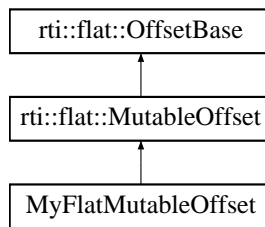
Begins building a sequence member of string elements.

## 9.331 MyFlatMutableOffset Class Reference

Represents the Offset to an arbitrary user-defined FlatData mutable IDL struct.

```
#include <Offset.hpp>
```

Inheritance diagram for MyFlatMutableOffset:



### Public Types

- typedef MyFlatMutableConstOffset **ConstOffset**  
*The equivalent read-only Offset type.*

### Public Member Functions

- **MyFlatMutableOffset** ()  
*Creates a null Offset.*
- int32\_t **my\_primitive** () const  
*Retrieves the value for a primitive member.*
- rti::flat::PrimitiveConstOffset< int32\_t > **my\_optional\_primitive** () const  
*Retrieves a const Offset to an optional primitive.*
- const rti::flat::PrimitiveArrayOffset< int32\_t, 10 > **my\_primitive\_array** () const  
*Retrieves a const Offset to a primitive array.*
- const rti::flat::PrimitiveSequenceOffset< int32\_t > **my\_primitive\_seq** () const  
*Retrieves a const Offset to a primitive sequence.*
- **MyFlatFinal::ConstOffset** **my\_final** () const  
*Retrieves a const Offset to a complex member.*
- rti::flat::FinalAlignedArrayOffset< MyFlatFinal::ConstOffset, 10 > **my\_final\_array** () const  
*Retrieves a const Offset to a complex array.*
- rti::flat::SequenceOffset< MyFlatFinal::ConstOffset > **my\_final\_seq** () const

- Retrieves a const Offset to a complex sequence.*

  - FlatMutableBar::ConstOffset **my\_mutable** () const
- Retrieves a const Offset to a complex member.*

  - **rti::flat::MutableArrayOffset**< FlatMutableBar::ConstOffset, 10 > **my\_mutable\_array** () const
- Retrieves a const Offset to a complex array.*

  - **rti::flat::SequenceOffset**< FlatMutableBar::ConstOffset > **my\_mutable\_seq** () const
- Retrieves a const Offset to a complex sequence.*

  - const **rti::flat::StringOffset** **my\_string** () const
- Retrieves a const Offset to a string.*

  - **rti::flat::SequenceOffset**< const **rti::flat::StringOffset** > **my\_string\_seq** () const
- Retrieves a const Offset to a sequence of strings.*

  - bool **my\_primitive** (int32\_t value)
- Sets the value of a primitive member.*

  - **rti::flat::PrimitiveArrayOffset**< int32\_t, 10 > **my\_primitive\_array** ()
- Retrieves a non-const Offset to a primitive array.*

  - **rti::flat::PrimitiveSequenceOffset**< int32\_t > **my\_primitive\_seq** ()
- Retrieves a non-const Offset to a primitive sequence.*

  - **MyFlatFinal::Offset** **my\_final** ()
- Retrieves a non-const Offset to a complex member.*

  - **rti::flat::FinalAlignedArrayOffset**< **MyFlatFinal::Offset**, 10 > **my\_final\_array** ()
- Retrieves a non-const Offset to a complex array.*

  - **rti::flat::SequenceOffset**< **MyFlatFinal::Offset** > **my\_final\_seq** ()
- Retrieves a non-const Offset to a complex sequence.*

  - FlatMutableBar::Offset **my\_mutable** ()
- Retrieves a non-const Offset to a complex member.*

  - **rti::flat::MutableArrayOffset**< FlatMutableBar::Offset, 10 > **my\_mutable\_array** ()
- Retrieves a non-const Offset to a complex array.*

  - **rti::flat::SequenceOffset**< FlatMutableBar::Offset > **my\_mutable\_seq** ()
- Retrieves a non-const Offset to a complex sequence.*

  - **rti::flat::StringOffset** **my\_string** ()
- Retrieves a non-const Offset to a string.*

  - **rti::flat::SequenceOffset**< **rti::flat::StringOffset** > **my\_string\_seq** ()
- Retrieves a non-const Offset to a sequence of strings.*

### 9.331.1 Detailed Description

Represents the Offset to an arbitrary user-defined FlatData mutable IDL struct.

This example type represents the Offset type that **rtiddsgen** would generate for **MyFlatMutable** (p. 562).

It provides accessors for each of its members. Accessors can return other Offsets or primitive values.

### 9.331.2 Member Typedef Documentation

### 9.331.2.1 ConstOffset

```
typedef MyFlatMutableConstOffset MyFlatMutableOffset::ConstOffset
```

The equivalent read-only Offset type.

Each Offset for a user type has an equivalent const Offset that doesn't allow modifying the underlying Sample.

## 9.331.3 Constructor & Destructor Documentation

### 9.331.3.1 MyFlatMutableOffset()

```
MyFlatMutableOffset::MyFlatMutableOffset ( ) [inline]
```

Creates a null Offset.

Postcondition

`is_null()` (p. 1857)

## 9.331.4 Member Function Documentation

### 9.331.4.1 my\_primitive() [1/2]

```
int32_t MyFlatMutableOffset::my_primitive ( ) const
```

Retrieves the value for a primitive member.

Returns

The value of the member or its default value if this member doesn't exist in this Sample.

### 9.331.4.2 my\_optional\_primitive()

```
rti::flat::PrimitiveConstOffset< int32_t > MyFlatMutableOffset::my_optional_primitive ( ) const
```

Retrieves a const Offset to an optional primitive.

Unlike the non-optional `my_primitive()` (p. 1759), which accesses the integer directly, for an optional primitive it is possible to check whether it exists or not. If it doesn't exist, the Offset this function returns will be null (`is_null()` (p. 1857)).

### 9.331.4.3 my\_primitive\_array() [1/2]

```
const rti::flat::PrimitiveArrayOffset< int32_t, 10 > MyFlatMutableOffset::my_primitive_array ( )  
const
```

Retrieves a const Offset to a primitive array.

### 9.331.4.4 my\_primitive\_seq() [1/2]

```
const rti::flat::PrimitiveSequenceOffset< int32_t > MyFlatMutableOffset::my_primitive_seq ( )  
const
```

Retrieves a const Offset to a primitive sequence.

### 9.331.4.5 my\_final() [1/2]

```
MyFlatFinal::ConstOffset MyFlatMutableOffset::my_final ( ) const
```

Retrieves a const Offset to a complex member.

### 9.331.4.6 my\_final\_array() [1/2]

```
rti::flat::FinalAlignedArrayOffset< MyFlatFinal::ConstOffset, 10 > MyFlatMutableOffset::my_↔  
final_array ( ) const
```

Retrieves a const Offset to a complex array.

### 9.331.4.7 my\_final\_seq() [1/2]

```
rti::flat::SequenceOffset< MyFlatFinal::ConstOffset > MyFlatMutableOffset::my_final_seq ( )  
const
```

Retrieves a const Offset to a complex sequence.

#### 9.331.4.8 my\_mutable() [1/2]

```
FlatMutableBar::ConstOffset MyFlatMutableOffset::my_mutable ( ) const
```

Retrieves a const Offset to a complex member.

FlatMutableBar is another arbitrary user-defined mutable FlatData type.

#### 9.331.4.9 my\_mutable\_array() [1/2]

```
rti::flat::MutableArrayOffset< FlatMutableBar::ConstOffset, 10 > MyFlatMutableOffset::my_↵  
mutable_array ( ) const
```

Retrieves a const Offset to a complex array.

#### 9.331.4.10 my\_mutable\_seq() [1/2]

```
rti::flat::SequenceOffset< FlatMutableBar::ConstOffset > MyFlatMutableOffset::my_mutable_seq ( )  
const
```

Retrieves a const Offset to a complex sequence.

#### 9.331.4.11 my\_string() [1/2]

```
const rti::flat::StringOffset MyFlatMutableOffset::my_string ( ) const
```

Retrieves a const Offset to a string.

#### 9.331.4.12 my\_string\_seq() [1/2]

```
rti::flat::SequenceOffset< const rti::flat::StringOffset > MyFlatMutableOffset::my_string_seq ( )  
const
```

Retrieves a const Offset to a sequence of strings.

#### 9.331.4.13 my\_primitive() [2/2]

```
bool MyFlatMutableOffset::my_primitive (
    int32_t value )
```

Sets the value of a primitive member.

#### 9.331.4.14 my\_primitive\_array() [2/2]

```
rti::flat::PrimitiveArrayOffset< int32_t, 10 > MyFlatMutableOffset::my_primitive_array ( )
```

Retrieves a non-const Offset to a primitive array.

#### 9.331.4.15 my\_primitive\_seq() [2/2]

```
rti::flat::PrimitiveSequenceOffset< int32_t > MyFlatMutableOffset::my_primitive_seq ( )
```

Retrieves a non-const Offset to a primitive sequence.

#### 9.331.4.16 my\_final() [2/2]

```
MyFlatFinal::Offset MyFlatMutableOffset::my_final ( )
```

Retrieves a non-const Offset to a complex member.

#### 9.331.4.17 my\_final\_array() [2/2]

```
rti::flat::FinalAlignedArrayOffset< MyFlatFinal::Offset, 10 > MyFlatMutableOffset::my_final_↔  
array ( )
```

Retrieves a non-const Offset to a complex array.



#### 9.331.4.18 my\_final\_seq() [2/2]

```
rti::flat::SequenceOffset< MyFlatFinal::Offset > MyFlatMutableOffset::my_final_seq ( )
```

Retrieves a non-const Offset to a complex sequence.

#### 9.331.4.19 my\_mutable() [2/2]

```
FlatMutableBar::Offset MyFlatMutableOffset::my_mutable ( )
```

Retrieves a non-const Offset to a complex member.

FlatMutableBar is another arbitrary user-defined mutable FlatData type.

#### 9.331.4.20 my\_mutable\_array() [2/2]

```
rti::flat::MutableArrayOffset< FlatMutableBar::Offset, 10 > MyFlatMutableOffset::my_mutable_↔  
array ( )
```

Retrieves a non-const Offset to a complex array.

#### 9.331.4.21 my\_mutable\_seq() [2/2]

```
rti::flat::SequenceOffset< FlatMutableBar::Offset > MyFlatMutableOffset::my_mutable_seq ( )
```

Retrieves a non-const Offset to a complex sequence.

#### 9.331.4.22 my\_string() [2/2]

```
rti::flat::StringOffset MyFlatMutableOffset::my_string ( )
```

Retrieves a non-const Offset to a string.

#### 9.331.4.23 my\_string\_seq() [2/2]

```
rti::flat::SequenceOffset< rti::flat::StringOffset > MyFlatMutableOffset::my_string_seq ( )
```

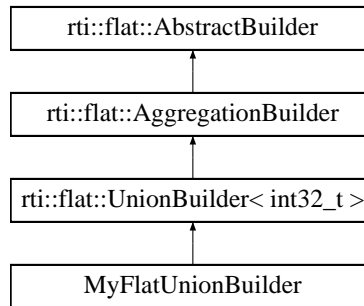
Retrieves a non-const Offset to a sequence of strings.

## 9.332 MyFlatUnionBuilder Class Reference

Represents the Builder for an arbitrary user-defined mutable IDL union.

```
#include <Builder.hpp>
```

Inheritance diagram for MyFlatUnionBuilder:



### Public Types

- typedef **MyFlatUnionOffset** **Offset**  
*The related offset type.*

### Public Member Functions

- **MyFlatUnionBuilder** ()  
*Creates an invalid Builder.*
- **Offset** **finish** ()  
*Finishes building a member.*
- **MyFlatUnion** \* **finish\_sample** ()  
*Finishes building a sample.*
- bool **add\_my\_primitive** (int32\_t value)  
*Adds a primitive member.*
- **MyFlatMutableBuilder** **build\_my\_mutable** (int32\_t discriminator=1)  
*Builds a mutable-struct member.*
- **MyFlatFinal::Offset** **add\_my\_final** ()  
*Adds a final-struct member.*

### Additional Inherited Members

#### 9.332.1 Detailed Description

Represents the Builder for an arbitrary user-defined mutable IDL union.

This example type represents the **Builder** (p. 558) type that **rtiddsgen** would generate for **MyFlatUnion** (p. 563) and allows creating a sample or a member of that type.

Union builders are similar to struct builders (see **MyFlatMutableBuilder** (p. 1750)), except that they only allow adding/building **one member**.

"Add" and "build" functions automatically set the discriminator value that in the IDL definition selects that member. If more than one discriminator value selects a member, the add/build function allows picking one.

## 9.332.2 Member Typedef Documentation

### 9.332.2.1 Offset

```
typedef MyFlatUnionOffset MyFlatUnionBuilder::Offset
```

The related offset type.

## 9.332.3 Constructor & Destructor Documentation

### 9.332.3.1 MyFlatUnionBuilder()

```
MyFlatUnionBuilder::MyFlatUnionBuilder ( ) [inline]
```

Creates an invalid Builder.

#### Postcondition

```
!is_valid()
```

#### Note

Top-level builders are created with `rti::flat::build_data()` (p. 560), and member builders are created with the corresponding `build_<member>` function.

## 9.332.4 Member Function Documentation

### 9.332.4.1 finish()

```
Offset MyFlatUnionBuilder::finish ( )
```

Finishes building a member.

#### See also

```
MyMutableBuilder::finish()
```

### 9.332.4.2 finish\_sample()

```
MyFlatUnion * MyFlatUnionBuilder::finish_sample ( )
```

Finishes building a sample.

See also

MyMutableBuilder::finish\_sample()

### 9.332.4.3 add\_my\_primitive()

```
bool MyFlatUnionBuilder::add_my_primitive (
    int32_t value )
```

Adds a primitive member.

This function automatically selects the discriminator 0, which corresponds to the member 'my\_primitive' (see **MyFlatUnion** (p. 563))

### 9.332.4.4 build\_my\_mutable()

```
MyFlatMutableBuilder MyFlatUnionBuilder::build_my_mutable (
    int32_t discriminator = 1 )
```

Builds a mutable-struct member.

Parameters

<i>discriminator</i>	Allows selecting one of the possible discriminator values for this member: 1 or 2. This argument is optional: if not specified it selects the first 'case' label in the IDL definition (1).
----------------------	---

Returns

The Builder to build this member

### 9.332.4.5 add\_my\_final()

```
MyFlatFinal::Offset MyFlatUnionBuilder::add_my_final ( )
```

Adds a final-struct member.

## Returns

The Offset to the member, which can be used to set its values.

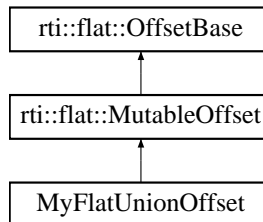
This function automatically selects the discriminator value 3, which corresponds to the member 'my\_final' (see [MyFlatUnion](#) (p. 563)).

## 9.333 MyFlatUnionOffset Class Reference

Represents the Offset to an arbitrary user-defined FlatData mutable IDL union.

```
#include <Offset.hpp>
```

Inheritance diagram for MyFlatUnionOffset:



### Public Types

- typedef MyFlatUnionConstOffset **ConstOffset**  
*The equivalent read-only Offset type.*

### Public Member Functions

- **MyFlatUnionOffset** ()  
*Creates a null Offset.*
- int32\_t **\_d** () const  
*Retrieves the union discriminator.*
- int32\_t **my\_primitive** () const  
*Retrieves the value for a primitive member.*
- **MyFlatMutable::ConstOffset my\_mutable** () const  
*Retrieves a const Offset to a complex member.*
- **MyFlatFinal::ConstOffset my\_final** () const  
*Retrieves a const Offset to a complex member.*
- bool **my\_primitive** (int32\_t value)  
*Sets the value for a primitive member.*
- **MyFlatMutable::Offset my\_mutable** ()  
*Retrieves a non-const Offset to a complex member.*
- **MyFlatFinal::Offset my\_final** ()  
*Retrieves a non-const Offset to a complex member.*

### 9.333.1 Detailed Description

Represents the Offset to an arbitrary user-defined FlatData mutable IDL union.

This example type represents the Offset type that `rtiddsgen` would generate for `MyFlatUnion` (p. 563).

It provides accessors for each of its members, plus the discriminator `_d()` (p. 1768). Accessors can return other Offsets or primitive values.

Given a union, only one member, the one identified by `_d()` (p. 1768), can exist at a time. The discriminator cannot be modified.

### 9.333.2 Member Typedef Documentation

#### 9.333.2.1 ConstOffset

```
typedef MyFlatUnionConstOffset MyFlatUnionOffset::ConstOffset
```

The equivalent read-only Offset type.

### 9.333.3 Constructor & Destructor Documentation

#### 9.333.3.1 MyFlatUnionOffset()

```
MyFlatUnionOffset::MyFlatUnionOffset ( ) [inline]
```

Creates a null Offset.

Postcondition

`is_null()` (p. 1857)

### 9.333.4 Member Function Documentation

#### 9.333.4.1 `_d()`

```
int32_t MyFlatUnionOffset::_d ( ) const
```

Retrieves the union discriminator.

##### Returns

The union discriminator, which identifies which field this union contains.

In this example:

- 0 selects `my_primitive()` (p. 1769)
- 1 and 2 select `my_mutable()` (p. 1770)
- 3 selects `my_final`

Any other discriminator value indicates that no member or an unknown member follows.

Note that the discriminator cannot be modified, since that would potentially change the size of this Sample by selecting a different member. The discriminator is selected during the building of a Sample (see `MyUnionBuilder`).

#### 9.333.4.2 `my_primitive()` [1/2]

```
int32_t MyFlatUnionOffset::my_primitive ( ) const
```

Retrieves the value for a primitive member.

##### Returns

The value of `my_primitive` if this member is selected by `_d()` (p. 1768) or its default value otherwise.

#### 9.333.4.3 `my_mutable()` [1/2]

```
MyFlatMutable::ConstOffset MyFlatUnionOffset::my_mutable ( ) const
```

Retrieves a const Offset to a complex member.

##### Returns

The Offset to the 'my\_mutable' member if selected by `_d()` (p. 1768), or a **null Offset** (p. 566) otherwise

#### 9.333.4.4 my\_final() [1/2]

```
MyFlatFinal::ConstOffset MyFlatUnionOffset::my_final ( ) const
```

Retrieves a const Offset to a complex member.

##### Returns

The Offset to the 'my\_final' member if selected by **\_d()** (p. 1768), or a **null Offset** (p. 566) otherwise

#### 9.333.4.5 my\_primitive() [2/2]

```
bool MyFlatUnionOffset::my_primitive (
    int32_t value )
```

Sets the value for a primitive member.

##### Precondition

**\_d()** (p. 1768) must select 'my\_primitive', otherwise this function returns false.

##### Returns

true if my\_primitive was set or false if the operation failed.

#### 9.333.4.6 my\_mutable() [2/2]

```
MyFlatMutable::Offset MyFlatUnionOffset::my_mutable ( )
```

Retrieves a non-const Offset to a complex member.

##### Returns

The Offset to the 'my\_mutable' member if selected by **\_d()** (p. 1768), or a **null Offset** (p. 566) otherwise

#### 9.333.4.7 my\_final() [2/2]

```
MyFlatFinal::Offset MyFlatUnionOffset::my_final ( )
```

Retrieves a non-const Offset to a complex member.

##### Returns

The Offset to the 'my\_final' member if selected by **\_d()** (p. 1768), or a **null Offset** (p. 566) otherwise



## 9.334 NDDS\_Config\_LibraryVersion\_t Struct Reference

The version of a single library shipped as part of an RTI Connex distribution.

### Public Attributes

- **DDS\_Long major**  
*The major version of a single RTI Connex library.*
- **DDS\_Long minor**  
*The minor version of a single RTI Connex library.*
- char **release**  
*The release letter of a single RTI Connex library.*
- **DDS\_Long build**  
*The build number of a single RTI Connex library.*

### 9.334.1 Detailed Description

The version of a single library shipped as part of an RTI Connex distribution.

RTI Connex is comprised of a number of separate libraries. Although RTI Connex as a whole has a version, the individual libraries each have their own versions as well. It may be necessary to check these individual library versions when seeking technical support.

### 9.334.2 Member Data Documentation

#### 9.334.2.1 major

```
DDS_Long NDDS_Config_LibraryVersion_t::major
```

The major version of a single RTI Connex library.

#### 9.334.2.2 minor

```
DDS_Long NDDS_Config_LibraryVersion_t::minor
```

The minor version of a single RTI Connex library.

### 9.334.2.3 release

```
char NDDS_Config_LibraryVersion_t::release
```

The release letter of a single RTI Connex library.

### 9.334.2.4 build

```
DDS_Long NDDS_Config_LibraryVersion_t::build
```

The build number of a single RTI Connex library.

## 9.335 NDDS\_Config\_LogMessage Struct Reference

Log message.

### Public Attributes

- const char \* **text**  
*Message text.*
- **NDDS\_Config\_LogLevel level**  
*Message level.*
- **DDS\_Boolean is\_security\_message**  
*Indicates if the message is a security-related message.*
- **DDS\_UnsignedLong message\_id**  
*A numeric code that identifies a specific log message.*
- struct **DDS\_Duration\_t timestamp**  
*The time when the log message was printed.*
- **NDDS\_Config\_LogFacility facility**  
*The Facility associated with the log message. See [NDDS\\_Config\\_LogFacility](#) (p. 528).*

### 9.335.1 Detailed Description

Log message.

### 9.335.2 Member Data Documentation

### 9.335.2.1 text

```
const char* NDDS_Config_LogMessage::text
```

Message text.

### 9.335.2.2 level

```
NDDS_Config_LogLevel NDDS_Config_LogMessage::level
```

Message level.

### 9.335.2.3 is\_security\_message

```
DDS_Boolean NDDS_Config_LogMessage::is_security_message
```

Indicates if the message is a security-related message.

A "security-related message" is a log message that meets any of the following:

- A security event logged with the RTI Security Plugins Logging Plugin.
- Any regular message coming from the RTI Security Plugins.
- RTI TLS Support log messages related to OpenSSL (e.g., SSL handshake failures or certificate validation failures).

### 9.335.2.4 message\_id

```
DDS_UnsignedLong NDDS_Config_LogMessage::message_id
```

A numeric code that identifies a specific log message.

Two log messages that have the same `message_id` will have a similar structure. E.g. "ERROR: Failed to get Data↔WriterQos" and "ERROR: Failed to get TopicName". In this case, the `message_id` is associated to the get failure.

### 9.335.2.5 timestamp

```
struct DDS_Duration_t NDDS_Config_LogMessage::timestamp
```

The time when the log message was printed.

### 9.335.2.6 facility

```
NDDS_Config_LogFacility NDDS_Config_LogMessage::facility
```

The Facility associated with the log message. See **NDDS\_Config\_LogFacility** (p. 528).

## 9.336 NDDS\_Transport\_Address\_t Struct Reference

Addresses are stored individually as network-ordered bytes.

### Public Attributes

- unsigned char **network\_ordered\_value** [NDDS\_TRANSPORT\_ADDRESS\_LENGTH]

### 9.336.1 Detailed Description

Addresses are stored individually as network-ordered bytes.

RTI Connex addresses are numerically stored in a transport independent manner. RTI Connex uses a IPv6-compatible format, which means that the data structure to hold an **NDDS\_Transport\_Address\_t** (p. 1774) is the same size as a data structure needed to hold an IPv6 address.

In addition, the functions provided to translate a string representation of an RTI Connex address to a value assumes that the string presentation follows the IPv6 address presentation as specified in RFC 2373.

An **NDDS\_Transport\_Address\_t** (p. 1774) always stores the address in network-byte order (which is Big Endian).

For example, IPv4 multicast address of 225.0.0.0 is represented by

```
{{0,0,0,0, 0,0,0,0, 0,0,0,0, 0xE1,0,0,0}}
```

 regardless of endianness,

where 0xE1 is the 13th byte of the structure (`network_ordered_value[12]`).

### 9.336.2 Member Data Documentation

### 9.336.2.1 network\_ordered\_value

```
unsigned char NDDS_Transport_Address_t::network_ordered_value[NDDS_TRANSPORT_ADDRESS_LENGTH]
```

network-byte ordered (i.e., bit 0 is the most significant bit and bit 128 is the least significant bit).

## 9.337 NDDS\_Transport\_Interface\_t Struct Reference

Storage for the description of a network interface used by a Transport Plugin.

### Public Attributes

- **NDDS\_Transport\_ClassId\_t transport\_classid**  
*The transport classid of the interface.*
- **NDDS\_Transport\_Address\_t address**  
*An unicast address that uniquely identifies this interface in the network specified by the transport class.*
- **NDDS\_Transport\_Interface\_Status\_t status**  
*The state of the interface.*
- **RTI\_UINT16 rank**  
*Rank of the interface. Used when allow\_interfaces\_list Qos is set. A rank value will be assing to each of the interfaces that match the allow\_interfaces\_list filter allowing an endpoint to prioritace some interfaces upon others.*

### 9.337.1 Detailed Description

Storage for the description of a network interface used by a Transport Plugin.

### 9.337.2 Member Data Documentation

#### 9.337.2.1 transport\_classid

```
NDDS_Transport_ClassId_t NDDS_Transport_Interface_t::transport_classid
```

The transport classid of the interface.

### 9.337.2.2 address

`NDDS_Transport_Address_t` `NDDS_Transport_Interface_t::address`

An unicast address that uniquely identifies this interface in the network specified by the transport class.

### 9.337.2.3 status

`NDDS_Transport_Interface_Status_t` `NDDS_Transport_Interface_t::status`

The state of the interface.

### 9.337.2.4 rank

`RTI_UINT16` `NDDS_Transport_Interface_t::rank`

Rank of the interface. Used when `allow_interfaces_list` Qos is set. A rank value will be assigned to each of the interfaces that match the `allow_interfaces_list` filter allowing an endpoint to prioritize some interfaces upon others.

## 9.338 NDDS\_Transport\_Property\_t Struct Reference

Base configuration structure that must be inherited by derived Transport Plugin classes.

### Public Attributes

- **NDDS\_Transport\_ClassId\_t classid**  
*The Transport-Plugin Class ID.*
- **RTI\_INT32 address\_bit\_count**  
*Number of bits in a 16-byte address that are used by the transport. Should be between -128 and 128.*
- **RTI\_INT32 properties\_bitmap**  
*A bitmap that defines various properties of the transport to the RTI Connex core.*
- **RTI\_INT32 gather\_send\_buffer\_count\_max**  
*Specifies the maximum number of buffers that RTI Connex can pass to the `send()` method of a transport plugin.*
- **RTI\_INT32 message\_size\_max**  
*The maximum size of an RTPS message in bytes that can be sent or received by the transport plugin.*
- **char \*\* allow\_interfaces\_list**  
*A list of strings, each identifying a range of interface addresses or an interface name. If the list is non-empty (i.e., `allow_interfaces_list_length > 0`), allow the use of only these interfaces. If the list is empty, allow the use of all interfaces.*
- **RTI\_INT32 allow\_interfaces\_list\_length**

*Number of elements in the `allow_interfaces_list`.*

- char \*\* **deny\_interfaces\_list**

*A list of strings, each identifying a range of interface addresses or an interface name. If the list is non-empty (i.e., `deny_interfaces_list_length > 0`), deny the use of these interfaces.*

- RTI\_INT32 **deny\_interfaces\_list\_length**

*Number of elements in the `deny_interfaces_list`.*

- char \*\* **allow\_multicast\_interfaces\_list**

*A list of strings, each identifying a range of interface addresses or an interface name. If the list is non-empty (i.e., `allow_multicast_interfaces_list_length > 0`), allow the use of multicast only on these interfaces; otherwise allow the use of all the allowed interfaces.*

- RTI\_INT32 **allow\_multicast\_interfaces\_list\_length**

*Number of elements in the `allow_multicast_interfaces_list`.*

- char \*\* **deny\_multicast\_interfaces\_list**

*A list of strings, each identifying a range of interface addresses or an interface name. If the list is non-empty (i.e., `deny_multicast_interfaces_list_length > 0`), deny the use of those interfaces for multicast.*

- RTI\_INT32 **deny\_multicast\_interfaces\_list\_length**

*Number of elements in `deny_multicast_interfaces_list`.*

- struct **NDDS\_Transport\_UUID** **transport\_uuid**

*Univocally identifies a transport plugin.*

- char \* **thread\_name\_prefix**

*Prefix used to name the transport threads.*

- RTI\_INT32 **max\_interface\_count**

*Maximum number of addresses from the `allow_interfaces_list` that will be announced.*

### 9.338.1 Detailed Description

Base configuration structure that must be inherited by derived Transport Plugin classes.

This structure contains properties that must be set before registration of any transport plugin with RTI Connex. The RTI Connex core will configure itself to use the plugin based on the properties set within this structure.

A transport plugin may extend from this structure to add transport-specific properties.

In the C-language, this can be done by creating a custom plugin property structure whose first member is a **NDDS\_Transport\_Property\_t** (p. 1776) structure.

For example,

```
struct MyTransport_Plugin_Property_t {
    NDDS_Transport_Property_t base_properties;
    int myIntProperty;
    < etc >;
};
```

**WARNING:** The transport properties of an instance of a Transport Plugin should be considered immutable after the plugin has been created. That means the values contained in the property structure stored as a part of the transport plugin itself should not be changed. If those values are modified, the results are undefined.

### 9.338.2 Member Data Documentation

### 9.338.2.1 classid

`NDDS_Transport_ClassId_t` `NDDS_Transport_Property_t::classid`

The Transport-Plugin Class ID.

The transport plugin sets the value for this field.

Class IDs below **NDDS\_TRANSPORT\_CLASSID\_RESERVED\_RANGE** (p. 251) are reserved for RTI (Real-Time Innovations) usage.

User-defined transports should set an ID above this range.

The ID should be globally unique for each Transport-Plugin class. Transport-Plugin implementors should ensure that the class IDs do not conflict with each other amongst different Transport-Plugin classes.

#### Invariant

The `classid` is invariant for the lifecycle of a transport plugin.

### 9.338.2.2 address\_bit\_count

`RTI_INT32` `NDDS_Transport_Property_t::address_bit_count`

Number of bits in a 16-byte address that are used by the transport. Should be between -128 and 128.

The transport plugin sets the value for this field.

A transport plugin should define the range of addresses that are meaningful to the plugin. It does this by setting the number of bits of an IPv6 address that will be used to designate an address in the network to which the transport plugin is connected. The sign of this field determines whether the count of bits starts on the most significant bit (negative sign) or on the least significant bit (positive sign).

For example, for an address range of 0-255, the `address_bit_count` should be set to 8. For the range of addresses used by IPv4 (4 bytes), it should be set to 32.

#### See also

**Transport Class Attributes** (p. 169)



### 9.338.2.3 properties\_bitmap

```
RTI_INT32 NDDS_Transport_Property_t::properties_bitmap
```

A bitmap that defines various properties of the transport to the RTI Connex core.

Currently, the only property supported is whether or not the transport plugin will always loan a buffer when RTI Connex tries to receive a message using the plugin. This is in support of a zero-copy interface.

See also

**NDDS\_TRANSPORT\_PROPERTY\_BIT\_BUFFER\_ALWAYS\_LOANED** (p. 251)

### 9.338.2.4 gather\_send\_buffer\_count\_max

```
RTI_INT32 NDDS_Transport_Property_t::gather_send_buffer_count_max
```

Specifies the maximum number of buffers that RTI Connex can pass to the `send()` method of a transport plugin.

The transport plugin `send()` API supports a gather-send concept, where the `send()` call can take several discontinuous buffers, assemble and send them in a single message. This enables RTI Connex to send a message from parts obtained from different sources without first having to copy the parts into a single contiguous buffer.

However, most transports that support a gather-send concept have an upper limit on the number of buffers that can be gathered and sent. Setting this value will prevent RTI Connex from trying to gather too many buffers into a send call for the transport plugin.

RTI Connex requires all transport-plugin implementations to support a gather-send of at least a minimum number of buffers. This minimum number is defined to be **NDDS\_TRANSPORT\_PROPERTY\_GATHER\_SEND\_BUFFER\_COUNT\_MIN** (p. 251).

If the underlying transport does not support a gather-send concept directly, then the transport plugin itself must copy the separate buffers passed into the `send()` call into a single buffer for sending or otherwise send each buffer individually. However this is done by the transport plugin, the `receive_rEA()` call of the destination application should assemble, if needed, all of the pieces of the message into a single buffer before the message is passed to the RTI Connex layer.

### 9.338.2.5 message\_size\_max

```
RTI_INT32 NDDS_Transport_Property_t::message_size_max
```

The maximum size of an RTPS message in bytes that can be sent or received by the transport plugin.

If the maximum size of a message that can be sent by a transport plugin is user configurable, the transport plugin should provide a default value for this property. In any case, this value must be set before the transport plugin is registered, so that RTI Connex can properly use the plugin.

For information about the default value for different transports, see the `Core Libraries User's Manual`.

### 9.338.2.6 allow\_interfaces\_list

```
char** NDDS_Transport_Property_t::allow_interfaces_list
```

A list of strings, each identifying a range of interface addresses or an interface name. If the list is non-empty (i.e., `allow_interfaces_list_length > 0`), allow the use of only these interfaces. If the list is empty, allow the use of all interfaces.

The "white" list restricts *reception* to a particular set of interfaces for unicast UDP.

For UDPv4 and UDPv6 transports, the resulting list also controls the interfaces over which the DomainParticipant will send multicast traffic to the remote DomainParticipants (if multicast is supported on the platform).

*Note:* This property does not affect the interfaces that the transport uses to send unicast data from that DomainParticipant. That decision is made by the OS based on the destination address.

It is up to the transport plugin to interpret the list of strings passed in.

For example, the following are acceptable strings in IPv4 format: 192.168.1.1, 192.168.1.\*, 192.168.\*, 192.\*, ether0

The left-to-right order of this list matters if you are using the `max_interface_count` to limit the allowable interfaces further. See `max_interface_count`.

This property is not interpreted by the RTI Connext core; it is provided merely as a convenient and standardized way to specify the interfaces for the benefit of the transport plugin developer and user.

The caller (user) must manage the memory of the list. The memory may be freed after the **DDSDomainParticipant** (p. 1351) is deleted.

**[default]** empty list that represents all available interfaces.

See also

**NDDS\_Transport\_Property\_t::max\_interface\_count** (p. 1783)

### 9.338.2.7 allow\_interfaces\_list\_length

```
RTI_INT32 NDDS_Transport_Property_t::allow_interfaces_list_length
```

Number of elements in the `allow_interfaces_list`.

By default, `allow_interfaces_list_length = 0`, i.e. an empty list.

This property is not interpreted by the RTI Connext core; it is provided merely as a convenient and standardized way to specify the interfaces for the benefit of the transport plugin developer and user.

**[default]** 0

### 9.338.2.8 deny\_interfaces\_list

```
char** NDDS_Transport_Property_t::deny_interfaces_list
```

A list of strings, each identifying a range of interface addresses or an interface name. If the list is non-empty (i.e., `deny_interfaces_list_length > 0`), deny the use of these interfaces.

This "black" list is applied *after* the `allow_interfaces_list` and filters out the interfaces that should not be used.

The resulting list restricts *reception* to a particular set of interfaces for unicast UDP.

For UDPv4 and UDPv6 transports, the resulting list also controls the interfaces over which the DomainParticipant will send multicast traffic to the remote DomainParticipants (if multicast is supported on the platform).

*Note:* This property does not affect the interfaces that the transport uses to send unicast data from that DomainParticipant. That decision is made by the OS based on the destination address.

It is up to the transport plugin to interpret the list of strings passed in.

For example, the following are acceptable strings in IPv4 format: 192.168.1.1, 192.168.1.\*, 192.168.\*, 192.\*, ether0

This property is not interpreted by the RTI Connext core; it is provided merely as a convenient and standardized way to specify the interfaces for the benefit of the transport plugin developer and user.

The caller (user) must manage the memory of the list. The memory may be freed after the **DDSDomainParticipant** (p. 1351) is deleted.

**[default]** empty list that represents no denied interfaces.

### 9.338.2.9 deny\_interfaces\_list\_length

```
RTI_INT32 NDDS_Transport_Property_t::deny_interfaces_list_length
```

Number of elements in the `deny_interfaces_list`.

By default, `deny_interfaces_list_length = 0` (i.e., an empty list).

This property is not interpreted by the RTI Connext core; it is provided merely as a convenient and standardized way to specify the interfaces for the benefit of the transport plugin developer and user.

**[default]** 0

### 9.338.2.10 allow\_multicast\_interfaces\_list

```
char** NDDS_Transport_Property_t::allow_multicast_interfaces_list
```

A list of strings, each identifying a range of interface addresses or an interface name. If the list is non-empty (i.e., `allow_multicast_interfaces_list_length > 0`), allow the use of multicast only on these interfaces; otherwise allow the use of all the allowed interfaces.

This "white" list sub-selects from the allowed interfaces obtained *after* applying the `allow_interfaces_list` "white" list *and* the `deny_interfaces_list` "black" list.

After `allow_multicast_interfaces_list`, the `deny_multicast_interfaces_list` is applied. Multicast output will be sent and may be received over the interfaces in the resulting list.

If this list is empty, all the allowed interfaces will be potentially used for multicast. It is up to the transport plugin to interpret the list of strings passed in.

This property is not interpreted by the RTI Connext core; it is provided merely as a convenient and standardized way to specify the interfaces for the benefit of the transport plugin developer and user.

The caller (user) must manage the memory of the list. The memory may be freed after the **DDSDomainParticipant** (p. 1351) is deleted.

**[default]** empty list that represents all available interfaces.

### 9.338.2.11 allow\_multicast\_interfaces\_list\_length

```
RTI_INT32 NDDS_Transport_Property_t::allow_multicast_interfaces_list_length
```

Number of elements in the `allow_multicast_interfaces_list`.

By default, `allow_multicast_interfaces_list_length = 0` (i.e., an empty list).

This property is not interpreted by the RTI Connext core; it is provided merely as a convenient and standardized way to specify the interfaces for the benefit of the transport plugin developer and user.

**[default]** 0

### 9.338.2.12 deny\_multicast\_interfaces\_list

```
char** NDDS_Transport_Property_t::deny_multicast_interfaces_list
```

A list of strings, each identifying a range of interface addresses or an interface name. If the list is non-empty (i.e., `deny_multicast_interfaces_list_length > 0`), deny the use of those interfaces for multicast.

This "black" list is applied after `allow_multicast_interfaces_list` and filters out interfaces that should not be used for multicast.

Multicast output will be sent and may be received over the interfaces in the resulting list.

It is up to the transport plugin to interpret the list of strings passed in.

This property is not interpreted by the RTI Connext core; it is provided merely as a convenient and standardized way to specify the interfaces for the benefit of the transport plugin developer and user.

The caller (user) must manage the memory of the list. The memory may be freed after the **DDSDomainParticipant** (p. 1351) is deleted.

**[default]** empty list that represents no denied interfaces.

### 9.338.2.13 deny\_multicast\_interfaces\_list\_length

```
RTI_INT32 NDDS_Transport_Property_t::deny_multicast_interfaces_list_length
```

Number of elements in `deny_multicast_interfaces_list`.

By default, `deny_multicast_interfaces_list_length = 0` (i.e., an empty list).

This property is not interpreted by the RTI Connex core; it is provided merely as a convenient and standardized way to specify the interfaces for the benefit of the transport plugin developer and user.

**[default]** 0

### 9.338.2.14 transport\_uuid

```
struct NDDS_Transport_UUID NDDS_Transport_Property_t::transport_uuid
```

Univocally identifies a transport plugin.

It represents the prefix of the participant GUID.

### 9.338.2.15 thread\_name\_prefix

```
char* NDDS_Transport_Property_t::thread_name_prefix
```

Prefix used to name the transport threads.

This field is optional.

The maximum size of this string is 8 characters.

If "thread\_name\_prefix" is not set by the user, RTI Connex creates the following prefix: 'r' + 'Tr' + participant identifier + '\0'.

Where 'r' indicates this is a thread from RTI, 'Tr' indicates the thread is related to a transport, and participant identifier contains 5 characters as follows:

If `participant_name` is set: The participant identifier will be the first 3 characters and the last 2 characters of the `participant_name`.

If `participant_name` is not set, then the identifier is computed as `domain_id` (3 characters) followed by `participant_id` (2 characters).

If `participant_name` is not set and the `participant_id` is set to -1 (default value), then the participant identifier is computed as the last 5 digits of the `rtps_instance_id` in the participant GUID.

### 9.338.2.16 max\_interface\_count

RTI\_INT32 NDDS\_Transport\_Property\_t::max\_interface\_count

Maximum number of addresses from the `allow_interfaces_list` that will be announced.

By default, `max_interface_count` = `LENGTH_UNLIMITED`: all the interfaces are announced.

This feature is useful if you want to control the network interfaces on which your DomainParticipants receive data. For example, if you have one wired and one wireless interface both up and running, and `max_interface_count` is set to 1, the DomainParticipant will receive data over the interface you list first in the `allow_interfaces_list` -for example, the wired one.

RTI Connex selects the preferred interface(s) by iterating over the list of allowed interfaces until the first `max_↔ interfaces_count` of active interfaces encountered are announced. The order of iteration is left to right as specified in the `allow_interfaces_list` setting.

This setting applies only if the `allow_interfaces_list` is not empty.

The `max_interface_count` setting does not consider end-to-end connectivity to select interfaces. The decision is based purely on whether interfaces are up or down in a node. Therefore, this feature is not intended to be used in the following scenarios:

- A DomainParticipant is not reachable by other DomainParticipants in all the interfaces in the `allow_↔ interfaces_list`. This could occur if the DomainParticipant is in different subnets, and some of these subnets cannot be reached by other DomainParticipants.
- End-to-end connectivity issues lead to situations in which the interfaces selected after applying `max_↔ interface_count` cannot be reached by other DomainParticipants.

For UDPv4 and UDPv6 transports, this feature also affects multicast traffic by limiting the interfaces over which a DomainParticipant sends multicast traffic. The `(allow/deny)_multicast_interfaces_list` applies to the interfaces selected by using the `max_interfaces_count` property.

Note: If a pattern string in the `allow_interfaces_list` matches multiple interface addresses, and `max_↔ interface_count` is set to a finite value, the order for the matching allowed interfaces is decided based on the order in which the operating system provides these interfaces.

**[default]** `LENGTH_UNLIMITED`

See also

**NDDS\_Transport\_Property\_t::allow\_interfaces\_list** (p. 1779)

## 9.339 NDDS\_Transport\_Shmem\_Property\_t Struct Reference

Subclass of **NDDS\_Transport\_Property\_t** (p. 1776) allowing specification of parameters that are specific to the shared-memory transport.

## Public Attributes

- struct **NDDS\_Transport\_Property\_t** **parent**  
*Generic properties of all transport plugins.*
- RTI\_INT32 **received\_message\_count\_max**  
*Number of messages that can be buffered in the receive queue.*
- RTI\_INT32 **receive\_buffer\_size**  
*The total number of bytes that can be buffered in the receive queue.*
- RTIBool **enable\_udp\_debugging**  
*Enables UDP debugging when using shared memory.*
- **NDDS\_Transport\_Address\_t** **udp\_debugging\_address**  
*IP address to which shared memory traffic will be published if `NDDS_Transport_Shmem_Property_t::enable_udp_debugging` (p. 1786) is set to '1'.*
- **NDDS\_Transport\_Port\_t** **udp\_debugging\_port**  
*Port to which shared memory traffic will be published if `NDDS_Transport_Shmem_Property_t::enable_udp_debugging` (p. 1786) is set to '1'.*

### 9.339.1 Detailed Description

Subclass of **NDDS\_Transport\_Property\_t** (p. 1776) allowing specification of parameters that are specific to the shared-memory transport.

See also

**NDDSTransportSupport::set\_builtin\_transport\_property()** (p. 1838)

### 9.339.2 Member Data Documentation

#### 9.339.2.1 parent

```
struct NDDS_Transport_Property_t NDDS_Transport_Shmem_Property_t::parent
```

Generic properties of all transport plugins.

#### 9.339.2.2 received\_message\_count\_max

```
RTI_INT32 NDDS_Transport_Shmem_Property_t::received_message_count_max
```

Number of messages that can be buffered in the receive queue.

This does not guarantee that the Transport-Plugin will actually be able to buffer `received_message_count_max` messages of the maximum size set in **NDDS\_Transport\_Property\_t::message\_size\_max** (p. 1779). The total number of bytes that can be buffered for a transport plug-in is actually controlled by `receive_buffer_size`.

See also

**NDDS\_Transport\_Property\_t** (p. 1776), **NDDS\_TRANSPORT\_SHMEM\_RECEIVED\_MESSAGE\_COUNT\_MAX\_DEFAULT** (p. 265)

### 9.339.2.3 receive\_buffer\_size

RTI\_INT32 NDDS\_Transport\_Shmem\_Property\_t::receive\_buffer\_size

The total number of bytes that can be buffered in the receive queue.

This number controls how much memory is allocated by the plugin for the receive queue. The actual number of bytes allocated is:

```
size = receive_buffer_size + message_size_max +
      received_message_count_max * fixedOverhead
```

where `fixedOverhead` is some small number of bytes used by the queue data structure. The following rules are noted:

- `receive_buffer_size < message_size_max * received_message_count_max`, then the transport plugin will not be able to store `received_message_count_max` messages of size `message_size_max`.
- `receive_buffer_size > message_size_max * received_message_count_max`, then there will be memory allocated that cannot be used by the plugin and thus wasted.

To optimize memory usage, the user is allowed to specify a size for the receive queue to be less than that required to hold the maximum number of messages which are all of the maximum size.

In most situations, the average message size may be far less than the maximum message size. So for example, if the maximum message size is 64 K bytes, and the user configures the plugin to buffer at least 10 messages, then 640 K bytes of memory would be needed if all messages were 64 K bytes. Should this be desired, then `receive_buffer_size` should be set to 640 K bytes.

However, if the average message size is only 10 K bytes, then the user could set the `receive_buffer_size` to 100 K bytes. This allows the user to optimize the memory usage of the plugin for the average case and yet allow the plugin to handle the extreme case.

**NOTE**, the queue will always be able to hold 1 message of `message_size_max` bytes, no matter what the value of `receive_buffer_size` is.

See also

**NDDS\_TRANSPORT\_SHMEM\_RECEIVE\_BUFFER\_SIZE\_DEFAULT** (p. 265)

### 9.339.2.4 enable\_udp\_debugging

RTIBool NDDS\_Transport\_Shmem\_Property\_t::enable\_udp\_debugging

Enables UDP debugging when using shared memory.

If set to '1', all shared memory traffic will be published to `NDDS_Transport_Shmem_Property_t::udp_debugging_address` (p. 1786) :: `NDDS_Transport_Shmem_Property_t::udp_debugging_port` (p. 1787).

[default] 0



### 9.339.2.5 udp\_debugging\_address

`NDDS_Transport_Address_t` `NDDS_Transport_Shmem_Property_t::udp_debugging_address`

IP address to which shared memory traffic will be published if `NDDS_Transport_Shmem_Property_t::enable_udp_↔_debugging` (p. 1786) is set to '1'.

[default] 239.255.1.2

### 9.339.2.6 udp\_debugging\_port

`NDDS_Transport_Port_t` `NDDS_Transport_Shmem_Property_t::udp_debugging_port`

Port to which shared memory traffic will be published if `NDDS_Transport_Shmem_Property_t::enable_udp_↔_debugging` (p. 1786) is set to '1'.

[default] 7399

## 9.340 NDDS\_Transport\_UDP\_WAN\_CommPortsMappingInfo Struct Reference

Type for storing UDP WAN communication ports.

### Public Attributes

- `NDDS_Transport_Port_t` `rtps_port`  
*RTPS port.*
- `NDDS_Transport_UDP_Port` `host_port`  
*Host port.*
- `NDDS_Transport_UDP_Port` `public_port`  
*Public port.*

### 9.340.1 Detailed Description

Type for storing UDP WAN communication ports.

### 9.340.2 Member Data Documentation

### 9.340.2.1 rtps\_port

`NDDS_Transport_Port_t NDDS_Transport_UDP_WAN_CommPortsMappingInfo::rtps_port`

RTPS port.

### 9.340.2.2 host\_port

`NDDS_Transport_UDP_Port NDDS_Transport_UDP_WAN_CommPortsMappingInfo::host_port`

Host port.

### 9.340.2.3 public\_port

`NDDS_Transport_UDP_Port NDDS_Transport_UDP_WAN_CommPortsMappingInfo::public_port`

Public port.

## 9.341 NDDS\_Transport\_UDPv4\_Property\_t Struct Reference

Configurable IPv4/UDP Transport-Plugin properties.

### Public Attributes

- struct **NDDS\_Transport\_Property\_t parent**  
*Generic properties of all transport plugins.*
- RTI\_INT32 **send\_socket\_buffer\_size**  
*Size in bytes of the send buffer of a socket used for sending.*
- RTI\_INT32 **recv\_socket\_buffer\_size**  
*Size in bytes of the receive buffer of a socket used for receiving.*
- RTI\_INT32 **unicast\_enabled**  
*Allows the transport plugin to use unicast for sending and receiving.*
- RTI\_INT32 **multicast\_enabled**  
*Allows the transport plugin to use multicast for sending and receiving.*
- RTI\_INT32 **multicast\_ttl**  
*Value for the time-to-live parameter for all multicast sends using this plugin.*
- RTI\_INT32 **multicast\_loopback\_disabled**  
*Prevents the transport plugin from putting multicast packets onto the loopback interface.*
- RTI\_INT32 **ignore\_loopback\_interface**  
*Prevents the transport plugin from using the IP loopback interface.*

- RTI\_INT32 **ignore\_nonup\_interfaces**  
*[DEPRECATED] Prevents the transport plugin from using a network interface that is not reported as UP by the operating system.*
- RTI\_INT32 **ignore\_nonrunning\_interfaces**  
*Prevents the transport plugin from using a network interface that is not reported as RUNNING by the operating system.*
- RTI\_INT32 **no\_zero\_copy**  
*[DEPRECATED] Prevents the transport plugin from doing a zero copy.*
- RTI\_INT32 **send\_blocking**  
*Control blocking behavior of send sockets. CHANGING THIS FROM THE DEFAULT CAN CAUSE SIGNIFICANT PERFORMANCE PROBLEMS.*
- RTI\_INT32 **use\_checksum**  
*Configures whether to send UDP checksum.*
- RTI\_UINT32 **transport\_priority\_mask**  
*Set mask for use of transport priority field.*
- RTI\_INT32 **transport\_priority\_mapping\_low**  
*Set low value of output range to IPv4 TOS.*
- RTI\_INT32 **transport\_priority\_mapping\_high**  
*Set high value of output range to IPv4 TOS.*
- RTI\_INT32 **send\_ping**  
*Configures whether to send PING messages.*
- RTI\_INT32 **force\_interface\_poll\_detection**  
*Forces the interface tracker to use a polling mechanism to detect changes on the UDPv4 interfaces.*
- RTI\_UINT32 **interface\_poll\_period**  
*Specifies the period in milliseconds to query for changes in the state of all the interfaces.*
- RTI\_INT32 **reuse\_multicast\_receive\_resource**  
*Controls whether or not to reuse multicast receive resources.*
- RTI\_INT32 **protocol\_overhead\_max**  
*Maximum size in bytes of protocol overhead, including headers.*
- RTI\_INT32 **disable\_interface\_tracking**  
*Disables detection of network interface changes.*
- RTI\_UINT32 **join\_multicast\_group\_timeout**  
*[Windows only] Defines how much time (milliseconds) to wait to join a multicast group address when a new interface is detected.*
- char \* **public\_address**  
*Public IP address associated with the transport instantiation.*
- RTI\_INT32 **port\_offset**  
*Port offset to allow multiple instances of UDPv4 transports in the same **DDSDomainParticipant** (p. 1351).*

### 9.341.1 Detailed Description

Configurable IPv4/UDP Transport-Plugin properties.

You can modify the properties in this structure to configure the plugin. However, you must set the properties before the plugin is instantiated.

See also

**NDDSTransportSupport::set\_builtin\_transport\_property()** (p. 1838)

**NDDS\_Transport\_UDPv4\_new** (p. 274)

## 9.341.2 Member Data Documentation

### 9.341.2.1 parent

```
struct NDDS_Transport_Property_t NDDS_Transport_UDPv4_Property_t::parent
```

Generic properties of all transport plugins.

### 9.341.2.2 send\_socket\_buffer\_size

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::send_socket_buffer_size
```

Size in bytes of the send buffer of a socket used for sending.

On most operating systems, `setsockopt ()` will be called to set the `SENDBUF` to the value of this parameter.

This value must be greater than or equal to `NDDS_Transport_Property_t::message_size_max` (p. 1779). The maximum value is operating system-dependent.

By default, it will be set to `NDDS_TRANSPORT_UDPv4_SEND_SOCKET_BUFFER_SIZE_DEFAULT` (p. 272).

If you configure this parameter to be `NDDS_TRANSPORT_UDPv4_SOCKET_BUFFER_SIZE_OS_DEFAULT` (p. 271), then `setsockopt()` (or equivalent) will not be called to size the send buffer of the socket. The transport will use the OS default.

### 9.341.2.3 recv\_socket\_buffer\_size

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::recv_socket_buffer_size
```

Size in bytes of the receive buffer of a socket used for receiving.

On most operating systems, `setsockopt ()` will be called to set the `RECVBUF` to the value of this parameter.

This value must be greater than or equal to `NDDS_Transport_Property_t::message_size_max` (p. 1779). The maximum value is operating system-dependent.

By default, it will be set to `NDDS_TRANSPORT_UDPv4_RECV_SOCKET_BUFFER_SIZE_DEFAULT` (p. 272).

If you configure this parameter to be `NDDS_TRANSPORT_UDPv4_SOCKET_BUFFER_SIZE_OS_DEFAULT` (p. 271), then `setsockopt()` (or equivalent) will not be called to size the receive buffer of the socket. The transport will use the OS default.

### 9.341.2.4 unicast\_enabled

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::unicast_enabled
```

Allows the transport plugin to use unicast for sending and receiving.

This value turns unicast UDP on (if set to 1) or off (if set to 0) for this plugin. By default, it will be turned on (1). Also by default, the plugin will use all the allowed network interfaces that it finds up and running when the plugin is instantiated.

### 9.341.2.5 multicast\_enabled

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::multicast_enabled
```

Allows the transport plugin to use multicast for sending and receiving.

This value turns multicast UDP on (if set to 1) or off (if set to 0) for this plugin. By default, it will be turned on (1) for those platforms that support multicast. Also by default, the plugin will use all the network interfaces allowed for multicast that it finds up and running when the plugin is instantiated.

### 9.341.2.6 multicast\_ttl

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::multicast_ttl
```

Value for the time-to-live parameter for all multicast sends using this plugin.

This value is used to set the TTL of multicast packets sent by this transport plugin.

**[default]** 1

See also

**NDDS\_TRANSPORT\_UDPv4\_MULTICAST\_TTL\_DEFAULT** (p. 272)

### 9.341.2.7 multicast\_loopback\_disabled

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::multicast_loopback_disabled
```

Prevents the transport plugin from putting multicast packets onto the loopback interface.

If multicast loopback is disabled (this value is set to 1), then when sending multicast packets, RTI Connex will *not* put a copy of the packets on the loopback interface. This prevents applications on the same node (including itself) from receiving those packets.

This value is set to 0 by default, meaning multicast loopback is *enabled*.

Disabling multicast loopback (setting this value to 1) may result in minor performance gains when using multicast.

[NOTE: Windows CE systems do not support multicast loopback. This field is ignored for Windows CE targets.]

### 9.341.2.8 ignore\_loopback\_interface

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::ignore_loopback_interface
```

Prevents the transport plugin from using the IP loopback interface.

Currently three values are allowed:

- **0**: Forces local traffic to be sent over loopback, even if a more efficient transport (such as shared memory) is installed (in which case traffic will be sent over both transports).
- **1**: Disables local traffic via this plugin. The IP loopback interface is not used, even if no NICs are discovered. This is useful when you want applications running on the same node to use a more efficient plugin (such as shared memory) instead of the IP loopback.
- **-1**: Automatic. Lets RTI Connexx decide between the above two choices.

The current "automatic" (-1) RTI Connexx policy is as follows:

- If a shared memory transport plugin is available for local traffic and there is a locator on the initial peers list that can use shared memory, the effective value is 1 (i.e., disable UPV4 local traffic).
- Otherwise, the effective value is 0 (i.e., use UDPv4 for local traffic also).

**[default]** -1 Automatic RTI Connexx policy based on availability of the shared memory transport.

### 9.341.2.9 ignore\_nonup\_interfaces

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::ignore_nonup_interfaces
```

**[DEPRECATED]** Prevents the transport plugin from using a network interface that is not reported as UP by the operating system.

DEPRECATED: this property has no effect. Non-UP interfaces are ignored until they change their status to UP, unless **NDDS\_Transport\_UDPv4\_Property\_t::disable\_interface\_tracking** (p. 1796) is set to 1, in which case interfaces are ignored even if they change their status at a later point.

The transport checks the flags reported by the operating system for each network interface upon initialization. An interface that is not reported as UP will not be used. This property allows you to configure the transport to start using even the interfaces that were not reported as UP.

Two values are allowed:

- **0**: Allow the use of interfaces that were not reported as UP.
- **1**: Do not use interfaces that were not reported as UP.

**[default]** 1

### 9.341.2.10 ignore\_nonrunning\_interfaces

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::ignore_nonrunning_interfaces
```

Prevents the transport plugin from using a network interface that is not reported as RUNNING by the operating system.

The transport checks the flags reported by the operating system for each network interface upon initialization. An interface that is not reported as UP will not be used. This property allows the same check to be extended to the IFF\_↔\_RUNNING flag implemented by some operating systems. The RUNNING flag is defined to mean that "all resources are allocated," and may be off if there is no link detected, e.g., the network cable is unplugged.

Two values are allowed:

- **0**: Do not check the RUNNING flag when enumerating interfaces, just make sure the interface is UP.
- **1**: Check the flag when enumerating interfaces, and ignore those that are not reported as RUNNING. This can be used on some operating systems to cause the transport to ignore interfaces that are enabled but not connected to the network.

**[default]** 1 (i.e., check RUNNING flag)

### 9.341.2.11 no\_zero\_copy

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::no_zero_copy
```

**[DEPRECATED]** Prevents the transport plugin from doing a zero copy.

DEPRECATED: This property has no effect. By default, this plugin will use the zero copy on OSes that offer it. While this is good for performance, it may sometimes tax the OS resources in a manner that cannot be overcome by the application.

The best example is if the hardware/device driver lends the buffer to the application itself. If the application does not return the loaned buffers soon enough, the node may err or malfunction. In case you cannot reconfigure the H/W, device driver, or the OS to allow the zero copy feature to work for your application, you may have no choice but to turn off zero copy use.

By default this is set to 0, so RTI Connexxt will use the zero-copy API if offered by the OS.

### 9.341.2.12 send\_blocking

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::send_blocking
```

Control blocking behavior of send sockets. CHANGING THIS FROM THE DEFAULT CAN CAUSE SIGNIFICANT PERFORMANCE PROBLEMS.

Currently two values are defined:

- **NDDS\_TRANSPORT\_UDPV4\_BLOCKING\_ALWAYS**: Sockets are blocking (default socket options for the operating system).
- **NDDS\_TRANSPORT\_UDPV4\_BLOCKING\_NEVER**: Sockets are modified to make them non-blocking. THIS MAY CAUSE SIGNIFICANT PERFORMANCE PROBLEMS.

**[default]** NDDS\_TRANSPORT\_UDPV4\_BLOCKING\_ALWAYS

### 9.341.2.13 use\_checksum

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::use_checksum
```

Configures whether to send UDP checksum.

This property specifies whether the UDP checksum will be computed. On Windows and Linux, the UDP protocol will not set the checksum when `use_checksum` is set to 0. This is useful when RTPS protocol statistics related to corrupted messages need to be collected through the API `DDSDomainParticipant::get_participant_protocol_status` (p. 1407).

**[default]** 1 (enabled)

### 9.341.2.14 transport\_priority\_mask

```
RTI_UINT32 NDDS_Transport_UDPv4_Property_t::transport_priority_mask
```

Set mask for use of transport priority field.

This is used in conjunction with `NDDS_Transport_UDPv4_Property_t::transport_priority_mapping_low` (p. 1794) and `NDDS_Transport_UDPv4_Property_t::transport_priority_mapping_high` (p. 1794) to define the mapping from the DDS transport priority (see `TRANSPORT_PRIORITY` (p. 449)) to the IPv4 TOS field. Defines a contiguous region of bits in the 32-bit transport priority value that is used to generate values for the IPv4 TOS field on an outgoing socket.

For example, the value `0x0000ff00` causes bits 9-16 (8 bits) to be used in the mapping. The value will be scaled from the mask range (`0x0000 - 0xff00` in this case) to the range specified by `low` and `high`.

If the mask is set to zero, then the transport will not set IPv4 TOS for send sockets.

**[default]** 0.

### 9.341.2.15 transport\_priority\_mapping\_low

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::transport_priority_mapping_low
```

Set low value of output range to IPv4 TOS.

This is used in conjunction with `NDDS_Transport_UDPv4_Property_t::transport_priority_mask` (p. 1794) and `NDDS_Transport_UDPv4_Property_t::transport_priority_mapping_high` (p. 1794) to define the mapping from the DDS transport priority to the IPv4 TOS field. Defines the low value of the output range for scaling.

Note that IPv4 TOS is generally an 8-bit value.

**[default]** 0.



### 9.341.2.16 transport\_priority\_mapping\_high

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::transport_priority_mapping_high
```

Set high value of output range to IPv4 TOS.

This is used in conjunction with **NDDS\_Transport\_UDPv4\_Property\_t::transport\_priority\_mask** (p.1794) and **NDDS\_Transport\_UDPv4\_Property\_t::transport\_priority\_mapping\_low** (p.1794) to define the mapping from the DDS transport priority to the IPv4 TOS field. Defines the high value of the output range for scaling.

Note that IPv4 TOS is generally an 8-bit value.

**[default]** 0xff.

### 9.341.2.17 send\_ping

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::send_ping
```

Configures whether to send PING messages.

This property specifies whether to send a PING message before commencing the discovery process. On certain operating systems or with certain switches the initial UDP packet, while configuring the ARP table, can unfortunately be dropped. To avoid dropping the initial RTPS discovery sample, a PING message is sent to preconfigure the ARP table in those environments.

**[default]** 1 (enabled)

### 9.341.2.18 force\_interface\_poll\_detection

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::force_interface_poll_detection
```

Forces the interface tracker to use a polling mechanism to detect changes on the UDPv4 interfaces.

When possible, the detection of an IP address change is done asynchronously using the APIs offered by the underlying OS. By setting this property on those OSes, the use of a polling mechanism to detect changes can be forced.

**[default]** 0 (disabled).

### 9.341.2.19 interface\_poll\_period

```
RTI_UINT32 NDDS_Transport_UDPv4_Property_t::interface_poll_period
```

Specifies the period in milliseconds to query for changes in the state of all the interfaces.

When possible, the detection of an IP address change is done asynchronously using the APIs offered by the underlying OS. If there is no mechanism to do that, the detection will use a polling strategy where the polling period can be configured by setting this property.

**[default]** 500 milliseconds.

### 9.341.2.20 reuse\_multicast\_receive\_resource

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::reuse_multicast_receive_resource
```

Controls whether or not to reuse multicast receive resources.

Setting this to 0 (FALSE) prevents multicast crosstalk by uniquely configuring a port and creating a receive thread for each multicast group address.

**[default]** 1.

### 9.341.2.21 protocol\_overhead\_max

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::protocol_overhead_max
```

Maximum size in bytes of protocol overhead, including headers.

This value is the maximum size, in bytes, of protocol-related overhead. Normally, the overhead accounts for UDP and IP headers. The default value is set to accommodate the most common UDP/IP header size.

Note that when **NDDS\_Transport\_Property\_t::message\_size\_max** (p. 1779) plus this overhead is larger than the UDPv4 maximum message size (65535 bytes), the middleware will automatically reduce the effective `message_size_max`, to 65535 minus this overhead.

**[default]** 28.

See also

**NDDS\_Transport\_Property\_t::message\_size\_max** (p. 1779)

### 9.341.2.22 disable\_interface\_tracking

```
RTI_INT32 NDDS_Transport_UDPv4_Property_t::disable_interface_tracking
```

Disables detection of network interface changes.

By default, network interface changes are propagated in the form of locators to other applications. This is done to support IP mobility scenarios.

For example, you could start a RTI Connex application with Wi-Fi and move to a wired connection. In order to continue communicating with other applications, this interface change has to be propagated.

In RTI Connex 5.2 (the initial release) and earlier versions of the product, IP mobility scenarios were not supported. 5.2 applications will report errors if they detect locator changes in a DataWriter or DataReader.

You can disable the notification and propagation of interface changes by setting this property to 1.

This way, an interface change in a newer application will not trigger errors in an application running 5.2 or earlier. Of course, this will prevent the new application from being able to detect network interface changes.

**[default]** 0

### 9.341.2.23 join\_multicast\_group\_timeout

```
RTI_UINT32 NDDS_Transport_UDPv4_Property_t::join_multicast_group_timeout
```

[Windows only] Defines how much time (milliseconds) to wait to join a multicast group address when a new interface is detected.

On Windows, a network interface may be detected before it is allowed to join a multicast group address. This property adjusts how much time (milliseconds) to wait for the ADD\_MEMBERSHIP multicast operation to succeed before withdrawing.

**[default]** 5000

### 9.341.2.24 public\_address

```
char* NDDS_Transport_UDPv4_Property_t::public_address
```

Public IP address associated with the transport instantiation.

Setting the public IP address is only necessary to support communication over WAN that involves Network Address Translation (NAT).

Typically, the address is the public address of the IP NAT router that provides access to the WAN.

By default, the **DDSDomainParticipant** (p. 1351) creating the transport will announce the IP addresses obtained from the NICs to other DomainParticipants in the system.

When this property is set, the DomainParticipant will announce the IP address corresponding to the property value instead of the LAN IP addresses associated with the NICs.

**Note 1:** Setting this property is necessary, but is not a sufficient condition for sending and receiving data over the WAN. You must also configure the IP NAT router to allow UDP traffic and to map the public IP address specified by this property to the DomainParticipant's private LAN IP address. This is typically done with one of the following mechanisms:

- Port Forwarding: You must map the private ports used to receive discovery and user data traffic to the corresponding public ports (see **DDS\_RtpsWellKnownPorts\_t** (p. 1076)). Public and private ports must be the same since the transport does not allow you to change the mapping.
- 1:1 NAT: You must add a 1:1 NAT entry that maps the public IP address specified in this property to the private LAN IP address of the DomainParticipant.

**Note 2:** By setting this property, the **DDSDomainParticipant** (p. 1351) only announces its public IP address to other DomainParticipants. Therefore, communication with DomainParticipants within the LAN that are running on different nodes will not work unless the NAT router is configured to enable NAT reflection (hairpin NAT).

There is another way to achieve simultaneous communication with DomainParticipants running in the LAN and WAN, that does not require hairpin NAT. This way uses a gateway application such as RTI Routing Service to provide access to the WAN.

**[default]** NULL (the transport uses the IP addresses obtained from the NICs)

### 9.341.2.25 port\_offset

RTI\_INT32 NDDS\_Transport\_UDPv4\_Property\_t::port\_offset

Port offset to allow multiple instances of UDPv4 transports in the same **DDSDomainParticipant** (p. 1351).

By default, it is not possible to have multiple instances of the UDPv4 transport in the same **DDSDomainParticipant** (p. 1351). This is because all instances will try to bind to the same UDP port(s) for receiving data.

With this property, you can specify an offset that will be added to the RTPS port(s) to determine the UDP port(s) to bind to. This way, you can have multiple instances of the UDPv4 transport in the same **DDSDomainParticipant** (p. 1351).

An RTPS port will be mapped to an UDP port as follows: UDP port = RTPS port + port\_offset.

[default] 0

## 9.342 NDDS\_Transport\_UDPv4\_WAN\_Property\_t Struct Reference

Configurable IPv4/UDP WAN Transport-Plugin properties.

### Public Attributes

- struct **NDDS\_Transport\_Property\_t parent**  
*Generic properties of all transport plugins.*
- RTI\_INT32 **send\_socket\_buffer\_size**  
*Size in bytes of the send buffer of a socket used for sending.*
- RTI\_INT32 **recv\_socket\_buffer\_size**  
*Size in bytes of the receive buffer of a socket used for receiving.*
- RTI\_INT32 **ignore\_loopback\_interface**  
*Prevents the transport plugin from using the IP loopback interface.*
- RTI\_INT32 **ignore\_nonup\_interfaces**  
**[DEPRECATED]** *Prevents the transport plugin from using a network interface that is not reported as UP by the operating system.*
- RTI\_INT32 **ignore\_nonrunning\_interfaces**  
*Prevents the transport plugin from using a network interface that is not reported as RUNNING by the operating system.*
- RTI\_INT32 **no\_zero\_copy**  
**[DEPRECATED]** *Prevents the transport plugin from doing a zero copy.*
- RTI\_INT32 **send\_blocking**  
*Control blocking behavior of send sockets. CHANGING THIS FROM THE DEFAULT CAN CAUSE SIGNIFICANT PERFORMANCE PROBLEMS.*
- RTI\_INT32 **use\_checksum**  
*Configures whether to send UDP checksum.*
- RTI\_UINT32 **transport\_priority\_mask**  
*Set mask for use of transport priority field.*
- RTI\_INT32 **transport\_priority\_mapping\_low**  
*Set low value of output range to IPv4 TOS.*
- RTI\_INT32 **transport\_priority\_mapping\_high**

*Set high value of output range to IPv4 TOS.*

- RTI\_INT32 **send\_ping**  
*Configures whether to send PING messages.*
- RTI\_INT32 **force\_interface\_poll\_detection**  
*Forces the interface tracker to use a polling mechanism to detect changes on the UDPv4 interfaces.*
- RTI\_UINT32 **interface\_poll\_period**  
*Specifies the period in milliseconds to query for changes in the state of all the interfaces.*
- RTI\_INT32 **protocol\_overhead\_max**  
*Maximum size in bytes of protocol overhead, including headers.*
- RTI\_INT32 **disable\_interface\_tracking**  
*Disables detection of network interface changes.*
- char \* **public\_address**  
*Public IP address associated with the transport instantiation.*
- struct **NDDS\_Transport\_UDP\_WAN\_CommPortsMappingInfo** \* **comm\_ports\_list**  
*Configures the public and private UDP ports that a transport instance uses to receive/send RTPS data.*
- RTI\_INT32 **comm\_ports\_list\_length**  
*Number of elements in the `NDDS_Transport_UDPv4_WAN_Property_t::comm_ports_list` (p. 1805).*
- RTI\_INT32 **port\_offset**  
*Port offset to allow coexistence with built-in UDPv4 transport.*
- RTI\_UINT32 **binding\_ping\_period**  
*Specifies the period in milliseconds at which BINDING PINGS messages are sent to keep NAT mappings open.*

### 9.342.1 Detailed Description

Configurable IPv4/UDP WAN Transport-Plugin properties.

You can modify the properties in this structure to configure the plugin. However, you must set the properties before the plugin is instantiated.

See also

**NDDSTransportSupport::set\_builtin\_transport\_property()** (p. 1838)

**NDDS\_Transport\_UDPv4\_WAN\_new** (p. 280)

### 9.342.2 Member Data Documentation

#### 9.342.2.1 parent

```
struct NDDS_Transport_Property_t NDDS_Transport_UDPv4_WAN_Property_t::parent
```

Generic properties of all transport plugins.

### 9.342.2.2 send\_socket\_buffer\_size

RTI\_INT32 NDDS\_Transport\_UDPv4\_WAN\_Property\_t::send\_socket\_buffer\_size

Size in bytes of the send buffer of a socket used for sending.

See also

**NDDS\_Transport\_UDPv4\_Property\_t::send\_socket\_buffer\_size** (p. 1790)

### 9.342.2.3 recv\_socket\_buffer\_size

RTI\_INT32 NDDS\_Transport\_UDPv4\_WAN\_Property\_t::recv\_socket\_buffer\_size

Size in bytes of the receive buffer of a socket used for receiving.

See also

**NDDS\_Transport\_UDPv4\_Property\_t::recv\_socket\_buffer\_size** (p. 1790)

### 9.342.2.4 ignore\_loopback\_interface

RTI\_INT32 NDDS\_Transport\_UDPv4\_WAN\_Property\_t::ignore\_loopback\_interface

Prevents the transport plugin from using the IP loopback interface.

Currently three values are allowed:

- **0**: Forces local traffic to be sent over loopback, even if a more efficient transport (such as shared memory) is installed (in which case traffic will be sent over both transports).
- **1**: Disables local traffic via this plugin. The IP loopback interface is not used, even if no NICs are discovered. This is useful when you want applications running on the same node to use a more efficient plugin (such as shared memory) instead of the IP loopback.
- **-1**: Automatic. Lets RTI Connexx decide between the above two choices.

The current "automatic" (-1) RTI Connexx policy is as follows:

- If a shared memory transport plugin is available for local traffic and there is a locator on the initial peers list that can use shared memory, the effective value is 1 (i.e., disable UPV4 local traffic).
- Otherwise, the effective value is 0 (i.e., use UDPv4 for local traffic also).

**[default]** -1 Automatic RTI Connexx policy based on availability of the shared memory transport.

### 9.342.2.5 ignore\_nonup\_interfaces

RTI\_INT32 NDDS\_Transport\_UDPv4\_WAN\_Property\_t::ignore\_nonup\_interfaces

**[DEPRECATED]** Prevents the transport plugin from using a network interface that is not reported as UP by the operating system.

DEPRECATED: this property has no effect. Non-UP interfaces are ignored until they change their status to UP, unless **NDDS\_Transport\_UDPv4\_WAN\_Property\_t::disable\_interface\_tracking** (p. 1804) is set to 1, in which case interfaces are ignored even if they change their status at a later point.

The transport checks the flags reported by the operating system for each network interface upon initialization. An interface that is not reported as UP will not be used. This property allows you to configure the transport to start using even the interfaces that were not reported as UP.

Two values are allowed:

- **0**: Allow the use of interfaces that were not reported as UP.
- **1**: Do not use interfaces that were not reported as UP.

**[default]** 1

### 9.342.2.6 ignore\_nonrunning\_interfaces

RTI\_INT32 NDDS\_Transport\_UDPv4\_WAN\_Property\_t::ignore\_nonrunning\_interfaces

Prevents the transport plugin from using a network interface that is not reported as RUNNING by the operating system.

The transport checks the flags reported by the operating system for each network interface upon initialization. An interface that is not reported as UP will not be used. This property allows the same check to be extended to the IFF\_↔\_RUNNING flag implemented by some operating systems. The RUNNING flag is defined to mean that "all resources are allocated," and may be off if there is no link detected, e.g., the network cable is unplugged.

Two values are allowed:

- **0**: Do not check the RUNNING flag when enumerating interfaces, just make sure the interface is UP.
- **1**: Check the flag when enumerating interfaces, and ignore those that are not reported as RUNNING. This can be used on some operating systems to cause the transport to ignore interfaces that are enabled but not connected to the network.

**[default]** 1 (i.e., check RUNNING flag)

### 9.342.2.7 no\_zero\_copy

```
RTI_INT32 NDDS_Transport_UDPv4_WAN_Property_t::no_zero_copy
```

**[DEPRECATED]** Prevents the transport plugin from doing a zero copy.

DEPRECATED: This property has no effect. By default, this plugin will use the zero copy on OSes that offer it. While this is good for performance, it may sometimes tax the OS resources in a manner that cannot be overcome by the application.

The best example is if the hardware/device driver lends the buffer to the application itself. If the application does not return the loaned buffers soon enough, the node may err or malfunction. In case you cannot reconfigure the H/W, device driver, or the OS to allow the zero copy feature to work for your application, you may have no choice but to turn off zero copy use.

By default this is set to 0, so RTI Connexx will use the zero-copy API if offered by the OS.

### 9.342.2.8 send\_blocking

```
RTI_INT32 NDDS_Transport_UDPv4_WAN_Property_t::send_blocking
```

Control blocking behavior of send sockets. CHANGING THIS FROM THE DEFAULT CAN CAUSE SIGNIFICANT PERFORMANCE PROBLEMS.

Currently two values are defined:

- **NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_ALWAYS:** Sockets are blocking (default socket options for the operating system).
- **NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_NEVER:** Sockets are modified to make them non-blocking. THIS MAY CAUSE SIGNIFICANT PERFORMANCE PROBLEMS.

**[default]** NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_ALWAYS

### 9.342.2.9 use\_checksum

```
RTI_INT32 NDDS_Transport_UDPv4_WAN_Property_t::use_checksum
```

Configures whether to send UDP checksum.

This property specifies whether the UDP checksum will be computed. On Windows and Linux, the UDP protocol will not set the checksum when use\_checksum is set to 0. This is useful when RTPS protocol statistics related to corrupted messages need to be collected through the API **DDSDomainParticipant::get\_participant\_protocol\_status** (p. 1407).

**[default]** 1 (enabled)



### 9.342.2.10 transport\_priority\_mask

```
RTT_UINT32 NDDS_Transport_UDPv4_WAN_Property_t::transport_priority_mask
```

Set mask for use of transport priority field.

This is used in conjunction with **NDDS\_Transport\_UDPv4\_WAN\_Property\_t::transport\_priority\_mapping\_low** (p. 1803) and **NDDS\_Transport\_UDPv4\_WAN\_Property\_t::transport\_priority\_mapping\_high** (p. 1803) to define the mapping from the DDS transport priority (see **TRANSPORT\_PRIORITY** (p. 449)) to the IPv4 TOS field. Defines a contiguous region of bits in the 32-bit transport priority value that is used to generate values for the IPv4 TOS field on an outgoing socket.

For example, the value 0x0000ff00 causes bits 9-16 (8 bits) to be used in the mapping. The value will be scaled from the mask range (0x0000 - 0xff00 in this case) to the range specified by low and high.

If the mask is set to zero, then the transport will not set IPv4 TOS for send sockets.

**[default]** 0.

### 9.342.2.11 transport\_priority\_mapping\_low

```
RTT_INT32 NDDS_Transport_UDPv4_WAN_Property_t::transport_priority_mapping_low
```

Set low value of output range to IPv4 TOS.

This is used in conjunction with **NDDS\_Transport\_UDPv4\_WAN\_Property\_t::transport\_priority\_mask** (p. 1802) and **NDDS\_Transport\_UDPv4\_WAN\_Property\_t::transport\_priority\_mapping\_high** (p. 1803) to define the mapping from the DDS transport priority to the IPv4 TOS field. Defines the low value of the output range for scaling.

Note that IPv4 TOS is generally an 8-bit value.

**[default]** 0.

### 9.342.2.12 transport\_priority\_mapping\_high

```
RTT_INT32 NDDS_Transport_UDPv4_WAN_Property_t::transport_priority_mapping_high
```

Set high value of output range to IPv4 TOS.

This is used in conjunction with **NDDS\_Transport\_UDPv4\_WAN\_Property\_t::transport\_priority\_mask** (p. 1802) and **NDDS\_Transport\_UDPv4\_WAN\_Property\_t::transport\_priority\_mapping\_low** (p. 1803) to define the mapping from the DDS transport priority to the IPv4 TOS field. Defines the high value of the output range for scaling.

Note that IPv4 TOS is generally an 8-bit value.

**[default]** 0xff.

### 9.342.2.13 send\_ping

RTI\_INT32 NDDS\_Transport\_UDPv4\_WAN\_Property\_t::send\_ping

Configures whether to send PING messages.

This property specifies whether to send a PING message before commencing the discovery process. On certain operating systems or with certain switches the initial UDP packet, while configuring the ARP table, can unfortunately be dropped. To avoid dropping the initial RTPS discovery sample, a PING message is sent to preconfigure the ARP table in those environments.

**[default]** 1 (enabled)

### 9.342.2.14 force\_interface\_poll\_detection

RTI\_INT32 NDDS\_Transport\_UDPv4\_WAN\_Property\_t::force\_interface\_poll\_detection

Forces the interface tracker to use a polling mechanism to detect changes on the UDPv4 interfaces.

When possible, the detection of an IP address change is done asynchronously using the APIs offered by the underlying OS. By setting this property on those OSes, the use of a polling mechanism to detect changes can be forced.

**[default]** 0 (disabled).

### 9.342.2.15 interface\_poll\_period

RTI\_UINT32 NDDS\_Transport\_UDPv4\_WAN\_Property\_t::interface\_poll\_period

Specifies the period in milliseconds to query for changes in the state of all the interfaces.

When possible, the detection of an IP address change is done asynchronously using the APIs offered by the underlying OS. If there is no mechanism to do that, the detection will use a polling strategy where the polling period can be configured by setting this property.

**[default]** 500 milliseconds.

### 9.342.2.16 protocol\_overhead\_max

RTI\_INT32 NDDS\_Transport\_UDPv4\_WAN\_Property\_t::protocol\_overhead\_max

Maximum size in bytes of protocol overhead, including headers.

This value is the maximum size, in bytes, of protocol-related overhead. Normally, the overhead accounts for UDP and IP headers. The default value is set to accommodate the most common UDP/IP header size.

Note that when **NDDS\_Transport\_Property\_t::message\_size\_max** (p. 1779) plus this overhead is larger than the UDPv4 maximum message size (65535 bytes), the middleware will automatically reduce the effective message\_size\_max, to 65535 minus this overhead.

**[default]** 28.

See also

**NDDS\_Transport\_Property\_t::message\_size\_max** (p. 1779)

### 9.342.2.17 disable\_interface\_tracking

```
RTI_INT32 NDDS_Transport_UDPv4_WAN_Property_t::disable_interface_tracking
```

Disables detection of network interface changes.

By default, network interface changes are propagated in the form of locators to other applications. This is done to support IP mobility scenarios.

For example, you could start a RTI Connex application with Wi-Fi and move to a wired connection. In order to continue communicating with other applications, this interface change has to be propagated.

In RTI Connex 5.2 (the initial release) and earlier versions of the product, IP mobility scenarios were not supported. 5.2 applications will report errors if they detect locator changes in a DataWriter or DataReader.

You can disable the notification and propagation of interface changes by setting this property to 1.

This way, an interface change in a newer application will not trigger errors in an application running 5.2 or earlier. Of course, this will prevent the new application from being able to detect network interface changes.

**[default]** 0

### 9.342.2.18 public\_address

```
char* NDDS_Transport_UDPv4_WAN_Property_t::public_address
```

Public IP address associated with the transport instantiation.

Setting the public IP address is only necessary for the Real-Time WAN Transport associated with an external **DDSDomainParticipant** (p. 1351) (publicly reachable) in order to support the two communication scenarios shown in the Figure below.

For an external **DDSDomainParticipant** (p. 1351) behind a NAT-enabled router, this address is the public IP address of the router.

When this property is set, the DomainParticipant will announce PUBLIC+UUID locators to other DomainParticipants. These locators are reachable locators because they contain this public IP address.

For additional information on Real-Time WAN Transport locators, see the `Core Libraries User's Manual`.

with a Participant that has a Public Address"

**[default]** NULL (the transport will announce UUID locators)

### 9.342.2.19 comm\_ports\_list

```
struct NDDS_Transport_UDP_WAN_CommPortsMappingInfo* NDDS_Transport_UDPv4_WAN_Property_t::comm_ports_list
```

Configures the public and private UDP ports that a transport instance uses to receive/send RTPS data.

Array containing the mapping between "RTPS ports", "UDP receive host ports", and "UDP receive public ports".

When the transport is configured using properties, the port mapping array is provided using a JSON string.

For example:

```
{
  "default": {"host": 8192, "public": 9678},
  "mappings": [
    {"rtps": 1234, "host": 9999, "public": 5678},
    {"rtps": 1235, "host": 9990, "public": 5679},
  ]
}
```

It is also possible to configure the mapping with XML:

```
<transport_builtin>
  <udpv4_wan>
    <comm_ports>
      <default>
        <host>8192</host>
        <public>9678</public>
      </default>
      <mappings>
        <element>
          <rtps>1234</rtps>
          <host>9999</host>
          <public>5678</public>
        </element>
        <element>
          <rtps>1235</rtps>
          <host>9990</host>
          <public>5679</public>
        </element>
      </mappings>
    </comm_ports>
  </udpv4_wan>
</transport_builtin>
```

For additional information on how to set the value of this property, see the [Core Libraries User's Manual](#).

**[default]** NULL (The UDP ports used for communications will be derived from the RTPS ports associated with the locators for the DomainParticipant and its Endpoints (DataWriters and DataReaders)).

### 9.342.2.20 comm\_ports\_list\_length

```
RTI_INT32 NDDS_Transport_UDPv4_WAN_Property_t::comm_ports_list_length
```

Number of elements in the `NDDS_Transport_UDPv4_WAN_Property_t::comm_ports_list` (p.1805).

**[default]** 0

### 9.342.2.21 port\_offset

```
RTI_INT32 NDDS_Transport_UDPv4_WAN_Property_t::port_offset
```

Port offset to allow coexistence with built-in UDPv4 transport.

This property allows using the built-in UDPv4 transport and the Real-Time WAN Transport at the same time.

```
<transport_builtin>
```

```
    <mask>UDPv4_WAN|UDPv4</mask>
```

```
</transport_builtin>
```

When the UDP ports used by Real-Time WAN Transport are not explicitly set, they are calculated as follows: RTPS port + port\_offset.

**[default]** 125

### 9.342.2.22 binding\_ping\_period

```
RTI_UINT32 NDDS_Transport_UDPv4_WAN_Property_t::binding_ping_period
```

Specifies the period in milliseconds at which BINDING\_PINGS messages are sent to keep NAT mappings open.

Configures the period in milliseconds at which BINDING\_PING messages are sent by a local transport instance to a remote transport instance. For example, 1000 means to send BINDING\_PING messages every second.

BINDING\_PING messages are used on the sending side to open NAT bindings from a local transport instance to a remote transport instance and they are sent periodically to keep the bindings open.

On the receiving side, BINDING\_PINGS are used to calculate the public IP transport address of an UUID locator. This address will be used to send data to the locator.

For additional information on the role of BINDING\_PING, see the `Core Libraries User's Manual`.

From a configuration point of view, and to avoid communication disruptions, the period at which a transport instance sends BINDING\_PING messages should be smaller than the NAT binding session timeout. This timeout depends on the NAT router configuration.

**[default]** 1000 (1 sec)

## 9.343 NDDS\_Transport\_UDPv6\_Property\_t Struct Reference

Configurable IPv6/UDP Transport-Plugin properties.

### Public Attributes

- struct **NDDS\_Transport\_Property\_t parent**  
*Generic properties of all transport plugins.*
- RTI\_INT32 **send\_socket\_buffer\_size**  
*Size in bytes of the send buffer of a socket used for sending.*
- RTI\_INT32 **recv\_socket\_buffer\_size**  
*Size in bytes of the receive buffer of a socket used for receiving.*
- RTI\_INT32 **unicast\_enabled**  
*Allows the transport plugin to use unicast for sending and receiving.*
- RTI\_INT32 **multicast\_enabled**  
*Allows the transport plugin to use multicast for sending and receiving.*
- RTI\_INT32 **multicast\_ttl**  
*Value for the time-to-live parameter for all multicast sends using this plugin.*
- RTI\_INT32 **multicast\_loopback\_disabled**  
*Prevents the transport plugin from putting multicast packets onto the loopback interface.*
- RTI\_INT32 **ignore\_loopback\_interface**  
*Prevents the transport plugin from using the IP loopback interface.*
- RTI\_INT32 **ignore\_nonrunning\_interfaces**  
*Prevents the transport plugin from using a network interface that is not reported as RUNNING by the operating system.*
- RTI\_INT32 **no\_zero\_copy**  
**[DEPRECATED]** *Prevents the transport plugin from doing zero copy.*
- RTI\_INT32 **send\_blocking**  
*Control blocking behavior of send sockets. CHANGING THIS FROM THE DEFAULT CAN CAUSE SIGNIFICANT PERFORMANCE PROBLEMS.*
- RTI\_INT32 **enable\_v4mapped**  
*Specify whether UDPv6 transport will process IPv4 addresses.*
- RTI\_UINT32 **transport\_priority\_mask**  
*Set mask for use of transport priority field.*
- RTI\_INT32 **transport\_priority\_mapping\_low**  
*Set low value of output range to IPv6 TCLASS.*
- RTI\_INT32 **transport\_priority\_mapping\_high**  
*Set high value of output range to IPv6 TCLASS.*
- RTI\_INT32 **send\_ping**  
*Configures whether to send PING messages.*
- RTI\_INT32 **force\_interface\_poll\_detection**  
*Forces the interface tracker to use a polling mechanism to detect changes on the UDPv6 interfaces.*
- RTI\_UINT32 **interface\_poll\_period**  
*Specifies the period in milliseconds to query for changes in the state of all the interfaces.*
- RTI\_INT32 **reuse\_multicast\_receive\_resource**  
*Controls whether or not to reuse multicast receive resources.*
- RTI\_INT32 **protocol\_overhead\_max**

*Maximum size in bytes of protocol overhead, including headers.*

- RTI\_INT32 **disable\_interface\_tracking**

*Disables detection of network interface changes.*

- RTI\_UINT32 **join\_multicast\_group\_timeout**

*[Windows only] Defines how much time (milliseconds) to wait to join a multicast group address when a new interface is detected.*

- char \* **public\_address**

*Public IP address associated with the transport instantiation.*

- RTI\_INT32 **port\_offset**

*Port offset to allow multiple instances of UDPv6 transports in the same **DDSDomainParticipant** (p. 1351).*

### 9.343.1 Detailed Description

Configurable IPv6/UDP Transport-Plugin properties.

You can modify the properties in this structure to configure the plugin. However, you must set the properties before the plugin is instantiated.

See also

**NDDSTransportSupport::set\_builtin\_transport\_property()** (p. 1838)

**NDDS\_Transport\_UDPv6\_new** (p. 290)

### 9.343.2 Member Data Documentation

#### 9.343.2.1 parent

```
struct NDDS_Transport_Property_t NDDS_Transport_UDPv6_Property_t::parent
```

Generic properties of all transport plugins.

#### 9.343.2.2 send\_socket\_buffer\_size

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::send_socket_buffer_size
```

Size in bytes of the send buffer of a socket used for sending.

On most operating systems, `setsockopt()` will be called to set the `SENDBUF` to the value of this parameter.

This value must be greater than or equal to **NDDS\_Transport\_Property\_t::message\_size\_max** (p. 1779). The maximum value is operating system-dependent.

By default, it will be set to **NDDS\_TRANSPORT\_UDPv6\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT** (p. 287).

If you configure this parameter to be **NDDS\_TRANSPORT\_UDPv6\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT** (p. 287), then `setsockopt()` (or equivalent) will not be called to size the send buffer of the socket. The transport will use the OS default.

### 9.343.2.3 `recv_socket_buffer_size`

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::recv_socket_buffer_size
```

Size in bytes of the receive buffer of a socket used for receiving.

On most operating systems, `setsockopt()` will be called to set the `RECVBUF` to the value of this parameter.

This value must be greater than or equal to `NDDS_Transport_Property_t::message_size_max` (p. 1779). The maximum value is operating system-dependent.

By default, it will be set to `NDDS_TRANSPORT_UDPv6_RECV_SOCKET_BUFFER_SIZE_DEFAULT` (p. 288).

If you configure this parameter to be `NDDS_TRANSPORT_UDPv6_SOCKET_BUFFER_SIZE_OS_DEFAULT` (p. 287), then `setsockopt()` (or equivalent) will not be called to size the receive buffer of the socket. The transport will use the OS default.

### 9.343.2.4 `unicast_enabled`

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::unicast_enabled
```

Allows the transport plugin to use unicast for sending and receiving.

This value turns unicast UDP on (if set to 1) or off (if set to 0) for this plugin. By default, it will be turned on (1). Also by default, the plugin will use all the allowed network interfaces that it finds up and running when the plugin is instantiated.

### 9.343.2.5 `multicast_enabled`

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::multicast_enabled
```

Allows the transport plugin to use multicast for sending and receiving.

This value turns multicast UDP on (if set to 1) or off (if set to 0) for this plugin. By default, it will be turned on (1) for those platforms that support multicast. Also by default, the plugin will use the all network interfaces allowed for multicast that it finds up and running when the plugin is instantiated.

### 9.343.2.6 `multicast_ttl`

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::multicast_ttl
```

Value for the time-to-live parameter for all multicast sends using this plugin.

This is used to set the TTL of multicast packets sent by this transport plugin.

**[default]** 1

See also

**`NDDS_TRANSPORT_UDPv6_MULTICAST_TTL_DEFAULT`** (p. 288)



### 9.343.2.7 multicast\_loopback\_disabled

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::multicast_loopback_disabled
```

Prevents the transport plugin from putting multicast packets onto the loopback interface.

If multicast loopback is disabled (this value is set to 1), then when sending multicast packets, RTI Connex will *not* put a copy of the packets on the loopback interface. This prevents applications on the same node (including itself) from receiving those packets.

This value is set to 0 by default, meaning multicast loopback is *enabled*.

Disabling multicast loopback (setting this value to 1) may result in minor performance gains when using multicast.

### 9.343.2.8 ignore\_loopback\_interface

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::ignore_loopback_interface
```

Prevents the transport plugin from using the IP loopback interface.

Currently three values are allowed:

- **0**: Forces local traffic to be sent over loopback, even if a more efficient transport (such as shared memory) is installed (in which case traffic will be sent over both transports).
- **1**: Disables local traffic via this plugin. Do not use the IP loopback interface even if no NICs are discovered. This is useful when you want applications running on the same node to use a more efficient transport (such as shared memory) instead of the IP loopback.
- **-1**: Automatic. Lets RTI Connex decide between the above two choices.

The current "automatic" (-1) RTI Connex policy is as follows.

- If a shared memory transport plugin is available for local traffic and there is a locator on the initial peers list that can use shared memory, the effective value is 1 (i.e., disable UDPv6 local traffic).
- Otherwise, the effective value is 0 (i.e., use UDPv6 for local traffic also).

**[default]** -1 Automatic RTI Connex policy based on availability of the shared memory transport.

### 9.343.2.9 ignore\_nonrunning\_interfaces

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::ignore_nonrunning_interfaces
```

Prevents the transport plugin from using a network interface that is not reported as RUNNING by the operating system.

The transport checks the flags reported by the operating system for each network interface upon initialization. An interface that is not reported as UP will not be used. This property allows the same check to be extended to the IFF\_↔\_RUNNING flag implemented by some operating systems. The RUNNING flag is defined to mean that "all resources are allocated," and may be off if there is no link detected, e.g., the network cable is unplugged.

Two values are allowed:

- **0**: Do not check the RUNNING flag when enumerating interfaces, just make sure interface is UP.
- **1**: Check flag when enumerating interfaces and ignore those that are not reported as RUNNING. This can be used on some operating systems to cause the transport to ignore interfaces that are enabled but not connected to the network.

**[default]** 1 (i.e., check RUNNING flag)

### 9.343.2.10 no\_zero\_copy

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::no_zero_copy
```

**[DEPRECATED]** Prevents the transport plugin from doing zero copy.

DEPRECATED: This property has no effect. By default, this plugin will use the zero copy on OSes that offer it. While this is good for performance, it may sometimes tax the OS resources in a manner that cannot be overcome by the application.

The best example is if the hardware/device driver lends the buffer to the application itself. If the application does not return the loaned buffers soon enough, the node may error or malfunction. If you cannot reconfigure the H/W, device driver, or the OS to allow the zero copy feature to work for your application, you may have no choice but to turn off the use of zero copy.

By default this is set to 0, so RTI Connexxt will use the zero copy API if offered by the OS.

### 9.343.2.11 send\_blocking

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::send_blocking
```

Control blocking behavior of send sockets. CHANGING THIS FROM THE DEFAULT CAN CAUSE SIGNIFICANT PERFORMANCE PROBLEMS.

Currently two values are defined:

- **NDDS\_TRANSPORT\_UDPv6\_BLOCKING\_ALWAYS**: Sockets are blocking (default socket options for the operating system).
- **NDDS\_TRANSPORT\_UDPv6\_BLOCKING\_NEVER**: Sockets are modified to make them non-blocking. THIS MAY CAUSE SIGNIFICANT PERFORMANCE PROBLEMS.

**[default]** NDDS\_TRANSPORT\_UDPv6\_BLOCKING\_ALWAYS.

### 9.343.2.12 enable\_v4mapped

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::enable_v4mapped
```

Specify whether UDPv6 transport will process IPv4 addresses.

Set this to 1 to turn on processing of IPv4 addresses. Note that this may make it incompatible with use of the UDPv4 transport within the same domain participant.

**[default]** 0.

### 9.343.2.13 transport\_priority\_mask

```
RTI_UINT32 NDDS_Transport_UDPv6_Property_t::transport_priority_mask
```

Set mask for use of transport priority field.

If transport priority mapping is supported on the platform, this mask is used in conjunction with **NDDS\_Transport\_UDPv6\_Property\_t::transport\_priority\_mapping\_low** (p.1813) and **NDDS\_Transport\_UDPv6\_Property\_t::transport\_priority\_mapping\_high** (p.1813) to define the mapping from the DDS transport priority (see **TRANSPORT\_PRIORITY** (p.449)) to the IPv6 TCLASS field. Defines a contiguous region of bits in the 32-bit transport priority value that is used to generate values for the IPv6 TCLASS field on an outgoing socket.

For example, the value 0x0000ff00 causes bits 9-16 (8 bits) to be used in the mapping. The value will be scaled from the mask range (0x0000 - 0xff00 in this case) to the range specified by low and high.

If the mask is set to zero, then the transport will not set IPv6 TCLASS for send sockets.

**[default]** 0.

### 9.343.2.14 transport\_priority\_mapping\_low

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::transport_priority_mapping_low
```

Set low value of output range to IPv6 TCLASS.

This is used in conjunction with **NDDS\_Transport\_UDPv6\_Property\_t::transport\_priority\_mask** (p.1813) and **NDDS\_Transport\_UDPv6\_Property\_t::transport\_priority\_mapping\_high** (p.1813) to define the mapping from the DDS transport priority to the IPv6 TCLASS field. Defines the low value of the output range for scaling.

Note that IPv6 TCLASS is generally an 8-bit value.

**[default]** 0.

### 9.343.2.15 transport\_priority\_mapping\_high

RTI\_INT32 NDDS\_Transport\_UDPv6\_Property\_t::transport\_priority\_mapping\_high

Set high value of output range to IPv6 TCLASS.

This is used in conjunction with **NDDS\_Transport\_UDPv6\_Property\_t::transport\_priority\_mask** (p.1813) and **NDDS\_Transport\_UDPv6\_Property\_t::transport\_priority\_mapping\_low** (p.1813) to define the mapping from the DDS transport priority to the IPv6 TCLASS field. Defines the high value of the output range for scaling.

Note that IPv6 TCLASS is generally an 8-bit value.

**[default]** 0xff.

### 9.343.2.16 send\_ping

RTI\_INT32 NDDS\_Transport\_UDPv6\_Property\_t::send\_ping

Configures whether to send PING messages.

See also

**NDDS\_Transport\_UDPv4\_Property\_t::send\_ping** (p. 1795)

### 9.343.2.17 force\_interface\_poll\_detection

RTI\_INT32 NDDS\_Transport\_UDPv6\_Property\_t::force\_interface\_poll\_detection

Forces the interface tracker to use a polling mechanism to detect changes on the UDPv6 interfaces.

See also

**NDDS\_Transport\_UDPv4\_Property\_t::force\_interface\_poll\_detection** (p. 1795)

### 9.343.2.18 interface\_poll\_period

RTI\_UINT32 NDDS\_Transport\_UDPv6\_Property\_t::interface\_poll\_period

Specifies the period in milliseconds to query for changes in the state of all the interfaces.

See also

**NDDS\_Transport\_UDPv4\_Property\_t::interface\_poll\_period** (p. 1795)

### 9.343.2.19 reuse\_multicast\_receive\_resource

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::reuse_multicast_receive_resource
```

Controls whether or not to reuse multicast receive resources.

See also

**NDDS\_Transport\_UDPv4\_Property\_t::reuse\_multicast\_receive\_resource** (p. 1795)

### 9.343.2.20 protocol\_overhead\_max

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::protocol_overhead_max
```

Maximum size in bytes of protocol overhead, including headers.

This value is the maximum size, in bytes, of protocol-related overhead. Normally, the overhead accounts for UDP and IP headers. The default value is set to accommodate the most common UDP/IP header size.

Note that when **NDDS\_Transport\_Property\_t::message\_size\_max** (p. 1779) plus this overhead is larger than the UDPv6 maximum message size (65535 bytes), the middleware will automatically reduce the effective `message_size_max`, to 65535 minus this overhead.

**[default]** 48.

See also

**NDDS\_Transport\_Property\_t::message\_size\_max** (p. 1779)

### 9.343.2.21 disable\_interface\_tracking

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::disable_interface_tracking
```

Disables detection of network interface changes.

See also

**NDDS\_Transport\_UDPv4\_Property\_t::disable\_interface\_tracking** (p. 1796)

### 9.343.2.22 `join_multicast_group_timeout`

```
RTI_UINT32 NDDS_Transport_UDPv6_Property_t::join_multicast_group_timeout
```

[Windows only] Defines how much time (milliseconds) to wait to join a multicast group address when a new interface is detected.

See also

**`NDDS_Transport_UDPv4_Property_t::join_multicast_group_timeout`** (p. 1796)

### 9.343.2.23 `public_address`

```
char* NDDS_Transport_UDPv6_Property_t::public_address
```

Public IP address associated with the transport instantiation.

Setting the public IP address is only necessary to support communication over WAN that involves Network Address Translation (NAT).

Typically, the address is the public address of the IP NAT router that provides access to the WAN.

By default, the **`DDSDomainParticipant`** (p. 1351) creating the transport will announce the IP addresses obtained from the NICs to other DomainParticipants in the system.

When this property is set, the DomainParticipant will announce the IP address corresponding to the property value instead of the LAN IP addresses associated with the NICs.

**Note 1:** Setting this property is necessary, but is not a sufficient condition for sending and receiving data over the WAN. You must also configure the IP NAT router to allow UDP traffic and to map the public IP address specified by this property to the DomainParticipant's private LAN IP address. This is typically done with one of the following mechanisms:

- Port Forwarding: You must map the private ports used to receive discovery and user data traffic to the corresponding public ports (see **`DDS_RtpsWellKnownPorts_t`** (p. 1076)). Public and private ports must be the same since the transport does not allow you to change the mapping.
- 1:1 NAT: You must add a 1:1 NAT entry that maps the public IP address specified in this property to the private LAN IP address of the DomainParticipant.

**Note 2:** By setting this property, the **`DDSDomainParticipant`** (p. 1351) only announces its public IP address to other DomainParticipants. Therefore, communication with DomainParticipants within the LAN that are running on different nodes will not work unless the NAT router is configured to enable NAT reflection (hairpin NAT).

There is another way to achieve simultaneous communication with DomainParticipants running in the LAN and WAN, that does not require hairpin NAT. This way uses a gateway application such as RTI Routing Service to provide access to the WAN.

**[default]** NULL (the transport uses the IP addresses obtained from the NICs)

### 9.343.2.24 port\_offset

```
RTI_INT32 NDDS_Transport_UDPv6_Property_t::port_offset
```

Port offset to allow multiple instances of UDPv6 transports in the same **DDSDomainParticipant** (p. 1351).

By default, it is not possible to have multiple instances of the UDPv6 transport in the same **DDSDomainParticipant** (p. 1351). This is because all instances will try to bind to the same UDP port(s) for receiving data.

With this property, you can specify an offset that will be added to the RTPS port(s) to determine the UDP port(s) to bind to. This way, you can have multiple instances of the UDPv6 transport in the same **DDSDomainParticipant** (p. 1351).

An RTPS port will be mapped to an UDP port as follows: UDP port = RTPS port + port\_offset.

[default] 0

## 9.344 NDDS\_Transport\_UUID Struct Reference

Univocally identifies a transport plugin instance.

### 9.344.1 Detailed Description

Univocally identifies a transport plugin instance.

## 9.345 NDDS\_Utility\_NetworkCaptureParams\_t Struct Reference

Input parameters for starting network capture.

### Public Attributes

- struct **DDS\_StringSeq transports**  
*List of transports to capture.*
- **NDDS\_Utility\_NetworkCaptureContentKindMask dropped\_content**  
*Exclude contents from the capture file.*
- **NDDS\_Utility\_NetworkCaptureTrafficKindMask traffic**  
*Traffic direction to capture.*
- **DDS\_Boolean parse\_encrypted\_content**  
*If secure traffic should be decrypted or not.*
- struct **DDS\_ThreadSettings\_t checkpoint\_thread\_settings**  
*The properties of the checkpoint thread.*
- **DDS\_Long frame\_queue\_size**  
*Size of the frame queue (Bytes).*

### 9.345.1 Detailed Description

Input parameters for starting network capture.

### 9.345.2 Member Data Documentation

#### 9.345.2.1 transports

```
struct DDS_StringSeq NDDS_Utility_NetworkCaptureParams_t::transports
```

List of transports to capture.

Network Capture will only save RTPS frames if the associated transport protocol is part of this sequence.

**[default]** Empty sequence initializer. This means that by default all transports will be captured.

#### 9.345.2.2 dropped\_content

```
NDDS_Utility_NetworkCaptureContentKindMask NDDS_Utility_NetworkCaptureParams_t::dropped_content
```

Exclude contents from the capture file.

It accepts values from **NDDS\_Utility\_NetworkCaptureContentKind** (p.545) and **NDDS\_Utility\_NetworkCaptureContentKindMask** (p.544) .

We can choose to exclude user data or encrypted content from the capture file.

**[default]** No content is excluded - **NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_DEFAULT** (p.543).

#### 9.345.2.3 traffic

```
NDDS_Utility_NetworkCaptureTrafficKindMask NDDS_Utility_NetworkCaptureParams_t::traffic
```

Traffic direction to capture.

It accepts values from **NDDS\_Utility\_NetworkCaptureTrafficKind** (p.545) and **NDDS\_Utility\_NetworkCaptureTrafficKindMask** (p.544) .

**[default]** Capture both inbound and outbound traffic - **NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_DEFAULT** (p.543).



### 9.345.2.4 parse\_encrypted\_content

```
DDS_Boolean NDDS_Utility_NetworkCaptureParams_t::parse_encrypted_content
```

If secure traffic should be decrypted or not.

Network Capture supports decryption of RTPS messages and submessages. It does not support decryption of the user data payload (<data\_protection\_kind> tag in the GovernanceDocument).

**[default]** `DDS_BOOLEAN_FALSE` (p. 317)

### 9.345.2.5 checkpoint\_thread\_settings

```
struct DDS_ThreadSettings_t NDDS_Utility_NetworkCaptureParams_t::checkpoint_thread_settings
```

The properties of the checkpoint thread.

The checkpoint thread is a per-participant thread responsible for reading frames from a queue and saving them to disk (as soon as they are produced).

The members that can be configured are:

- `DDS_ThreadSettings_t::mask` (p. 1123). Default value of (`DDS_THREAD_SETTINGS_PRIORITY_ENFORCE` (p. 352) | `DDS_THREAD_SETTINGS_STDIO` (p. 352)).
- `DDS_ThreadSettings_t::priority` (p. 1123). Platform-dependent - Consult `Platform Notes` for additional details.
- `DDS_ThreadSettings_t::stack_size` (p. 1124). Platform-dependent - Consult `Platform Notes` for additional details.

### 9.345.2.6 frame\_queue\_size

```
DDS_Long NDDS_Utility_NetworkCaptureParams_t::frame_queue_size
```

Size of the frame queue (Bytes).

Network Capture enqueues frames before saving them to disk, which takes place in a separate thread.

Network Capture does not block if the queue becomes full. Attempting to enqueue a frame with a full frame queue will fail (frame won't be captured) with a log message.

The size of the queue is dependent on the network traffic (amount of frames that we want to capture) and system resources (how fast we can capture frames).

**[default]** 2097152 (2MB).

## 9.346 NDDSSConfigActivityContext Class Reference

Activity Context APIs.

### Static Public Member Functions

- static void **set\_attribute\_mask** ( **NDDSSConfigActivityContextAttributeKindMask** attribute\_format)  
*Set the **NDDSSConfigActivityContextAttributeKindMask** (p. 532) of the Activity Context.*

### 9.346.1 Detailed Description

Activity Context APIs.

Activity Context APIs.

## 9.347 NDDSSConfigCompliance Class Reference

APIs to configure the XTypes compliance mask.

### Static Public Member Functions

- static **NDDSSConfigXTypesComplianceMask** **get\_xtypes\_mask** ()  
*Gets the XTypes compliance mask value for the application.*
- static void **set\_xtypes\_mask** ( **NDDSSConfigXTypesComplianceMask** mask)  
*Sets the level of compliance of the application with the XTypes specification.*
- static void **load\_compliance\_masks** ()  
*Load the compliance masks from the environment variables.*

### 9.347.1 Detailed Description

APIs to configure the XTypes compliance mask.

### 9.347.2 Member Function Documentation

### 9.347.2.1 get\_xtypes\_mask()

```
static NDDS_Config_XTypesComplianceMask NDDSSConfigCompliance::get_xtypes_mask ( ) [static]
```

Gets the XTypes compliance mask value for the application.

The **NDDS\_Config\_XTypesComplianceMask** (p. 536) configures different aspects of the Extended CDR encoding (XCDR and XCDR2) for the application.

#### Returns

The **NDDS\_Config\_XTypesComplianceMask** (p. 536) value.

#### See also

**NDDS\_Config\_XTypesComplianceMask** (p. 536)

**NDDSSConfigCompliance::get\_xtypes\_mask** (p. 1820)

**NDDSSConfigCompliance::load\_compliance\_masks** (p. 1821)

### 9.347.2.2 set\_xtypes\_mask()

```
static void NDDSSConfigCompliance::set_xtypes_mask (
    NDDS_Config_XTypesComplianceMask mask ) [static]
```

Sets the level of compliance of the application with the XTypes specification.

The **NDDS\_Config\_XTypesComplianceMask** (p. 536) configures different aspects of the Extended CDR encoding (XCDR and XCDR2) for the application.

Once you call this function the value of the mask will apply to all the DomainParticipants created after the call. It won't apply to DomainParticipants created before the call.

In general, applications should only set the mask once, before executing any other RTI Connex API. The mask can also be set using the environment variable **NDDS\_XTYPES\_COMPLIANCE\_MASK**.

#### Parameters

<i>mask</i>	<< <i>in</i> >> (p. 238) Compliance mask.
-------------	---

#### See also

**NDDS\_Config\_XTypesComplianceMask** (p. 536)

**NDDSSConfigCompliance::get\_xtypes\_mask** (p. 1820)

**NDDSSConfigCompliance::load\_compliance\_masks** (p. 1821)

### 9.347.2.3 load\_compliance\_masks()

```
static void NDDSSConfigCompliance::load_compliance_masks ( ) [static]
```

Load the compliance masks from the environment variables.

The only compliance mask loaded by this function is the XTypes compliance mask, which can be set using the environment variable **NDDSS\_XTYPES\_COMPLIANCE\_MASK**.

See also

**NDDSS\_Config\_XTypesComplianceMask** (p. 536)

**NDDSSConfigCompliance::set\_xtypes\_mask** (p. 1821)

**NDDSSConfigCompliance::get\_xtypes\_mask** (p. 1820)

## 9.348 NDDSSConfigLogger Class Reference

<<*interface*>> (p. 237) The singleton type used to configure RTI Connexxt logging.

### Public Member Functions

- **NDDSS\_Config\_LogVerbosity get\_verbosity ( )**  
*Get the verbosity at which RTI Connexxt is currently logging diagnostic information.*
- **NDDSS\_Config\_LogVerbosity get\_verbosity\_by\_category ( NDDSS\_Config\_LogCategory category)**  
*Get the verbosity at which RTI Connexxt is currently logging diagnostic information in the given category.*
- void **set\_verbosity ( NDDSS\_Config\_LogVerbosity verbosity)**  
*Set the verbosity at which RTI Connexxt will log diagnostic information.*
- void **set\_verbosity\_by\_category ( NDDSS\_Config\_LogCategory category, NDDSS\_Config\_LogVerbosity verbosity)**  
*Set the verbosity at which RTI Connexxt will log diagnostic information in the given category.*
- FILE \* **get\_output\_file ( )**  
*Get the file to which the logged output is redirected.*
- bool **set\_output\_file (FILE \*out)**  
*Set the file to which the logged output is redirected.*
- bool **set\_output\_file\_set (const char \*file\_prefix, const char \*file\_suffix, int max\_capacity, int max\_files)**  
*Configure a set of files to redirect the logged output.*
- **NDDSSConfigLoggerDevice \* get\_output\_device ( )**  
*Return the user device registered with the logger.*
- bool **set\_output\_device ( NDDSSConfigLoggerDevice \*device)**  
*Register a NDDSSConfigLoggerDevice (p. 1829).*
- **NDDSS\_Config\_LogPrintFormat get\_print\_format ( )**  
*Get the current message format for the log level NDDSS\_CONFIG\_LOG\_LEVEL\_ERROR (p. 525).*
- bool **set\_print\_format ( NDDSS\_Config\_LogPrintFormat print\_format)**  
*Set the message format that RTI Connexxt will use to log diagnostic information for all the log levels, except for NDDSS\_CONFIG\_LOG\_LEVEL\_FATAL\_ERROR (p. 525). When the Activity Context (p. 530) is printed, the user can select the information that will be part of the Activity Context (p. 530) by using the API NDDSSConfigActivityContext::set\_attribute\_mask (p. 534).*

- **NDDConfig\_LogPrintFormat get\_print\_format\_by\_log\_level** ( **NDDConfig\_LogLevel** log\_level)
 

*Get the current message format, by log level, that RTI Connexx is using to log diagnostic information.*
- bool **set\_print\_format\_by\_log\_level** ( **NDDConfig\_LogPrintFormat** print\_format, **NDDConfig\_LogLevel** log\_level)
 

*Set the message format, by log level, that RTI Connexx will use to log diagnostic information. When the **Activity Context** (p. 530) is printed, the user can select the information that will be part of the **Activity Context** (p. 530) by using the API **NDDConfigActivityContext::set\_attribute\_mask** (p. 534).*
- void **emergency** (const char \*msg)
 

*Logs message with **NDD\_CONFIG\_SYSLOG\_LEVEL\_EMERGENCY** (p. 526) and **NDD\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).*
- void **alert** (const char \*msg)
 

*Logs message with **NDD\_CONFIG\_SYSLOG\_LEVEL\_ALERT** (p. 526) and **NDD\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).*
- void **critical** (const char \*msg)
 

*Logs message with **NDD\_CONFIG\_SYSLOG\_LEVEL\_CRITICAL** (p. 526) and **NDD\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).*
- void **error** (const char \*msg)
 

*Logs message with **NDD\_CONFIG\_SYSLOG\_LEVEL\_ERROR** (p. 526) and **NDD\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).*
- void **warning** (const char \*msg)
 

*Logs message with **NDD\_CONFIG\_SYSLOG\_LEVEL\_WARNING** (p. 526) and **NDD\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).*
- void **notice** (const char \*msg)
 

*Logs message with **NDD\_CONFIG\_SYSLOG\_LEVEL\_NOTICE** (p. 526) and **NDD\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).*
- void **informational** (const char \*msg)
 

*Logs message with **NDD\_CONFIG\_SYSLOG\_LEVEL\_INFORMATIONAL** (p. 526) and **NDD\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).*
- void **debug** (const char \*msg)
 

*Logs message with **NDD\_CONFIG\_SYSLOG\_LEVEL\_DEBUG** (p. 526) and **NDD\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).*

## Static Public Member Functions

- static **NDDConfigLogger \* get\_instance** ()
 

*Get the singleton instance of this type.*
- static void **finalize\_instance** ()
 

*Finalize the singleton instance of this type.*

### 9.348.1 Detailed Description

<<**interface**>> (p. 237) The singleton type used to configure RTI Connexx logging.

### 9.348.2 Member Function Documentation

### 9.348.2.1 `get_instance()`

```
static NDDSSConfigLogger * NDDSSConfigLogger::get_instance ( ) [static]
```

Get the singleton instance of this type.

#### Examples

**HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.

### 9.348.2.2 `finalize_instance()`

```
static void NDDSSConfigLogger::finalize_instance ( ) [static]
```

Finalize the singleton instance of this type.

#### MT Safety:

UNSAFE. It is not safe to call this method while another thread may be simultaneously calling another logger-related method, including this one.

### 9.348.2.3 `get_verbosity()`

```
NDDS_Config_LogVerbosity NDDSSConfigLogger::get_verbosity ( )
```

Get the verbosity at which RTI Connex is currently logging diagnostic information.

The default verbosity if **NDDSSConfigLogger::set\_verbosity** (p. 1824) is never called is **NDDS\_CONFIG\_LOG\_↔  
VERBOSITY\_ERROR** (p. 525).

If **NDDSSConfigLogger::set\_verbosity\_by\_category** (p. 1825) has been used to set different verbositys for different categories of messages, this method will return the maximum verbosity of all categories.

### 9.348.2.4 `get_verbosity_by_category()`

```
NDDS_Config_LogVerbosity NDDSSConfigLogger::get_verbosity_by_category (   
    NDDS_Config_LogCategory category )
```

Get the verbosity at which RTI Connex is currently logging diagnostic information in the given category.

The default verbosity if **NDDSSConfigLogger::set\_verbosity** (p. 1824) and **NDDSSConfigLogger::set\_verbosity\_by\_↔  
\_category** (p. 1825) are never called is **NDDS\_CONFIG\_LOG\_VERBOSITY\_ERROR** (p. 525).

### 9.348.2.5 set\_verbosity()

```
void NDDSSConfigLogger::set_verbosity (
    NDDSSConfig_LogVerbosity verbosity )
```

Set the verbosity at which RTI Connexx will log diagnostic information.

*Note:* Logging at high verbosity levels will be detrimental to your application's performance. Your default setting should typically remain at **NDDSS\_CONFIG\_LOG\_VERBOSITY\_WARNING** (p. 525) or below. (The default verbosity if you never set it is **NDDSS\_CONFIG\_LOG\_VERBOSITY\_ERROR** (p. 525).)

#### Examples

**HelloWorld\_publisher.cxx**, and **HelloWorld\_subscriber.cxx**.

### 9.348.2.6 set\_verbosity\_by\_category()

```
void NDDSSConfigLogger::set_verbosity_by_category (
    NDDSSConfig_LogCategory category,
    NDDSSConfig_LogVerbosity verbosity )
```

Set the verbosity at which RTI Connexx will log diagnostic information in the given category.

### 9.348.2.7 get\_output\_file()

```
FILE * NDDSSConfigLogger::get_output_file ( )
```

Get the file to which the logged output is redirected.

If no output file has been registered through **NDDSSConfigLogger::set\_output\_file** (p. 1825), this method will return NULL. In this case, logged output will on most platforms go to standard out as if through printf.

### 9.348.2.8 set\_output\_file()

```
bool NDDSSConfigLogger::set_output_file (
    FILE * out )
```

Set the file to which the logged output is redirected.

The file passed may be NULL, in which case further logged output will be redirected to the platform-specific default output location (standard out on most platforms).

For better performance when log messages are generated frequently, the log messages are not flushed into a file immediately after they are generated. In other words, while writing a log message, RTI Connexx only calls the function `fwrite()` (see <https://pubs.opengroup.org/onlinepubs/009695399/functions/fwrite.html>); it does not call the function `fflush()` (see <https://pubs.opengroup.org/onlinepubs/009695399/functions/fflush.html>). If your application requires a different flushing behavior, you may use **NDDSSConfigLogger::set\_output\_device** (p. 1826) to configure a custom logging device.

### 9.348.2.9 set\_output\_file\_set()

```
bool NDDConfigLogger::set_output_file_set (
    const char * file_prefix,
    const char * file_suffix,
    int max_capacity,
    int max_files )
```

Configure a set of files to redirect the logged output.

The logged output will be redirected to a set of files whose names are configured with a prefix and a suffix. The maximum number of bytes configures how many bytes to write into a file before opening the next file. After reaching the maximum number of files, the first one is overwritten.

For example, if the prefix is 'Foo (p. 1648)', the suffix is '.txt', the max number of bytes is 1GB, and the max number of files is 3, the logger will create (at most) these files: Foo1.txt, Foo2.txt, and Foo3.txt. It will write to Foo1.txt, and after writing 1GB, it will move on to Foo2.txt, then to Foo3.txt, then to Foo1.txt again, and so on.

To stop logging to these files and redirect the output to the platform-specific location, pass NULL, NULL, 0, 0.

See **NDDConfigLogger::set\_output\_file** (p. 1825) for the flushing behavior.

### 9.348.2.10 get\_output\_device()

```
NDDConfigLoggerDevice * NDDConfigLogger::get_output_device ( )
```

Return the user device registered with the logger.

#### Returns

Registered user device or NULL if no user device is registered.

### 9.348.2.11 set\_output\_device()

```
bool NDDConfigLogger::set_output_device (
    NDDConfigLoggerDevice * device )
```

Register a **NDDConfigLoggerDevice** (p. 1829).

Register the specified logging device with the logger.

There can be at most only one device registered with the logger at any given time.

When a device is installed, the logger will stop sending the log messages to the standard output and to the file set with **NDDConfigLogger::set\_output\_file** (p. 1825).

To remove an existing device, use this method with NULL as the device parameter. After a device is removed the logger will continue sending log messages to the standard output and to the output file.

To replace an existing device with a new device, use this method providing the new device as the device parameter.

When a device is unregistered (by setting it to NULL), **NDDConfigLoggerDevice** (p.1829) calls the method **NDDConfigLoggerDevice::close** (p. 1830).



## Parameters

<i>device</i>	<< <i>in</i> >> (p. 238) Logging device.
---------------	--

9.348.2.12 `get_print_format()`

```
NDDS_Config_LogPrintFormat NDDConfigLogger::get_print_format ( )
```

Get the current message format for the log level **NDDS\_CONFIG\_LOG\_LEVEL\_ERROR** (p. 525).

Use **NDDConfigLogger::get\_print\_format\_by\_log\_level** (p. 1827) to retrieve the format for other log levels.

If **NDDConfigLogger::set\_print\_format** (p. 1827) is never called, the default format is **NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_DEFAULT** (p. 527).

9.348.2.13 `set_print_format()`

```
bool NDDConfigLogger::set_print_format (
    NDDS_Config_LogPrintFormat print_format )
```

Set the message format that RTI Connexx will use to log diagnostic information for all the log levels, except for **NDDS\_CONFIG\_LOG\_LEVEL\_FATAL\_ERROR** (p. 525). When the **Activity Context** (p. 530) is printed, the user can select the information that will be part of the **Activity Context** (p. 530) by using the API **NDDConfigActivityContext::set\_attribute\_mask** (p. 534).

9.348.2.14 `get_print_format_by_log_level()`

```
NDDS_Config_LogPrintFormat NDDConfigLogger::get_print_format_by_log_level (
    NDDS_Config_LogLevel log_level )
```

Get the current message format, by log level, that RTI Connexx is using to log diagnostic information.

If **NDDConfigLogger::set\_print\_format** (p. 1827) is never called, the default format is **NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_DEFAULT** (p. 527).

9.348.2.15 `set_print_format_by_log_level()`

```
bool NDDConfigLogger::set_print_format_by_log_level (
    NDDS_Config_LogPrintFormat print_format,
    NDDS_Config_LogLevel log_level )
```

Set the message format, by log level, that RTI Connexx will use to log diagnostic information. When the **Activity Context** (p. 530) is printed, the user can select the information that will be part of the **Activity Context** (p. 530) by using the API **NDDConfigActivityContext::set\_attribute\_mask** (p. 534).

### 9.348.2.16 emergency()

```
void NDDSSConfigLogger::emergency (
    const char * msg )
```

Logs message with **NDDS\_CONFIG\_SYSLOG\_LEVEL\_EMERGENCY** (p. 526) and **NDDS\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).

### 9.348.2.17 alert()

```
void NDDSSConfigLogger::alert (
    const char * msg )
```

Logs message with **NDDS\_CONFIG\_SYSLOG\_LEVEL\_ALERT** (p. 526) and **NDDS\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).

### 9.348.2.18 critical()

```
void NDDSSConfigLogger::critical (
    const char * msg )
```

Logs message with **NDDS\_CONFIG\_SYSLOG\_LEVEL\_CRITICAL** (p. 526) and **NDDS\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).

### 9.348.2.19 error()

```
void NDDSSConfigLogger::error (
    const char * msg )
```

Logs message with **NDDS\_CONFIG\_SYSLOG\_LEVEL\_ERROR** (p. 526) and **NDDS\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).

### 9.348.2.20 warning()

```
void NDDSSConfigLogger::warning (
    const char * msg )
```

Logs message with **NDDS\_CONFIG\_SYSLOG\_LEVEL\_WARNING** (p. 526) and **NDDS\_CONFIG\_LOG\_CATEGORY\_USER** (p. 527).

### 9.348.2.21 notice()

```
void NDDConfigLogger::notice (
    const char * msg )
```

Logs message with **NDDS\_CONFIG\_SYSLOG\_LEVEL\_NOTICE** (p. 526) and **NDDS\_CONFIG\_LOG\_CATEGORY\_↔USER** (p. 527).

### 9.348.2.22 informational()

```
void NDDConfigLogger::informational (
    const char * msg )
```

Logs message with **NDDS\_CONFIG\_SYSLOG\_LEVEL\_INFORMATIONAL** (p. 526) and **NDDS\_CONFIG\_LOG\_↔CATEGORY\_USER** (p. 527).

### 9.348.2.23 debug()

```
void NDDConfigLogger::debug (
    const char * msg )
```

Logs message with **NDDS\_CONFIG\_SYSLOG\_LEVEL\_DEBUG** (p. 526) and **NDDS\_CONFIG\_LOG\_↔USER** (p. 527).

## 9.349 NDDConfigLoggerDevice Class Reference

<<*interface*>> (p. 237) Logging device interface. Use for user-defined logging devices.

### Public Member Functions

- virtual void **write** (const **NDDS\_Config\_LogMessage** \*message)=0  
*Write a log message to a specified logging device.*
- virtual void **close** ()  
*Close the logging device.*

### 9.349.1 Detailed Description

<<*interface*>> (p. 237) Logging device interface. Use for user-defined logging devices.

Interface for handling log messages.

By default, the logger sends the log messages generated by RTI Connex to the standard output.

You can use the method **NDDConfigLogger::set\_output\_file** (p. 1825) to redirect the log messages to a file.

To further customize the management of generated log messages, the logger offers the method **NDDConfigLogger**↔**::set\_output\_device** (p. 1826) that allows you to install a user-defined logging device.

The logging device installed by the user must implement this interface.

**Note:** It is not safe to make any calls to the RTI Connex core library, including calls to **DDSDomainParticipant**↔**::get**↔**\_current\_time** (p. 1398), from any of the logging device operations.

### 9.349.2 Member Function Documentation

#### 9.349.2.1 write()

```
virtual void NDDConfigLoggerDevice::write (
    const NDDS_Config_LogMessage * message ) [pure virtual]
```

Write a log message to a specified logging device.

**Note:** It is not safe to make any calls to the RTI Connex core library, including calls to **DDSDomainParticipant**↔**::get**↔**\_current\_time** (p. 1398), from any of the logging device operations.

Parameters

<i>message</i>	<< <i>in</i> >> (p. 238) Message to log.
----------------	--

#### 9.349.2.2 close()

```
virtual void NDDConfigLoggerDevice::close ( ) [virtual]
```

Close the logging device.

**Note:** It is not safe to make any calls to the RTI Connex core library, including calls to **DDSDomainParticipant**↔**::get**↔**\_current\_time** (p. 1398), from any of the logging device operations.

## 9.350 NDDSSConfigVersion Class Reference

<<*interface*>> (p. 237) The version of an RTI Connext distribution.

### Public Member Functions

- const **DDS\_ProductVersion\_t** & **get\_product\_version** () const  
*Get the RTI Connext product version.*
- const **NDDSS\_Config\_LibraryVersion\_t** & **get\_cpp\_api\_version** () const  
*Get the version of the C++ API library.*
- const **NDDSS\_Config\_LibraryVersion\_t** & **get\_c\_api\_version** () const  
*Get the version of the C API library.*
- const **NDDSS\_Config\_LibraryVersion\_t** & **get\_core\_version** () const  
*Get the version of the core library.*
- const char \* **to\_string** () const  
*Get this version in string form.*

### Static Public Member Functions

- static const **NDDSSConfigVersion** & **get\_instance** ()  
*Get the singleton instance of this type.*

#### 9.350.1 Detailed Description

<<*interface*>> (p. 237) The version of an RTI Connext distribution.

The complete version is made up of the versions of the individual libraries that make up the product distribution.

#### 9.350.2 Member Function Documentation

##### 9.350.2.1 **get\_instance()**

```
static const NDDSSConfigVersion & NDDSSConfigVersion::get_instance ( ) [static]
```

Get the singleton instance of this type.

### 9.350.2.2 `get_product_version()`

```
const DDS_ProductVersion_t & NDDSSConfigVersion::get_product_version ( ) const
```

Get the RTI Connext product version.

### 9.350.2.3 `get_cpp_api_version()`

```
const NDDS_Config_LibraryVersion_t & NDDSSConfigVersion::get_cpp_api_version ( ) const
```

Get the version of the C++ API library.

### 9.350.2.4 `get_c_api_version()`

```
const NDDS_Config_LibraryVersion_t & NDDSSConfigVersion::get_c_api_version ( ) const
```

Get the version of the C API library.

### 9.350.2.5 `get_core_version()`

```
const NDDS_Config_LibraryVersion_t & NDDSSConfigVersion::get_core_version ( ) const
```

Get the version of the core library.

### 9.350.2.6 `to_string()`

```
const char * NDDSSConfigVersion::to_string ( ) const
```

Get this version in string form.

Combine all of the constituent library versions into a single string.

The memory in which the string is stored is internal to this **NDDSSConfigVersion** (p. 1831). The caller should not modify it.

## 9.351 NDDSLM Class Reference

Other Utilities APIs.

## Static Public Member Functions

- static **DDS\_Boolean** **unload\_activation\_library** ()  
*Unloads the Activation Library (rti\_activation) if it was previously loaded.*

### 9.351.1 Detailed Description

Other Utilities APIs.

### 9.351.2 Member Function Documentation

#### 9.351.2.1 unload\_activation\_library()

```
static DDS_Boolean NDDSLM::unload_activation_library ( ) [static]
```

Unloads the Activation Library (rti\_activation) if it was previously loaded.

This function should be called just before your process finishes. See the License Management section in the Installation Guide for additional details.

Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if successful. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

## 9.352 NDDSTransportSupport Class Reference

<<*interface*>> (p. 237) The utility class used to configure RTI Connexx pluggable transports.

### Static Public Member Functions

- static **NDDS\_Transport\_Handle\_t** **register\_transport** ( **DDSDomainParticipant** \*participant\_in, **NDDS\_↔\_Transport\_Plugin** \*transport\_in, const **DDS\_StringSeq** &aliases\_in, const **NDDS\_Transport\_Address\_↔\_t** &network\_address\_in)  
*Register a transport plugin for use with a **DDSDomainParticipant** (p. 1351), assigning it a network\_address.*
- static **NDDS\_Transport\_Handle\_t** **lookup\_transport** ( **DDSDomainParticipant** \*participant\_in, **DDS\_↔\_StringSeq** &aliases\_out, **NDDS\_Transport\_Address\_t** &network\_address\_out, **NDDS\_Transport\_Plugin** \*transport\_in)  
*Look up a transport plugin within a **DDSDomainParticipant** (p. 1351).*
- static **DDS\_ReturnCode\_t** **add\_send\_route** (const **NDDS\_Transport\_Handle\_t** &transport\_handle\_in, const **NDDS\_Transport\_Address\_t** &address\_range\_in, **DDS\_Long** address\_range\_bit\_count\_in)  
*Add a route for outgoing messages.*

- static `DDS_ReturnCode_t add_receive_route` (const `NDDS_Transport_Handle_t` &transport\_handle\_in, const `NDDS_Transport_Address_t` &address\_range\_in, `DDS_Long` address\_range\_bit\_count\_in)  
*Add a route for incoming messages.*
- static `DDS_ReturnCode_t get_builtin_transport_property` (`DDSDomainParticipant` \*participant\_in, `DDS_↔_TransportBuiltinKind` builtin\_transport\_kind\_in, struct `NDDS_Transport_Property_t` &builtin\_transport\_↔\_property\_inout)  
*Get the properties used to create a builtin transport plugin.*
- static `DDS_ReturnCode_t set_builtin_transport_property` (`DDSDomainParticipant` \*participant\_in, `DDS_TransportBuiltinKind` builtin\_transport\_kind\_in, const struct `NDDS_Transport_Property_t` &builtin\_↔\_transport\_property\_in)  
*Set the properties used to create a builtin transport plugin.*
- static `NDDS_Transport_Plugin` \* `get_transport_plugin` (`DDSDomainParticipant` \*participant\_in, const char \*alias\_in)  
*Retrieve a transport plugin registered in a `DDSDomainParticipant` (p. 1351) by its alias.*

### 9.352.1 Detailed Description

<<*interface*>> (p. 237) The utility class used to configure RTI Connexx pluggable transports.

### 9.352.2 Member Function Documentation

#### 9.352.2.1 register\_transport()

```
static NDDS_Transport_Handle_t NDDSTransportSupport::register_transport (
    DDSDomainParticipant * participant_in,
    NDDS_Transport_Plugin * transport_in,
    const DDS_StringSeq & aliases_in,
    const NDDS_Transport_Address_t & network_address_in ) [static]
```

Register a transport plugin for use with a `DDSDomainParticipant` (p. 1351), assigning it a `network_address`.

A transport plugin instance can be used by exactly one `DDSDomainParticipant` (p. 1351) at a time.

When a `DataWriter/DataReader` is created, only those transports already registered to the corresponding `DDSDomainParticipant` (p. 1351) are available to the `DataWriter/DataReader`.

Builtin transports can be automatically registered by RTI Connexx as a convenience to the user. See **Built-in Transport Plugins** (p. 177) for details on how to control the builtin transports that are automatically registered.

#### Precondition

A disabled `DDSDomainParticipant` (p. 1351) and a transport plugin that will be registered exclusively with it.



## Parameters

<i>participant_in</i>	<< <i>in</i> >> (p. 238) A non-null, disabled <b>DDSDomainParticipant</b> (p. 1351).
<i>transport_in</i>	<< <i>in</i> >> (p. 238) A non-null transport plugin that is currently not registered with another <b>DDSDomainParticipant</b> (p. 1351).
<i>aliases_in</i>	<< <i>in</i> >> (p. 238) A non-null sequence of strings used as aliases to symbolically refer to the transport plugins. The transport plugin will be "available for use" by a <b>DDSEntity</b> (p. 1463) in the <b>DDSDomainParticipant</b> (p. 1351) if the transport alias list associated with the <b>DDSEntity</b> (p. 1463) contains one of these transport aliases. An empty alias list represents a wildcard and matches all aliases. Alias names for the builtin transports are defined in <b>TRANSPORT_BUILTIN</b> (p. 443).
<i>network_address_in</i>	<< <i>in</i> >> (p. 238) The network address at which to register this transport plugin. The bits indicated by <code>transport_in.property.address_bit_count</code> will be truncated. The remaining bits are the network address of the transport plugin. (see <b>Transport Class Attributes</b> (p. 169)).

## Returns

Upon success, a valid non-NIL transport handle, representing the association between the **DDSDomainParticipant** (p. 1351) and the transport plugin; a **NDDS\_TRANSPORT\_HANDLE\_NIL** (p. 177) upon failure.

Note that a transport plugin's class name is automatically registered as an implicit alias for the plugin. Thus, a class name can be used to refer to all the transport plugin instance of that class.

## See also

**Transport Class Attributes** (p. 169)

**Transport Network Address** (p. 171)

**Locator Format** (p. 465)

**NDDS\_DISCOVERY\_PEERS** (p. 464)

## 9.352.2.2 lookup\_transport()

```
static NDDS_Transport_Handle_t NDDSTransportSupport::lookup_transport (
    DDSDomainParticipant * participant_in,
    DDS_StringSeq & aliases_out,
    NDDS_Transport_Address_t & network_address_out,
    NDDS_Transport_Plugin * transport_in ) [static]
```

Look up a transport plugin within a **DDSDomainParticipant** (p. 1351).

The transport plugin should have already been registered with the **DDSDomainParticipant** (p. 1351).

## Parameters

<i>participant_in</i>	<< <i>in</i> >> (p. 238) A non-null <b>DDSDomainParticipant</b> (p. 1351).
<i>aliases_out</i> Generated by Doxygen	<< <i>inout</i> >> (p. 238) A sequence of string where the aliases used to refer to the transport plugin symbolically will be returned. null if not interested.
<i>network_address_out</i>	<< <i>inout</i> >> (p. 238) The network address at which to register the transport plugin will be returned here. null if not interested.
<i>transport_in</i>	<< <i>in</i> >> (p. 238) A non-null transport plugin that is already registered with the

## Returns

Upon success, a valid non-NIL transport handle, representing the association between the **DDSDomain**↔**Participant** (p. 1351) and the transport plugin; a **NDDS\_TRANSPORT\_HANDLE\_NIL** (p. 177) upon failure.

## See also

**Transport Class Attributes** (p. 169)

**Transport Network Address** (p. 171)

## 9.352.2.3 add\_send\_route()

```
static DDS_ReturnCode_t NDDSTransportSupport::add_send_route (
    const NDDS_Transport_Handle_t & transport_handle_in,
    const NDDS_Transport_Address_t & address_range_in,
    DDS_Long address_range_bit_count_in ) [static]
```

Add a route for outgoing messages.

This method can be used to narrow the range of addresses to which outgoing messages can be sent.

## Precondition

A disabled **DDSDomainParticipant** (p. 1351).

## Parameters

<i>transport_handle_in</i>	<< <i>in</i> >> (p. 238) A valid non-NIL transport handle as a result of a call to <b>NDDSTransportSupport::register_transport()</b> (p. 1834).
<i>address_range_in</i>	<< <i>in</i> >> (p. 238) The outgoing address range for which to use this transport plugin.
<i>address_range_bit_count</i> ↔ <i>_in</i>	<< <i>in</i> >> (p. 238) The number of most significant bits used to specify the address range. This function only works for transport plugins that have a positive <b>NDDS_Transport_Property_t::address_bit_count</b> (p. 1778).

## Returns

One of the **Standard Return Codes** (p. 336), or **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

## See also

**Transport Send Route** (p. 171)

### 9.352.2.4 add\_receive\_route()

```
static DDS_ReturnCode_t NDDSTransportSupport::add_receive_route (
    const NDDS_Transport_Handle_t & transport_handle_in,
    const NDDS_Transport_Address_t & address_range_in,
    DDS_Long address_range_bit_count_in ) [static]
```

Add a route for incoming messages.

This method can be used to narrow the range of addresses at which to receive incoming messages.

#### Precondition

A disabled **DDSDomainParticipant** (p. 1351).

#### Parameters

<i>transport_handle_in</i>	<< <i>in</i> >> (p. 238) A valid non-NIL transport handle as a result of a call to <b>NDDSTransportSupport::register_transport()</b> (p. 1834).
<i>address_range_in</i>	<< <i>in</i> >> (p. 238) The incoming address range for which to use this transport plugin.
<i>address_range_bit_count_in</i>	<< <i>in</i> >> (p. 238) The number of most significant bits used to specify the address range. This function only works for transport plugins that have a positive <b>NDDS_Transport_Property_t::address_bit_count</b> (p. 1778).

#### Returns

One of the **Standard Return Codes** (p. 336), or **DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336).

#### See also

**Transport Receive Route** (p. 172)

### 9.352.2.5 get\_builtin\_transport\_property()

```
static DDS_ReturnCode_t NDDSTransportSupport::get_builtin_transport_property (
    DDSDomainParticipant * participant_in,
    DDS_TransportBuiltinKind builtin_transport_kind_in,
    struct NDDS_Transport_Property_t & builtin_transport_property_inout ) [static]
```

Get the properties used to create a builtin transport plugin.

Retrieves the properties that will be used to create a builtin transport plugin.

#### Precondition

The *builtin\_transport\_property\_inout* parameter must be of the type specified by the *builtin\_transport\_kind\_in*.

## Parameters

<i>participant_in</i>	<< <i>in</i> >> (p. 238) A valid non-null <b>DDSDomainParticipant</b> (p. 1351)
<i>builtin_transport_kind_in</i>	<< <i>in</i> >> (p. 238) The builtin transport kind for which to retrieve the properties.
<i>builtin_transport_property_inout</i>	<< <i>inout</i> >> (p. 238) The storage area where the retrieved property will be output. The specific type required by the <i>builtin_transport_kind_in</i> must be used.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--

## See also

**NDDSTransportSupport::set\_builtin\_transport\_property()** (p. 1838)

## 9.352.2.6 set\_builtin\_transport\_property()

```
static DDS_ReturnCode_t NDDSTransportSupport::set_builtin_transport_property (
    DDSDomainParticipant * participant_in,
    DDS_TransportBuiltinKind builtin_transport_kind_in,
    const struct NDDS_Transport_Property_t & builtin_transport_property_in ) [static]
```

Set the properties used to create a builtin transport plugin.

Specifies the properties that will be used to create a builtin transport plugin.

If the builtin transport is already registered when this operation is called, these property changes will *not* have any effect. Builtin transport properties should always be set before the transport is registered. See **Built-in Transport Plugins** (p. 177) for details on when a builtin transport is registered.

## Precondition

A disabled **DDSDomainParticipant** (p. 1351). The *builtin\_transport\_property\_inout* parameter must be of the type specified by the *builtin\_transport\_kind\_in*.

## Parameters

<i>participant_in</i>	<< <i>in</i> >> (p. 238) A valid non-null <b>DDSDomainParticipant</b> (p. 1351) that has not been enabled.
<i>builtin_transport_kind_in</i>	<< <i>in</i> >> (p. 238) The builtin transport kind for which to specify the properties.
<i>builtin_transport_property↔_in</i>	<< <i>inout</i> >> (p. 238) The new transport property that will be used to the create the builtin transport plugin. The specific type required by the <i>builtin_transport_kind_in</i> must be used.

## Exceptions

<i>One</i>	of the <b>Standard Return Codes</b> (p. 336), or <b>DDS_RETCODE_PRECONDITION_NOT_MET</b> (p. 336).
------------	--

## See also

**NDDSTransportSupport::get\_built\_in\_transport\_property()** (p. 1837)

## 9.352.2.7 get\_transport\_plugin()

```
static NDDS_Transport_Plugin * NDDSTransportSupport::get_transport_plugin (
    DDSDomainParticipant * participant_in,
    const char * alias_in ) [static]
```

Retrieve a transport plugin registered in a **DDSDomainParticipant** (p. 1351) by its alias.

This method can be used to get a pointer to a transport Plugin that has been registered into the **DDSDomainParticipant** (p. 1351).

## Parameters

<i>participant_in</i>	<< <i>in</i> >> (p. 238) A non-null <b>DDSDomainParticipant</b> (p. 1351).
<i>alias_in</i>	<< <i>in</i> >> (p. 238) A non-null string used to symbolically refer to the transport plugins.

## Returns

Upon success, a valid non-null pointer to a registered plugin; a null pointer if a plugin with that alias is not registered/found in that participant.

## 9.353 NDDUtility Class Reference

Other Utilities APIs.

## Static Public Member Functions

- static void **sleep** (const struct **DDS\_Duration\_t** &durationIn)
  - Block the calling thread for the specified duration.*
- static void **spin** ( **DDS\_UnsignedLongLong** spinCount)
  - Performs the spin operation as many times as indicated.*
- static **DDS\_UnsignedLongLong** **get\_spin\_per\_microsecond** ()

Returns the number of spin operations to perform to wait 1 microsecond.

- static **DDS\_Boolean** **enable\_heap\_monitoring** ()  
*[DEPRECATED]* See: *NDDUtilityHeapMonitoring::enable* (p. 1843).
- static void **disable\_heap\_monitoring** ()  
*[DEPRECATED]* See: *NDDUtilityHeapMonitoring::disable* (p. 1843).
- static **DDS\_Boolean** **pause\_heap\_monitoring** ()  
*[DEPRECATED]* See: *NDDUtilityHeapMonitoring::pause* (p. 1844).
- static **DDS\_Boolean** **resume\_heap\_monitoring** ()  
*[DEPRECATED]* See: *NDDUtilityHeapMonitoring::resume* (p. 1844)
- static **DDS\_Boolean** **take\_heap\_snapshot** (const char \*filename, **DDS\_Boolean** print\_details)  
*[DEPRECATED]* See: *NDDUtilityHeapMonitoring::take\_heap\_snapshot* (p. 1844).

### 9.353.1 Detailed Description

Other Utilities APIs.

### 9.353.2 Member Function Documentation

#### 9.353.2.1 sleep()

```
static void NDDUtility::sleep (
    const struct DDS_Duration_t & durationIn ) [static]
```

Block the calling thread for the specified duration.

Note that the achievable resolution of sleep is OS-dependent. That is, do not assume that you can sleep for 1 nanosecond just because you can specify a 1-nanosecond sleep duration via the API. The sleep resolution on most operating systems is usually 10 ms or greater.

#### Parameters

<i>duration</i> ↔ <i>In</i>	<< <i>in</i> >> (p. 238) Sleep duration.
--------------------------------	--

#### MT Safety:

safe

#### Examples

**HelloWorld\_publisher.cxx.**

### 9.353.2.2 spin()

```
static void NDDSUtility::spin (
    DDS_UnsignedLongLong spinCount ) [static]
```

Performs the spin operation as many times as indicated.

Spinning is the action of performing useless operations in a for loop in order to actively wait some time without yielding the CPU. Given that the resolution of sleep is in the order of ms, you can use this utility to wait times in the order of microseconds. To properly use this functionality, it is useful to measure previously the number of spin operations needed to wait the equivalent to microsecond (using the utility `get_spin_per_microsecond`) and then compute the corresponding spin count desired.

#### Parameters

<i>spinCount</i>	<< <i>in</i> >> (p. 238) Number of spin operations to perform.
------------------	--

### 9.353.2.3 get\_spin\_per\_microsecond()

```
static DDS_UnsignedLongLong NDDSUtility::get_spin_per_microsecond ( ) [static]
```

Returns the number of spin operations to perform to wait 1 microsecond.

This utility can be used to measure how many spin operations must be performed to wait 1 microsecond. Since the time that it takes the CPU to perform 1 spin operation depends on the CPU frequency, it is recommended to use this utility before using `spin()` (p. 1840).

#### Returns

Number of spin operations to wait 1 microsecond.

#### See also

**NDDSUtility::spin** (p. 1840)

### 9.353.2.4 enable\_heap\_monitoring()

```
static DDS_Boolean NDDSUtility::enable_heap_monitoring ( ) [static]
```

**[DEPRECATED]** See: **NDDSUtilityHeapMonitoring::enable** (p. 1843).

### 9.353.2.5 disable\_heap\_monitoring()

```
static void NDDUtility::disable_heap_monitoring ( ) [static]
```

**[DEPRECATED]** See: `NDDUtilityHeapMonitoring::disable` (p. 1843).

### 9.353.2.6 pause\_heap\_monitoring()

```
static DDS_Boolean NDDUtility::pause_heap_monitoring ( ) [static]
```

**[DEPRECATED]** See: `NDDUtilityHeapMonitoring::pause` (p. 1844).

### 9.353.2.7 resume\_heap\_monitoring()

```
static DDS_Boolean NDDUtility::resume_heap_monitoring ( ) [static]
```

**[DEPRECATED]** See: `NDDUtilityHeapMonitoring::resume` (p. 1844)

### 9.353.2.8 take\_heap\_snapshot()

```
static DDS_Boolean NDDUtility::take_heap_snapshot (
    const char * filename,
    DDS_Boolean print_details ) [static]
```

**[DEPRECATED]** See: `NDDUtilityHeapMonitoring::take_heap_snapshot` (p. 1844).

## 9.354 NDDUtilityHeapMonitoring Class Reference

Heap Monitoring APIs.

### Static Public Member Functions

- static **DDS\_Boolean enable** ()  
*Starts monitoring the heap memory used by RTI Connex.*
- static **DDS\_Boolean enable** (const NDDUtilityHeapMonitoringParams\_t &params)  
*Starts monitoring the heap memory used by RTI Connex.*
- static void **disable** ()  
*Stops monitoring the heap memory used by RTI Connex.*
- static **DDS\_Boolean pause** ()  
*Pauses heap monitoring.*
- static **DDS\_Boolean resume** ()  
*Resumes heap monitoring.*
- static **DDS\_Boolean take\_heap\_snapshot** (const char \*filename, **DDS\_Boolean** print\_details)  
*Saves the current heap memory usage in a file.*



## 9.354.1 Detailed Description

Heap Monitoring APIs.

## 9.354.2 Member Function Documentation

### 9.354.2.1 enable() [1/2]

```
static DDS_Boolean NDDUtilityHeapMonitoring::enable ( ) [static]
```

Starts monitoring the heap memory used by RTI Connex.

This function must be called before any other function in the RTI Connex library is called.

Once heap monitoring is enabled, you can take heap snapshots by using **NDDUtilityHeapMonitoring::take\_heap\_snapshot** (p. 1844).

Use this method only for debugging purposes, since it may introduce a significant performance impact.

#### MT Safety:

UNSAFE. It is not safe to call this method while another thread may be simultaneously calling another heap-related method, including this one.

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

#### See also

**NDDUtilityHeapMonitoring::disable** (p. 1843)

### 9.354.2.2 enable() [2/2]

```
static DDS_Boolean NDDUtilityHeapMonitoring::enable (
    const NDDUtility_HeapMonitoringParams_t & params ) [static]
```

Starts monitoring the heap memory used by RTI Connex.

Performs the same function as **NDDUtilityHeapMonitoring::enable** (p. 1843) except that it also provides the values in *params*. Those values will set the format used in the snapshot **NDDUtilityHeapMonitoring::take\_heap\_snapshot** (p. 1844).

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

#### See also

**NDDUtilityHeapMonitoring::disable** (p. 1843)

### 9.354.2.3 disable()

```
static void NDDUtilityHeapMonitoring::disable ( ) [static]
```

Stops monitoring the heap memory used by RTI Connex.

This method must be the last method called from RTI Connex.

See also

**NDDUtilityHeapMonitoring::enable** (p. 1843)

### 9.354.2.4 pause()

```
static DDS_Boolean NDDUtilityHeapMonitoring::pause ( ) [static]
```

Pauses heap monitoring.

New memory allocations will not be monitored and they will not appear in the snapshot generated by **NDDUtilityHeapMonitoring::take\_heap\_snapshot** (p. 1844).

Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

See also

**NDDUtilityHeapMonitoring::resume** (p. 1844)

### 9.354.2.5 resume()

```
static DDS_Boolean NDDUtilityHeapMonitoring::resume ( ) [static]
```

Resumes heap monitoring.

Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

See also

**NDDUtilityHeapMonitoring::pause** (p. 1844)

### 9.354.2.6 take\_heap\_snapshot()

```
static DDS_Boolean NDDUtilityHeapMonitoring::take_heap_snapshot (
    const char * filename,
    DDS_Boolean print_details ) [static]
```

Saves the current heap memory usage in a file.

After **NDDUtilityHeapMonitoring::enable** (p. 1843) is called, you may invoke this method periodically to save the current heap memory usage to a file.

By comparing two snapshots, you can tell if new memory has been allocated and in many cases where. This is why this operation can be used to debug unexpected memory growth.

The format of a snapshot is as follows:

First, there is a memory usage summary like this:

```
<P>
    Product Version: NDDSCORE_BUILD_6.0.0.0_20200316T123411Z_RTI_ENG
    Process virtual memory: 2552352768
    Process physical memory: 16187392
    Current application heap usage: 10532131
    Approximate total heap usage: 203331110
    High watermark: 10532131
    Alloc count: 17634
    Free count: 3518
```

- Process virtual memory: The amount of virtual memory in bytes taken by the process. This memory includes RTI Connex and non-RTI Connex memory.
- Process physical memory: The amount of physical memory in bytes taken by the process.
- Current application heap usage: The amount of heap memory in bytes used by the middleware. For Java and .NET APIs, this memory only accounts for unmanaged RTI Connex memory, not memory living in the managed heap. This value does not include overhead memory allocations that are used by the Heap Monitoring utility. It therefore provides the heap usage that is used when Heap Monitoring is disabled and does not reflect the actual amount of memory that has been allocated by the middleware. That value is accounted for in 'Approximate total heap usage'.
- Approximate total heap usage: The amount of heap memory in bytes used by the middleware, including overhead allocations from the Heap Monitoring utility. When the Heap Monitoring utility is enabled, every allocation has an additional overhead number of bytes allocated so that the middleware can keep track of the meta-data that is output in the heap snapshots. This overhead is not accounted for in the 'Current application heap usage' summary field, but is included in this field. For Java and .NET APIs, this memory only accounts for unmanaged RTI Connex memory, not memory living in the managed heap.
- High watermark: The maximum amount of heap usage by RTI Connex since **NDDUtilityHeapMonitoring::enable** (p. 1843) was invoked.
- Alloc count: The number of invocations to malloc, realloc, or calloc operations done by RTI Connex.
- Free count: The number of invocations to the free operation done by RTI Connex.

After the previous summary, and only if you set the parameter `print_details` to `DDS_BOOLEAN_TRUE` (p.317), the method will print the details of every single outstanding heap allocation done by RTI Connex. For example:

```
<P>
    block_id, timestamp, block_size, alloc_method_name, type_name, pool_alloc, pool_buffer_size,
    pool_buffer_count, topic_name, function_name, activity_context

    23087, 1586943520, 16, RTIOsapiHeap_allocateArray, struct RTIEncapsulationInfo, MALLOC, 0,
    0, PRESServiceRequest, PRESWriterHistoryDriver_new,
    "0X101175A,0X76DD63D7,0X984377BC:0X1C1{Name=ShapeTypeParticipant,Domain=110}|CREATE
    Participant|ENABLE|:0X80000088{Entity=Pu,Domain=110}|CREATE Writer WITH TOPIC PRESServiceRequest"
```

- `block_id`: Block ID of the allocation. This number increases with every allocation.
- `timestamp`: Timestamp in UTC seconds corresponding to the time where the allocation was done.
- `block_size`: The number of bytes allocated.
- `alloc_method_name`: The allocation RTI Connex method name.
- `type_name`: The allocation typename.
- `pool_alloc`: Indicates if the heap allocation is a RTI Connex pool allocation (POOL) or a regular allocation (MALLOC).
- `pool_buffer_size`: For pool allocations, this number indicates the size of the elements in the pool in number of bytes. `block_size` is equal to (`pool_buffer_size * pool_buffer_count`).
- `pool_buffer_count`: For pool allocations, this number indicates the number of buffers allocated for the pool. `block_size` is equal to (`pool_buffer_size * pool_buffer_count`).
- `topic_name`: The topic name associated with the allocation or 'n/a' if it is not available.
- `function_name`: function name associated with the allocation or 'n/a' if it is not available.
- `activity_context`: **Activity Context** (p.530)

#### Parameters

<code>filename</code>	<< <i>in</i> >> (p.238). Name of file in which to store the snapshot.
<code>print_details</code>	<< <i>in</i> >> (p.238). Indicates if the snapshot will contain only the memory usage summary or the details of the individual allocations.

#### Returns

`DDS_BOOLEAN_TRUE` (p.317) if success. Otherwise, `DDS_BOOLEAN_FALSE` (p.317)

## 9.355 NDDUtilityNetworkCapture Class Reference

Network Capture APIs.

### Static Public Member Functions

- static `DDS_Boolean enable ()`

- Enable Network Capture.*

  - static **DDS\_Boolean disable** ()

*Disable Network Capture.*
- static **DDS\_Boolean set\_default\_params** (const **NDDS\_Utility\_NetworkCaptureParams\_t** &params)

*Set the default Network Capture parameters.*
- static **DDS\_Boolean start** (const char \*filename)

*Start capturing traffic for all DomainParticipants, with the default parameters.*
- static **DDS\_Boolean start** ( **DDSDomainParticipant** \*participant, const char \*filename)

*Start capturing traffic for a DomainParticipant, with the default parameters.*
- static **DDS\_Boolean start** (const char \*filename, const **NDDS\_Utility\_NetworkCaptureParams\_t** &params)

*Start capturing traffic for all DomainParticipants, with the provided parameters.*
- static **DDS\_Boolean start** ( **DDSDomainParticipant** \*participant, const char \*filename, const **NDDS\_Utility\_↵\_NetworkCaptureParams\_t** &params)

*Start capturing traffic for a DomainParticipant, with the provided parameters.*
- static **DDS\_Boolean stop** ()

*Stop capturing traffic for all participants.*
- static **DDS\_Boolean stop** ( **DDSDomainParticipant** \*participant)

*Stop capturing traffic for a DomainParticipant.*
- static **DDS\_Boolean pause** ()

*Pause capturing traffic for all DomainParticipants.*
- static **DDS\_Boolean pause** ( **DDSDomainParticipant** \*participant)

*Pause capturing traffic for a DomainParticipant.*
- static **DDS\_Boolean resume** ()

*Resume capturing traffic for all DomainParticipants.*
- static **DDS\_Boolean resume** ( **DDSDomainParticipant** \*participant)

*Resume capturing traffic for a DomainParticipant.*

### 9.355.1 Detailed Description

Network Capture APIs.

### 9.355.2 Member Function Documentation

#### 9.355.2.1 enable()

```
static DDS_Boolean NDDSUtilityNetworkCapture::enable ( ) [static]
```

Enable Network Capture.

This method must be called before any other Network Capture method. It must also be called before creating the participants for which we want to capture traffic.

Use this method only for debugging purposes, since it may introduce a significant performance impact.

**Returns**

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

**MT Safety:**

UNSAFE. It is not safe to call this method while another thread may be simultaneously calling another Network Capture related method, including this one.

**MT Safety:**

UNSAFE. In VxWorks, it is unsafe to call this method while another thread may be simulatenously calling **DDSDomainParticipantFactory::get\_instance** (p. 1429), **DDSDomainParticipantFactory::finalize\_instance** (p. 1429), **DDS\_TypeCodeFactory::get\_instance** (p. 1212), **NDDUtilityNetworkCapture::enable** (p. 1847), or **NDDUtilityNetworkCapture::disable** (p. 1848).

**See also**

**NDDUtilityNetworkCapture::disable** (p. 1848)

**9.355.2.2 disable()**

```
static DDS_Boolean NDDUtilityNetworkCapture::disable ( ) [static]
```

Disable Network Capture.

This method must be the last Network Capture method to be called. It must also be called after deleting the participants for which we captured traffic. Disabling Network Capture without stopping it first is not ok!

**Returns**

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

**MT Safety:**

UNSAFE. It is not safe to call this method while another thread may be simultaneously calling another Network Capture related method, including this one.

**MT Safety:**

UNSAFE. In VxWorks, it is unsafe to call this method while another thread may be simulatenously calling **DDSDomainParticipantFactory::get\_instance** (p. 1429), **DDSDomainParticipantFactory::finalize\_instance** (p. 1429), **DDS\_TypeCodeFactory::get\_instance** (p. 1212), **NDDUtilityNetworkCapture::enable** (p. 1847), or **NDDUtilityNetworkCapture::disable** (p. 1848).

**See also**

**NDDUtilityNetworkCapture::enable** (p. 1847)

### 9.355.2.3 set\_default\_params()

```
static DDS_Boolean NDDUtilityNetworkCapture::set_default_params (
    const NDD_UTILITY_NetworkCaptureParams_t & params ) [static]
```

Set the default Network Capture parameters.

The default parameters are used when Network Capture is started without parameters, i.e., **NDDUtilityNetworkCapture::start** (p. 1849).

#### Precondition

This method requires first enabling Network Capture. See **NDDUtilityNetworkCapture::enable** (p. 1847).

#### Parameters

<i>params</i>	<< <i>in</i> >> (p. 238). Configuration parameters that we want to set as defaults.
---------------	---

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

#### See also

**NDDUtilityNetworkCapture::start** (p. 1849)

**NDDUtilityNetworkCapture::start(DDSDomainParticipant \*, const char \*)** (p. 1850)

### 9.355.2.4 start() [1/4]

```
static DDS_Boolean NDDUtilityNetworkCapture::start (
    const char * filename ) [static]
```

Start capturing traffic for all DomainParticipants, with the default parameters.

#### Precondition

This method requires first enabling Network Capture. See **NDDUtilityNetworkCapture::enable** (p. 1847).

#### Parameters

<i>filename</i>	<< <i>in</i> >> (p. 238). The name of the output capture file will be based on this input parameter.
-----------------	--

In particular, the name for the capture file is the concatenation of the *filename* input parameter, the "\_GUID-"

string followed by the decimal representation of bytes 8-11 of the DomainParticipant's GUID, and the file extension (".pcap").

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

#### See also

**NDDSUtilityNetworkCapture::stop** (p. 1852)

**NDDSUtilityNetworkCapture::start(DDSDomainParticipant \*, const char \*)** (p. 1850)

### 9.355.2.5 start() [2/4]

```
static DDS_Boolean NDDSUtilityNetworkCapture::start (
    DDSDomainParticipant * participant,
    const char * filename ) [static]
```

Start capturing traffic for a DomainParticipant, with the default parameters.

#### Precondition

This method requires first enabling Network Capture. See **NDDSUtilityNetworkCapture::enable** (p. 1847).

#### Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238). DomainParticipant for which we want to capture traffic.
<i>filename</i>	<< <i>in</i> >> (p. 238). The name of the output capture file will be based on this input parameter.

In particular, the name for the capture file is the concatenation of the *filename* input parameter, and the file extension (".pcap").

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

#### See also

**NDDSUtilityNetworkCapture::stop(DDSDomainParticipant \*)** (p. 1852)

**NDDSUtilityNetworkCapture::start(DDSDomainParticipant \*, const char \*, const NDDS\_UTILITY\_NETWORK\_CAPTURE\_PARAMS\_t&)** (p. 1851)

**NDDSUtilityNetworkCapture::enable** (p. 1847)



**9.355.2.6 start()** [3/4]

```
static DDS_Boolean NDDSUtilityNetworkCapture::start (
    const char * filename,
    const NDDS_Utility_NetworkCaptureParams_t & params ) [static]
```

Start capturing traffic for all DomainParticipants, with the provided parameters.

**Precondition**

This method requires first enabling Network Capture. See **NDDSUtilityNetworkCapture::enable** (p. 1847).

Performs the same function as **NDDSUtilityNetworkCapture::start** (p. 1849) except that it uses the provided parameters, instead of the default ones.

**Parameters**

<i>filename</i>	<< <i>in</i> >> (p. 238). The name of the output capture file will be based on this input parameter.
-----------------	--

In particular, the name for the capture file is the concatenation of the *filename* input parameter, the "\_GUID-" string followed by the decimal representation of bytes 8-11 of the DomainParticipant's GUID, and the file extension (".pcap").

**Parameters**

<i>params</i>	<< <i>in</i> >> (p. 238). Configuration parameters for the capture.
---------------	---

**Returns**

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

**See also**

**NDDSUtilityNetworkCapture::stop** (p. 1852)

**NDDSUtilityNetworkCapture::start(DDSDomainParticipant \*, const char \*, const NDDS\_Utility\_NetworkCaptureParams\_t&)** (p. 1851)

**9.355.2.7 start()** [4/4]

```
static DDS_Boolean NDDSUtilityNetworkCapture::start (
    DDSDomainParticipant * participant,
    const char * filename,
    const NDDS_Utility_NetworkCaptureParams_t & params ) [static]
```

Start capturing traffic for a DomainParticipant, with the provided parameters.

**Precondition**

This method requires enabling first Network Capture. See **NDDSUtilityNetworkCapture::enable** (p. 1847).

## Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238). DomainParticipant for which we want to capture traffic.
<i>filename</i>	<< <i>in</i> >> (p. 238). The name of the output capture file will be based on this input parameter.

In particular, the name for the capture file is the concatenation of the `filename` input parameter, and the file extension (`".pcap"`).

## Parameters

<i>params</i>	<< <i>in</i> >> (p. 238). Parameters for configuring the capture.
---------------	---

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

## See also

**NDDSUtilityNetworkCapture::stop(DDSDomainParticipant \*)** (p. 1852)

**NDDSUtilityNetworkCapture::start(DDSDomainParticipant \*, const char \*)** (p. 1850)

**9.355.2.8 stop()** [1/2]

```
static DDS_Boolean NDDSUtilityNetworkCapture::stop ( ) [static]
```

Stop capturing traffic for all participants.

## Precondition

This method requires enabling first Network Capture. See **NDDSUtilityNetworkCapture::enable** (p. 1847).

This method can (and must) be called after **NDDSUtilityNetworkCapture::start** (p. 1849), not **NDDSUtilityNetworkCapture::start(DDSDomainParticipant \*, const char \*)** (p. 1850). That is, if we start capturing traffic globally (for all DomainParticipants), we must stop capturing traffic also globally. It is not possible to start capturing traffic for a participant but stop it globally.

It is possible to start capturing globally and then stop capturing for a participant, as long as we eventually stop capturing traffic globally.

We must stop capturing for a participant before deleting it.

## Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

## See also

**NDDSUtilityNetworkCapture::start** (p. 1849)

**NDDSUtilityNetworkCapture::stop(DDSDomainParticipant \*)** (p. 1852)

### 9.355.2.9 stop() [2/2]

```
static DDS_Boolean NDDSUtilityNetworkCapture::stop (
    DDSDomainParticipant * participant ) [static]
```

Stop capturing traffic for a DomainParticipant.

#### Precondition

This method requires first enabling Network Capture. See **NDDSUtilityNetworkCapture::enable** (p. 1847).

#### Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238). DomainParticipant for which we want to stop capturing traffic.
--------------------	--

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

#### See also

**NDDSUtilityNetworkCapture::start(DDSDomainParticipant \*, const char \*)** (p. 1850)

**NDDSUtilityNetworkCapture::stop** (p. 1852)

### 9.355.2.10 pause() [1/2]

```
static DDS_Boolean NDDSUtilityNetworkCapture::pause ( ) [static]
```

Pause capturing traffic for all DomainParticipants.

#### Precondition

This method requires first enabling Network Capture. See **NDDSUtilityNetworkCapture::enable** (p. 1847).

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

#### See also

**NDDSUtilityNetworkCapture::resume** (p. 1854)

**NDDSUtilityNetworkCapture::pause(DDSDomainParticipant \*)** (p. 1853)

### 9.355.2.11 pause() [2/2]

```
static DDS_Boolean NDDSUtilityNetworkCapture::pause (  
    DDSDomainParticipant * participant ) [static]
```

Pause capturing traffic for a DomainParticipant.

#### Precondition

This method requires first enabling Network Capture. See **NDDSUtilityNetworkCapture::enable** (p. 1847).

#### Parameters

<i>participant</i>	<< <i>in</i> >> (p. 238). DomainParticipant for which we want to pause capturing traffic.
--------------------	---

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

#### See also

**NDDSUtilityNetworkCapture::resume(DDSDomainParticipant \*)** (p. 1854)

**NDDSUtilityNetworkCapture::pause** (p. 1853)

### 9.355.2.12 resume() [1/2]

```
static DDS_Boolean NDDSUtilityNetworkCapture::resume ( ) [static]
```

Resume capturing traffic for all DomainParticipants.

#### Precondition

This method requires first enabling Network Capture. See **NDDSUtilityNetworkCapture::enable** (p. 1847).

#### Returns

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

#### See also

**NDDSUtilityNetworkCapture::pause** (p. 1853)

**NDDSUtilityNetworkCapture::resume(DDSDomainParticipant \*)** (p. 1854)

**9.355.2.13 resume()** [2/2]

```
static DDS_Boolean NDDSUtilityNetworkCapture::resume (
    DDSDomainParticipant * participant ) [static]
```

Resume capturing traffic for a DomainParticipant.

**Precondition**

This method requires first enabling Network Capture. See **NDDSUtilityNetworkCapture::enable** (p. 1847).

**Parameters**

<i>participant</i>	<< <i>in</i> >> (p. 238). DomainParticipant for which we want to resume capturing traffic.
--------------------	--

**Returns**

**DDS\_BOOLEAN\_TRUE** (p. 317) if success. Otherwise, **DDS\_BOOLEAN\_FALSE** (p. 317)

**See also**

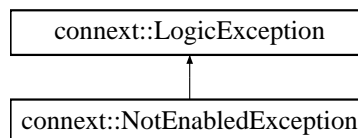
**NDDSUtilityNetworkCapture::pause(DDSDomainParticipant \*)** (p. 1853)

**NDDSUtilityNetworkCapture::resume** (p. 1854)

**9.356 connext::NotEnabledException Class Reference**

Operation invoked on a **DDSEntity** (p. 1463) that is not yet enabled.

Inheritance diagram for connext::NotEnabledException:

**9.356.1 Detailed Description**

Operation invoked on a **DDSEntity** (p. 1463) that is not yet enabled.

**See also**

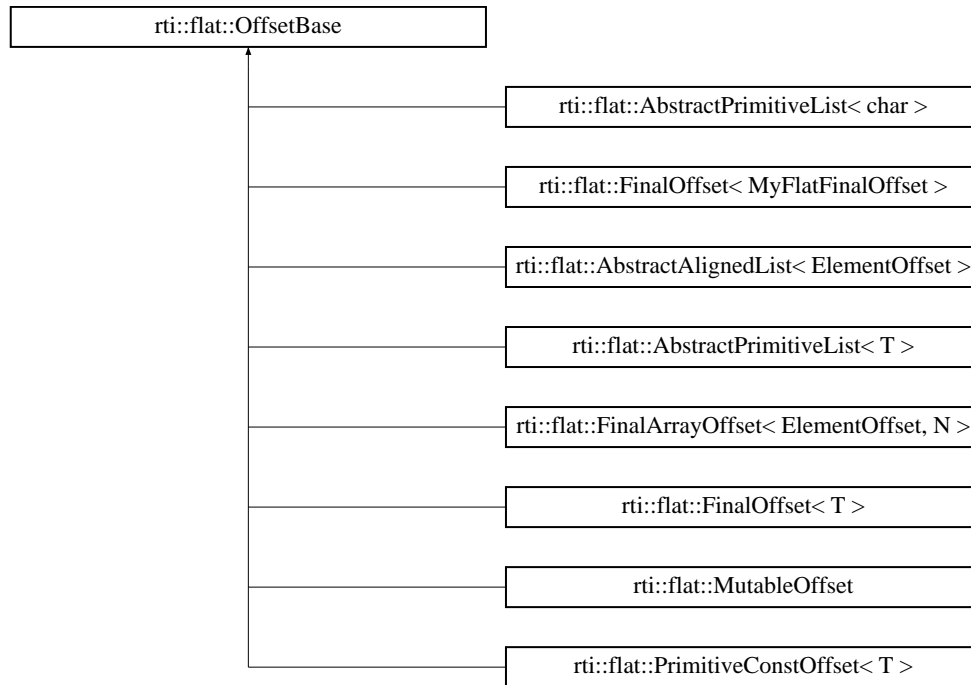
**DDS\_RETCODE\_NOT\_ENABLED** (p. 337)

## 9.357 rti::flat::OffsetBase Class Reference

Base class of all Offset types.

```
#include <Offset.hpp>
```

Inheritance diagram for rti::flat::OffsetBase:



### Public Member Functions

- bool **is\_null** () const  
*Indicates whether this Offset doesn't point to a valid element.*
- bool **is\_cpp\_compatible** () const  
*Indicates whether **rti::flat::plain\_cast()** (p. 566) is possible.*
- const unsigned char \* **get\_buffer** () const  
*Gets this member's position in the buffer.*
- offset\_t **get\_buffer\_size** () const  
*Gets the size, in bytes, of this member in the buffer.*

### Friends

- bool **operator**< (const **OffsetBase** &s1, const **OffsetBase** &s2)  
*Compares two Offsets.*
- bool **operator**> (const **OffsetBase** &s1, const **OffsetBase** &s2)  
*Compares two Offsets.*

- bool **operator<=** (const **OffsetBase** &s1, const **OffsetBase** &s2)  
*Compares two Offsets.*
- bool **operator>=** (const **OffsetBase** &s1, const **OffsetBase** &s2)  
*Compares two Offsets.*
- bool **operator==** (const **OffsetBase** &s1, const **OffsetBase** &s2)  
*Determines if two offsets point to the same position.*
- bool **operator!=** (const **OffsetBase** &s1, const **OffsetBase** &s2)  
*Determines if two offsets point to different positions.*

### 9.357.1 Detailed Description

Base class of all Offset types.

See also

**FlatData Offsets** (p. 564)

### 9.357.2 Member Function Documentation

#### 9.357.2.1 is\_null()

```
bool rti::flat::OffsetBase::is_null ( ) const [inline]
```

Indicates whether this Offset doesn't point to a valid element.

See also

**Offset Error Management** (p. 566)

Referenced by **get\_buffer()**.

#### 9.357.2.2 is\_cpp\_compatible()

```
bool rti::flat::OffsetBase::is_cpp_compatible ( ) const [inline]
```

Indicates whether **rti::flat::plain\_cast()** (p. 566) is possible.

Returns

True only if the data pointed to by this Offset can be **rti::flat::plain\_cast()** (p. 566)

See also

**rti::flat::plain\_cast()** (p. 566) for the requirements that a type needs to meet

### 9.357.2.3 get\_buffer()

```
const unsigned char * rti::flat::OffsetBase::get_buffer ( ) const [inline]
```

Gets this member's position in the buffer.

#### Note

This function should be used for debugging purposes only. To access the data in this Offset use the Offset accessor methods or, if this type allows it, `rti::flat::plain_cast()` (p. 566).

Returns the position within the **Sample** (p. 1916)'s buffer that this Offset points to.

#### See also

`get_buffer_size()` (p. 1858)

References `is_null()`.

Referenced by `rti::flat::StringOffset::get_string()`.

### 9.357.2.4 get\_buffer\_size()

```
offset_t rti::flat::OffsetBase::get_buffer_size ( ) const [inline]
```

Gets the size, in bytes, of this member in the buffer.

Returns the number of bytes that this member comprises after the position returned by `get_buffer()`.

Referenced by `rti::flat::AbstractAlignedList< ElementOffset >::begin()`, and `rti::flat::AbstractAlignedList< ElementOffset >::end()`.

## 9.357.3 Friends And Related Function Documentation

### 9.357.3.1 operator<

```
bool operator< (
    const OffsetBase & s1,
    const OffsetBase & s2 ) [friend]
```

Compares two Offsets.

#### Returns

True if `s1` points to a position smaller than `s2`'s.



### 9.357.3.2 operator>

```
bool operator> (
    const OffsetBase & s1,
    const OffsetBase & s2 ) [friend]
```

Compares two Offsets.

#### Returns

True if s1 points to a position greater than s2's.

### 9.357.3.3 operator<=

```
bool operator<= (
    const OffsetBase & s1,
    const OffsetBase & s2 ) [friend]
```

Compares two Offsets.

#### Returns

True if s1 points to a position equal to or smaller than s2's.

### 9.357.3.4 operator>=

```
bool operator>= (
    const OffsetBase & s1,
    const OffsetBase & s2 ) [friend]
```

Compares two Offsets.

#### Returns

True if s1 points to a position equal to or greater than s2's.

### 9.357.3.5 operator==

```
bool operator== (
    const OffsetBase & s1,
    const OffsetBase & s2 ) [friend]
```

Determines if two offsets point to the same position.

#### Returns

True if s1 points to the same position as s2.

### 9.357.3.6 operator!=

```
bool operator!= (
    const OffsetBase & s1,
    const OffsetBase & s2 ) [friend]
```

Determines if two offsets point to different positions.

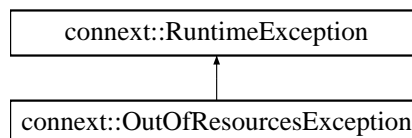
#### Returns

True if s1 points to a different position than s2.

## 9.358 connext::OutOfResourcesException Class Reference

RTI Connex ran out of the resources needed to complete the operation.

Inheritance diagram for connext::OutOfResourcesException:



### 9.358.1 Detailed Description

RTI Connex ran out of the resources needed to complete the operation.

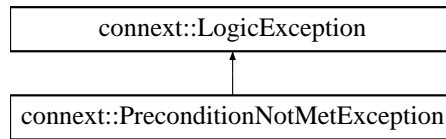
See also

**DDS\_RETCODE\_OUT\_OF\_RESOURCES** (p. 337)

## 9.359 connext::PreconditionNotMetException Class Reference

A pre-condition for the operation was not met.

Inheritance diagram for connext::PreconditionNotMetException:



### 9.359.1 Detailed Description

A pre-condition for the operation was not met.

See also

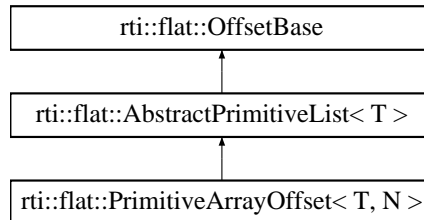
**DDS\_RETCODE\_PRECONDITION\_NOT\_MET** (p. 336)

## 9.360 rti::flat::PrimitiveArrayOffset< T, N > Class Template Reference

Offset to an array of primitive elements.

```
#include <SequenceOffsets.hpp>
```

Inheritance diagram for rti::flat::PrimitiveArrayOffset< T, N >:



### Public Member Functions

- unsigned int **element\_count** () const

*Returns the number of elements, N.*

### 9.360.1 Detailed Description

```
template<typename T, unsigned int N>
class rti::flat::PrimitiveArrayOffset< T, N >
```

Offset to an array of primitive elements.

### Template Parameters

<i>T</i>	The primitive type
<i>N</i>	The array bound. For multidimensional arrays, <i>N</i> is the product of each dimension bound.

A **PrimitiveArrayOffset** (p. 1861) may meet the requirements to be cast to an array of the equivalent plain C++ element type (see `rti::flat::plain_cast()` (p. 566)).

## 9.360.2 Member Function Documentation

### 9.360.2.1 `element_count()`

```
template<typename T , unsigned int N>
unsigned int rti::flat::PrimitiveArrayOffset< T, N >::element_count ( ) const [inline]
```

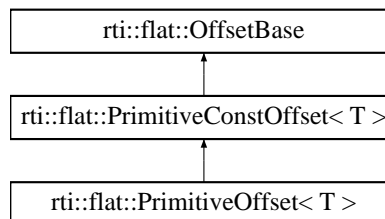
Returns the number of elements, *N*.

## 9.361 `rti::flat::PrimitiveConstOffset< T >` Struct Template Reference

A const Offset to an optional primitive member.

```
#include <Offset.hpp>
```

Inheritance diagram for `rti::flat::PrimitiveConstOffset< T >`:



### Public Member Functions

- `T get () const`  
*Gets the value of this primitive member.*

### 9.361.1 Detailed Description

```
template<typename T>
struct rti::flat::PrimitiveConstOffset< T >
```

A const Offset to an optional primitive member.

Read-only version of **PrimitiveOffset** (p. 1863).

If `lis_null()`, the value can be retrieved with `get()` (p. 1863).

### 9.361.2 Member Function Documentation

#### 9.361.2.1 get()

```
template<typename T >
T rti::flat::PrimitiveConstOffset< T >::get ( ) const [inline]
```

Gets the value of this primitive member.

**Precondition**

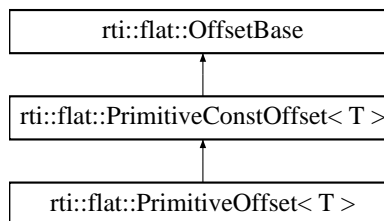
`!lis_null()`

## 9.362 rti::flat::PrimitiveOffset< T > Struct Template Reference

An Offset to an optional primitive member.

```
#include <Offset.hpp>
```

Inheritance diagram for `rti::flat::PrimitiveOffset< T >`:



### Public Member Functions

- `bool set (T value)`

*Sets a value for this primitive member.*

### 9.362.1 Detailed Description

```
template<typename T>
struct rti::flat::PrimitiveOffset< T >
```

An Offset to an optional primitive member.

### Template Parameters

<i>T</i>	The primitive type
----------	--------------------

Non-optional primitive members are accessed directly using its container type's methods; however, since an optional member may not exist, this Offset is returned instead. The only purpose of the type **PrimitiveOffset** (p. 1863) is to provide a way to check for the member's existence.

If `!is_null()`, the value can be retrieved with `get()` (p. 1863) or set with `set()` (p. 1864).

See also

**MyFlatMutableOffset::my\_optional\_primitive** (p. 1759) vs. **MyFlatMutableOffset::my\_primitive** (p. 1759)

## 9.362.2 Member Function Documentation

### 9.362.2.1 set()

```
template<typename T >
bool rti::flat::PrimitiveOffset< T >::set (
    T value ) [inline]
```

Sets a value for this primitive member.

Precondition

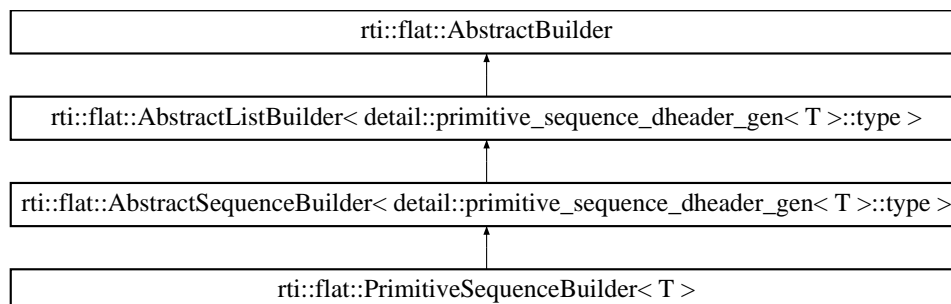
`!is_null()`

## 9.363 rti::flat::PrimitiveSequenceBuilder< T > Class Template Reference

Builds a sequence of primitive members.

```
#include <SequenceBuilders.hpp>
```

Inheritance diagram for `rti::flat::PrimitiveSequenceBuilder< T >`:



## Public Member Functions

- **PrimitiveSequenceBuilder** & **add\_next** (T value)  
*Adds the next element.*
- **PrimitiveSequenceBuilder** & **add\_n** (const T \*array, unsigned int count)  
*Adds all the elements in an array.*
- **PrimitiveSequenceBuilder** & **add\_n** (unsigned int count, T value)  
*Adds a number of elements with the same value.*
- **PrimitiveSequenceBuilder** & **add\_n** (unsigned int count)  
*Adds a number of uninitialized elements.*
- **Offset finish** ()  
*Finishes building the sequence.*

## Additional Inherited Members

### 9.363.1 Detailed Description

```
template<typename T>
class rti::flat::PrimitiveSequenceBuilder< T >
```

Builds a sequence of primitive members.

The elements can be added one by one with `add_next()` or all at once with `add_n()` (p. 1865).

### 9.363.2 Member Function Documentation

#### 9.363.2.1 add\_next()

```
template<typename T >
PrimitiveSequenceBuilder & rti::flat::PrimitiveSequenceBuilder< T >::add_next (
    T value ) [inline]
```

Adds the next element.

#### Parameters

<i>value</i>	The primitive element to add
--------------	------------------------------

**9.363.2.2 add\_n()** [1/3]

```
template<typename T >
PrimitiveSequenceBuilder & rti::flat::PrimitiveSequenceBuilder< T >::add_n (
    const T * array,
    unsigned int count ) [inline]
```

Adds all the elements in an array.

**Parameters**

<i>array</i>	The array containing the values to add
<i>count</i>	The size of the array

**9.363.2.3 add\_n()** [2/3]

```
template<typename T >
PrimitiveSequenceBuilder & rti::flat::PrimitiveSequenceBuilder< T >::add_n (
    unsigned int count,
    T value ) [inline]
```

Adds a number of elements with the same value.

This overload initializes all the elements to a value.

**Note**

This operation is  $O(\text{count})$ . The other overloads, **add\_n(unsigned int)** (p. 1866) and **add\_n(const T\*, unsigned int)** (p. 1865), are more efficient

**Parameters**

<i>count</i>	The number of elements to add
<i>value</i>	The value to set for each element

**9.363.2.4 add\_n()** [3/3]

```
template<typename T >
PrimitiveSequenceBuilder & rti::flat::PrimitiveSequenceBuilder< T >::add_n (
    unsigned int count ) [inline]
```

Adds a number of uninitialized elements.



This operation is  $O(1)$ , since it leaves the elements uninitialized. They can be initialized using the Offset returned by **finish()** (p. 1867) and **rti::flat::plain\_cast()** (p. 566). For example:

```
MyFlatMutableBuilder builder = ...;
auto seq_builder = builder.build_my_primitive_seq();
seq_builder.add_n(1000);
auto seq_offset = seq_builder.finish();
int32_t *elements = rti::flat::plain_cast(seq_offset);
for (int i = 0; i < 1000; i++) {
    elements[i] = ...;
}
```

#### Parameters

<i>count</i>	The number of elements to add
--------------	-------------------------------

#### 9.363.2.5 finish()

```
template<typename T >
Offset rti::flat::PrimitiveSequenceBuilder< T >::finish ( ) [inline]
```

Finishes building the sequence.

#### Returns

An Offset to the member that has been built.

#### See also

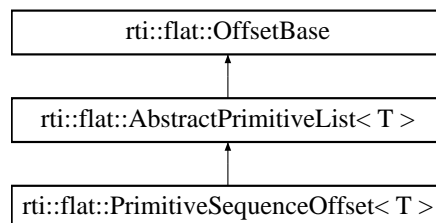
**discard()** (p. 580)

## 9.364 rti::flat::PrimitiveSequenceOffset< T > Class Template Reference

Offset to a sequence of primitive elements.

```
#include <SequenceOffsets.hpp>
```

Inheritance diagram for rti::flat::PrimitiveSequenceOffset< T >:



## Public Member Functions

- unsigned int **element\_count** () const  
*Returns the number of elements.*

### 9.364.1 Detailed Description

```
template<typename T>
class rti::flat::PrimitiveSequenceOffset< T >
```

Offset to a sequence of primitive elements.

#### Template Parameters

<i>T</i>	The primitive type
----------	--------------------

### 9.364.2 Member Function Documentation

#### 9.364.2.1 element\_count()

```
template<typename T >
unsigned int rti::flat::PrimitiveSequenceOffset< T >::element_count ( ) const [inline]
```

Returns the number of elements.

Referenced by `rti::flat::StringOffset::element_count()`.

## 9.365 connext::Replier< TReq, TRep > Class Template Reference

Allows receiving requests and sending replies.

### Public Types

- typedef TReq **Request**  
*The request type.*
- typedef TRep **Reply**  
*The reply type.*
- typedef dds\_type\_traits< TRep >::DataWriter **ReplyDataWriter**  
*The typed DataWriter for type TRep.*
- typedef dds\_type\_traits< TReq >::DataReader **RequestDataReader**  
*The typed DataReader for type TReq.*

## Public Member Functions

- **Replier** ( **DDSDomainParticipant** \*participant, const std::string &service\_name)
 

*Creates a **Replier** (p. 1868) with the minimum set of parameters.*
- **Replier** (const **ReplierParams**< TReq, TRep > &params)
 

*Creates a **Replier** (p. 1868) with parameters.*
- virtual ~**Replier** ()
 

*Releases the internal entities created by this **Replier** (p. 1868).*
- template<typename URep >
 void **send\_reply** (const URep &reply, const **SampleIdentity\_t** &related\_request\_id)
 

*Sends a reply for a previous request.*
- template<typename URep >
 void **send\_reply** ( **WriteSample**< URep > &reply, const **SampleIdentity\_t** &related\_request\_id)
 

*Sends a reply for a previous request.*
- template<typename URep >
 void **send\_reply** ( **WriteSampleRef**< URep > &reply, const **SampleIdentity\_t** &related\_request\_id)
 

*Sends a reply for a previous request using a **SampleRef** (p. 1920).*
- bool **receive\_request** ( **connex::Sample**< TReq > &request, const **DDS\_Duration\_t** &max\_wait)
 

*Waits for a request and copies its contents into a **Sample** (p. 1912).*
- bool **receive\_request** ( **connex::SampleRef**< TReq > request, const **DDS\_Duration\_t** &max\_wait)
 

*Waits for a request and copies its contents into a **SampleRef** (p. 1920).*
- **LoanedSamplesType** **receive\_requests** (const **DDS\_Duration\_t** &max\_wait)
 

*Waits for multiple requests and provides a loaned container to access them.*
- **LoanedSamplesType** **receive\_requests** (int min\_request\_count, int max\_request\_count, const **DDS\_↔Duration\_t** &max\_wait)
 

*Waits for multiple requests and provides a loaned container to access them.*
- bool **wait\_for\_requests** (const **DDS\_Duration\_t** &max\_wait)
 

*Waits for requests.*
- bool **wait\_for\_requests** (int min\_count, const **DDS\_Duration\_t** &max\_wait)
 

*Waits for requests.*
- bool **take\_request** ( **connex::Sample**< TReq > &request)
 

*Copies the contents of a request into a **Sample** (p. 1912).*
- bool **take\_request** ( **connex::SampleRef**< TReq > request)
 

*Copies the contents of a request into a **SampleRef** (p. 1920).*
- **LoanedSamplesType** **take\_requests** (int max\_samples= **DDS\_LENGTH\_UNLIMITED**)
 

*Provides a loaned container to access the existing requests.*
- bool **read\_request** ( **connex::Sample**< TReq > &request)
 

*Copies the contents of a request into a **Sample** (p. 1912).*
- bool **read\_request** ( **connex::SampleRef**< TReq > request)
 

*Copies the contents of a request into a **SampleRef** (p. 1920).*
- **LoanedSamplesType** **read\_requests** (int max\_samples= **DDS\_LENGTH\_UNLIMITED**)
 

*Provides a loaned container to access the existing requests.*
- **RequestDataReader** \* **get\_request\_datareader** () const
 

*Retrieves the underlying **DDSDataReader** (p. 1288).*
- **ReplyDataWriter** \* **get\_reply\_datawriter** () const
 

*Retrieves the underlying **DDSDataWriter** (p. 1321).*

### 9.365.1 Detailed Description

```
template<typename TReq, typename TRep>
class connex::Replier< TReq, TRep >
```

Allows receiving requests and sending replies.

A **Replier** (p. 1868) is an entity with two associated **topics** (p.61): a request topic and a reply topic. It can receive requests by subscribing to the request topic and can send replies to those requests by publishing the reply topic.

Valid types for these topics (`TReq` and `TRep`) are: those generated by `rtiddsgen`, the **DDS built-in types** (p.92), and **DDS\_DynamicData** (p.775). See **Creating a Replier** (p.232).

A **Replier** (p. 1868) has four main types of operations:

- Waiting for requests to be received from the middleware
- Getting those requests
- Receiving requests (a convenience operation that is a combination of waiting and getting in a single operation)
- Sending a reply for a previously received request (i.e., publishing a reply sample on the reply topic with special meta-data so that the original **Requester** (p. 1886) can identify it)

For multi-reply scenarios in which a **connex::Replier** (p.1868) generates more than one reply for a request, the **connex::Replier** (p. 1868) should mark all the intermediate replies (all but the last) using the **DDS\_INTERMEDIATE\_REPLY\_SEQUENCE\_SAMPLE** (p.475) flag in **DDS\_WriteParams\_t::flag** (p.1254).

Much like a **Requester** (p. 1886), a **Replier** (p. 1868) has an associated **DDSDomainParticipant** (p.1351), which can be shared with other Repliers or RTI Connex routines. All the other entities required for the request-reply interaction, including a **DDSDataWriter** (p.1321) for writing replies and a **DDSDataReader** (p.1288) for reading requests, are automatically created when the **Replier** (p. 1868) is constructed.

Quality of Service for the underlying DataWriter and DataReader can be configured (see **connex::RequesterParams::qos\_profile** (p.1909)). By default, they are created with **DDS\_RELIABLE\_RELIABILITY\_QOS** (p.435). The exact default configuration is described here: **Configuring Request-Reply QoS profiles** (p.234)

There are several ways to use a **Replier** (p. 1868):

- A thread **receives** (p. 1876) requests and then dispatches them. If the computation of a reply is a simple operation, consider using a **connex::SimpleReplier** (p.1935) instead of a **Replier** (p.1868).
- Polling without waiting, using **take\_requests(int)** (p.1878) directly.
- Using a **connex::ReplierListener** (p.1880) to get notified and **get** (p.1878) the requests within the callback.

#### Template Parameters

<i>TReq</i>	The data type for the request topic
<i>TRep</i>	The data type for the reply topic

See also

**connext::Requester** (p. 1886)

**Request-Reply Examples** (p. 226)

**Basic Replier example** (p. 232)

## 9.365.2 Member Typedef Documentation

### 9.365.2.1 Request

```
template<typename TReq , typename TRep >
typedef TReq  connext::Replier< TReq, TRep >::Request
```

The request type.

### 9.365.2.2 Reply

```
template<typename TReq , typename TRep >
typedef TRep  connext::Replier< TReq, TRep >::Reply
```

The reply type.

### 9.365.2.3 ReplyDataWriter

```
template<typename TReq , typename TRep >
typedef dds_type_traits<TRep>::DataWriter  connext::Replier< TReq, TRep >::ReplyDataWriter
```

The typed DataWriter for type TRep.

### 9.365.2.4 RequestDataReader

```
template<typename TReq , typename TRep >
typedef dds_type_traits<TReq>::DataReader  connext::Replier< TReq, TRep >::RequestDataReader
```

The typed DataReader for type TReq.

### 9.365.3 Constructor & Destructor Documentation

#### 9.365.3.1 Replier() [1/2]

```
template<typename TReq , typename TRep >  
connext::Replier< TReq, TRep >::Replier (   
    DDSDomainParticipant * participant,  
    const std::string & service_name )
```

Creates a **Replier** (p. 1868) with the minimum set of parameters.

## Parameters

<i>participant</i>	The DomainParticipant that this <b>Replier</b> (p. 1868) uses to join a domain.
<i>service_name</i>	The service name. See <b>connext::ReplierParams::service_name</b> (p. 1883)

## Exceptions

<i>One</i>	of the <b>RTI Connex Exceptions</b> (p. 37)
------------	---

## 9.365.3.2 Replier() [2/2]

```
template<typename TReq , typename TRep >
connext::Replier< TReq, TRep >::Replier (
    const ReplierParams< TReq, TRep > & params ) [explicit]
```

Creates a **Replier** (p. 1868) with parameters.

## Parameters

<i>params</i>	All the parameters that configure this <b>Replier</b> (p. 1868)
---------------	---

## Exceptions

<i>One</i>	of the <b>RTI Connex Exceptions</b> (p. 37)
------------	---

## See also

**connext::ReplierParams** (p. 1881)

**Creating a Replier** (p. 232)

## 9.365.3.3 ~Replier()

```
template<typename TReq , typename TRep >
connext::Replier< TReq, TRep >::~~Replier [virtual]
```

Releases the internal entities created by this **Replier** (p. 1868).

Among other internal resources, it deletes the **Replier** (p. 1868)'s underlying DataReader and DataWriter.

## See also

**DDSSubscriber::delete\_datareader** (p. 1602)

**DDSPublisher::delete\_datawriter** (p. 1561)

## 9.365.4 Member Function Documentation

### 9.365.4.1 send\_reply() [1/3]

```
template<typename TReq , typename TRep >
template<typename URep >
void connext::Replier< TReq, TRep >::send_reply (
    const URep & reply,
    const SampleIdentity_t & related_request_id )
```

Sends a reply for a previous request.

The related request identity can be retrieved from an existing request sample (**connext::Sample** (p. 1912)).

#### Parameters

<i>reply</i>	The reply to be sent.
<i>related_request_id</i>	The identity of a previously received request

#### Exceptions

<i>One</i>	of the <b>RTI Connext Exceptions</b> (p. 37)
------------	--

#### See also

**connext::Sample::identity()** (p. 1914)  
**receive\_request(Sample<TReq>&, const Duration\_t&)** (p. 1875)  
**receive\_requests(int, int, const Duration\_t&)** (p. 1876)  
**take\_request(Sample<TReq>&)** (p. 1878)  
**take\_requests(int)** (p. 1878)  
**Basic Replier example** (p. 232)

### 9.365.4.2 send\_reply() [2/3]

```
template<typename TReq , typename TRep >
template<typename URep >
void connext::Replier< TReq, TRep >::send_reply (
    WriteSample< URep > & reply,
    const SampleIdentity_t & related_request_id )
```



Sends a reply for a previous request.

Allows you to set custom parameters for writing a reply.

Contrary to the **connext::Requester** (p. 1886), where retrieving the sample identity for correlation is common, on the **Replier** (p. 1868) side using a **WriteSample** (p. 1948) is only necessary when the default write parameters need to be overridden, and **send\_reply(const URep&, const SampleIdentity\_t&)** (p. 1874) may be used if that is not necessary.

One reason to override the default write parameters is a multi-reply scenario in which a **connext::Replier** (p. 1868) generates more than one reply for a request. In this case, all the intermediate replies (all but the last) should be marked with the **DDS\_INTERMEDIATE\_REPLY\_SEQUENCE\_SAMPLE** (p. 475) flag in **DDS\_WriteParams\_t::flag** (p. 1254) within **connext::WriteSample::info()** (p. 1951).

A **connext::Requester** (p. 1886) can detect if a reply is the last reply of a sequence of replies by checking that the flag **DDS\_INTERMEDIATE\_REPLY\_SEQUENCE\_SAMPLE** (p. 475) is not set in **DDS\_SampleInfo::flag** (p. 1091) within **connext::Sample::info()** (p. 1915).

See also

**send\_reply(const URep&, const SampleIdentity\_t&)** (p. 1874)

**connext::WriteSample** (p. 1948)

### 9.365.4.3 send\_reply() [3/3]

```
template<typename TReq , typename TRep >
template<typename URep >
void connext::Replier< TReq, TRep >::send_reply (
    WriteSampleRef< URep > & reply,
    const SampleIdentity_t & related_request_id )
```

Sends a reply for a previous request using a **SampleRef** (p. 1920).

See also

**connext::WriteSampleRef** (p. 1952)

**connext::Requester::send\_request(WriteSampleRef<UReq>&)** (p. 1893)

**connext::Replier::send\_reply(WriteSample<URep>&, const SampleIdentity\_t&)** (p. 1874)

**Basic Requester example using SampleRef** (p. 231)

**9.365.4.4 receive\_request()** [1/2]

```
template<typename TReq , typename TRep >
bool connex::Replier< TReq, TRep >::receive_request (
    connex::Sample< TReq > & request,
    const DDS_Duration_t & max_wait )
```

Waits for a request and copies its contents into a **Sample** (p. 1912).

Equivalent to using **wait\_for\_requests(int, const Duration\_t&)** (p.1877) and **take\_request(Sample<TReq>&)** (p. 1878)

See also

**connex::Sample** (p. 1912)

**wait\_for\_requests(int, const Duration\_t&)** (p.1877)

**take\_request(Sample<TReq>&)** (p. 1878)

**Basic Replier example** (p. 232)

**9.365.4.5 receive\_request()** [2/2]

```
template<typename TReq , typename TRep >
bool connex::Replier< TReq, TRep >::receive_request (
    connex::SampleRef< TReq > request,
    const DDS_Duration_t & max_wait )
```

Waits for a request and copies its contents into a **SampleRef** (p. 1920).

See also

**connex::Requester::receive\_reply(SampleRef<TRep>, const Duration\_t&)** (p. 1894)

**9.365.4.6 receive\_requests()** [1/2]

```
template<typename TReq , typename TRep >
Replier< TReq, TRep >::LoanedSamplesType connex::Replier< TReq, TRep >::receive_requests (
    const DDS_Duration_t & max_wait )
```

Waits for multiple requests and provides a loaned container to access them.

Equivalent to using **receive\_requests(int, int, const Duration\_t&)** (p. 1876) with `min_count=1` and `max_count=DDS_LENGTH_UNLIMITED` (p. 438)

See also

**connex::LoanedSamples** (p. 1727)

**receive\_requests(int, int, const Duration\_t&)** (p. 1876)

**9.365.4.7 receive\_requests()** [2/2]

```
template<typename TReq , typename TRep >
Replier< TReq, TRep >::LoanedSamplesType connex::Replier< TReq, TRep >::receive_requests (
    int min_request_count,
    int max_request_count,
    const DDS_Duration_t & max_wait )
```

Waits for multiple requests and provides a loaned container to access them.

Equivalent to using **wait\_for\_requests(int, const Duration\_t&)** (p. 1877) and **take\_requests(int)** (p. 1878)

See also

**connex::LoanedSamples** (p. 1727)

**wait\_for\_requests(int, const Duration\_t&)** (p. 1877)

**take\_requests(int)** (p. 1878)

**9.365.4.8 wait\_for\_requests()** [1/2]

```
template<typename TReq , typename TRep >
bool connex::Replier< TReq, TRep >::wait_for_requests (
    const DDS_Duration_t & max_wait )
```

Waits for requests.

Equivalent to **wait\_for\_requests(int, const Duration\_t&)** (p. 1877) with *min\_count*=1

See also

**wait\_for\_requests(int, const Duration\_t&)** (p. 1877)

**9.365.4.9 wait\_for\_requests()** [2/2]

```
template<typename TReq , typename TRep >
bool connex::Replier< TReq, TRep >::wait_for_requests (
    int min_count,
    const DDS_Duration_t & max_wait )
```

Waits for requests.

This operation waits for *min\_count* requests to be available. It will wait up to *max\_wait* .

This operation is similar to **connex::Requester::wait\_for\_replies(int, const Duration\_t&)** (p. 1896).

## Parameters

<i>min_count</i>	Minimum number of requests that need to be available for this operation to unblock.
<i>max_wait</i>	Maximum waiting time after which this operation unblocks regardless of how many requests are available.

## Returns

true if at least `min_count` requests were available before `max_wait` elapsed, or false otherwise.

## See also

**take\_requests(int)** (p. 1878)

**connex::Requester::wait\_for\_replies(int, const Duration\_t&)** (p. 1896)

**9.365.4.10 take\_request()** [1/2]

```
template<typename TReq , typename TRep >
bool connex::Replier< TReq, TRep >::take_request (
    connex::Sample< TReq > & request )
```

Copies the contents of a request into a **Sample** (p. 1912).

## See also

**connex::Requester::take\_reply(Sample<TRep>&)** (p. 1898)

**9.365.4.11 take\_request()** [2/2]

```
template<typename TReq , typename TRep >
bool connex::Replier< TReq, TRep >::take_request (
    connex::SampleRef< TReq > request )
```

Copies the contents of a request into a **SampleRef** (p. 1920).

## See also

**connex::Requester::take\_reply(SampleRef<TRep>)** (p. 1898)

**9.365.4.12 take\_requests()**

```
template<typename TReq , typename TRep >
Replier< TReq, TRep >::LoanedSamplesType connex::Replier< TReq, TRep >::take_requests (
    int max_samples = DDS_LENGTH_UNLIMITED )
```

Provides a loaned container to access the existing requests.

See also

**connex::Requester::take\_replies(int)** (p. 1899)

**9.365.4.13 read\_request()** [1/2]

```
template<typename TReq , typename TRep >
bool connex::Replier< TReq, TRep >::read_request (
    connex::Sample< TReq > & request )
```

Copies the contents of a request into a **Sample** (p. 1912).

This operation is equivalent to **connex::Replier::take\_request(Sample<TReq>&)** (p. 1878) except the request remains in the **Replier** (p. 1868) and can be read or taken again.

**9.365.4.14 read\_request()** [2/2]

```
template<typename TReq , typename TRep >
bool connex::Replier< TReq, TRep >::read_request (
    connex::SampleRef< TReq > request )
```

Copies the contents of a request into a **SampleRef** (p. 1920).

See also

**connex::Requester::read\_reply(SampleRef<TRep>)** (p. 1904)

**9.365.4.15 read\_requests()**

```
template<typename TReq , typename TRep >
Replier< TReq, TRep >::LoanedSamplesType connex::Replier< TReq, TRep >::read_requests (
    int max_samples = DDS_LENGTH_UNLIMITED )
```

Provides a loaned container to access the existing requests.

This operation is equivalent to **connex::Replier::take\_requests(int)** (p. 1878) except the requests remain in the **Replier** (p. 1868) and can be read or taken again.

### 9.365.4.16 `get_request_datareader()`

```
template<typename TReq , typename TRep >
Replier< TReq, TRep > ::RequestDataReader * connext::Replier< TReq, TRep >::get_request_↔
datareader [inline]
```

Retrieves the underlying **DDSDataReader** (p. 1288).

See also

**connext::Requester::get\_reply\_datareader()** (p. 1906)

### 9.365.4.17 `get_reply_datawriter()`

```
template<typename TReq , typename TRep >
Replier< TReq, TRep > ::ReplyDataWriter * connext::Replier< TReq, TRep >::get_reply_datawriter
[inline]
```

Retrieves the underlying **DDSDataWriter** (p. 1321).

See also

**connext::Requester::get\_request\_datawriter()** (p. 1906)

## 9.366 **connext::ReplierListener**< TReq, TRep > Class Template Reference

Called when a **connext::Replier** (p. 1868) has new available requests.

### Public Member Functions

- virtual void **on\_request\_available** ( **Replier**< TReq, TRep > &replier)=0  
*User callback.*

### 9.366.1 Detailed Description

```
template<class TReq, class TRep>
class connext::ReplierListener< TReq, TRep >
```

Called when a **connext::Replier** (p. 1868) has new available requests.

A replier listener is a way to implement a callback that will be invoked when requests are available. It is an optional **connext::ReplierParams** (p. 1881).

This listener simply notifies when requests are available. The callback implementation can then use **connext::Replier**↔  
**::take\_requests(int)** (p. 1878) to retrieve them.

A simpler callback mechanism, where one request sample is a parameter and the reply is the callback return value, is implemented by the **connext::SimpleReplier** (p. 1935).

See also

**connext::Replier::Replier(const ReplierParams&)** (p. 1873)

## 9.366.2 Member Function Documentation

### 9.366.2.1 on\_request\_available()

```
template<class TReq , class TRep >
virtual void connext::ReplierListener< TReq, TRep >::on_request_available (
    Replier< TReq, TRep > & replier ) [pure virtual]
```

User callback.

See also

[DDSDataReaderListener::on\\_data\\_available](#) (p. 1317)

## 9.367 connext::ReplierParams< TReq, TRep > Class Template Reference

Contains the parameters for creating a [connext::Replier](#) (p. 1868).

Inherits [connext::details::EntityParams](#).

### Public Member Functions

- **ReplierParams** ( [DDS::DomainParticipant](#) \*participant)
  - Creates a **ReplierParams** (p. 1881) with the parameters that a **Replier** (p. 1868) always needs.*
- **ReplierParams** & **replier\_listener** ( [ReplierListener](#)< TReq, TRep > &listener)
  - Sets a listener that is called when requests are available.*
- **ReplierParams** & **service\_name** (const std::string &service\_name)
  - The service name the **Replier** (p. 1868) offers and Requesters use to match.*
- **ReplierParams** & **request\_topic\_name** (const std::string &req\_topic)
  - Sets a specific request topic name.*
- **ReplierParams** & **reply\_topic\_name** (const std::string &rep\_topic)
  - Sets a specific reply topic name.*
- **ReplierParams** & **qos\_profile** (const std::string &qos\_library\_name, const std::string &qos\_profile\_name)
  - Sets a QoS profile for the entities in this replier.*
- **ReplierParams** & **datawriter\_qos** (const [DDS\\_DataWriterQos](#) &qos)
  - Sets the quality of service of the reply DataWriter.*
- **ReplierParams** & **datareader\_qos** (const [DDS\\_DataReaderQos](#) &qos)
  - Sets the quality of service of the request DataReader.*
- **ReplierParams** & **publisher** ( [DDS::Publisher](#) \*publisher)
  - Sets a specific Publisher.*
- **ReplierParams** & **subscriber** ( [DDS::Subscriber](#) \*subscriber)
  - Sets a specific Subscriber.*
- **ReplierParams** & **request\_type\_support** ( [DDS::TypeSupport](#) \*type\_support)
  - Sets the type support for the request type.*
- **ReplierParams** & **reply\_type\_support** ( [DDS::TypeSupport](#) \*type\_support)
  - Sets the type support for the reply type.*

### 9.367.1 Detailed Description

```
template<typename TReq, typename TRep>
class connex::ReplierParams< TReq, TRep >
```

Contains the parameters for creating a **connex::Replier** (p. 1868).

See also

**connex::RequesterParams** (p. 1907)

### 9.367.2 Constructor & Destructor Documentation

#### 9.367.2.1 ReplierParams()

```
template<typename TReq , typename TRep >
connex::ReplierParams< TReq, TRep >::ReplierParams (
    DDS::DomainParticipant * participant ) [inline], [explicit]
```

Creates a **ReplierParams** (p. 1881) with the parameters that a **Replier** (p. 1868) always needs.

In addition to the *participant* , a **Replier** (p. 1868) needs either:

- A service name (**service\_name** (p. 1883)), or
- Custom topic names (**reply\_topic\_name** (p. 1883) and **request\_topic\_name** (p. 1883)).

When **DDS\_DynamicData** (p.775) is used, **connex::ReplierParams::request\_type\_support** (p. 1885) and/or **connex::ReplierParams::reply\_type\_support** (p. 1885) are required as well.

The other parameters are optional.

Parameters

<i>participant</i>	The DomainParticipant that this replier uses to join a domain.
--------------------	--

### 9.367.3 Member Function Documentation



### 9.367.3.1 replier\_listener()

```
template<typename TReq , typename TRep >
ReplierParams & connext::ReplierParams< TReq, TRep >::replier_listener (
    ReplierListener< TReq, TRep > & listener ) [inline]
```

Sets a listener that is called when requests are available.

See also

**connext::ReplierListener** (p. 1880)

### 9.367.3.2 service\_name()

```
template<typename TReq , typename TRep >
ReplierParams & connext::ReplierParams< TReq, TRep >::service_name (
    const std::string & service_name ) [inline]
```

The service name the **Replier** (p. 1868) offers and Requesters use to match.

See also

**connext::RequesterParams::service\_name** (p. 1909)

### 9.367.3.3 request\_topic\_name()

```
template<typename TReq , typename TRep >
ReplierParams & connext::ReplierParams< TReq, TRep >::request_topic_name (
    const std::string & req_topic ) [inline]
```

Sets a specific request topic name.

The specified topic name will be used, instead of allowing a topic name to be generated based on the **service\_name** (p. 1883). If that topic already exists, it will be reused. This is useful to have the **Replier** (p. 1868) use a **DDSContentFilteredTopic** (p. 1283) to receive only certain requests.

### 9.367.3.4 reply\_topic\_name()

```
template<typename TReq , typename TRep >
ReplierParams & connext::ReplierParams< TReq, TRep >::reply_topic_name (
    const std::string & rep_topic ) [inline]
```

Sets a specific reply topic name.

The specified topic name will be used, instead of allowing a topic name to be generated based on c the **service\_name** (p. 1883). If that topic already exists, it will be reused.

### 9.367.3.5 qos\_profile()

```
template<typename TReq , typename TRep >
ReplierParams & connext::ReplierParams< TReq, TRep >::qos_profile (
    const std::string & qos_library_name,
    const std::string & qos_profile_name ) [inline]
```

Sets a QoS profile for the entities in this replier.

Specifies the XML QoS profile that will be used to configure the quality of service for the **Replier** (p. 1868)'s underlying reply DataWriter and request DataReader.

#### Parameters

<i>qos_library_name</i>	The name of the QoS library
<i>qos_profile_name</i>	The name of the QoS profile inside the QoS library

#### See also

**connext::RequesterParams::qos\_profile** (p. 1909)

**Configuring Request-Reply QoS profiles** (p. 234)

**Configuring QoS Profiles with XML** (p. 197)

### 9.367.3.6 datawriter\_qos()

```
template<typename TReq , typename TRep >
ReplierParams & connext::ReplierParams< TReq, TRep >::datawriter_qos (
    const DDS_DataWriterQos & qos ) [inline]
```

Sets the quality of service of the reply DataWriter.

#### See also

**qos\_profile** (p. 1883)

### 9.367.3.7 datareader\_qos()

```
template<typename TReq , typename TRep >
ReplierParams & connext::ReplierParams< TReq, TRep >::datareader_qos (
    const DDS_DataReaderQos & qos ) [inline]
```

Sets the quality of service of the request DataReader.

#### See also

**qos\_profile** (p. 1883)

### 9.367.3.8 publisher()

```
template<typename TReq , typename TRep >  
ReplierParams & connext::ReplierParams< TReq, TRep >::publisher (   
    DDS::Publisher * publisher ) [inline]
```

Sets a specific Publisher.

See also

**connext::RequesterParams::publisher** (p. 1910)

### 9.367.3.9 subscriber()

```
template<typename TReq , typename TRep >  
ReplierParams & connext::ReplierParams< TReq, TRep >::subscriber (   
    DDS::Subscriber * subscriber ) [inline]
```

Sets a specific Subscriber.

See also

**connext::RequesterParams::subscriber** (p. 1911)

### 9.367.3.10 request\_type\_support()

```
template<typename TReq , typename TRep >  
ReplierParams & connext::ReplierParams< TReq, TRep >::request_type_support (   
    DDS::TypeSupport * type_support ) [inline]
```

Sets the type support for the request type.

This parameter is required when TReq is **DDS\_DynamicData** (p. 775).

In all other cases, this parameter is ignored and the singleton Reply<TReq, TRep>::RequestTypeSupport is used instead

See also

**DDSDynamicDataTypeSupport** (p. 1456)

### 9.367.3.11 reply\_type\_support()

```
template<typename TReq , typename TRep >
ReplierParams & connext::ReplierParams< TReq, TRep >::reply_type_support (
    DDS::TypeSupport * type_support ) [inline]
```

Sets the type support for the reply type.

This parameter is required when TRep is **DDS\_DynamicData** (p.775).

In all other cases, this parameter is ignored and the singleton Reply<TReq, TRep>::RequestTypeSupport is used instead

See also

**DDSDynamicDataTypeSupport** (p.1456)

## 9.368 connext::Requester< TReq, TRep > Class Template Reference

Allows sending requests and receiving replies.

### Public Types

- typedef TReq **Request**  
*The request type.*
- typedef TRep **Reply**  
*The reply type.*
- typedef dds\_type\_traits< TReq > ::**DataWriter RequestDataWriter**  
*The typed DataWriter for type TReq.*
- typedef dds\_type\_traits< TRep > ::**DataReader ReplyDataReader**  
*The typed DataReader for type TRep.*
- typedef dds\_type\_traits< TReq > ::**TypeSupport RequestTypeSupport**  
*The type support for type TReq.*
- typedef dds\_type\_traits< TRep > ::**TypeSupport ReplyTypeSupport**  
*The type support for type TRep.*

## Public Member Functions

- **Requester** ( **DDSDomainParticipant** \*participant, const std::string &service\_name)  
*Creates a **Requester** (p. 1886) with the minimum set of parameters.*
- **Requester** (const **RequesterParams** &params)  
*Creates a **Requester** (p. 1886) with parameters.*
- virtual **~Requester** ()  
*Releases the internal entities created by this object.*
- template<typename UReq >  
void **send\_request** (const UReq &request)  
*Sends a request.*
- template<typename UReq >  
void **send\_request** ( **WriteSample**< UReq > &request)  
*Sends a request and gets back information about it that allows correlation with future replies.*
- template<typename UReq >  
void **send\_request** ( **WriteSampleRef**< UReq > &request)  
*Sends a request and gets back information about it that allows correlation with future replies.*
- bool **receive\_reply** ( **Sample**< TRep > &reply, const **DDS\_Duration\_t** &timeout)  
*Waits for a reply and copies its contents into a **Sample** (p. 1912).*
- bool **receive\_reply** ( **SampleRef**< TRep > reply, const **DDS\_Duration\_t** &timeout)  
*Waits for a reply and copies its contents into a **SampleRef** (p. 1920).*
- **LoanedSamples**< TRep > **receive\_replies** (const **DDS\_Duration\_t** &max\_wait)  
*Waits for multiple replies and provides a loaned container to access them.*
- **LoanedSamples**< TRep > **receive\_replies** (int min\_count, int max\_count, const **DDS\_Duration\_t** &max\_wait)  
*Waits for multiple replies and provides a loaned container to access them.*
- bool **wait\_for\_replies** (int min\_count, const **DDS\_Duration\_t** &max\_wait)  
*Waits for replies to any request.*
- bool **wait\_for\_replies** (const **DDS\_Duration\_t** &max\_wait)  
*Waits for replies to any request.*
- bool **wait\_for\_replies** (int min\_count, const **DDS\_Duration\_t** &max\_wait, const **SampleIdentity\_t** &related\_request\_id)  
*Waits for replies to a specific request.*
- bool **take\_reply** ( **Sample**< TRep > &reply)  
*Copies the contents of a reply into a **Sample** (p. 1912).*
- bool **take\_reply** ( **SampleRef**< TRep > reply)  
*Copies the contents of a reply into a **SampleRef** (p. 1920).*
- **LoanedSamples**< TRep > **take\_replies** (int max\_count= **DDS\_LENGTH\_UNLIMITED**)  
*Provides a loaned container to access the existing replies.*
- bool **take\_reply** ( **Sample**< TRep > &reply, const **SampleIdentity\_t** &related\_request\_id)  
*Copies the contents of a reply for a specific request.*
- bool **take\_reply** ( **SampleRef**< TRep > reply, const **SampleIdentity\_t** &related\_request\_id)  
*Copies the contents of a reply for a specific request.*
- **LoanedSamples**< TRep > **take\_replies** (int max\_count, const **SampleIdentity\_t** &related\_request\_id)  
*Provides a loaned container to access the existing replies for a specific request.*
- **LoanedSamples**< TRep > **take\_replies** (const **SampleIdentity\_t** &related\_request\_id)  
*Provides a loaned container to access the existing replies for a specific request.*
- bool **read\_reply** ( **Sample**< TRep > &reply)

- *Copies the contents of a reply into a **Sample** (p. 1912).*
- `bool read_reply ( SampleRef< TRep > reply)`  
*Copies the contents of a reply into a **SampleRef** (p. 1920).*
- `LoanedSamples< TRep > read_replies (int max_count= DDS_LENGTH_UNLIMITED)`  
*Provides a loaned container to access the existing replies.*
- `bool read_reply ( Sample< TRep > &reply, const SampleIdentity_t &related_request_id)`  
*Copies the contents of a reply for a specific request.*
- `bool read_reply ( SampleRef< TRep > reply, const SampleIdentity_t &related_request_id)`  
*Copies the contents of a reply for a specific request.*
- `LoanedSamples< TRep > read_replies (int max_count, const SampleIdentity_t &related_request_id)`  
*Provides a loaned container to access the existing replies for a specific request.*
- `LoanedSamples< TRep > read_replies (const SampleIdentity_t &related_request_id)`  
*Provides a loaned container to access the existing replies for a specific request.*
- `RequestDataWriter * get_request_datawriter ()`  
*Retrieves the underlying **DDSDataWriter** (p. 1321).*
- `ReplyDataReader * get_reply_datareader ()`  
*Retrieves the underlying **DDSDataReader** (p. 1288).*

### 9.368.1 Detailed Description

```
template<typename TReq, typename TRep>
class connex::Requester< TReq, TRep >
```

Allows sending requests and receiving replies.

A requester is an entity with two associated **topics** (p. 61): a request topic and a reply topic. It can send requests by publishing samples of the request topic and receive replies to those requests by subscribing to the reply topic.

Valid types for these topics (TReq and TRep) are: those generated by rttidsgen, the **DDS built-in types** (p. 92), and **DDS\_DynamicData** (p. 775).

For example:

```
using namespace connex;
```

```
Requester<Foo, Bar> requester(...);
Requester<DDS::DynamicData, Bar> requester(...);
Requester<Foo, DDS::Octets> requester(...);
```

A **Replier** (p. 1868) and a **Requester** (p. 1886) communicate when they use the same topics for requests and replies (see `connex::RequesterParams::service_name` (p. 1909)) on the same **domain** (p. 51).

A **Requester** (p. 1886) can send requests and receive one or multiple replies. It does that using the following operations:

- Sending requests (i.e. publishing request samples on the request topic)
- Waiting for replies to be received by the middleware (for any request or for a specific request)



### 9.368.2.2 Reply

```
template<typename TReq , typename TRep >
typedef TRep connext::Requester< TReq, TRep >::Reply
```

The reply type.

### 9.368.2.3 RequestDataWriter

```
template<typename TReq , typename TRep >
typedef dds_type_traits<TReq> ::DataWriter connext::Requester< TReq, TRep >::RequestDataWriter
```

The typed DataWriter for type TReq.

### 9.368.2.4 ReplyDataReader

```
template<typename TReq , typename TRep >
typedef dds_type_traits<TRep> ::DataReader connext::Requester< TReq, TRep >::ReplyDataReader
```

The typed DataReader for type TRep.

### 9.368.2.5 RequestTypeSupport

```
template<typename TReq , typename TRep >
typedef dds_type_traits<TReq> ::TypeSupport connext::Requester< TReq, TRep >::RequestType←
Support
```

The type support for type TReq.

### 9.368.2.6 ReplyTypeSupport

```
template<typename TReq , typename TRep >
typedef dds_type_traits<TRep> ::TypeSupport connext::Requester< TReq, TRep >::ReplyTypeSupport
```

The type support for type TRep.

## 9.368.3 Constructor & Destructor Documentation

### 9.368.3.1 Requester() [1/2]

```
template<typename TReq , typename TRep >
connext::Requester< TReq, TRep >::Requester (
    DDSDomainParticipant * participant,
    const std::string & service_name )
```

Creates a **Requester** (p. 1886) with the minimum set of parameters.



## Parameters

<i>participant</i>	The DomainParticipant this requester uses to join a DDS domain
<i>service_name</i>	The service name. See <b>connext::RequesterParams::service_name</b> (p. 1909)

## Exceptions

<i>One</i>	of the <b>RTI Connex Exceptions</b> (p. 37)
------------	---

## 9.368.3.2 Requester() [2/2]

```
template<typename TReq , typename TRep >
connext::Requester< TReq, TRep >::Requester (
    const RequesterParams & params ) [explicit]
```

Creates a **Requester** (p. 1886) with parameters.

## Parameters

<i>params</i>	All the parameters that configure this requester. See <b>connext::RequesterParams</b> (p. 1907) for the list of mandatory parameters.
---------------	---

## Exceptions

<i>One</i>	of the <b>RTI Connex Exceptions</b> (p. 37)
------------	---

## See also

**connext::RequesterParams** (p. 1907)

**Requester Creation** (p. 228)

## 9.368.3.3 ~Requester()

```
template<typename TReq , typename TRep >
connext::Requester< TReq, TRep >::~~Requester [virtual]
```

Releases the internal entities created by this object.

Among other internal resources, it deletes the underlying DataReader and DataWriter.

## See also

**DDSSubscriber::delete\_datareader** (p. 1602)

**DDSPublisher::delete\_datawriter** (p. 1561)

## 9.368.4 Member Function Documentation

### 9.368.4.1 `send_request()` [1/3]

```
template<typename TReq , typename TRep >
template<typename UReq >
void connext::Requester< TReq, TRep >::send_request (
    const UReq & request )
```

Sends a request.

If a future reply needs to be correlated to exactly this request, use `connext::Requester::send_request(WriteSample<UReq>&)` (p. 1892).

#### Parameters

<i>request</i>	The request to be sent
----------------	------------------------

#### Exceptions

<i>One</i>	of the <b>RTI Connext Exceptions</b> (p. 37)
------------	--

#### MT Safety:

SAFE

#### See also

`send_request(WriteSample<UReq>&)` (p. 1892)

### 9.368.4.2 `send_request()` [2/3]

```
template<typename TReq , typename TRep >
template<typename UReq >
void connext::Requester< TReq, TRep >::send_request (
    WriteSample< UReq > & request )
```

Sends a request and gets back information about it that allows correlation with future replies.

After calling this operation, the sample contains a valid identity that can be used for correlation with future replies.

See example code in **Correlating requests and replies** (p. 230).

## Parameters

<i>request</i>	<< <i>inout</i> >> (p. 238) Contains the request and optional write parameters. When this call ends successfully, <b>connext::WriteSample</b> (p. 1948) contains a valid identity that can be used for correlation with future replies.
----------------	---

## Exceptions

<i>One</i>	of the <b>RTI Connex Exceptions</b> (p. 37) ; <b>connext::TimeoutException</b> (p. 1946) may be reported in the same conditions as in <b>FooDataWriter::write</b> (p. 1683).
------------	--

## MT Safety:

SAFE

## See also

**connext::WriteSample::identity()** (p. 1951)**wait\_for\_replies(int, const Duration\_t&, const SampleIdentity\_t&)** (p. 1897)**take\_replies(int, const SampleIdentity\_t&)** (p. 1901)**Correlating requests and replies** (p. 230)**9.368.4.3 send\_request()** [3/3]

```
template<typename TReq , typename TRep >
template<typename UReq >
void connext::Requester< TReq, TRep >::send_request (
    WriteSampleRef< UReq > & request )
```

Sends a request and gets back information about it that allows correlation with future replies.

This operation is equivalent to **connext::Requester::send\_request(WriteSample<UReq>&)** (p. 1892) except it uses a **WriteSampleRef** (p. 1952).

A **WriteSampleRef** (p. 1952) needs to be initialized with references to existing data and info objects before it can be used. See an example here: **Basic Requester example using SampleRef** (p. 231)

## See also

**connext::Requester::send\_request(WriteSample<UReq>&)** (p. 1892)**Basic Requester example using SampleRef** (p. 231)

**9.368.4.4 receive\_reply()** [1/2]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::receive_reply (
    Sample< TRep > & reply,
    const DDS_Duration_t & timeout ) [inline]
```

Waits for a reply and copies its contents into a **Sample** (p. 1912).

This operation is equivalent to using **wait\_for\_replies(int, const Duration\_t&)** (p. 1896) and **take\_reply(Sample<TRep>&)** (p. 1898).

**MT Safety:**

Same restrictions as **wait\_for\_replies(int, const Duration\_t&)** (p. 1896)

**See also**

**connext::Sample** (p. 1912)  
**wait\_for\_replies(int, const Duration\_t&)** (p. 1896)  
**take\_reply(Sample<TRep>&)** (p. 1898)  
**Basic Requester example** (p. 228)

**9.368.4.5 receive\_reply()** [2/2]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::receive_reply (
    SampleRef< TRep > reply,
    const DDS_Duration_t & timeout ) [inline]
```

Waits for a reply and copies its contents into a **SampleRef** (p. 1920).

This operation is equivalent to using **wait\_for\_replies(int, const Duration\_t&)** (p. 1896) and **take\_reply(SampleRef<TRep>)** (p. 1898).

**MT Safety:**

Same restrictions as **wait\_for\_replies(int, const Duration\_t&)** (p. 1896)

**See also**

**connext::SampleRef** (p. 1920)  
**wait\_for\_replies(int, const Duration\_t&)** (p. 1896)  
**take\_reply(SampleRef<TRep>)** (p. 1898)  
**Basic Requester example using SampleRef** (p. 231)

**9.368.4.6 receive\_replies()** [1/2]

```
template<typename TReq , typename TRep >
LoanedSamples< TRep > connex::Requester< TReq, TRep >::receive_replies (
    const DDS_Duration_t & max_wait )
```

Waits for multiple replies and provides a loaned container to access them.

This operation is equivalent to using **receive\_replies(int,int, const Duration\_t&)** (p. 1895) with *min\_count*=1 and *max\_count*=**DDS\_LENGTH\_UNLIMITED** (p. 438)

**MT Safety:**

See **wait\_for\_replies(int, const Duration\_t&)** (p. 1896)

**See also**

**connex::LoanedSamples** (p. 1727)

**receive\_replies(int,int, const Duration\_t&)** (p. 1895)

**9.368.4.7 receive\_replies()** [2/2]

```
template<typename TReq , typename TRep >
LoanedSamples< TRep > connex::Requester< TReq, TRep >::receive_replies (
    int min_count,
    int max_count,
    const DDS_Duration_t & max_wait )
```

Waits for multiple replies and provides a loaned container to access them.

This operation is equivalent to using **wait\_for\_replies(int, const Duration\_t&)** (p. 1896) and **take\_replies(int)** (p. 1899).

**MT Safety:**

See **wait\_for\_replies(int, const Duration\_t&)** (p. 1896)

**Exceptions**

<i>One</i>	of the <b>RTI Connex Exceptions</b> (p. 37)
------------	---

See also

**connext::LoanedSamples** (p. 1727)  
**wait\_for\_replies(int, const Duration\_t&)** (p. 1896)  
**take\_replies(int)** (p. 1899)

### 9.368.4.8 wait\_for\_replies() [1/3]

```
template<typename TReq , typename TRep >
bool  connext::Requester< TReq, TRep >::wait_for_replies (
    int min_count,
    const  DDS_Duration_t & max_wait )
```

Waits for replies to any request.

This operation waits for min\_count requests to be available for up to max\_wait .

If this operation is called several times but the available replies are not taken (with **take\_replies(int)** (p. 1899)), this operation may return immediately and will not wait for new replies. New replies may replace existing ones if they are not taken, depending on the **DDS\_HistoryQosPolicy** (p. 919) used to configure this **Requester** (p. 1886).

#### Parameters

<i>min_count</i>	Minimum number of replies that need to be available for this operation to unblock.
<i>max_wait</i>	Maximum waiting time after which this operation unblocks, regardless of how many replies are available.

#### Returns

true if at least min\_count replies were available before max\_wait elapsed, or false otherwise.

#### MT Safety:

Concurrent calls to this operation on the same object are not allowed. However, waiting for replies for specific requests in parallel is supported (see **wait\_for\_replies(int, const Duration\_t&, const SampleIdentity\_t&)** (p. 1897)).

See also

**take\_replies(int)** (p. 1899)

**9.368.4.9 wait\_for\_replies()** [2/3]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::wait_for_replies (
    const DDS_Duration_t & max_wait )
```

Waits for replies to any request.

This operation is equivalent to using `wait_for_replies(int, const Duration_t&)` (p. 1896) with `min_count=1`.

See also

`wait_for_replies(int, const Duration_t&)` (p. 1896)

**9.368.4.10 wait\_for\_replies()** [3/3]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::wait_for_replies (
    int min_count,
    const DDS_Duration_t & max_wait,
    const SampleIdentity_t & related_request_id )
```

Waits for replies to a specific request.

This operation is analogous to `wait_for_replies(int, const Duration_t&)` (p. 1896) except this operation waits for replies for a specific request.

**Parameters**

<i>min_count</i>	Minimum number of replies for the related request that need to be available for this operation to unblock.
<i>max_wait</i>	Maximum wait time after which this operation unblocks, regardless of how many replies are available.
<i>related_request_id</i>	The identity of a request previously sent by this <b>Requester</b> (p. 1886)

**Returns**

true if at least `min_count` replies for the related request were available before `max_wait` elapsed, or false otherwise.

**Exceptions**

One	of the <b>RTI Connex Exceptions</b> (p. 37)
-----	---

MT Safety:

SAFE

See also

**wait\_for\_replies(int, const Duration\_t&)** (p. 1896)

#### 9.368.4.11 take\_reply() [1/4]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::take_reply (
    Sample< TRep > & reply ) [inline]
```

Copies the contents of a reply into a **Sample** (p. 1912).

Takes a reply sample from the **Requester** (p. 1886) and makes a copy.

This operation may be used after a call to **wait\_for\_replies(int, const Duration\_t&)** (p. 1896).

To avoid copies, you can use **take\_replies(int)** (p. 1899).

Parameters

<i>reply</i>	The sample where the reply data and the related SampleInfo are copied
--------------	---

Returns

true if there was a reply to get. If this operation returns false, the contents of *reply* remain unchanged, except **DDS\_SampleInfo::valid\_data** (p. 1089) becomes false.

Exceptions

<i>One</i>	of the <b>RTI Connext Exceptions</b> (p. 37)
------------	--

MT Safety:

SAFE

See also

**connext::Sample** (p. 1912)

**wait\_for\_replies(int, const Duration\_t&)** (p. 1896)



**9.368.4.12 take\_reply()** [2/4]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::take_reply (
    SampleRef< TRep > reply ) [inline]
```

Copies the contents of a reply into a **SampleRef** (p. 1920).

This operation is analogous to **connext::Requester::take\_reply(Sample<TRep>&)** (p.1898) except it uses a **SampleRef** (p. 1920) instance.

A **SampleRef** (p. 1920) needs to be initialized with references to existing data and info objects before it can be used. See an example here: **Basic Requester example using SampleRef** (p. 231)

MT Safety:

SAFE

See also

**connext::SampleRef** (p. 1920)

**take\_reply(Sample<TRep>&)** (p. 1898)

**Basic Requester example using SampleRef** (p. 231)

**9.368.4.13 take\_replies()** [1/3]

```
template<typename TReq , typename TRep >
LoanedSamples< TRep > connext::Requester< TReq, TRep >::take_replies (
    int max_count = DDS_LENGTH_UNLIMITED )
```

Provides a loaned container to access the existing replies.

Takes all the existing replies up to `max_count` and provides a loaned container to access them.

This operation does not make a copy of the data.

The loan is returned with **connext::LoanedSamples::return\_loan** (p. 1734) or in the destructor

This operation may be used after a call to **wait\_for\_replies(int, const Duration\_t&)** (p. 1896)

See an **example** here: **Taking loaned samples** (p. 229)

Parameters

<i>max_count</i>	The maximum number of samples that are taken at a time. The special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) may be used. This value will read up to the limit specified by <b>DDS_DataReaderResourceLimitsQosPolicy::max_samples_per_read</b> (p. 659)
------------------	---

**Returns**

A container with up to `max_count` elements. May be empty if there were no replies to get.

**Exceptions**

<i>One</i>	of the <b>RTI Connex</b> Exceptions (p. 37)
------------	---

**MT Safety:**

SAFE

**See also**

**connex::Sample** (p. 1912)

**connex::LoanedSamples** (p. 1727)

**connex::LoanedSamples::return\_loan** (p. 1734)

**wait\_for\_replies(int, const Duration\_t&)** (p. 1896)

**FooDataReader::take** (p. 1652) (for a more detailed description on how QoS and other parameters affect the underlying DataReader)

**Taking loaned samples** (p. 229)

**Taking samples by copy** (p. 229)

**9.368.4.14 take\_reply() [3/4]**

```
template<typename TReq , typename TRep >
bool connex::Requester< TReq, TRep >::take_reply (
    Sample< TRep > & reply,
    const SampleIdentity_t & related_request_id ) [inline]
```

Copies the contents of a reply for a specific request.

This operation is analogous to **take\_reply(Sample<TRep>&)** (p. 1898) except the reply corresponds to a specific request.

**Parameters**

<i>reply</i>	The sample where a reply is copied into
<i>related_request_id</i>	The identity of a request previously sent by this <b>Requester</b> (p. 1886)

**Returns**

true if there was a reply to get. If this operation returns false, the contents of `reply` remain unchanged, except `DDS_SampleInfo::valid_data` (p. 1089) becomes false.

**MT Safety:**

SAFE

**See also**

**connext::Sample** (p. 1912)  
**take\_reply(Sample<TRep>&)** (p. 1898)  
**send\_request(WriteSample<UReq>&)** (p. 1892)  
**Correlating requests and replies** (p. 230)

**9.368.4.15 take\_reply()** [4/4]

```
template<typename TReq , typename TRep >
bool  connext::Requester< TReq, TRep >::take_reply (
    SampleRef< TRep > reply,
    const SampleIdentity_t & related_request_id ) [inline]
```

Copies the contents of a reply for a specific request.

This operation is analogous to `connext::Requester::take_reply(Sample<TRep>&, const SampleIdentity_t&)` (p. 1900) except it uses a `SampleRef` (p. 1920) instance.

A `SampleRef` (p. 1920) needs to be initialized with references to existing data and info objects before it can be used. See an example here: **Basic Requester example using SampleRef** (p. 231)

**MT Safety:**

SAFE

**See also**

**connext::SampleRef** (p. 1920)  
**take\_reply(SampleRef<TRep>)** (p. 1898)  
**take\_reply(Sample<TRep>&, const SampleIdentity\_t&)** (p. 1900)  
**Basic Requester example using SampleRef** (p. 231)  
**Correlating requests and replies** (p. 230)

**9.368.4.16 take\_replies()** [2/3]

```
template<typename TReq , typename TRep >  
LoanedSamples< TRep > connex::Requester< TReq, TRep >::take_replies (   
    int max_count,  
    const SampleIdentity_t & related_request_id )
```

Provides a loaned container to access the existing replies for a specific request.

This operation is analogous to **take\_replies(int)** (p. 1899) except the replies this operation provides correspond to a specific request.

## Parameters

<i>max_count</i>	The maximum number of samples that are taken at a time. The special value <b>DDS_LENGTH_UNLIMITED</b> (p. 438) may be used.
<i>related_request_id</i>	The identity of a request previously sent by this <b>Requester</b> (p. 1886)

## MT Safety:

SAFE

## See also

**take\_replies(int)** (p. 1899)**connex::LoanedSamples** (p. 1727)**Taking samples by copy** (p. 229)**Correlating requests and replies** (p. 230)**9.368.4.17 take\_replies()** [3/3]

```
template<typename TReq , typename TRep >
LoanedSamples< TRep > connex::Requester< TReq, TRep >::take_replies (
    const SampleIdentity_t & related_request_id )
```

Provides a loaned container to access the existing replies for a specific request.

Equivalent to using **take\_replies(int, const SampleIdentity\_t&)** (p.1901) with `max_count=DDS_LENGTH_UNLIMITED` (p. 438)

## MT Safety:

SAFE

## See also

**connex::LoanedSamples** (p. 1727)**take\_replies(int, const SampleIdentity\_t&)** (p. 1901)

References **DDS\_LENGTH\_UNLIMITED**.

**9.368.4.18 read\_reply()** [1/4]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::read_reply (
    Sample< TRep > & reply ) [inline]
```

Copies the contents of a reply into a **Sample** (p. 1912).

This operation is equivalent to **connext::Requester::take\_reply(Sample<TRep>&)** (p. 1898) except the reply remains in the **Requester** (p. 1886) and can be read or taken again.

**9.368.4.19 read\_reply()** [2/4]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::read_reply (
    SampleRef< TRep > reply ) [inline]
```

Copies the contents of a reply into a **SampleRef** (p. 1920).

This operation is analogous to **connext::Requester::read\_reply(Sample<TRep>&)** (p. 1903) except it uses a **SampleRef** (p. 1920) instance.

A **SampleRef** (p. 1920) needs to be initialized with references to existing data and info objects before it can be used. See an example here: **Basic Requester example using SampleRef** (p. 231)

MT Safety:

SAFE

See also

**connext::SampleRef** (p. 1920)

**read\_reply(Sample<TRep>&)** (p. 1903)

**Basic Requester example using SampleRef** (p. 231)

**9.368.4.20 read\_replies()** [1/3]

```
template<typename TReq , typename TRep >
LoanedSamples< TRep > connext::Requester< TReq, TRep >::read_replies (
    int max_count = DDS_LENGTH_UNLIMITED )
```

Provides a loaned container to access the existing replies.

This operation is equivalent to **connext::Requester::take\_replies(int)** (p. 1899) except the replies remain in the **Requester** (p. 1886) and can be read or taken again.

**9.368.4.21 read\_reply()** [3/4]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::read_reply (
    Sample< TRep > & reply,
    const SampleIdentity_t & related_request_id ) [inline]
```

Copies the contents of a reply for a specific request.

This operation is equivalent to **connext::Requester::take\_reply(Sample<TRep>&, const SampleIdentity\_t&)** (p. 1900) except the reply remains in the **Requester** (p. 1886) and can be read or taken again.

**9.368.4.22 read\_reply()** [4/4]

```
template<typename TReq , typename TRep >
bool connext::Requester< TReq, TRep >::read_reply (
    SampleRef< TRep > reply,
    const SampleIdentity_t & related_request_id ) [inline]
```

Copies the contents of a reply for a specific request.

This operation is analogous to **connext::Requester::read\_reply(Sample<TRep>&, const SampleIdentity\_t&)** (p. 1904) except it uses a **SampleRef** (p. 1920) instance.

A **SampleRef** (p. 1920) needs to be initialized with references to existing data and info objects before it can be used. See an example here: **Basic Requester example using SampleRef** (p. 231)

MT Safety:

SAFE

See also

**connext::SampleRef** (p. 1920)

**read\_reply(SampleRef<TRep>)** (p. 1904)

**read\_reply(Sample<TRep>&, const SampleIdentity\_t&)** (p. 1904)

**Basic Requester example using SampleRef** (p. 231)

**Correlating requests and replies** (p. 230)

**9.368.4.23 read\_replies()** [2/3]

```
template<typename TReq , typename TRep >
LoanedSamples< TRep > connext::Requester< TReq, TRep >::read_replies (
    int max_count,
    const SampleIdentity_t & related_request_id )
```

Provides a loaned container to access the existing replies for a specific request.

This operation is equivalent to **connext::Requester::take\_replies(int, const SampleIdentity\_t&)** (p. 1901) except the replies remain in the **Requester** (p. 1886) and can be read or taken again.

**9.368.4.24 read\_replies()** [3/3]

```
template<typename TReq , typename TRep >
LoanedSamples< TRep > connext::Requester< TReq, TRep >::read_replies (
    const SampleIdentity_t & related_request_id )
```

Provides a loaned container to access the existing replies for a specific request.

This operation is equivalent to **connext::Requester::take\_replies(const SampleIdentity\_t&)** (p. 1903) except the replies remain in the **Requester** (p. 1886) and can be read or taken again.

References **DDS\_LENGTH\_UNLIMITED**.

**9.368.4.25 get\_request\_datawriter()**

```
template<typename TReq , typename TRep >
Requester< TReq, TRep > ::RequestDataWriter * connext::Requester< TReq, TRep >::get_request_↔
datawriter [inline]
```

Retrieves the underlying **DDSDataWriter** (p. 1321).

Accessing the request DataWriter may be useful for a number of advanced use cases, such as:

- Finding matching subscriptions (e.g., Repliers)
- Setting a DataWriter listener
- Getting DataWriter protocol or cache statuses

**MT Safety:**

SAFE

**See also**

- DDSDataWriter** (p. 1321)
- FooDataWriter** (p. 1676)
- DDSDataWriter::get\_matched\_subscriptions** (p. 1331)
- DDSDataWriter::get\_matched\_subscription\_data** (p. 1332)
- DDSDataWriter::set\_listener** (p. 1339)
- DDSDataWriter::get\_datawriter\_protocol\_status** (p. 1327)



### 9.368.4.26 get\_reply\_datareader()

```
template<typename TReq , typename TRep >
Requester< TReq, TRep > ::ReplyDataReader * connex::Requester< TReq, TRep >::get_reply_↔
datareader [inline]
```

Retrieves the underlying **DDSDataReader** (p. 1288).

Accessing the reply DataReader may be useful for a number of advanced use cases, such as:

- Finding matching publications (e.g., Repliers)
- Setting a DataReader listener
- Getting DataReader protocol or cache statuses

MT Safety:

SAFE

See also

- **DDSDataReader** (p. 1288)
- **FooDataReader** (p. 1649)
- **DDSDataReader::get\_matched\_publications** (p. 1299)
- **DDSDataReader::get\_matched\_publication\_data** (p. 1300)
- **DDSDataReader::set\_listener** (p. 1309)
- **DDSDataReader::get\_datareader\_protocol\_status** (p. 1305)

## 9.369 connex::RequesterParams Class Reference

Contains the parameters for creating a **connex::Requester** (p. 1886).

Inherits connex::details::EntityParams.

### Public Member Functions

- **RequesterParams** ( **DomainParticipant** \*participant)
 

*Creates a **RequesterParams** (p. 1907) with the parameters a **Requester** (p. 1886) always needs.*
- **RequesterParams** & **service\_name** (const std::string &name)
 

*The service name that Repliers and **Requester** (p. 1886) use to match and communicate.*
- **RequesterParams** & **request\_topic\_name** (const std::string &name)
 

*Sets a specific request topic name.*
- **RequesterParams** & **reply\_topic\_name** (const std::string &name)
 

*Sets a specific reply topic name.*
- **RequesterParams** & **qos\_profile** (const std::string &qos\_library\_name, const std::string &qos\_profile\_name)

*Sets a QoS profile for the entities in this requester.*

- **RequesterParams** & **datawriter\_qos** (const **DDS\_DataWriterQos** &qos)  
*Sets the quality of service of the request DataWriter.*
- **RequesterParams** & **datareader\_qos** (const **DDS\_DataReaderQos** &qos)  
*Sets the quality of service of the request DataReader.*
- **RequesterParams** & **publisher** ( **DDSPublisher** \*publisher)  
*Sets a specific Publisher.*
- **RequesterParams** & **subscriber** ( **DDSSubscriber** \*subscriber)  
*Sets a specific Subscriber.*
- **RequesterParams** & **request\_type\_support** ( **TypeSupport** \*type\_support)  
*Sets the type support for the request type.*
- **RequesterParams** & **reply\_type\_support** ( **TypeSupport** \*type\_support)  
*Sets the type support for the reply type.*

### 9.369.1 Detailed Description

Contains the parameters for creating a **connext::Requester** (p. 1886).

See also

**Creating a Requester with optional parameters** (p. 228)

### 9.369.2 Constructor & Destructor Documentation

#### 9.369.2.1 RequesterParams()

```
connext::RequesterParams::RequesterParams (
    DomainParticipant * participant ) [explicit]
```

Creates a **RequesterParams** (p. 1907) with the parameters a **Requester** (p. 1886) always needs.

In addition to the participant , a **Requester** (p. 1886) needs either:

- A service name (**service\_name** (p. 1909)),
- Or custom topic names (**request\_topic\_name** (p. 1909) and **reply\_topic\_name** (p. 1909))

When **DDS\_DynamicData** (p. 775) is used, **connext::RequesterParams::request\_type\_support** (p. 1911) and/or **connext::RequesterParams::reply\_type\_support** (p. 1911) are required as well.

The rest of the parameters that can be set in a **RequesterParams** (p. 1907) object are optional.

## Parameters

<i>participant</i>	The <b>DDSDomainParticipant</b> (p. 1351) this requester uses to join a domain.
--------------------	---

## See also

**Creating a Requester with optional parameters** (p. 228)

### 9.369.3 Member Function Documentation

#### 9.369.3.1 service\_name()

```
RequesterParams & connext::RequesterParams::service_name (  
    const std::string & name )
```

The service name that Repliers and **Requester** (p. 1886) use to match and communicate.

A **Requester** (p. 1886) and a **Replier** (p. 1868) need to be configured with the same topic names in order to match.

The service name is used to generate a request topic and a reply topic that the **Requester** (p. 1886) and **Replier** (p. 1868) will use to communicate. For example, the service name "MyService" will be used to create topics named "MyServiceRequest" and "MyServiceReply".

In some cases, the name of these topics is known beforehand or needs to be customized for another reason. The service name can be overridden by setting specific request and reply topic names using **request\_topic\_name** (p. 1909) and **reply\_topic\_name** (p. 1909).

#### 9.369.3.2 request\_topic\_name()

```
RequesterParams & connext::RequesterParams::request_topic_name (  
    const std::string & name )
```

Sets a specific request topic name.

The specified topic name will be used, instead of allowing a topic name to be generated based on the **service\_name** (p. 1909). If that topic already exists, it will be reused.

#### 9.369.3.3 reply\_topic\_name()

```
RequesterParams & connext::RequesterParams::reply_topic_name (  
    const std::string & name )
```

Sets a specific reply topic name.

The specified topic name will be used, instead of allowing a topic name to be generated based on the **service\_name** (p. 1909). If that topic already exists, it will be reused.

### 9.369.3.4 qos\_profile()

```
RequesterParams & connext::RequesterParams::qos_profile (
    const std::string & qos_library_name,
    const std::string & qos_profile_name )
```

Sets a QoS profile for the entities in this requester.

Specifies an XML QoS profile that will be used to configure the quality of service of a **Requester** (p. 1886)'s underlying request DataWriter and reply DataReader.

Within that profile, the DataWriter QoS in <datawriter\_qos> will be used to configure the request DataWriter and the DataReader.

Alternatively, you can set the QoS using the DataWriterQos and DataReaderQos objects (**connext::RequesterParams::datawriter\_qos** (p. 1910), **connext::RequesterParams::datareader\_qos** (p. 1910)).

#### Parameters

<i>qos_library_name</i>	The name of the QoS library
<i>qos_profile_name</i>	The name of the QoS profile inside the QoS library

#### See also

**Configuring Request-Reply QoS profiles** (p. 234)

**Configuring QoS Profiles with XML** (p. 197)

### 9.369.3.5 datawriter\_qos()

```
RequesterParams & connext::RequesterParams::datawriter_qos (
    const DDS_DataWriterQos & qos )
```

Sets the quality of service of the request DataWriter.

#### See also

**qos\_profile** (p. 1909)

### 9.369.3.6 datareader\_qos()

```
RequesterParams & connext::RequesterParams::datareader_qos (
    const DDS_DataReaderQos & qos )
```

Sets the quality of service of the request DataReader.

#### See also

**qos\_profile** (p. 1909)

### 9.369.3.7 publisher()

```
RequesterParams & connext::RequesterParams::publisher (
    DDSPublisher * publisher )
```

Sets a specific Publisher.

By default, a **Requester** (p. 1886) uses the DomainParticipant's implicit Publisher. Sometimes a different Publisher may be needed, for example, to use non-default PublisherQos.

### 9.369.3.8 subscriber()

```
RequesterParams & connext::RequesterParams::subscriber (
    DDSSubscriber * subscriber )
```

Sets a specific Subscriber.

By default, a **Requester** (p. 1886) uses the DomainParticipant's implicit Subscriber. Sometimes a different Subscriber may be needed, for example, to use non-default SubscriberQos.

### 9.369.3.9 request\_type\_support()

```
RequesterParams & connext::RequesterParams::request_type_support (
    TypeSupport * type_support )
```

Sets the type support for the request type.

This parameter is required when TReq is **DDS\_DynamicData** (p. 775).

In all other cases, this parameter is ignored and the singleton **Requester<TReq, TRep>::RequestTypeSupport** (p. 1890) is used instead.

See also

**DDSDynamicDataTypeSupport** (p. 1456)

### 9.369.3.10 reply\_type\_support()

```
RequesterParams & connext::RequesterParams::reply_type_support (
    TypeSupport * type_support )
```

Sets the type support for the reply type.

This parameter is required when TRep is **DDS\_DynamicData** (p. 775).

In all other cases, this parameter is ignored and the singleton **Requester<TReq, TRep>::ReplyTypeSupport** (p. 1890) is used instead.

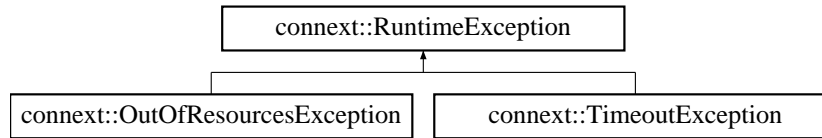
See also

**DDSDynamicDataTypeSupport** (p. 1456)

## 9.370 connext::RuntimeException Class Reference

Generic, unspecified error.

Inheritance diagram for connext::RuntimeException:



### 9.370.1 Detailed Description

Generic, unspecified error.

Its base class is `std::runtime_error`, from which it inherits the `what()` method.

See also

[DDS\\_RETCODE\\_ERROR](#) (p. 336)

## 9.371 connext::Sample< T > Class Template Reference

A data sample and related info received from the middleware.

Inherits `connext::details::SampleBase< T, I >`.

### Public Member Functions

- **Sample** ()  
*Creates a sample with default data and info values.*
- **Sample** (const **Sample**< T > &other)  
*Creates a sample making a deep copy of another sample.*
- **Sample** ( **SampleRef**< T > sample\_ref)  
*Creates a sample as a deep copy of the contents referenced by a **WriteSampleRef** (p. 1952).*
- **SampleIdentity\_t identity** () const  
*Gets the identity of this sample.*
- **SampleIdentity\_t related\_identity** () const  
*Gets the identity of a sample that is related to this one.*
- T & **data** ()  
*Gets the data this sample contains.*
- **SampleInfo & info** ()  
*Gets the sample information.*
- const T & **data** ()  
*Gets the data this sample contains.*
- const **SampleInfo & info** ()  
*Gets the sample information.*

### 9.371.1 Detailed Description

```
template<typename T>
class connext::Sample< T >
```

A data sample and related info received from the middleware.

Samples contain data received from the middleware and information associated to the data.

#### Template Parameters

<i>T</i>	The data type that this sample contains
----------	---

#### See also

**connext::Requester::receive\_reply(Sample<TRep>&, const Duration\_t&)** (p. 1893)

**connext::Requester::take\_reply(Sample<TRep>&)** (p. 1898)

**connext::Replier::receive\_request(Sample<TReq>&, const Duration\_t&)** (p. 1875)

### 9.371.2 Constructor & Destructor Documentation

#### 9.371.2.1 Sample() [1/3]

```
template<typename T >
connext::Sample< T >::Sample ( ) [inline]
```

Creates a sample with default data and info values.

The data is deeply initialized using the corresponding TypeSupport

#### See also

**FooTypeSupport::initialize\_data** (p. 1718)

#### 9.371.2.2 Sample() [2/3]

```
template<typename T >
connext::Sample< T >::Sample (
    const Sample< T > & other ) [inline]
```

Creates a sample making a deep copy of another sample.

### 9.371.2.3 Sample() [3/3]

```
template<typename T >
connext::Sample< T >::Sample (
    SampleRef< T > sample_ref )
```

Creates a sample as a deep copy of the contents referenced by a **WriteSampleRef** (p. 1952).

## 9.371.3 Member Function Documentation

### 9.371.3.1 identity()

```
template<typename T >
SampleIdentity_t connext::Sample< T >::identity ( ) const [inline]
```

Gets the identity of this sample.

The identity is assigned by the middleware upon reception.

See also

**Correlating requests and replies** (p. 230)

References **connext::Sample**< T >::info().

### 9.371.3.2 related\_identity()

```
template<typename T >
SampleIdentity_t connext::Sample< T >::related_identity ( ) const [inline]
```

Gets the identity of a sample that is related to this one.

When a **connext::Requester** (p. 1886) receives a reply, the reply **Sample** (p. 1912) contains the identity of the related request.

Returns

The identity of another sample that is related to this one, or **DDS\_UNKNOWN\_SAMPLE\_IDENTITY** (p. 479) if there is not a related sample.

See also

**connext::Requester::receive\_reply(Sample<TRep>&, const Duration\_t&)** (p. 1893)

**Correlating requests and replies** (p. 230)

References **connext::Sample**< T >::info().



### 9.371.3.3 data() [1/2]

```
template<typename T >
T & connext::Sample< T >::data ( )
```

Gets the data this sample contains.

See also

**Basic Requester example** (p. 228)

### 9.371.3.4 info() [1/2]

```
template<typename T >
SampleInfo & connext::Sample< T >::info ( )
```

Gets the sample information.

See also

**DDS\_SampleInfo** (p. 1082)

**Basic Requester example** (p. 228)

Referenced by **connext::Sample< T >::identity()**, and **connext::Sample< T >::related\_identity()**.

### 9.371.3.5 data() [2/2]

```
template<typename T >
const T & connext::Sample< T >::data ( )
```

Gets the data this sample contains.

See also

**Basic Requester example** (p. 228)

### 9.371.3.6 info() [2/2]

```
template<typename T >
const SampleInfo & connexr::Sample< T >::info ( )
```

Gets the sample information.

See also

**DDS\_SampleInfo** (p. 1082)

**Basic Requester example** (p. 228)

## 9.372 rti::flat::Sample< OffsetType > Class Template Reference

The generic definition of FlatData topic-types.

```
#include <FlatSample.hpp>
```

Inherits rti::flat::SampleBase.

### Public Types

- typedef OffsetType **Offset**  
*The related Offset type.*
- typedef OffsetType::ConstOffset **ConstOffset**  
*The related read-only Offset type.*

### Public Member Functions

- **Offset root ()**  
*Provides the Offset to the top-level type.*
- **ConstOffset root () const**  
*Provides the Offset to the top-level type.*
- **Sample< OffsetType > \* clone () const**  
*Clones a **Sample** (p. 1916), creating an unmanaged **Sample** (p. 1916).*

### Static Public Member Functions

- static **Sample< OffsetType > \* create\_data ()**  
*Creates an unmanaged FlatData **Sample** (p. 1916).*
- static void **delete\_data ( rti::flat::Sample< OffsetType > \*sample)**  
*Releases an unmanaged **Sample** (p. 1916).*

### 9.372.1 Detailed Description

```
template<typename OffsetType>
class rti::flat::Sample< OffsetType >
```

The generic definition of FlatData topic-types.

## Template Parameters

<i>OffsetType</i>	The Offset to the beginning of the data <b>Sample</b> (p. 1916) (the root), for example <b>MyFlatFinalOffset</b> (p. 1746), or <b>MyFlatMutableOffset</b> (p. 1757).
-------------------	--

For a FlatData IDL type, **rtiddsgen** generates an instantiation of this class, such as **MyFlatFinal** or **MyFlatMutable**. That's the **topic-type** used to declare a **DDSTopic** (p. 1617) and write or read FlatData samples.

A FlatData **Sample** (p. 1916) owns an inline buffer that contains the serialized data. To access the **Sample** (p. 1916) data members we use **Offsets** (p. 564), iterators that point to the position of a member in the **Sample** (p. 1916) buffer. The **root()** (p. 1918) is the Offset to the top-level element (for example **MyFlatMutableOffset** (p. 1757)). From there **MyFlatMutableOffset** (p. 1757)'s member functions provide access to its members.

The method to create a **Sample** (p. 1916) varies depending on whether the type is final or mutable.

Samples of **final** FlatData types always have the same size, and can be obtained directly with **FooDataWriter::get\_loan()** (p. 1695).

Samples of **mutable** FlatData types need to be "built" using the Builder returned by **rti::flat::build\_data()** (p. 560) (**MyFlatMutableBuilder** (p. 1750) in this example). A Builder allows adding each member individually in any order, and sizing sequences as needed.

See **Publishing FlatData** (p. 570) for code snippets.

Samples created with **FooDataWriter::get\_loan()** (p. 1695) or **rti::flat::build\_data()** (p. 560) are DataWriter-managed and do not need to be explicitly deleted. See **FooDataWriter::get\_loan()** (p. 1695) for an explanation of the lifecycle of DataWriter-managed samples.

Samples received with a **FooDataReader** (p. 1649) can be examined by obtaining the **root()** (p. 1918), but cannot be modified. See **Subscribing to FlatData** (p. 570).

FlatData samples are not value types. They don't provide copy constructors or assignment operators, because of their definition as an inline buffer that contains the serialized **Sample** (p. 1916) at all times. A **Sample** (p. 1916) can be cloned with the static function **clone()** (p. 1919). A cloned **Sample** (p. 1916) is unmanaged and has to be deleted with the static function **delete\_data()** (p. 1919).

## 9.372.2 Member Typedef Documentation

### 9.372.2.1 Offset

```
template<typename OffsetType >
typedef OffsetType rti::flat::Sample< OffsetType >::Offset
```

The related Offset type.

This is the template parameter, OffsetType

### 9.372.2.2 ConstOffset

```
template<typename OffsetType >
typedef OffsetType::ConstOffset rti::flat::Sample< OffsetType >::ConstOffset
```

The related read-only Offset type.

For example, **MyFlatMutableOffset::ConstOffset** (p. 1758).

## 9.372.3 Member Function Documentation

### 9.372.3.1 root() [1/2]

```
template<typename OffsetType >
Offset rti::flat::Sample< OffsetType >::root ( ) [inline]
```

Provides the Offset to the top-level type.

#### Returns

An Offset that allows reading and modifying the members of this **Sample** (p. 1916), for example **MyFlatFinalOffset** (p. 1746) or **MyFlatMutableOffset** (p. 1757).

This overload allows modifying the **Sample** (p. 1916).

#### Example:

```
MyFlatFinal *my_sample = ...; // for example, created with DataWriter::get_loan()
MyFlatFinalOffset my_sample_root = my_sample->root();
my_sample_root.my_primitive(33);
auto my_member_offset = my_sample_root.my_complex();
// ... modify my_member_offset
```

### 9.372.3.2 root() [2/2]

```
template<typename OffsetType >
ConstOffset rti::flat::Sample< OffsetType >::root ( ) const [inline]
```

Provides the Offset to the top-level type.

#### Returns

An Offset that allows reading the members of this **Sample** (p. 1916). For example, **MyFlatFinalOffset::ConstOffset** (p. 1747) or **MyFlatMutableOffset::ConstOffset** (p. 1758).

This overload doesn't allow modifying the **Sample** (p. 1916).

#### Example:

```
const MyFlatMutable *my_sample = ...; // for example, read from a DataReader
MyFlatMutableOffset::ConstOffset my_sample_root = my_sample->root();
std::cout << my_sample_root.my_primitive() << std::endl;
auto my_member_offset = my_sample_root.my_mutable_seq();
// ... read my_member_offset
```

### 9.372.3.3 create\_data()

```
template<typename OffsetType >
Sample< OffsetType > * rti::flat::Sample< OffsetType >::create_data [static]
```

Creates an unmanaged FlatData **Sample** (p. 1916).

#### Note

In general on the publication side it is recommended to create DataWriter-managed samples using **FooDataWriter::get\_loan** (p. 1695) (for final types) and **rti::flat::build\_data()** (p. 560) (for mutable types).

If the topic-type is final, the returned **Sample** (p. 1916) can be initialized by obtaining the **root()** (p. 1918).

If the topic-type is mutable, the resulting **Sample** (p. 1916) has no members, and **root()** (p. 1918) returns a **null** (p. 1857) Offset. The result of **create\_data()** (p. 1918) must be used to create a Builder. This is a rare use case, and **rti::flat::build\_data()** (p. 560) should be used in most situations.

In all cases, the returned **Sample** (p. 1916) must be explicitly deleted with **delete\_data()** (p. 1919).

### 9.372.3.4 clone()

```
template<typename OffsetType >
Sample< OffsetType > * rti::flat::Sample< OffsetType >::clone ( ) const [inline]
```

Clones a **Sample** (p. 1916), creating an unmanaged **Sample** (p. 1916).

#### Warning

When this **Sample** (p. 1916) has been created with **FooDataWriter::get\_loan** (p. 1695) or **rti::flat::build\_data()** (p. 560), the clone this function creates cannot be used in **FooDataWriter::write** (p. 1683), because the DataWriter is managing the lifecycle of its samples.

Creates a new **Sample** (p. 1916) and copies the underlying serialized buffer.

**delete\_data()** (p. 1919) must be called to release the **Sample** (p. 1916).

### 9.372.3.5 delete\_data()

```
template<typename OffsetType >
static void rti::flat::Sample< OffsetType >::delete_data (
    rti::flat::Sample< OffsetType > * sample ) [inline], [static]
```

Releases an unmanaged **Sample** (p. 1916).

Unmanaged samples are those created with **create\_data()** (p. 1918) or **clone()** (p. 1919).

#### Precondition

*sample* cannot have been created with **FooDataWriter::get\_loan** (p. 1695) or **rti::flat::build\_data()** (p. 560).

#### Postcondition

*sample* becomes invalid and shouldn't be used

## 9.373 connext::SampleIterator< T, IsConst > Class Template Reference

STL-compliant random-access iterator for SampleRef<T>

### 9.373.1 Detailed Description

```
template<typename T, bool IsConst>
class connext::SampleIterator< T, IsConst >
```

STL-compliant random-access iterator for SampleRef<T>

See also

[connext::LoanedSamples::begin](#) (p. 1735)

## 9.374 connext::SampleRef< T > Class Template Reference

A data sample and related information received from the middleware.

### Public Member Functions

- **SampleRef** ()  
*Creates an object with no data.*
- **SampleRef** (T \* **data**, Info \* **info**)  
*Creates an object with a reference to a data object.*
- **SampleRef** (T & **data**, Info & **info**)  
*Creates an object with a reference to a data object.*
- **SampleRef** ( **Sample**< T > &sample)  
*Copies the references to data and info.*
- **SampleRef** & **operator=** ( **Sample**< T > &sample)  
*Copies the references to data and info.*
- T & **data** () const  
*Gets the data this sample contains.*
- Info & **info** () const  
*Gets the SampleInfo.*
- **operator T&** () const  
*Gets the data this sample contains.*
- void **set\_data** (T & **data**)  
*Sets a reference to a data object.*
- void **set\_info** ( **DDS\_SampleInfo** & **info**)  
*Sets the info object.*
- bool **is\_nil\_data** () const  
*Indicates if this **SampleRef** (p. 1920) contains a reference to data or not.*
- bool **is\_nil\_info** () const  
*Indicates if this **SampleRef** (p. 1920) contains a reference to data or not.*
- **SampleIdentity\_t identity** () const  
*Gets the identity of this sample.*
- **SampleIdentity\_t related\_identity** () const  
*Gets the identity of a sample that is related to this one.*

### 9.374.1 Detailed Description

```
template<typename T>
class connex::SampleRef< T >
```

A data sample and related information received from the middleware.

A **SampleRef** (p. 1920) can be used much like a **connex::Sample** (p. 1912), but it's different in that it holds references to data and **DDS\_SampleInfo** (p. 1082), whereas a **Sample** (p. 1912) is a value type and owns its data and info.

When calling an operation that copies data from the middleware into a **Sample** (p. 1912) (e.g. **connex::Requester**↔**::take\_reply(Sample<TRep>&)** (p. 1898)), the references to its data and information must have been set explicitly (see **connex::SampleRef::set\_data(T&)** (p. 1924) and **connex::SampleRef::set\_info(DDS\_SampleInfo&)** (p. 1925))

When a **SampleRef** (p. 1920) is copied, the destination **SampleRef** (p. 1920) references the same data and info objects as the source. Copying and passing by value are inexpensive operations.

**SampleRef** (p. 1920) is also the type of the elements in a **connex::LoanedSamples** (p. 1727) container and they hold references to data from the middleware.

#### Template Parameters

<i>T</i>	The data type that this sample contains
----------	---

#### See also

**connex::Requester::receive\_reply(Sample<TRep>&, const Duration\_t&)** (p. 1893)

**connex::Requester::take\_reply(Sample<TRep>&)** (p. 1898)

**connex::Replier::receive\_request(Sample<TReq>&, const Duration\_t&)** (p. 1875)

**Basic Requester example using SampleRef** (p. 231)

#### Template Parameters

<i>T</i>	The data type that this sample can contain
----------	--

### 9.374.2 Constructor & Destructor Documentation

#### 9.374.2.1 SampleRef() [1/4]

```
template<typename T >
connex::SampleRef< T >::SampleRef ( ) [inline]
```

Creates an object with no data.

See also

**set\_data(T&)** (p. 1924)

Referenced by **connext::SampleRef< T >::operator=()**.

### 9.374.2.2 SampleRef() [2/4]

```
template<typename T >
connext::SampleRef< T >::SampleRef (
    T * data,
    Info * info ) [inline]
```

Creates an object with a reference to a data object.

See also

**set\_data(T&)** (p. 1924)

### 9.374.2.3 SampleRef() [3/4]

```
template<typename T >
connext::SampleRef< T >::SampleRef (
    T & data,
    Info & info ) [inline]
```

Creates an object with a reference to a data object.

See also

**set\_data(T&)** (p. 1924)

### 9.374.2.4 SampleRef() [4/4]

```
template<typename T >
connext::SampleRef< T >::SampleRef (
    Sample< T > & sample ) [inline]
```

Copies the references to data and info.

After this operation, this object contains a reference to the same data and info instances as the source.



## 9.374.3 Member Function Documentation

### 9.374.3.1 operator=()

```
template<typename T >
SampleRef & connext::SampleRef< T >::operator= (
    Sample< T > & sample ) [inline]
```

Copies the references to data and info.

After this operation, this object contains a reference to the same data and info instances as the source.

References **connext::SampleRef**< T >::**SampleRef**().

### 9.374.3.2 data()

```
template<typename T >
T & connext::SampleRef< T >::data ( ) const [inline]
```

Gets the data this sample contains.

#### Precondition

Data must have been set before

#### See also

**connext::WriteSampleRef::set\_data** (p. 1954)

**connext::WriteSample::data**() (p. 1950)

Referenced by **connext::SampleRef**< T >::**set\_data**().

### 9.374.3.3 info()

```
template<typename T >
Info & connext::SampleRef< T >::info ( ) const [inline]
```

Gets the SampleInfo.

#### Precondition

The info object must have been set

#### See also

**set\_info(DDS\_SampleInfo&)** (p. 1925)

**connext::SampleRef::identity()** (p. 1925)

Referenced by **connext::SampleRef< T >::identity()**, **connext::SampleRef< T >::related\_identity()**, and **connext::SampleRef< T >::set\_info()**.

### 9.374.3.4 operator T&()

```
template<typename T >
connext::SampleRef< T >::operator T& ( ) const [inline]
```

Gets the data this sample contains.

#### Precondition

Data must have been set before

#### See also

**connext::WriteSampleRef::set\_data** (p. 1954)

**connext::WriteSample::data()** (p. 1950)

### 9.374.3.5 set\_data()

```
template<typename T >
void connext::SampleRef< T >::set_data (
    T & data ) [inline]
```

Sets a reference to a data object.

## Parameters

<i>data</i>	The data object this sample will reference
-------------	--

References `connext::SampleRef< T >::data()`.

### 9.374.3.6 set\_info()

```
template<typename T >
void connext::SampleRef< T >::set_info (
    DDS_SampleInfo & info ) [inline]
```

Sets the info object.

References `connext::SampleRef< T >::info()`.

### 9.374.3.7 is\_nil\_data()

```
template<typename T >
bool connext::SampleRef< T >::is_nil_data ( ) const [inline]
```

Indicates if this **SampleRef** (p. 1920) contains a reference to data or not.

## Returns

True if this sample does not contain a reference to data.

## See also

`connext::SampleRef::data` (p. 1923)

`connext::SampleRef::set_data(T&)` (p. 1924)

### 9.374.3.8 is\_nil\_info()

```
template<typename T >
bool connext::SampleRef< T >::is_nil_info ( ) const [inline]
```

Indicates if this **SampleRef** (p. 1920) contains a reference to data or not.

## Returns

True if this sample does not contain a reference to info.

## See also

`connext::SampleRef::info()` (p. 1923)

`connext::SampleRef::set_info(DDS_SampleInfo&)` (p. 1925)

### 9.374.3.9 identity()

```
template<typename T >
SampleIdentity_t connext::SampleRef< T >::identity ( ) const [inline]
```

Gets the identity of this sample.

#### Precondition

The info object must have been set

#### See also

**set\_info(DDS\_SampleInfo&)** (p. 1925)

**connext::Sample::identity()** (p. 1914)

References **connext::SampleRef**< T >::info().

### 9.374.3.10 related\_identity()

```
template<typename T >
SampleIdentity_t connext::SampleRef< T >::related_identity ( ) const [inline]
```

Gets the identity of a sample that is related to this one.

#### Precondition

The info object must have been set

#### See also

**connext::Sample::related\_identity()** (p. 1914)

References **connext::SampleRef**< T >::info().

## 9.375 rti::flat::Sequenceliterator< E, OffsetKind > Class Template Reference

Iterator for collections of Offsets.

```
#include <SequenceIterator.hpp>
```

## Public Types

- typedef std::forward\_iterator\_tag **iterator\_category**  
*The iterator category.*
- typedef E **value\_type**  
*The element type.*
- typedef **value\_type** **reference**  
*The reference type is the same as the value type, an Offset.*
- typedef **value\_type** **pointer**  
*The pointer type is the same as the value type, an Offset.*
- typedef std::ptrdiff\_t **difference\_type**  
*The difference type.*

## Public Member Functions

- **Sequenceliterator** ()  
*Constructs an invalid iterator.*
- bool **is\_null** () const  
*Returns whether the iterator is invalid.*
- **value\_type** **operator\*** () const  
*Returns the Offset of the current element.*
- **value\_type** **operator->** () const  
*Returns the Offset of the current element.*
- bool **advance** ()  
*Advances to the next element, reporting any errors by returning false.*
- **Sequenceliterator** & **operator++** ()  
*Advances to the next element.*
- **Sequenceliterator** **operator++** (int)  
*Advances to the next element.*

## Friends

- bool **operator**< (const **Sequenceliterator** &s1, const **Sequenceliterator** &s2)  
*Compares two iterators.*
- bool **operator**> (const **Sequenceliterator** &s1, const **Sequenceliterator** &s2)  
*Compares two iterators.*
- bool **operator**<= (const **Sequenceliterator** &s1, const **Sequenceliterator** &s2)  
*Compares two iterators.*
- bool **operator**>= (const **Sequenceliterator** &s1, const **Sequenceliterator** &s2)  
*Compares two iterators.*
- bool **operator**== (const **Sequenceliterator** &s1, const **Sequenceliterator** &s2)  
*Compares two iterators.*
- bool **operator**!= (const **Sequenceliterator** &s1, const **Sequenceliterator** &s2)  
*Compares two iterators.*

### 9.375.1 Detailed Description

```
template<typename E, typename OffsetKind>  
class rti::flat::Sequenceliterator< E, OffsetKind >
```

Iterator for collections of Offsets.

## Template Parameters

<i>E</i>	The Offset type of the elements
<i>OffsetKind</i>	(implementation detail)

## Note

This type should not be declared directly. For example, for a **SequenceOffset** (p. 1934), use **SequenceOffset**↔  
**::iterator** (p. 578) (or simply `auto`).

A **Sequenceliterator** (p. 1926) moves through the Offset to elements of a sequence or array **Offset** (p. 564), and provides the functionality of a standard `forward_iterator`.

Note that a dereferenced **Sequenceliterator** (p. 1926) returns **by value** the Offset to the current element; it doesn't return it by reference.

Since the Traditional C++ API doesn't use exceptions, it is recommended to use the function **advance()** (p. 1931) instead of `operator++` to check for errors

## 9.375.2 Member Typedef Documentation

### 9.375.2.1 iterator\_category

```
template<typename E , typename OffsetKind >
typedef std::forward_iterator_tag  rti::flat::SequenceIterator< E, OffsetKind >::iterator_↔
category
```

The iterator category.

### 9.375.2.2 value\_type

```
template<typename E , typename OffsetKind >
typedef E  rti::flat::SequenceIterator< E, OffsetKind >::value_type
```

The element type.

### 9.375.2.3 reference

```
template<typename E , typename OffsetKind >
typedef value_type rti::flat::SequenceIterator< E, OffsetKind >::reference
```

The reference type is the same as the value type, an Offset.

### 9.375.2.4 pointer

```
template<typename E , typename OffsetKind >
typedef value_type rti::flat::SequenceIterator< E, OffsetKind >::pointer
```

The pointer type is the same as the value type, an Offset.

### 9.375.2.5 difference\_type

```
template<typename E , typename OffsetKind >
typedef std::ptrdiff_t rti::flat::SequenceIterator< E, OffsetKind >::difference_type
```

The difference type.

## 9.375.3 Constructor & Destructor Documentation

### 9.375.3.1 SequenceIterator()

```
template<typename E , typename OffsetKind >
rti::flat::SequenceIterator< E, OffsetKind >::SequenceIterator ( ) [inline]
```

Constructs an invalid iterator.

## 9.375.4 Member Function Documentation



### 9.375.4.1 is\_null()

```
template<typename E , typename OffsetKind >
bool rti::flat::SequenceIterator< E, OffsetKind >::is_null ( ) const [inline]
```

Returns whether the iterator is invalid.

### 9.375.4.2 operator\*()

```
template<typename E , typename OffsetKind >
value_type rti::flat::SequenceIterator< E, OffsetKind >::operator* ( ) const [inline]
```

Returns the Offset of the current element.

#### Returns

The Offset to the current element. Note that this function returns by value, not by reference. This Offset may be **null** (p. 1857) if the iterator has surpassed the length of the collection. See **Offset Error Management** (p. 566).

### 9.375.4.3 operator->()

```
template<typename E , typename OffsetKind >
value_type rti::flat::SequenceIterator< E, OffsetKind >::operator-> ( ) const [inline]
```

Returns the Offset of the current element.

### 9.375.4.4 advance()

```
template<typename E , typename OffsetKind >
bool rti::flat::SequenceIterator< E, OffsetKind >::advance ( ) [inline]
```

Advances to the next element, reporting any errors by returning false.

Since the Traditional C++ API doesn't support exceptions, this function is recommended instead of operator++.

#### Returns

True if the function succeeds, or false if there was an error

### 9.375.4.5 operator++() [1/2]

```
template<typename E , typename OffsetKind >
SequenceIterator & rti::flat::SequenceIterator< E, OffsetKind >::operator++ ( ) [inline]
```

Advances to the next element.

#### Warning

Since the Traditional C++ API doesn't use exceptions, use **advance()** (p. 1931) instead of this operator to check for errors.

### 9.375.4.6 operator++() [2/2]

```
template<typename E , typename OffsetKind >
SequenceIterator rti::flat::SequenceIterator< E, OffsetKind >::operator++ (
    int ) [inline]
```

Advances to the next element.

#### Warning

Since the Traditional C++ API doesn't use exceptions, use **advance()** (p. 1931) instead of this operator to check for errors.

## 9.375.5 Friends And Related Function Documentation

### 9.375.5.1 operator<

```
template<typename E , typename OffsetKind >
bool operator< (
    const SequenceIterator< E, OffsetKind > & s1,
    const SequenceIterator< E, OffsetKind > & s2 ) [friend]
```

Compares two iterators.

### 9.375.5.2 operator>

```
template<typename E , typename OffsetKind >
bool operator> (
    const SequenceIterator< E, OffsetKind > & s1,
    const SequenceIterator< E, OffsetKind > & s2 ) [friend]
```

Compares two iterators.

### 9.375.5.3 operator<=

```
template<typename E , typename OffsetKind >
bool operator<= (
    const SequenceIterator< E, OffsetKind > & s1,
    const SequenceIterator< E, OffsetKind > & s2 ) [friend]
```

Compares two iterators.

### 9.375.5.4 operator>=

```
template<typename E , typename OffsetKind >
bool operator>= (
    const SequenceIterator< E, OffsetKind > & s1,
    const SequenceIterator< E, OffsetKind > & s2 ) [friend]
```

Compares two iterators.

### 9.375.5.5 operator==

```
template<typename E , typename OffsetKind >
bool operator== (
    const SequenceIterator< E, OffsetKind > & s1,
    const SequenceIterator< E, OffsetKind > & s2 ) [friend]
```

Compares two iterators.

### 9.375.5.6 operator"!=

```
template<typename E , typename OffsetKind >
bool operator!= (
    const SequenceIterator< E, OffsetKind > & s1,
    const SequenceIterator< E, OffsetKind > & s2 ) [friend]
```

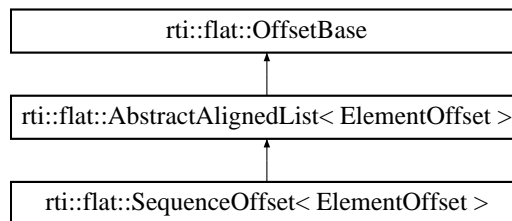
Compares two iterators.

## 9.376 rti::flat::SequenceOffset< ElementOffset > Class Template Reference

Offset to a sequence of non-primitive elements.

```
#include <SequenceOffsets.hpp>
```

Inheritance diagram for rti::flat::SequenceOffset< ElementOffset >:



### Public Member Functions

- ElementOffset **get\_element** (unsigned int i)  
*Gets the Offset to an element.*
- unsigned int **element\_count** () const  
*The number of elements.*

### Additional Inherited Members

#### 9.376.1 Detailed Description

```
template<typename ElementOffset>
class rti::flat::SequenceOffset< ElementOffset >
```

Offset to a sequence of non-primitive elements.

## Template Parameters

<i>ElementOffset</i>	The Offset type, for example <b>MyFlatMutableOffset</b> (p. 1757), <b>MyFlatFinalOffset</b> (p. 1746), or <b>StringOffset</b> (p. 1945).
----------------------	--

Represents an Offset to a sequence member and allows getting an Offset to each of its elements.

A **SequenceOffset** (p. 1934) may meet the requirements to be cast to an array of the equivalent plain C++ element type (see **rti::flat::plain\_cast** (p. 566)), if the `ElementOffset` is a final type.

## 9.376.2 Member Function Documentation

### 9.376.2.1 `get_element()`

```
template<typename ElementOffset >
ElementOffset rti::flat::SequenceOffset< ElementOffset >::get_element (
    unsigned int i ) [inline]
```

Gets the Offset to an element.

## Parameters

<i>i</i>	The zero-based index to the element
----------	-------------------------------------

## Returns

The Offset to the element in the *i*-th position

### 9.376.2.2 `element_count()`

```
template<typename ElementOffset >
unsigned int rti::flat::SequenceOffset< ElementOffset >::element_count ( ) const [inline]
```

The number of elements.

## 9.377 connext::SimpleReplier< TReq, TRep > Class Template Reference

A callback-based replier.

## Public Member Functions

- **SimpleReplier** ( **DDSDomainParticipant** \*participant, const std::string &service\_name, **SimpleReplier**↔  
**Listener**< TReq, TRep > &listener)  
*Creates a new **SimpleReplier** (p. 1935).*
- **SimpleReplier** (const **SimpleReplierParams**< TReq, TRep > &params)  
*Creates a new **SimpleReplier** (p. 1935).*
- virtual ~**SimpleReplier** ()  
*Releases the resources created by this **SimpleReplier** (p. 1935).*

### 9.377.1 Detailed Description

```
template<typename TReq, typename TRep>
class connext::SimpleReplier< TReq, TRep >
```

A callback-based replier.

A **SimpleReplier** (p. 1935) is based on a **connext::SimpleReplierListener** (p. 1937) that users provide . Requests are passed to the callback, which returns a reply. The reply is directed only to the **Requester** (p. 1886) that sent the request.

SimpleRepliers are useful for simple use cases where a single reply for a request can be generated quickly, for example, looking up a table.

When more than one reply for a request can be generated or the processing is complex or needs to happen asynchronously, use a **connext::Replier** (p. 1868) instead.

See also

- connext::Replier** (p. 1868)
- connext::SimpleReplierListener** (p. 1937)
- SimpleReplier example** (p. 233)

### 9.377.2 Constructor & Destructor Documentation

#### 9.377.2.1 SimpleReplier() [1/2]

```
template<typename TReq , typename TRep >
connext::SimpleReplier< TReq, TRep >::SimpleReplier (
    DDSDomainParticipant * participant,
    const std::string & service_name,
    SimpleReplierListener< TReq, TRep > & listener )
```

Creates a new **SimpleReplier** (p. 1935).

See also

- connext::SimpleReplierParams** (p. 1939)
- connext::SimpleReplierListener** (p. 1937)

### 9.377.2.2 SimpleReplier() [2/2]

```
template<typename TReq , typename TRep >
connext::SimpleReplier< TReq, TRep >::SimpleReplier (
    const SimpleReplierParams< TReq, TRep > & params ) [explicit]
```

Creates a new **SimpleReplier** (p. 1935).

See also

**connext::SimpleReplierParams** (p. 1939)

**connext::SimpleReplierListener** (p. 1937)

### 9.377.2.3 ~SimpleReplier()

```
template<typename TReq , typename TRep >
connext::SimpleReplier< TReq, TRep >::~~SimpleReplier [virtual]
```

Releases the resources created by this **SimpleReplier** (p. 1935).

See also

**connext::Replier::~~Replier()** (p. 1873)

## 9.378 connext::SimpleReplierListener< TReq, TRep > Class Template Reference

The listener called by a **SimpleReplier** (p. 1935).

### Public Member Functions

- virtual TRep \* **on\_request\_available** (typename dds\_type\_traits< TReq >::SampleRefType request)=0  
*User callback that receives a request and provides a reply.*
- virtual void **return\_loan** (TRep \*reply)=0  
*Returns a previously generated reply to the user.*

### 9.378.1 Detailed Description

```
template<class TReq, class TRep>
class connext::SimpleReplierListener< TReq, TRep >
```

The listener called by a **SimpleReplier** (p. 1935).

See also

**connext::SimpleReplier** (p. 1935)

**SimpleReplier example** (p. 233)

## 9.378.2 Member Function Documentation

### 9.378.2.1 `on_request_available()`

```
template<class TReq , class TRep >
virtual TRep * connext::SimpleReplierListener< TReq, TRep >::on_request_available (
    typename dds_type_traits< TReq >::SampleRefType request ) [pure virtual]
```

User callback that receives a request and provides a reply.

This operation gets called when a request is available and expects a reply that is automatically sent. Immediately after that, `return_loan` (p. 1938) is called.

#### Parameters

<i>request</i>	The received request
----------------	----------------------

#### Returns

A reply for that request

### 9.378.2.2 `return_loan()`

```
template<class TReq , class TRep >
virtual void connext::SimpleReplierListener< TReq, TRep >::return_loan (
    TRep * reply ) [pure virtual]
```

Returns a previously generated reply to the user.

This operation is always called right after sending the reply created by `on_request_available` (p. 1938). It can be used to release any resources from the reply creation. If there are no resources to release, the implementation body can be empty.

#### Parameters

<i>reply</i>	The reply previously provided in <code>on_request_available</code> (p. 1938)
--------------	--



## 9.379 connext::SimpleReplierParams< TReq, TRep > Class Template Reference

Contains the parameters for creating a **connext::SimpleReplier** (p. 1935).

Inherits connext::details::EntityParams.

### Public Member Functions

- **SimpleReplierParams** ( **DDS::DomainParticipant** \*participant, **SimpleReplierListener**< TReq, TRep > &listener)
 

*Creates **SimpleReplierParams** (p. 1939) with the parameters that a **SimpleReplier** (p. 1935) always needs.*
- **SimpleReplierParams** & **service\_name** (const std::string &service\_name)
 

*The service name the **Replier** (p. 1868) offers and Requesters use to match.*
- **SimpleReplierParams** & **request\_topic\_name** (const std::string &req\_topic)
 

*Sets a specific request topic name.*
- **SimpleReplierParams** & **reply\_topic\_name** (const std::string &rep\_topic)
 

*Sets a specific reply topic name.*
- **SimpleReplierParams** & **qos\_profile** (const std::string &qos\_library\_name, const std::string &qos\_profile\_↔ name)
 

*Sets a QoS profile for the entities in this replier.*
- **SimpleReplierParams** & **datawriter\_qos** (const **DDS\_DataWriterQos** &qos)
 

*Sets the quality of service of the reply **DataWriter**.*
- **SimpleReplierParams** & **datareader\_qos** (const **DDS\_DataReaderQos** &qos)
 

*Sets the quality of service of the request **DataReader**.*
- **SimpleReplierParams** & **publisher** ( **DDSPublisher** \*publisher)
 

*Sets a specific **Publisher**.*
- **SimpleReplierParams** & **subscriber** ( **DDSSubscriber** \*subscriber)
 

*Sets a specific **Subscriber**.*
- **SimpleReplierParams** & **request\_type\_support** ( **DDS::TypeSupport** \*type\_support)
 

*Sets the type support for the request type.*
- **SimpleReplierParams** & **reply\_type\_support** ( **DDS::TypeSupport** \*type\_support)
 

*Sets the type support for the reply type.*

### 9.379.1 Detailed Description

```
template<typename TReq, typename TRep>
class connext::SimpleReplierParams< TReq, TRep >
```

Contains the parameters for creating a **connext::SimpleReplier** (p. 1935).

The parameters for a **SimpleReplier** (p. 1935) are identical to those of the **Replier** (p. 1868), except for the **Simple↔ ReplierListener** (p. 1937), which is required and has a different user callback.

See also

**connext::ReplierParams** (p. 1881)

## 9.379.2 Constructor & Destructor Documentation

### 9.379.2.1 SimpleReplierParams()

```
template<typename TReq , typename TRep >
connext::SimpleReplierParams< TReq, TRep >::SimpleReplierParams (
    DDS::DomainParticipant * participant,
    SimpleReplierListener< TReq, TRep > & listener ) [inline]
```

Creates **SimpleReplierParams** (p. 1939) with the parameters that a **SimpleReplier** (p. 1935) always needs.

In addition to these parameters, a **SimpleReplier** (p. 1935) needs either:

- A service name (**service\_name** (p. 1940)), or
- Custom topic names (**reply\_topic\_name** (p. 1941) and **request\_topic\_name** (p. 1940)).

The other parameters are optional.

#### Parameters

<i>participant</i>	The DomainParticipant that this <b>SimpleReplier</b> (p. 1935) uses to join a domain.
<i>listener</i>	The listener where the user callback that a <b>SimpleReplier</b> (p. 1935) calls is implemented.

## 9.379.3 Member Function Documentation

### 9.379.3.1 service\_name()

```
template<typename TReq , typename TRep >
SimpleReplierParams & connext::SimpleReplierParams< TReq, TRep >::service_name (
    const std::string & service_name ) [inline]
```

The service name the **Replier** (p. 1868) offers and Requesters use to match.

See also

**connext::RequesterParams::service\_name** (p. 1909)

### 9.379.3.2 request\_topic\_name()

```
template<typename TReq , typename TRep >
SimpleReplierParams & connex::SimpleReplierParams< TReq, TRep >::request_topic_name (
    const std::string & req_topic ) [inline]
```

Sets a specific request topic name.

This is an alternative to **service\_name** (p. 1940)

### 9.379.3.3 reply\_topic\_name()

```
template<typename TReq , typename TRep >
SimpleReplierParams & connex::SimpleReplierParams< TReq, TRep >::reply_topic_name (
    const std::string & rep_topic ) [inline]
```

Sets a specific reply topic name.

This is an alternative to **service\_name** (p. 1940)

### 9.379.3.4 qos\_profile()

```
template<typename TReq , typename TRep >
SimpleReplierParams & connex::SimpleReplierParams< TReq, TRep >::qos_profile (
    const std::string & qos_library_name,
    const std::string & qos_profile_name ) [inline]
```

Sets a QoS profile for the entities in this replier.

See also

**connex::ReplierParams::qos\_profile** (p. 1883)

### 9.379.3.5 datawriter\_qos()

```
template<typename TReq , typename TRep >
SimpleReplierParams & connex::SimpleReplierParams< TReq, TRep >::datawriter_qos (
    const DDS_DataWriterQos & qos ) [inline]
```

Sets the quality of service of the reply DataWriter.

See also

**qos\_profile** (p. 1941)

### 9.379.3.6 `datareader_qos()`

```
template<typename TReq , typename TRep >  
SimpleReplierParams & connext::SimpleReplierParams< TReq, TRep >::datareader_qos (   
    const DDS_DataReaderQos & qos ) [inline]
```

Sets the quality of service of the request DataReader.

See also

[qos\\_profile](#) (p. 1941)

### 9.379.3.7 `publisher()`

```
template<typename TReq , typename TRep >  
SimpleReplierParams & connext::SimpleReplierParams< TReq, TRep >::publisher (   
    DDSPublisher * publisher ) [inline]
```

Sets a specific Publisher.

See also

[connext::RequesterParams::publisher](#) (p. 1910)

### 9.379.3.8 `subscriber()`

```
template<typename TReq , typename TRep >  
SimpleReplierParams & connext::SimpleReplierParams< TReq, TRep >::subscriber (   
    DDSSubscriber * subscriber ) [inline]
```

Sets a specific Subscriber.

See also

[connext::RequesterParams::subscriber](#) (p. 1911)

### 9.379.3.9 request\_type\_support()

```
template<typename TReq , typename TRep >
SimpleReplierParams & connext::SimpleReplierParams< TReq, TRep >::request_type_support (
    DDS::TypeSupport * type_support ) [inline]
```

Sets the type support for the request type.

See also

[connext::ReplierParams::request\\_type\\_support](#) (p. 1885)

### 9.379.3.10 reply\_type\_support()

```
template<typename TReq , typename TRep >
SimpleReplierParams & connext::SimpleReplierParams< TReq, TRep >::reply_type_support (
    DDS::TypeSupport * type_support ) [inline]
```

Sets the type support for the reply type.

See also

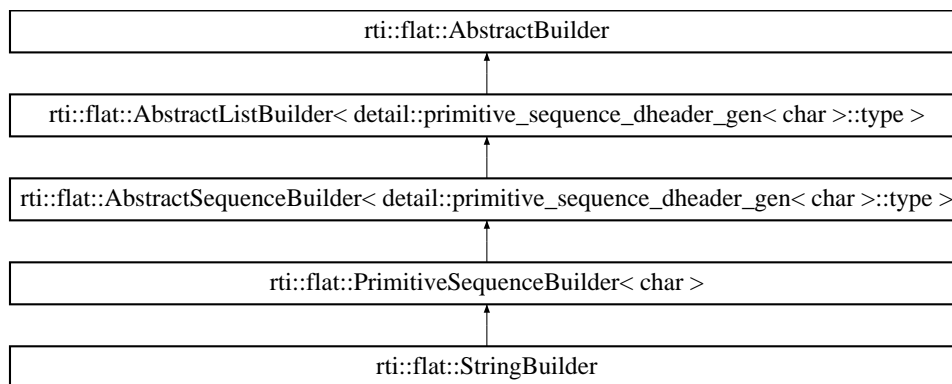
[connext::ReplierParams::reply\\_type\\_support](#) (p. 1885)

## 9.380 rti::flat::StringBuilder Class Reference

Builds a string.

```
#include <SequenceBuilders.hpp>
```

Inheritance diagram for rti::flat::StringBuilder:



## Public Member Functions

- **StringBuilder** & **set\_string** (const char \*value)  
*Sets the string value.*
- **Offset** **finish** ()  
*Finishes building the string.*

## Additional Inherited Members

### 9.380.1 Detailed Description

Builds a string.

A **StringBuilder** (p. 1943) only provides one method, **set\_string()** (p. 1944), so it can be typically used as follows:

```
MyFlatMutableBuilder my_builder = ...;
my_builder.build_my_string().set_string("Hello!");
```

Note that by relying on the builder destructor, there is no need to call **finish()** (p. 1944) on the object returned by `build_my_string()`.

### 9.380.2 Member Function Documentation

#### 9.380.2.1 set\_string()

```
StringBuilder & rti::flat::StringBuilder::set_string (
    const char * value ) [inline]
```

Sets the string value.

References `rti::flat::PrimitiveSequenceBuilder< char >::add_n()`.

#### 9.380.2.2 finish()

```
Offset rti::flat::StringBuilder::finish ( ) [inline]
```

Finishes building the string.

Returns

An Offset to the member that has been built.

See also

`discard()` (p. 580)

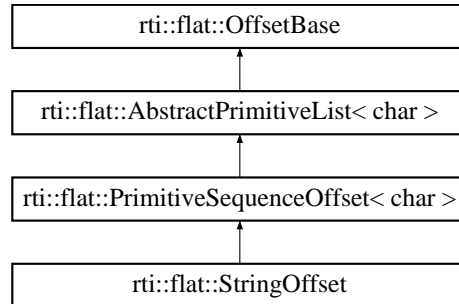
References `rti::flat::PrimitiveSequenceBuilder< char >::add_next()`.

## 9.381 rti::flat::StringOffset Class Reference

Offset to a string.

```
#include <SequenceOffsets.hpp>
```

Inheritance diagram for rti::flat::StringOffset:



### Public Member Functions

- char \* **get\_string** ()  
*Gets the string.*
- const char \* **get\_string** () const  
*Gets the string (const)*
- unsigned int **element\_count** () const  
*Returns the number of characters.*

### 9.381.1 Detailed Description

Offset to a string.

### 9.381.2 Member Function Documentation

#### 9.381.2.1 get\_string() [1/2]

```
char * rti::flat::StringOffset::get_string ( ) [inline]
```

Gets the string.

The string returned can be modified as long as its size doesn't change.

References [rti::flat::OffsetBase::get\\_buffer\(\)](#).

### 9.381.2.2 `get_string()` [2/2]

```
const char * rti::flat::StringOffset::get_string ( ) const [inline]
```

Gets the string (const)

References `rti::flat::OffsetBase::get_buffer()`.

### 9.381.2.3 `element_count()`

```
unsigned int rti::flat::StringOffset::element_count ( ) const [inline]
```

Returns the number of characters.

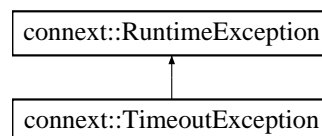
This number doesn't include the null terminating character.

References `rti::flat::PrimitiveSequenceOffset< T >::element_count()`.

## 9.382 `connext::TimeoutException` Class Reference

The operation timed out (does not apply to wait or receive operations)

Inheritance diagram for `connext::TimeoutException`:



### 9.382.1 Detailed Description

The operation timed out (does not apply to wait or receive operations)

Operations that wait for samples (e.g. `connext::Requester::wait_for_replies(int, const Duration_t&)` (p. 1896) or `connext::Replier::receive_requests(int, int, const Duration_t&)` (p. 1876)) do not throw this exception.

See also

`DDS_RETCODE_TIMEOUT` (p. 337)



## 9.383 TransportAllocationSettings\_t Struct Reference

Allocation settings used by various internal buffers.

### 9.383.1 Detailed Description

Allocation settings used by various internal buffers.

An allocation setting structure defines the rules of memory management used by internal buffers.

An internal buffer can provide blocks of memory of fixed size. They are used in several places of any transport, and this structure defines its starting size, limits, and how to increase its capacity.

It contains three values:

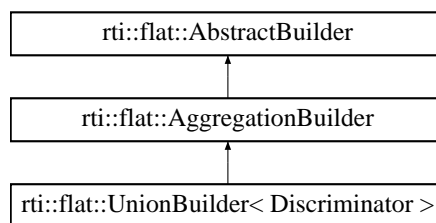
- `initial_count`: the number of individual elements that are allocated when the buffer is created.
- `max_count`: the maximum number of elements the buffer can hold. The buffer will grow up to this amount. After this limit is reached, new allocation requests will fail. For unlimited size, use the value `NDDS_TRANSPORT_ALLOCATION_SETTINGS_MAX_COUNT_UNLIMITED`
- `incremental_count`: The amount of elements that are allocated at every increment. You can use the value `NDDS_TRANSPORT_ALLOCATION_SETTINGS_INCREMENTAL_COUNT_AUTOMATIC` to have the buffer double its size at every reallocation request.

## 9.384 rti::flat::UnionBuilder< Discriminator > Class Template Reference

Base class of builders for user-defined mutable unions.

```
#include <AggregationBuilders.hpp>
```

Inheritance diagram for `rti::flat::UnionBuilder< Discriminator >`:



## Additional Inherited Members

### 9.384.1 Detailed Description

```
template<typename Discriminator>
class rti::flat::UnionBuilder< Discriminator >
```

Base class of builders for user-defined mutable unions.

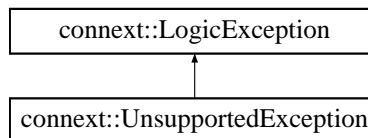
Union builders can only add or build a single member.

This class contains implementation details and doesn't add any public function to **AbstractBuilder** (p. 579).

## 9.385 connext::UnsupportedException Class Reference

Unsupported operation.

Inheritance diagram for connext::UnsupportedException:



### 9.385.1 Detailed Description

Unsupported operation.

See also

**DDS\_RETCODE\_UNSUPPORTED** (p. 336)

## 9.386 connext::WriteSample< T > Class Template Reference

A sample for writing data.

Inherits connext::details::SampleBase< T, I >.

## Public Member Functions

- **WriteSample** ()  
*Creates a sample with default data and info values.*
- **WriteSample** (const **WriteSample**< T > &other)  
*Creates a sample making a deep copy of another sample.*
- **WriteSample** (const T & data)  
*Creates a sample making a deep copy of another sample.*
- **WriteSample** ( **WriteSampleRef**< T > wsref)  
*Creates a sample deep copying the data and info the source references.*
- T & **data** ()  
*Gets the data this sample contains.*
- **WriteParams\_t** & **info** ()  
*Gets the write parameters.*
- const T & **data** ()  
*Gets the data this sample contains.*
- const **WriteParams\_t** & **info** ()  
*Gets the write parameters.*
- **SampleIdentity\_t** **identity** () const  
*Gets the identity of this sample.*

### 9.386.1 Detailed Description

```
template<typename T>
class connext::WriteSample< T >
```

A sample for writing data.

WriteSamples are value types containing data that can be sent and optional parameters that configure how the data is written.

The data is automatically initialized using the corresponding **TypeSupport** (p.1711) for type T, and the memory is released in the destructor.

When the data already exists and allocating a new instance is not required, **connext::WriteSampleRef** (p.1952) can be used instead.

#### Template Parameters

<i>T</i>	The data type that this sample contains
----------	---

### 9.386.2 Constructor & Destructor Documentation

### 9.386.2.1 WriteSample() [1/4]

```
template<typename T >
connext::WriteSample< T >::WriteSample ( ) [inline]
```

Creates a sample with default data and info values.

The data is deeply initialized using the corresponding TypeSupport

See also

**FooTypeSupport::initialize\_data** (p. 1718)

### 9.386.2.2 WriteSample() [2/4]

```
template<typename T >
connext::WriteSample< T >::WriteSample (
    const WriteSample< T > & other ) [inline]
```

Creates a sample making a deep copy of another sample.

### 9.386.2.3 WriteSample() [3/4]

```
template<typename T >
connext::WriteSample< T >::WriteSample (
    const T & data )
```

Creates a sample making a deep copy of another sample.

### 9.386.2.4 WriteSample() [4/4]

```
template<typename T >
connext::WriteSample< T >::WriteSample (
    WriteSampleRef< T > wsref ) [inline]
```

Creates a sample deep copying the data and info the source references.

## 9.386.3 Member Function Documentation

### 9.386.3.1 data() [1/2]

```
template<typename T >
T & connext::WriteSample< T >::data ( )
```

Gets the data this sample contains.

### 9.386.3.2 info() [1/2]

```
template<typename T >
WriteParams_t & connext::WriteSample< T >::info ( )
```

Gets the write parameters.

The parameters are input and output to write operations. They can be set to configure the write operation (e.g. setting a specific publication timestamp) or they can be looked up afterward (e.g. what was the actual timestamp the sample was written with).

See also

**connext::Requester::send\_request(WriteSample<UReq>&)** (p. 1892)

**connext::Replier::send\_reply(WriteSample<URep>&, const SampleIdentity\_t&)** (p. 1874)

Referenced by **connext::WriteSample< T >::identity()**.

### 9.386.3.3 data() [2/2]

```
template<typename T >
const T & connext::WriteSample< T >::data ( )
```

Gets the data this sample contains.

### 9.386.3.4 info() [2/2]

```
template<typename T >
const WriteParams_t & connext::WriteSample< T >::info ( )
```

Gets the write parameters.

The parameters are input and output to write operations. They can be set to configure the write operation (e.g. setting a specific publication timestamp) or they can be looked up afterward (e.g. what was the actual timestamp the sample was written with).

See also

**connext::Requester::send\_request(WriteSample<UReq>&)** (p. 1892)

**connext::Replier::send\_reply(WriteSample<URep>&, const SampleIdentity\_t&)** (p. 1874)

### 9.386.3.5 identity()

```
template<typename T >
SampleIdentity_t connext::WriteSample< T >::identity ( ) const [inline]
```

Gets the identity of this sample.

The identity is assigned by the middleware after writing.

See also

**Correlating requests and replies** (p. 230)

References **DDS\_WriteParams\_t::identity**, and **connext::WriteSample< T >::info()**.

## 9.387 connext::WriteSampleRef< T > Class Template Reference

A reference to a data sample for writing.

### Public Member Functions

- **WriteSampleRef** ()  
*Creates an object with no data.*
- **WriteSampleRef** (T & **data**, **WriteParams\_t** &wparams)  
*Creates an object with a reference to a data object.*
- **WriteSampleRef** ( **WriteSample**< T > &ws)  
*Copies the references to data and params.*
- T & **data** () const  
*Gets the data this sample contains.*
- **WriteParams\_t** & **info** () const  
*Gets the write parameters.*
- void **set\_data** (T & **data**)  
*Sets a reference to the data to be written.*
- void **set\_info** ( **WriteParams\_t** & **info**)  
*Copies the new parameters, overwriting the existing ones*
- bool **is\_nil\_data** () const  
*Indicates if this **WriteSampleRef** (p. 1952) contains a reference to data or not.*
- **SampleIdentity\_t** **identity** () const  
*Gets the identity of this sample.*

### 9.387.1 Detailed Description

```
template<typename T>
class connext::WriteSampleRef< T >
```

A reference to a data sample for writing.

A **WriteSampleRef** (p. 1952) can be used much like a **connext::WriteSample** (p. 1948), but it's different in that it holds references to data and write parameters, which need to be explicitly set to existing objects, whereas **WriteSample** (p. 1948) is a value type and it owns its data and info.

## Template Parameters

<i>T</i>	The data type that this sample can contain
----------	--

## 9.387.2 Constructor & Destructor Documentation

### 9.387.2.1 WriteSampleRef() [1/3]

```
template<typename T >  
connext::WriteSampleRef< T >::WriteSampleRef ( ) [inline]
```

Creates an object with no data.

See also

[set\\_data](#) (p. 1954)

### 9.387.2.2 WriteSampleRef() [2/3]

```
template<typename T >  
connext::WriteSampleRef< T >::WriteSampleRef (  
    T & data,  
    WriteParams_t & wparams ) [inline]
```

Creates an object with a reference to a data object.

See also

[set\\_data](#) (p. 1954)

### 9.387.2.3 WriteSampleRef() [3/3]

```
template<typename T >  
connext::WriteSampleRef< T >::WriteSampleRef (  
    WriteSample< T > & ws ) [inline]
```

Copies the references to data and params.

After this operation, this object contains a reference to the same data and WriteParams instances as the source.

### 9.387.3 Member Function Documentation

#### 9.387.3.1 data()

```
template<typename T >
T & connext::WriteSampleRef< T >::data ( ) const [inline]
```

Gets the data this sample contains.

##### Precondition

Data must have been set before

##### See also

**set\_data** (p. 1954)

**connext::WriteSample::data()** (p. 1950)

Referenced by **connext::WriteSampleRef< T >::set\_data()**.

#### 9.387.3.2 info()

```
template<typename T >
WriteParams_t & connext::WriteSampleRef< T >::info ( ) const [inline]
```

Gets the write parameters.

##### Precondition

The info object must have been set

##### See also

**set\_info()** (p. 1955)

**connext::WriteSample::identity()** (p. 1951)

Referenced by **connext::WriteSampleRef< T >::identity()**, and **connext::WriteSampleRef< T >::set\_info()**.

#### 9.387.3.3 set\_data()

```
template<typename T >
void connext::WriteSampleRef< T >::set_data (
    T & data ) [inline]
```

Sets a reference to the data to be written.

Assigns a reference to the



## Parameters

<i>data</i>	The data this sample will hold a reference to
-------------	---

References `connext::WriteSampleRef< T >::data()`.

9.387.3.4 `set_info()`

```
template<typename T >
void connext::WriteSampleRef< T >::set_info (
    WriteParams_t & info ) [inline]
```

Copies the new parameters, overwriting the existing ones

References `connext::WriteSampleRef< T >::info()`.

9.387.3.5 `is_nil_data()`

```
template<typename T >
bool connext::WriteSampleRef< T >::is_nil_data ( ) const [inline]
```

Indicates if this `WriteSampleRef` (p. 1952) contains a reference to data or not.

## Returns

True if this sample does not contain a reference to data.

## See also

`data()` (p. 1954)

`set_data` (p. 1954)

9.387.3.6 `identity()`

```
template<typename T >
SampleIdentity_t connext::WriteSampleRef< T >::identity ( ) const [inline]
```

Gets the identity of this sample.

## Precondition

The info object must have been set

## See also

`set_info()` (p. 1955)

`connext::WriteSample::identity()` (p. 1951)

References `DDS_WriteParams_t::identity`, and `connext::WriteSampleRef< T >::info()`.



# Chapter 10

## File Documentation

### 10.1 AggregationBuilders.hpp

```
1 /*
2 (c) Copyright, Real-Time Innovations, 2018.
3 All rights reserved.
4
5 No duplications, whole or partial, manual or electronic, may be made
6 without express written permission. Any such copies, or
7 revisions thereof, must display this notice unaltered.
8 This code contains trade secrets of Real-Time Innovations, Inc.
9 */
10
11 #ifndef RTI_DDS_FLAT_AGGREGATIONBUILDERS_HPP_
12 #define RTI_DDS_FLAT_AGGREGATIONBUILDERS_HPP_
13
14 #include "rti/flat/BuilderHelper.hpp"
15 #include "rti/flat/Builder.hpp"
16
17 namespace rti { namespace flat {
18
19 /*
20 * Provides the common functionality for builders of aggregated types
21 *
22 * Extends and specializes AbstractBuilder to add or override the functionality
23 * required to build an aggregated type:
24 *
25 * - Add or build members, prepending the member header
26 * - Add dheader at the beginning
27 * - Add parameter-list-end header at the end
28 */
29
30 class AggregationBuilder : public AbstractBuilder {
31 protected:
32     AggregationBuilder() :
33         dheader_position_(NULL),
34         emheader_position_(NULL)
35     {
36     }
37
38     // Create a new top-level builder
39     AggregationBuilder(
40         unsigned char *initial_buffer,
41         offset_t size,
42         bool initialize_members) :
43         AbstractBuilder(initial_buffer, size, initialize_members),
44         dheader_position_(NULL),
45         emheader_position_(NULL)
46     {
47         dheader_position_ = stream().serialize_dheader();
48         if (dheader_position_ == NULL) {
49             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(invalidate());
50         }
51     }
52 }
53
54 }
```

```

60 public:
61     // For internal use and testing
62     //
63     // Modifies the encapsulation set in the constructor with a custom value.
64     // This function can only be called after the construction of a non-nested
65     // Builder, before any member is built or added.
66     //
67     void set_encapsulation_impl(RTIXCdrEncapsulationId encapsulation_id)
68     {
69         // Only a top-level Builder can change the encapsulation
70         RTI_FLAT_CHECK_PRECONDITION(!is_nested(), return);
71
72         char *current_position = (char *) owned_stream_.current_position();
73         // This operation is only valid right after construction, when no
74         // member has been added yet
75         RTI_FLAT_CHECK_PRECONDITION(
76             current_position == dheader_position_ + RTI_XCDR_DHEADER_SIZE,
77             return);
78
79         owned_stream_.skip_back(
80             RTI_XCDR_DHEADER_SIZE + RTI_XCDR_ENCAPSULATION_HEADER_SIZE);
81
82         if (!RTIXCdrFlatSample_initializeEncapsulationAndStream(
83             (char *) owned_stream_.buffer(),
84             &owned_stream_.c_stream(),
85             encapsulation_id,
86             owned_stream_.total_size())) {
87             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return);
88         }
89
90         stream().serialize_dheader();
91     }
92
93 protected:
94
95 #if defined(RTI_FLAT_DATA_CXX11_RVALUE_REFERENCES)
96     AggregationBuilder(AggregationBuilder&& other) = default;
97
98     AggregationBuilder& operator=(AggregationBuilder&& other)
99     {
100         if (this == &other) {
101             return *this;
102         }
103
104         finish_untyped_impl();
105
106         AbstractBuilder::operator=(static_cast<AbstractBuilder&&>(other));
107
108         dheader_position_ = other.dheader_position_;
109         emheader_position_ = other.emheader_position_;
110
111         return *this;
112     }
113 #else
114 public:
115     // Enable the safe-move-constructor idiom without C++11 move constructors
116     struct UntypedAggregationBuilderMoveProxy : AbstractBuilderMoveProxy {
117         char * dheader_position_;
118         char * emheader_position_;
119     };
120
121     operator UntypedAggregationBuilderMoveProxy () throw() // move-constructor idiom
122     {
123         UntypedAggregationBuilderMoveProxy other;
124         move_to(other);
125         return other;
126     }
127
128 protected:
129     void move_from(UntypedAggregationBuilderMoveProxy& other)
130     {
131         AbstractBuilder::move_from(other);
132         dheader_position_ = other.dheader_position_;
133         emheader_position_ = other.emheader_position_;
134     }
135
136     void move_to(UntypedAggregationBuilderMoveProxy& other)
137     {
138         AbstractBuilder::move_to(other);
139         other.dheader_position_ = dheader_position_;
140         other.emheader_position_ = emheader_position_;

```

```

141     }
142 #endif
143
144 protected:
145     virtual ~AggregationBuilder()
146     {
147         // AggregationBuilder::finish_untyped_impl() is specialized
148         // with respect to AbstractBuilder::finish_untyped_impl()
149         finish_untyped_impl();
150     }
151
152     template <typename T>
153     bool add_primitive_member(member_id_t id, T value)
154     {
155         RTI_FLAT_BUILDER_CHECK_VALID(return false);
156
157         rti::xcdr::Stream::Memento stream_memento(stream());
158
159         if (!begin_emheader(id, detail::primitive_lc_code<T>::value)) {
160             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return false);
161         }
162         // no need to call finish_emheader()
163
164         if (!stream().serialize_no_align(value)) {
165             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return false);
166         }
167
168         stream_memento.discard(); // success: do not restore the current position
169         return true;
170     }
171
172     template <typename OffsetType>
173     OffsetType add_member(member_id_t id)
174     {
175         RTI_FLAT_BUILDER_CHECK_VALID(return OffsetType());
176
177         // save state in case of error
178         rti::xcdr::Stream::Memento stream_memento(stream());
179         return add_member<OffsetType>(id, stream_memento);
180     }
181
182     template <typename OffsetType>
183     OffsetType add_member(
184         member_id_t id,
185         rti::xcdr::Stream::Memento& stream_memento)
186     {
187         // fixed-size non-primitive members may have a dheader or not; when they
188         // do the LC code is 5, otherwise it is 4.
189         if (!begin_emheader(
190             id,
191             detail::is_fixed_type_w_dheader<OffsetType>::value() ? 5 : 4)) {
192             return OffsetType();
193         }
194
195         OffsetType result = AbstractBuilder::add_element<OffsetType>();
196         finish_emheader();
197
198         stream_memento.discard(); // success - do not restore the previous state
199         return result;
200     }
201
202     template <typename NestedBuilder>
203     NestedBuilder build_member(member_id_t id)
204     {
205         RTI_FLAT_BUILDER_CHECK_VALID(return NestedBuilder());
206
207         // save state in case of error
208         rti::xcdr::Stream::Memento stream_memento(stream());
209         return build_member<NestedBuilder>(id, stream_memento);
210     }
211
212     template <typename NestedBuilder>
213     NestedBuilder build_member(
214         member_id_t id,
215         rti::xcdr::Stream::Memento& stream_memento)
216     {
217         if (!begin_emheader(id, detail::lc_code<NestedBuilder>::value())) {
218             return NestedBuilder();
219         }
220
221         return AbstractBuilder::build_element_no_align<NestedBuilder>(

```

```

222         stream_memento);
223     }
224
225     unsigned char* finish_sample_impl()
226     {
227         RTI_FLAT_BUILDER_CHECK_VALID(return NULL);
228         RTI_FLAT_BUILDER_CHECK_NOT_BOUND(return NULL);
229         RTI_FLAT_BUILDER_CHECK_CAN_FINISH_SAMPLE(return NULL);
230
231         if (!stream().finish_dheader(dheader_position_)) {
232             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return NULL);
233         }
234
235         unsigned char *return_sample = stream().buffer();
236         invalidate();
237
238         return return_sample;
239     }
240
241     // Same as finish_impl() but it doesn't throw exceptions or return an Offset
242     void finish_untyped_impl()
243     {
244         if (is_valid() && is_nested()) {
245             stream().finish_dheader(dheader_position_);
246             AbstractBuilder::finish_untyped_impl();
247         }
248     }
249
250     template <typename OffsetType>
251     OffsetType finish_impl()
252     {
253         RTI_FLAT_BUILDER_CHECK_VALID(return OffsetType());
254         RTI_FLAT_BUILDER_CHECK_CAN_FINISH(return OffsetType());
255
256         stream().finish_dheader(dheader_position_);
257         return AbstractBuilder::finish_impl<OffsetType>();
258     }
259
260 public:
261     // For internal use; need to use rti::flat::discard_sample(writer, builder)
262     unsigned char * discard_sample_impl()
263     {
264         RTI_FLAT_BUILDER_CHECK_VALID(return NULL);
265         RTI_FLAT_BUILDER_CHECK_NOT_BOUND(return NULL);
266         RTI_FLAT_BUILDER_CHECK_CAN_FINISH_SAMPLE(return NULL);
267
268         unsigned char *buffer = this->buffer();
269         invalidate();
270         return buffer;
271     }
272
273 private:
274     void finish_member() // override noexcept
275     {
276         if (!is_valid()) {
277             return;
278         }
279
280         finish_emheader();
281         AbstractBuilder::finish_member();
282     }
283
284 private:
285
286     bool begin_emheader(member_id_t id, RTIXCdrUnsignedLong lc)
287     {
288         RTI_FLAT_BUILDER_CHECK_NOT_BOUND(return false);
289
290         if (!stream().serialize_emheader(emheader_position_, id, lc)) {
291             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return false);
292         }
293
294         return true;
295     }
296
297     void finish_emheader() // noexcept
298     {
299         if (emheader_position_ != NULL) {
300             stream().finish_emheader(emheader_position_);
301             emheader_position_ = NULL;
302         }

```

```

303     }
304
305 protected:
306     // Create a nested builder
307     AggregationBuilder(nested_tag_t, AbstractBuilder& parent, unsigned int alignment)
308         : AbstractBuilder(nested_tag_t(), parent, alignment),
309           dheader_position_(NULL),
310           emheader_position_(NULL)
311     {
312         dheader_position_ = stream().serialize_dheader();
313         if (dheader_position_ == NULL) {
314             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(invalidate());
315         }
316     }
317
318 private:
319     char * dheader_position_;
320     char * emheader_position_;
321 };
322
323 // Specializes an AggregationBuilder to enforce that only one member can
324 // be set at a time
325 template <typename Discriminator>
326 class UnionBuilder : public AggregationBuilder {
327 protected:
328     UnionBuilder()
329     {
330     }
331
332     // Create a new top-level builder
333     UnionBuilder(
334         unsigned char *initial_buffer,
335         offset_t size,
336         bool initialize_members) :
337         AggregationBuilder(initial_buffer, size, initialize_members)
338     {
339     }
340
341     template <typename T>
342     bool add_primitive_member(member_id_t id, Discriminator disc, T value)
343     {
344         RTI_FLAT_BUILDER_CHECK_VALID(return false);
345
346         // Always start at the beginning and override any member or discriminator
347         // that may have been set
348         move_to_discriminator();
349         rti::xcdr::Stream::Memento stream_memento(stream());
350
351         if (!add_discriminator(disc)) {
352             return false;
353         }
354
355         if (!AggregationBuilder::add_primitive_member(id, value)) {
356             return false;
357         }
358
359         stream_memento.discard(); // success: do not restore the current position
360         return true;
361     }
362
363     template <typename OffsetType>
364     OffsetType add_member(member_id_t id, Discriminator disc)
365     {
366         RTI_FLAT_BUILDER_CHECK_VALID(return OffsetType());
367
368         move_to_discriminator();
369         rti::xcdr::Stream::Memento stream_memento(stream());
370         if (!add_discriminator(disc)) {
371             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return OffsetType());
372         }
373
374         return AggregationBuilder::add_member<OffsetType>(id, stream_memento);
375     }
376
377     template <typename NestedBuilder>
378     NestedBuilder build_member(member_id_t id, Discriminator disc)
379     {
380         RTI_FLAT_BUILDER_CHECK_VALID(return NestedBuilder());
381
382         move_to_discriminator();
383         rti::xcdr::Stream::Memento stream_memento(stream());

```

```

393     add_discriminator(disc);
394
395     return AggregationBuilder::build_member<NestedBuilder>(id, stream_memento);
396 }
397
398 // Create a nested builder
399 UnionBuilder(nested_tag_t, AbstractBuilder& parent, unsigned int alignment)
400     : AggregationBuilder(nested_tag_t(), parent, alignment)
401 {
402 }
403
404 private:
405 void move_to_discriminator()
406 {
407     stream().current_position(begin_position() + RTI_XCDR_DHEADER_SIZE);
408 }
409
410 bool add_discriminator(Discriminator disc)
411 {
412     return AggregationBuilder::add_primitive_member(0, disc);
413 }
414 };
415
416
417 } }
418
419 #endif // RTI_DDS_FLAT_AGGREGATIONBUILDERS_HPP_
420

```

## 10.2 Builder.hpp

```

1 /*
2 (c) Copyright, Real-Time Innovations, 2018.
3 All rights reserved.
4
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6 without express written permission. Any such copies, or
7 revisions thereof, must display this notice unaltered.
8 This code contains trade secrets of Real-Time Innovations, Inc.
9 */
10
11 #ifndef RTI_DDS_FLAT_BUILDER_HPP_
12 #define RTI_DDS_FLAT_BUILDER_HPP_
13
14 #include "xcdr/xcdr_stream.h"
15 #include "xcdr/xcdr_stream_impl.h"
16 #include "xcdr/xcdr_interpreter.h"
17 #include "xcdr/xcdr_interpreter.h"
18
19 #include "rti/xcdr/Stream.hpp"
20 #include "rti/flat/ExceptionHelper.hpp"
21 #include "rti/flat/SequenceOffsets.hpp"
22
23 #ifdef DOXYGEN_DOCUMENTATION_ONLY
24
25 class NDDUSERDllExport MyFlatMutableBuilder : public rti::flat::AggregationBuilder {
26 public:
27     typedef MyFlatMutableOffset Offset;
28
29     MyFlatMutableBuilder()
30     {
31     }
32
33     MyFlatMutableBuilder(
34         unsigned char *buffer,
35         int32_t size,
36         bool initialize_members = false)
37     {
38     }
39
40     Offset finish();
41
42     MyFlatMutable * finish_sample();
43
44     bool add_my_primitive(int32_t value);
45
46     bool add_my_optional_primitive(int32_t value);
47

```



```

285
291     rti::flat::PrimitiveArrayOffset<int32_t, 10> add_my_primitive_array();
292
296     rti::flat::PrimitiveSequenceBuilder<int32_t> build_my_primitive_seq();
297
303     MyFlatFinalOffset add_my_final();
304
310     rti::flat::FinalAlignedArrayOffset<MyFlatFinalOffset, 10> add_my_final_array();
311
315     rti::flat::FinalSequenceBuilder<MyFlatFinalOffset> build_my_final_seq();
316
322     FlatMutableBarBuilder build_my_mutable();
323
327     rti::flat::MutableArrayBuilder<FlatMutableBarBuilder, 10> build_my_mutable_array();
328
332     rti::flat::MutableSequenceBuilder<FlatMutableBarBuilder > build_my_mutable_seq();
333
337     rti::flat::StringBuilder build_my_string();
338
342     rti::flat::MutableSequenceBuilder<rti::flat::StringBuilder > build_my_string_seq();
343 };
344
361 class MyFlatUnionBuilder : public rti::flat::UnionBuilder<int32_t> {
362 public:
366     typedef MyFlatUnionOffset Offset;
367
368
378     MyFlatUnionBuilder()
379     {
380     }
381
387     Offset finish();
388
389
395     MyFlatUnion * finish_sample();
396
403     bool add_my_primitive(int32_t value);
404
414     MyFlatMutableBuilder build_my_mutable(int32_t discriminator = 1);
415
424     MyFlatFinal::Offset add_my_final();
425 };
426
427 #endif
428
429 namespace rti { namespace flat {
430
431 // Support for move constructor and assignment operator in C++98
432 //
433 // All concrete subclasses of AbstractBuilder must use this macro to implement
434 // move semantics
435 //
436 #if defined(RTI_FLAT_DATA_CXX11_RVALUE_REFERENCES)
437 #define RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS_IMPL(TYPE, BASE, PROXY)
438 #define RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS(TYPE, BASE)
439 #define RTI_FLAT_MOVE_BUILDER(BUILDER) BUILDER
440 #else
441 #define RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS_IMPL(TYPE, BASE, PROXY) \
442 public: \
443     TYPE(PROXY other) throw() \
444     { \
445         this->move_from(other); \
446     } \
447     TYPE& operator=(PROXY other) throw() \
448     { \
449         this->finish_untyped_impl(); \
450         this->move_from(other); \
451         return *this; \
452     } \
453     TYPE move() \
454     { \
455         return TYPE(PROXY(*this)); \
456     } \
457 private: \
458     TYPE(TYPE&); \
459     TYPE& operator=(TYPE&);
460
461 // Shortcut for generated IDL types
462 #define RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS(TYPE, BASE) \
463     RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS_IMPL( \
464         TYPE, BASE, UntypedAggregationBuilderMoveProxy)

```

```

465
466 #define RTI_FLAT_MOVE_BUILDER(BUILDER) (BUILDER).move()
467 #endif
468
469 namespace detail {
470     // Template parameters can be AbstractBuilder or AbstractBuilderMoveProxy
471     template <typename Builder1, typename Builder2>
472     void move_abstract_builder(Builder1& to, Builder2& from)
473     {
474         if (from.parent_builder_ == NULL) {
475             to.owned_stream_ = from.owned_stream_;
476         }
477
478         to.parent_stream_ = from.parent_stream_;
479         to.parent_builder_ = from.parent_builder_;
480         to.begin_position_ = from.begin_position_;
481         to.bind_position_ = from.bind_position_;
482         to.initialize_on_add_ = from.initialize_on_add_;
483 #ifndef RTI_FLAT_DATA_NO_EXCEPTIONS
484         to.failure_ = from.failure_;
485 #endif
486
487         from.parent_stream_ = NULL;
488         from.parent_builder_ = NULL;
489         from.bind_position_ = NULL;
490         from.begin_position_ = NULL;
491     }
492 }
493
494 /*
495  * @brief Provides the functionality common to all builders
496  *
497  * This class is the base of all builders and provides the following
498  * functionality:
499  *
500  * - Get the buffer and its size
501  * - Add final elements (base case)
502  * - Build operations--create nested builders, binding (base case)
503  * - Finish operation--unbind (base case)
504  * - Discard operation--throw away a nested Builder and roll back the parent
505  * - Error management when exceptions are not supported (traditional C++)
506  * - Move semantics (base case)
507  */
508
509 class AbstractBuilder {
510 protected:
511     AbstractBuilder()
512         : parent_stream_(NULL),
513           parent_builder_(NULL),
514           begin_position_(NULL),
515           bind_position_(NULL),
516           initialize_on_add_(false)
517 #ifndef RTI_FLAT_DATA_NO_EXCEPTIONS
518           , failure_(false)
519 #endif
520     {
521     }
522
523     /*i
524     * @brief Create a new top-level Builder
525     */
526     AbstractBuilder(unsigned char *buffer, offset_t size, bool initialize_members)
527         : parent_stream_(NULL),
528           parent_builder_(NULL),
529           bind_position_(NULL),
530           initialize_on_add_(initialize_members)
531 #ifndef RTI_FLAT_DATA_NO_EXCEPTIONS
532           , failure_(false)
533 #endif
534     {
535         // Serializes the encapsulation into the buffer and initializes the
536         // stream with that buffer and that encapsulation
537         if (!RTIXCdrFlatSample_initializeEncapsulationAndStream(
538             (char *) buffer,
539             &owned_stream_.c_stream(),
540             RTIXCdrEncapsulationId_getNativePlCdr2(),
541             size)) {
542             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return);
543         }
544
545         begin_position_ = owned_stream_.current_position();
546     }
547
548 }

```

```

550
551 protected:
552     template <typename Builder1, typename Builder2>
553     friend void detail::move_abstract_builder(Builder1& to, Builder2& from);
554
555 #if defined(RTI_FLAT_DATA_CXX11_RVALUE_REFERENCES)
556     AbstractBuilder(AbstractBuilder&& other)
557     {
558         detail::move_abstract_builder(*this, other);
559     }
560
561     AbstractBuilder& operator=(AbstractBuilder&& other)
562     {
563         if (this == &other) {
564             return *this;
565         }
566
567         finish_untyped_impl();
568
569         detail::move_abstract_builder(*this, other);
570
571         return *this;
572     }
573 #else
574     // Enables the safe-move-constructor idiom without C++11 move constructors
575     struct AbstractBuilderMoveProxy {
576         rti::xcdr::Stream owned_stream_;
577         rti::xcdr::Stream *parent_stream_;
578         AbstractBuilder *parent_builder_;
579         unsigned char *begin_position_;
580         unsigned char *bind_position_;
581         bool initialize_on_add_;
582 #ifndef RTI_FLAT_DATA_NO_EXCEPTIONS
583         bool failure_;
584 #endif
585     };
586
587     void move_from(AbstractBuilderMoveProxy& other)
588     {
589         detail::move_abstract_builder(*this, other);
590     }
591
592     void move_to(AbstractBuilderMoveProxy& other)
593     {
594         detail::move_abstract_builder(other, *this);
595     }
596
597     operator AbstractBuilderMoveProxy () throw() // move-constructor idiom
598     {
599         AbstractBuilderMoveProxy other;
600         move_to(other);
601         return other;
602     }
603 private:
604     AbstractBuilder(AbstractBuilder& other);
605     AbstractBuilder& operator=(AbstractBuilder& other);
606 #endif
607
608 protected:
609     virtual ~AbstractBuilder()
610     {
611         finish_untyped_impl();
612     }
613
614     struct nested_tag_t {}; // disambiguate copy constructor
615
616 /*i
617 * @brief Creates a nested Builder to build a member or element
618 *
619 * @param parent The Builder for the type that contains the member or element
620 * this Builder builds.
621 *
622 * @param alignment Specifies the alignment required by the concrete Builder.
623 * Namely, aggregation and sequence builders require alignment of 4 for the
624 * DHeader and the sequence length, respectively. This alignment doesn't
625 * reflect the alignment requirement of the elements, that's why arrays do
626 * not require an alignment here. If no alignment is required, this parameter
627 * must be zero. Concrete classes must provide a default value for alignment,
628 * that indicates their requirement. This parameter can be overridden by
629 * build_element_no_align to when we know we don't need to align.
630 */

```

```

642     AbstractBuilder(
643         nested_tag_t,
644         AbstractBuilder& parent,
645         unsigned int alignment)
646     : /* owned_stream_ empty and unused */
647       parent_stream(&parent.stream()), /* work on the parent's stream */
648       parent_builder_(&parent),
649       begin_position_(NULL),
650       bind_position_(NULL),
651       initialize_on_add_(parent.initialize_on_add_)
652 #ifdef RTI_FLAT_DATA_NO_EXCEPTIONS
653       , failure_(false)
654 #endif
655     {
656         if (alignment != 0) {
657             if (!stream().align(alignment)) {
658                 RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return);
659             }
660         }
661         begin_position_ = stream().current_position();
662     }
663
664     unsigned char * buffer()
665     {
666         return stream().buffer();
667     }
668
669     unsigned char * begin_position()
670     {
671         return begin_position_;
672     }
673
674     /*i
675     * @brief Adds a fixed-size member or element
676     *
677     * @return The offset to the member or element that was added. This offset
678     * can be used to initialize it.
679     */
680     template <typename OffsetType>
681     OffsetType add_element()
682     {
683         RTI_FLAT_BUILDER_CHECK_VALID(return OffsetType());
684         RTI_FLAT_BUILDER_CHECK_NOT_BOUND(return OffsetType());
685
686         offset_t member_size = OffsetType::serialized_size(0);
687         unsigned char *pos = stream().current_position();
688         if (detail::is_fixed_type_w_dheader<OffsetType>::value()) {
689             pos = (unsigned char *) stream().serialize_dheader();
690             if (pos == NULL) {
691                 RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return OffsetType());
692             }
693         }
694         if (!stream().skip(member_size)) {
695             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return OffsetType());
696         }
697         if (detail::is_fixed_type_w_dheader<OffsetType>::value()) {
698             stream().finish_dheader((char *) pos);
699         }
700
701         if (initialize_on_add_) {
702             OffsetType offset(
703                 (SampleBase *) stream().buffer(),
704                 detail::ptrdiff(pos, stream().buffer()));
705
706             detail::final_offset_initializer<OffsetType>::initialize(offset);
707
708             return offset;
709         } else {
710             return OffsetType(
711                 (SampleBase *) stream().buffer(),
712                 detail::ptrdiff(pos, stream().buffer()));
713         }
714     }
715
716     /*i
717     * @brief Creates a nested Builder to build a variable-size member or element
718     *
719     * @param stream_memento Subclasses using build_element() to implement
720     * their own build method are required to provide a stream memento that
721     * contains the position in the stream before any bytes related to this
722     * member were added. Any error before the nested Builder is created will

```

```

723     * cause the memento's destructor to roll back the Builder to its state
724     * before this member was added. If the Builder can be created without errors
725     * stream_memento.discard() is called, and its position is kept in case
726     * the nested Builder is discarded (instead of finished), which also rolls
727     * back the parent Builder to its previous state.
728     *
729     * @post This Builder becomes "bound" until the returned Builder is finished.
730     * While bound, this Builder can't be used to add or build more elements.
731     *
732     * @return The Builder that allows building this member or element
733     */
734 template <typename NestedBuilder>
735 NestedBuilder build_element(rti::xcdr::Stream::Memento& stream_memento)
736 {
737     RTI_FLAT_BUILDER_CHECK_VALID(return NestedBuilder());
738     RTI_FLAT_BUILDER_CHECK_NOT_BOUND(return NestedBuilder());
739
740     NestedBuilder nested_builder(nested_tag_t(), *this);
741     RTI_FLAT_BUILDER_CHECK_CREATE_BUILDER(
742         nested_builder,
743         return NestedBuilder());
744
745     bind_position_ = stream_memento.discard();
746
747     // uninit_use_in_call is not possible given how the constructor for
748     // the NestedBuilder type is generated by rtiidsgen. The warning is
749     // suppressed for performance reasons.
750     /* coverity[uninit_use_in_call : FALSE] */
751     return RTI_FLAT_MOVE_BUILDER(nested_builder);
752 }
753
754 template <typename NestedBuilder>
755 NestedBuilder build_element_no_align(rti::xcdr::Stream::Memento& stream_memento)
756 {
757     RTI_FLAT_BUILDER_CHECK_VALID(return NestedBuilder());
758     RTI_FLAT_BUILDER_CHECK_NOT_BOUND(return NestedBuilder());
759
760     // By passing '0' to the builder constructor we override its default
761     // argument which indicates its required alignment
762     NestedBuilder nested_builder(nested_tag_t(), *this, 0);
763     RTI_FLAT_BUILDER_CHECK_CREATE_BUILDER(
764         nested_builder,
765         return NestedBuilder());
766
767     bind_position_ = stream_memento.discard();
768
769     // uninit_use_in_call is not possible given how the constructor for
770     // the NestedBuilder type is generated by rtiidsgen. The warning is
771     // suppressed for performance reasons.
772     /* coverity[uninit_use_in_call : FALSE] */
773     return RTI_FLAT_MOVE_BUILDER(nested_builder);
774 }
775
776 /*i
777  * @brief Returns the currently used number of bytes
778  *
779  * The current size is the number of bytes that have been used to create
780  * this sample by adding or building members.
781  *
782  * When current_size() reaches capacity(), the Builder will fail to add
783  * or build any additional member.
784  *
785  * @see capacity().
786  */
787 unsigned int current_size()
788 {
789     return detail::ptrdiff(stream().current_position(), begin_position_);
790 }
791
792
793 friend class AggregationBuilder; // to access finish_member()
794
795 // Finishes this nested builder, updating the parent builder.
796 //
797 // This function doesn't throw exceptions and doesn't return a typed Offset
798 // This function can be used in destructors to "silently" finish the builder
799 void finish_untyped_impl()
800 {
801     if (!is_valid() || !is_nested()) {
802         return;
803     }

```

```

804
805     parent_builder_->finish_member();
806     invalidate();
807 }
808
809 protected:
810 /*i
811  * @brief Complete the building of a nested member
812  *
813  * Concrete Builders must implement a finish() function with the following body:
814  *
815  * RTI_FLAT_BUILDER_CHECK_CAN_FINISH(...);
816  * // optionally, additional work
817  * return finish_impl<OffsetType>();
818  *
819  * Destructors can directly call finish_untyped_impl();
820  *
821  * When this is a nested Builder, this function indicates that this element
822  * or member is complete.
823  *
824  * This function is automatically called by the Builder destructor.
825  *
826  * Concrete builders must override this function to return a typed Offset to
827  * the element that was built.
828  *
829  * @post This Builder is in an empty state and cannot be used further
830  *
831  * @return The position in the buffer where this element ended.
832  */
833 template <typename OffsetType>
834 OffsetType finish_impl()
835 {
836     RTI_FLAT_BUILDER_CHECK_VALID(return OffsetType());
837
838     unsigned char *begin_pos = this->begin_position_;
839     unsigned char *sample_base = stream().buffer();
840     unsigned char *current_pos = stream().current_position();
841     finish_untyped_impl();
842
843     return OffsetType(
844         reinterpret_cast<SampleBase *>(sample_base), // start of the top-level sample
845         detail::ptrdiff(begin_pos, sample_base), // absolute offset to the member
846         detail::ptrdiff(current_pos, begin_pos)); // size of the member
847 }
848
849 public:
850 void discard()
851 {
852     RTI_FLAT_BUILDER_CHECK_VALID(return);
853     RTI_FLAT_BUILDER_CHECK_CAN_FINISH(return);
854
855     parent_builder_->discard_member();
856     invalidate();
857 }
858
859 bool is_nested() const
860 {
861     return parent_builder_ != NULL;
862 }
863
864 bool is_valid() const
865 {
866     return begin_position_ != NULL;
867 }
868
869 rti::xcdr::length_t capacity() const
870 {
871     return stream().total_size();
872 }
873
874 protected:
875 // Makes this Builder invalid after finish(); discard(); finish_sample();
876 // and, when exceptions are not enabled (traditional C++ API), after an
877 // error during construction
878 void invalidate()
879 {
880     parent_stream_ = NULL;
881     parent_builder_ = NULL;
882     bind_position_ = NULL;
883     begin_position_ = NULL;
884 }

```

```

928
929 // This function is called by a nested Builder when it has finished building
930 // an element
931 virtual void finish_member() // noexcept
932 {
933     if (!is_valid()) {
934         return;
935     }
936
937     bind_position_ = NULL;
938 }
939
940 void discard_member()
941 {
942     RTI_FLAT_BUILDER_CHECK_VALID(return);
943
944     stream().current_position(bind_position_);
945     bind_position_ = NULL;
946 }
947
948 rti::xcdr::Stream& stream()
949 {
950     if (parent_stream_ != NULL) {
951         return *parent_stream_;
952     } else {
953         return owned_stream_;
954     }
955 }
956
957 const rti::xcdr::Stream& stream() const
958 {
959     if (parent_stream_ != NULL) {
960         return *parent_stream_;
961     } else {
962         return owned_stream_;
963     }
964 }
965
966 private:
967     rti::xcdr::Stream owned_stream_;
968     rti::xcdr::Stream *parent_stream_;
969     AbstractBuilder *parent_builder_;
970     unsigned char *begin_position_;
971     unsigned char *bind_position_;
972     bool initialize_on_add_;
973
974 #ifndef RTI_FLAT_DATA_NO_EXCEPTIONS
975 public:
976     bool check_failure()
977     {
978         bool failure = failure_;
979         failure_ = false;
980         return failure;
981     }
982 protected:
983     void set_failure()
984     {
985         failure_ = true;
986     }
987 private:
988     bool failure_;
989 #endif
990
991 };
992
993 #endif // RTI_DDS_FLAT_BUILDER_HPP_
994
995
996
997
998
999
1000
1001
1002 };
1003
1004 } }
1005
1006 #endif // RTI_DDS_FLAT_BUILDER_HPP_
1007

```

## 10.3 BuilderHelper.hpp

```

1 /*
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4

```

```

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6 without express written permission. Any such copies, or
7 revisions thereof, must display this notice unaltered.
8 This code contains trade secrets of Real-Time Innovations, Inc.
9 */
10
11 #ifndef RTI_DDS_FLAT_BUILDERHELPER_HPP_
12 #define RTI_DDS_FLAT_BUILDERHELPER_HPP_
13
14 namespace rti { namespace flat {
15
16 template <typename T>
17 class PrimitiveSequenceBuilder;
18
19 template <typename ElementBuilder>
20 class MutableSequenceBuilder;
21
22 template <typename ElementOffset>
23 class FinalSequenceBuilder;
24
25 template <typename ElementBuilder, unsigned int N>
26 class MutableArrayBuilder;
27
28 class StringBuilder;
29
30 namespace detail {
31
32 //
33 // lc_code:
34 //
35
36 template <size_t PrimitiveSize>
37 struct primitive_lc_code_helper;
38
39 template <>
40 struct primitive_lc_code_helper<1> {
41     enum {
42         single = 0, // LC = 1 => member length is 1
43         sequence = 5 // LC = 5 => member length is also NEXTINT
44     };
45 };
46
47 template <>
48 struct primitive_lc_code_helper<2> {
49     enum {
50         single = 1, // LC = 1 => member length is 2
51         sequence = 4 // LC = 4 => member length is provided as an additional int
52     };
53 };
54
55 template <>
56 struct primitive_lc_code_helper<4> {
57     enum {
58         single = 2, // LC = 2 => member length is 4
59         sequence = 6 // LC = 6 => member length is 4 * NEXTINT
60     };
61 };
62
63 template <>
64 struct primitive_lc_code_helper<8> {
65     enum {
66         single = 3, // LC = 3 => member length is 8
67         sequence = 7 // LC = 7 => member length is 8 * NEXTINT
68     };
69 };
70
71 template <typename T>
72 struct primitive_lc_code {
73     enum { value = primitive_lc_code_helper<sizeof(T)>::single };
74 };
75
76 // In general, use LC = 5, for mutable aggregation types. Final aggregation
77 // types don't use this 'lc_code' trait type. The other cases are specialized
78 // after this.
79 template <typename T, typename Enable = void>
80 struct lc_code {
81     static int value()
82     {
83         return 5; // LC = 5 => member length is provided in NEXTINT/
84     }
85 };

```



```

86
87 // For collections of complex types and enums, if we serialize the DHeader
88 // (XCDR2 compliant behavior) we use LC = 5; if we don't (legacy RTI behavior)
89 // we use LC = 4, since we codify the length in the member header.
90 template <typename T>
91 struct lc_code<MutableSequenceBuilder<T> > {
92     static int value()
93     {
94         return is_dheader_required_in_non_primitive_collections() ? 5 : 4;
95     }
96 };
97
98 template <typename T>
99 struct lc_code<FinalSequenceBuilder<T> > {
100     static int value()
101     {
102         return is_dheader_required_in_non_primitive_collections() ? 5 : 4;
103     }
104 };
105
106 template <typename T, unsigned int N>
107 struct lc_code<MutableArrayBuilder<T, N> > {
108     static int value()
109     {
110         return is_dheader_required_in_non_primitive_collections() ? 5 : 4;
111     }
112 };
113
114 #if defined(RTI_FLAT_DATA_NO_EXCEPTIONS)
115
116 // Traditional C++: no support for std::is_enum<T>
117
118 template <typename T>
119 struct lc_code<PrimitiveSequenceBuilder<T> > {
120     static int value()
121     {
122         return primitive_lc_code_helper<sizeof(T)>::sequence;
123     }
124 };
125
126 #else
127
128 template <typename T>
129 struct lc_code<
130     PrimitiveSequenceBuilder<T>,
131     typename std::enable_if<!std::is_enum<T>::value>::type> {
132     static int value()
133     {
134         return primitive_lc_code_helper<sizeof(T)>::sequence;
135     }
136 };
137
138 template <typename T>
139 struct lc_code<
140     PrimitiveSequenceBuilder<T>,
141     typename std::enable_if<std::is_enum<T>::value>::type> {
142     static int value()
143     {
144         return is_dheader_required_in_enum_collections()
145             ? 5
146             : primitive_lc_code_helper<sizeof(T)>::sequence;
147     }
148 };
149
150 #endif
151
152
153 //
154 // Initialization of final types
155 //
156
157 template <typename Offset>
158 struct final_offset_initializer {
159     static bool initialize(Offset& offset)
160     {
161         {
162             return RTI_XCDR_TRUE == RTIXcdrFlatData_initializeSample(
163                 (char *) offset.get_buffer(),
164                 offset.get_buffer_size(),
165                 rti::xcdr::type_programs<rti::flat::Sample<Offset> >::get());
166         }
167     }
168 };

```

```

167
168 };
169
170 // This will be specialized for enums in generated code (traditional C++)
171 // and for enum classes in FlatDataTraits.hpp (modern C++)
172 template <typename T, typename Enable = void>
173 struct default_primitive_value {
174     static T get()
175     {
176         return (T) 0;
177     }
178 };
179
180 template <typename T, unsigned int N>
181 struct final_offset_initializer<rti::flat::PrimitiveArrayOffset<T, N> > {
182
183     static bool initialize(rti::flat::PrimitiveArrayOffset<T, N>& array)
184     {
185         T default_value = default_primitive_value<T>::get();
186         if (default_value == (T) 0) { // don't need to deal with endianness
187             memset(array.get_buffer(), 0, array.get_buffer_size());
188         } else {
189             for (unsigned int i = 0; i < array.element_count(); i++) {
190                 array.set_element(i, default_value);
191             }
192         }
193         return true;
194     }
195 };
196
197 template <typename T, unsigned int N>
198 struct final_offset_initializer<rti::flat::FinalAlignedArrayOffset<T, N> > {
199
200     static bool initialize(rti::flat::FinalAlignedArrayOffset<T, N>& array)
201     {
202         for (unsigned int i = 0; i < N; i++) {
203             T offset = array.get_element(i);
204             if (offset.is_null()) {
205                 return false;
206             }
207
208             if (!final_offset_initializer<T>::initialize(offset)) {
209                 return false;
210             }
211         }
212
213         return true;
214     }
215 };
216
217 } } }
218
219 #endif // RTI_DDS_FLAT_BUILDERHELPER_HPP_
220

```

## 10.4 ExceptionHelper.hpp

```

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9 */
10
11
12 #ifndef RTI_DDS_FLAT_EXCEPTIONHELPER_HPP_
13 #define RTI_DDS_FLAT_EXCEPTIONHELPER_HPP_
14
15 //
16 // Enable debug assertions (RTI_FLAT_ASSERT) in debug mode
17 //
18 #if !defined(NDEBUG)
19 #define RTI_FLAT_DATA_ENABLE_DEBUG_ASSERTIONS
20 #endif

```

```

21
22 //
23 // Error handling without C++ exceptions (traditional C++ and Micro C++ APIs)
24 //
25 #ifndef RTI_FLAT_DATA_NO_EXCEPTIONS
26 // TODO: use MSG
27 #ifdef RTI_FLAT_DATA_ENABLE_DEBUG_ASSERTIONS
28 #define RTI_FLAT_ASSERT(COND, ACTION) \
29     if (!(COND)) { \
30         RTIXCdrFlatData_logPreconditionError(__FILE__, __LINE__, "Assertion failure: " #COND); \
31         ACTION; \
32     }
33 #else
34 #define RTI_FLAT_ASSERT(COND, ACTION)
35 #endif
36
37 // CR decision: Log error messages. Export function for each log kind (serialize, deserialize,
38 // precondition, skip)
39 // pass type/field (if possible) to serialization errors
40 #define RTI_FLAT_OFFSET_CHECK_NOT_NULL(ACTION) \
41     if (this->is_null()) { \
42         RTIXCdrFlatData_logPreconditionError(__FILE__, __LINE__, "null offset"); \
43         ACTION; \
44     }
45 #define RTI_FLAT_OFFSET_PRECONDITION_ERROR(MSG, ACTION) \
46     RTIXCdrFlatData_logPreconditionError(__FILE__, __LINE__, MSG); \
47     ACTION
48
49 #define RTI_FLAT_CHECK_PRECONDITION(COND, ACTION) \
50     if (!(COND)) { \
51         RTIXCdrFlatData_logPreconditionError(__FILE__, __LINE__, "Precondition failure: " #COND); \
52         ACTION; \
53     }
54
55 #define RTI_FLAT_BUILDER_CHECK_NOT_BOUND(ACTION) \
56     if (this->bind_position_) { \
57         RTIXCdrFlatData_logPreconditionError(__FILE__, __LINE__, "Builder is currently bound - call
58 finish() first"); \
59         ACTION; \
60     }
61 #define RTI_FLAT_BUILDER_CHECK_CAN_FINISH(ACTION) \
62     if (!this->is_nested()) { \
63         RTIXCdrFlatData_logPreconditionError(__FILE__, __LINE__, "This is not a member builder; call
64 finish_sample() instead"); \
65         ACTION; \
66     }
67 #define RTI_FLAT_BUILDER_CHECK_CAN_FINISH_SAMPLE(ACTION) \
68     if (this->is_nested()) { \
69         RTIXCdrFlatData_logPreconditionError(__FILE__, __LINE__, "This is a member builder; call finish()
70 instead"); \
71         ACTION; \
72     }
73 #define RTI_FLAT_BUILDER_CHECK_VALID(ACTION) \
74     if (!this->is_valid()) { \
75         RTIXCdrFlatData_logPreconditionError(__FILE__, __LINE__, "This Builder is not valid"); \
76         ACTION; \
77     }
78
79 #define RTI_FLAT_BUILDER_CHECK_CREATE_BUILDER(BUILDER, ACTION) \
80     if (!BUILDER.is_valid()) { \
81         this->set_failure(); \
82         RTIXCdrFlatData_logCreationError(__FILE__, __LINE__, "Builder"); \
83         ACTION; \
84     }
85
86 #define RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(ACTION) \
87     this->set_failure(); \
88     RTIXCdrFlatData_logBuilderOutOfResources(__FILE__, __LINE__); \
89     ACTION
90
91 #define RTI_FLAT_BUILDER_PRECONDITION_ERROR(MSG, ACTION) \
92     this->set_failure(); \
93     RTIXCdrFlatData_logPreconditionError(__FILE__, __LINE__, MSG); \
94     ACTION
95
96 //
97 // Error handling with C++ exceptions (modern C++ API)

```

```

98 //
99 #else // !RTI_FLAT_DATA_NO_EXCEPTIONS
100
101 #ifdef RTI_FLAT_DATA_ENABLE_DEBUG_ASSERTIONS
102 #define RTI_FLAT_ASSERT(COND, ACTION) \
103     if (!(COND)) throw dds::core::PreconditionNotMetError("Assertion failure: " #COND)
104 #else
105 #define RTI_FLAT_ASSERT(COND, ACTION)
106 #endif
107
108 #define RTI_FLAT_OFFSET_CHECK_NOT_NULL(ACTION) \
109     if (this->is_null()) throw dds::core::NullReferenceError("null offset")
110
111 #define RTI_FLAT_OFFSET_PRECONDITION_ERROR(MSG, ACTION) \
112     throw dds::core::PreconditionNotMetError(MSG)
113
114 #define RTI_FLAT_CHECK_PRECONDITION(COND, ACTION) \
115     if (!(COND)) throw dds::core::PreconditionNotMetError("Precondition failure: " #COND)
116
117 #define RTI_FLAT_BUILDER_CHECK_NOT_BOUND(ACTION) \
118     if (bind_position_) \
119         throw dds::core::PreconditionNotMetError( \
120             "Builder is currently bound - call finish() first")
121
122 #define RTI_FLAT_BUILDER_CHECK_CAN_FINISH(ACTION) \
123     if (!is_nested()) \
124         throw dds::core::PreconditionNotMetError( \
125             "This is not a member builder; call finish_sample() instead")
126
127 #define RTI_FLAT_BUILDER_CHECK_CAN_FINISH_SAMPLE(ACTION) \
128     if (is_nested()) \
129         throw dds::core::PreconditionNotMetError( \
130             "This is a member builder; call finish() instead")
131
132 #define RTI_FLAT_BUILDER_CHECK_VALID(ACTION) \
133     if (!is_valid()) \
134         throw dds::core::PreconditionNotMetError("This Builder is not valid")
135
136 // With exceptions, nothing to check (exception would have been thrown)
137 #define RTI_FLAT_BUILDER_CHECK_CREATE_BUILDER(BUILDER, ACTION)
138
139 #define RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(ACTION) \
140     throw dds::core::OutOfResourcesError("builder reached end of buffer")
141
142 #define RTI_FLAT_BUILDER_PRECONDITION_ERROR(MSG, ACTION) \
143     throw dds::core::PreconditionNotMetError(MSG)
144
145
146 #endif // RTI_FLAT_DATA_NO_EXCEPTIONS
147
148 //
149 // Error checking (other than assertions) in release mode is enabled unless
150 // the sources are compiled with -DRTI_FLAT_DATA_DISABLE_ERROR_CHECKING
151 //
152 // In that case, most error checks that deal with preconditions due to incorrect
153 // usage of the API are disabled in release mode. This would lead to undefined
154 // behavior in case of bad usage, but can improve performance.
155 //
156 #if defined(RTI_FLAT_DATA_ENABLE_DEBUG_ASSERTIONS) \
157     || !defined(RTI_FLAT_DATA_DISABLE_ERROR_CHECKING)
158 #define RTI_FLAT_DATA_ENABLE_ERROR_CHECKING
159 #endif
160
161 #ifndef RTI_FLAT_DATA_ENABLE_ERROR_CHECKING
162
163 #define RTI_FLAT_OFFSET_CHECK_NOT_NULL(ACTION)
164 #define RTI_FLAT_ASSERT(COND, ACTION)
165 #define RTI_FLAT_CHECK_PRECONDITION(COND, ACTION)
166 #define RTI_FLAT_BUILDER_CHECK_NOT_BOUND(ACTION)
167 #define RTI_FLAT_BUILDER_CHECK_CAN_FINISH(ACTION)
168 #define RTI_FLAT_BUILDER_CHECK_CAN_FINISH_SAMPLE(ACTION)
169 #define RTI_FLAT_BUILDER_CHECK_VALID(ACTION)
170 #define RTI_FLAT_BUILDER_CHECK_CREATE_BUILDER(BUILDER, ACTION)
171
172 #endif // RTI_FLAT_DATA_ENABLE_ERROR_CHECKING
173
174 namespace rti { namespace flat { namespace detail {
175
176 } } }
177
178 #endif // RTI_DDS_FLAT_EXCEPTIONHELPER_HPP_

```

179

## 10.5 FlatSample.hpp

```

1 /*
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9 */
10
11 #ifndef RTI_DDS_FLAT_FLATSAMPLE_HPP_
12 #define RTI_DDS_FLAT_FLATSAMPLE_HPP_
13
14 // Note: FlatSampleImpl.hpp needs to be included in addition to this header.
15
16 #include <cstdlib>
17 #include <memory>
18
19 #include "xcdr/xcdr_stream_impl.h"
20 #include "xcdr/xcdr_flat_data.h"
21 #include "xcdr/xcdr_interpreter.h"
22
23 #include "rti/xcdr/Interpreter.hpp" // for type_programs
24
25 namespace rti { namespace flat {
26
27     struct fixed_size_type_tag_t {};
28     struct variable_size_type_tag_t {};
29
30     typedef RTIXCdrUnsignedLong offset_t;
31     typedef RTIXCdrUnsignedLong member_id_t;
32
33     // The untemplated base of Sample<T>
34     class SampleBase {
35     public:
36
37         unsigned char* get_buffer()
38         {
39             return &data[0];
40         }
41
42         const unsigned char* get_buffer() const
43         {
44             return &data[0];
45         }
46
47         unsigned char* get_root_buffer()
48         {
49             return get_buffer() + RTI_XCDR_ENCAPSULATION_SIZE;
50         }
51
52         /*i
53          * @brief Provides the address of the top-level type
54          */
55         const unsigned char* get_root_buffer() const
56         {
57             return get_buffer() + RTI_XCDR_ENCAPSULATION_SIZE;
58         }
59
60         void initialize_stream(
61             RTIXCdrStream& stream,
62             offset_t offset,
63             offset_t serialized_size) const
64         {
65             RTIXCdrFlatData_initializeStream(
66                 &stream,
67                 const_cast<unsigned char*>(get_buffer()),
68                 offset,
69                 serialized_size);
70         }
71
72     protected: // xlc compiler fails when the default constructor is private
73     #if !defined(RTI_FLAT_DATA_CXX11_DELETED_FUNCTIONS)

```

```

88     SampleBase() {} // Samples can only be created via Sample::create_data
89     SampleBase(const SampleBase&) {}
90     SampleBase& operator=(const SampleBase&);
91 #else
92     SampleBase() = delete;
93     SampleBase(const SampleBase&) = delete;
94     SampleBase& operator=(const SampleBase&) = delete;
95 #endif
96
97     // The actual size of data (and therefore, the Sample object) is variable,
98     // and equal to the serialized size of the IDL Sample
99     unsigned char data[1];
100 };
101
102 template <typename OffsetType>
103 class Sample : public SampleBase {
104 public:
105     typedef OffsetType Offset;
106
107     typedef typename OffsetType::ConstOffset ConstOffset;
108
109     Offset root()
110     {
111         return root_impl(typename Offset::offset_kind());
112     }
113
114     ConstOffset root() const
115     {
116         return root_impl(typename ConstOffset::offset_kind());
117     }
118
119     RTIXCdrEndian endian() const
120     {
121         RTIXCdrStream tmp_stream;
122         initialize_stream(tmp_stream, 0, RTI_XCDR_ENCAPSULATION_SIZE);
123         return tmp_stream._endian;
124     }
125
126     static Sample<OffsetType>* from_buffer(unsigned char *buffer)
127     {
128         return reinterpret_cast<Sample<OffsetType>*>(buffer);
129     }
130
131     static Sample<OffsetType>* create_data(); // impl in FlatSampleImpl.hpp
132
133     Sample<OffsetType>* clone() const
134     {
135         unsigned char *buffer = RTIXCdrFlatData_cloneSample(
136             get_buffer(),
137             sample_size());
138
139         if (buffer == NULL) {
140             #ifndef RTI_FLAT_DATA_NO_EXCEPTIONS
141                 throw std::bad_alloc();
142             #else
143                 return NULL;
144             #endif
145         }
146
147         return reinterpret_cast<rti::flat::Sample<OffsetType> *>(buffer);
148     }
149
150     static void delete_data(rti::flat::Sample<OffsetType>* sample)
151     {
152         RTIXCdrFlatData_deleteSample(sample);
153     }
154
155     offset_t buffer_size() const
156     {
157         return sample_size() + RTI_XCDR_ENCAPSULATION_SIZE;
158     }
159
160     offset_t sample_size() const
161     {
162         return sample_size_impl(typename OffsetType::offset_kind());
163     }
164
165 private:
166     offset_t sample_size_impl(fixed_size_type_tag_t) const
167     {
168         return OffsetType::serialized_size(0);

```

```

309     }
310
311     offset_t sample_size_impl(variable_size_type_tag_t) const
312     {
313         return RTIXCdrFlatSample_getMutableSampleSize(
314             get_buffer(),
315             RTI_XCDR_ENCAPSULATION_SIZE);
316     }
317
318     Offset root_impl(fixed_size_type_tag_t)
319     {
320         return Offset(this, RTI_XCDR_ENCAPSULATION_SIZE);
321     }
322
323     Offset root_impl(variable_size_type_tag_t)
324     {
325         return Offset(this, RTI_XCDR_ENCAPSULATION_SIZE, sample_size());
326     }
327
328     ConstOffset root_impl(fixed_size_type_tag_t) const
329     {
330         return ConstOffset(this, RTI_XCDR_ENCAPSULATION_SIZE);
331     }
332
333     ConstOffset root_impl(variable_size_type_tag_t) const
334     {
335         return ConstOffset(this, RTI_XCDR_ENCAPSULATION_SIZE, sample_size());
336     }
337 };
338
339 template <typename T>
340 struct flat_type_traits;
341
342 } }
343
344 #ifdef DOXYGEN_DOCUMENTATION_ONLY
345
346 typedef rti::flat::Sample<MyFlatFinalOffset> MyFlatFinal;
347
348 typedef rti::flat::Sample<MyFlatMutableOffset> MyFlatMutable;
349
350 typedef rti::flat::Sample<MyFlatUnionOffset> MyFlatUnion;
351 #endif
352
353 #endif // RTI_DDS_FLAT_FLATSAMPLE_HPP_
354
355

```

## 10.6 FlatSampleImpl.hpp

```

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9 */
10
11 #ifndef RTI_DDS_FLAT_FLATSAMPLEIMPL_HPP_
12 #define RTI_DDS_FLAT_FLATSAMPLEIMPL_HPP_
13
14 // This file includes the implementation of some templates that need to
15 // appear after some types are defined in the generated code. This is a
16 // a restriction on some platforms such as pentiumInty11.pcx64 and other Intys,
17 // sparcSol2.10gcc3.4.2.
18
19 // For example, type_programs<T> needs to be defined (as an specialization
20 // for T) before its used in create_data().
21
22 #include "rti/flat/FlatSample.hpp"
23
24 namespace rti { namespace flat {
25
26 namespace detail {
27
28 template <typename OffsetType>

```

```

29 Sample<OffsetType>* create_data_impl(fixed_size_type_tag_t)
30 {
31     unsigned char *buffer = RTIXCdrFlatData_createSampleFinal(
32         OffsetType::serialized_size(0),
33         rti::xcdr::type_programs<Sample<OffsetType> >::get());
34
35     if (buffer == NULL) {
36         #ifndef RTI_FLAT_DATA_NO_EXCEPTIONS
37             throw std::bad_alloc();
38         #else
39             return NULL;
40         #endif
41     }
42
43     return reinterpret_cast<rti::flat::Sample<OffsetType> *>(buffer);
44 }
45
46 template <typename OffsetType>
47 Sample<OffsetType>* create_data_impl(variable_size_type_tag_t)
48 {
49     unsigned char *buffer = RTIXCdrFlatData_createSampleMutable(
50         rti::xcdr::type_programs<Sample<OffsetType> >::get());
51
52     if (buffer == NULL) {
53         #ifndef RTI_FLAT_DATA_NO_EXCEPTIONS
54             throw std::bad_alloc();
55         #else
56             return NULL;
57         #endif
58     }
59
60     return reinterpret_cast<rti::flat::Sample<OffsetType> *>(buffer);
61 }
62
63 }
64
65 // Declared in FlatSample.hpp
66 template <typename OffsetType>
67 Sample<OffsetType>* Sample<OffsetType>::create_data()
68 {
69     return detail::create_data_impl<OffsetType>(
70         typename OffsetType::offset_kind());
71 }
72
73 } }
74
75 #endif // RTI_DDS_FLAT_FLATSAMPLEIMPL_HPP_
76

```

## 10.7 FlatTypeTraits.hpp

```

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9 */
10
11 #ifndef RTI_DDS_FLAT_FLATTYPETRAITS_HPP_
12 #define RTI_DDS_FLAT_FLATTYPETRAITS_HPP_
13
14 #include "rti/flat/Offset.hpp"
15 #include "rti/flat/SequenceOffsets.hpp"
16 #include "rti/flat/AggregationBuilders.hpp"
17
18 namespace rti { namespace flat {
19
20
21
22
23
24 // For aggregation types, this template is to be specialized in generated code
25 template <typename T>
26 struct flat_type_traits;
27
28 template <typename T, unsigned int N>
29 struct flat_type_traits<FinalArrayOffset<T, N> > {

```



```

70     typedef typename flat_type_traits<T>::plain_type plain_type;
71 };
72
73 template <typename T, unsigned int N>
74 struct flat_type_traits<PrimitiveArrayOffset<T, N> > {
75     typedef T plain_type;
76 };
77
78 template <typename T>
79 struct flat_type_traits<PrimitiveSequenceOffset<T> > {
80     typedef T plain_type;
81 };
82
83 template <typename T, unsigned int N>
84 struct flat_type_traits<FinalAlignedArrayOffset<T, N> > {
85     typedef typename flat_type_traits<T>::plain_type plain_type;
86 };
87
88 template <typename T, unsigned int N>
89 struct flat_type_traits<MutableArrayOffset<T, N> > {
90     typedef typename flat_type_traits<T>::plain_type plain_type;
91 };
92
93 template <typename T>
94 struct flat_type_traits<SequenceOffset<T> > {
95     typedef typename flat_type_traits<T>::plain_type plain_type;
96 };
97
98 template <>
99 struct flat_type_traits<StringOffset > :
100     flat_type_traits<PrimitiveSequenceOffset<char> > {
101 };
102
103 template <typename T>
104 struct flat_type_traits<PrimitiveOffset<T> > {
105     typedef T plain_type;
106 };
107
219 template <typename OffsetType>
220 typename flat_type_traits<OffsetType>::plain_type* plain_cast(OffsetType& offset)
221 {
222     RTI_FLAT_CHECK_PRECONDITION(offset.is_cpp_compatible(), return NULL);
223     return reinterpret_cast<typename flat_type_traits<OffsetType>::plain_type*>(
224         offset.get_buffer());
225 }
226
227 template <typename OffsetType>
228 const typename flat_type_traits<OffsetType>::plain_type* plain_cast(const OffsetType& offset)
229 {
230     RTI_FLAT_CHECK_PRECONDITION(offset.is_cpp_compatible(), return NULL);
231     return reinterpret_cast<const typename flat_type_traits<OffsetType>::plain_type*>(
232         offset.get_buffer());
233 }
234
235 namespace detail {
236
237 template <typename OffsetKind>
238 struct offset_kind_is_fixed_size {
239     enum { value = 0 };
240 };
241
242 template <>
243 struct offset_kind_is_fixed_size<rti::flat::fixed_size_type_tag_t> {
244     enum { value = 1 };
245 };
246
247 // Utility to determine if a Flat Data type is fixed size (final) or variable
248 // size (mutable)
249 template <typename T>
250 struct is_fixed_size_type
251     : detail::offset_kind_is_fixed_size<typename T::Offset::offset_kind>
252 {
253 };
254
255 #endif // RTI_DDS_FLAT_FLATSAMPLE_HPP_
256
257
258
259
260
261
262
263
264

```

## 10.8 Offset.hpp

```

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9  */
10
11 #ifndef RTI_DDS_FLAT_FLATOFFSETS_HPP_
12 #define RTI_DDS_FLAT_FLATOFFSETS_HPP_
13
14 #include "xcdr/xcdr_stream.h"
15 #include "xcdr/xcdr_stream_impl.h"
16 #include "xcdr/xcdr_interpreter.h"
17
18 #include "rti/xcdr/Stream.hpp"
19
108 #ifdef DOXYGEN_DOCUMENTATION_ONLY
109
125 class MyFlatFinalOffset : public rti::flat::FinalOffset<MyFlatFinalOffset> {
126 public:
135     typedef MyFlatFinalConstOffset ConstOffset;
136
142     MyFlatFinalOffset()
143     {
144     }
145
149     int32_t my_primitive() const;
150
156     FlatFinalBar::ConstOffset my_complex() const;
157
161     const rti::flat::PrimitiveArrayOffset<int32_t, 10> my_primitive_array() const;
162
166     rti::flat::FinalArrayOffset<FlatFinalBar::ConstOffset, 10> my_complex_array() const;
167
171     bool my_primitive(int32_t value);
172
178     FlatFinalBar::Offset my_complex();
179
183     rti::flat::PrimitiveArrayOffset<int32_t, 10> my_primitive_array();
184
188     rti::flat::FinalArrayOffset<FlatFinalBar::Offset, 10> my_complex_array();
189 };
190
203 class NDDUSERD11Export MyFlatMutableOffset : public rti::flat::MutableOffset {
204 public:
213     typedef MyFlatMutableConstOffset ConstOffset;
214
220     MyFlatMutableOffset()
221     {
222     }
223
230     int32_t my_primitive() const;
231
240     rti::flat::PrimitiveConstOffset<int32_t> my_optional_primitive() const;
241
245     const rti::flat::PrimitiveArrayOffset<int32_t, 10> my_primitive_array() const;
246
250     const rti::flat::PrimitiveSequenceOffset<int32_t> my_primitive_seq() const;
251
255     MyFlatFinal::ConstOffset my_final() const;
256
260     rti::flat::FinalAlignedArrayOffset<MyFlatFinal::ConstOffset, 10> my_final_array() const;
261
265     rti::flat::SequenceOffset<MyFlatFinal::ConstOffset> my_final_seq() const;
266
272     FlatMutableBar::ConstOffset my_mutable() const;
273
277     rti::flat::MutableArrayOffset<FlatMutableBar::ConstOffset, 10> my_mutable_array() const;
278
282     rti::flat::SequenceOffset<FlatMutableBar::ConstOffset> my_mutable_seq() const;
283
287     const rti::flat::StringOffset my_string() const;
288
292     rti::flat::SequenceOffset<const rti::flat::StringOffset> my_string_seq() const;
293

```

```

297     bool my_primitive(int32_t value);
298
299     /* @brief Retrieves a non-const Offset to an optional primitive
300      *
301      * Unlike the non-optional my_primitive(), which allows accessing the integer
302      * directly, an optional primitive may not exist. If it doesn't, the Offset
303      * this function returns will be null (\p is_null()).
304      */
305     rti::flat::PrimitiveOffset<int32_t> my_optional_primitive();
306
307     rti::flat::PrimitiveArrayOffset<int32_t, 10> my_primitive_array();
308
309     rti::flat::PrimitiveSequenceOffset<int32_t> my_primitive_seq();
310
311     MyFlatFinal::Offset my_final();
312
313     rti::flat::FinalAlignedArrayOffset<MyFlatFinal::Offset, 10> my_final_array();
314
315     rti::flat::SequenceOffset<MyFlatFinal::Offset> my_final_seq();
316
317     FlatMutableBar::Offset my_mutable();
318
319     rti::flat::MutableArrayOffset<FlatMutableBar::Offset, 10> my_mutable_array();
320
321     rti::flat::SequenceOffset<FlatMutableBar::Offset> my_mutable_seq();
322
323     rti::flat::StringOffset my_string();
324
325     rti::flat::SequenceOffset<rti::flat::StringOffset> my_string_seq();
326 };
327
328 class NDDSUSERDllExport MyFlatUnionOffset
329 : public rti::flat::MutableOffset {
330 public:
331     typedef MyFlatUnionConstOffset ConstOffset;
332
333     MyFlatUnionOffset()
334     {
335     }
336
337     int32_t _d() const;
338
339     int32_t my_primitive() const;
340
341     MyFlatMutable::ConstOffset my_mutable() const;
342
343     MyFlatFinal::ConstOffset my_final() const;
344
345     bool my_primitive(int32_t value);
346
347     MyFlatMutable::Offset my_mutable();
348
349     MyFlatFinal::Offset my_final();
350 };
351 #endif
352
353 namespace rti { namespace flat {
354     namespace detail {
355         inline rti::flat::offset_t ptrdiff(unsigned char *a, unsigned char *b)
356         {
357             RTI_FLAT_ASSERT(a - b < RTI_XCDR_MAX_SERIALIZED_SIZE, return 0);
358             return static_cast<rti::flat::offset_t>(a - b);
359         }
360
361         // Used to determine which fixed-size types need a DHeader when adding a
362         // fixed-size member or element. OffsetType classes may specialize this template
363         // to indicate if they need a DHeader.
364         template <typename OffsetType, typename Enable = void>
365         struct is_fixed_type_w_dheader {
366             static bool value()
367             {
368                 return false;
369             }
370         };
371
372         inline bool is_dheader_required_in_non_primitive_collections()
373         {

```

```

490 // Allow setting the behavior at compilation time to gain compiler
491 // optimizations
492 #if defined(RTI_FLATDATA_NO_DHEADER_COLLECTIONS)
493     return false;
494 #elif defined(RTI_FLATDATA_DHEADER_COLLECTIONS)
495     return true;
496 #else
497     // Without any compilation flag, the behavior is configurable at runtime
498     RTIXCdrXTypesComplianceMask xTypesComplianceMask;
499     xTypesComplianceMask = RTIXCdrInterpreter_getGlobalXtypeComplianceMask();
500     return RTIXCdrXTypesComplianceMask_isBitSet (
501         xTypesComplianceMask,
502         RTI_XCDR_XTYPES_DHEADER_IN_NON_PRIMITIVE_COLLECTIONS_BIT);
503 #endif
504 }
505
506 inline bool is_dheader_required_in_enum_collections()
507 {
508     #if defined(RTI_FLATDATA_NO_DHEADER_COLLECTIONS)
509         return false;
510     #elif defined(RTI_FLATDATA_DHEADER_COLLECTIONS)
511         return true;
512     #else
513         RTIXCdrXTypesComplianceMask xTypesComplianceMask;
514         xTypesComplianceMask = RTIXCdrInterpreter_getGlobalXtypeComplianceMask();
515         return RTIXCdrXTypesComplianceMask_isBitSet (
516             xTypesComplianceMask,
517             RTI_XCDR_XTYPES_DHEADER_IN_NON_PRIMITIVE_COLLECTIONS_BIT)
518             && !RTIXCdrXTypesComplianceMask_isBitSet (
519                 xTypesComplianceMask,
520                 RTI_XCDR_XTYPES_ENUM_AS_PRIMITIVE_IN_COLLECTIONS_BIT);
521     #endif
522 }
523
524 template <bool IsForEnum>
525 struct collection_dheader_traits {
526     static bool dheader_required()
527     {
528         return is_dheader_required_in_non_primitive_collections();
529     }
530
531     static unsigned int dheader_size()
532     {
533         return dheader_required() ? RTI_XCDR_DHEADER_SIZE : 0;
534     }
535 };
536
537 template <>
538 struct collection_dheader_traits<true> {
539     static bool dheader_required()
540     {
541         return is_dheader_required_in_enum_collections();
542     }
543
544     static unsigned int dheader_size()
545     {
546         return dheader_required() ? RTI_XCDR_DHEADER_SIZE : 0;
547     }
548 };
549
550 } // namespace detail
551
552 // Forward declaration
553 template <typename T, unsigned int N>
554 class FinalArrayOffset;
555
556 class OffsetBase {
557 public:
558
559     bool is_null() const
560     {
561         return sample_ == NULL;
562     }
563
564     bool is_cpp_compatible() const
565     {
566         // Derived classes may indicate whether
567         // a type is cpp-compatible
568         return false;
569     }
570 };
571

```

```

607 unsigned char * get_buffer()
608 {
609     if (is_null()) {
610         return NULL;
611     }
612     return stream_.current_position();
613 }
614
627 const unsigned char * get_buffer() const
628 {
629     if (is_null()) {
630         return NULL;
631     }
632     return stream_.current_position();
633 }
634
641 offset_t get_buffer_size() const
642 {
643     RTI_FLAT_OFFSET_CHECK_NOT_NULL(return 0);
644     return stream_.total_size();
645 }
646
652 friend bool operator<(
653     const OffsetBase & s1,
654     const OffsetBase & s2) {
655     return s1.get_buffer() < s2.get_buffer();
656 }
657
663 friend bool operator > (
664     const OffsetBase & s1,
665     const OffsetBase & s2) {
666     return s1.get_buffer() > s2.get_buffer();
667 }
668
674 friend bool operator <= (
675     const OffsetBase & s1,
676     const OffsetBase & s2) {
677     return s1.get_buffer() <= s2.get_buffer();
678 }
679
685 friend bool operator >= (
686     const OffsetBase & s1,
687     const OffsetBase & s2) {
688     return s1.get_buffer() >= s2.get_buffer();
689 }
690
696 friend bool operator == (
697     const OffsetBase & s1,
698     const OffsetBase & s2) {
699     return s1.get_buffer() == s2.get_buffer();
700 }
701
707 friend bool operator != (
708     const OffsetBase & s1,
709     const OffsetBase & s2) {
710     return !(s1 == s2);
711 }
712
713 protected:
714
715 OffsetBase() :
716     sample_(NULL),
717     absolute_offset_(0)
718 {
719 }
720
721 OffsetBase(
722     SampleBase *sample,
723     offset_t absolute_offset,
724     offset_t serialized_size)
725 : sample_(sample),
726     absolute_offset_(absolute_offset)
727 {
728     // In modern C++ this throws PreconditionNotMetError; in traditional
729     // C++, this ends the constructor leaving the object in a state such
730     // that is_null() is true.
731     RTI_FLAT_CHECK_PRECONDITION(sample != NULL, return);
732
733     sample_->initialize_stream(
734         stream_.c_stream(),
735         absolute_offset_,

```

```

736         serialized_size);
737     }
738
739     // Gets the value of a primitive member at the specified relative Offset
740     template <typename U>
741     U deserialize(offset_t member_offset) const
742     {
743         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return U());
744         RTI_FLAT_ASSERT(stream_.check_size(member_offset + static_cast<offset_t>(sizeof(U))), return U());
745
746         rti::xcdr::Stream::Memento stream_memento(stream_);
747         stream_.skip_fast(member_offset);
748         return stream_.deserialize_fast<U>();
749     }
750
751     // Sets the value of a primitive member at the specified relative Offset
752     template <typename U>
753     bool serialize(offset_t member_offset, U value)
754     {
755         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return false);
756         RTI_FLAT_ASSERT(stream_.check_size(member_offset + static_cast<offset_t>(sizeof(U))), return false);
757
758         rti::xcdr::Stream::Memento stream_memento(stream_);
759
760         stream_.skip_fast(member_offset);
761         stream_.serialize_fast<U>(value);
762         return true;
763     }
764
765     // Obtains a member at the specified relative offset
766     //
767     // U is the type of the member. U must be a subclass of Offset<U>.
768     template <typename U>
769     U get_member(offset_t relative_member_offset)
770     {
771         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return U());
772
773         return U(
774             sample_,
775             // the absolute location of the member:
776             absolute_offset_ + relative_member_offset);
777     }
778
779     template <typename U>
780     U get_member(offset_t relative_member_offset) const
781     {
782         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return U());
783
784         return U(
785             sample_,
786             // the absolute location of the member:
787             absolute_offset_ + relative_member_offset);
788     }
789
790 protected:
791     SampleBase *sample_; // the actual CDR buffer is in the sample
792
793     offset_t absolute_offset_; // the position of this Offset in the buffer
794     mutable rti::xcdr::Stream stream_; // a substream that shares the same buffer
795 };
796
797 template <typename T>
798 class FinalOffset : public OffsetBase {
799 public:
800     typedef fixed_size_type_tag_t offset_kind;
801
802     static offset_t serialized_size_w_padding()
803     {
804         RTI_FLAT_ASSERT(T::serialized_size() > 0, return 0);
805         RTI_FLAT_ASSERT(T::required_alignment > 0, return 0);
806
807         const offset_t element_size = T::serialized_size();
808         if (element_size % T::required_alignment != 0) {
809             return element_size + T::required_alignment
810                 - element_size % T::required_alignment;
811         } else {
812             return element_size;
813         }
814     }
815
816     bool is_cpp_compatible() const // override

```

```

824     {
825         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return false);
826         return !stream_needs_byte_swap()
827             && rti::xcdr::has_cpp_friendly_cdr_layout<
828                 typename rti::flat::flat_type_traits<T>::flat_type>();
829     }
830
831 protected:
832     FinalOffset()
833     {
834     }
835
836     // Creates an Offset within the sample's CDR buffer at the specified
837     // absolute offset
838     //
839     // This overload requires T::serialized_size(offset_t)
840     //
841     FinalOffset(SampleBase *sample, offset_t absolute_offset)
842     : OffsetBase(
843         sample,
844         absolute_offset,
845         T::serialized_size(absolute_offset))
846     {
847     }
848
849     // Gets the value of a primitive member at the specified relative offset
850     // relative_member_offsets - the 4 possible offsets depending on the this
851     // type's initial alignment
852     template <typename U>
853     U deserialize(const offset_t *relative_member_offsets) const
854     {
855         RTI_FLAT_ASSERT(relative_member_offsets != NULL, return U());
856
857         // In a FinalOffset the stream is guaranteed to have enough space to
858         // contain all its members. There are two possible cases:
859         //
860         // - If the FinalOffset is a member of a mutable type, the member getter
861         // will ensure that the stream has enough space for the whole final
862         // type.
863         //
864         // - If the final offset is a top-level type, the type plugin ensures
865         // that the serialized buffer is large enough to contain the type.
866
867         return OffsetBase::deserialize<U>(
868             // pick the right offset based on the initial alignment
869             get_value_for_alignment(relative_member_offsets));
870     }
871
872     // Sets the value of a primitive member at the specified relative offset
873     template <typename U>
874     bool serialize(const offset_t *relative_member_offsets, U value)
875     {
876         RTI_FLAT_ASSERT(relative_member_offsets != NULL, return false);
877
878         return OffsetBase::serialize<U>(
879             // pick the right offset based on the initial alignment
880             get_value_for_alignment(relative_member_offsets), value);
881     }
882
883
884     // Obtains a member at the specified relative offset
885     //
886     // U is the type of the member. U must be a subclass of Offset<U>.
887     template <typename U>
888     U get_member(const offset_t *relative_member_offsets)
889     {
890         RTI_FLAT_ASSERT(relative_member_offsets != NULL, return U());
891
892         return OffsetBase::get_member<U>(
893             get_value_for_alignment(relative_member_offsets));
894     }
895
896     template <typename U>
897     U get_member(const offset_t *relative_member_offsets) const
898     {
899         RTI_FLAT_ASSERT(relative_member_offsets != NULL, return U());
900
901         return OffsetBase::get_member<U>(
902             get_value_for_alignment(relative_member_offsets));
903     }
904

```

```

905 // Returns an FinalArrayOffset located within this Offset
906 template <typename U, unsigned int N>
907 FinalArrayOffset<U, N> get_array_member(
908     const offset_t *relative_member_offsets,
909     const offset_t *first_element_sizes,
910     offset_t element_size)
911 {
912     typedef FinalArrayOffset<U, N> ArrayType;
913
914     RTI_FLAT_ASSERT(relative_member_offsets != NULL, return ArrayType());
915     RTI_FLAT_ASSERT(first_element_sizes != NULL, return ArrayType());
916
917     RTI_FLAT_OFFSET_CHECK_NOT_NULL(return ArrayType());
918
919     return ArrayType(
920         sample_,
921         // the absolute location of the member:
922         absolute_offset_ + get_value_for_alignment(relative_member_offsets),
923         // the size of the first element, which can differ from the rest
924         get_value_for_alignment(first_element_sizes),
925         // the size of every other element
926         element_size);
927 }
928
929 template <typename U, unsigned int N>
930 FinalArrayOffset<U, N> get_array_member(
931     const offset_t *relative_member_offsets,
932     const offset_t *first_element_sizes,
933     offset_t element_size) const
934 {
935     typedef FinalArrayOffset<U, N> ArrayType;
936
937     RTI_FLAT_ASSERT(relative_member_offsets != NULL, return ArrayType());
938     RTI_FLAT_ASSERT(first_element_sizes != NULL, return ArrayType());
939
940     RTI_FLAT_OFFSET_CHECK_NOT_NULL(return ArrayType());
941     return ArrayType(
942         sample_,
943         // the absolute location of the member:
944         absolute_offset_ + get_value_for_alignment(relative_member_offsets),
945         // the size of the first element, which can differ from the rest
946         get_value_for_alignment(first_element_sizes),
947         // the size of every other element
948         element_size);
949 }
950
951 private:
952 // A member's relative offset or an array's first element size
953 // may be different depending on the alignment of the position in the CDR
954 // buffer of the type that contains them (this). These values are passed
955 // to get_member or get_array_member as an array of 4 possible values. This
956 // function picks the right one based on the alignment of absolute_offset_
957 offset_t get_value_for_alignment(const offset_t *values_per_alignment) const
958 {
959     return values_per_alignment
960         [absolute_offset_ % RTI_XCDR_MAX_XCDR2_ALIGNMENT];
961 }
962 };
963
964 struct MutableOffsetHelper {
965     // Obtains the size of a mutable struct located at the absolute_offset of
966     // a FlatData sample
967     static offset_t calculate_serialized_size(
968         rti::flat::SampleBase *sample,
969         offset_t absolute_offset,
970         offset_t)
971     {
972         RTI_FLAT_ASSERT(sample != NULL, return 0);
973
974         return RTIXcdrFlatSample_getMutableSampleSize(
975             sample->get_buffer(),
976             absolute_offset);
977     }
978 };
979
980 class MutableOffset : public OffsetBase {
981 public:
982     typedef variable_size_type_tag_t offset_kind;
983     typedef MutableOffsetHelper Helper;
984
985 protected:

```



```

993     MutableOffset()
994     {
995     }
996
997     MutableOffset(
998         SampleBase *sample,
999         offset_t absolute_offset,
1000        offset_t serialized_size)
1001        : OffsetBase(
1002            sample,
1003            absolute_offset,
1004            serialized_size)
1005        {
1006        }
1007
1008     template <typename U>
1009     U deserialize(member_id_t member_id, U default_val = U()) const
1010     {
1011         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return U());
1012
1013         rti::xcdr::Stream::Memento stream_memento(stream_);
1014
1015         offset_t member_size = 0;
1016         if (!RTIXCdrStream_findV2MutableSampleMember(
1017             &stream_.c_stream(),
1018             member_id,
1019             &member_size)) {
1020             return default_val;
1021         }
1022
1023         return stream_.deserialize_fast<U>();
1024     }
1025
1026     // Sets the value of a primitive member at the specified relative offset
1027     template <typename U>
1028     bool serialize(member_id_t member_id, U value)
1029     {
1030         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return false);
1031
1032         rti::xcdr::Stream::Memento stream_memento(stream_);
1033
1034         offset_t member_size = 0;
1035         if (!RTIXCdrStream_findV2MutableSampleMember(
1036             &stream_.c_stream(),
1037             member_id,
1038             &member_size)) {
1039             return false;
1040         }
1041
1042         stream_.serialize_fast<U>(value);
1043         return true;
1044     }
1045
1046     template <typename U>
1047     U get_member(member_id_t member_id) const
1048     {
1049         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return U());
1050
1051         rti::xcdr::Stream::Memento stream_memento(stream_);
1052
1053         offset_t member_size = 0;
1054         if (!RTIXCdrStream_findV2MutableSampleMember(
1055             &stream_.c_stream(),
1056             member_id,
1057             &member_size)) {
1058             return U();
1059         }
1060
1061         return get_member_impl<U>(
1062             // absolute offset to the found member
1063             detail::ptrdiff(stream_.current_position(), sample->get_buffer()),
1064             member_size,
1065             typename U::offset_kind());
1066     }
1067
1068     private:
1069     template <typename U>
1070     U get_member_impl(
1071         offset_t absolute_member_offset,
1072         offset_t member_size,
1073         variable_size_type_tag_t) const

```

```

1074     {
1075         RTI_FLAT_ASSERT(absolute_member_offset > 0, return U());
1076
1077         // VariableOffsets receive a member_size
1078         return U(sample_, absolute_member_offset, member_size);
1079     }
1080
1081     template <typename U>
1082     U get_member_impl(
1083         offset_t absolute_member_offset,
1084         offset_t member_size,
1085         fixed_size_type_tag_t) const
1086     {
1087         (void) member_size; // suppress unused-param warning in release mode
1088         RTI_FLAT_ASSERT(absolute_member_offset > 0, return U());
1089
1090         // FixedOffsets do not receive a member_size (it's already known)
1091         return U(sample_, absolute_member_offset);
1092     }
1093 };
1094
1103 template <typename T>
1104 struct PrimitiveConstOffset : public OffsetBase {
1105 public:
1106     typedef fixed_size_type_tag_t offset_kind;
1107
1108     PrimitiveConstOffset()
1109     {
1110     }
1111
1112     PrimitiveConstOffset(
1113         SampleBase *sample,
1114         offset_t absolute_offset)
1115         : OffsetBase(
1116             sample,
1117             absolute_offset,
1118             serialized_size(0))
1119     {
1120     }
1121
1122     bool is_cpp_compatible() const
1123     {
1124         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return false);
1125         return sizeof(T) == 1 || !stream_.needs_byte_swap();
1126     }
1127
1128     T get() const
1129     {
1130         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return T());
1131         RTI_FLAT_ASSERT(stream_.check_size(sizeof(T)), return T());
1132
1133         return stream_.deserialize_fast<T>();
1134     }
1135
1136     static offset_t serialized_size(offset_t)
1137     {
1138         return sizeof(T);
1139     }
1140
1141     static offset_t serialized_size_w_padding()
1142     {
1143         return serialized_size(0);
1144     }
1145
1146 };
1147
1148 template <typename T>
1149 struct PrimitiveOffset : public PrimitiveConstOffset<T> {
1150 public:
1151     PrimitiveOffset()
1152     {
1153     }
1154
1155     PrimitiveOffset(
1156         SampleBase *sample,
1157         offset_t absolute_offset)
1158         : PrimitiveConstOffset<T>(
1159             sample,
1160             absolute_offset)
1161     {
1162     }
1163

```

```

1184
1190     bool set(T value)
1191     {
1192         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return false);
1193         RTI_FLAT_ASSERT(this->stream_.check_size(sizeof(T)), return false);
1194
1195         this->stream_.template serialize_fast<T>(value);
1196         return true;
1197     }
1198 };
1199
1200 } }
1201
1202 #endif // RTI_DDS_FLAT_FLATOFFSETS_HPP_
1203

```

## 10.9 rtiflat.hpp

```

1 /*
2 (c) Copyright, Real-Time Innovations, 2018.
3 All rights reserved.
4
5 No duplications, whole or partial, manual or electronic, may be made
6 without express written permission. Any such copies, or
7 revisions thereof, must display this notice unaltered.
8 This code contains trade secrets of Real-Time Innovations, Inc.
9 */
10
11 // Note: this file shouldn't be included directly. Include the header for the
12 // corresponding C++ API:
13 //
14 // - Modern C++ API: "rti/topic/flat/FlatData.hpp"
15 // - Traditional C++ API: "ndds/ndds_flat_data_cpp.h"
16
17 #ifndef RTI_DDS_FLAT_RTIFLAT_HPP_
18 #define RTI_DDS_FLAT_RTIFLAT_HPP_
19
154 #ifdef DOXYGEN_DOCUMENTATION_ONLY
155 namespace rti {
156     namespace flat {
160         }
161     }
162 }
163 #endif
164
165 #include "rti/flat/ExceptionHelper.hpp"
166 #include "rti/flat/FlatSample.hpp"
167 #include "rti/flat/FlatTypeTraits.hpp"
168 #include "rti/flat/SequenceBuilders.hpp"
169
170 #endif // RTI_DDS_FLAT_RTIFLAT_HPP_
171

```

## 10.10 SequenceBuilders.hpp

```

1 /*
2 (c) Copyright, Real-Time Innovations, 2018.
3 All rights reserved.
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6 without express written permission. Any such copies, or
7 revisions thereof, must display this notice unaltered.
8 This code contains trade secrets of Real-Time Innovations, Inc.
9 */
10
11 #ifndef RTI_DDS_FLAT_SEQUENCEBUILDERS_HPP_
12 #define RTI_DDS_FLAT_SEQUENCEBUILDERS_HPP_
13
14 #include "rti/flat/Builder.hpp"
15
16 //
17 // Builders for sequences, strings, and arrays.
18 //

```

```

19 // Type hierarchy (- indicates an abstract builder; * a concrete, usable builder)
20 //
21 // - AbstractListBuilder
22 //   * MutableArrayBuilder
23 //   - AbstractSequenceBuilder
24 //     * MutableSequenceBuilder
25 //     * FinalSequenceBuilder
26 //     * PrimitiveSequenceBuilder
27 //     * StringBuilder
28 //
29 // Notes:
30 //   - there's no "FinalArrayBuilder" because that's a fixed-size type and
31 //     doesn't need a builder (it's constructed via an "add" operation, not a "build"
32 //     operation).
33 //   - MutableSequenceBuilder "builds" its elements
34 //   - FinalSequenceBuilder "adds" its elements
35 //
36
37 namespace rti { namespace flat {
38
39 namespace detail {
40
41 template <bool IsForEnum>
42 struct DHeaderGeneratorImpl {
43     static bool reserve_dheader(rti::xcdr::Stream& stream)
44     {
45         if (collection_dheader_traits<IsForEnum>::dheader_required()) {
46             return stream.serialize_dheader() != NULL;
47         } else {
48             return true;
49         }
50     }
51
52     static bool finish_dheader(
53         rti::xcdr::Stream& stream,
54         unsigned char *dheader_position)
55     {
56         if (collection_dheader_traits<IsForEnum>::dheader_required()) {
57             return stream.finish_dheader((char *) dheader_position);
58         } else {
59             return true;
60         }
61     }
62
63     static bool move_after_dheader(
64         rti::xcdr::Stream& stream,
65         unsigned char *begin_position)
66     {
67         stream.current_position(begin_position);
68
69         if (collection_dheader_traits<IsForEnum>::dheader_required()) {
70             return stream.skip(RTI_XCDR_DHEADER_SIZE);
71         } else {
72             return true;
73         }
74     }
75 };
76
77 struct NoDHeaderGenerator {
78     static bool reserve_dheader(rti::xcdr::Stream&)
79     {
80         return true;
81     }
82
83     static bool finish_dheader(rti::xcdr::Stream&, unsigned char *)
84     {
85         return true;
86     }
87
88     static bool move_after_dheader(
89         rti::xcdr::Stream& stream,
90         unsigned char *begin_position)
91     {
92         stream.current_position(begin_position);
93         return true;
94     }
95 };
96
97 typedef DHeaderGeneratorImpl<false> DHeaderGenerator;
98 typedef DHeaderGeneratorImpl<true> DHeaderGeneratorForEnum;
99

```

```

100 // Maybe specialized for enums to select DHeaderGenerator
101 template <typename T, typename Enable = void>
102 struct primitive_sequence_dheader_gen {
103     typedef NoDHeaderGenerator type;
104 };
105
106 } // namespace detail
107
108 /*i
109  * Extends and specializes AbstractBuilder to add or override the
110  * functionality required to build a collection of consecutive elements
111  * (sequence or array):
112  *
113  * - Add or build elements
114  * - Keep track of the element count
115  * - Handle element alignment
116  *
117  */
122 template <typename DHeaderGen>
123 class AbstractListBuilder : public AbstractBuilder {
124 protected:
125     AbstractListBuilder() : element_count_(0)
126     { }
127
128     AbstractListBuilder(
129         nested_tag_t,
130         AbstractBuilder& parent,
131         unsigned int alignment)
132         : AbstractBuilder(nested_tag_t(), parent, alignment),
133           element_count_(0)
134     {
135         DHeaderGen::reserve_dheader(stream());
136     }
137
138     template <typename ElementBuilder>
139     ElementBuilder build_next()
140     {
141         rti::xodr::Stream::Memento stream_memento(stream());
142         return build_element<ElementBuilder>(stream_memento);
143     }
144
145     template <typename ElementOffset>
146     ElementOffset add_next()
147     {
148         RTI_FLAT_BUILDER_CHECK_VALID(return ElementOffset());
149
150         // save state in case of error
151         rti::xodr::Stream::Memento stream_memento(stream());
152
153         if (!stream().align(ElementOffset::required_alignment)) {
154             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return ElementOffset());
155         }
156
157         ElementOffset element = add_element<ElementOffset>();
158         if (element.is_null()) {
159             return ElementOffset();
160         }
161
162         // Success: clear memento, increment element count
163         stream_memento.discard();
164         element_count_++;
165
166         return element;
167     }
168
169     template <typename ElementOffset>
170     void add_n(unsigned int count)
171     {
172         RTI_FLAT_BUILDER_CHECK_VALID(return);
173
174         if (count == 0) {
175             return;
176         }
177
178         if (!stream().align(ElementOffset::required_alignment)) {
179             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return);
180         }
181
182         offset_t elements_size = ElementOffset::serialized_size(0)
183             + ElementOffset::serialized_size_w_padding() * (count - 1);
184         if (!stream().skip(elements_size)) {

```

```

185         RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return);
186     }
187
188     element_count_ += count;
189 }
190
194 unsigned int element_count() const
195 {
196     return element_count_;
197 }
198
199 #if defined(RTI_FLAT_DATA_CXX11_RVALUE_REFERENCES)
200 AbstractListBuilder(AbstractListBuilder&& other) = default;
201 AbstractListBuilder& operator=(AbstractListBuilder&& other)
202 {
203     if (this == &other) {
204         return *this;
205     }
206
207     finish_untyped_impl();
208
209     AbstractBuilder::operator=(static_cast<AbstractBuilder&&>(other));
210
211     element_count_ = other.element_count_;
212     other.element_count_ = 0;
213
214     return *this;
215 }
216 #else
217 public:
218     // Enables the safe-move-constructor idiom without C++11 move constructors
219     struct AbstractListBuilderMoveProxy : AbstractBuilderMoveProxy {
220         unsigned int element_count_;
221     };
222
223     operator AbstractListBuilderMoveProxy () throw() // move-constructor idiom
224     {
225         AbstractListBuilderMoveProxy other;
226         move_to(other);
227         return other;
228     }
229
230 protected:
231     void move_from(AbstractListBuilderMoveProxy& other)
232     {
233         AbstractBuilder::move_from(other);
234         element_count_ = other.element_count_;
235     }
236
237     void move_to(AbstractListBuilderMoveProxy& other)
238     {
239         AbstractBuilder::move_to(other);
240         other.element_count_ = element_count_;
241     }
242
243 #endif
244
245 private:
246     friend class AbstractBuilder;
247
248     virtual void finish_member() // override
249     {
250         RTI_FLAT_BUILDER_CHECK_VALID(return);
251
252         // Increment element count after the nested element builder finishes,
253         // instead of on build_next(). This makes it easier to roll back the
254         // state if the element building doesn't complete.
255         element_count_++;
256         AbstractBuilder::finish_member();
257     }
258
259 protected:
260     bool finish_dheader()
261     {
262         return DHeaderGen::finish_dheader(stream(), begin_position());
263     }
264
265     unsigned int element_count_;
266 };
267
268 // --- Array: -----

```

```

269 //
270 // (Note: there is no FinalArrayBuilder, because a final array's size is fixed,
271 // and is handled directly returning its offset with add_*; on the other hand,
272 // sequences are never fixed-size.)
273
274 template <typename ElementBuilder, unsigned int N>
275 class MutableArrayBuilder : public AbstractListBuilder<detail::DHeaderGenerator> {
276 public:
277     typedef MutableArrayOffset<typename ElementBuilder::Offset, N> Offset;
278     typedef AbstractListBuilder<detail::DHeaderGenerator> Base;
279
280     MutableArrayBuilder()
281     { }
282
283     // The destructor does the same as finish_impl() but doesn't need to return
284     // an Offset
285     ~MutableArrayBuilder()
286     {
287         finish_untyped_impl();
288     }
289
290 #if defined(RTI_FLAT_DATA_CXX11_RVALUE_REFERENCES)
291     MutableArrayBuilder(MutableArrayBuilder&& other) = default;
292
293     MutableArrayBuilder& operator=(MutableArrayBuilder&& other)
294     {
295         finish_untyped_impl();
296         Base::operator=(static_cast<Base&&>(other));
297
298         return *this;
299     }
300 #endif
301
302     void finish_untyped_impl()
303     {
304         if (!Base::is_valid() || !Base::is_nested()) {
305             return;
306         }
307
308         Base::finish_dheader();
309         Base::finish_untyped_impl();
310     }
311
312 private:
313     friend class AbstractBuilder; // to allow access to the constructor
314
315     MutableArrayBuilder(
316         nested_tag_t,
317         AbstractBuilder& parent,
318         unsigned int alignment = 0)
319         : AbstractListBuilder(nested_tag_t(), parent, alignment)
320     { }
321
322 public:
323     ElementBuilder build_next()
324     {
325         if (element_count() == N) {
326             RTI_FLAT_BUILDER_PRECONDITION_ERROR(
327                 "Array builder build_next: too many elements",
328                 return ElementBuilder());
329         }
330
331         return AbstractListBuilder::build_next<ElementBuilder>();
332     }
333
334     Offset finish()
335     {
336         RTI_FLAT_BUILDER_CHECK_CAN_FINISH(return Offset());
337
338         if (element_count() != N) {
339             RTI_FLAT_BUILDER_PRECONDITION_ERROR(
340                 "Cannot finish array builder: too few elements",
341                 return Offset());
342         }
343
344         if (!finish_dheader()) {
345             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return Offset());
346         }
347
348         return finish_impl<Offset>();
349     }

```

```

396     }
397
398     RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS_IMPL(\
399         MutableArrayBuilder, AbstractListBuilder, AbstractListBuilderMoveProxy)
400
401 };
402
403 // --- Sequences: -----
404
405 // Specializes AbstractListBuilder to handle the length header serialization
406 // common to all sequences (which arrays don't have)
407 template <typename DHeaderGen>
408 class AbstractSequenceBuilder : public AbstractListBuilder<DHeaderGen> {
409 public:
410     typedef AbstractListBuilder<DHeaderGen> Base;
411     using Base::element_count;
412     using Base::is_nested;
413     using Base::is_valid;
414     using Base::stream;
415     using typename Base::nested_tag_t;
416     #if defined(RTI_FLAT_DATA_CXX11_RVALUE_REFERENCES)
417     using typename Base::AbstractListBuilderMoveProxy;
418     #endif
419
420 protected:
421     AbstractSequenceBuilder()
422     {
423     }
424
425     AbstractSequenceBuilder(
426         nested_tag_t,
427         AbstractBuilder& parent,
428         unsigned int alignment)
429         : Base(nested_tag_t(), parent, alignment)
430     {
431         // leave space for sequence length
432         if (!stream().check_size(sizeof(rti::xcdr::length_t))) {
433             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(this->invalidate());
434         } else {
435             // No need to align; the base constructor already aligned to 4 the
436             // begin_position
437             stream().template serialize_fast<rti::xcdr::length_t>(0);
438         }
439     }
440
441     // The destructor does the same as finish_impl() but doesn't need to return
442     // an Offset
443     ~AbstractSequenceBuilder()
444     {
445         finish_untyped_impl();
446     }
447
448     #if defined(RTI_FLAT_DATA_CXX11_RVALUE_REFERENCES)
449     AbstractSequenceBuilder(AbstractSequenceBuilder&& other) = default;
450     AbstractSequenceBuilder& operator=(AbstractSequenceBuilder&& other)
451     {
452         finish_untyped_impl();
453         Base::operator=(static_cast<Base&&>(other));
454
455         return *this;
456     }
457     #endif
458
459     void finish_untyped_impl()
460     {
461         if (!Base::is_valid() || !Base::is_nested()) {
462             return;
463         }
464
465         Base::finish_dheader();
466         finish_length();
467         Base::finish_untyped_impl();
468     }
469
470     // Concrete sequences must call this method in their own finish() function
471     template <typename Offset>
472     Offset finish_impl()
473     {
474         RTI_FLAT_BUILDER_CHECK_VALID(return Offset());
475         RTI_FLAT_BUILDER_CHECK_CAN_FINISH(return Offset());
476     }

```



```

484
485     Base::finish_dheader();
486     finish_length(); // serialize the length header
487     return Base::template finish_impl<Offset>();
488 }
489
490 private:
491     // Serializes the sequence length when finishing the builder.
492     void finish_length()
493     {
494         rti::xcdr::Stream::Memento stream_memento(stream());
495         DHeaderGen::move_after_dheader(stream(), Base::begin_position());
496
497         // Coverity found examples where element_count() is checked, but
498         // that's only done in Array builders, which are unrelated to this
499         // class, AbstractSequenceBuilder.
500         // coverity[CHECKED_RETURN : FALSE]
501         stream().template serialize_fast<rti::xcdr::length_t>(element_count());
502     }
503 };
504
505 template <typename ElementBuilder>
506 class MutableSequenceBuilder
507     : public AbstractSequenceBuilder<detail::DHeaderGenerator> {
508 public:
509     typedef SequenceOffset<typename ElementBuilder::Offset> Offset;
510
511     MutableSequenceBuilder()
512     {
513     }
514
515 private:
516     typedef AbstractSequenceBuilder<detail::DHeaderGenerator> Base;
517
518     friend class AbstractBuilder; // to allow access to the constructor
519
520     MutableSequenceBuilder(
521         nested_tag_t,
522         AbstractBuilder& parent,
523         unsigned int alignment = RTI_XCDR_DHEADER_ALIGNMENT)
524         : Base(nested_tag_t(), parent, alignment)
525     {
526     }
527
528 public:
529     ElementBuilder build_next()
530     {
531         return AbstractListBuilder::build_next<ElementBuilder>();
532     }
533
534     Offset finish()
535     {
536         return finish_impl<Offset>();
537     }
538
539     RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS_IMPL(
540         MutableSequenceBuilder,
541         Base,
542         AbstractListBuilderMoveProxy)
543 };
544
545 template <typename ElementOffset>
546 class FinalSequenceBuilder
547     : public AbstractSequenceBuilder<detail::DHeaderGenerator> {
548 public:
549     typedef SequenceOffset<ElementOffset> Offset;
550
551     FinalSequenceBuilder()
552     {
553     }
554
555 private:
556     friend class AbstractBuilder; // to allow access to the constructor
557
558     FinalSequenceBuilder(
559         nested_tag_t,
560         AbstractBuilder& parent,
561         unsigned int alignment = RTI_XCDR_SEQ_LENGTH_ALIGNMENT)
562         : AbstractSequenceBuilder(nested_tag_t(), parent, alignment)
563     {
564     }
565 }

```

```

641
642 public:
643     ElementOffset add_next()
644     {
645         return AbstractListBuilder::add_next<ElementOffset>();
646     }
647
648     FinalSequenceBuilder& add_n(unsigned int count)
649     {
650         AbstractListBuilder::add_n<ElementOffset>(count);
651         return *this;
652     }
653
654     Offset finish()
655     {
656         return finish_impl<Offset>();
657     }
658
659     RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS_IMPL(\
660         FinalSequenceBuilder, AbstractSequenceBuilder, AbstractListBuilderMoveProxy)
661 };
662
663 template <typename T>
664 class PrimitiveSequenceBuilder
665     : public AbstractSequenceBuilder<
666         typename detail::primitive_sequence_dheader_gen<T>::type> {
667 public:
668     typedef PrimitiveSequenceOffset<T> Offset;
669     typedef AbstractSequenceBuilder<
670         typename detail::primitive_sequence_dheader_gen<T>::type>
671         Base;
672     using Base::is_valid;
673     using Base::stream;
674     using typename Base::nested_tag_t;
675 #if !defined(RTI_FLAT_DATA_CXX11_RVALUE_REFERENCES)
676     using typename Base::AbstractListBuilderMoveProxy;
677 #endif
678
679     PrimitiveSequenceBuilder()
680     {
681     }
682
683 protected:
684     friend class AbstractBuilder; // to allow access to the constructor
685
686     PrimitiveSequenceBuilder(
687         nested_tag_t,
688         AbstractBuilder& parent,
689         unsigned int alignment = RTI_XCDR_SEQ_LENGTH_ALIGNMENT)
690         : Base(nested_tag_t(), parent, alignment)
691     {
692     }
693
694 public:
695     PrimitiveSequenceBuilder& add_next(T value)
696     {
697         RTI_FLAT_BUILDER_CHECK_VALID(return *this);
698
699         if (!stream().template serialize<T>(value)) {
700             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return *this);
701         }
702
703         Base::element_count_++;
704         return *this;
705     }
706
707     PrimitiveSequenceBuilder& add_n(const T *array, unsigned int count)
708     {
709         RTI_FLAT_BUILDER_CHECK_VALID(return *this);
710
711         if (RTIXCdrUnsignedLong_MAX / static_cast<unsigned int>(sizeof(T))
712             < count) {
713             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return *this);
714         }
715
716         if (!stream().check_size(static_cast<unsigned int>(sizeof(T)) * count)) {
717             RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return *this);
718         }
719
720         if (stream().needs_byte_swap() && sizeof(T) > 1) {
721             for (unsigned int i = 0; i < count; i++) {

```

```

759         stream().template serialize_fast<T>(array[i]);
760     }
761     } else {
762         stream().serialize_fast((void *) array, count * static_cast<unsigned int>(sizeof(T)));
763     }
764
765     Base::element_count_ += count;
766     return *this;
767 }
768
769 PrimitiveSequenceBuilder& add_n(unsigned int count, T value)
770 {
771     RTI_FLAT_BUILDER_CHECK_VALID(return *this);
772
773     if (RTIXCdrUnsignedLong_MAX / static_cast<unsigned int>(sizeof(T))
774         < count) {
775         RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return *this);
776     }
777
778     if (!stream().check_size(static_cast<unsigned int>(sizeof(T)) * count)) {
779         RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return *this);
780     }
781
782     for (unsigned int i = 0; i < count; i++) {
783         stream().template serialize_fast<T>(value);
784     }
785     Base::element_count_ += count;
786     return *this;
787 }
788
789 PrimitiveSequenceBuilder& add_n(unsigned int count)
790 {
791     RTI_FLAT_BUILDER_CHECK_VALID(return *this);
792
793     if (RTIXCdrUnsignedLong_MAX / static_cast<unsigned int>(sizeof(T))
794         < count) {
795         RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return *this);
796     }
797
798     if (!stream().skip(static_cast<unsigned int>(sizeof(T)) * count)) {
799         RTI_FLAT_BUILDER_OUT_OF_RESOURCES_ERROR(return *this);
800     }
801
802     Base::element_count_ += count;
803     return *this;
804 }
805
806 Offset finish()
807 {
808     this->finish_dheader();
809     return Base::template finish_impl<Offset>();
810 }
811
812 private:
813     RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS_IMPL(\
814         PrimitiveSequenceBuilder, Base, AbstractListBuilderMoveProxy)
815 };
816
817 class StringBuilder : public PrimitiveSequenceBuilder<char> {
818 public:
819     typedef StringOffset Offset;
820     typedef PrimitiveSequenceBuilder<char> Base;
821     using Base::is_valid;
822     using Base::stream;
823     using typename Base::nested_tag_t;
824
825     StringBuilder()
826     {
827     }
828
829 private:
830     friend class AbstractBuilder; // to allow access to the constructor
831
832     StringBuilder(
833         nested_tag_t,
834         AbstractBuilder& parent,
835         unsigned int alignment = RTI_XCDR_SEQ_LENGTH_ALIGNMENT)
836         : Base(nested_tag_t(), parent, alignment)
837     {
838     }
839 }

```

```

894
895 public:
896     StringBuilder& set_string(const char *value)
900     {
901         RTI_FLAT_BUILDER_CHECK_VALID(return *this);
902
903         // if set_string is called more than once we override the string
904         // that was set before
905         if (Base::element_count_ != 0) {
906             stream().current_position(begin_position());
907             stream().serialize_fast<rti::xcdr::length_t>(0);
908             Base::element_count_ = 0;
909         }
910
911         unsigned int length = static_cast<unsigned int>(strlen(value)) + 1;
912         add_n(value, length); // if this fail, error has been reported
913         return *this;
914     }
915
916     Offset finish()
917     {
918         RTI_FLAT_BUILDER_CHECK_VALID(return Offset());
919
920         if (element_count_ == 0) {
921             add_next('\0'); // build empty string if no string was built
922         }
923
924         Base::finish_dheader();
925         return finish_impl<Offset>();
926     }
927
928     RTI_FLAT_BUILDER_DEFINE_MOVE_OPERATIONS_IMPL(\
929         StringBuilder, Base, AbstractListBuilderMoveProxy)
930 };
931
932 // Wide strings are treated as a sequence of octets
933 typedef PrimitiveSequenceBuilder<unsigned char> WStringBuilder;
934 } }
935 #endif // RTI_DDS_FLAT_SEQUENCEBUILDERS_HPP_
936

```

## 10.11 SequenceIterator.hpp

```

1 /*
2 (c) Copyright, Real-Time Innovations, 2018.
3 All rights reserved.
4
5 No duplications, whole or partial, manual or electronic, may be made
6 without express written permission. Any such copies, or
7 revisions thereof, must display this notice unaltered.
8 This code contains trade secrets of Real-Time Innovations, Inc.
9 */
10
11 #ifndef RTI_DDS_FLAT_SEQUENCEITERATOR_HPP_
12 #define RTI_DDS_FLAT_SEQUENCEITERATOR_HPP_
13
14 #include <iterator>
15
16 #include "rti/flat/Offset.hpp"
17
18 namespace rti { namespace flat {
19
20     template <typename E, typename OffsetKind>
21     class SequenceIterator {
22     public:
23         typedef std::forward_iterator_tag iterator_category;
24
25         typedef E value_type;
26
27         typedef value_type reference;
28
29         typedef value_type pointer;
30
31         typedef std::ptrdiff_t difference_type;

```

```
74     SequenceIterator() : sample_(NULL), current_offset_(0), max_offset_(0)
75     {
76     }
77
78     SequenceIterator(
79         rti::flat::SampleBase *sample,
80         offset_t initial_offset,
81         offset_t max_offset)
82     : sample_(sample),
83       current_offset_(initial_offset),
84       max_offset_(max_offset)
85     {
86         RTI_FLAT_ASSERT(sample != NULL, return);
87     }
88
89     bool is_null() const
90     {
91         return sample_ == NULL;
92     }
93
94     value_type operator*() const
95     {
96         return get_impl(OffsetKind());
97     }
98
99     value_type operator->() const
100    {
101        return get_impl(OffsetKind());
102    }
103
104    bool advance()
105    {
106        // Unlike operator++, advance() allows checking for errors when
107        // exceptions are disabled (traditional C++)
108        return advance_impl(OffsetKind());
109    }
110
111    SequenceIterator& operator++()
112    {
113        bool can_advance_iter = advance_impl(OffsetKind());
114        RTI_FLAT_CHECK_PRECONDITION(can_advance_iter, return *this);
115        return *this;
116    }
117
118    SequenceIterator operator++(int)
119    {
120        SequenceIterator tmp(*this);
121        ++(*this);
122        return tmp;
123    }
124
125    friend bool operator<(
126        const SequenceIterator & s1,
127        const SequenceIterator & s2)
128    {
129        return s1.get_position() < s2.get_position();
130    }
131
132    friend bool operator > (
133        const SequenceIterator & s1,
134        const SequenceIterator & s2)
135    {
136        return s1.get_position() > s2.get_position();
137    }
138
139    friend bool operator <= (
140        const SequenceIterator & s1,
141        const SequenceIterator & s2)
142    {
143        return s1.get_position() <= s2.get_position();
144    }
145
146    friend bool operator >= (
147        const SequenceIterator & s1,
148        const SequenceIterator & s2)
149    {
150        return s1.get_position() >= s2.get_position();
151    }
152
153    friend bool operator == (
154        const SequenceIterator & s1,
```

```

214         const SequenceIterator & s2)
215     {
216         return s1.get_position() == s2.get_position();
217     }
218
219 friend bool operator != (
220     const SequenceIterator & s1,
221     const SequenceIterator & s2)
222 {
223     return !(s1 == s2);
224 }
225
226 unsigned char * get_position() const
227 {
228     if (is_null()) {
229         return NULL;
230     } else {
231         return sample_->get_buffer() + current_offset_;
232     }
233 }
234
235 private:
236 E get_impl(variable_size_type_tag_t) const
237 {
238     if (is_null()) {
239         return E();
240     }
241
242     // The iterator points to the end of the previous element. If elements
243     // need padding, we have to add it here (required alignment is 4 because
244     // mutable types (variable_size_type_tag_t) are always aligned to 4)
245     offset_t offset = RTIXCdrAlignment_alignSizeUp(current_offset_, 4);
246
247     if (offset >= max_offset_) {
248         return E();
249     }
250
251     // Calculate the size of the current element; if E is a struct type,
252     // this will be quick (just deserialize the DHeader); if we're iterating
253     // over an array of sequences (E is a sequence), this will require
254     // skipping over the current sequence.
255     offset_t size = E::Helper::calculate_serialized_size(
256         sample_,
257         offset,
258         max_offset_);
259     // size 0 indicates an error; a variable-size type E cannot have size
260     // zero because it will always have a header (DHeader for mutable structs,
261     // length for sequences)
262     if (size == 0) {
263         return E();
264     }
265
266     return E(sample_, offset, size);
267 }
268
269 E get_impl(fixed_size_type_tag_t) const
270 {
271     if (is_null()) {
272         return E();
273     }
274
275     // The iterator points to the end of the previous element. If elements
276     // need padding, we have to add it here.
277     offset_t offset = RTIXCdrAlignment_alignSizeUp(
278         current_offset_,
279         E::required_alignment);
280     if (offset >= max_offset_) {
281         return E();
282     }
283
284     return E(sample_, offset);
285 }
286
287 bool advance_impl(variable_size_type_tag_t)
288 {
289     if (is_null()) {
290         return false;
291     }
292
293     current_offset_ = RTIXCdrAlignment_alignSizeUp(current_offset_, 4);
294     offset_t size = E::Helper::calculate_serialized_size(

```

```

298         sample_, // beginning of the buffer
299         current_offset_, // absolute offset to the current element
300         max_offset_); // maximum offset in the list
301     if (size == 0) {
302         return false;
303     }
304
305     current_offset_ += size;
306
307     if (current_offset_ > max_offset_) {
308         current_offset_ = max_offset_;
309         return false;
310     }
311
312     return true;
313 }
314
315 bool advance_impl(fixed_size_type_tag_t)
316 {
317     if (is_null()) {
318         return false;
319     }
320
321     // The iterator points to the end of the previous element. If elements
322     // need padding, we have to add it here. We do that to keep the end()
323     // iterator consistent, because the last element may not need padding.
324     current_offset_ = RTIXCdrAlignment_alignSizeUp(
325         current_offset_,
326         E::required_alignment);
327     current_offset_ += E::serialized_size(0);
328
329     if (current_offset_ > max_offset_) {
330         current_offset_ = max_offset_;
331         return false;
332     }
333
334     return true;
335 }
336
337 rti::flat::SampleBase *sample_;
338 offset_t current_offset_;
339 offset_t max_offset_;
340 };
341
342 } }
343
344 #endif // RTI_DDS_FLAT_SEQUENCEITERATOR_HPP_
345

```

## 10.12 SequenceOffsets.hpp

```

1 /*
2 (c) Copyright, Real-Time Innovations, 2018.
3 All rights reserved.
4
5 No duplications, whole or partial, manual or electronic, may be made
6 without express written permission. Any such copies, or
7 revisions thereof, must display this notice unaltered.
8 This code contains trade secrets of Real-Time Innovations, Inc.
9 */
10
11 #ifndef RTI_DDS_FLAT_SEQUENCEOFFSETS_HPP_
12 #define RTI_DDS_FLAT_SEQUENCEOFFSETS_HPP_
13
14 #include "rti/flat/Offset.hpp"
15 #include "rti/flat/SequenceIterator.hpp"
16
17 namespace rti { namespace flat {
18
19     template <typename T>
20     class AbstractPrimitiveList : public OffsetBase {
21     public:
22         typedef T value_type;
23
24     protected:
25         AbstractPrimitiveList()
26         {

```

```

34     }
35
36     AbstractPrimitiveList(
37         rti::flat::SampleBase *sample,
38         offset_t offset,
39         offset_t sequence_size)
40     : OffsetBase(sample, offset, sequence_size)
41     {
42     }
43
44 public:
45
46     bool is_cpp_compatible() const
47     {
48         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return false);
49         return sizeof(T) == 1 || !stream_.needs_byte_swap();
50     }
51
52
53     /**@private
54      * @brief Gets direct access to the elements
55      *
56      * Returns a pointer to the elements of this sequence.
57      *
58      * @note If the Sample that contains this PrimitiveSequenceOffset has an endianness
59      * different from the native one, the element bytes may be swapped. This can
60      * happen if this Sample was published by a DataWriter running on a platform
61      * with a different endianness and received by a DataReader running locally.
62      *
63      * This function is not for public use. See rti::flat::plain_cast() instead.
64      */
65     T * get_elements()
66     {
67         return reinterpret_cast<T*>(this->get_buffer());
68     }
69
70     /**@private
71      * @brief Gets direct access to the array elements
72      *
73      * (Const overload)
74      */
75     const T * get_elements() const
76     {
77         return reinterpret_cast<const T*>(this->get_buffer());
78     }
79
80     T get_element(unsigned int i) const
81     {
82         // OffsetBase::serialize only checks this as a debug assertion; in
83         // a sequence or array we need to do it in release mode too
84         if (!stream_.check_size((i + 1) * ((unsigned int) sizeof(T)))) {
85             return T();
86         }
87
88         return OffsetBase::template deserialize<T>(i * (unsigned int) sizeof(T));
89     }
90
91     bool set_element(unsigned int i, T value)
92     {
93         // OffsetBase::serialize only checks this as a debug assertion; in
94         // a sequence or array we need to do it in release mode too
95         if (!stream_.check_size((i + 1) * static_cast<unsigned int>(sizeof(T)))) {
96             return false;
97         }
98
99         return OffsetBase::serialize(i * static_cast<unsigned int>(sizeof(T)), value);
100     }
101 };
102
103 namespace detail {
104
105     template <typename T>
106     struct PrimitiveSequenceOffsetHelper;
107
108     template <typename T, typename Enable = void>
109     struct primitive_sequence_header_length {
110         static size_t value()
111         {
112             return sizeof(rti::xcdr::length_t);
113         }
114     };
115 };

```



```

135
136 } // namespace detail
137
145 template <typename T>
146 class PrimitiveSequenceOffset : public AbstractPrimitiveList<T> {
147 public:
148     typedef variable_size_type_tag_t offset_kind;
149     typedef detail::PrimitiveSequenceOffsetHelper<T> Helper;
150
151     PrimitiveSequenceOffset() : element_count_(0)
152     {
153     }
154
155     PrimitiveSequenceOffset(
156         rti::flat::SampleBase *sample,
157         offset_t offset,
158         offset_t serialized_size)
159     : AbstractPrimitiveList<T>(
160         // passing NULL causes the base constructors to fail
161         serialized_size >= static_cast<offset_t>(header_length()) ? sample : NULL,
162         offset + static_cast<offset_t>(header_length()),
163         serialized_size - static_cast<offset_t>(header_length())),
164         element_count_(0)
165     {
166 #ifdef RTI_FLAT_DATA_NO_EXCEPTIONS
167         if (!this->is_null()) { // without exceptions, we need to check if the base ctor failed
168 #endif
169             rti::xcdr::Stream::Memento stream_memento(this->stream_);
170             this->stream_.skip_back(sizeof(rti::xcdr::length_t));
171             element_count_ = this->stream_.template deserialize_fast<rti::xcdr::length_t>();
172 #ifdef RTI_FLAT_DATA_NO_EXCEPTIONS
173         }
174 #endif
175     }
176 }
177
178 unsigned int element_count() const
179 {
180     RTI_FLAT_OFFSET_CHECK_NOT_NULL(return 0);
181     return element_count_;
182 }
183
184 private:
185     static size_t header_length()
186     {
187         return detail::primitive_sequence_header_length<T>::value();
188     }
189     unsigned int element_count_;
190 };
191
192 namespace detail {
193
194 template <typename T>
195 struct PrimitiveSequenceOffsetHelper {
196     static offset_t calculate_serialized_size(
197         rti::flat::SampleBase *sample,
198         offset_t absolute_offset,
199         offset_t max_size)
200     {
201         RTI_FLAT_ASSERT(sample != NULL, return 0);
202         RTI_FLAT_ASSERT(max_size > sizeof(rti::xcdr::length_t), return 0);
203
204         PrimitiveSequenceOffset<T> tmp(sample, absolute_offset, max_size);
205
206         // elements + header
207         if ((RTIXCdrUnsignedLong_MAX
208             - static_cast<unsigned int>(sizeof(rti::xcdr::length_t)))
209             / static_cast<unsigned int>(sizeof(T))
210             < tmp.element_count()) {
211             RTI_FLAT_OFFSET_PRECONDITION_ERROR(
212                 "Serialized size of a sequence of primitive elements "
213                 "exceeds maximum representable 32-bit unsigned integer.",
214                 return 0);
215         }
216         return (tmp.element_count() * static_cast<unsigned int>(sizeof(T)))
217             + static_cast<unsigned int>(sizeof(rti::xcdr::length_t));
218     }
219 };
220 };

```

```

226
227 } // namespace detail
228
240 template <typename T, unsigned int N>
241 class PrimitiveArrayOffset : public AbstractPrimitiveList<T> {
242 public:
243     typedef fixed_size_type_tag_t offset_kind;
244
245     PrimitiveArrayOffset()
246     {
247     }
248
249     PrimitiveArrayOffset(rti::flat::SampleBase *sample, offset_t offset)
250     : AbstractPrimitiveList<T>(
251         sample,
252         offset + static_cast<offset_t>(header_length()),
253         serialized_size(0))
254     {
255     }
256
257 public:
258
259     unsigned int element_count() const
260     {
261         return N;
262     }
263
264     static offset_t serialized_size(offset_t)
265     {
266         return sizeof(T) * N;
267     }
268
269 private:
270     static size_t header_length()
271     {
272         return detail::primitive_sequence_header_length<T>::value()
273             - sizeof(rti::xcdr::length_t);
274     }
275 };
276
277 // Note: the modern C++ API defines a PrimitiveArrayOffset specializations for
278 // safe_enum and wchar_t
279
280 struct StringOffsetHelper;
281
282 class StringOffset : public PrimitiveSequenceOffset<char> {
283 public:
284     typedef variable_size_type_tag_t offset_kind;
285     typedef StringOffsetHelper Helper;
286
287     StringOffset()
288     {
289     }
290
291     StringOffset(
292         SampleBase *sample,
293         offset_t absolute_offset,
294         offset_t serialized_size)
295     : PrimitiveSequenceOffset<char>(
296         sample,
297         absolute_offset,
298         serialized_size)
299     {
300     }
301
302     char * get_string()
303     {
304         return reinterpret_cast<char*>(this->get_buffer());
305     }
306
307     const char * get_string() const
308     {
309         return reinterpret_cast<const char*>(this->get_buffer());
310     }
311
312     unsigned int element_count() const
313     {
314         RTI_FLAT_CHECK_PRECONDITION(
315             PrimitiveSequenceOffset<char>::element_count() > 0,
316             return 0);
317     }
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340

```

```

341         return PrimitiveSequenceOffset<char>::element_count() - 1;
342     }
343 };
344
345 struct StringOffsetHelper {
346     static offset_t calculate_serialized_size(
347         rti::flat::SampleBase *sample,
348         offset_t absolute_offset,
349         offset_t max_size)
350     {
351         StringOffset tmp(sample, absolute_offset, max_size);
352         return tmp.element_count()
353             + 1 // null terminator
354             + (unsigned int) sizeof(rti::xcdr::length_t); // length header
355     }
356 };
357
358 // Wide strings are treated as a sequence of octets
359 typedef PrimitiveSequenceOffset<unsigned char> WStringOffset;
360
361 // The base class of SequenceOffset, and FinalAlignedArrayOffset
362 //
363 // This encapsulates the functionality that allows iterating through a list
364 // of elements (a sequence or an array). The list must be always aligned to 4
365 // (that excludes FinalArrayOffset)
366 //
367 template <typename ElementOffset>
368 class AbstractAlignedList : public OffsetBase {
369 public:
370     typedef SequenceIterator<ElementOffset, typename ElementOffset::offset_kind>
371         iterator;
372
373 protected:
374     AbstractAlignedList()
375     {
376     }
377
378     AbstractAlignedList(
379         rti::flat::SampleBase *sample,
380         offset_t offset,
381         offset_t sequence_size)
382         : OffsetBase(
383             sample,
384             offset,
385             sequence_size)
386     {
387     }
388
389 public:
390     bool is_cpp_compatible() const // override
391     {
392         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return false);
393         return !stream_.needs_byte_swap()
394             && rti::xcdr::has_cpp_friendly_cdr_layout_collection<
395                 typename rti::flat::flat_type_traits<ElementOffset>::flat_type>());
396     }
397
398     ElementOffset get_element(unsigned int i)
399     {
400         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return ElementOffset());
401
402         return get_element_impl<ElementOffset>(
403             i,
404             typename ElementOffset::offset_kind());
405     }
406
407     iterator begin()
408     {
409         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return iterator(NULL, 0, 0));
410
411         return iterator(
412             sample_,
413             absolute_offset_,
414             absolute_offset_ + get_buffer_size());
415     }
416
417     iterator end()
418     {
419         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return iterator(NULL, 0, 0));
420     }
421
422 private:
423     ElementOffset get_element_impl<ElementOffset>(
424         unsigned int i,
425         typename ElementOffset::offset_kind()) const
426     {
427         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return ElementOffset());
428
429         return ElementOffset(
430             sample_,
431             absolute_offset_ + i * sizeof(typename ElementOffset::value_type),
432             absolute_offset_ + get_buffer_size());
433     }
434
435     void check_offset(const offset_t offset) const
436     {
437         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return);
438     }
439
440     void check_offset(const offset_t offset, const offset_t max_size) const
441     {
442         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return);
443     }
444
445     void check_offset(const offset_t offset, const offset_t max_size,

```

```

446         return iterator(
447             sample_,
448             absolute_offset_ + get_buffer_size(),
449             absolute_offset_ + get_buffer_size());
450     }
451
452 private:
453     // for variable size types we skip element by element
454     template <typename E>
455     E get_element_impl(unsigned int i, variable_size_type_tag_t)
456     {
457         iterator it = begin();
458         while (it != end() && i > 0) {
459             if (!it.advance()) {
460                 return E();
461             }
462             i--;
463         }
464
465         return *it;
466     }
467
468     // for fixed-size types we support random access
469     template <typename E>
470     E get_element_impl(unsigned int i, fixed_size_type_tag_t)
471     {
472         offset_t size = i * E::serialized_size_w_padding();
473
474         // Ensure that the stream has space for i + 1 elements
475         if (!stream_.check_size(size + E::serialized_size(0))) {
476             return E();
477         }
478
479         return E(this->sample_, this->absolute_offset_ + size);
480     }
481 };
482
483 template <typename ElementOffset>
484 struct SequenceOffsetHelper;
485
486 template <typename ElementOffset>
487 class SequenceOffset : public AbstractAlignedList<ElementOffset> {
488 public:
489     typedef variable_size_type_tag_t offset_kind;
490     typedef SequenceOffsetHelper<ElementOffset> Helper;
491
492     SequenceOffset() : element_count_(0)
493     {
494     }
495
496     SequenceOffset(
497         rti::flat::SampleBase *sample,
498         offset_t offset,
499         offset_t sequence_size)
500     : AbstractAlignedList<ElementOffset>(
501         // Member size in bytes must be > 4, otherwise let base ctor
502         // fail
503         sequence_size >= header_length() ? sample : NULL,
504         // The offset begins after any padding to align to 4;
505         // padding may be needed for example for an array of
506         // sequence of final types; the end position of the previous
507         // sequence may not be aligned
508         RTIXcdrAlignment_alignSizeUp(
509             offset,
510             RTI_XCDR_SEQ_LENGTH_ALIGNMENT)
511         + header_length(),
512         sequence_size - header_length(),
513         element_count_(0)
514     )
515     {
516 #ifdef RTI_FLAT_DATA_NO_EXCEPTIONS
517         if (!this->is_null()) { // without exceptions, we need to check if the base ctor failed
518 #endif
519             rti::xcdr::Stream::Memento stream_memento(this->stream_);
520             this->stream_.skip_back(sizeof(rti::xcdr::length_t));
521             element_count_ = this->stream_.template deserialize_fast<rti::xcdr::length_t>();
522 #ifdef RTI_FLAT_DATA_NO_EXCEPTIONS
523         }
524 #endif
525     }
526
527     ElementOffset get_element(unsigned int i)

```

```

547     {
548         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return ElementOffset());
549
550         if (i >= element_count_) {
551             return ElementOffset();
552         }
553         return AbstractAlignedList<ElementOffset>::get_element(i);
554     }
555
556     unsigned int element_count() const
557     {
558         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return 0);
559
560         return element_count_;
561     }
562
563 private:
564     static offset_t header_length()
565     {
566         return static_cast<offset_t>(
567             detail::collection_dheader_traits<false>::dheader_size()
568             + sizeof(rti::xcdr::length_t));
569     }
570
571     unsigned int element_count_;
572 };
573
574 template <typename E>
575 struct SequenceOffsetHelper {
576     // Calculates the serialized size of a Sequence by skipping each element
577     static offset_t calculate_serialized_size(
578         rti::flat::SampleBase *sample,
579         offset_t absolute_offset,
580         offset_t max_offset)
581     {
582         // Create a SequenceOffset beginning at sample + absolute_offset,
583         // with a size we don't know, but no greater than
584         // max_offset - absolute_offset
585         SequenceOffset<E> tmp(
586             sample,
587             absolute_offset,
588             max_offset - absolute_offset);
589         unsigned int count = tmp.element_count();
590         typename SequenceOffset<E>::iterator it = tmp.begin();
591         for (unsigned int i = 0; i < count; i++) {
592             if (!it.advance()) {
593                 return 0; // error
594             }
595         }
596
597         return detail::ptrdiff(it.get_position(), sample->get_buffer())
598             - absolute_offset;
599     }
600 };
601
602 template <typename ElementOffset, unsigned int N>
603 class MutableArrayOffset : public AbstractAlignedList<ElementOffset> {
604 public:
605     typedef variable_size_type_tag_t offset_kind;
606
607     MutableArrayOffset()
608     {
609     }
610
611     MutableArrayOffset(
612         rti::flat::SampleBase *sample,
613         offset_t offset,
614         offset_t sequence_size)
615         : AbstractAlignedList<ElementOffset>(
616             sequence_size >= header_length() ? sample : NULL,
617             offset + header_length(),
618             sequence_size - header_length())
619     {
620     }
621
622     ElementOffset get_element(unsigned int i)
623     {
624         if (i >= N) {
625             return ElementOffset();
626         }
627     }
628 };

```

```

651         return AbstractAlignedList<ElementOffset>::get_element(i);
652     }
653 }
654
655 private:
656     static offset_t header_length()
657     {
658         return static_cast<offset_t>(
659             detail::collection_dheader_traits<false>::dheader_size());
660     }
661 };
662
663 template <typename ElementOffset, unsigned int N>
664 class FinalArrayOffset : public OffsetBase {
665 public:
666     typedef fixed_size_type_tag_t offset_kind;
667
668     FinalArrayOffset()
669     {
670     }
671
672     // Constructor used when this array is part of a fixed-size type, and
673     // therefore it's initial alignment is not known ahead of time
674     FinalArrayOffset(
675         rti::flat::SampleBase *sample,
676         offset_t absolute_offset,
677         offset_t first_element_size,
678         offset_t element_size)
679         : OffsetBase(
680             sample,
681             absolute_offset,
682             first_element_size + element_size * (N - 1)),
683           first_element_size_(first_element_size),
684           element_size_(element_size)
685     {
686     }
687
688     ElementOffset get_element(unsigned int i)
689     {
690         RTI_FLAT_OFFSET_CHECK_NOT_NULL(return ElementOffset());
691
692         if (i >= N) {
693             return ElementOffset(); // null offset
694         }
695
696         offset_t element_offset = this->absolute_offset_;
697         if (i > 0) {
698             element_offset += this->first_element_size_
699                 + (i - 1) * this->element_size_;
700         }
701
702         return ElementOffset(this->sample_, element_offset);
703     }
704 }
705
706 private:
707     offset_t first_element_size_;
708     offset_t element_size_;
709 };
710
711 template <typename ElementOffset, unsigned int N>
712 class FinalAlignedArrayOffset : public AbstractAlignedList<ElementOffset> {
713 public:
714     typedef fixed_size_type_tag_t offset_kind;
715
716     FinalAlignedArrayOffset()
717     {
718     }
719
720     // Constructor used when this array is part of a mutable type, and
721     // therefore it's aligned to 4 always
722     FinalAlignedArrayOffset(
723         rti::flat::SampleBase *sample,
724         offset_t absolute_offset)
725         : AbstractAlignedList<ElementOffset>(
726             sample,
727             absolute_offset
728             + detail::collection_dheader_traits<
729                 false>::dheader_size(),
730             serialized_size(0))
731     {
732     }
733 }
734
735
736

```

```

797 // serialized_size() only works when this array is part of a mutable type
798 // and we know it's aligned to 4
799 static offset_t serialized_size(offset_t)
800 {
801     // [element1][pad][element2][pad]...[elementN]
802     return ElementOffset::serialized_size_w_padding() * (N - 1)
803         + ElementOffset::serialized_size(0);
804 }
805
806 ElementOffset get_element(unsigned int i)
807 {
808     RTI_FLAT_OFFSET_CHECK_NOT_NULL(return ElementOffset());
809
810     if (i >= N) {
811         return ElementOffset();
812     }
813
814     return AbstractAlignedList<ElementOffset>::get_element(i);
815 }
816 };
817
818 namespace detail {
819 // Arrays of complex elements may need a DHEADER
820 template <typename T, unsigned int N>
821 struct is_fixed_type_w_dheader<FinalAlignedArrayOffset<T, N> > {
822     static bool value()
823     {
824         return is_dheader_required_in_non_primitive_collections();
825     }
826 };
827
828 } // namespace detail
829 }} // namespace rti::flat
830 #endif // RTI_DDS_FLAT_SEQUENCEOFFSETS_HPP_
831

```

## 10.13 Interpreter.hpp

```

1 /* $Id$
2
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5
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7 without express written permission. Any such copies, or
8 revisions thereof, must display this notice unaltered.
9 This code contains trade secrets of Real-Time Innovations, Inc.
10
11 ===== */
12
13 #ifndef RTI_XCDR_INTERPRETER_HPP_
14 #define RTI_XCDR_INTERPRETER_HPP_
15
16 #include "xcdr/xcdr_interpreter.h"
17
18
19 namespace rti { namespace xcdr {
20
21 /*
22 * Provides the type code of a type.
23 *
24 * This struct is to be specialized in generated code for each TopicType.
25 * Specializations must define a static member function:
26 * RTIXCdrTypeCode * get()
27 */
28 template <typename TopicType>
29 struct type_code;
30
31 namespace detail {
32
33 template <typename TopicType, bool IsCollection>
34 bool has_cpp_friendly_cdr_layout_impl()
35 {

```

```

36     RTIXCdrUnsignedLongLong size;
37     RTIXCdrAlignment alignment;
38     RTIXCdrXTypesComplianceMask xTypesComplianceMask;
39
40     xTypesComplianceMask = RTIXCdrInterpreter_getGlobalXtypeComplianceMask();
41
42     return RTIXCdrTypeCode_hasCFriendlyCdrLayout(
43         type_code<TopicType>::get(),
44         &size,
45         &alignment,
46         /*
47          * The number of element is not important; it's only important to
48          * know if there's one or more than one
49          */
50         IsCollection ? 2 : 1,
51         RTI_XCDR_TRUE, /* v2Encapsulation */
52         RTIXCdrXTypesComplianceMask_isBitSet(
53             xTypesComplianceMask,
54             RTI_XCDR_XTYPES_DHEADER_IN_NON_PRIMITIVE_COLLECTIONS_BIT),
55         RTIXCdrXTypesComplianceMask_isBitSet(
56             xTypesComplianceMask,
57             RTI_XCDR_XTYPES_ENUM_AS_PRIMITIVE_IN_COLLECTIONS_BIT));
58 }
59
60 }
61
62 template <typename TopicType>
63 bool has_cpp_friendly_cdr_layout()
64 {
65     static bool result =
66         detail::has_cpp_friendly_cdr_layout_impl<TopicType, false>();
67     return result;
68 }
69
70 template <typename TopicType>
71 bool has_cpp_friendly_cdr_layout_collection()
72 {
73     static bool result =
74         detail::has_cpp_friendly_cdr_layout_impl<TopicType, true>();
75     return result;
76 }
77
78 struct NoOpPropertyConfigurator {
79     static void configure(RTIXCdrInterpreterProgramsGenProperty&)
80     {
81         // In general (trad. and micro C++), no additional properties.
82         //
83         // dds_cpp.2.0 defines a custom Configurator
84         //
85     }
86 };
87
88 /*i
89 * @brief Programs singleton for the to/from cdr functions
90 *
91 * The combination of the ProgramSingleton template parameters builds a single
92 * instance for the given type, program kinds and options.
93 * This will typically be instantiated in IDL-generated code.
94 *
95 * @tparam TopicType The topic-type these programs operate with
96 * @tparam ProgramKind A mask of the different programs to be generated
97 * @tparam ResolveAlias Value for RTIXCdrInterpreterProgramsGenProperty::resolveAlias
98 *     when creating the programs
99 * @tparam InlineStruct Value for RTIXCdrInterpreterProgramsGenProperty::inlineStruct
100 *     when creating the programs
101 * @tparam OptimizeEnum Value for RTIXCdrInterpreterProgramsGenProperty::optimizeEnum
102 *     when creating the programs
103 * @tparam KeysOnly (default false) Whether to generate programs only for key fields
104 * @tparam PropertyConfigurator (default no-op) A functor that configures
105 *     additional RTIXCdrInterpreterProgramsGenProperty to generate the
106 *     programs.
107 *
108 * get_instance() creates the singleton the first time it's called. The singleton
109 * is automatically deleted by the destructor of a static local variable.
110 */
111 template <
112     typename TopicType,
113     int ProgramKind,
114     bool ResolveAlias,
115     bool InlineStruct,
116     bool OptimizeEnum,

```



```

117     bool KeysOnly = false,
118     typename PropertyConfigurator = NoOpPropertyConfigurator>
119 struct ProgramsSingleton {
120 private:
121     ProgramsSingleton()
122     {
123         RTIXCdrInterpreterProgramsGenProperty property =
124             RTIXCdrInterpreterProgramsGenProperty_INITIALIZER;
125
126         configure_property(property);
127
128         programs_ = RTIXCdrInterpreterPrograms_new(
129             type_code<TopicType>::get(),
130             &property,
131             ProgramKind);
132     }
133
134 ~ProgramsSingleton()
135 {
136     if (programs_ != NULL) {
137         RTIXCdrInterpreterPrograms_delete(programs_);
138     }
139 }
140
141 static void configure_property(
142     RTIXCdrInterpreterProgramsGenProperty& property)
143 {
144     property.generateWithAllFields =
145         KeysOnly ? RTI_XCDR_FALSE : RTI_XCDR_TRUE;
146     property.resolveAlias = ResolveAlias ? RTI_XCDR_TRUE : RTI_XCDR_FALSE;
147     property.inlineStruct = InlineStruct ? RTI_XCDR_TRUE : RTI_XCDR_FALSE;
148     property.optimizeEnum = OptimizeEnum ? RTI_XCDR_TRUE : RTI_XCDR_FALSE;
149     PropertyConfigurator::configure(property);
150 }
151
152 RTIXCdrInterpreterPrograms *programs_;
153
154 public:
155     // Returns the singleton instance. It can be NULL if the program creation
156     // failed.
157     static RTIXCdrInterpreterPrograms * get_instance()
158     {
159         static ProgramsSingleton<
160             TopicType,
161             ProgramKind,
162             ResolveAlias,
163             InlineStruct,
164             OptimizeEnum,
165             KeysOnly,
166             PropertyConfigurator> instance;
167         return instance.programs_;
168     }
169
170     // Creates the programs returned by get_instance() again for this singleton.
171     // This is required in testing when the global interpreter properties are
172     // modified from test to test.
173     static RTIXCdrInterpreterPrograms *regenerate_programs()
174     {
175         RTIXCdrInterpreterPrograms *programs = get_instance();
176         if (programs == NULL) {
177             return NULL;
178         }
179
180         RTIXCdrInterpreterProgramsGenProperty property =
181             RTIXCdrInterpreterProgramsGenProperty_INITIALIZER;
182         configure_property(property);
183
184         // finalize and re-initialize the programs. Note that get_instance()
185         // will continue returning the same object, but internally it's been
186         // re-initialized.
187         RTIXCdrInterpreterPrograms_finalize(programs);
188         if (!RTIXCdrInterpreterPrograms_initialize(
189             programs,
190             type_code<TopicType>::get(),
191             &property,
192             ProgramKind)) {
193             return NULL;
194         }
195
196         return programs;
197     }

```

```

198
199 };
200
201 // Returns a ProgramsSingleton with the programs that the generated
202 // to/from cdr functions need
203 template <
204     typename TopicType,
205     bool ResolveAlias,
206     bool InlineStruct,
207     bool OptimizeEnum,
208     typename PropertyConfigurator>
209 RTIXCdrInterpreterPrograms * get_cdr_serialization_programs_w_property_configurator()
210 {
211     return ProgramsSingleton<
212         TopicType,
213         RTI_XCDR_SER_PROGRAM
214         | RTI_XCDR_DESER_PROGRAM
215         | RTI_XCDR_GET_SER_SIZE_PROGRAM
216         | RTI_XCDR_GET_MAX_SER_SIZE_PROGRAM,
217         ResolveAlias,
218         InlineStruct,
219         OptimizeEnum,
220         false,
221         PropertyConfigurator>::get_instance();
222 }
223
224 template <
225     typename TopicType,
226     bool ResolveAlias,
227     bool InlineStruct,
228     bool OptimizeEnum>
229 RTIXCdrInterpreterPrograms * get_cdr_serialization_programs()
230 {
231     return ProgramsSingleton<
232         TopicType,
233         RTI_XCDR_SER_PROGRAM
234         | RTI_XCDR_DESER_PROGRAM
235         | RTI_XCDR_GET_SER_SIZE_PROGRAM
236         | RTI_XCDR_GET_MAX_SER_SIZE_PROGRAM,
237         ResolveAlias,
238         InlineStruct,
239         OptimizeEnum,
240         false,
241         NoOpPropertyConfigurator>::get_instance();
242 }
243
244 /*i
245 * Provides the interpreter programs for a type. (Currently it only provides
246 * the initialize_sample program used to initialize FlatData samples)
247 *
248 * This struct is to be specialized in generated code for each TopicType.
249 * Specializations must define a static member function:
250 * RTIXCdrInterpreterPrograms * get(), which will call
251 * get_cdr_initialization_programs() with the options (ResolveAlias, etc.) used
252 * to generate code for this type.
253 */
254 template <typename SampleType>
255 struct type_programs;
256
257 } } // namespace rti::xcdr
258
259 #endif // RTI_XCDR_INTERPRETER_HPP_

```

## 10.14 Stream.hpp

```

1 /* $Id$
2
3 (c) Copyright, Real-Time Innovations, 2018.
4 All rights reserved.
5
6 No duplications, whole or partial, manual or electronic, may be made
7 without express written permission. Any such copies, or
8 revisions thereof, must display this notice unaltered.
9 This code contains trade secrets of Real-Time Innovations, Inc.
10
11 ===== */
12

```

```

13 #ifndef RTI_XCDR_STREAM_HPP_
14 #define RTI_XCDR_STREAM_HPP_
15
16 #include "xcdr/xcdr_stream.h"
17
18 namespace rti { namespace xcdr {
19
20
21 #define RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_BODY(\
22     TYPE,\
23     CDR_TYPE,\
24     SERIALIZE_MACRO)\
25     static void serialize_fast(RTIXCdrStream *stream, const TYPE* v)\
26     {\
27         RTIXCdrStream_ ## SERIALIZE_MACRO ## ByteFast(stream, (CDR_TYPE *) v);\
28     }\
29     static void deserialize_fast(RTIXCdrStream *stream, TYPE* v)\
30     {\
31         RTIXCdrStream_de ## SERIALIZE_MACRO ## ByteFast(stream, (CDR_TYPE *) v);\
32     }\
33     static bool serialize(RTIXCdrStream *stream, const TYPE* v)\
34     {\
35         return RTIXCdrStream_ ## SERIALIZE_MACRO ## Byte(stream, (CDR_TYPE *) v, RTI_XCDR_TRUE);\
36     }\
37     static bool deserialize(RTIXCdrStream *stream, TYPE* v)\
38     {\
39         return RTIXCdrStream_de ## SERIALIZE_MACRO ## Byte(stream, (CDR_TYPE *) v, RTI_XCDR_TRUE);\
40     }\
41
42 #define RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS(\
43     TYPE,\
44     CDR_TYPE,\
45     SERIALIZE_MACRO)\
46 template <>\
47 struct primitive_type_traits<TYPE> {\
48     RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_BODY(TYPE, CDR_TYPE, SERIALIZE_MACRO)\
49 }
50
51 #define RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_W_ALIGNMENT_PARAM(\
52     TYPE,\
53     CDR_TYPE,\
54     SERIALIZE_MACRO,\
55     ALIGNMENT)\
56 template <>\
57 struct primitive_type_traits<TYPE> {\
58     static void serialize_fast(RTIXCdrStream *stream, const TYPE* v)\
59     {\
60         RTIXCdrStream_ ## SERIALIZE_MACRO ## ByteFast(stream, (CDR_TYPE *) v);\
61     }\
62     static void deserialize_fast(RTIXCdrStream *stream, TYPE* v)\
63     {\
64         RTIXCdrStream_de ## SERIALIZE_MACRO ## ByteFast(stream, (CDR_TYPE *) v);\
65     }\
66     static bool serialize(RTIXCdrStream *stream, const TYPE* v)\
67     {\
68         return RTIXCdrStream_ ## SERIALIZE_MACRO ## Byte(stream, (CDR_TYPE *) v, RTI_XCDR_TRUE, ALIGNMENT);\
69     }\
70     static bool deserialize(RTIXCdrStream *stream, TYPE* v)\
71     {\
72         return RTIXCdrStream_de ## SERIALIZE_MACRO ## Byte(stream, (CDR_TYPE *) v, RTI_XCDR_TRUE,
ALIGNMENT);\
73     }\
74 }
75
76 #define RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_NO_ALIGN_PARAM(\
77     TYPE,\
78     CDR_TYPE,\
79     SERIALIZE_MACRO)\
80 template <>\
81 struct primitive_type_traits<TYPE> {\
82     static void serialize_fast(RTIXCdrStream *stream, const TYPE* v)\
83     {\
84         RTIXCdrStream_ ## SERIALIZE_MACRO ## ByteFast(stream, (CDR_TYPE *) v);\
85     }\
86     static void deserialize_fast(RTIXCdrStream *stream, TYPE* v)\
87     {\
88         RTIXCdrStream_de ## SERIALIZE_MACRO ## ByteFast(stream, (CDR_TYPE *) v);\
89     }\
90     static bool serialize(RTIXCdrStream *stream, const TYPE* v)\
91     {\
92         return RTIXCdrStream_ ## SERIALIZE_MACRO ## Byte(stream, (CDR_TYPE *) v);\

```

```

93     }\
94     static bool deserialize(RTIXCdrStream *stream, TYPE* v)\
95     {\
96         return RTIXCdrStream_de ## SERIALIZE_MACRO ## Byte(stream, (CDR_TYPE *) v);\
97     }\
98 }
99
100 // Base case handles T as an 4-byte integer (this is necessary for traditional
101 // C++ enums as well as C++11 enum classes)
102 template <typename T>
103 struct primitive_type_traits {
104     RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_BODY(T, RTIXCdr4Byte, serialize4)
105 };
106
107 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_NO_ALIGN_PARAM(\
108     char, RTIXCdr1Byte, serialize1);
109
110 // The API can work with fixed-width integers (dds_cpp.2.0) or
111 // RTI-defined integers (dds_cpp.1.0). We need to make this distinction because
112 // on some platforms these types may not be exactly the same as far as template
113 // resolution. That is, compilers may or may not pick the template
114 // specialization for int32_t for an instantiation with int.
115 //
116 // If we define only one (e.g. int32_t) some compilers won't find a suitable
117 // definition for int. If we define both, some compilers will find duplicate
118 // definitions for int/int32_t.
119 #if !defined(RTI_AVOID_FIXED_WIDTH_INTEGERS)
120 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_NO_ALIGN_PARAM(\
121     uint8_t, RTIXCdr1Byte, serialize1);
122
123 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS(\
124     int16_t, RTIXCdr2Byte, serialize2);
125 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS(\
126     uint16_t, RTIXCdr2Byte, serialize2);
127
128 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS(\
129     int32_t, RTIXCdr4Byte, serialize4);
130 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS(\
131     uint32_t, RTIXCdr4Byte, serialize4);
132
133 typedef uint32_t length_t;
134 #else
135 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_NO_ALIGN_PARAM(\
136     unsigned char, RTIXCdr1Byte, serialize1);
137
138 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS(\
139     short, RTIXCdr2Byte, serialize2);
140 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS(\
141     unsigned short, RTIXCdr2Byte, serialize2);
142
143 // int and unsigned int, as well as enum are handled by the general case
144
145 typedef unsigned int length_t;
146 #endif
147
148 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS(\
149     float, RTIXCdr4Byte, serialize4);
150
151 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_W_ALIGNMENT_PARAM(\
152     DDS_LongLong, RTIXCdr8Byte, serialize8, 4);
153
154 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_W_ALIGNMENT_PARAM(\
155     DDS_UnsignedLongLong, RTIXCdr8Byte, serialize8, 4);
156 RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS_W_ALIGNMENT_PARAM(\
157     double, RTIXCdr8Byte, serialize8, 4);
158
159 // RTI_XCDR_SPECIALIZE_PRIMITIVE_TYPE_TRAITS(
160 //     rti::core::LongDouble, RTI_CDR_LONG_DOUBLE_TYPE, RTIXCdr16Byte, serialize16Byte);
161
162 template <typename T>
163 void serialize_fast(RTIXCdrStream& stream, const T& value)
164 {
165     primitive_type_traits<T>::serialize_fast(&stream, &value);
166 }
167
168 template <typename T>
169 void deserialize_fast(RTIXCdrStream& stream, T& value)
170 {
171     primitive_type_traits<T>::deserialize_fast(&stream, &value);
172 }
173

```

```
174 class Stream {
175 public:
176     Stream()
177     {
178         RTIXCdrStream_set(&stream_, NULL, 0);
179     }
180
181     explicit Stream(const RTIXCdrStream& c_stream)
182     {
183         stream_ = c_stream; // shallow assign
184     }
185
186     // Creates a new stream that shares the same buffer and current position
187     // as another Stream
188     Stream(const Stream& other)
189     {
190         stream_ = other.stream_; // shallow assign
191     }
192
193     // Creates a new Stream from an existing already-initialized buffer, whose
194     // encapsulation has already been set
195     Stream(
196         unsigned char *buffer,
197         length_t size,
198         length_t offset)
199     {
200         RTIXCdrFlatData_initializeStream(
201             &stream_,
202             buffer,
203             offset,
204             size);
205     }
206
207     Stream& operator=(const Stream& other)
208     {
209         stream_ = other.stream_; // shallow assign (see copy constructor)
210         return *this;
211     }
212
213     bool skip(length_t size)
214     {
215         if (!check_size(size)) {
216             return false;
217         }
218         RTIXCdrStream_increaseCurrentPosition(&stream_, size);
219         return true;
220     }
221
222     void skip_fast(length_t size)
223     {
224         RTIXCdrStream_increaseCurrentPosition(&stream_, size);
225     }
226
227     void skip_back(length_t bytes)
228     {
229         RTIXCdrStream_increaseCurrentPosition(
230             &stream_,
231             -static_cast<int>(bytes));
232     }
233
234     unsigned char * buffer()
235     {
236         return reinterpret_cast<unsigned char*>(stream_.buffer);
237     }
238
239     const unsigned char * buffer() const
240     {
241         return reinterpret_cast<unsigned char*>(stream_.buffer);
242     }
243
244     unsigned char * current_position()
245     {
246         return reinterpret_cast<unsigned char*>(
247             RTIXCdrStream_getCurrentPosition(&stream_));
248     }
249
250     void current_position(unsigned char * pos)
251     {
252         RTIXCdrStream_setCurrentPosition(
253             &stream_,
254             reinterpret_cast<char*>(pos));

```

```

255     }
256
257     length_t used_size() const
258     {
259         return static_cast<length_t>(
260             RTIXCdrStream_getCurrentPosition(&stream_) - stream_._buffer);
261     }
262
263     length_t remaining_size() const
264     {
265         return total_size() - used_size();
266     }
267
268     length_t total_size() const
269     {
270         return stream_._bufferLength;
271     }
272
273     bool needs_byte_swap() const
274     {
275         return stream_._needByteSwap == RTI_XCDR_TRUE;
276     }
277
278     template <typename T>
279     bool serialize(T value)
280     {
281         return primitive_type_traits<T>::serialize(&stream_, &value);
282     }
283
284     template <typename T>
285     void serialize_fast(T value)
286     {
287         primitive_type_traits<T>::serialize_fast(&stream_, &value);
288     }
289
290     template <typename T>
291     bool serialize_no_align(T value)
292     {
293         if (!check_size(sizeof(T))) {
294             return false;
295         }
296         primitive_type_traits<T>::serialize_fast(&stream_, &value);
297         return true;
298     }
299
300     template <typename T>
301     T deserialize_fast()
302     {
303         T value;
304         primitive_type_traits<T>::deserialize_fast(&stream_, &value);
305         return value;
306     }
307
308     void serialize_fast(const void *array, length_t bytes)
309     {
310         RTIXCdrStream_serializeNByteFast(&stream_, array, bytes);
311     }
312
313     char * serialize_dheader()
314     {
315         return RTIXCdrStream_serializeDHeader(&stream_);
316     }
317
318     bool finish_dheader(char *dheader_position)
319     {
320         return RTIXCdrStream_serializeDHeaderLength(&stream_, dheader_position)
321             == RTI_XCDR_TRUE;
322     }
323
324     bool serialize_emheader(
325         char*& position,
326         RTIXCdrUnsignedLong parameter_id,
327         RTIXCdrUnsignedLong lc,
328         bool must_understand = false)
329     {
330         RTIXCdrBoolean failure = 0;
331         position = RTIXCdrStream_serializeV2ParameterHeader(
332             &stream_,
333             &failure,
334             parameter_id,
335             must_understand ? RTI_XCDR_TRUE : RTI_XCDR_FALSE,

```

```

336         lc);
337
338     return failure == RTI_XCDR_FALSE;
339 }
340
341 void finish_emheader(char * emheader_position)
342 {
343     RTIXCdrStream_finishV2ParameterHeader(&stream_, emheader_position);
344 }
345
346 bool align(unsigned int alignment)
347 {
348     return RTIXCdrStream_align(&stream_, (RTIXCdrAlignment) alignment)
349         == RTI_XCDR_TRUE;
350 }
351
352 bool check_size(length_t size) const
353 {
354     bool result = RTIXCdrStream_checkSize(&stream_, size) == RTI_XCDR_TRUE;
355     return result;
356 }
357
358 bool need_byte_swap() const
359 {
360     return stream_.needByteSwap != 0;
361 }
362
363 RTIXCdrStream& c_stream()
364 {
365     return stream_;
366 }
367
368
369 // Saves the current position of a stream so it can be restored later on if
370 // needed. This utility has two main uses:
371 // - For Offsets: move the offset to a member, then go back
372 // - For Builders: allow rolling back to the state before starting building
373 //   a member, in case of an error or a call to the builder's discard()
374 //
375 // For maintainability we also save the relativeBuffer, but FlatData doesn't
376 // use it.
377 class Memento {
378 public:
379     explicit Memento(Stream& stream) :
380         stream_(stream),
381         original_position_(stream.current_position()),
382         relative_buffer_(stream.c_stream()._relativeBuffer)
383     {
384     }
385
386     // Restores the saved position unless discard() has been called
387     ~Memento()
388     {
389         restore();
390     }
391
392     // Restores the saved position unless discard() has been called
393     void restore()
394     {
395         if (original_position_ != NULL) {
396             stream_.current_position(original_position_);
397             stream_.c_stream()._relativeBuffer = relative_buffer_;
398         }
399     }
400
401     // Call this to no longer restore the original position
402     unsigned char * discard()
403     {
404         unsigned char *pos = original_position_;
405         original_position_ = NULL;
406         return pos;
407     }
408
409 private:
410     Stream& stream_;
411     unsigned char *original_position_;
412     char *relative_buffer_;
413 };
414
415
416 private:

```

```
417     RTIXCdrStream stream_;
418 };
419
420 } } // namespace rti::xcdr
421
422 #endif // RTI_XCDR_STREAM_HPP_
```



# Chapter 11

## Example Documentation

### 11.1 HelloWorld.idl

#### 11.1.1 IDL Type Description

The data type to be disseminated by RTI Connext is described in language-independent IDL. The IDL file is input to `rtiddsgen` (see the `Code Generator User's Manual` for more information), which produces the following files.

The programming language specific type representation of the type **Foo** (p. 1648) = `HelloWorld`, for use in the application code.

- `HelloWorld.h`
- `HelloWorld.cxx`

**User Data Type Support** (p. 71) types as required by the DDS specification for use in the application code.

- `HelloWorldSupport.h`
- `HelloWorldSupport.cxx`

Methods required by the RTI Connext implementation. These contains the auto-generated methods for serializing and deserializing the type.

- `HelloWorldPlugin.h`
- `HelloWorldPlugin.cxx`

#### 11.1.1.1 HelloWorld.idl

```
struct HelloWorld {  
    string<128> msg;  
};
```

## 11.2 HelloWorld.cxx

### 11.2.1 Programming Language Type Description

The following programming language specific type representation is generated by rtiddsgen (see the Code Generator User's Manual for more information) for use in application code, where:

- **Foo** (p. 1648) = HelloWorld
- **FooSeq** (p. 1697) = HelloWorldSeq

#### 11.2.1.1 HelloWorld.h

```

/*
WARNING: THIS FILE IS AUTO-GENERATED. DO NOT MODIFY.

This file was generated from HelloWorld.idl
using RTI Code Generator (rtiddsgen) version 4.3.0.
The rtiddsgen tool is part of the RTI Connexx DDS distribution.
For more information, type 'rtiddsgen -help' at a command shell
or consult the Code Generator User's Manual.
*/
#ifndef HelloWorld_1436885487_h
#define HelloWorld_1436885487_h
#ifndef NDDS_STANDALONE_TYPE
#ifndef ndds_cpp_h
#include "ndds/ndds_cpp.h"
#endif
#include "rti/xcdr/Interpreter.hpp"
#else
#include "ndds_standalone_type.h"
#endif
extern "C" {
    extern const char *HelloWorldTYPENAME;
}
struct HelloWorldSeq;
#ifndef NDDS_STANDALONE_TYPE
class HelloWorldTypeSupport;
class HelloWorldDataWriter;
class HelloWorldDataReader;
#endif
class HelloWorld
{
public:
    typedef struct HelloWorldSeq Seq;
    #ifndef NDDS_STANDALONE_TYPE
    typedef HelloWorldTypeSupport TypeSupport;
    typedef HelloWorldDataWriter DataWriter;
    typedef HelloWorldDataReader DataReader;
    #endif
    DDS_Char * msg;
};
#if (defined(RTI_WIN32) || defined(RTI_WINCE) || defined(RTI_INTIME)) && defined(NDDS_USER_DLL_EXPORT)
/* If the code is building on Windows, start exporting symbols.
*/
#undef NDDUSERD11Export
#define NDDUSERD11Export __declspec(dllexport)
#endif
#ifndef NDDS_STANDALONE_TYPE
NDDUSERD11Export DDS_TypeCode * HelloWorld_get_typecode(void); /* Type code */
NDDUSERD11Export RTIXCdrTypePlugin *HelloWorld_get_type_plugin_info(void);
NDDUSERD11Export RTIXCdrSampleAccessInfo *HelloWorld_get_sample_access_info(void);
NDDUSERD11Export RTIXCdrSampleAccessInfo *HelloWorld_get_sample_seq_access_info(void);
#endif
DDS_SEQUENCE(HelloWorldSeq, HelloWorld);
NDDUSERD11Export
RTIBool HelloWorld_initialize(
    HelloWorld* self);
NDDUSERD11Export
RTIBool HelloWorld_initialize_ex(
    HelloWorld* self, RTIBool allocatePointers, RTIBool allocateMemory);

```

```

NDDSUSERDllExport
RTIBool HelloWorld_initialize_w_params(
    HelloWorld* self,
    const struct DDS_TypeAllocationParams_t * allocParams);
NDDSUSERDllExport
RTIBool HelloWorld_finalize_w_return(
    HelloWorld* self);
NDDSUSERDllExport
void HelloWorld_finalize(
    HelloWorld* self);
NDDSUSERDllExport
void HelloWorld_finalize_ex(
    HelloWorld* self, RTIBool deletePointers);
NDDSUSERDllExport
void HelloWorld_finalize_w_params(
    HelloWorld* self,
    const struct DDS_TypeDeallocationParams_t * deallocParams);
NDDSUSERDllExport
void HelloWorld_finalize_optional_members(
    HelloWorld* self, RTIBool deletePointers);
NDDSUSERDllExport
RTIBool HelloWorld_copy(
    HelloWorld* dst,
    const HelloWorld* src);
#if (defined(RTI_WIN32) || defined(RTI_WINCE) || defined(RTI_INTIME)) && defined(NDDS_USER_DLL_EXPORT)
/* If the code is building on Windows, stop exporting symbols.
*/
#undef NDDSUSERDllExport
#define NDDSUSERDllExport
#endif
#ifndef NDDS_STANDALONE_TYPE
namespace rti {
    namespace xcdr {
        template <>
        struct type_code< HelloWorld> {
            static const RTIXcdrTypeCode * get();
        };
    }
}
#endif
#endif /* HelloWorld */

```

### 11.2.1.2 HelloWorld.cxx

```

/*
WARNING: THIS FILE IS AUTO-GENERATED. DO NOT MODIFY.

This file was generated from HelloWorld.idl
using RTI Code Generator (rtiddsgen) version 4.3.0.
The rtiddsgen tool is part of the RTI Connext DDS distribution.
For more information, type 'rtiddsgen -help' at a command shell
or consult the Code Generator User's Manual.
*/
#ifndef NDDS_STANDALONE_TYPE
#ifndef ndds_cpp_h
#include "ndds/ndds_cpp.h"
#endif
#ifndef dds_c_log_impl_h
#include "dds_c/dds_c_log_impl.h"
#endif
#ifndef dds_c_log_infrastructure_h
#include "dds_c/dds_c_infrastructure_impl.h"
#endif
#ifndef cdr_type_h
#include "cdr/cdr_type.h"
#endif
#ifndef osapi_heap_h
#include "osapi/osapi_heap.h"
#endif
#else
#include "ndds_standalone_type.h"
#endif
#include "HelloWorld.h"
#ifndef NDDS_STANDALONE_TYPE
#include "HelloWorldPlugin.h"
#endif
#include <new>
/* ===== */

```

```

const char *HelloWorldTYPENAME = "HelloWorld";
#ifdef NDDS_STANDALONE_TYPE
DDS_TypeCode * HelloWorld_get_typecode(void)
{
    static RTIBool is_initialized = RTI_FALSE;
    static DDS_TypeCode HelloWorld_g_tc_msg_string = DDS_INITIALIZE_STRING_TYPECODE((128L));
    static DDS_TypeCode_Member HelloWorld_g_tc_members[1]=
    {
        {
            (char *)"msg", /* Member name */
            {
                0, /* Representation ID */
                DDS_BOOLEAN_FALSE, /* Is a pointer? */
                -1, /* Bitfield bits */
                NULL, /* Member type code is assigned later */
            },
            0, /* Ignored */
            0, /* Ignored */
            0, /* Ignored */
            NULL, /* Ignored */
            RTI_CDR_REQUIRED_MEMBER, /* Is a key? */
            DDS_PUBLIC_MEMBER, /* Member visibility */
            1,
            NULL, /* Ignored */
            RTICdrTypeCodeAnnotations_INITIALIZER
        }
    };
    static DDS_TypeCode HelloWorld_g_tc =
    {{
        DDS_TK_STRUCT, /* Kind */
        DDS_BOOLEAN_FALSE, /* Ignored */
        -1, /* Ignored */
        (char *)"HelloWorld", /* Name */
        NULL, /* Ignored */
        0, /* Ignored */
        0, /* Ignored */
        NULL, /* Ignored */
        1, /* Number of members */
        HelloWorld_g_tc_members, /* Members */
        DDS_VM_NONE, /* Ignored */
        RTICdrTypeCodeAnnotations_INITIALIZER,
        DDS_BOOLEAN_TRUE, /* _isCopyable */
        NULL, /* _sampleAccessInfo: assigned later */
        NULL /* _typePlugin: assigned later */
    }}; /* Type code for HelloWorld*/
    if (is_initialized) {
        return &HelloWorld_g_tc;
    }
    is_initialized = RTI_TRUE;
    HelloWorld_g_tc._data._annotations._allowedDataRepresentationMask = 5;
    HelloWorld_g_tc._members[0]._representation._typeCode = (RTICdrTypeCode *)&HelloWorld_g_tc_msg_string;
    /* Initialize the values for member annotations. */
    HelloWorld_g_tc._members[0]._annotations._defaultValue._d = RTI_XCDR_TK_STRING;
    HelloWorld_g_tc._members[0]._annotations._defaultValue._u.string_value = (DDS_Char *) "";
    HelloWorld_g_tc._data._sampleAccessInfo =
    HelloWorld_get_sample_access_info();
    HelloWorld_g_tc._data._typePlugin =
    HelloWorld_get_type_plugin_info();
    return &HelloWorld_g_tc;
}
#define TSeq HelloWorldSeq
#define T HelloWorld
#include "dds_cpp/generic/dds_cpp_data_TInterpreterSupport.gen"
#undef T
#undef TSeq
RTIXCdrSampleAccessInfo *HelloWorld_get_sample_seq_access_info()
{
    static RTIXCdrSampleAccessInfo HelloWorld_g_seqSampleAccessInfo = {
        RTI_XCDR_TYPE_BINDING_CPP, \
        {sizeof(HelloWorldSeq),0,0,0}, \
        RTI_XCDR_FALSE, \
        DDS_Sequence_get_member_value_pointer, \
        HelloWorldSeq_set_member_element_count, \
        NULL, \
        NULL, \
        NULL \
    };
    return &HelloWorld_g_seqSampleAccessInfo;
}
RTIXCdrSampleAccessInfo *HelloWorld_get_sample_access_info()
{

```

```

static RTIBool is_initialized = RTI_FALSE;
HelloWorld *sample;
static RTIXCdrMemberAccessInfo HelloWorld_g_memberAccessInfos[1] =
{RTIXCdrMemberAccessInfo_INITIALIZER};
static RTIXCdrSampleAccessInfo HelloWorld_g_sampleAccessInfo =
RTIXCdrSampleAccessInfo_INITIALIZER;
if (is_initialized) {
    return (RTIXCdrSampleAccessInfo*) &HelloWorld_g_sampleAccessInfo;
}
RTIXCdrHeap_allocateStruct (
    &sample,
    HelloWorld);
if (sample == NULL) {
    return NULL;
}
HelloWorld_g_memberAccessInfos[0].bindingMemberValueOffset[0] =
(RTIXCdrUnsignedLong) ((char *)&sample->msg - (char *)sample);
HelloWorld_g_sampleAccessInfo.memberAccessInfos =
HelloWorld_g_memberAccessInfos;
{
    size_t candidateTypeSize = sizeof(HelloWorld);
    if (candidateTypeSize > RTIXCdrLong_MAX) {
        HelloWorld_g_sampleAccessInfo.typeSize[0] =
RTIXCdrLong_MAX;
    } else {
        HelloWorld_g_sampleAccessInfo.typeSize[0] =
(RTIXCdrUnsignedLong) candidateTypeSize;
    }
}
HelloWorld_g_sampleAccessInfo.useGetMemberValueOnlyWithRef =
RTI_XCDR_TRUE;
HelloWorld_g_sampleAccessInfo.getMemberValuePointerFcn =
HelloWorld_get_member_value_pointer;
HelloWorld_g_sampleAccessInfo.languageBinding =
RTI_XCDR_TYPE_BINDING_CPP ;
RTIXCdrHeap_freeStruct (sample);
is_initialized = RTI_TRUE;
return (RTIXCdrSampleAccessInfo*) &HelloWorld_g_sampleAccessInfo;
}
RTIXCdrTypePlugin *HelloWorld_get_type_plugin_info()
{
    static RTIXCdrTypePlugin HelloWorld_g_typePlugin =
    {
        NULL, /* serialize */
        NULL, /* serialize_key */
        NULL, /* deserialize_sample */
        NULL, /* deserialize_key_sample */
        NULL, /* skip */
        NULL, /* get_serialized_sample_size */
        NULL, /* get_serialized_sample_max_size_ex */
        NULL, /* get_serialized_key_max_size_ex */
        NULL, /* get_serialized_sample_min_size */
        NULL, /* serialized_sample_to_key */
        (RTIXCdrTypePluginInitializeSampleFunction)
HelloWorld_initialize_ex,
        NULL,
        (RTIXCdrTypePluginFinalizeSampleFunction)
HelloWorld_finalize_w_return,
        NULL,
        NULL
    };
    return &HelloWorld_g_typePlugin;
}
#endif
RTIBool HelloWorld_initialize(
    HelloWorld* sample)
{
    return HelloWorld_initialize_ex(
        sample,
        RTI_TRUE,
        RTI_TRUE);
}
RTIBool HelloWorld_initialize_w_params(
    HelloWorld *sample,
    const struct DDS_TypeAllocationParams_t *allocParams)
{
    if (sample == NULL) {
        return RTI_FALSE;
    }
    if (allocParams == NULL) {
        return RTI_FALSE;
    }
}

```

```

    }
    if (allocParams->allocate_memory) {
        sample->msg = DDS_String_alloc((128L));
        if (sample->msg != NULL) {
            RTIOsapiUtility_unusedReturnValue(
                RTICdrType_copyStringEx(
                    &sample->msg,
                    "",
                    (128L),
                    RTI_FALSE),
                RTIBool);
        }
        if (sample->msg == NULL) {
            return RTI_FALSE;
        }
    } else {
        if (sample->msg != NULL) {
            RTIOsapiUtility_unusedReturnValue(
                RTICdrType_copyStringEx(
                    &sample->msg,
                    "",
                    (128L),
                    RTI_FALSE),
                RTIBool);
            if (sample->msg == NULL) {
                return RTI_FALSE;
            }
        }
    }
    return RTI_TRUE;
}

RTIBool HelloWorld_initialize_ex(
    HelloWorld *sample,
    RTIBool allocatePointers,
    RTIBool allocateMemory)
{
    struct DDS_TypeAllocationParams_t allocParams =
        DDS_TYPE_ALLOCATION_PARAMS_DEFAULT;
    allocParams.allocate_pointers = (DDS_Boolean)allocatePointers;
    allocParams.allocate_memory = (DDS_Boolean)allocateMemory;
    return HelloWorld_initialize_w_params(
        sample,
        &allocParams);
}

RTIBool HelloWorld_finalize_w_return(
    HelloWorld* sample)
{
    HelloWorld_finalize_ex(sample, RTI_TRUE);
    return RTI_TRUE;
}

void HelloWorld_finalize(
    HelloWorld* sample)
{
    HelloWorld_finalize_ex(
        sample,
        RTI_TRUE);
}

void HelloWorld_finalize_ex(
    HelloWorld *sample,
    RTIBool deletePointers)
{
    struct DDS_TypeDeallocationParams_t deallocParams =
        DDS_TYPE_DEALLOCATION_PARAMS_DEFAULT;
    if (sample==NULL) {
        return;
    }
    deallocParams.delete_pointers = (DDS_Boolean)deletePointers;
    HelloWorld_finalize_w_params(
        sample,
        &deallocParams);
}

void HelloWorld_finalize_w_params(
    HelloWorld *sample,
    const struct DDS_TypeDeallocationParams_t *deallocParams)
{
    if (sample==NULL) {
        return;
    }
    if (deallocParams == NULL) {
        return;
    }
}

```

```

    if (sample->msg != NULL) {
        DDS_String_free(sample->msg);
        sample->msg=NULL;
    }
}
void HelloWorld_finalize_optional_members(
    HelloWorld* sample, RTIBool deletePointers)
{
    struct DDS_TypeDeallocationParams_t deallocParamsTmp =
        DDS_TYPE_DEALLOCATION_PARAMS_DEFAULT;
    struct DDS_TypeDeallocationParams_t * deallocParams =
        &deallocParamsTmp;
    if (sample==NULL) {
        return;
    }
    if (deallocParams) {} /* To avoid warnings */
    deallocParamsTmp.delete_pointers = (DDS_Boolean)deletePointers;
    deallocParamsTmp.delete_optional_members = DDS_BOOLEAN_TRUE;
}
RTIBool HelloWorld_copy(
    HelloWorld* dst,
    const HelloWorld* src)
{
    try {
        if (dst == NULL || src == NULL) {
            return RTI_FALSE;
        }
        if (!RTICdrType_copyStringEx (
            &dst->msg
            ,
            src->msg,
            (128L) + 1,
            RTI_FALSE)){
            return RTI_FALSE;
        }
        return RTI_TRUE;
    } catch (const std::bad_alloc&) {
        return RTI_FALSE;
    }
}
#define T HelloWorld
#define TSeq HelloWorldSeq
#define T_initialize_w_params HelloWorld_initialize_w_params
#define T_finalize_w_params HelloWorld_finalize_w_params
#define T_copy HelloWorld_copy
#ifdef NDDS_STANDALONE_TYPE
#include "dds_c/generic/dds_c_sequence_TSeq.gen"
#include "dds_cpp/generic/dds_cpp_sequence_TSeq.gen"
#else
#include "dds_c_sequence_TSeq.gen"
#include "dds_cpp_sequence_TSeq.gen"
#endif
#undef T_copy
#undef T_finalize_w_params
#undef T_initialize_w_params
#undef TSeq
#undef T
#ifdef NDDS_STANDALONE_TYPE
namespace rti {
    namespace xcdr {
        const RTIXCdrTypeCode * type_code< HelloWorld>::get()
        {
            return (const RTIXCdrTypeCode *) HelloWorld_get_typecode();
        }
    }
}
#endif

```

## 11.3 HelloWorldSupport.cxx

### 11.3.1 User Data Type Support

Files generated by rtidsgen (see the [Code Generator User's Manual](#) for more information) that implement the type specific APIs required by the DDS specification, as described in the **User Data Type Support** (p. 71), where:

- **FooTypeSupport** (p. 1711) = HelloWorldTypeSupport
- **FooDataWriter** (p. 1676) = HelloWorldDataWriter
- **FooDataReader** (p. 1649) = HelloWorldDataReader

### 11.3.1.1 HelloWorldSupport.h

```

/*
WARNING: THIS FILE IS AUTO-GENERATED. DO NOT MODIFY.

This file was generated from HelloWorld.idl
using RTI Code Generator (rtiddsgen) version 4.3.0.
The rtiddsgen tool is part of the RTI Connex DDS distribution.
For more information, type 'rtiddsgen -help' at a command shell
or consult the Code Generator User's Manual.
*/
#ifndef HelloWorldSupport_1436885487_h
#define HelloWorldSupport_1436885487_h
/* Uses */
#include "HelloWorld.h"
#ifndef ndds_cpp_h
#include "ndds/ndds_cpp.h"
#endif
#if (defined(RTI_WIN32) || defined(RTI_WINCE) || defined(RTI_INTIME)) && defined(NDDS_USER_DLL_EXPORT)
class __declspec(dllexport) DDSTypeSupport;
class __declspec(dllexport) DDSDataWriter;
class __declspec(dllexport) DDSDataReader;
#endif
/* ===== */
#if (defined(RTI_WIN32) || defined(RTI_WINCE) || defined(RTI_INTIME)) && defined(NDDS_USER_DLL_EXPORT)
/* If the code is building on Windows, start exporting symbols.
*/
#undef NDDUSERDllExport
#define NDDUSERDllExport __declspec(dllexport)
#endif
DDS_TYPESUPPORT_CPP(
    HelloWorldTypeSupport,
    HelloWorld);
#define RTI_ENABLE_TDATAWRITER_DATA_CONSTRUCTOR_METHODS
DDS_DATAWRITER_WITH_DATA_CONSTRUCTOR_METHODS_CPP(HelloWorldDataWriter, HelloWorld);
#undef RTI_ENABLE_TDATAWRITER_DATA_CONSTRUCTOR_METHODS
#define RTI_ENABLE_TDATAREADER_DATA_CONSISTENCY_CHECK_METHOD
DDS_DATAREADER_W_DATA_CONSISTENCY_CHECK(HelloWorldDataReader, HelloWorldSeq, HelloWorld);
#undef RTI_ENABLE_TDATAREADER_DATA_CONSISTENCY_CHECK_METHOD
#if (defined(RTI_WIN32) || defined(RTI_WINCE) || defined(RTI_INTIME)) && defined(NDDS_USER_DLL_EXPORT)
/* If the code is building on Windows, stop exporting symbols.
*/
#undef NDDUSERDllExport
#define NDDUSERDllExport
#endif
#endif /* HelloWorldSupport_1436885487_h */

```

### 11.3.1.2 HelloWorldSupport.cxx

```

/*
WARNING: THIS FILE IS AUTO-GENERATED. DO NOT MODIFY.

This file was generated from HelloWorld.idl
using RTI Code Generator (rtiddsgen) version 4.3.0.
The rtiddsgen tool is part of the RTI Connex DDS distribution.
For more information, type 'rtiddsgen -help' at a command shell
or consult the Code Generator User's Manual.
*/
#include "HelloWorldSupport.h"
#include "HelloWorldPlugin.h"
#ifndef dds_c_log_impl_h
#include "dds_c/dds_c_log_impl.h"
#endif
/* ===== */
/* ----- */
/* DDSDataWriter
*/
/* Requires */
#define TYPENAME HelloWorldTYPENAME

```



```

/* Defines */
#define TDataWriter HelloWorldDataWriter
#define TData HelloWorld
#define RTI_ENABLE_TDATAWRITER_DATA_CONSTRUCTOR_METHODS
#include "dds_cpp/generic/dds_cpp_data_TDataWriter.gen"
#undef RTI_ENABLE_TDATAWRITER_DATA_CONSTRUCTOR_METHODS
#undef TDataWriter
#undef TData
#undef TYPENAME
/* ----- */
/* DDSDataReader
*/
/* Requires */
#define TYPENAME HelloWorldTYPENAME
/* Defines */
#define TDataReader HelloWorldDataReader
#define TDataSeq HelloWorldSeq
#define TData HelloWorld
#define RTI_ENABLE_TDATAREADER_DATA_CONSISTENCY_CHECK_METHOD
#include "dds_cpp/generic/dds_cpp_data_TDataReader.gen"
#undef RTI_ENABLE_TDATAREADER_DATA_CONSISTENCY_CHECK_METHOD
#undef TDataReader
#undef TDataSeq
#undef TData
#undef TYPENAME
/* ----- */
/* TypeSupport

«IMPLEMENTATION »

Requires: TYPENAME,
TPlugin_new
TPlugin_delete
Defines: TTypeSupport, TData, TDataReader, TDataWriter
*/
/* Requires */
#define TYPENAME HelloWorldTYPENAME
#define TPlugin_new HelloWorldPlugin_new
#define TPlugin_delete HelloWorldPlugin_delete
/* Defines */
#define TTypeSupport HelloWorldTypeSupport
#define TData HelloWorld
#define TDataReader HelloWorldDataReader
#define TDataWriter HelloWorldDataWriter
#define TGENERATE_SER_CODE
#ifndef NDDS_STANDALONE_TYPE
#define TGENERATE_TYPECODE
#endif
#include "dds_cpp/generic/dds_cpp_data_TTypeSupport.gen"
#undef TTypeSupport
#undef TData
#undef TDataReader
#undef TDataWriter
#ifndef NDDS_STANDALONE_TYPE
#undef TGENERATE_TYPECODE
#endif
#undef TGENERATE_SER_CODE
#undef TYPENAME
#undef TPlugin_new
#undef TPlugin_delete

```

## 11.4 HelloWorldPlugin.cxx

### 11.4.1 RTI Connex Implementation Support

Files generated by rtdidsgen (see the [Code Generator User's Manual](#) for more information) that provided methods for type specific serialization and deserialization, to support the RTI Connex implementation.

### 11.4.1.1 HelloWorldPlugin.h

```

/*
WARNING: THIS FILE IS AUTO-GENERATED. DO NOT MODIFY.

This file was generated from HelloWorld.idl
using RTI Code Generator (rtiddsgen) version 4.3.0.
The rtiddsgen tool is part of the RTI Connex DDS distribution.
For more information, type 'rtiddsgen -help' at a command shell
or consult the Code Generator User's Manual.
*/
#ifdef HelloWorldPlugin_1436885487_h
#define HelloWorldPlugin_1436885487_h
#include "HelloWorld.h"
struct RTICdrStream;
#ifdef pres_typePlugin_h
#include "pres/pres_typePlugin.h"
#endif
#if (defined(RTI_WIN32) || defined(RTI_WINCE) || defined(RTI_INTIME)) && defined(NDDS_USER_DLL_EXPORT)
/* If the code is building on Windows, start exporting symbols.
*/
#undef NDDUSERDllExport
#define NDDUSERDllExport __declspec(dllexport)
#endif
extern "C"{
#define HelloWorldPlugin_get_sample PRESTypePluginDefaultEndpointData_getSample
#define HelloWorldPlugin_get_buffer PRESTypePluginDefaultEndpointData_getBuffer
#define HelloWorldPlugin_return_buffer PRESTypePluginDefaultEndpointData_returnBuffer
#define HelloWorldPlugin_create_sample PRESTypePluginDefaultEndpointData_createSample
#define HelloWorldPlugin_destroy_sample PRESTypePluginDefaultEndpointData_deleteSample
/* -----
Support functions:
* ----- */
NDDUSERDllExport extern HelloWorld*
HelloWorldPluginSupport_create_data_w_params(
    const struct DDS_TypeAllocationParams_t * alloc_params);
NDDUSERDllExport extern HelloWorld*
HelloWorldPluginSupport_create_data_ex(RTIBool allocate_pointers);
NDDUSERDllExport extern HelloWorld*
HelloWorldPluginSupport_create_data(void);
NDDUSERDllExport extern RTIBool
HelloWorldPluginSupport_copy_data(
    HelloWorld *out,
    const HelloWorld *in);
NDDUSERDllExport extern void
HelloWorldPluginSupport_destroy_data_w_params(
    HelloWorld *sample,
    const struct DDS_TypeDeallocationParams_t * dealloc_params);
NDDUSERDllExport extern void
HelloWorldPluginSupport_destroy_data_ex(
    HelloWorld *sample,RTIBool deallocate_pointers);
NDDUSERDllExport extern void
HelloWorldPluginSupport_destroy_data(
    HelloWorld *sample);
NDDUSERDllExport extern void
HelloWorldPluginSupport_print_data(
    const HelloWorld *sample,
    const char *desc,
    unsigned int indent);
/* -----
Callback functions:
* ----- */
NDDUSERDllExport extern PRESTypePluginParticipantData
HelloWorldPlugin_on_participant_attached(
    void *registration_data,
    const struct PRESTypePluginParticipantInfo *participant_info,
    RTIBool top_level_registration,
    void *container_plugin_context,
    RTICdrTypeCode *typeCode);
NDDUSERDllExport extern void
HelloWorldPlugin_on_participant_detached(
    PRESTypePluginParticipantData participant_data);
NDDUSERDllExport extern PRESTypePluginEndpointData
HelloWorldPlugin_on_endpoint_attached(
    PRESTypePluginParticipantData participant_data,
    const struct PRESTypePluginEndpointInfo *endpoint_info,
    RTIBool top_level_registration,
    void *container_plugin_context);
NDDUSERDllExport extern void
HelloWorldPlugin_on_endpoint_detached(
    PRESTypePluginEndpointData endpoint_data);

```

```

NDDSUSERDllExport extern void
HelloWorldPlugin_return_sample(
    PRESTypePluginEndpointData endpoint_data,
    HelloWorld *sample,
    void *handle);
NDDSUSERDllExport extern RTIBool
HelloWorldPlugin_copy_sample(
    PRESTypePluginEndpointData endpoint_data,
    HelloWorld *out,
    const HelloWorld *in);
/* -----
(De)Serialize functions:
* ----- */
NDDSUSERDllExport extern RTIBool
HelloWorldPlugin_serialize_to_cdr_buffer(
    char * buffer,
    unsigned int * length,
    const HelloWorld *sample);
NDDSUSERDllExport extern RTIBool
HelloWorldPlugin_serialize_to_cdr_buffer_ex(
    char *buffer,
    unsigned int *length,
    const HelloWorld *sample,
    DDS_DataRepresentationId_t representation);
NDDSUSERDllExport extern RTIBool
HelloWorldPlugin_deserialize_from_cdr_buffer(
    HelloWorld *sample,
    const char * buffer,
    unsigned int length);
#if !defined(NDDS_STANDALONE_TYPE)
NDDSUSERDllExport extern DDS_ReturnCode_t
HelloWorldPlugin_data_to_string(
    const HelloWorld *sample,
    char *str,
    DDS_UnsignedLong *str_size,
    const struct DDS_PrintFormatProperty *property);
#endif
NDDSUSERDllExport extern unsigned int
HelloWorldPlugin_get_serialized_sample_max_size(
    PRESTypePluginEndpointData endpoint_data,
    RTIBool include_encapsulation,
    RTIEncapsulationId encapsulation_id,
    unsigned int current_alignment);
/* -----
Key Management functions:
* ----- */
NDDSUSERDllExport extern PRESTypePluginKeyKind
HelloWorldPlugin_get_key_kind(void);
NDDSUSERDllExport extern unsigned int
HelloWorldPlugin_get_serialized_key_max_size(
    PRESTypePluginEndpointData endpoint_data,
    RTIBool include_encapsulation,
    RTIEncapsulationId encapsulation_id,
    unsigned int current_alignment);
NDDSUSERDllExport extern unsigned int
HelloWorldPlugin_get_serialized_key_max_size_for_keyhash(
    PRESTypePluginEndpointData endpoint_data,
    RTIEncapsulationId encapsulation_id,
    unsigned int current_alignment);
NDDSUSERDllExport extern RTIBool
HelloWorldPlugin_deserialize_key(
    PRESTypePluginEndpointData endpoint_data,
    HelloWorld ** sample,
    RTIBool * drop_sample,
    struct RTICdrStream *cdrStream,
    RTIBool deserialize_encapsulation,
    RTIBool deserialize_key,
    void *endpoint_plugin_qos);
NDDSUSERDllExport extern
struct RTIXCdrInterpreterPrograms * HelloWorldPlugin_get_programs(void);
/* Plugin Functions */
NDDSUSERDllExport extern struct PRESTypePlugin*
HelloWorldPlugin_new(void);
NDDSUSERDllExport extern void
HelloWorldPlugin_delete(struct PRESTypePlugin *);
}
#if defined(RTI_WIN32) || defined(RTI_WINCE) || defined(RTI_INTIME) && defined(NDDS_USER_DLL_EXPORT)
/* If the code is building on Windows, stop exporting symbols.
*/
#undef NDDSUSERDllExport
#define NDDSUSERDllExport

```



```

        /* Coverity reports a possible uninitialized_use_in_call that will happen if the
        allocation fails. But if the allocation fails then sample == null and
        the method will return before reach this point.*/
        /* Coverity reports a possible overwrite_var on the members of the sample.
        It is a false positive since all the pointers are freed before assigning
        null to them. */
        /* coverity[uninit_use_in_call : FALSE] */
        /* coverity[overwrite_var : FALSE] */
        HelloWorld_finalize_w_params(sample, &deallocParams);
        /* Coverity reports a possible leaked_storage on the sample members when
        freeing sample. It is a false positive since all the members' memory
        is freed in the call "HelloWorld_finalize_ex" */
        /* coverity[leaked_storage : FALSE] */
        delete sample;
        sample=NULL;
    }
    return sample;
}
HelloWorld *
HelloWorldPluginSupport_create_data_ex(RTIBool allocate_pointers)
{
    HelloWorld *sample = NULL;
    sample = new (std::nothrow) HelloWorld();
    if(sample == NULL) {
        return NULL;
    }
    /* coverity[example_checked : FALSE] */
    if (!HelloWorld_initialize_ex(sample,allocate_pointers, RTI_TRUE)) {
        /* Coverity reports a possible uninitialized_use_in_call that will happen if the
        new fails. But if new fails then sample == null and the method will
        return before reach this point. */
        /* Coverity reports a possible overwrite_var on the members of the sample.
        It is a false positive since all the pointers are freed before assigning
        null to them. */
        /* coverity[uninit_use_in_call : FALSE] */
        /* coverity[overwrite_var : FALSE] */
        HelloWorld_finalize_ex(sample, RTI_TRUE);
        /* Coverity reports a possible leaked_storage on the sample members when
        freeing sample. It is a false positive since all the members' memory
        is freed in the call "HelloWorld_finalize_ex" */
        /* coverity[leaked_storage : FALSE] */
        delete sample;
        sample=NULL;
    }
    return sample;
}
HelloWorld *
HelloWorldPluginSupport_create_data(void)
{
    return HelloWorldPluginSupport_create_data_ex(RTI_TRUE);
}
void
HelloWorldPluginSupport_destroy_data_w_params(
    HelloWorld *sample,
    const struct DDS_TypeDeallocationParams_t * dealloc_params) {
    HelloWorld_finalize_w_params(sample,dealloc_params);
    delete sample;
}
void
HelloWorldPluginSupport_destroy_data_ex(
    HelloWorld *sample,RTIBool deallocate_pointers) {
    HelloWorld_finalize_ex(sample,deallocate_pointers);
    delete sample;
}
void
HelloWorldPluginSupport_destroy_data(
    HelloWorld *sample) {
    HelloWorldPluginSupport_destroy_data_ex(sample,RTI_TRUE);
}
RTIBool
HelloWorldPluginSupport_copy_data(
    HelloWorld *dst,
    const HelloWorld *src)
{
    return HelloWorld_copy(dst,(const HelloWorld*) src);
}
void
HelloWorldPluginSupport_print_data(
    const HelloWorld *sample,
    const char *desc,
    unsigned int indent_level)

```

```

{
    RTICdrType_printIndent(indent_level);
    if (desc != NULL) {
        RTILogParamString_printPlain("%s:\n", desc);
    } else {
        RTILogParamString_printPlain("\n");
    }
}
if (sample == NULL) {
    RTILogParamString_printPlain("NULL\n");
    return;
}
if (sample->msg==NULL) {
    RTICdrType_printString(
        NULL,"msg", indent_level + 1);
} else {
    RTICdrType_printString(
        sample->msg,"msg", indent_level + 1);
}
}
/* -----
Callback functions:
* ----- */
PRESTypePluginParticipantData
HelloWorldPlugin_on_participant_attached(
    void *registration_data,
    const struct PRESTypePluginParticipantInfo *participant_info,
    RTIBool top_level_registration,
    void *container_plugin_context,
    RTICdrTypeCode *type_code)
{
    struct RTIXCdrInterpreterPrograms *programs = NULL;
    struct RTIXCdrInterpreterProgramsGenProperty programProperty =
        RTIXCdrInterpreterProgramsGenProperty_INITIALIZER;
    struct PRESTypePluginDefaultParticipantData *pd = NULL;
    if (registration_data) {} /* To avoid warnings */
    if (participant_info) {} /* To avoid warnings */
    if (top_level_registration) {} /* To avoid warnings */
    if (container_plugin_context) {} /* To avoid warnings */
    if (type_code) {} /* To avoid warnings */
    pd = (struct PRESTypePluginDefaultParticipantData *)
        PRESTypePluginDefaultParticipantData_new(participant_info);
    programProperty.generateV1Encapsulation = RTI_XCDR_TRUE;
    programProperty.generateV2Encapsulation = RTI_XCDR_TRUE;
    programProperty.resolveAlias = RTI_XCDR_TRUE;
    programProperty.inlineStruct = RTI_XCDR_TRUE;
    programProperty.optimizeEnum = RTI_XCDR_TRUE;
    programProperty.unboundedSize = RTIXCdrLong_MAX;
    programs = DDS_TypeCodeFactory_assert_programs_in_global_list(
        DDS_TypeCodeFactory_get_instance(),
        HelloWorld_get_typecode(),
        &programProperty,
        RTI_XCDR_PROGRAM_MASK_TYPEPLUGIN);
    if (programs == NULL) {
        PRESTypePluginDefaultParticipantData_delete(
            (PRESTypePluginParticipantData) pd);
        return NULL;
    }
    pd->programs = programs;
    return (PRESTypePluginParticipantData)pd;
}
void
HelloWorldPlugin_on_participant_detached(
    PRESTypePluginParticipantData participant_data)
{
    if (participant_data != NULL) {
        struct PRESTypePluginDefaultParticipantData *pd =
            (struct PRESTypePluginDefaultParticipantData *)participant_data;
        if (pd->programs != NULL) {
            DDS_TypeCodeFactory_remove_programs_from_global_list(
                DDS_TypeCodeFactory_get_instance(),
                pd->programs);
            pd->programs = NULL;
        }
        PRESTypePluginDefaultParticipantData_delete(participant_data);
    }
}
PRESTypePluginEndpointData
HelloWorldPlugin_on_endpoint_attached(
    PRESTypePluginParticipantData participant_data,
    const struct PRESTypePluginEndpointInfo *endpoint_info,
    RTIBool top_level_registration,

```

```

void *containerPluginContext)
{
    PRESTypePluginEndpointData epd = NULL;
    unsigned int serializedSampleMaxSize = 0;
    if (top_level_registration) {} /* To avoid warnings */
    if (containerPluginContext) {} /* To avoid warnings */
    if (participant_data == NULL) {
        return NULL;
    }
    epd = PRESTypePluginDefaultEndpointData_new(
        participant_data,
        endpoint_info,
        (PRESTypePluginDefaultEndpointDataCreateSampleFunction)
        HelloWorldPluginSupport_create_data,
        (PRESTypePluginDefaultEndpointDataDestroySampleFunction)
        HelloWorldPluginSupport_destroy_data,
        NULL , NULL );
    if (epd == NULL) {
        return NULL;
    }
    if (endpoint_info->endpointKind == PRES_TYPEPLUGIN_ENDPOINT_WRITER) {
        serializedSampleMaxSize = HelloWorldPlugin_get_serialized_sample_max_size(
            epd, RTI_FALSE, RTI_CDR_ENCAPSULATION_ID_CDR_BE, 0);
        PRESTypePluginDefaultEndpointData_setMaxSizeSerializedSample(epd, serializedSampleMaxSize);
        if (PRESTypePluginDefaultEndpointData_createWriterPool(
            epd,
            endpoint_info,
            (PRESTypePluginGetSerializedSampleMaxSizeFunction)
            HelloWorldPlugin_get_serialized_sample_max_size, epd,
            (PRESTypePluginGetSerializedSampleSizeFunction)
            PRESTypePlugin_interpretedGetSerializedSampleSize,
            epd) == RTI_FALSE) {
            PRESTypePluginDefaultEndpointData_delete(epd);
            return NULL;
        }
    }
    return epd;
}
void
HelloWorldPlugin_on_endpoint_detached(
    PRESTypePluginEndpointData endpoint_data)
{
    PRESTypePluginDefaultEndpointData_delete(endpoint_data);
}
void
HelloWorldPlugin_return_sample(
    PRESTypePluginEndpointData endpoint_data,
    HelloWorld *sample,
    void *handle)
{
    HelloWorld_finalize_optional_members(sample, RTI_TRUE);
    PRESTypePluginDefaultEndpointData_returnSample(
        endpoint_data, sample, handle);
}
void HelloWorldPlugin_finalize_optional_members(
    PRESTypePluginEndpointData endpoint_data,
    HelloWorld* sample,
    RTIBool deletePointers)
{
    RTIosapiUtility_unusedParameter(endpoint_data);
    HelloWorld_finalize_optional_members(
        sample, deletePointers);
}
RTIBool
HelloWorldPlugin_copy_sample(
    PRESTypePluginEndpointData endpoint_data,
    HelloWorld *dst,
    const HelloWorld *src)
{
    if (endpoint_data) {} /* To avoid warnings */
    return HelloWorldPluginSupport_copy_data(dst, src);
}
/* -----
(De)Serialize functions:
* ----- */
unsigned int
HelloWorldPlugin_get_serialized_sample_max_size(
    PRESTypePluginEndpointData endpoint_data,
    RTIBool include_encapsulation,
    RTIEncapsulationId encapsulation_id,
    unsigned int current_alignment);

```

```

RTIBool
HelloWorldPlugin_serialize_to_cdr_buffer_ex(
    char *buffer,
    unsigned int *length,
    const HelloWorld *sample,
    DDS_DataRepresentationId_t representation)
{
    RTIEncapsulationId encapsulationId = RTI_CDR_ENCAPSULATION_ID_INVALID;
    struct RTICdrStream cdrStream;
    struct PRESTypePluginDefaultEndpointData epd;
    RTIBool result;
    struct PRESTypePluginDefaultParticipantData pd;
    struct RTIXCdrTypePluginProgramContext defaultProgramContext =
    RTIXCdrTypePluginProgramContext_INITIALIZER;
    struct PRESTypePlugin plugin;
    if (length == NULL) {
        return RTI_FALSE;
    }
    RTIOsapiMemory_zero(&epd, sizeof(struct PRESTypePluginDefaultEndpointData));
    epd.programContext = defaultProgramContext;
    epd._participantData = &pd;
    epd.typePlugin = &plugin;
    epd.programContext.endpointPluginData = &epd;
    plugin.typeCode = (struct RTICdrTypeCode *)
    HelloWorld_get_typecode();
    pd.programs = HelloWorldPlugin_get_programs();
    if (pd.programs == NULL) {
        return RTI_FALSE;
    }
    encapsulationId = DDS_TypeCode_get_native_encapsulation(
        (DDS_TypeCode *) plugin.typeCode,
        representation);
    if (encapsulationId == RTI_CDR_ENCAPSULATION_ID_INVALID) {
        return RTI_FALSE;
    }
    epd._maxSizeSerializedSample =
    HelloWorldPlugin_get_serialized_sample_max_size(
        (PRESTypePluginEndpointData)&epd,
        RTI_TRUE,
        encapsulationId,
        0);
    if (buffer == NULL) {
        *length =
        PRESTypePlugin_interpretedGetSerializedSampleSize(
            (PRESTypePluginEndpointData)&epd,
            RTI_TRUE,
            encapsulationId,
            0,
            sample);
        if (*length == 0) {
            return RTI_FALSE;
        }
    }
    return RTI_TRUE;
}
RTICdrStream_init(&cdrStream);
RTICdrStream_set(&cdrStream, (char *)buffer, *length);
result = PRESTypePlugin_interpretedSerialize(
    (PRESTypePluginEndpointData)&epd,
    sample,
    &cdrStream,
    RTI_TRUE,
    encapsulationId,
    RTI_TRUE,
    NULL);
*length = (unsigned int) RTICdrStream_getCurrentPositionOffset(&cdrStream);
return result;
}
RTIBool
HelloWorldPlugin_serialize_to_cdr_buffer(
    char *buffer,
    unsigned int *length,
    const HelloWorld *sample)
{
    return HelloWorldPlugin_serialize_to_cdr_buffer_ex(
        buffer,
        length,
        sample,
        DDS_AUTO_DATA_REPRESENTATION);
}
RTIBool
HelloWorldPlugin_deserialize_from_cdr_buffer(

```



```

HelloWorld *sample,
const char * buffer,
unsigned int length)
{
    struct RTICdrStream cdrStream;
    struct PRESTypePluginDefaultEndpointData epd;
    struct RTIXCdrTypePluginProgramContext defaultProgramContext =
RTIXCdrTypePluginProgramContext_INITIALIZER;
    struct PRESTypePluginDefaultParticipantData pd;
    struct PRESTypePlugin plugin;
    epd.programContext = defaultProgramContext;
    epd._participantData = &pd;
    epd.typePlugin = &plugin;
    epd.programContext.endpointPluginData = &epd;
    plugin.typeCode = (struct RTICdrTypeCode *)
HelloWorld_get_typecode();
    pd.programs = HelloWorldPlugin_get_programs();
    if (pd.programs == NULL) {
        return RTI_FALSE;
    }
    epd._assignabilityProperty.acceptUnknownEnumValue = RTI_XCDR_TRUE;
    epd._assignabilityProperty.acceptUnknownUnionDiscriminator =
RTI_XCDR_ACCEPT_UNKNOWN_DISCRIMINATOR_AND_SELECT_DEFAULT;
    RTICdrStream_init(&cdrStream);
    RTICdrStream_set(&cdrStream, (char *)buffer, length);
    HelloWorld_finalize_optional_members(sample, RTI_TRUE);
    return PRESTypePlugin_interpretedDeserialize(
        (PRESTypePluginEndpointData)&epd, sample,
        &cdrStream, RTI_TRUE, RTI_TRUE,
        NULL);
}

#if !defined(NDDS_STANDALONE_TYPE)
DDS_ReturnCode_t
HelloWorldPlugin_data_to_string(
    const HelloWorld *sample,
    char *_str,
    DDS_UnsignedLong *str_size,
    const struct DDS_PrintFormatProperty *property)
{
    DDS_DynamicData *data = NULL;
    char *buffer = NULL;
    unsigned int length = 0;
    struct DDS_PrintFormat printFormat;
    DDS_ReturnCode_t retCode = DDS_RETCODE_ERROR;
    if (sample == NULL) {
        return DDS_RETCODE_BAD_PARAMETER;
    }
    if (str_size == NULL) {
        return DDS_RETCODE_BAD_PARAMETER;
    }
    if (property == NULL) {
        return DDS_RETCODE_BAD_PARAMETER;
    }
    if (!HelloWorldPlugin_serialize_to_cdr_buffer(
        NULL,
        &length,
        sample)) {
        return DDS_RETCODE_ERROR;
    }
    RTIOsapiHeap_allocateBuffer(&buffer, length, RTI_OSAPI_ALIGNMENT_DEFAULT);
    if (buffer == NULL) {
        return DDS_RETCODE_ERROR;
    }
    if (!HelloWorldPlugin_serialize_to_cdr_buffer(
        buffer,
        &length,
        sample)) {
        RTIOsapiHeap_freeBuffer(buffer);
        return DDS_RETCODE_ERROR;
    }
    data = DDS_DynamicData_new(
        HelloWorld_get_typecode(),
        &DDS_DYNAMIC_DATA_PROPERTY_DEFAULT);
    if (data == NULL) {
        RTIOsapiHeap_freeBuffer(buffer);
        return DDS_RETCODE_ERROR;
    }
    retCode = DDS_DynamicData_from_cdr_buffer(data, buffer, length);
    if (retCode != DDS_RETCODE_OK) {
        RTIOsapiHeap_freeBuffer(buffer);
        DDS_DynamicData_delete(data);
    }
}

```

```

        return retCode;
    }
    retCode = DDS_PrintFormatProperty_to_print_format(
        property,
        &printFormat);
    if (retCode != DDS_RETCODE_OK) {
        RTIOsapiHeap_freeBuffer(buffer);
        DDS_DynamicData_delete(data);
        return retCode;
    }
    retCode = DDS_DynamicDataFormatter_to_string_w_format(
        data,
        _str,
        str_size,
        &printFormat);
    if (retCode != DDS_RETCODE_OK) {
        RTIOsapiHeap_freeBuffer(buffer);
        DDS_DynamicData_delete(data);
        return retCode;
    }
    RTIOsapiHeap_freeBuffer(buffer);
    DDS_DynamicData_delete(data);
    return DDS_RETCODE_OK;
}
#endif
unsigned int
HelloWorldPlugin_get_serialized_sample_max_size(
    PRESTypePluginEndpointData endpoint_data,
    RTIBool include_encapsulation,
    RTIEncapsulationId encapsulation_id,
    unsigned int current_alignment)
{
    unsigned int size;
    RTIBool overflow = RTI_FALSE;
    size = PRESTypePlugin_interpretedGetSerializedSampleMaxSize(
        endpoint_data, &overflow, include_encapsulation, encapsulation_id, current_alignment);
    if (overflow) {
        size = RTI_CDR_MAX_SERIALIZED_SIZE;
    }
    return size;
}
/* -----
Key Management functions:
* ----- */
PRESTypePluginKeyKind
HelloWorldPlugin_get_key_kind(void)
{
    return PRES_TYPEPLUGIN_NO_KEY;
}
RTIBool HelloWorldPlugin_deserialize_key(
    PRESTypePluginEndpointData endpoint_data,
    HelloWorld **sample,
    RTIBool * drop_sample,
    struct RTICdrStream *cdrStream,
    RTIBool deserialize_encapsulation,
    RTIBool deserialize_key,
    void *endpoint_plugin_qos)
{
    RTIBool result;
    if (drop_sample) {} /* To avoid warnings */
    /* Depending on the type and the flags used in rtdidsgen, coverity may detect
that sample is always null. Since the case is very dependant on
the IDL/XML and the configuration we keep the check for safety.
*/
    result= PRESTypePlugin_interpretedDeserializeKey(
        endpoint_data,
        /* coverity[check_after_deref] */
        (sample != NULL) ? *sample : NULL,
        cdrStream,
        deserialize_encapsulation,
        deserialize_key,
        endpoint_plugin_qos);
    return result;
}
unsigned int
HelloWorldPlugin_get_serialized_key_max_size(
    PRESTypePluginEndpointData endpoint_data,
    RTIBool include_encapsulation,
    RTIEncapsulationId encapsulation_id,
    unsigned int current_alignment)
{

```

```

    unsigned int size;
    RTIBool overflow = RTI_FALSE;
    size = PRESTypePlugin_interpretedGetSerializedKeyMaxSize(
        endpoint_data, &overflow, include_encapsulation, encapsulation_id, current_alignment);
    if (overflow) {
        size = RTI_CDR_MAX_SERIALIZED_SIZE;
    }
    return size;
}
unsigned int
HelloWorldPlugin_get_serialized_key_max_size_for_keyhash(
    PRESTypePluginEndpointData endpoint_data,
    RTIEncapsulationId encapsulation_id,
    unsigned int current_alignment)
{
    unsigned int size;
    RTIBool overflow = RTI_FALSE;
    size = PRESTypePlugin_interpretedGetSerializedKeyMaxSizeForKeyhash(
        endpoint_data,
        &overflow,
        encapsulation_id,
        current_alignment);
    if (overflow) {
        size = RTI_CDR_MAX_SERIALIZED_SIZE;
    }
    return size;
}
struct RTIXcdrInterpreterPrograms * HelloWorldPlugin_get_programs(void)
{
    return ::rti::xcdr::get_cdr_serialization_programs<
        HelloWorld,
        true, true, true>();
}
/* -----
 * Plug-in Installation Methods
 * ----- */
struct PRESTypePlugin *HelloWorldPlugin_new(void)
{
    struct PRESTypePlugin *plugin = NULL;
    const struct PRESTypePluginVersion PLUGIN_VERSION =
        PRES_TYPE_PLUGIN_VERSION_2_0;
    RTIOsapiHeap_allocateStructure(
        &plugin, struct PRESTypePlugin);
    if (plugin == NULL) {
        return NULL;
    }
    plugin->version = PLUGIN_VERSION;
    /* set up parent's function pointers */
    plugin->onParticipantAttached =
        (PRESTypePluginOnParticipantAttachedCallback)
        HelloWorldPlugin_on_participant_attached;
    plugin->onParticipantDetached =
        (PRESTypePluginOnParticipantDetachedCallback)
        HelloWorldPlugin_on_participant_detached;
    plugin->onEndpointAttached =
        (PRESTypePluginOnEndpointAttachedCallback)
        HelloWorldPlugin_on_endpoint_attached;
    plugin->onEndpointDetached =
        (PRESTypePluginOnEndpointDetachedCallback)
        HelloWorldPlugin_on_endpoint_detached;
    plugin->copySampleFnc =
        (PRESTypePluginCopySampleFunction)
        HelloWorldPlugin_copy_sample;
    plugin->createSampleFnc =
        (PRESTypePluginCreateSampleFunction)
        HelloWorldPlugin_create_sample;
    plugin->destroySampleFnc =
        (PRESTypePluginDestroySampleFunction)
        HelloWorldPlugin_destroy_sample;
    plugin->finalizeOptionalMembersFnc =
        (PRESTypePluginFinalizeOptionalMembersFunction)
        HelloWorldPlugin_finalize_optional_members;
    plugin->serializeFnc =
        (PRESTypePluginSerializeFunction) PRESTypePlugin_interpretedSerialize;
    plugin->deserializeFnc =
        (PRESTypePluginDeserializeFunction) PRESTypePlugin_interpretedDeserializeWithAlloc;
    plugin->getSerializedSampleMaxSizeFnc =
        (PRESTypePluginGetSerializedSampleMaxSizeFunction)
        HelloWorldPlugin_get_serialized_sample_max_size;
    plugin->getSerializedSampleMinSizeFnc =
        (PRESTypePluginGetSerializedSampleMinSizeFunction)

```

```

PRESTypePlugin_interpretedGetSerializedSampleMinSize;
plugin->getDeserializedSampleMaxSizeFnc = NULL;
plugin->getSampleFnc =
(PRESTypePluginGetSampleFunction)
HelloWorldPlugin_get_sample;
plugin->returnSampleFnc =
(PRESTypePluginReturnSampleFunction)
HelloWorldPlugin_return_sample;
plugin->getKeyKindFnc =
(PRESTypePluginGetKeyKindFunction)
HelloWorldPlugin_get_key_kind;
/* These functions are only used for keyed types. As this is not a keyed
type they are all set to NULL
*/
plugin->serializeKeyFnc = NULL ;
plugin->deserializeKeyFnc = NULL;
plugin->getKeyFnc = NULL;
plugin->returnKeyFnc = NULL;
plugin->instanceToKeyFnc = NULL;
plugin->keyToInstanceFnc = NULL;
plugin->getSerializedKeyMaxSizeFnc = NULL;
plugin->instanceToKeyHashFnc = NULL;
plugin->serializedSampleToKeyHashFnc = NULL;
plugin->serializedKeyToKeyHashFnc = NULL;
#ifdef NDDS_STANDALONE_TYPE
plugin->typeCode = NULL;
#else
plugin->typeCode = (struct RTICdrTypeCode *)HelloWorld_get_typecode();
#endif
plugin->languageKind = PRES_TYPEPLUGIN_CPP_LANG;
/* Serialized buffer */
plugin->getBuffer =
(PRESTypePluginGetBufferFunction)
HelloWorldPlugin_get_buffer;
plugin->returnBuffer =
(PRESTypePluginReturnBufferFunction)
HelloWorldPlugin_return_buffer;
plugin->getBufferWithParams = NULL;
plugin->returnBufferWithParams = NULL;
plugin->getSerializedSampleSizeFnc =
(PRESTypePluginGetSerializedSampleSizeFunction)
PRESTypePlugin_interpretedGetSerializedSampleSize;
plugin->getWriterLoanedSampleFnc = NULL;
plugin->returnWriterLoanedSampleFnc = NULL;
plugin->returnWriterLoanedSampleFromCookieFnc = NULL;
plugin->validateWriterLoanedSampleFnc = NULL;
plugin->setWriterLoanedSampleSerializedStateFnc = NULL;
plugin->endpointTypeName = HelloWorldTYPENAME;
plugin->isMetpType = RTI_FALSE;
return plugin;
}
void
HelloWorldPlugin_delete(struct PRESTypePlugin *plugin)
{
    RTIOSapiHeap_freeStructure(plugin);
}
#undef RTI_CDR_CURRENT_SUBMODULE

```

## 11.5 HelloWorld\_publisher.cxx

### 11.5.1 RTI Connexx Publication Example

The publication example generated by rtidsgen (see the [Code Generator User's Manual](#) for more information). The example has been modified slightly to update the sample value.

#### 11.5.1.1 HelloWorld\_publisher.cxx

```

/*
 * (c) Copyright, Real-Time Innovations, 2020. All rights reserved.
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```

```

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* type, including any warranty for fitness for any purpose. RTI is under no
* obligation to maintain or support the software. RTI shall not be liable for
* any incidental or consequential damages arising out of the use or inability
* to use the software.
*/
#include <iostream>
#include <stdio.h>
#include <stdlib.h>
#include "HelloWorld.h"
#include "HelloWorldSupport.h"
#include "ndds/ndds_cpp.h"
#include "application.h"
using namespace application;
static int shutdown_participant(
    DDSDomainParticipant *participant,
    const char *shutdown_message,
    int status);
int run_publisher_application(unsigned int domain_id, unsigned int sample_count)
{
    // Start communicating in a domain, usually one participant per application
    DDSDomainParticipant *participant =
    DDSTheParticipantFactory->create_participant(
        domain_id,
        DDS_PARTICIPANT_QOS_DEFAULT,
        NULL /* listener */,
        DDS_STATUS_MASK_NONE);
    if (participant == NULL) {
        return shutdown_participant(participant, "create_participant error", EXIT_FAILURE);
    }
    // A Publisher allows an application to create one or more DataWriters
    DDSPublisher *publisher = participant->create_publisher(
        DDS_PUBLISHER_QOS_DEFAULT,
        NULL /* listener */,
        DDS_STATUS_MASK_NONE);
    if (publisher == NULL) {
        return shutdown_participant(participant, "create_publisher error", EXIT_FAILURE);
    }
    // Register the datatype to use when creating the Topic
    const char *type_name = HelloWorldTypeSupport::get_type_name();
    DDS_ReturnCode_t retcode =
    HelloWorldTypeSupport::register_type(participant, type_name);
    if (retcode != DDS_RETCODE_OK) {
        return shutdown_participant(participant, "register_type error", EXIT_FAILURE);
    }
    // Create a Topic with a name and a datatype
    DDSTopic *topic = participant->create_topic(
        "Example HelloWorld",
        type_name,
        DDS_TOPIC_QOS_DEFAULT,
        NULL /* listener */,
        DDS_STATUS_MASK_NONE);
    if (topic == NULL) {
        return shutdown_participant(participant, "create_topic error", EXIT_FAILURE);
    }
    // This DataWriter writes data on "Example HelloWorld" Topic
    DDSDataWriter *untyped_writer = publisher->create_datawriter(
        topic,
        DDS_DATAWRITER_QOS_DEFAULT,
        NULL /* listener */,
        DDS_STATUS_MASK_NONE);
    if (untyped_writer == NULL) {
        return shutdown_participant(participant, "create_datawriter error", EXIT_FAILURE);
    }
    // Narrow casts from an untyped DataWriter to a writer of your type
    HelloWorldDataWriter *typed_writer =
    HelloWorldDataWriter::narrow(untyped_writer);
    if (typed_writer == NULL) {
        return shutdown_participant(participant, "DataWriter narrow error", EXIT_FAILURE);
    }
    // Create data for writing, allocating all members
    HelloWorld *data = HelloWorldTypeSupport::create_data();
    if (data == NULL) {
        return shutdown_participant(
            participant,
            "HelloWorldTypeSupport::create_data error",
            EXIT_FAILURE);
    }
    // Main loop, write data

```

```

for (unsigned int samples_written = 0;
!shutdown_requested && samples_written < sample_count;
++samples_written) {
    // Modify the data to be written here
    std::cout << "Writing HelloWorld, count " << samples_written
    << std::endl;
    retcode = typed_writer->write(*data, DDS_HANDLE_NIL);
    if (retcode != DDS_RETCODE_OK) {
        std::cerr << "write error " << retcode << std::endl;
    }
    // Send once every second
    DDS_Duration_t send_period = { 1, 0 };
    NDDSUtility::sleep(send_period);
}
// Delete previously allocated HelloWorld, including all contained elements
retcode = HelloWorldTypeSupport::delete_data(data);
if (retcode != DDS_RETCODE_OK) {
    std::cerr << "HelloWorldTypeSupport::delete_data error " << retcode
    << std::endl;
}
// Delete all entities (DataWriter, Topic, Publisher, DomainParticipant)
return shutdown_participant(participant, "Shutting down", EXIT_SUCCESS);
}
// Delete all entities
static int shutdown_participant(
    DDSDomainParticipant *participant,
    const char *shutdown_message,
    int status)
{
    DDS_ReturnCode_t retcode;
    std::cout << shutdown_message << std::endl;
    if (participant != NULL) {
        // Cleanup everything created by this Participant
        retcode = participant->delete_contained_entities();
        if (retcode != DDS_RETCODE_OK) {
            std::cerr << "delete_contained_entities error " << retcode
            << std::endl;
            status = EXIT_FAILURE;
        }
        retcode = DDSTheParticipantFactory->delete_participant(participant);
        if (retcode != DDS_RETCODE_OK) {
            std::cerr << "delete_participant error " << retcode << std::endl;
            status = EXIT_FAILURE;
        }
    }
    return status;
}
int main(int argc, char *argv[])
{
    // Parse arguments and handle control-C
    ApplicationArguments arguments;
    parse_arguments(arguments, argc, argv);
    if (arguments.parse_result == PARSE_RETURN_EXIT) {
        return EXIT_SUCCESS;
    } else if (arguments.parse_result == PARSE_RETURN_FAILURE) {
        return EXIT_FAILURE;
    }
    setup_signal_handlers();
    // Sets Connexr verbosity to help debugging
    NDDSSConfigLogger::get_instance()->set_verbosity(arguments.verbosity);
    int status = run_publisher_application(arguments.domain_id, arguments.sample_count);
    // Releases the memory used by the participant factory. Optional at
    // application exit
    DDS_ReturnCode_t retcode = DDSDomainParticipantFactory::finalize_instance();
    if (retcode != DDS_RETCODE_OK) {
        std::cerr << "finalize_instance error " << retcode << std::endl;
        status = EXIT_FAILURE;
    }
    return status;
}

```

## 11.6 HelloWorld\_subscriber.cxx

### 11.6.1 RTI Connex Subscription Example

The unmodified subscription example generated by rtidsgen (see the Code Generator User's Manual for more information).

#### 11.6.1.1 HelloWorld\_subscriber.cxx

```

/*
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 * any incidental or consequential damages arising out of the use or inability
 * to use the software.
 */
#include <iostream>
#include <stdio.h>
#include <stdlib.h>
#include "HelloWorld.h"
#include "HelloWorldSupport.h"
#include "ndds/ndds_cpp.h"
#include "application.h"
using namespace application;
static int shutdown_participant(
    DDSDomainParticipant *participant,
    const char *shutdown_message,
    int status);
// Process data. Returns number of samples processed.
unsigned int process_data(HelloWorldDataReader *typed_reader)
{
    HelloWorldSeq data_seq; // Sequence of received data
    DDS_SampleInfoSeq info_seq; // Metadata associated with samples in data_seq
    unsigned int samples_read = 0;
    // Take available data from DataReader's queue
    typed_reader->take(
        data_seq,
        info_seq,
        DDS_LENGTH_UNLIMITED,
        DDS_ANY_SAMPLE_STATE,
        DDS_ANY_VIEW_STATE,
        DDS_ANY_INSTANCE_STATE);
    // Iterate over all available data
    for (int i = 0; i < data_seq.length(); ++i) {
        // Check if a sample is an instance lifecycle event
        if (info_seq[i].valid_data) {
            // Print data
            std::cout << "Received data" << std::endl;
            HelloWorldTypeSupport::print_data(&data_seq[i]);
            samples_read++;
        } else { // This is an instance lifecycle event with no data payload.
            std::cout << "Received instance state notification" << std::endl;
        }
    }
    // Data loaned from Connex for performance. Return loan when done.
    DDS_ReturnCode_t retcode = typed_reader->return_loan(data_seq, info_seq);
    if (retcode != DDS_RETCODE_OK) {
        std::cerr << "return loan error " << retcode << std::endl;
    }
    return samples_read;
}
int run_subscriber_application(unsigned int domain_id, unsigned int sample_count)
{
    // Start communicating in a domain, usually one participant per application
    DDSDomainParticipant *participant =
        DDSTheParticipantFactory->create_participant(
            domain_id,
            DDS_PARTICIPANT_QOS_DEFAULT,
            NULL /* listener */,

```

```

    DDS_STATUS_MASK_NONE);
if (participant == NULL) {
    return shutdown_participant(participant, "create_participant error", EXIT_FAILURE);
}
// A Subscriber allows an application to create one or more DataReaders
DDSSubscriber *subscriber = participant->create_subscriber(
    DDS_SUBSCRIBER_QOS_DEFAULT,
    NULL /* listener */,
    DDS_STATUS_MASK_NONE);
if (subscriber == NULL) {
    return shutdown_participant(participant, "create_subscriber error", EXIT_FAILURE);
}
// Register the datatype to use when creating the Topic
const char *type_name = HelloWorldTypeSupport::get_type_name();
DDS_ReturnCode_t retcode =
HelloWorldTypeSupport::register_type(participant, type_name);
if (retcode != DDS_RETCODE_OK) {
    return shutdown_participant(participant, "register_type error", EXIT_FAILURE);
}
// Create a Topic with a name and a datatype
DDSTopic *topic = participant->create_topic(
    "Example HelloWorld",
    type_name,
    DDS_TOPIC_QOS_DEFAULT,
    NULL /* listener */,
    DDS_STATUS_MASK_NONE);
if (topic == NULL) {
    return shutdown_participant(participant, "create_topic error", EXIT_FAILURE);
}
// This DataReader reads data on "Example HelloWorld" Topic
DDSDataReader *untyped_reader = subscriber->create_datareader(
    topic,
    DDS_DATAREADER_QOS_DEFAULT,
    NULL,
    DDS_STATUS_MASK_NONE);
if (untyped_reader == NULL) {
    return shutdown_participant(participant, "create_datareader error", EXIT_FAILURE);
}
// Narrow casts from a untyped DataReader to a reader of your type
HelloWorldDataReader *typed_reader =
HelloWorldDataReader::narrow(untyped_reader);
if (typed_reader == NULL) {
    return shutdown_participant(participant, "DataReader narrow error", EXIT_FAILURE);
}
// Create ReadCondition that triggers when unread data in reader's queue
DDSReadCondition *read_condition = typed_reader->create_readcondition(
    DDS_NOT_READ_SAMPLE_STATE,
    DDS_ANY_VIEW_STATE,
    DDS_ANY_INSTANCE_STATE);
if (read_condition == NULL) {
    return shutdown_participant(participant, "create_readcondition error", EXIT_FAILURE);
}
// WaitSet will be woken when the attached condition is triggered
DDSWaitSet waitset;
retcode = waitset.attach_condition(read_condition);
if (retcode != DDS_RETCODE_OK) {
    return shutdown_participant(participant, "attach_condition error", EXIT_FAILURE);
}
// Main loop. Wait for data to arrive, and process when it arrives
unsigned int samples_read = 0;
while (!shutdown_requested && samples_read < sample_count) {
    DDSConditionSeq active_conditions_seq;
    // Wait for data and report if it does not arrive in 1 second
    DDS_Duration_t wait_timeout = { 1, 0 };
    retcode = waitset.wait(active_conditions_seq, wait_timeout);
    if (retcode == DDS_RETCODE_OK) {
        // If the read condition is triggered, process data
        samples_read += process_data(typed_reader);
    } else {
        if (retcode == DDS_RETCODE_TIMEOUT) {
            std::cout << "No data after 1 second" << std::endl;
        }
    }
}
// Cleanup
return shutdown_participant(participant, "Shutting down", 0);
}
// Delete all entities
static int shutdown_participant(
    DDSDomainParticipant *participant,
    const char *shutdown_message,

```



```
int status)
{
    DDS_ReturnCode_t retcode;
    std::cout << shutdown_message << std::endl;
    if (participant != NULL) {
        // Cleanup everything created by this Participant
        retcode = participant->delete_contained_entities();
        if (retcode != DDS_RETCODE_OK) {
            std::cerr << "delete_contained_entities error" << retcode
                << std::endl;
            status = EXIT_FAILURE;
        }
        retcode = DDSTheParticipantFactory->delete_participant(participant);
        if (retcode != DDS_RETCODE_OK) {
            std::cerr << "delete_participant error" << retcode << std::endl;
            status = EXIT_FAILURE;
        }
    }
    return status;
}

int main(int argc, char *argv[])
{
    // Parse arguments and handle control-C
    ApplicationArguments arguments;
    parse_arguments(arguments, argc, argv);
    if (arguments.parse_result == PARSE_RETURN_EXIT) {
        return EXIT_SUCCESS;
    } else if (arguments.parse_result == PARSE_RETURN_FAILURE) {
        return EXIT_FAILURE;
    }
    setup_signal_handlers();
    // Sets Connexrt verbosity to help debugging
    NDDSSConfigLogger::get_instance()->set_verbosity(arguments.verbosity);
    int status = run_subscriber_application(arguments.domain_id, arguments.sample_count);
    // Releases the memory used by the participant factory. Optional at
    // application exit
    DDS_ReturnCode_t retcode = DDSDomainParticipantFactory::finalize_instance();
    if (retcode != DDS_RETCODE_OK) {
        std::cerr << "finalize_instance error" << retcode << std::endl;
        status = EXIT_FAILURE;
    }
    return status;
}
```



# Index

- \_d
    - MyFlatUnionOffset, 1768
  - ~AbstractBuilder
    - rti::flat::AbstractBuilder, 579
  - ~DDSAsyncWaitSet
    - DDSAsyncWaitSet, 1264
  - ~DDSDataReaderStatusConditionHandler
    - DDSDataReaderStatusConditionHandler, 1319
  - ~DDSDynamicDataTypeSupport
    - DDSDynamicDataTypeSupport, 1458
  - ~DDSGuardCondition
    - DDSGuardCondition, 1472
  - ~DDSWaitSet
    - DDSWaitSet, 1632
  - ~DDS\_DynamicData
    - DDS\_DynamicData, 791
  - ~DDS\_KeyedOctets
    - DDS\_KeyedOctets, 926
  - ~DDS\_KeyedString
    - DDS\_KeyedString, 928
  - ~DDS\_Octets
    - DDS\_Octets, 968
  - ~FooSeq
    - FooSeq, 1698
  - ~LoanedSamples
    - connext::LoanedSamples< T >, 1731
  - ~Replier
    - connext::Replier< TReq, TRep >, 1873
  - ~Requester
    - connext::Requester< TReq, TRep >, 1891
  - ~SimpleReplier
    - connext::SimpleReplier< TReq, TRep >, 1937
- absolute\_generation\_rank
  - DDS\_SampleInfo, 1088
- accept\_unknown\_peers
  - DDS\_DiscoveryQosPolicy, 734
- access
  - DDS\_ValueMember, 1240
- access\_scope
  - DDS\_PresentationQosPolicy, 1000
- acknowledge\_all
  - DDSDataReader, 1297, 1298
- acknowledge\_sample
  - DDSDataReader, 1296, 1297
- acknowledgment\_kind
  - DDS\_ReliabilityQosPolicy, 1043
- active\_count
  - DDS\_ReliableReaderActivityChangedStatus, 1045
- active\_count\_change
  - DDS\_ReliableReaderActivityChangedStatus, 1045
- Activity Context, 530
  - NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_DOMAIN\_ID, 534
  - NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_ENTITY\_KIND, 534
  - NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_ENTITY\_NAME, 534
  - NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_GUID\_PREFIX, 533
  - NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_ALL, 532
  - NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_DEFAULT, 531
  - NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_NONE, 532
  - NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_TOPIC, 533
  - NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_TYPE, 533
  - NDDS\_Config\_ActivityContextAttributeKind, 532
  - NDDS\_Config\_ActivityContextAttributeKindMask, 532
  - set\_attribute\_mask, 534
- add\_member
  - DDS\_TypeCode, 1199
- add\_member\_ex
  - DDS\_TypeCode, 1201
- add\_member\_to\_enum
  - DDS\_TypeCode, 1197
- add\_member\_to\_union
  - DDS\_TypeCode, 1198
- add\_my\_final
  - MyFlatMutableBuilder, 1755
  - MyFlatUnionBuilder, 1766
- add\_my\_final\_array
  - MyFlatMutableBuilder, 1755
- add\_my\_optional\_primitive
  - MyFlatMutableBuilder, 1754
- add\_my\_primitive
  - MyFlatMutableBuilder, 1754

- MyFlatUnionBuilder, 1766
- add\_my\_primitive\_array
  - MyFlatMutableBuilder, 1754
- add\_n
  - rti::flat::FinalSequenceBuilder< ElementOffset >, 1647
  - rti::flat::PrimitiveSequenceBuilder< T >, 1865, 1866
- add\_next
  - rti::flat::FinalSequenceBuilder< ElementOffset >, 1646
  - rti::flat::PrimitiveSequenceBuilder< T >, 1865
- add\_peer
  - DDSDomainParticipant, 1409
- add\_pointer\_property
  - PROPERTY, 426
- add\_property
  - PROPERTY, 424
- add\_receive\_route
  - NDDSTransportSupport, 1836
- add\_send\_route
  - NDDSTransportSupport, 1836
- add\_tag
  - DATA\_TAG, 379
- Additional RTI Connexxt Communication Patterns, 242
- address
  - DDS\_Locator\_t, 940
  - NDDDS\_Transport\_Interface\_t, 1775
- address\_bit\_count
  - NDDDS\_Transport\_Property\_t, 1778
- addresses
  - DDS\_TransportMulticastMapping\_t, 1147
- advance
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1931
- AggregationBuilders.hpp, 1957
- alert
  - NDDSConfigLogger, 1828
- alive\_count
  - DDS\_LivelinessChangedStatus, 933
- alive\_count\_change
  - DDS\_LivelinessChangedStatus, 934
- alive\_instance\_count
  - DDS\_DataReaderCacheStatus, 627
  - DDS\_DataWriterCacheStatus, 672
- alive\_instance\_count\_peak
  - DDS\_DataReaderCacheStatus, 628
  - DDS\_DataWriterCacheStatus, 672
- alive\_instance\_removal
  - DDS\_DataReaderResourceLimitsInstanceReplacementSettings, 653
- allocate\_optional\_members
  - DDS\_TypeAllocationParams\_t, 1164
- allocate\_pointers
  - DDS\_TypeAllocationParams\_t, 1164
- allow\_interfaces\_list
  - NDDDS\_Transport\_Property\_t, 1779
- allow\_interfaces\_list\_length
  - NDDDS\_Transport\_Property\_t, 1780
- allow\_multicast\_interfaces\_list
  - NDDDS\_Transport\_Property\_t, 1781
- allow\_multicast\_interfaces\_list\_length
  - NDDDS\_Transport\_Property\_t, 1782
- app\_ack\_period
  - DDS\_RtpsReliableReaderProtocol\_t, 1060
- append\_to\_expression\_parameter
  - DDSContentFilteredTopic, 1286
- application\_name
  - DDS\_MonitoringQosPolicy, 962
- array\_dimension
  - DDS\_TypeCode, 1186
- array\_dimension\_count
  - DDS\_TypeCode, 1185
- as\_readconditionparams
  - DDS\_QueryConditionParams, 1034
- assert\_liveliness
  - DDSDataWriter, 1329
  - DDSDomainParticipant, 1399
- assert\_pointer\_property
  - PROPERTY, 425
- assert\_property
  - PROPERTY, 424
- assert\_tag
  - DATA\_TAG, 378
- assertions\_per\_lease\_duration
  - DDS\_LivelinessQosPolicy, 938
- asynchronous\_batch\_thread
  - DDS\_AsynchronousPublisherQosPolicy, 592
- ASYNCHRONOUS\_PUBLISHER, 363
  - DDS\_ASYNCHRONOUSPUBLISHER\_QOS\_POLICY\_NAME, 363
- asynchronous\_publisher
  - DDS\_DiscoveryConfigQosPolicy, 723
  - DDS\_PublisherQos, 1025
- AsyncWaitSet, 292
  - COMPLETION\_TOKEN\_IGNORE, 293
  - COMPLETION\_TOKEN\_USE\_IMPLICIT\_AND\_WAIT, 293
  - DDS\_ASYNC\_WAITSET\_PROPERTY\_DEFAULT, 293
- attach\_condition
  - DDSAsyncWaitSet, 1267
  - DDSWaitSet, 1635
- attach\_condition\_with\_completion\_token
  - DDSAsyncWaitSet, 1269
- autodispose\_unregistered\_instances
  - DDS\_WriterDataLifecycleQosPolicy, 1257
- autoenable\_created\_entities
  - DDS\_EntityFactoryQosPolicy, 905
- autopurge\_disposed\_instances\_delay

- DDS\_ReaderDataLifecycleQosPolicy, 1037
- DDS\_WriterDataLifecycleQosPolicy, 1258
- autopurge\_disposed\_samples\_delay
  - DDS\_ReaderDataLifecycleQosPolicy, 1037
- autopurge\_nowriter\_instances\_delay
  - DDS\_ReaderDataLifecycleQosPolicy, 1038
- autopurge\_nowriter\_samples\_delay
  - DDS\_ReaderDataLifecycleQosPolicy, 1037
- autopurge\_remote\_not\_alive\_writer\_delay
  - DDS\_DataReaderResourceLimitsQosPolicy, 667
- autopurge\_unregistered\_instances\_delay
  - DDS\_WriterDataLifecycleQosPolicy, 1257
- autoregister\_instances
  - DDS\_DataWriterResourceLimitsQosPolicy, 702
- AVAILABILITY, 364
  - DDS\_AVAILABILITY\_QOS\_POLICY\_NAME, 364
- availability
  - DDS\_DataReaderQos, 652
  - DDS\_DataWriterQos, 697
- banish\_ignored\_participants
  - DDSDomainParticipant, 1394
- BATCH, 364
  - DDS\_BATCH\_QOS\_POLICY\_NAME, 365
- batch
  - DDS\_DataWriterQos, 696
- begin
  - connext::LoanedSamples< T >, 1735
  - rti::flat::AbstractAlignedList< ElementOffset >, 578
- begin\_access
  - DDSSubscriber, 1605
- begin\_coherent\_changes
  - DDSPublisher, 1564
- bind\_complex\_member
  - DDS\_DynamicData, 803
- bind\_type
  - DDS\_DynamicData, 802
- binding\_ping\_period
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1807
- bitmask
  - DDS\_EndpointTrustProtectionInfo, 903
  - DDS\_ParticipantTrustProtectionInfo, 987
- bits
  - DDS\_StructMember, 1104
  - DDS\_ValueMember, 1240
- buffer\_alignment
  - DDS\_ReceiverPoolQosPolicy, 1040
- buffer\_initial\_size
  - DDS\_DynamicDataProperty\_t, 895
- buffer\_max\_size
  - DDS\_DynamicDataProperty\_t, 895
- buffer\_size
  - DDS\_ReceiverPoolQosPolicy, 1040
- build
  - NDDS\_Config\_LibraryVersion\_t, 1772
- build\_data
  - FlatData Builders, 560
- build\_my\_final\_seq
  - MyFlatMutableBuilder, 1755
- build\_my\_mutable
  - MyFlatMutableBuilder, 1756
  - MyFlatUnionBuilder, 1766
- build\_my\_mutable\_array
  - MyFlatMutableBuilder, 1756
- build\_my\_mutable\_seq
  - MyFlatMutableBuilder, 1756
- build\_my\_primitive\_seq
  - MyFlatMutableBuilder, 1755
- build\_my\_string
  - MyFlatMutableBuilder, 1756
- build\_my\_string\_seq
  - MyFlatMutableBuilder, 1756
- build\_next
  - rti::flat::MutableArrayBuilder< ElementBuilder, N >, 1741
  - rti::flat::MutableSequenceBuilder< ElementBuilder >, 1745
- build\_version
  - connext::MessagingLibraryVersion, 1738
- Builder.hpp, 1962
- BuilderHelper.hpp, 1969
- Built-in Sequences, 164
- Built-in Topic's Trust Types, 95
  - DDS\_EndpointTrustAlgorithmInfo, 99
  - DDS\_EndpointTrustAttributesMask, 97
  - DDS\_EndpointTrustInterceptorAlgorithmInfo, 99
  - DDS\_EndpointTrustProtectionInfo, 97
  - DDS\_ParticipantTrustAlgorithmInfo, 98
  - DDS\_ParticipantTrustAttributesMask, 96
  - DDS\_ParticipantTrustInterceptorAlgorithmInfo, 98
  - DDS\_ParticipantTrustKeyEstablishmentAlgorithmInfo, 98
  - DDS\_ParticipantTrustProtectionInfo, 97
  - DDS\_ParticipantTrustSignatureAlgorithmInfo, 98
  - DDS\_PluginEndpointTrustAttributesMask, 97
  - DDS\_PluginParticipantTrustAttributesMask, 97
  - DDS\_TrustAlgorithmBit, 97
  - DDS\_TrustAlgorithmRequirements, 98
  - DDS\_TrustAlgorithmSet, 98
  - DDS\_VendorEndpointTrustAttributesMask, 97
- Built-in Topics, 59
- Built-in Transport Plugins, 177
- Built-in Types, 92
- Builtin Qos Profiles, 481
  - DDS\_BUILTIN\_QOS\_LIB, 486
  - DDS\_BUILTIN\_QOS\_LIB\_EXP, 491
  - DDS\_BUILTIN\_QOS\_SNIPPET\_LIB, 501
  - DDS\_PROFILE\_BASELINE, 487

DDS_PROFILE_BASELINE_5_0_0, 487	DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_FAST
DDS_PROFILE_BASELINE_5_1_0, 487	494
DDS_PROFILE_BASELINE_5_2_0, 488	DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_MED
DDS_PROFILE_BASELINE_5_3_0, 488	494
DDS_PROFILE_BASELINE_6_0_0, 488	DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA_SLOW
DDS_PROFILE_BASELINE_6_1_0, 488	495
DDS_PROFILE_BASELINE_7_0_0, 488	DDS_PROFILE_GENERIC_STRICT_RELIABLE_LOW_LATENCY,
DDS_PROFILE_BASELINE_7_1_0, 489	492
DDS_PROFILE_BASELINE_ROOT, 487	DDS_PROFILE_PATTERN_ALARM_EVENT, 500
DDS_PROFILE_GENERIC_510_TRANSPORT_COMPATIBILITY,	DDS_PROFILE_PATTERN_ALARM_STATUS, 500
490	DDS_PROFILE_PATTERN_EVENT, 499
DDS_PROFILE_GENERIC_AUTO_TUNING, 496	DDS_PROFILE_PATTERN_LAST_VALUE_CACHE,
DDS_PROFILE_GENERIC_BEST_EFFORT, 491	501
DDS_PROFILE_GENERIC_COMMON, 489	DDS_PROFILE_PATTERN_PERIODIC_DATA, 498
DDS_PROFILE_GENERIC_CONNEXT_MICRO_COMPATIBILITY,	DDS_PROFILE_PATTERN_RELIABLE_STREAMING,
489	499
DDS_PROFILE_GENERIC_CONNEXT_MICRO_COMPATIBILITY,	DDS_PROFILE_PATTERN_STATUS, 500
490	DDS_PROFILE_PATTERN_STREAMING, 499
DDS_PROFILE_GENERIC_CONNEXT_MICRO_COMPATIBILITY,	DDS_SNIPPET_5_1_0_TRANSPORT_ENABLE,
490	517
DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE,	DDS_SNIPPET_COMPATIBILITY_CONNEXT_MICRO_VERSION_2_4
491	516
DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA,	DDS_SNIPPET_COMPATIBILITY_OTHER_DDS_VENDORS_ENABLE
494	516
DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA_FAST,	DDS_SNIPPET_FEATURE_AUTO_TUNING_ENABLE,
495	512
DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA_MEDIUM_FLOW,	DDS_SNIPPET_FEATURE_FLOW_CONTROLLER_209MBPS,
495	511
DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_LARGE_DATA_SLOW_FLOW,	DDS_SNIPPET_FEATURE_FLOW_CONTROLLER_52MBPS,
495	511
DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_PERSONAL,	DDS_SNIPPET_FEATURE_FLOW_CONTROLLER_838MBPS,
496	510
DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_TRANSPORT,	DDS_SNIPPET_FEATURE_MONITORING2_ENABLE,
496	513
DDS_PROFILE_GENERIC_KEEP_LAST_RELIABLE_TRANSPORT,	DDS_SNIPPET_FEATURE_MONITORING_ENABLE,
496	512
DDS_PROFILE_GENERIC_MINIMAL_MEMORY_FOOTPRINT,	DDS_SNIPPET_FEATURE_SECURITY_ENABLE,
497	513
DDS_PROFILE_GENERIC_MONITORING2, 497	DDS_SNIPPET_FEATURE_TOPIC_QUERY_ENABLE,
DDS_PROFILE_GENERIC_MONITORING_COMMON,	513
489	DDS_SNIPPET_OPTIMIZATION_DATACACHE_LARGE_DATA_DYNAMIC,
DDS_PROFILE_GENERIC_OTHER_DDS_VENDOR_COMPATIBILITY,	507,
490	DDS_SNIPPET_OPTIMIZATION_DISCOVERY_COMMON,
DDS_PROFILE_GENERIC_PARTICIPANT_LARGE_DATA,	505
492	DDS_SNIPPET_OPTIMIZATION_DISCOVERY_ENDPOINT_FAST,
DDS_PROFILE_GENERIC_PARTICIPANT_LARGE_DATA_MONITORING,	505,
493	DDS_SNIPPET_OPTIMIZATION_DISCOVERY_PARTICIPANT_COMPATIBILITY,
DDS_PROFILE_GENERIC_SECURITY, 497	505
DDS_PROFILE_GENERIC_STRICT_RELIABLE,	DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_COMMON,
491	501
DDS_PROFILE_GENERIC_STRICT_RELIABLE_HIGH_THROUGHPUT,	DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_HIGH_R
492	503
DDS_PROFILE_GENERIC_STRICT_RELIABLE_LARGE_DATA,	DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL_KEEP_A
493	502

DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_SUPPORT\_KIND, 502  
 DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_SUPPORT\_QOS\_POLICY, 504  
 DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_SUPPORT\_QOS\_POLICY\_KEY\_MAX\_SIZE, 503  
 DDS\_SNIPPET\_OPTIMIZATION\_RELIABILITY\_PROTOCOL\_SUPPORT\_QOS\_POLICY\_MAX\_SIZE, 506  
 DDS\_SNIPPET\_QOS\_POLICY\_BATCHING\_ENABLE, channel\_filter\_expression\_max\_length, 510  
 DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_PERSISTENT, 509  
 DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_PERSISTENT, channel\_seq\_max\_length, 509  
 DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_TRANSIENT, DDS\_DomainParticipantResourceLimitsQosPolicy, 509  
 DDS\_SNIPPET\_QOS\_POLICY\_DURABILITY\_TRANSIENT, channel\_max\_length, 508  
 DDS\_SNIPPET\_QOS\_POLICY\_HISTORY\_KEEP\_ALL, check\_crc, 508  
 DDS\_SNIPPET\_QOS\_POLICY\_HISTORY\_KEEP\_LAST, check\_failure, 507  
 DDS\_SNIPPET\_QOS\_POLICY\_PUBLISH\_MODE\_ASYNC, check\_non\_blocking\_settings, 508  
 DDS\_SNIPPET\_QOS\_POLICY\_RELIABILITY\_BEST\_EFFORT, DDS\_TransportInfo\_t, 507  
 DDS\_SNIPPET\_QOS\_POLICY\_RELIABILITY\_RELIABLE, bssid, 506  
 DDS\_SNIPPET\_TRANSPORT\_TCP\_LAN\_CLIENT, cleanup\_period, 514  
 DDS\_SNIPPET\_TRANSPORT\_TCP\_WAN\_ASYMMETRIC, carrier\_numbers, 515  
 DDS\_SNIPPET\_TRANSPORT\_TCP\_WAN\_ASYMMETRIC, carrier\_speed, 515  
 DDS\_SNIPPET\_TRANSPORT\_TCP\_WAN\_SYMMETRIC, local\_member, 514  
 DDS\_SNIPPET\_TRANSPORT\_UDP\_AVOID\_IP\_FRAGMENTATION, clone, 515  
 DDS\_SNIPPET\_TRANSPORT\_UDP\_WAN, 516  
 builtin\_discovery\_plugins, DDS\_DiscoveryConfigQosPolicy, 721  
 builtin\_endpoints\_required\_mask, DDS\_ParticipantTrustInterceptorAlgorithmInfo, 986  
 builtin\_kx\_endpoints\_required\_mask, DDS\_ParticipantTrustInterceptorAlgorithmInfo, 986  
 builtin\_multicast\_port\_offset, DDS\_RtpsWellKnownPorts\_t, 1080  
 builtin\_unicast\_port\_offset, DDS\_RtpsWellKnownPorts\_t, 1080  
 bytes\_per\_token, DDS\_FlowControllerTokenBucketProperty\_t, 916  
 capacity, rti::flat::AbstractBuilder, 580  
 category, DDS\_LoggingQosPolicy, 944  
 DDS\_TypeSupportQosPolicy, 1234  
 DDS\_TypeCode, 1195, 1197  
 DDS\_TypeCode, 1194, 1195  
 DDS\_TypeCode, 1194, 1196  
 DDS\_DomainParticipantResourceLimitsQosPolicy, 762  
 DDS\_DomainParticipantResourceLimitsQosPolicy, 762  
 DDS\_MultiChannelQosPolicy, 966  
 DDS\_WireProtocolQosPolicy, 1250  
 rti::flat::AbstractBuilder, 581  
 NDDS\_UTILITY\_NETWORK\_CAPTURE\_PARAMS\_t, 1819  
 DDS\_TransportInfo\_t, 1146  
 NDDS\_Transport\_Property\_t, 1777  
 DDS\_DatabaseQosPolicy, 621  
 DDS\_DynamicData, 794  
 DDS\_DynamicData, 795  
 DDS\_DynamicData, 794  
 DDS\_DynamicData, 794  
 DDS\_MonitoringNon, 38  
 rti::flat::Sample< OffsetType >, 1919  
 clone\_tc  
 DDS\_TypeCodeFactory, 1212  
 close  
 NDDSConfigLoggerDevice, 1830  
 coherent\_access  
 DDS\_PresentationQosPolicy, 1000  
 coherent\_set\_info  
 DDS\_SampleInfo, 1092  
 coherent\_set\_sequence\_number  
 DDS\_CoherentSetInfo\_t, 614  
 collector\_initial\_peers  
 DDS\_MonitoringDedicatedParticipantSettings, 949  
 comm\_ports\_list  
 NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1805  
 comm\_ports\_list\_length  
 NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1806  
 Common types and functions, 303

- DDS\_BuiltinTopicKey\_copy, 308
- DDS\_BuiltinTopicKey\_equals, 308
- DDS\_BuiltinTopicKey\_from\_guid, 309
- DDS\_BuiltinTopicKey\_from\_instance\_handle, 310
- DDS\_BuiltinTopicKey\_t, 307
- DDS\_BuiltinTopicKey\_to\_guid, 309
- DDS\_BuiltinTopicKey\_to\_instance\_handle, 309
- DDS\_LOCATOR\_ADDRESS\_INVALID, 311
- DDS\_LOCATOR\_ADDRESS\_LENGTH\_MAX, 305
- DDS\_LOCATOR\_INVALID, 310
- DDS\_LOCATOR\_KIND\_INVALID, 310
- DDS\_LOCATOR\_KIND\_RESERVED, 312
- DDS\_LOCATOR\_KIND\_SHMEM, 311
- DDS\_LOCATOR\_KIND\_SHMEM\_510, 311
- DDS\_LOCATOR\_KIND\_UDPv4, 311
- DDS\_LOCATOR\_KIND\_UDPv4\_WAN, 311
- DDS\_LOCATOR\_KIND\_UDPv6, 311
- DDS\_LOCATOR\_KIND\_UDPv6\_510, 312
- DDS\_LOCATOR\_PORT\_INVALID, 310
- DDS\_Locator\_t, 307
- DDS\_PRODUCTVERSION\_UNKNOWN, 307
- DDS\_PROTOCOLVERSION, 306
- DDS\_PROTOCOLVERSION\_1\_0, 305
- DDS\_PROTOCOLVERSION\_1\_1, 306
- DDS\_PROTOCOLVERSION\_1\_2, 306
- DDS\_PROTOCOLVERSION\_2\_0, 306
- DDS\_PROTOCOLVERSION\_2\_1, 306
- DDS\_ProtocolVersion\_t, 307
- DDS\_VENDOR\_ID\_LENGTH\_MAX, 306
- compile
  - DDSContentFilter, 1280
- COMPLETION\_TOKEN\_IGNORE
  - AsyncWaitSet, 293
- COMPLETION\_TOKEN\_USE\_IMPLICIT\_AND\_WAIT
  - AsyncWaitSet, 293
- Compliance Configuration, 535
  - NDDS\_CONFIG\_XTYPES\_COMPLIANCE\_MASK\_DEFAULT, 536
  - NDDS\_CONFIG\_XTYPES\_COMPLIANCE\_MASK\_VENDOR, 536
  - NDDS\_CONFIG\_XTYPES\_DHEADER\_IN\_NON\_PRIMITIVE\_CONDITIONS\_BIT, 538
  - NDDS\_CONFIG\_XTYPES\_ENCAPSULATION\_OPTIONS\_WITH\_READING, 539
  - NDDS\_CONFIG\_XTYPES\_ENUM\_AS\_PRIMITIVE\_IN\_COLLECTIONS\_BIT, 538
  - NDDS\_CONFIG\_XTYPES\_PARAMETER\_LENGTH\_WITH\_READING, 538
  - NDDS\_Config\_XTypesComplianceMask, 536
  - NDDS\_Config\_XTypesComplianceMaskBits, 537
- compressed\_sample\_count
  - DDS\_DataReaderCacheStatus, 629
- Compression Settings, 372
  - DDS\_COMPRESSION\_ID\_BZIP2, 375
  - DDS\_COMPRESSION\_ID\_LZ4, 376
  - DDS\_COMPRESSION\_ID\_MASK\_ALL, 373
  - DDS\_COMPRESSION\_ID\_MASK\_NONE, 373
  - DDS\_COMPRESSION\_ID\_MASK\_PUBLICATION\_DEFAULT, 374
  - DDS\_COMPRESSION\_ID\_MASK\_SUBSCRIPTION\_DEFAULT, 374
  - DDS\_COMPRESSION\_ID\_ZLIB, 375
  - DDS\_COMPRESSION\_LEVEL\_BEST\_COMPRESSION, 373
  - DDS\_COMPRESSION\_LEVEL\_BEST\_SPEED, 373
  - DDS\_COMPRESSION\_LEVEL\_DEFAULT, 374
  - DDS\_COMPRESSION\_THRESHOLD\_DEFAULT, 374
  - DDS\_CompressionId\_t, 375
  - DDS\_CompressionIdMask, 375
  - compression\_ids
    - DDS\_CompressionSettings\_t, 615
  - compression\_settings
    - DDS\_DataRepresentationQosPolicy, 669
  - compute\_crc
    - DDS\_WireProtocolQosPolicy, 1250
  - concrete\_base\_type
    - DDS\_TypeCode, 1189
  - concurrency\_level
    - DDS\_MonitoringEventDistributionSettings, 953
    - DDS\_MonitoringLoggingDistributionSettings, 955
  - Conditions and WaitSets, 471
    - DDS\_WaitSetProperty\_t\_INITIALIZER, 472
  - Configuring QoS Profiles with XML, 197
  - connect, 571
    - connect::AlreadyDeletedException, 585
    - connect::BadParameterException, 586
    - connect::IllegalOperationException, 1724
    - connect::ImmutablePolicyException, 1724
    - connect::InconsistentPolicyException, 1725
    - connect::IsInvalidSamplePredicate< T >, 1725
    - connect::IsReplyRelatedPredicate< T >, 1725
    - connect::IsReplyRelatedPredicate, 1726
    - connect::operator(), 1726
    - connect::OverlappedSamplesPredicate< T >, 1727
    - connect::LoanedSamples< T >, 1727
    - connect::WithReadings, 1731
    - connect::begin, 1735
    - connect::end, 1735, 1736
    - connect::length, 1734
    - connect::LoanedSamples, 1730
    - connect::move\_construct\_from\_loans, 1731
    - connect::operator LoanMemento, 1734
    - connect::operator[], 1733
    - connect::release, 1732
    - connect::return\_loan, 1734



- connext::LoanedSamples< T >::LoanMemento, 1736
- connext::LogicException, 1737
- connext::MessagingLibraryVersion, 1737
  - build\_version, 1738
  - major\_version, 1738
  - minor\_version, 1738
  - release\_version, 1738
- connext::MessagingVersion, 1738
  - get\_api\_build\_version, 1739
  - get\_api\_version, 1739
  - get\_api\_version\_string, 1739
- connext::NotEnabledException, 1855
- connext::OutOfResourcesException, 1860
- connext::PreconditionNotMetException, 1861
- connext::Replier< TReq, TRep >, 1868
  - ~Replier, 1873
  - get\_reply\_datawriter, 1880
  - get\_request\_datareader, 1879
  - read\_request, 1879
  - read\_requests, 1879
  - receive\_request, 1875, 1876
  - receive\_requests, 1876
  - Replier, 1872, 1873
  - Reply, 1871
  - ReplyDataWriter, 1871
  - Request, 1871
  - RequestDataReader, 1871
  - send\_reply, 1874, 1875
  - take\_request, 1878
  - take\_requests, 1878
  - wait\_for\_requests, 1877
- connext::ReplierListener< TReq, TRep >, 1880
  - on\_request\_available, 1881
- connext::ReplierParams< TReq, TRep >, 1881
  - datareader\_qos, 1884
  - datawriter\_qos, 1884
  - publisher, 1884
  - qos\_profile, 1883
  - replier\_listener, 1882
  - ReplierParams, 1882
  - reply\_topic\_name, 1883
  - reply\_type\_support, 1885
  - request\_topic\_name, 1883
  - request\_type\_support, 1885
  - service\_name, 1883
  - subscriber, 1885
- connext::Requester< TReq, TRep >, 1886
  - ~Requester, 1891
  - get\_reply\_datareader, 1906
  - get\_request\_datawriter, 1906
  - read\_replies, 1904, 1905
  - read\_reply, 1903–1905
  - receive\_replies, 1894, 1895
  - receive\_reply, 1893, 1894
  - Reply, 1889
  - ReplyDataReader, 1890
  - ReplyTypeSupport, 1890
  - Request, 1889
  - RequestDataWriter, 1890
  - Requester, 1890, 1891
  - RequestTypeSupport, 1890
  - send\_request, 1892, 1893
  - take\_replies, 1899, 1901, 1903
  - take\_reply, 1898, 1900, 1901
  - wait\_for\_replies, 1896, 1897
- connext::RequesterParams, 1907
  - datareader\_qos, 1910
  - datawriter\_qos, 1910
  - publisher, 1910
  - qos\_profile, 1909
  - reply\_topic\_name, 1909
  - reply\_type\_support, 1911
  - request\_topic\_name, 1909
  - request\_type\_support, 1911
  - RequesterParams, 1908
  - service\_name, 1909
  - subscriber, 1911
- connext::RuntimeException, 1912
- connext::Sample< T >, 1912
  - data, 1914, 1915
  - identity, 1914
  - info, 1915
  - related\_identity, 1914
  - Sample, 1913
- connext::SampleIterator< T, IsConst >, 1920
- connext::SampleRef< T >, 1920
  - data, 1923
  - identity, 1925
  - info, 1923
  - is\_nil\_data, 1925
  - is\_nil\_info, 1925
  - operator T&, 1924
  - operator=, 1923
  - related\_identity, 1926
  - SampleRef, 1921, 1922
  - set\_data, 1924
  - set\_info, 1925
- connext::SimpleReplier< TReq, TRep >, 1935
  - ~SimpleReplier, 1937
  - SimpleReplier, 1936
- connext::SimpleReplierListener< TReq, TRep >, 1937
  - on\_request\_available, 1938
  - return\_loan, 1938
- connext::SimpleReplierParams< TReq, TRep >, 1939
  - datareader\_qos, 1941
  - datawriter\_qos, 1941
  - publisher, 1942
  - qos\_profile, 1941

- reply\_topic\_name, 1941
- reply\_type\_support, 1943
- request\_topic\_name, 1940
- request\_type\_support, 1942
- service\_name, 1940
- SimpleReplierParams, 1940
- subscriber, 1942
- connext::TimeoutException, 1946
- connext::UnsupportedException, 1948
- connext::WriteSample< T >, 1948
  - data, 1950, 1951
  - identity, 1951
  - info, 1951
  - WriteSample, 1949, 1950
- connext::WriteSampleRef< T >, 1952
  - data, 1954
  - identity, 1955
  - info, 1954
  - is\_nil\_data, 1955
  - set\_data, 1954
  - set\_info, 1955
  - WriteSampleRef, 1953
- const\_iterator
  - connext::LoanedSamples< T >, 1730
- ConstOffset
  - MyFlatFinalOffset, 1747
  - MyFlatMutableOffset, 1758
  - MyFlatUnionOffset, 1768
  - rti::flat::Sample< OffsetType >, 1917
- contains\_entity
  - DDSDomainParticipant, 1406
- content\_filter\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 753
- content\_filter\_dropped\_sample\_count
  - DDS\_DataReaderCacheStatus, 626
- content\_filter\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 757
- content\_filter\_property
  - DDS\_SubscriptionBuiltinTopicData, 1115
- content\_filter\_topic\_name
  - DDS\_ContentFilterProperty\_t, 617
- content\_filtered\_topic\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 753
- content\_filtered\_topic\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 757
- content\_type
  - DDS\_TypeCode, 1187
- contentfilter\_property\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 761
- Conventions, 236
- Cookie, 473
  - to\_pointer, 473
- cookie
  - DDS\_WriteParams\_t, 1253
- copy
  - DDS\_DynamicData, 792
- copy\_data
  - DDSDynamicDataTypeSupport, 1461
  - FooTypeSupport, 1716
- copy\_from\_topic\_qos
  - DDSPublisher, 1566
  - DDSSubscriber, 1608
- copy\_no\_alloc
  - FooSeq, 1702
- corrupted\_rtps\_message\_count
  - DDS\_DomainParticipantProtocolStatus, 740
- corrupted\_rtps\_message\_count\_change
  - DDS\_DomainParticipantProtocolStatus, 740
- count
  - DDS\_QosPolicyCount, 1030
- cpu\_list
  - DDS\_ThreadSettings\_t, 1124
- cpu\_rotation
  - DDS\_ThreadSettings\_t, 1124
- create\_alias\_tc
  - DDS\_TypeCodeFactory, 1221
- create\_array\_tc
  - DDS\_TypeCodeFactory, 1223, 1224
- create\_completion\_token
  - DDSAsyncWaitSet, 1272
- create\_contentfilteredtopic
  - DDSDomainParticipant, 1385
- create\_contentfilteredtopic\_with\_filter
  - DDSDomainParticipant, 1386
- create\_data
  - DDSDynamicDataTypeSupport, 1460
  - DDSKeyedOctetsDataWriter, 1488
  - DDSKeyedStringDataWriter, 1515
  - DDSOctetsDataWriter, 1538
  - DDSStringDataWriter, 1585
  - FooDataWriter, 1694
  - FooTypeSupport, 1715
  - rti::flat::Sample< OffsetType >, 1918
- create\_data\_ex
  - FooTypeSupport, 1715
- create\_datareader
  - DDSDomainParticipant, 1418
  - DDSSubscriber, 1599
- create\_datareader\_with\_profile
  - DDSDomainParticipant, 1419
  - DDSSubscriber, 1601
- create\_datawriter
  - DDSDomainParticipant, 1415

- DDSPublisher, 1558
- create\_datawriter\_with\_profile
  - DDSDomainParticipant, 1416
  - DDSPublisher, 1559
- create\_enum\_tc
  - DDS\_TypeCodeFactory, 1218, 1220
- create\_flowcontroller
  - DDSDomainParticipant, 1391
- create\_multitopic
  - DDSDomainParticipant, 1388
- create\_participant
  - DDSDomainParticipantFactory, 1442
- create\_participant\_from\_config
  - DDSDomainParticipantFactory, 1449
- create\_participant\_from\_config\_w\_params
  - DDSDomainParticipantFactory, 1450
- create\_participant\_with\_profile
  - DDSDomainParticipantFactory, 1443
- create\_publisher
  - DDSDomainParticipant, 1376
- create\_publisher\_with\_profile
  - DDSDomainParticipant, 1377
- create\_querycondition
  - DDSDataReader, 1293
- create\_querycondition\_w\_params
  - DDSDataReader, 1294
- create\_readcondition
  - DDSDataReader, 1293
- create\_readcondition\_w\_params
  - DDSDataReader, 1293
- create\_sequence\_tc
  - DDS\_TypeCodeFactory, 1222
- create\_string\_tc
  - DDS\_TypeCodeFactory, 1221
- create\_struct\_tc
  - DDS\_TypeCodeFactory, 1214, 1215
- create\_subscriber
  - DDSDomainParticipant, 1379
- create\_subscriber\_with\_profile
  - DDSDomainParticipant, 1380
- create\_thread
  - DDSThreadFactory, 1616
- create\_topic
  - DDSDomainParticipant, 1382
- create\_topic\_query
  - DDSDataReader, 1309
- create\_topic\_with\_profile
  - DDSDomainParticipant, 1383
- create\_union\_tc
  - DDS\_TypeCodeFactory, 1217, 1218
- create\_value\_tc
  - DDS\_TypeCodeFactory, 1215, 1216
- create\_wstring\_tc
  - DDS\_TypeCodeFactory, 1222
- Creating Custom Content Filters, 222
- Creating New Transport Plugins, 178
- critical
  - NDDConfigLogger, 1828
- current\_count
  - DDS\_PublicationMatchedStatus, 1021
  - DDS\_ServiceRequestAcceptedStatus, 1100
  - DDS\_SubscriptionMatchedStatus, 1119
- current\_count\_change
  - DDS\_PublicationMatchedStatus, 1021
  - DDS\_ServiceRequestAcceptedStatus, 1100
  - DDS\_SubscriptionMatchedStatus, 1119
- current\_count\_peak
  - DDS\_PublicationMatchedStatus, 1021
  - DDS\_SubscriptionMatchedStatus, 1119
- data
  - connext::Sample< T >, 1914, 1915
  - connext::SampleRef< T >, 1923
  - connext::WriteSample< T >, 1950, 1951
  - connext::WriteSampleRef< T >, 1954
  - DDS\_DynamicDataTypeProperty\_t, 897
- Data Samples, 148
  - DDS\_CoherentSetInfo\_copy, 150
  - DDS\_CoherentSetInfo\_equals, 149
  - DDS\_SampleInfo\_get\_related\_sample\_identity, 150
  - DDS\_SampleInfo\_get\_sample\_identity, 150
- Data Writers, 111
  - DDS\_DataWriterQos\_equals, 113
  - print, 113
  - to\_string, 113–117
- DATA\_READER\_PROTOCOL, 366
  - DDS\_DATAREADERPROTOCOL\_QOS\_POLICY\_NAME, 366
- DATA\_READER\_RESOURCE\_LIMITS, 367
  - DDS\_ANY\_INSTANCE\_REMOVAL, 368
  - DDS\_AUTO\_MAX\_TOTAL\_INSTANCES, 369
  - DDS\_DataReaderInstanceRemovalKind, 367
  - DDS\_DATAREADERRESOURCELIMITS\_QOS\_POLICY\_NAME, 369
  - DDS\_EMPTY\_INSTANCE\_REMOVAL, 368
  - DDS\_FULLY\_PROCESSED\_INSTANCE\_REMOVAL, 368
  - DDS\_NO\_INSTANCE\_REMOVAL, 368
- DATA\_REPRESENTATION, 369
  - DDS\_AUTO\_DATA\_REPRESENTATION, 371
  - DDS\_DATA\_REPRESENTATION\_QOS\_POLICY\_NAME, 371
  - DDS\_DataRepresentationId\_t, 370
  - DDS\_XCDR2\_DATA\_REPRESENTATION, 371
  - DDS\_XCDR\_DATA\_REPRESENTATION, 370
  - DDS\_XML\_DATA\_REPRESENTATION, 370
- DATA\_TAG, 376
  - add\_tag, 379

- assert\_tag, 378
- DDS\_DATATAG\_QOS\_POLICY\_NAME, 381
- DDS\_DataTagQosPolicy, 377
- get\_number\_of\_tags, 378
- lookup\_tag, 379
- remove\_tag, 380
- data\_tags
  - DDS\_DataReaderQos, 650
  - DDS\_DataWriterQos, 695
  - DDS\_PublicationBuiltinTopicData, 1016
  - DDS\_SubscriptionBuiltinTopicData, 1113
- data\_to\_string
  - DDSKeyedOctetsTypeSupport, 1501
  - DDSKeyedStringTypeSupport, 1526
  - DDSOctetsTypeSupport, 1547
  - DDSStringTypeSupport, 1591
  - FooTypeSupport, 1723
- DATA\_WRITER\_PROTOCOL, 381
  - DDS\_DATAWRITERPROTOCOL\_QOS\_POLICY\_NAME, 381
- DATA\_WRITER\_RESOURCE\_LIMITS, 382
  - DDS\_ALIVE\_INSTANCE\_REPLACEMENT, 384
  - DDS\_ALIVE\_OR\_DISPOSED\_INSTANCE\_REPLACEMENT, 384
  - DDS\_ALIVE\_THEN\_DISPOSED\_INSTANCE\_REPLACEMENT, 384
  - DDS\_DATAWRITERRESOURCELIMITS\_QOS\_POLICY\_NAME, 384
  - DDS\_DataWriterResourceLimitsInstanceReplacementKind, 382
  - DDS\_DISPOSED\_INSTANCE\_REPLACEMENT, 384
  - DDS\_DISPOSED\_THEN\_ALIVE\_INSTANCE\_REPLACEMENT, 384
  - DDS\_UNREGISTERED\_INSTANCE\_REPLACEMENT, 383
- DATA\_WRITER\_TRANSFER\_MODE, 385
  - DDS\_DATAWRITERTRANSFERMODE\_QOS\_POLICY\_NAME, 385
- DATABASE, 365
  - DDS\_DATABASE\_QOS\_POLICY\_NAME, 366
- database
  - DDS\_DomainParticipantQos, 745
- DataReader Use Cases, 210
- datareader\_qos
  - connext::ReplierParams< TReq, TRep >, 1884
  - connext::RequesterParams, 1910
  - connext::SimpleReplierParams< TReq, TRep >, 1941
- DataReaders, 134
  - DDS\_DataReaderQos\_equals, 142
  - DDS\_LOST\_BY\_AVAILABILITY\_WAITING\_TIME, 138
  - DDS\_LOST\_BY\_DECODE\_FAILURE, 139
  - DDS\_LOST\_BY\_DESERIALIZATION\_FAILURE, 139
  - DDS\_LOST\_BY\_INCOMPLETE\_COHERENT\_SET, 137
  - DDS\_LOST\_BY\_INSTANCES\_LIMIT, 136
  - DDS\_LOST\_BY\_LARGE\_COHERENT\_SET, 137
  - DDS\_LOST\_BY\_OUT\_OF\_MEMORY, 139
  - DDS\_LOST\_BY\_REMOTE\_WRITER\_SAMPLES\_PER\_VIRTUAL\_QUEUE\_LIMIT, 139
  - DDS\_LOST\_BY\_REMOTE\_WRITERS\_PER\_INSTANCE\_LIMIT, 136
  - DDS\_LOST\_BY\_REMOTE\_WRITERS\_PER\_SAMPLE\_LIMIT, 138
  - DDS\_LOST\_BY\_SAMPLES\_LIMIT, 140
  - DDS\_LOST\_BY\_SAMPLES\_PER\_INSTANCE\_LIMIT, 139
  - DDS\_LOST\_BY\_SAMPLES\_PER\_REMOTE\_WRITER\_LIMIT, 138
  - DDS\_LOST\_BY\_UNKNOWN\_INSTANCE, 139
  - DDS\_LOST\_BY\_VIRTUAL\_WRITERS\_LIMIT, 138
  - DDS\_LOST\_BY\_WRITER, 136
  - DDS\_NOT\_LOST, 136
  - DDS\_NOT\_REJECTED, 140
  - DDS\_REJECTED\_BY\_DECODE\_FAILURE, 142
  - DDS\_REJECTED\_BY\_INSTANCES\_LIMIT, 140
  - DDS\_REJECTED\_BY\_REMOTE\_WRITER\_SAMPLES\_PER\_VIRTUAL\_QUEUE\_LIMIT, 141
  - DDS\_REJECTED\_BY\_SAMPLES\_LIMIT, 140
  - DDS\_REJECTED\_BY\_SAMPLES\_PER\_INSTANCE\_LIMIT, 141
  - DDS\_REJECTED\_BY\_SAMPLES\_PER\_REMOTE\_WRITER\_LIMIT, 141
  - DDS\_SampleLostStatusKind, 136
  - DDS\_SampleRejectedStatusKind, 140
  - print, 142
  - to\_string, 143–146
  - DataWriter Use Cases, 207
  - datawriter\_qos
    - connext::ReplierParams< TReq, TRep >, 1884
    - connext::RequesterParams, 1910
    - connext::SimpleReplierParams< TReq, TRep >, 1941
  - datawriter\_qos\_profile\_name
    - DDS\_MonitoringEventDistributionSettings, 953
    - DDS\_MonitoringLoggingDistributionSettings, 955
    - DDS\_MonitoringPeriodicDistributionSettings, 961
  - DDS-Specific Primitive Types, 315
    - DDS\_Boolean, 320
    - DDS\_BOOLEAN\_FALSE, 317
    - DDS\_BOOLEAN\_TRUE, 317
    - DDS\_Char, 317
    - DDS\_Double, 319
    - DDS\_Enum, 320
    - DDS\_Float, 319
    - DDS\_Int8, 318

- DDS\_Long, 318
- DDS\_LongDouble, 319
- DDS\_LongLong, 319
- DDS\_Octet, 317
- DDS\_Short, 318
- DDS\_UInt8, 318
- DDS\_UnsignedLong, 318
- DDS\_UnsignedLongLong, 319
- DDS\_UnsignedShort, 318
- DDS\_Wchar, 317
- DDS\_AcknowledgmentInfo, 586
  - response\_data, 587
  - sample\_identity, 587
  - subscription\_handle, 587
  - valid\_response\_data, 587
- DDS\_AckResponseData\_t, 588
  - value, 588
- DDS\_ALIVE\_INSTANCE\_REPLACEMENT
  - DATA\_WRITER\_RESOURCE\_LIMITS, 384
- DDS\_ALIVE\_INSTANCE\_STATE
  - Instance States, 161
- DDS\_ALIVE\_OR\_DISPOSED\_INSTANCE\_REPLACEMENT
  - DATA\_WRITER\_RESOURCE\_LIMITS, 384
- DDS\_ALIVE\_THEN\_DISPOSED\_INSTANCE\_REPLACEMENT
  - DATA\_WRITER\_RESOURCE\_LIMITS, 384
- DDS\_AllocationSettings\_t, 588
  - incremental\_count, 589
  - initial\_count, 589
  - max\_count, 589
- DDS\_ALLOW\_TYPE\_COERCION
  - TYPE\_CONSISTENCY\_ENFORCEMENT, 453
- DDS\_AnnotationParameterValue, 590
- DDS\_ANY\_INSTANCE\_REMOVAL
  - DATA\_READER\_RESOURCE\_LIMITS, 368
- DDS\_ANY\_INSTANCE\_STATE
  - Instance States, 161
- DDS\_ANY\_SAMPLE\_STATE
  - Sample States, 157
- DDS\_ANY\_VIEW\_STATE
  - View States, 159
- DDS\_APPLICATION\_AUTO\_ACKNOWLEDGMENT\_MODE
  - RELIABILITY, 435
- DDS\_APPLICATION\_EXPLICIT\_ACKNOWLEDGMENT\_MODE
  - RELIABILITY, 436
- DDS\_ASYNC\_WAITSET\_PROPERTY\_DEFAULT
  - AsyncWaitSet, 293
- DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS
  - PUBLISH\_MODE, 431
- DDS\_ASYNCHRONOUSPUBLISHER\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_ASYNCHRONOUSPUBLISHER\_QOS\_POLICY\_NAME
  - ASYNCHRONOUS\_PUBLISHER, 363
- DDS\_AsyncronousPublisherQosPolicy, 590
  - asynchronous\_batch\_thread, 592
  - disable\_asynchronous\_batch, 592
  - disable\_asynchronous\_write, 592
  - disable\_topic\_query\_publication, 593
  - thread, 592
  - topic\_query\_publication\_thread, 593
- DDS\_AsyncWaitSetProperty\_t, 594
  - level, 596
  - thread\_name\_prefix, 595
  - thread\_pool\_size, 594
  - thread\_settings, 595
  - wait\_timeout, 595
  - waitset\_property, 594
- DDS\_AUTO\_CDR\_PADDING
  - TYPESUPPORT, 454
- DDS\_AUTO\_COUNT
  - DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS, 397
- DDS\_AUTO\_DATA\_REPRESENTATION
  - DATA\_REPRESENTATION, 371
- DDS\_AUTO\_MAX\_TOTAL\_INSTANCES
  - DATA\_READER\_RESOURCE\_LIMITS, 369
- DDS\_AUTO\_SAMPLE\_IDENTITY
  - WriteParams, 478
- DDS\_AUTO\_SEQUENCE\_NUMBER
  - Sequence Number Support, 333
- DDS\_AUTO\_TYPE\_COERCION
  - TYPE\_CONSISTENCY\_ENFORCEMENT, 453
- DDS\_AUTO\_WRITER\_DEPTH
  - DURABILITY, 401
- DDS\_AUTOMATIC\_LIVELINESS\_QOS
  - LIVELINESS, 410
- DDS\_AUTOMATIC\_TRANSPORT\_MULTICAST\_QOS
  - TRANSPORT\_MULTICAST, 448
- DDS\_AVAILABILITY\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_AVAILABILITY\_QOS\_POLICY\_NAME
  - AVAILABILITY, 364
- DDS\_AvailabilityQosPolicy, 596
  - enable\_required\_subscriptions, 599
  - max\_data\_availability\_waiting\_time, 599
  - max\_endpoint\_availability\_waiting\_time, 599
  - required\_matched\_endpoint\_groups, 599
- DDS\_BAD\_MEMBER\_ID\_USER\_EXCEPTION\_CODE
  - Exception Codes, 335
- DDS\_BAD\_MEMBER\_NAME\_USER\_EXCEPTION\_CODE
  - Exception Codes, 335
- DDS\_BAD\_PARAM\_SYSTEM\_EXCEPTION\_CODE
  - Exception Codes, 334
- DDS\_BAD\_TYPECODE\_SYSTEM\_EXCEPTION\_CODE
  - Exception Codes, 334
- DDS\_BADKIND\_USER\_EXCEPTION\_CODE
  - Exception Codes, 334
- DDS\_BATCH\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_BATCH\_QOS\_POLICY\_NAME

- BATCH, 365
- DDS\_BatchQosPolicy, 600
  - enable, 601
  - max\_data\_bytes, 601
  - max\_flush\_delay, 602
  - max\_samples, 602
  - source\_timestamp\_resolution, 602
  - thread\_safe\_write, 603
- DDS\_BEST\_EFFORT\_RELIABILITY\_QOS
  - RELIABILITY, 435
- DDS\_Boolean
  - DDS-Specific Primitive Types, 320
- DDS\_BOOLEAN\_FALSE
  - DDS-Specific Primitive Types, 317
- DDS\_BOOLEAN\_TRUE
  - DDS-Specific Primitive Types, 317
- DDS\_BooleanSeq, 604
- DDS\_BOUNDS\_USER\_EXCEPTION\_CODE
  - Exception Codes, 334
- dds\_builtin\_endpoints
  - DDS\_ParticipantBuiltinTopicData, 981
- DDS\_BUILTIN\_QOS\_LIB
  - Builtin Qos Profiles, 486
- DDS\_BUILTIN\_QOS\_LIB\_EXP
  - Builtin Qos Profiles, 491
- DDS\_BUILTIN\_QOS\_SNIPPET\_LIB
  - Builtin Qos Profiles, 501
- DDS\_BuiltinTopicKey\_copy
  - Common types and functions, 308
- DDS\_BuiltinTopicKey\_equals
  - Common types and functions, 308
- DDS\_BuiltinTopicKey\_from\_guid
  - Common types and functions, 309
- DDS\_BuiltinTopicKey\_from\_instance\_handle
  - Common types and functions, 310
- DDS\_BuiltinTopicKey\_t, 604
  - Common types and functions, 307
  - value, 605
- DDS\_BuiltinTopicKey\_to\_guid
  - Common types and functions, 309
- DDS\_BuiltinTopicKey\_to\_instance\_handle
  - Common types and functions, 309
- DDS\_BuiltinTopicReaderResourceLimits\_t, 605
  - disable\_fragmentation\_support, 608
  - dynamically\_allocate\_fragmented\_samples, 609
  - initial\_fragmented\_samples, 608
  - initial\_infos, 606
  - initial\_outstanding\_reads, 607
  - initial\_samples, 606
  - max\_fragmented\_samples, 608
  - max\_fragmented\_samples\_per\_remote\_writer, 609
  - max\_fragments\_per\_sample, 609
  - max\_infos, 607
  - max\_outstanding\_reads, 607
  - max\_samples, 606
  - max\_samples\_per\_read, 607
- DDS\_BY\_RECEPTION\_TIMESTAMP\_DESTINATIONORDER\_QOS
  - DESTINATION\_ORDER, 387
- DDS\_BY\_SOURCE\_TIMESTAMP\_DESTINATIONORDER\_QOS
  - DESTINATION\_ORDER, 387
- DDS\_CdrPaddingKind
  - TYPESUPPORT, 454
- DDS\_ChannelSettings\_t, 610
  - filter\_expression, 611
  - multicast\_settings, 611
  - priority, 611
- DDS\_ChannelSettingsSeq, 612
- DDS\_Char
  - DDS-Specific Primitive Types, 317
- DDS\_CharSeq, 613
- DDS\_CoherentSetInfo\_copy
  - Data Samples, 150
- DDS\_CoherentSetInfo\_equals
  - Data Samples, 149
- DDS\_CoherentSetInfo\_t, 613
  - coherent\_set\_sequence\_number, 614
  - group\_coherent\_set\_sequence\_number, 614
  - group\_guid, 613
  - incomplete\_coherent\_set, 614
- DDS\_COMPRESSION\_ID\_BZIP2
  - Compression Settings, 375
- DDS\_COMPRESSION\_ID\_LZ4
  - Compression Settings, 376
- DDS\_COMPRESSION\_ID\_MASK\_ALL
  - Compression Settings, 373
- DDS\_COMPRESSION\_ID\_MASK\_NONE
  - Compression Settings, 373
- DDS\_COMPRESSION\_ID\_MASK\_PUBLICATION\_DEFAULT
  - Compression Settings, 374
- DDS\_COMPRESSION\_ID\_MASK\_SUBSCRIPTION\_DEFAULT
  - Compression Settings, 374
- DDS\_COMPRESSION\_ID\_ZLIB
  - Compression Settings, 375
- DDS\_COMPRESSION\_LEVEL\_BEST\_COMPRESSION
  - Compression Settings, 373
- DDS\_COMPRESSION\_LEVEL\_BEST\_SPEED
  - Compression Settings, 373
- DDS\_COMPRESSION\_LEVEL\_DEFAULT
  - Compression Settings, 374
- DDS\_COMPRESSION\_THRESHOLD\_DEFAULT
  - Compression Settings, 374
- DDS\_CompressionId\_t
  - Compression Settings, 375
- DDS\_CompressionIdMask
  - Compression Settings, 375
- DDS\_CompressionSettings\_t, 614
  - compression\_ids, 615
  - writer\_compression\_level, 615

- writer\_compression\_threshold, 616
- DDS\_ContentFilterProperty\_t, 616
  - content\_filter\_topic\_name, 617
  - expression\_parameters, 618
  - filter\_class\_name, 617
  - filter\_expression, 617
  - related\_topic\_name, 617
- DDS\_Cookie\_t, 618
  - value, 618
- DDS\_CookieSeq, 619
- DDS\_DATA\_AVAILABLE\_STATUS
  - Status Kinds, 345
- DDS\_DATA\_ON\_READERS\_STATUS
  - Status Kinds, 345
- DDS\_DATA\_READER\_CACHE\_STATUS
  - Status Kinds, 350
- DDS\_DATA\_READER\_PROTOCOL\_STATUS
  - Status Kinds, 350
- DDS\_DATA\_REPRESENTATION\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_DATA\_REPRESENTATION\_QOS\_POLICY\_NAME
  - DATA\_REPRESENTATION, 371
- DDS\_DATA\_WRITER\_APPLICATION\_ACKNOWLEDGMENT\_STATUS
  - Status Kinds, 348
- DDS\_DATA\_WRITER\_CACHE\_STATUS
  - Status Kinds, 349
- DDS\_DATA\_WRITER\_INSTANCE\_REPLACED\_STATUS
  - Status Kinds, 348
- DDS\_DATA\_WRITER\_PROTOCOL\_STATUS
  - Status Kinds, 349
- DDS\_DATA\_WRITER\_SAMPLE\_REMOVED\_STATUS
  - Status Kinds, 350
- DDS\_DATABASE\_INTEGRATION\_SERVICE\_QOS
  - SERVICE, 439
- DDS\_DATABASE\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_DATABASE\_QOS\_POLICY\_NAME
  - DATABASE, 366
- DDS\_DatabaseQosPolicy, 619
  - cleanup\_period, 621
  - initial\_records, 621
  - initial\_weak\_references, 622
  - max\_skiplist\_level, 621
  - max\_weak\_references, 622
  - shutdown\_cleanup\_period, 621
  - shutdown\_timeout, 620
  - thread, 620
- DDS\_DATAREADER\_QOS\_DEFAULT
  - Subscribers, 132
- DDS\_DATAREADER\_QOS\_USE\_TOPIC\_QOS
  - Subscribers, 133
- DDS\_DATAREADER\_W\_DATA\_CONSISTENCY\_CHECK
  - User Data Type Support, 73
- DDS\_DataReaderCacheStatus, 623
- alive\_instance\_count, 627
- alive\_instance\_count\_peak, 628
- compressed\_sample\_count, 629
- content\_filter\_dropped\_sample\_count, 626
- detached\_instance\_count, 629
- detached\_instance\_count\_peak, 629
- disposed\_instance\_count, 628
- disposed\_instance\_count\_peak, 629
- expired\_dropped\_sample\_count, 626
- no\_writers\_instance\_count, 628
- no\_writers\_instance\_count\_peak, 628
- old\_source\_timestamp\_dropped\_sample\_count, 625
- ownership\_dropped\_sample\_count, 625
- replaced\_dropped\_sample\_count, 627
- sample\_count, 625
- sample\_count\_peak, 624
- time\_based\_filter\_dropped\_sample\_count, 626
- tolerance\_source\_timestamp\_dropped\_sample\_count, 625
- total\_samples\_dropped\_by\_instance\_replacement, 627
- virtual\_duplicate\_dropped\_sample\_count, 626
- writers\_removed\_batch\_sample\_dropped\_sample\_count, 627
- DDS\_DataReaderInstanceRemovalKind
  - DATA\_READER\_RESOURCE\_LIMITS, 367
- DDS\_DATAREADERPROTOCOL\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_DATAREADERPROTOCOL\_QOS\_POLICY\_NAME
  - DATA\_READER\_PROTOCOL, 366
- DDS\_DataReaderProtocolQosPolicy, 630
  - disable\_positive\_acks, 632
  - expects\_inline\_qos, 631
  - propagate\_dispose\_of\_unregistered\_instances, 632
  - propagate\_unregister\_of\_disposed\_instances, 633
  - rtps\_object\_id, 631
  - rtps\_reliable\_reader, 633
  - virtual\_guid, 631
- DDS\_DataReaderProtocolStatus, 633
  - dropped\_fragment\_count, 643
  - duplicate\_sample\_bytes, 638
  - duplicate\_sample\_bytes\_change, 638
  - duplicate\_sample\_count, 637
  - duplicate\_sample\_count\_change, 637
  - filtered\_sample\_bytes, 638
  - filtered\_sample\_bytes\_change, 639
  - filtered\_sample\_count, 638
  - filtered\_sample\_count\_change, 638
  - first\_available\_sample\_sequence\_number, 642
  - last\_available\_sample\_sequence\_number, 642
  - last\_committed\_sample\_sequence\_number, 642
  - out\_of\_range\_rejected\_sample\_count, 643
  - reassembled\_sample\_count, 643
  - received\_fragment\_count, 643

- received\_gap\_bytes, 641
- received\_gap\_bytes\_change, 641
- received\_gap\_count, 641
- received\_gap\_count\_change, 641
- received\_heartbeat\_bytes, 639
- received\_heartbeat\_bytes\_change, 639
- received\_heartbeat\_count, 639
- received\_heartbeat\_count\_change, 639
- received\_sample\_bytes, 637
- received\_sample\_bytes\_change, 637
- received\_sample\_count, 636
- received\_sample\_count\_change, 636
- rejected\_sample\_count, 642
- rejected\_sample\_count\_change, 642
- sent\_ack\_bytes, 640
- sent\_ack\_bytes\_change, 640
- sent\_ack\_count, 640
- sent\_ack\_count\_change, 640
- sent\_nack\_bytes, 641
- sent\_nack\_bytes\_change, 641
- sent\_nack\_count, 640
- sent\_nack\_count\_change, 640
- sent\_nack\_fragment\_bytes, 644
- sent\_nack\_fragment\_count, 644
- uncommitted\_sample\_count, 643
- DDS\_DataReaderQos, 644
  - availability, 652
  - data\_tags, 650
  - deadline, 648
  - destination\_order, 649
  - durability, 648
  - history, 649
  - latency\_budget, 648
  - liveliness, 648
  - multicast, 651
  - operator!=, 647
  - operator==, 647
  - ownership, 649
  - property, 651
  - protocol, 651
  - reader\_data\_lifecycle, 650
  - reader\_resource\_limits, 650
  - reliability, 649
  - representation, 650
  - resource\_limits, 649
  - service, 652
  - subscription\_name, 652
  - time\_based\_filter, 650
  - transport\_priority, 652
  - transport\_selection, 651
  - type\_consistency, 650
  - type\_support, 652
  - unicast, 651
  - user\_data, 649
- DDS\_DataReaderQos\_equals
  - DataReaders, 142
- DDS\_DATAREADERRESOURCELIMITS\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_DATAREADERRESOURCELIMITS\_QOS\_POLICY\_NAME
  - DATA\_READER\_RESOURCE\_LIMITS, 369
- DDS\_DataReaderResourceLimitsInstanceReplacementSettings, 653
  - alive\_instance\_removal, 653
  - disposed\_instance\_removal, 653
  - no\_writers\_instance\_removal, 654
- DDS\_DataReaderResourceLimitsQosPolicy, 654
  - autopurge\_remote\_not\_alive\_writer\_delay, 667
  - disable\_fragmentation\_support, 659
  - dynamically\_allocate\_fragmented\_samples, 661
  - initial\_fragmented\_samples, 660
  - initial\_infos, 658
  - initial\_outstanding\_reads, 658
  - initial\_remote\_virtual\_writers, 662
  - initial\_remote\_virtual\_writers\_per\_instance, 663
  - initial\_remote\_writers, 657
  - initial\_remote\_writers\_per\_instance, 658
  - initial\_topic\_queries, 665
  - instance\_replacement, 666
  - keep\_minimum\_state\_for\_instances, 664
  - max\_app\_ack\_response\_length, 664
  - max\_fragmented\_samples, 659
  - max\_fragmented\_samples\_per\_remote\_writer, 660
  - max\_fragments\_per\_sample, 660
  - max\_infos, 657
  - max\_outstanding\_reads, 659
  - max\_query\_condition\_filters, 664
  - max\_remote\_virtual\_writers, 662
  - max\_remote\_virtual\_writers\_per\_instance, 663
  - max\_remote\_writers, 656
  - max\_remote\_writers\_per\_instance, 656
  - max\_remote\_writers\_per\_sample, 663
  - max\_samples\_per\_read, 659
  - max\_samples\_per\_remote\_writer, 657
  - max\_topic\_queries, 665
  - max\_total\_instances, 661
  - shmem\_ref\_transfer\_mode\_attached\_segment\_allocation, 665
- DDS\_DataRepresentationId\_t
  - DATA\_REPRESENTATION, 370
- DDS\_DataRepresentationIdSeq, 667
- DDS\_DataRepresentationQosPolicy, 668
  - compression\_settings, 669
  - value, 669
- DDS\_DATATAG\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_DATATAG\_QOS\_POLICY\_NAME
  - DATA\_TAG, 381
- DDS\_DataTagQosPolicy



- DATA\_TAG, 377
- DDS\_DataTags, 670
  - tags, 670
- DDS\_DATAWRITER\_CPP
  - User Data Type Support, 72
- DDS\_DATAWRITER\_QOS\_DEFAULT
  - Publishers, 110
- DDS\_DATAWRITER\_QOS\_USE\_TOPIC\_QOS
  - Publishers, 110
- DDS\_DataWriterCacheStatus, 671
  - alive\_instance\_count, 672
  - alive\_instance\_count\_peak, 672
  - disposed\_instance\_count, 672
  - disposed\_instance\_count\_peak, 672
  - sample\_count, 672
  - sample\_count\_peak, 672
  - unregistered\_instance\_count, 673
  - unregistered\_instance\_count\_peak, 673
- DDS\_DATAWRITERPROTOCOL\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_DATAWRITERPROTOCOL\_QOS\_POLICY\_NAME
  - DATA\_WRITER\_PROTOCOL, 381
- DDS\_DataWriterProtocolQosPolicy, 673
  - disable\_inline\_keyhash, 675
  - disable\_positive\_acks, 675
  - initial\_virtual\_sequence\_number, 677
  - propagate\_app\_ack\_with\_no\_response, 676
  - push\_on\_write, 675
  - rtps\_object\_id, 674
  - rtps\_reliable\_writer, 677
  - serialize\_key\_with\_dispose, 676
  - virtual\_guid, 674
- DDS\_DataWriterProtocolStatus, 678
  - filtered\_sample\_bytes, 681
  - filtered\_sample\_bytes\_change, 681
  - filtered\_sample\_count, 681
  - filtered\_sample\_count\_change, 681
  - first\_available\_sample\_sequence\_number, 686
  - first\_available\_sample\_virtual\_sequence\_number, 687
  - first\_unacknowledged\_sample\_sequence\_number, 686
  - first\_unacknowledged\_sample\_subscription\_handle, 687
  - first\_unacknowledged\_sample\_virtual\_sequence\_number, 687
  - first\_unelapsed\_keep\_duration\_sample\_sequence\_number, 687
  - last\_available\_sample\_sequence\_number, 686
  - last\_available\_sample\_virtual\_sequence\_number, 687
  - pulled\_fragment\_bytes, 688
  - pulled\_fragment\_count, 688
  - pulled\_sample\_bytes, 683
  - pulled\_sample\_bytes\_change, 683
  - pulled\_sample\_count, 682
  - pulled\_sample\_count\_change, 683
  - pushed\_fragment\_bytes, 688
  - pushed\_fragment\_count, 688
  - pushed\_sample\_bytes, 680
  - pushed\_sample\_bytes\_change, 681
  - pushed\_sample\_count, 680
  - pushed\_sample\_count\_change, 680
  - received\_ack\_bytes, 684
  - received\_ack\_bytes\_change, 684
  - received\_ack\_count, 683
  - received\_ack\_count\_change, 684
  - received\_nack\_bytes, 684
  - received\_nack\_bytes\_change, 685
  - received\_nack\_count, 684
  - received\_nack\_count\_change, 684
  - received\_nack\_fragment\_bytes, 689
  - received\_nack\_fragment\_count, 688
  - rejected\_sample\_count, 685
  - rejected\_sample\_count\_change, 686
  - send\_window\_size, 686
  - sent\_gap\_bytes, 685
  - sent\_gap\_bytes\_change, 685
  - sent\_gap\_count, 685
  - sent\_gap\_count\_change, 685
  - sent\_heartbeat\_bytes, 682
  - sent\_heartbeat\_bytes\_change, 682
  - sent\_heartbeat\_count, 682
  - sent\_heartbeat\_count\_change, 682
- DDS\_DataWriterQos, 689
  - availability, 697
  - batch, 696
  - data\_tags, 695
  - deadline, 693
  - destination\_order, 693
  - durability, 692
  - durability\_service, 692
  - history, 693
  - latency\_budget, 693
  - lifespan, 694
  - liveliness, 693
  - multi\_channel, 697
  - operator!=, 692
  - operator==, 692
  - ownership, 694
  - ownership\_strength, 694
  - property, 696
  - protocol, 695
  - publication\_name, 697
  - publish\_mode, 696
  - reliability, 693
  - representation, 695
  - resource\_limits, 694

- service, 696
- topic\_query\_dispatch, 697
- transfer\_mode, 697
- transport\_priority, 694
- transport\_selection, 695
- type\_support, 697
- unicast, 696
- user\_data, 694
- writer\_data\_lifecycle, 695
- writer\_resource\_limits, 695
- DDS\_DataWriterQos\_equals
  - Data Writers, 113
- DDS\_DATAWRITERRESOURCELIMITS\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_DATAWRITERRESOURCELIMITS\_QOS\_POLICY\_NAME
  - DATA\_WRITER\_RESOURCE\_LIMITS, 384
- DDS\_DataWriterResourceLimitsInstanceReplacementKind
  - DATA\_WRITER\_RESOURCE\_LIMITS, 382
- DDS\_DataWriterResourceLimitsQosPolicy, 698
  - autoregister\_instances, 702
  - initial\_active\_topic\_queries, 703
  - initial\_batches, 700
  - initial\_concurrent\_blocking\_threads, 699
  - initial\_virtual\_writers, 702
  - initialize\_writer\_loaned\_sample, 704
  - instance\_replacement, 701
  - max\_active\_topic\_queries, 703
  - max\_app\_ack\_remote\_readers, 703
  - max\_batches, 700
  - max\_concurrent\_blocking\_threads, 699
  - max\_remote\_reader\_filters, 700
  - max\_remote\_readers, 703
  - max\_virtual\_writers, 702
  - replace\_empty\_instances, 701
  - writer\_loaned\_sample\_allocation, 704
- DDS\_DataWriterShmemRefTransferModeSettings, 705
  - enable\_data\_consistency\_check, 705
- DDS\_DATAWRITERTRANSFERMODE\_QOS\_POLICY\_ID
  - QoS Policies, 363
- DDS\_DATAWRITERTRANSFERMODE\_QOS\_POLICY\_NAME
  - DATA\_WRITER\_TRANSFER\_MODE, 385
- DDS\_DataWriterTransferModeQosPolicy, 706
  - shmem\_ref\_settings, 706
- DDS\_DEADLINE\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_DEADLINE\_QOS\_POLICY\_NAME
  - DEADLINE, 386
- DDS\_DeadlineQosPolicy, 707
  - period, 708
- DDS\_DEFAULT\_FLOW\_CONTROLLER\_NAME
  - Flow Controllers, 121
- DDS\_DEFAULT\_PRINT\_FORMAT
  - Topics, 65
- DDS\_DELETE\_PERSISTENT\_JOURNAL
  - DURABILITY, 399
- DDS\_DESTINATIONORDER\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_DESTINATIONORDER\_QOS\_POLICY\_NAME
  - DESTINATION\_ORDER, 388
- DDS\_DestinationOrderQosPolicy, 709
  - kind, 711
  - scope, 711
  - source\_timestamp\_tolerance, 711
- DDS\_DestinationOrderQosPolicyKind
  - DESTINATION\_ORDER, 387
- DDS\_DestinationOrderQosPolicyScopeKind
  - DESTINATION\_ORDER, 388
- DDS\_DISALLOW\_TYPE\_COERCION
  - TYPE\_CONSISTENCY\_ENFORCEMENT, 453
- DDS\_DISCOVERY\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_DISCOVERY\_QOS\_POLICY\_NAME
  - DISCOVERY, 389
- DDS\_DISCOVERY\_SERVICE\_SAMPLE
  - Sample Flags, 475
- DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_ALL
  - DISCOVERY\_CONFIG, 392
- DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_DEFAULT
  - DISCOVERY\_CONFIG, 391
- DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_NONE
  - DISCOVERY\_CONFIG, 391
- DDS\_DISCOVERYCONFIG\_BUILTIN\_DPSE
  - DISCOVERY\_CONFIG, 394
- DDS\_DISCOVERYCONFIG\_BUILTIN\_PLUGIN\_MASK\_DEFAULT
  - DISCOVERY\_CONFIG, 391
- DDS\_DISCOVERYCONFIG\_BUILTIN\_PLUGIN\_MASK\_NONE
  - DISCOVERY\_CONFIG, 391
- DDS\_DISCOVERYCONFIG\_BUILTIN\_SDP
  - DISCOVERY\_CONFIG, 393
- DDS\_DISCOVERYCONFIG\_BUILTIN\_SDP2
  - DISCOVERY\_CONFIG, 394
- DDS\_DISCOVERYCONFIG\_BUILTIN\_SEDP
  - DISCOVERY\_CONFIG, 393
- DDS\_DISCOVERYCONFIG\_BUILTIN\_SPDP
  - DISCOVERY\_CONFIG, 393
- DDS\_DISCOVERYCONFIG\_BUILTIN\_SPDP2
  - DISCOVERY\_CONFIG, 394
- DDS\_DISCOVERYCONFIG\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_DISCOVERYCONFIG\_QOS\_POLICY\_NAME
  - DISCOVERY\_CONFIG, 396
- DDS\_DISCOVERYCONFIG\_SERVICE\_REQUEST\_CHANNEL
  - DISCOVERY\_CONFIG, 394
- DDS\_DiscoveryConfigBuiltinChannelKind
  - DISCOVERY\_CONFIG, 394
- DDS\_DiscoveryConfigBuiltinChannelKindMask
  - DISCOVERY\_CONFIG, 392
- DDS\_DiscoveryConfigBuiltinPluginKind

- DISCOVERY\_CONFIG, 393
- DDS\_DiscoveryConfigBuiltinPluginKindMask
  - DISCOVERY\_CONFIG, 392
- DDS\_DiscoveryConfigQosPolicy, 712
  - asynchronous\_publisher, 723
  - builtin\_discovery\_plugins, 721
  - default\_domain\_announcement\_period, 723
  - dns\_tracker\_polling\_period, 728
  - enabled\_builtin\_channels, 721
  - endpoint\_type\_object\_lb\_serialization\_threshold, 728
  - ignore\_default\_domain\_announcements, 724
  - initial\_participant\_announcements, 716
  - locator\_reachability\_assert\_period, 725
  - locator\_reachability\_change\_detection\_period, 726
  - locator\_reachability\_lease\_duration, 726
  - max\_initial\_participant\_announcement\_period, 717
  - max\_liveliness\_loss\_detection\_period, 716
  - min\_initial\_participant\_announcement\_period, 717
  - new\_remote\_participant\_announcements, 716
  - participant\_announcement\_period, 715
  - participant\_configuration\_reader, 730
  - participant\_configuration\_reader\_resource\_limits, 730
  - participant\_configuration\_writer, 729
  - participant\_configuration\_writer\_data\_lifecycle, 730
  - participant\_configuration\_writer\_publish\_mode, 729
  - participant\_liveliness\_assert\_period, 715
  - participant\_liveliness\_lease\_duration, 714
  - participant\_message\_reader, 721
  - participant\_message\_reader\_reliability\_kind, 721
  - participant\_message\_writer, 722
  - participant\_reader\_resource\_limits, 717
  - publication\_reader, 718
  - publication\_reader\_resource\_limits, 718
  - publication\_writer, 719
  - publication\_writer\_data\_lifecycle, 719
  - publication\_writer\_publish\_mode, 723
  - remote\_participant\_purge\_kind, 715
  - secure\_volatile\_reader, 728
  - secure\_volatile\_writer, 727
  - secure\_volatile\_writer\_publish\_mode, 728
  - service\_request\_reader, 725
  - service\_request\_writer, 724
  - service\_request\_writer\_data\_lifecycle, 725
  - service\_request\_writer\_publish\_mode, 725
  - subscription\_reader, 718
  - subscription\_reader\_resource\_limits, 718
  - subscription\_writer, 720
  - subscription\_writer\_data\_lifecycle, 720
  - subscription\_writer\_publish\_mode, 723
- DDS\_DiscoveryQosPolicy, 731
  - accept\_unknown\_peers, 734
  - enable\_endpoint\_discovery, 734
  - enabled\_transports, 732
  - initial\_peers, 732
  - metatraffic\_transport\_priority, 733
  - multicast\_receive\_addresses, 733
- DDS\_DISPOSED\_INSTANCE\_REPLACEMENT\_DATA\_WRITER\_RESOURCE\_LIMITS, 384
- DDS\_DISPOSED\_THEN\_ALIVE\_INSTANCE\_REPLACEMENT\_DATA\_WRITER\_RESOURCE\_LIMITS, 384
- DDS\_DOMAIN\_ID\_USE\_XML\_CONFIG
  - DomainParticipantConfigParams, 518
- DDS\_DomainId\_t
  - DomainParticipants, 51
- DDS\_DomainParticipantConfigParams\_t, 734
  - domain\_entity\_qos\_library\_name, 736
  - domain\_entity\_qos\_profile\_name, 736
  - domain\_id, 735
  - participant\_name, 735
  - participant\_qos\_library\_name, 735
  - participant\_qos\_profile\_name, 736
- DDS\_DomainParticipantConfigParams\_t\_INITIALIZER
  - DomainParticipantConfigParams, 518
- DDS\_DomainParticipantFactoryQos, 737
  - entity\_factory, 739
  - logging, 739
  - monitoring, 739
  - operator!=, 738
  - operator==, 738
  - profile, 739
  - resource\_limits, 739
- DDS\_DomainParticipantFactoryQos\_equals
  - DomainParticipantFactory, 42
- DDS\_DomainParticipantProtocolStatus, 740
  - corrupted\_rtps\_message\_count, 740
  - corrupted\_rtps\_message\_count\_change, 740
  - last\_corrupted\_message\_timestamp, 740
- DDS\_DomainParticipantQos, 741
  - database, 745
  - default\_unicast, 744
  - discovery, 744
  - discovery\_config, 745
  - entity\_factory, 744
  - event, 745
  - multicast\_mapping, 746
  - operator!=, 743
  - operator==, 743
  - participant\_name, 745
  - partition, 746
  - property, 745
  - receiver\_pool, 745
  - resource\_limits, 744
  - service, 746
  - transport\_builtin, 744
  - type\_support, 746
  - user\_data, 743

- wire\_protocol, 744
- DDS\_DomainParticipantQos\_equals
  - DomainParticipants, 51
- DDS\_DOMAINPARTICIPANTRESOURCELIMITS\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_DOMAINPARTICIPANTRESOURCELIMITS\_QOS\_POLICY\_NAME
  - DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS, 398
- DDS\_DomainParticipantResourceLimitsIgnoredEntityReplacementKind
  - DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS, 397
- DDS\_DomainParticipantResourceLimitsQosPolicy, 746
  - channel\_filter\_expression\_max\_length, 762
  - channel\_seq\_max\_length, 762
  - content\_filter\_allocation, 753
  - content\_filter\_hash\_buckets, 757
  - content\_filtered\_topic\_allocation, 753
  - content\_filtered\_topic\_hash\_buckets, 757
  - contentfilter\_property\_max\_length, 761
  - deserialized\_type\_object\_dynamic\_allocation\_threshold, 761
  - flow\_controller\_allocation, 754
  - flow\_controller\_hash\_buckets, 757
  - ignored\_entity\_allocation, 753
  - ignored\_entity\_hash\_buckets, 757
  - ignored\_entity\_replacement\_kind, 764
  - local\_publisher\_allocation, 751
  - local\_publisher\_hash\_buckets, 755
  - local\_reader\_allocation, 750
  - local\_reader\_hash\_buckets, 755
  - local\_subscriber\_allocation, 751
  - local\_subscriber\_hash\_buckets, 755
  - local\_topic\_allocation, 751
  - local\_topic\_hash\_buckets, 755
  - local\_writer\_allocation, 750
  - local\_writer\_hash\_buckets, 754
  - matching\_reader\_writer\_pair\_allocation, 752
  - matching\_reader\_writer\_pair\_hash\_buckets, 756
  - matching\_writer\_reader\_pair\_allocation, 752
  - matching\_writer\_reader\_pair\_hash\_buckets, 756
  - max\_endpoint\_group\_cumulative\_characters, 764
  - max\_endpoint\_groups, 764
  - max\_gather\_destinations, 757
  - max\_partition\_cumulative\_characters, 759
  - max\_partitions, 759
  - outstanding\_asynchronous\_sample\_allocation, 754
  - participant\_property\_list\_max\_length, 762
  - participant\_property\_string\_max\_length, 762
  - participant\_user\_data\_max\_length, 758
  - publisher\_group\_data\_max\_length, 758
  - query\_condition\_allocation, 754
  - read\_condition\_allocation, 753
  - reader\_data\_tag\_list\_max\_length, 766
  - reader\_data\_tag\_string\_max\_length, 766
  - reader\_property\_list\_max\_length, 763
  - reader\_property\_string\_max\_length, 763
  - reader\_user\_data\_max\_length, 759
  - remote\_participant\_allocation, 752
  - remote\_participant\_hash\_buckets, 756
  - remote\_reader\_allocation, 752
  - remote\_reader\_hash\_buckets, 756
  - remote\_topic\_query\_allocation, 765
  - remote\_topic\_query\_hash\_buckets, 765
  - remote\_writer\_allocation, 751
  - remote\_writer\_hash\_buckets, 755
  - serialized\_type\_object\_dynamic\_allocation\_threshold, 760
  - shmem\_ref\_transfer\_mode\_max\_segments, 766
  - subscriber\_group\_data\_max\_length, 758
  - topic\_data\_max\_length, 758
  - transport\_info\_list\_max\_length, 764
  - type\_code\_max\_serialized\_length, 760
  - type\_object\_max\_deserialized\_length, 761
  - type\_object\_max\_serialized\_length, 760
  - writer\_data\_tag\_list\_max\_length, 765
  - writer\_data\_tag\_string\_max\_length, 766
  - writer\_property\_list\_max\_length, 763
  - writer\_property\_string\_max\_length, 763
  - writer\_user\_data\_max\_length, 759
- DDS\_Double
  - DDS-Specific Primitive Types, 319
- DDS\_DoubleSeq, 767
- DDS\_DURABILITY\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_DURABILITY\_QOS\_POLICY\_NAME
  - DURABILITY, 401
- DDS\_DurabilityQosPolicy, 767
  - direct\_communication, 770
  - kind, 770
  - storage\_settings, 771
  - writer\_depth, 770
- DDS\_DurabilityQosPolicyKind
  - DURABILITY, 400
- DDS\_DURABILITYSERVICE\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_DURABILITYSERVICE\_QOS\_POLICY\_NAME
  - DURABILITY\_SERVICE, 402
- DDS\_DurabilityServiceQosPolicy, 771
  - history\_depth, 773
  - history\_kind, 773
  - max\_instances, 773
  - max\_samples, 773
  - max\_samples\_per\_instance, 774
  - service\_cleanup\_delay, 773
- DDS\_DURATION\_AUTO
  - Time Support, 327
- DDS\_DURATION\_AUTO\_NSEC
  - Time Support, 327
- DDS\_DURATION\_AUTO\_SEC
  - Time Support, 326

DDS\_DURATION\_INFINITE  
Time Support, 326

DDS\_DURATION\_INFINITE\_NSEC  
Time Support, 326

DDS\_DURATION\_INFINITE\_SEC  
Time Support, 326

DDS\_Duration\_is\_auto  
Time Support, 325

DDS\_Duration\_is\_infinite  
Time Support, 324

DDS\_Duration\_is\_zero  
Time Support, 325

DDS\_Duration\_t, 774  
nanosec, 775  
sec, 775

DDS\_DURATION\_ZERO  
Time Support, 327

DDS\_DURATION\_ZERO\_NSEC  
Time Support, 327

DDS\_DURATION\_ZERO\_SEC  
Time Support, 327

DDS\_DYNAMIC\_DATA\_JSON\_PARSER\_PROPERTIES\_DEFAULT  
Dynamic Data, 102

DDS\_DYNAMIC\_DATA\_MEMBER\_ID\_UNSPECIFIED  
Dynamic Data, 101

DDS\_DYNAMIC\_DATA\_PROPERTY\_DEFAULT  
Dynamic Data, 102

DDS\_DYNAMIC\_DATA\_TYPE\_PROPERTY\_DEFAULT  
Dynamic Data, 102

DDS\_DynamicData, 775  
~DDS\_DynamicData, 791  
bind\_complex\_member, 803  
bind\_type, 802  
clear\_all\_members, 794  
clear\_member, 795  
clear\_optional\_member, 794  
copy, 792  
DDS\_DynamicData, 790  
equal, 793  
from\_cdr\_buffer, 798  
from\_string, 800  
get\_boolean, 817  
get\_boolean\_array, 832  
get\_boolean\_seq, 845  
get\_cdr\_buffer, 796  
get\_char, 818  
get\_char\_array, 833  
get\_char\_seq, 846  
get\_complex\_member, 826  
get\_double, 816  
get\_double\_array, 832  
get\_double\_seq, 845  
get\_float, 815  
get\_float\_array, 831  
get\_float\_seq, 844  
get\_info, 801  
get\_int8, 825  
get\_int8\_array, 839  
get\_int8\_seq, 851  
get\_long, 812  
get\_long\_array, 827  
get\_long\_seq, 840  
get\_longdouble, 821  
get\_longdouble\_array, 837  
get\_longdouble\_seq, 850  
get\_longlong, 819  
get\_longlong\_array, 835  
get\_longlong\_seq, 848  
get\_member\_count, 806  
get\_member\_info, 808  
get\_member\_info\_by\_index, 810  
get\_member\_type, 810  
get\_octet, 819  
get\_octet\_array, 834  
get\_octet\_seq, 847  
get\_short, 813  
get\_short\_array, 828  
get\_short\_seq, 841  
get\_string, 823  
get\_type, 806  
get\_type\_kind, 806  
get\_uint8, 825  
get\_uint8\_array, 840  
get\_uint8\_seq, 852  
get\_ulong, 814  
get\_ulong\_array, 829  
get\_ulong\_seq, 842  
get\_ulonglong, 820  
get\_ulonglong\_array, 836  
get\_ulonglong\_seq, 849  
get\_ushort, 815  
get\_ushort\_array, 830  
get\_ushort\_seq, 843  
get\_wchar, 822  
get\_wchar\_array, 838  
get\_wchar\_seq, 850  
get\_wstring, 824  
is\_cdr, 796  
is\_member\_key, 811  
is\_valid, 791  
member\_exists, 807  
member\_exists\_in\_type, 808  
operator=, 793  
operator==, 793  
print, 801  
set\_boolean, 857  
set\_boolean\_array, 872  
set\_boolean\_seq, 884

- set\_cdr\_buffer, 797
- set\_char, 858
- set\_char\_array, 873
- set\_char\_seq, 885
- set\_complex\_member, 865
- set\_double, 857
- set\_double\_array, 871
- set\_double\_seq, 884
- set\_float, 856
- set\_float\_array, 870
- set\_float\_seq, 883
- set\_int8, 864
- set\_int8\_array, 878
- set\_int8\_seq, 890
- set\_long, 853
- set\_long\_array, 867
- set\_long\_seq, 880
- set\_longdouble, 861
- set\_longdouble\_array, 876
- set\_longdouble\_seq, 888
- set\_longlong, 859
- set\_longlong\_array, 874
- set\_longlong\_seq, 887
- set\_octet, 859
- set\_octet\_array, 874
- set\_octet\_seq, 886
- set\_short, 854
- set\_short\_array, 868
- set\_short\_seq, 880
- set\_string, 862
- set\_uint8, 864
- set\_uint8\_array, 879
- set\_uint8\_seq, 891
- set\_ulong, 854
- set\_ulong\_array, 868
- set\_ulong\_seq, 881
- set\_ulonglong, 860
- set\_ulonglong\_array, 875
- set\_ulonglong\_seq, 888
- set\_ushort, 855
- set\_ushort\_array, 869
- set\_ushort\_seq, 882
- set\_wchar, 862
- set\_wchar\_array, 877
- set\_wchar\_seq, 889
- set\_wstring, 863
- to\_cdr\_buffer, 798
- to\_cdr\_buffer\_ex, 799
- to\_string, 799
- unbind\_complex\_member, 805
- unbind\_type, 803
- DDS\_DynamicDataInfo, 892
  - member\_count, 892
  - stored\_size, 892
- DDS\_DynamicDataJsonParserProperties\_t, 892
- DDS\_DynamicDataMemberId
  - Dynamic Data, 101
- DDS\_DynamicDataMemberInfo, 893
  - element\_count, 894
  - element\_kind, 894
  - member\_exists, 894
  - member\_id, 893
  - member\_kind, 894
  - member\_name, 893
- DDS\_DynamicDataProperty\_t, 895
  - buffer\_initial\_size, 895
  - buffer\_max\_size, 895
- DDS\_DynamicDataSeq, 896
- DDS\_DynamicDataTypeProperty\_t, 896
  - data, 897
  - serialization, 897
- DDS\_DynamicDataTypeSerializationProperty\_t, 897
  - max\_size\_serialized, 898
  - min\_size\_serialized, 898
  - skip\_deserialization, 899
  - trim\_to\_size, 899
  - use\_42e\_compatible\_alignment, 898
- DDS\_EDF\_FLOW\_CONTROLLER\_SCHED\_POLICY
  - Flow Controllers, 120
- DDS\_EMPTY\_INSTANCE\_REMOVAL
  - DATA\_READER\_RESOURCE\_LIMITS, 368
- DDS\_EndpointGroup\_t, 900
  - quorum\_count, 900
  - role\_name, 900
- DDS\_EndpointGroupSeq, 900
- DDS\_EndpointTrustAlgorithmInfo, 901
  - Built-in Topic's Trust Types, 99
  - interceptor, 901
- DDS\_EndpointTrustAttributesMask
  - Built-in Topic's Trust Types, 97
- DDS\_EndpointTrustInterceptorAlgorithmInfo, 902
  - Built-in Topic's Trust Types, 99
  - required\_mask, 902
  - supported\_mask, 902
- DDS\_EndpointTrustProtectionInfo, 902
  - bitmask, 903
  - Built-in Topic's Trust Types, 97
  - plugin\_bitmask, 903
- DDS\_ENTITY\_NAME\_USE\_XML\_CONFIG
  - DomainParticipantConfigParams, 518
- DDS\_ENTITYFACTORY\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_ENTITYFACTORY\_QOS\_POLICY\_NAME
  - ENTITY\_FACTORY, 403
- DDS\_EntityFactoryQosPolicy, 903
  - autoenable\_created\_entities, 905
- DDS\_ENTITYNAME\_QOS\_POLICY\_ID
  - QoS Policies, 362

- DDS\_ENTITYNAME\_QOS\_POLICY\_NAME
  - ENTITY\_NAME, 404
- DDS\_EntityNameQosPolicy, 905
  - name, 906
  - role\_name, 906
- DDS\_Enum
  - DDS-Specific Primitive Types, 320
- DDS\_EnumMember, 906
  - name, 907
  - ordinal, 907
- DDS\_EnumMemberSeq, 907
- DDS\_EVENT\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_EVENT\_QOS\_POLICY\_NAME
  - EVENT, 404
- DDS\_EventQosPolicy, 908
  - initial\_count, 909
  - max\_count, 909
  - thread, 909
- DDS\_ExceptionCode\_t
  - Exception Codes, 334
- DDS\_EXCLUSIVE\_OWNERSHIP\_QOS
  - OWNERSHIP, 415
- DDS\_ExpressionProperty, 910
  - key\_only\_filter, 910
  - writer\_side\_filter\_optimization, 910
- DDS\_ExtensibilityKind
  - Type Code Support, 86
- DDS\_EXTENSIBLE\_EXTENSIBILITY
  - Type Code Support, 87
- DDS\_FilterSampleInfo, 911
  - related\_reader\_guid, 911
  - related\_sample\_identity, 911
  - related\_source\_guid, 911
- DDS\_FINAL\_EXTENSIBILITY
  - Type Code Support, 87
- DDS\_FIXED\_RATE\_FLOW\_CONTROLLER\_NAME
  - Flow Controllers, 122
- DDS\_Float
  - DDS-Specific Primitive Types, 319
- DDS\_FloatSeq, 912
- DDS\_FLOW\_CONTROLLER\_PROPERTY\_DEFAULT
  - DomainParticipants, 58
- DDS\_FlowControllerProperty\_t, 912
  - scheduling\_policy, 913
  - token\_bucket, 913
- DDS\_FlowControllerSchedulingPolicy
  - Flow Controllers, 119
- DDS\_FlowControllerTokenBucketProperty\_t, 914
  - bytes\_per\_token, 916
  - max\_tokens, 915
  - period, 915
  - tokens\_added\_per\_period, 915
  - tokens\_leaked\_per\_period, 915
- DDS\_FULL\_PERSISTENT\_SYNCHRONIZATION
  - DURABILITY, 400
- DDS\_FULLY\_PROCESSED\_INSTANCE\_REMOVAL
  - DATA\_READER\_RESOURCE\_LIMITS, 368
- DDS\_g\_tc\_boolean
  - Type Code Support, 89
- DDS\_g\_tc\_char
  - Type Code Support, 90
- DDS\_g\_tc\_double
  - Type Code Support, 89
- DDS\_g\_tc\_float
  - Type Code Support, 89
- DDS\_g\_tc\_long
  - Type Code Support, 88
- DDS\_g\_tc\_longdouble
  - Type Code Support, 91
- DDS\_g\_tc\_longlong
  - Type Code Support, 90
- DDS\_g\_tc\_null
  - Type Code Support, 87
- DDS\_g\_tc\_octet
  - Type Code Support, 90
- DDS\_g\_tc\_short
  - Type Code Support, 87
- DDS\_g\_tc\_ulong
  - Type Code Support, 88
- DDS\_g\_tc\_ulonglong
  - Type Code Support, 91
- DDS\_g\_tc\_ushort
  - Type Code Support, 88
- DDS\_g\_tc\_wchar
  - Type Code Support, 91
- DDS\_GROUP\_PRESENTATION\_QOS
  - PRESENTATION, 418
- DDS\_GROUPDATA\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_GROUPDATA\_QOS\_POLICY\_NAME
  - GROUP\_DATA, 407
- DDS\_GroupDataQosPolicy, 916
  - value, 918
- DDS\_GUID\_AUTO
  - GUID Support, 331
- DDS\_GUID\_compare
  - GUID Support, 330
- DDS\_GUID\_copy
  - GUID Support, 330
- DDS\_GUID\_equals
  - GUID Support, 329
- DDS\_GUID\_t, 918
  - GUID Support, 329
  - value, 918
- DDS\_GUID\_UNKNOWN
  - GUID Support, 331
- DDS\_GUID\_ZERO

- GUID Support, 331
- DDS\_HANDLE\_NIL
  - User Data Type Support, 76
- DDS\_Heap\_malloc
  - Heap Support in C, 480
- DDS\_Heap\_free
  - Heap Support in C, 480
- DDS\_Heap\_malloc
  - Heap Support in C, 480
- DDS\_HIGHEST\_OFFERED\_PRESENTATION\_QOS
  - PRESSENTATION, 418
- DDS\_HISTORY\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_HISTORY\_QOS\_POLICY\_NAME
  - HISTORY, 406
- DDS\_HistoryQosPolicy, 919
  - depth, 921
  - kind, 921
- DDS\_HistoryQosPolicyKind
  - HISTORY, 405
- DDS\_HPF\_FLOW\_CONTROLLER\_SCHED\_POLICY
  - Flow Controllers, 121
- DDS\_IMMUTABLE\_TYPECODE\_SYSTEM\_EXCEPTION\_CODE
  - Exception Codes, 334
- DDS\_INCONSISTENT\_TOPIC\_STATUS
  - Status Kinds, 343
- DDS\_InconsistentTopicStatus, 921
  - total\_count, 922
  - total\_count\_change, 922
- DDS\_INSTANCE\_PRESENTATION\_QOS
  - PRESSENTATION, 418
- DDS\_INSTANCE\_SCOPE\_DESTINATIONORDER\_QOS
  - DESTINATION\_ORDER, 388
- DDS\_INSTANCE\_STATE\_SERVICE\_REQUEST\_ID
  - ServiceRequest Built-in Topic, 302
- DDS\_InstanceHandle\_compare
  - User Data Type Support, 74
- DDS\_InstanceHandle\_copy
  - User Data Type Support, 75
- DDS\_InstanceHandle\_equals
  - User Data Type Support, 74
- DDS\_InstanceHandle\_is\_nil
  - User Data Type Support, 75
- DDS\_InstanceHandle\_t
  - User Data Type Support, 74
- DDS\_InstanceHandleSeq, 923
- DDS\_InstanceStateConsistencyKind
  - RELIABILITY, 436
- DDS\_InstanceStateKind
  - Instance States, 160
- DDS\_InstanceStateMask
  - Instance States, 160
- DDS\_Int8
  - DDS-Specific Primitive Types, 318
- DDS\_Int8Seq, 923
- DDS\_INTERMEDIATE\_REPLY\_SEQUENCE\_SAMPLE
  - Sample Flags, 475
- DDS\_INTERMEDIATE\_TOPIC\_QUERY\_SAMPLE
  - Sample Flags, 475
- DDS\_INTEROPERABLE\_RTPS\_WELL\_KNOWN\_PORTS
  - WIRE\_PROTOCOL, 461
- DDS\_INVALID\_LOCAL\_IDENTITY\_ADVANCE\_NOTICE\_STATUS
  - Status Kinds, 347
- DDS\_INVALID\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_InvalidLocalIdentityAdvanceNoticeStatus, 924
  - expiration\_time, 924
- DDS\_JSON\_PRINT\_FORMAT
  - Topics, 65
- DDS\_KEEP\_ALL\_HISTORY\_QOS
  - HISTORY, 406
- DDS\_KEEP\_LAST\_HISTORY\_QOS
  - HISTORY, 406
- DDS\_KeyedOctets, 924
  - ~DDS\_KeyedOctets, 926
  - DDS\_KeyedOctets, 925
  - KeyedOctets Built-in Type, 315
  - length, 926
  - value, 926
- DDS\_KeyedOctetsSeq, 926
- DDS\_KeyedString, 927
  - ~DDS\_KeyedString, 928
  - DDS\_KeyedString, 927, 928
  - key, 928
  - KeyedString Built-in Type, 313
  - value, 929
- DDS\_KeyedStringSeq, 929
- DDS\_LAST\_SHARED\_READER\_QUEUE\_SAMPLE
  - Sample Flags, 475
- DDS\_LATENCYBUDGET\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_LATENCYBUDGET\_QOS\_POLICY\_NAME
  - LATENCY\_BUDGET, 408
- DDS\_LatencyBudgetQosPolicy, 929
  - duration, 931
- DDS\_LENGTH\_AUTO
  - RECEIVER\_POOL, 433
- DDS\_LENGTH\_UNLIMITED
  - RESOURCE\_LIMITS, 438
- DDS\_LIFESPAN\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_LIFESPAN\_QOS\_POLICY\_NAME
  - LIFESPAN, 408
- DDS\_LifespanQosPolicy, 931
  - duration, 932
- DDS\_LIVE\_STREAM
  - Stream Kinds, 162



- DDS\_LIVELINESS\_BASED\_REMOTE\_PARTICIPANT\_PURGE kind, 939
- DISCOVERY\_CONFIG, 395
- DDS\_LIVELINESS\_CHANGED\_STATUS
  - Status Kinds, 346
- DDS\_LIVELINESS\_LOST\_STATUS
  - Status Kinds, 346
- DDS\_LIVELINESS\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_LIVELINESS\_QOS\_POLICY\_NAME
  - LIVELINESS, 410
- DDS\_LivelinessChangedStatus, 932
  - alive\_count, 933
  - alive\_count\_change, 934
  - last\_publication\_handle, 934
  - not\_alive\_count, 933
  - not\_alive\_count\_change, 934
- DDS\_LivelinessLostStatus, 934
  - total\_count, 935
  - total\_count\_change, 935
- DDS\_LivelinessQosPolicy, 936
  - assertions\_per\_lease\_duration, 938
  - kind, 938
  - lease\_duration, 938
- DDS\_LivelinessQosPolicyKind
  - LIVELINESS, 409
- DDS\_LOCATOR\_ADDRESS\_INVALID
  - Common types and functions, 311
- DDS\_LOCATOR\_ADDRESS\_LENGTH\_MAX
  - Common types and functions, 305
- DDS\_LOCATOR\_INVALID
  - Common types and functions, 310
- DDS\_LOCATOR\_KIND\_INVALID
  - Common types and functions, 310
- DDS\_LOCATOR\_KIND\_RESERVED
  - Common types and functions, 312
- DDS\_LOCATOR\_KIND\_SHMEM
  - Common types and functions, 311
- DDS\_LOCATOR\_KIND\_SHMEM\_510
  - Common types and functions, 311
- DDS\_LOCATOR\_KIND\_UDPv4
  - Common types and functions, 311
- DDS\_LOCATOR\_KIND\_UDPv4\_WAN
  - Common types and functions, 311
- DDS\_LOCATOR\_KIND\_UDPv6
  - Common types and functions, 311
- DDS\_LOCATOR\_KIND\_UDPv6\_510
  - Common types and functions, 312
- DDS\_LOCATOR\_PORT\_INVALID
  - Common types and functions, 310
- DDS\_LOCATOR\_REACHABILITY\_SERVICE\_REQUEST\_IDDDS
  - ServiceRequest Built-in Topic, 302
- DDS\_Locator\_t, 939
  - address, 940
  - Common types and functions, 307
  - kind, 939
  - port, 940
- DDS\_LOCATORFILTER\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_LOCATORFILTER\_QOS\_POLICY\_NAME
  - LOCATORFILTER, 411
- DDS\_LocatorFilter\_t, 940
  - filter\_expression, 941
  - locators, 941
- DDS\_LocatorFilterQosPolicy, 941
  - filter\_name, 942
  - locator\_filters, 942
- DDS\_LocatorFilterSeq, 943
- DDS\_LocatorSeq, 943
- DDS\_LOGGING\_QOS\_POLICY\_ID
  - QoS Policies, 363
- DDS\_LoggingQosPolicy, 943
  - category, 944
  - max\_bytes\_per\_file, 946
  - max\_files, 946
  - output\_file, 945
  - output\_file\_suffix, 945
  - print\_format, 945
  - verbosity, 944
- DDS\_Long
  - DDS-Specific Primitive Types, 318
- DDS\_LongDouble
  - DDS-Specific Primitive Types, 319
- DDS\_LongDoubleSeq, 947
- DDS\_LongLong
  - DDS-Specific Primitive Types, 319
- DDS\_LongLongSeq, 947
- DDS\_LongSeq, 948
- DDS\_LOST\_BY\_AVAILABILITY\_WAITING\_TIME
  - DataReaders, 138
- DDS\_LOST\_BY\_DECODE\_FAILURE
  - DataReaders, 139
- DDS\_LOST\_BY\_DESERIALIZATION\_FAILURE
  - DataReaders, 139
- DDS\_LOST\_BY\_INCOMPLETE\_COHERENT\_SET
  - DataReaders, 137
- DDS\_LOST\_BY\_INSTANCES\_LIMIT
  - DataReaders, 136
- DDS\_LOST\_BY\_LARGE\_COHERENT\_SET
  - DataReaders, 137
- DDS\_LOST\_BY\_OUT\_OF\_MEMORY
  - DataReaders, 139
- DDS\_LOST\_BY\_REMOTE\_WRITER\_SAMPLES\_PER\_VIRTUAL\_QUEUE
  - DataReaders, 139
- DDS\_LOST\_BY\_REMOTE\_WRITERS\_PER\_INSTANCE\_LIMIT
  - DataReaders, 136
- DDS\_LOST\_BY\_REMOTE\_WRITERS\_PER\_SAMPLE\_LIMIT
  - DataReaders, 138
- DDS\_LOST\_BY\_SAMPLES\_LIMIT

- DataReaders, 140
- DDS\_LOST\_BY\_SAMPLES\_PER\_INSTANCE\_LIMIT
  - DataReaders, 139
- DDS\_LOST\_BY\_SAMPLES\_PER\_REMOTE\_WRITER\_LIMIT
  - DataReaders, 138
- DDS\_LOST\_BY\_UNKNOWN\_INSTANCE
  - DataReaders, 139
- DDS\_LOST\_BY\_VIRTUAL\_WRITERS\_LIMIT
  - DataReaders, 138
- DDS\_LOST\_BY\_WRITER
  - DataReaders, 136
- DDS\_MANUAL\_BY\_PARTICIPANT\_LIVELINESS\_QOS
  - LIVELINESS, 410
- DDS\_MANUAL\_BY\_TOPIC\_LIVELINESS\_QOS
  - LIVELINESS, 410
- DDS\_MEMORY\_PERSISTENT\_JOURNAL
  - DURABILITY, 399
- DDS\_MONITORING\_LIBRARY\_COMMAND\_SERVICE\_REQUEST
  - ServiceRequest Built-in Topic, 302
- DDS\_MONITORING\_LIBRARY\_REPLY\_SERVICE\_REQUEST
  - ServiceRequest Built-in Topic, 302
- DDS\_MONITORING\_QOS\_POLICY\_ID
  - QoS Policies, 363
- DDS\_MONITORING\_QOS\_POLICY\_NAME
  - MONITORING, 413
- DDS\_MonitoringDedicatedParticipantSettings, 948
  - collector\_initial\_peers, 949
  - domain\_id, 949
  - enable, 949
  - participant\_qos\_profile\_name, 949
- DDS\_MonitoringDistributionSettings, 950
  - dedicated\_participant, 951
  - event\_settings, 951
  - logging\_settings, 951
  - periodic\_settings, 951
  - publisher\_qos\_profile\_name, 951
- DDS\_MonitoringEventDistributionSettings, 952
  - concurrency\_level, 953
  - datawriter\_qos\_profile\_name, 953
  - publication\_period, 953
  - thread, 953
- DDS\_MonitoringLoggingDistributionSettings, 954
  - concurrency\_level, 955
  - datawriter\_qos\_profile\_name, 955
  - max\_historical\_logs, 955
  - publication\_period, 956
  - thread, 955
- DDS\_MonitoringLoggingForwardingSettings, 956
  - middleware\_forwarding\_level, 957
  - security\_event\_forwarding\_level, 957
  - service\_forwarding\_level, 957
  - user\_forwarding\_level, 957
- DDS\_MonitoringMetricSelection, 958
  - disabled\_metrics\_selection, 959
  - enabled\_metrics\_selection, 959
  - resource\_selection, 958
- DDS\_MonitoringMetricSelectionSeq, 960
- DDS\_MonitoringPeriodicDistributionSettings, 960
  - datawriter\_qos\_profile\_name, 961
  - polling\_period, 961
  - thread, 961
- DDS\_MonitoringQoSPolicy, 962
  - application\_name, 962
  - distribution\_settings, 963
  - enable, 962
  - telemetry\_data, 963
- DDS\_MonitoringTelemetryData, 963
  - logs, 964
  - metrics, 964
- DDS\_MULTICHANNEL\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_MULTICHANNEL\_QOS\_POLICY\_NAME
  - MULTICHANNEL, 413
- DDS\_MultiChannelQoSPolicy, 964
  - channels, 966
  - filter\_name, 966
- DDS\_MUTABLE\_EXTENSIBILITY
  - Type Code Support, 87
- DDS\_NEW\_VIEW\_STATE
  - View States, 159
- DDS\_NO\_EXCEPTION\_CODE
  - Exception Codes, 334
- DDS\_NO\_INSTANCE\_REMOVAL
  - DATA\_READER\_RESOURCE\_LIMITS, 368
- DDS\_NO\_MEMORY\_SYSTEM\_EXCEPTION\_CODE
  - Exception Codes, 334
- DDS\_NO\_RECOVER\_INSTANCE\_STATE\_CONSISTENCY
  - RELIABILITY, 436
- DDS\_NO\_REMOTE\_PARTICIPANT\_PURGE
  - DISCOVERY\_CONFIG, 396
- DDS\_NO\_REPLACEMENT\_IGNORED\_ENTITY\_REPLACEMENT
  - DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS, 397
- DDS\_NO\_SERVICE\_QOS
  - SERVICE, 439
- DDS\_NORMAL\_PERSISTENT\_SYNCHRONIZATION
  - DURABILITY, 400
- DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE
  - Instance States, 161
- DDS\_NOT\_ALIVE\_FIRST\_IGNORED\_ENTITY\_REPLACEMENT
  - DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS, 397
- DDS\_NOT\_ALIVE\_INSTANCE\_STATE
  - Instance States, 161
- DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE
  - Instance States, 161
- DDS\_NOT\_LOST
  - DataReaders, 136
- DDS\_NOT\_NEW\_VIEW\_STATE
  - View States, 159

- DDS\_NOT\_READ\_SAMPLE\_STATE
  - Sample States, 157
- DDS\_NOT\_REJECTED
  - DataReaders, 140
- DDS\_NOT\_SET\_CDR\_PADDING
  - TYPESUPPORT, 454
- DDS\_OBSERVABILITY\_COLLECTOR\_SERVICE\_QOS
  - SERVICE, 439
- DDS\_Octet
  - DDS-Specific Primitive Types, 317
- DDS\_OctetBuffer\_alloc
  - Octet Buffer Support, 548
- DDS\_OctetBuffer\_dup
  - Octet Buffer Support, 549
- DDS\_OctetBuffer\_free
  - Octet Buffer Support, 549
- DDS\_Octets, 967
  - ~DDS\_Octets, 968
  - DDS\_Octets, 968
  - length, 968
  - Octets Built-in Type, 314
  - value, 969
- DDS\_OctetSeq, 969
- DDS\_OctetsSeq, 969
- DDS\_OFF\_PERSISTENT\_JOURNAL
  - DURABILITY, 399
- DDS\_OFF\_PERSISTENT\_SYNCHRONIZATION
  - DURABILITY, 400
- DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS
  - Status Kinds, 343
- DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS
  - Status Kinds, 344
- DDS\_OfferedDeadlineMissedStatus, 970
  - last\_instance\_handle, 971
  - total\_count, 970
  - total\_count\_change, 971
- DDS\_OfferedIncompatibleQosStatus, 971
  - last\_policy\_id, 972
  - policies, 972
  - total\_count, 972
  - total\_count\_change, 972
- DDS\_ON\_DEMAND\_FLOW\_CONTROLLER\_NAME
  - Flow Controllers, 123
- DDS\_OWNERSHIP\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_OWNERSHIP\_QOS\_POLICY\_NAME
  - OWNERSHIP, 415
- DDS\_OwnershipQosPolicy, 973
  - kind, 977
- DDS\_OwnershipQosPolicyKind
  - OWNERSHIP, 414
- DDS\_OWNERSHIPSTRENGTH\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_OWNERSHIPSTRENGTH\_QOS\_POLICY\_NAME
  - OWNERSHIP\_STRENGTH, 416
- DDS\_OwnershipStrengthQosPolicy, 978
  - value, 978
- DDS\_PARTICIPANT\_CONFIG\_PARAMS\_DEFAULT
  - DomainParticipantFactory, 48
- DDS\_PARTICIPANT\_QOS\_DEFAULT
  - DomainParticipantFactory, 48
- DDS\_PARTICIPANT\_TOPIC\_NAME
  - Participant Built-in Topics, 295
- DDS\_ParticipantBuiltinTopicData, 979
  - dds\_builtin\_endpoints, 981
  - default\_unicast\_locators, 981
  - domain\_id, 981
  - key, 980
  - partial\_configuration, 983
  - Participant Built-in Topics, 295
  - participant\_name, 981
  - partition, 982
  - product\_version, 981
  - property, 980
  - reachability\_lease\_duration, 982
  - rtps\_protocol\_version, 980
  - rtps\_vendor\_id, 980
  - transport\_info, 981
  - trust\_algorithm\_info, 982
  - trust\_protection\_info, 982
  - user\_data, 980
- DDS\_ParticipantBuiltinTopicDataSeq, 984
- DDS\_ParticipantTrustAlgorithmInfo, 984
  - Built-in Topic's Trust Types, 98
  - interceptor, 985
  - key\_establishment, 985
  - signature, 984
- DDS\_ParticipantTrustAttributesMask
  - Built-in Topic's Trust Types, 96
- DDS\_ParticipantTrustInterceptorAlgorithmInfo, 985
  - Built-in Topic's Trust Types, 98
  - builtin\_endpoints\_required\_mask, 986
  - builtin\_kx\_endpoints\_required\_mask, 986
  - supported\_mask, 986
  - user\_endpoints\_default\_required\_mask, 986
- DDS\_ParticipantTrustKeyEstablishmentAlgorithmInfo, 986
  - Built-in Topic's Trust Types, 98
  - shared\_secret, 987
- DDS\_ParticipantTrustProtectionInfo, 987
  - bitmask, 987
  - Built-in Topic's Trust Types, 97
  - plugin\_bitmask, 988
- DDS\_ParticipantTrustSignatureAlgorithmInfo, 988
  - Built-in Topic's Trust Types, 98
  - message\_auth, 989
  - trust\_chain, 988
- DDS\_PARTITION\_QOS\_POLICY\_ID
  - QoS Policies, 361

- DDS\_PARTITION\_QOS\_POLICY\_NAME
  - PARTITION, 416
- DDS\_PartitionQosPolicy, 989
  - name, 991
- DDS\_PERSIST\_PERSISTENT\_JOURNAL
  - DURABILITY, 399
- DDS\_PERSISTENCE\_SERVICE\_QOS
  - SERVICE, 439
- DDS\_PERSISTENT\_DURABILITY\_QOS
  - DURABILITY, 401
- DDS\_PersistentJournalKind
  - DURABILITY, 399
- DDS\_PersistentStorageSettings, 991
  - enable, 993
  - file\_name, 993
  - journal\_kind, 993
  - reader\_checkpoint\_frequency, 996
  - restore, 994
  - synchronization\_kind, 994
  - trace\_file\_name, 993
  - vacuum, 994
  - writer\_instance\_cache\_allocation, 994
  - writer\_memory\_state, 995
  - writer\_sample\_cache\_allocation, 995
- DDS\_PersistentSynchronizationKind
  - DURABILITY, 399
- DDS\_PluginEndpointTrustAttributesMask
  - Built-in Topic's Trust Types, 97
- DDS\_PluginParticipantTrustAttributesMask
  - Built-in Topic's Trust Types, 97
- DDS\_PRESENTATION\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_PRESENTATION\_QOS\_POLICY\_NAME
  - PRESENTATION, 418
- DDS\_PresentationQosPolicy, 996
  - access\_scope, 1000
  - coherent\_access, 1000
  - drop\_incomplete\_coherent\_set, 1000
  - ordered\_access, 1000
- DDS\_PresentationQosPolicyAccessScopeKind
  - PRESENTATION, 417
- DDS\_PRINT\_FORMAT\_PROPERTY\_DEFAULT
  - Topics, 70
- DDS\_PrintFormatKind
  - Topics, 64
- DDS\_PrintFormatProperty, 1001
  - enum\_as\_int, 1002
  - include\_root\_elements, 1002
  - kind, 1001
  - pretty\_print, 1001
  - Topics, 64
- DDS\_PRIVATE\_MEMBER
  - Type Code Support, 82
- DDS\_ProductVersion\_t, 1003
  - major, 1003
  - minor, 1003
  - release, 1003
  - revision, 1004
- DDS\_PRODUCTVERSION\_UNKNOWN
  - Common types and functions, 307
- DDS\_PROFILE\_BASELINE
  - Builtin Qos Profiles, 487
- DDS\_PROFILE\_BASELINE\_5\_0\_0
  - Builtin Qos Profiles, 487
- DDS\_PROFILE\_BASELINE\_5\_1\_0
  - Builtin Qos Profiles, 487
- DDS\_PROFILE\_BASELINE\_5\_2\_0
  - Builtin Qos Profiles, 488
- DDS\_PROFILE\_BASELINE\_5\_3\_0
  - Builtin Qos Profiles, 488
- DDS\_PROFILE\_BASELINE\_6\_0\_0
  - Builtin Qos Profiles, 488
- DDS\_PROFILE\_BASELINE\_6\_1\_0
  - Builtin Qos Profiles, 488
- DDS\_PROFILE\_BASELINE\_7\_0\_0
  - Builtin Qos Profiles, 488
- DDS\_PROFILE\_BASELINE\_7\_1\_0
  - Builtin Qos Profiles, 489
- DDS\_PROFILE\_BASELINE\_ROOT
  - Builtin Qos Profiles, 487
- DDS\_PROFILE\_GENERIC\_510\_TRANSPORT\_COMPATIBILITY
  - Builtin Qos Profiles, 490
- DDS\_PROFILE\_GENERIC\_AUTO\_TUNING
  - Builtin Qos Profiles, 496
- DDS\_PROFILE\_GENERIC\_BEST\_EFFORT
  - Builtin Qos Profiles, 491
- DDS\_PROFILE\_GENERIC\_COMMON
  - Builtin Qos Profiles, 489
- DDS\_PROFILE\_GENERIC\_CONNEXT\_MICRO\_COMPATIBILITY
  - Builtin Qos Profiles, 489
- DDS\_PROFILE\_GENERIC\_CONNEXT\_MICRO\_COMPATIBILITY\_2\_4\_3
  - Builtin Qos Profiles, 490
- DDS\_PROFILE\_GENERIC\_CONNEXT\_MICRO\_COMPATIBILITY\_2\_4\_9
  - Builtin Qos Profiles, 490
- DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE
  - Builtin Qos Profiles, 491
- DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA
  - Builtin Qos Profiles, 494
- DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA\_FAST
  - Builtin Qos Profiles, 495
- DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA\_MEDIUM
  - Builtin Qos Profiles, 495
- DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_LARGE\_DATA\_SLOW
  - Builtin Qos Profiles, 495
- DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_PERSISTENT
  - Builtin Qos Profiles, 496
- DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_TRANSIENT
  - Builtin Qos Profiles, 496

- DDS\_PROFILE\_GENERIC\_KEEP\_LAST\_RELIABLE\_TRANSIENT\_HISTOGRAM
  - Builtin Qos Profiles, 496
- DDS\_PROFILE\_GENERIC\_MINIMAL\_MEMORY\_FOOTPRINT
  - Builtin Qos Profiles, 497
- DDS\_PROFILE\_GENERIC\_MONITORING2
  - Builtin Qos Profiles, 497
- DDS\_PROFILE\_GENERIC\_MONITORING\_COMMON
  - Builtin Qos Profiles, 489
- DDS\_PROFILE\_GENERIC\_OTHER\_DDS\_VENDOR\_COMPATIBILITY
  - Builtin Qos Profiles, 490
- DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA
  - Builtin Qos Profiles, 492
- DDS\_PROFILE\_GENERIC\_PARTICIPANT\_LARGE\_DATA\_METADATA
  - Builtin Qos Profiles, 493
- DDS\_PROFILE\_GENERIC\_SECURITY
  - Builtin Qos Profiles, 497
- DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE
  - Builtin Qos Profiles, 491
- DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_HIGH\_THROUGHPUT
  - Builtin Qos Profiles, 492
- DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA
  - Builtin Qos Profiles, 493
- DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA\_AS\_PUBLISHER
  - Builtin Qos Profiles, 494
- DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA\_AS\_SUBSCRIBER
  - Builtin Qos Profiles, 494
- DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LARGE\_DATA\_AS\_SPINNING
  - Builtin Qos Profiles, 495
- DDS\_PROFILE\_GENERIC\_STRICT\_RELIABLE\_LOW\_LATENCY
  - Builtin Qos Profiles, 492
- DDS\_PROFILE\_PATTERN\_ALARM\_EVENT
  - Builtin Qos Profiles, 500
- DDS\_PROFILE\_PATTERN\_ALARM\_STATUS
  - Builtin Qos Profiles, 500
- DDS\_PROFILE\_PATTERN\_EVENT
  - Builtin Qos Profiles, 499
- DDS\_PROFILE\_PATTERN\_LAST\_VALUE\_CACHE
  - Builtin Qos Profiles, 501
- DDS\_PROFILE\_PATTERN\_PERIODIC\_DATA
  - Builtin Qos Profiles, 498
- DDS\_PROFILE\_PATTERN\_RELIABLE\_STREAMING
  - Builtin Qos Profiles, 499
- DDS\_PROFILE\_PATTERN\_STATUS
  - Builtin Qos Profiles, 500
- DDS\_PROFILE\_PATTERN\_STREAMING
  - Builtin Qos Profiles, 499
- DDS\_PROFILE\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_PROFILE\_QOS\_POLICY\_NAME
  - PROFILE, 419
- DDS\_ProfileQosPolicy, 1004
  - ignore\_environment\_profile, 1005
  - ignore\_resource\_profile, 1005
  - ignore\_user\_profile, 1005
- StringCache, 1005
- url\_profile, 1005
- DDS\_PROPERTY\_QOS\_IMMUTABLE
  - PROPERTY, 422
- DDS\_PROPERTY\_QOS\_MUTABLE
  - PROPERTY, 422
- DDS\_PROPERTY\_QOS\_MUTABLE\_UNTIL\_ENABLE
  - PROPERTY, 422
- DDS\_PROPERTY\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_PROPERTY\_QOS\_POLICY\_NAME
  - PROPERTY, 428
- DDS\_Property\_t, 1006
  - name, 1006
  - propagate, 1007
  - value, 1006
- DDS\_PropertyQosPolicy, 1007
  - PROPERTY, 421
- DDS\_PropertyQosPolicyHelper, 1009
  - DDS\_PropertyQosPolicyHelper\_get\_property\_mutability
    - PROPERTY, 423
  - DDS\_PropertyQosPolicyMutability
    - PROPERTY, 422
  - DDS\_PropertySeq, 1009
- DDS\_PROTOCOL\_VERSION\_ACKNOWLEDGMENT\_MODE
  - RELIABILITY, 435
- DDS\_PROTOCOL\_VERSION
  - Common types and functions, 306
- DDS\_PROTOCOL\_VERSION\_1\_0
  - Common types and functions, 305
- DDS\_PROTOCOL\_VERSION\_1\_1
  - Common types and functions, 306
- DDS\_PROTOCOL\_VERSION\_1\_2
  - Common types and functions, 306
- DDS\_PROTOCOL\_VERSION\_2\_0
  - Common types and functions, 306
- DDS\_PROTOCOL\_VERSION\_2\_1
  - Common types and functions, 306
- DDS\_ProtocolVersion\_t, 1009
  - Common types and functions, 307
  - major, 1010
  - minor, 1010
- DDS\_PUBLIC\_MEMBER
  - Type Code Support, 83
- DDS\_PUBLICATION\_MATCHED\_STATUS
  - Status Kinds, 347
- DDS\_PUBLICATION\_PRIORITY\_AUTOMATIC
  - PUBLISH\_MODE, 430
- DDS\_PUBLICATION\_PRIORITY\_UNDEFINED
  - PUBLISH\_MODE, 430
- DDS\_PUBLICATION\_TOPIC\_NAME
  - Publication Built-in Topics, 298
- DDS\_PublicationBuiltinTopicData, 1010
  - data\_tags, 1016

- deadline, 1013
- destination\_order, 1015
- disable\_positive\_acks, 1018
- durability, 1013
- durability\_service, 1013
- group\_data, 1016
- key, 1012
- latency\_budget, 1014
- lifespan, 1014
- liveliness, 1014
- locator\_filter, 1018
- ownership, 1014
- ownership\_strength, 1015
- participant\_key, 1012
- partition, 1015
- presentation, 1015
- product\_version, 1018
- property, 1016
- Publication Built-in Topics, 298
- publication\_name, 1018
- publisher\_key, 1016
- reliability, 1014
- representation, 1016
- rtps\_protocol\_version, 1017
- rtps\_vendor\_id, 1017
- service, 1017
- topic\_data, 1015
- topic\_name, 1012
- trust\_algorithm\_info, 1019
- trust\_protection\_info, 1018
- type\_code, 1016
- type\_name, 1013
- unicast\_locators, 1017
- user\_data, 1014
- virtual\_guid, 1017
- DDS\_PublicationBuiltinTopicDataSeq, 1019
- DDS\_PublicationMatchedStatus, 1020
  - current\_count, 1021
  - current\_count\_change, 1021
  - current\_count\_peak, 1021
  - last\_subscription\_handle, 1021
  - total\_count, 1020
  - total\_count\_change, 1021
- DDS\_PUBLISHER\_QOS\_DEFAULT
  - DomainParticipants, 57
- DDS\_PublisherQos, 1022
  - asynchronous\_publisher, 1025
  - entity\_factory, 1024
  - group\_data, 1024
  - operator!=, 1023
  - operator==, 1023
  - partition, 1024
  - presentation, 1024
  - publisher\_name, 1025
- DDS\_PublisherQos\_equals
  - Publishers, 105
- DDS\_PUBLISHMODE\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_PUBLISHMODE\_QOS\_POLICY\_NAME
  - PUBLISH\_MODE, 431
- DDS\_PublishModeQosPolicy, 1025
  - flow\_controller\_name, 1027
  - kind, 1027
  - priority, 1028
- DDS\_PublishModeQosPolicyKind
  - PUBLISH\_MODE, 430
- DDS\_QOS\_ELEMENT\_NAME\_USE\_XML\_CONFIG
  - DomainParticipantConfigParams, 518
- DDS\_QOS\_POLICY\_COUNT
  - QoS Policies, 360
- DDS\_QOS\_PRINT\_ALL
  - Infrastructure Module, 164
- DDS\_QosPolicyCount, 1029
  - count, 1030
  - policy\_id, 1030
- DDS\_QosPolicyCountSeq, 1030
- DDS\_QosPolicyId\_t
  - QoS Policies, 360
- DDS\_QosPrintAll\_t, 1030
- DDS\_QosPrintFormat, 1031
  - indent, 1032
  - is\_standalone, 1031
  - print\_private, 1032
- DDS\_QosPrintFormat\_INITIALIZER
  - QoS Policies, 360
- DDS\_QueryConditionParams, 1033
  - as\_readconditionparams, 1034
  - query\_expression, 1034
  - query\_parameters, 1034
- DDS\_QUEUEING\_SERVICE\_QOS
  - SERVICE, 439
- DDS\_READ\_SAMPLE\_STATE
  - Sample States, 157
- DDS\_ReadConditionParams, 1034
  - instance\_states, 1035
  - sample\_states, 1035
  - stream\_kinds, 1035
  - view\_states, 1035
- DDS\_READERDATALIFECYCLE\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_READERDATALIFECYCLE\_QOS\_POLICY\_NAME
  - READER\_DATA\_LIFECYCLE, 432
- DDS\_ReaderDataLifecycleQosPolicy, 1035
  - autopurge\_disposed\_instances\_delay, 1037
  - autopurge\_disposed\_samples\_delay, 1037
  - autopurge\_nowriter\_instances\_delay, 1038
  - autopurge\_nowriter\_samples\_delay, 1037
- DDS\_RECEIVERPOOL\_QOS\_POLICY\_ID

- QoS Policies, 362
- DDS\_RECEIVERPOOL\_QOS\_POLICY\_NAME
  - RECEIVER\_POOL, 433
- DDS\_ReceiverPoolQosPolicy, 1038
  - buffer\_alignment, 1040
  - buffer\_size, 1040
  - thread, 1039
- DDS\_RECORDING\_SERVICE\_QOS
  - SERVICE, 439
- DDS\_RECOVER\_INSTANCE\_STATE\_CONSISTENCY
  - RELIABILITY, 436
- DDS\_REDELIVERED\_SAMPLE
  - Sample Flags, 475
- DDS\_REJECTED\_BY\_DECODE\_FAILURE
  - DataReaders, 142
- DDS\_REJECTED\_BY\_INSTANCES\_LIMIT
  - DataReaders, 140
- DDS\_REJECTED\_BY\_REMOTE\_WRITER\_SAMPLES\_PER\_INSTANCE\_LIMIT
  - DataReaders, 141
- DDS\_REJECTED\_BY\_SAMPLES\_LIMIT
  - DataReaders, 140
- DDS\_REJECTED\_BY\_SAMPLES\_PER\_INSTANCE\_LIMIT
  - DataReaders, 141
- DDS\_REJECTED\_BY\_SAMPLES\_PER\_REMOTE\_WRITER\_LIMIT
  - DataReaders, 141
- DDS\_RELIABILITY\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_RELIABILITY\_QOS\_POLICY\_NAME
  - RELIABILITY, 437
- DDS\_ReliabilityQosPolicy, 1041
  - acknowledgment\_kind, 1043
  - instance\_state\_consistency\_kind, 1044
  - kind, 1043
  - max\_blocking\_time, 1043
- DDS\_ReliabilityQosPolicyAcknowledgmentModeKind
  - RELIABILITY, 435
- DDS\_ReliabilityQosPolicyKind
  - RELIABILITY, 434
- DDS\_RELIABLE\_READER\_ACTIVITY\_CHANGED\_STATUS
  - Status Kinds, 349
- DDS\_RELIABLE\_RELIABILITY\_QOS
  - RELIABILITY, 435
- DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS
  - Status Kinds, 349
- DDS\_ReliableReaderActivityChangedStatus, 1044
  - active\_count, 1045
  - active\_count\_change, 1045
  - inactive\_count, 1045
  - inactive\_count\_change, 1046
  - last\_instance\_handle, 1046
- DDS\_ReliableWriterCacheChangedStatus, 1046
  - empty\_reliable\_writer\_cache, 1047
  - full\_reliable\_writer\_cache, 1047
  - high\_watermark\_reliable\_writer\_cache, 1048
  - low\_watermark\_reliable\_writer\_cache, 1047
  - replaced\_unacknowledged\_sample\_count, 1048
  - unacknowledged\_sample\_count, 1048
  - unacknowledged\_sample\_count\_peak, 1048
- DDS\_ReliableWriterCacheEventCount, 1049
  - total\_count, 1049
  - total\_count\_change, 1049
- DDS\_RemoteParticipantPurgeKind
  - DISCOVERY\_CONFIG, 394
- DDS\_REPLAY\_SERVICE\_QOS
  - SERVICE, 439
- DDS\_REPLICATE\_SAMPLE
  - Sample Flags, 475
- DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS
  - Status Kinds, 344
- DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS
  - Status Kinds, 344
- DDS\_RequestedDeadlineMissedStatus, 1050
  - last\_instance\_handle, 1050
  - total\_count, 1050
  - total\_count\_change, 1050
- DDS\_RequestedIncompatibleQosStatus, 1051
  - last\_policy\_id, 1052
  - policies, 1052
  - total\_count, 1051
  - total\_count\_change, 1052
- DDS\_RESOURCELIMITS\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_RESOURCELIMITS\_QOS\_POLICY\_NAME
  - RESOURCE\_LIMITS, 437
- DDS\_ResourceLimitsQosPolicy, 1052
  - initial\_instances, 1056
  - initial\_samples, 1055
  - instance\_hash\_buckets, 1056
  - max\_instances, 1055
  - max\_samples, 1055
  - max\_samples\_per\_instance, 1055
- DDS\_RETCODE\_ALREADY\_DELETED
  - Return Codes, 337
- DDS\_RETCODE\_BAD\_PARAMETER
  - Return Codes, 336
- DDS\_RETCODE\_ERROR
  - Return Codes, 336
- DDS\_RETCODE\_ILLEGAL\_OPERATION
  - Return Codes, 337
- DDS\_RETCODE\_IMMUTABLE\_POLICY
  - Return Codes, 337
- DDS\_RETCODE\_INCONSISTENT\_POLICY
  - Return Codes, 337
- DDS\_RETCODE\_NO\_DATA
  - Return Codes, 337
- DDS\_RETCODE\_NOT\_ALLOWED\_BY\_SECURITY
  - Return Codes, 337
- DDS\_RETCODE\_NOT\_ENABLED

- Return Codes, 337
- DDS\_RETCODE\_OK
  - Return Codes, 336
- DDS\_RETCODE\_OUT\_OF\_RESOURCES
  - Return Codes, 337
- DDS\_RETCODE\_PRECONDITION\_NOT\_MET
  - Return Codes, 336
- DDS\_RETCODE\_TIMEOUT
  - Return Codes, 337
- DDS\_RETCODE\_UNSUPPORTED
  - Return Codes, 336
- DDS\_ReturnCode\_t
  - Return Codes, 336
- DDS\_ROUTING\_SERVICE\_QOS
  - SERVICE, 439
- DDS\_RR\_FLOW\_CONTROLLER\_SCHED\_POLICY
  - Flow Controllers, 120
- DDS\_RTI\_BACKWARDS\_COMPATIBLE RTPS\_WELL\_KNOWN\_PORTS\_WIRE\_PROTOCOL, 460
- DDS RTPS\_AUTO\_ID\_FROM\_IP
  - WIRE\_PROTOCOL, 460
- DDS RTPS\_AUTO\_ID\_FROM\_MAC
  - WIRE\_PROTOCOL, 460
- DDS RTPS\_AUTO\_ID\_FROM\_UUID
  - WIRE\_PROTOCOL, 460
- DDS RTPS\_EntityId\_t, 1056
  - GUID Support, 329
- DDS RTPS\_GUID\_t, 1057
  - GUID Support, 329
- DDS RTPS\_GuidPrefix\_t
  - GUID Support, 329
- DDS RTPS\_RESERVED\_PORT\_BUILTIN\_MULTICAST
  - WIRE\_PROTOCOL, 460
- DDS RTPS\_RESERVED\_PORT\_BUILTIN\_UNICAST
  - WIRE\_PROTOCOL, 460
- DDS RTPS\_RESERVED\_PORT\_MASK\_ALL
  - WIRE\_PROTOCOL, 458
- DDS RTPS\_RESERVED\_PORT\_MASK\_DEFAULT
  - WIRE\_PROTOCOL, 457
- DDS RTPS\_RESERVED\_PORT\_MASK\_NONE
  - WIRE\_PROTOCOL, 458
- DDS RTPS\_RESERVED\_PORT\_USER\_MULTICAST
  - WIRE\_PROTOCOL, 460
- DDS RTPS\_RESERVED\_PORT\_USER\_UNICAST
  - WIRE\_PROTOCOL, 460
- DDS\_RtpsReliableReaderProtocol\_t, 1057
  - app\_ack\_period, 1060
  - heartbeat\_suppression\_duration, 1058
  - max\_heartbeat\_response\_delay, 1058
  - min\_app\_ack\_response\_keep\_duration, 1060
  - min\_heartbeat\_response\_delay, 1058
  - nack\_period, 1059
  - receive\_window\_size, 1059
  - round\_trip\_time, 1059
  - samples\_per\_app\_ack, 1060
- DDS\_RtpsReliableWriterProtocol\_t, 1061
  - disable\_positive\_acks\_decrease\_sample\_keep\_duration\_factor, 1071
  - disable\_positive\_acks\_enable\_adaptive\_sample\_keep\_duration, 1071
  - disable\_positive\_acks\_increase\_sample\_keep\_duration\_factor, 1072
  - disable\_positive\_acks\_max\_sample\_keep\_duration, 1070
  - disable\_positive\_acks\_min\_sample\_keep\_duration, 1070
  - disable\_repair\_piggyback\_heartbeat, 1076
  - enable\_multicast\_periodic\_heartbeat, 1075
  - fast\_heartbeat\_period, 1064
  - heartbeat\_period, 1064
  - heartbeats\_per\_max\_samples, 1067
  - high\_watermark, 1063
  - inactivate\_nonprogressing\_readers, 1067
  - late\_joiner\_heartbeat\_period, 1065
  - low\_watermark, 1063
  - max\_bytes\_per\_nack\_response, 1069
  - max\_heartbeat\_retries, 1066
  - max\_nack\_response\_delay, 1069
  - max\_send\_window\_size, 1073
  - min\_nack\_response\_delay, 1068
  - min\_send\_window\_size, 1072
  - multicast\_resend\_threshold, 1075
  - nack\_suppression\_duration, 1069
  - samples\_per\_virtual\_heartbeat, 1066
  - send\_window\_decrease\_factor, 1074
  - send\_window\_increase\_factor, 1074
  - send\_window\_update\_period, 1073
  - virtual\_heartbeat\_period, 1066
- DDS\_RtpsReservedPortKind
  - WIRE\_PROTOCOL, 459
- DDS\_RtpsReservedPortKindMask
  - WIRE\_PROTOCOL, 459
- DDS\_RtpsWellKnownPorts\_t, 1076
  - builtin\_multicast\_port\_offset, 1080
  - builtin\_unicast\_port\_offset, 1080
  - domain\_id\_gain, 1078
  - participant\_id\_gain, 1080
  - port\_base, 1078
  - user\_multicast\_port\_offset, 1080
  - user\_unicast\_port\_offset, 1081
- DDS\_SAMPLE\_LOST\_STATUS
  - Status Kinds, 345
- DDS\_SAMPLE\_REJECTED\_STATUS
  - Status Kinds, 345
- DDS\_SampleFlag
  - Sample Flags, 474
- DDS\_SampleFlagBits
  - Sample Flags, 474, 475



- DDS\_SampleIdentity\_equals
  - WriteParams, 476
- DDS\_SampleIdentity\_t, 1081
- DDS\_SampleInfo, 1082
  - absolute\_generation\_rank, 1088
  - coherent\_set\_info, 1092
  - disposed\_generation\_count, 1087
  - flag, 1091
  - generation\_rank, 1088
  - instance\_handle, 1087
  - instance\_state, 1086
  - no\_writers\_generation\_count, 1087
  - original\_publication\_virtual\_guid, 1090
  - original\_publication\_virtual\_sequence\_number, 1090
  - publication\_handle, 1087
  - publication\_sequence\_number, 1089
  - reception\_sequence\_number, 1090
  - reception\_timestamp, 1089
  - related\_original\_publication\_virtual\_guid, 1090
  - related\_original\_publication\_virtual\_sequence\_number, 1091
  - related\_source\_guid, 1091
  - related\_subscription\_guid, 1092
  - sample\_rank, 1088
  - sample\_state, 1085
  - source\_guid, 1091
  - source\_timestamp, 1086
  - topic\_query\_guid, 1092
  - valid\_data, 1089
  - view\_state, 1086
- DDS\_SampleInfo\_get\_related\_sample\_identity
  - Data Samples, 150
- DDS\_SampleInfo\_get\_sample\_identity
  - Data Samples, 150
- DDS\_SampleInfoSeq, 1093
- DDS\_SampleLostStatus, 1093
  - last\_reason, 1094
  - total\_count, 1093
  - total\_count\_change, 1093
- DDS\_SampleLostStatusKind
  - DataReaders, 136
- DDS\_SampleRejectedStatus, 1094
  - last\_instance\_handle, 1095
  - last\_reason, 1095
  - total\_count, 1094
  - total\_count\_change, 1095
- DDS\_SampleRejectedStatusKind
  - DataReaders, 140
- DDS\_SampleStateKind
  - Sample States, 156
- DDS\_SampleStateMask
  - Sample States, 156
- DDS\_SEQUENCE\_NUMBER\_MAX
  - Sequence Number Support, 333
- DDS\_SEQUENCE\_NUMBER\_UNKNOWN
  - Sequence Number Support, 332
- DDS\_SEQUENCE\_NUMBER\_ZERO
  - Sequence Number Support, 332
- DDS\_SequenceNumber\_t, 1095
  - high, 1096
  - low, 1096
  - Sequence Number Support, 332
- DDS\_SERVICE\_QOS\_POLICY\_NAME
  - SERVICE, 439
- DDS\_SERVICE\_REQUEST\_ACCEPTED\_STATUS
  - Status Kinds, 348
- DDS\_SERVICE\_REQUEST\_TOPIC\_NAME
  - ServiceRequest Built-in Topic, 303
- DDS\_ServiceQosPolicy, 1096
  - kind, 1097
- DDS\_ServiceQosPolicyKind
  - SERVICE, 439
- DDS\_ServiceRequest, 1097
  - instance\_id, 1098
  - request\_body, 1098
  - service\_id, 1098
  - ServiceRequest Built-in Topic, 301
- DDS\_ServiceRequestAcceptedStatus, 1099
  - current\_count, 1100
  - current\_count\_change, 1100
  - last\_request\_handle, 1100
  - service\_id, 1100
  - total\_count, 1100
  - total\_count\_change, 1100
- DDS\_ServiceRequestSeq, 1101
- DDS\_SHARED\_OWNERSHIP\_QOS
  - OWNERSHIP, 415
- DDS\_Short
  - DDS-Specific Primitive Types, 318
- DDS\_ShortSeq, 1101
- DDS\_SNIPPET\_5\_1\_0\_TRANSPORT\_ENABLE
  - Builtin Qos Profiles, 517
- DDS\_SNIPPET\_COMPATIBILITY\_CONNEXT\_MICRO\_VERSION\_2\_4\_3
  - Builtin Qos Profiles, 516
- DDS\_SNIPPET\_COMPATIBILITY\_OTHER\_DDS\_VENDORS\_ENABLE
  - Builtin Qos Profiles, 516
- DDS\_SNIPPET\_FEATURE\_AUTO\_TUNING\_ENABLE
  - Builtin Qos Profiles, 512
- DDS\_SNIPPET\_FEATURE\_FLOW\_CONTROLLER\_209MBPS
  - Builtin Qos Profiles, 511
- DDS\_SNIPPET\_FEATURE\_FLOW\_CONTROLLER\_52MBPS
  - Builtin Qos Profiles, 511
- DDS\_SNIPPET\_FEATURE\_FLOW\_CONTROLLER\_838MBPS
  - Builtin Qos Profiles, 510
- DDS\_SNIPPET\_FEATURE\_MONITORING2\_ENABLE
  - Builtin Qos Profiles, 513
- DDS\_SNIPPET\_FEATURE\_MONITORING\_ENABLE
  - Builtin Qos Profiles, 512

DDS_SNIPPET_FEATURE_SECURITY_ENABLE	DDS_SNIPPET_TRANSPORT_UDP_WAN
Builtin Qos Profiles, 513	Builtin Qos Profiles, 516
DDS_SNIPPET_FEATURE_TOPIC_QUERY_ENABLE	DDS_SQLFILTER_NAME
Builtin Qos Profiles, 513	DomainParticipants, 59
DDS_SNIPPET_OPTIMIZATION_DATACACHE_LARGE_DATA	DDS_STATUS_MASK_ALL
Builtin Qos Profiles, 504	Status Kinds, 341
DDS_SNIPPET_OPTIMIZATION_DISCOVERY_COMMON	DDS_STATUS_MASK_NONE
Builtin Qos Profiles, 505	Status Kinds, 341
DDS_SNIPPET_OPTIMIZATION_DISCOVERY_ENDPOINT	DDS_StatusKind
Builtin Qos Profiles, 506	Status Kinds, 342
DDS_SNIPPET_OPTIMIZATION_DISCOVERY_PARTICIPANT	DDS_SwapTask
Builtin Qos Profiles, 505	Status Kinds, 341
DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL	DDS_SwapTask
Builtin Qos Profiles, 501	Status Kinds, 341
DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL	DDS_StreamKind
Builtin Qos Profiles, 503	Stream Kinds, 162
DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL	DDS_StreamKindMask
Builtin Qos Profiles, 502	Stream Kinds, 162
DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL	DDS_StringAlloc
Builtin Qos Profiles, 502	String Support, 553
DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL	DDS_StringSet
Builtin Qos Profiles, 502	String Support, 553
DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL	DDS_StringDate
Builtin Qos Profiles, 504	String Support, 554
DDS_SNIPPET_OPTIMIZATION_RELIABILITY_PROTOCOL	DDS_StringEndOfLine
Builtin Qos Profiles, 503	String Support, 554
DDS_SNIPPET_OPTIMIZATION_TRANSPORT_LARGE_BUFFER	DDS_STRINGMATCHFILTER_NAME
Builtin Qos Profiles, 506	DomainParticipants, 59
DDS_SNIPPET_QOS_POLICY_BATCHING_ENABLE	DDS_StringSeq, 1102
Builtin Qos Profiles, 510	DDS_StructMember, 1103
DDS_SNIPPET_QOS_POLICY_DURABILITY_PERSISTENT	bits, 1104
Builtin Qos Profiles, 509	id, 1104
DDS_SNIPPET_QOS_POLICY_DURABILITY_TRANSIENT	is_key, 1104
Builtin Qos Profiles, 509	is_optional, 1104
DDS_SNIPPET_QOS_POLICY_DURABILITY_TRANSIENT_LOCAL	Allocator, 1104
Builtin Qos Profiles, 508	name, 1103
DDS_SNIPPET_QOS_POLICY_HISTORY_KEEP_ALL	type, 1103
Builtin Qos Profiles, 508	DDS_StructMemberSeq, 1105
DDS_SNIPPET_QOS_POLICY_HISTORY_KEEP_LAST_1	DDS_SUBSCRIBER_QOS_DEFAULT
Builtin Qos Profiles, 507	DomainParticipants, 57
DDS_SNIPPET_QOS_POLICY_PUBLISH_MODE_ASYNC	DDS_SubscriberQos, 1105
Builtin Qos Profiles, 508	entity_factory, 1107
DDS_SNIPPET_QOS_POLICY_RELIABILITY_BEST_EFFORT	group_data, 1107
Builtin Qos Profiles, 507	operator!=, 1106
DDS_SNIPPET_QOS_POLICY_RELIABILITY_RELIABLE	operator==, 1106
Builtin Qos Profiles, 506	partition, 1107
DDS_SNIPPET_TRANSPORT_TCP_LAN_CLIENT	presentation, 1107
Builtin Qos Profiles, 514	subscriber_name, 1108
DDS_SNIPPET_TRANSPORT_TCP_WAN_ASYMMETRIC_CLIENT	DDS_SubscriberQos_equals
Builtin Qos Profiles, 515	Subscribers, 127
DDS_SNIPPET_TRANSPORT_TCP_WAN_ASYMMETRIC_SERVER	DDS_SUBSCRIPTION_MATCHED_STATUS
Builtin Qos Profiles, 515	Status Kinds, 347
DDS_SNIPPET_TRANSPORT_TCP_WAN_SYMMETRIC_CLIENT	DDS_SUBSCRIPTION_TOPIC_NAME
Builtin Qos Profiles, 514	Subscription Built-in Topics, 300
DDS_SNIPPET_TRANSPORT_UDP_AVOID_IP_FRAGMENTATION	DDS_SubscriptionBuiltinTopicData, 1108
Builtin Qos Profiles, 515	content_filter_property, 1115

- data\_tags, 1113
- deadline, 1111
- destination\_order, 1112
- disable\_positive\_acks, 1116
- durability, 1111
- group\_data, 1113
- key, 1110
- latency\_budget, 1111
- liveliness, 1111
- multicast\_locators, 1114
- ownership, 1112
- participant\_key, 1110
- partition, 1113
- presentation, 1112
- product\_version, 1116
- property, 1114
- reliability, 1111
- representation, 1113
- rtps\_protocol\_version, 1115
- rtps\_vendor\_id, 1115
- service, 1115
- subscriber\_key, 1114
- Subscription Built-in Topics, 299
- subscription\_name, 1116
- time\_based\_filter, 1112
- topic\_data, 1113
- topic\_name, 1110
- trust\_algorithm\_info, 1116
- trust\_protection\_info, 1116
- type\_code, 1114
- type\_consistency, 1113
- type\_name, 1110
- unicast\_locators, 1114
- user\_data, 1112
- virtual\_guid, 1115
- DDS\_SubscriptionBuiltinTopicDataSeq, 1117
- DDS\_SubscriptionMatchedStatus, 1117
  - current\_count, 1119
  - current\_count\_change, 1119
  - current\_count\_peak, 1119
  - last\_publication\_handle, 1119
  - total\_count, 1118
  - total\_count\_change, 1119
- DDS\_SYNCHRONOUS\_PUBLISH\_MODE\_QOS
  - PUBLISH\_MODE, 431
- DDS\_SYSTEM\_EXCEPTION\_CODE
  - Exception Codes, 334
- DDS\_SYSTEMRESOURCELIMITS\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_SYSTEMRESOURCELIMITS\_QOS\_POLICY\_NAME
  - SYSTEM\_RESOURCE\_LIMITS, 440
- DDS\_SystemResourceLimitsQosPolicy, 1120
  - initial\_objects\_per\_thread, 1121
  - max\_objects\_per\_thread, 1121
- DDS\_Tag, 1122
  - name, 1122
  - value, 1122
- DDS\_TagSeq, 1122
- DDS\_TCKind
  - Type Code Support, 86
- DDS\_THREAD\_SETTINGS\_CANCEL\_ASYNCHRONOUS
  - Thread Settings, 352
- DDS\_THREAD\_SETTINGS\_CPU\_NO\_ROTATION
  - Thread Settings, 353
- DDS\_THREAD\_SETTINGS\_CPU\_RR\_ROTATION
  - Thread Settings, 353
- DDS\_THREAD\_SETTINGS\_FLOATING\_POINT
  - Thread Settings, 352
- DDS\_THREAD\_SETTINGS\_KIND\_MASK\_DEFAULT
  - Thread Settings, 351
- DDS\_THREAD\_SETTINGS\_PRIORITY\_ENFORCE
  - Thread Settings, 352
- DDS\_THREAD\_SETTINGS\_REALTIME\_PRIORITY
  - Thread Settings, 352
- DDS\_THREAD\_SETTINGS\_STUDIO
  - Thread Settings, 352
- DDS\_ThreadSettings\_t, 1123
  - cpu\_list, 1124
  - cpu\_rotation, 1124
  - mask, 1123
  - priority, 1123
  - stack\_size, 1124
- DDS\_ThreadSettingsCpuRotationKind
  - Thread Settings, 352
- DDS\_ThreadSettingsKind
  - Thread Settings, 352
- DDS\_ThreadSettingsKindMask
  - Thread Settings, 351
- DDS\_TIME\_INVALID
  - Time Support, 326
- DDS\_TIME\_INVALID\_NSEC
  - Time Support, 326
- DDS\_TIME\_INVALID\_SEC
  - Time Support, 325
- DDS\_Time\_is\_invalid
  - Time Support, 324
- DDS\_Time\_is\_zero
  - Time Support, 324
- DDS\_TIME\_MAX
  - Time Support, 325
- DDS\_Time\_t, 1125
  - nanosec, 1125
  - sec, 1125
- DDS\_TIME\_ZERO
  - Time Support, 322
- DDS\_TIMEBASEDFILTER\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_TIMEBASEDFILTER\_QOS\_POLICY\_NAME

- TIME\_BASED\_FILTER, 441
- DDS\_TimeBasedFilterQosPolicy, 1126
  - minimum\_separation, 1128
- DDS\_TK\_ALIAS
  - Type Code Support, 86
- DDS\_TK\_ARRAY
  - Type Code Support, 86
- DDS\_TK\_BOOLEAN
  - Type Code Support, 86
- DDS\_TK\_CHAR
  - Type Code Support, 86
- DDS\_TK\_DOUBLE
  - Type Code Support, 86
- DDS\_TK\_ENUM
  - Type Code Support, 86
- DDS\_TK\_FLOAT
  - Type Code Support, 86
- DDS\_TK\_LONG
  - Type Code Support, 86
- DDS\_TK\_LONGDOUBLE
  - Type Code Support, 86
- DDS\_TK\_LOGLONG
  - Type Code Support, 86
- DDS\_TK\_NULL
  - Type Code Support, 86
- DDS\_TK\_OCTET
  - Type Code Support, 86
- DDS\_TK\_SEQUENCE
  - Type Code Support, 86
- DDS\_TK\_SHORT
  - Type Code Support, 86
- DDS\_TK\_STRING
  - Type Code Support, 86
- DDS\_TK\_STRUCT
  - Type Code Support, 86
- DDS\_TK\_ULONG
  - Type Code Support, 86
- DDS\_TK\_ULONGLONG
  - Type Code Support, 86
- DDS\_TK\_UNION
  - Type Code Support, 86
- DDS\_TK\_USHORT
  - Type Code Support, 86
- DDS\_TK\_VALUE
  - Type Code Support, 86
- DDS\_TK\_WCHAR
  - Type Code Support, 86
- DDS\_TK\_WSTRING
  - Type Code Support, 86
- DDS\_TOPIC\_PRESENTATION\_QOS
  - PRESENTATION, 418
- DDS\_TOPIC\_QOS\_DEFAULT
  - DomainParticipants, 56
- DDS\_TOPIC\_QUERY\_SELECTION\_KIND\_CONTINUOUS
  - Topic Queries, 155
- DDS\_TOPIC\_QUERY\_SELECTION\_KIND\_HISTORY\_SNAPSHOT
  - Topic Queries, 155
- DDS\_TOPIC\_QUERY\_SELECTION\_SELECT\_ALL
  - Topic Queries, 155
- DDS\_TOPIC\_QUERY\_SELECTION\_USE\_READER\_CONTENT\_FILTER
  - Topic Queries, 155
- DDS\_TOPIC\_QUERY\_SERVICE\_REQUEST\_ID
  - ServiceRequest Built-in Topic, 302
- DDS\_TOPIC\_QUERY\_STREAM
  - Stream Kinds, 162
- DDS\_TOPIC\_SCOPE\_DESTINATIONORDER\_QOS
  - DESTINATION\_ORDER, 388
- DDS\_TOPIC\_TOPIC\_NAME
  - Topic Built-in Topics, 297
- DDS\_TopicBuiltinTopicData, 1128
  - deadline, 1131
  - destination\_order, 1132
  - durability, 1130
  - durability\_service, 1131
  - history, 1132
  - key, 1130
  - latency\_budget, 1131
  - lifespan, 1132
  - liveliness, 1131
  - name, 1130
  - ownership, 1132
  - reliability, 1131
  - representation, 1133
  - resource\_limits, 1132
  - Topic Built-in Topics, 296
  - topic\_data, 1132
  - transport\_priority, 1131
  - type\_name, 1130
- DDS\_TopicBuiltinTopicDataSeq, 1133
- DDS\_TOPICDATA\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_TOPICDATA\_QOS\_POLICY\_NAME
  - TOPIC\_DATA, 442
- DDS\_TopicDataQosPolicy, 1133
  - value, 1134
- DDS\_TopicQos, 1135
  - deadline, 1138
  - destination\_order, 1138
  - durability, 1137
  - durability\_service, 1137
  - history, 1138
  - latency\_budget, 1138
  - lifespan, 1139
  - liveliness, 1138
  - operator!=, 1137
  - operator==, 1136
  - ownership, 1139
  - reliability, 1138

- representation, 1139
- resource\_limits, 1139
- topic\_data, 1137
- transport\_priority, 1139
- DDS\_TopicQos\_equals
  - Topics, 65
- DDS\_TopicQueryData, 1140
  - original\_related\_reader\_guid, 1140
  - Topic Queries, 154
  - topic\_name, 1140
  - topic\_query\_selection, 1140
- DDS\_TOPICQUERYDISPATCH\_QOS\_POLICY\_ID
  - QoS Policies, 363
- DDS\_TOPICQUERYDISPATCH\_QOS\_POLICY\_NAME
  - TOPIC\_QUERY\_DISPATCH, 442
- DDS\_TopicQueryDispatchQosPolicy, 1141
  - enable, 1142
  - publication\_period, 1142
  - samples\_per\_period, 1142
- DDS\_TopicQuerySelection, 1143
  - filter\_class\_name, 1143
  - filter\_expression, 1143
  - filter\_parameters, 1144
  - kind, 1144
  - Topic Queries, 154
- DDS\_TopicQuerySelectionKind
  - Topic Queries, 154
- DDS\_TRANSIENT\_DURABILITY\_QOS
  - DURABILITY, 401
- DDS\_TRANSIENT\_LOCAL\_DURABILITY\_QOS
  - DURABILITY, 401
- DDS\_TRANSPORTBUILTIN\_MASK\_ALL
  - TRANSPORT\_BUILTIN, 445
- DDS\_TRANSPORTBUILTIN\_MASK\_DEFAULT
  - TRANSPORT\_BUILTIN, 444
- DDS\_TRANSPORTBUILTIN\_MASK\_NONE
  - TRANSPORT\_BUILTIN, 444
- DDS\_TRANSPORTBUILTIN\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_TRANSPORTBUILTIN\_QOS\_POLICY\_NAME
  - TRANSPORT\_BUILTIN, 446
- DDS\_TRANSPORTBUILTIN\_SHMEM
  - TRANSPORT\_BUILTIN, 446
- DDS\_TRANSPORTBUILTIN\_SHMEM\_ALIAS
  - TRANSPORT\_BUILTIN, 446
- DDS\_TRANSPORTBUILTIN\_UDPv4
  - TRANSPORT\_BUILTIN, 446
- DDS\_TRANSPORTBUILTIN\_UDPv4\_ALIAS
  - TRANSPORT\_BUILTIN, 446
- DDS\_TRANSPORTBUILTIN\_UDPv4\_WAN
  - TRANSPORT\_BUILTIN, 446
- DDS\_TRANSPORTBUILTIN\_UDPv4\_WAN\_ALIAS
  - TRANSPORT\_BUILTIN, 446
- DDS\_TRANSPORTBUILTIN\_UDPv6
  - TRANSPORT\_BUILTIN, 446
- DDS\_TRANSPORTBUILTIN\_UDPv6\_ALIAS
  - TRANSPORT\_BUILTIN, 446
- DDS\_TransportBuiltinKind
  - TRANSPORT\_BUILTIN, 445
- DDS\_TransportBuiltinKindMask
  - TRANSPORT\_BUILTIN, 445
- DDS\_TransportBuiltinQosPolicy, 1144
  - mask, 1145
- DDS\_TransportInfo\_t, 1145
  - class\_id, 1146
  - message\_size\_max, 1146
- DDS\_TransportInfoSeq, 1146
- DDS\_TRANSPORTMULTICAST\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_TRANSPORTMULTICAST\_QOS\_POLICY\_NAME
  - TRANSPORT\_MULTICAST, 448
- DDS\_TRANSPORTMULTICASTMAPPING\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_TRANSPORTMULTICASTMAPPING\_QOS\_POLICY\_NAME
  - TRANSPORT\_MULTICAST\_MAPPING, 449
- DDS\_TransportMulticastMapping\_t, 1147
  - addresses, 1147
  - mapping\_function, 1148
  - topic\_expression, 1147
- DDS\_TransportMulticastMappingFunction\_t, 1148
  - dll, 1148
  - function\_name, 1149
- DDS\_TransportMulticastMappingQosPolicy, 1149
  - value, 1151
- DDS\_TransportMulticastMappingSeq, 1151
- DDS\_TransportMulticastQosPolicy, 1151
  - kind, 1152
  - value, 1152
- DDS\_TransportMulticastQosPolicyKind
  - TRANSPORT\_MULTICAST, 448
- DDS\_TransportMulticastSettings\_t, 1153
  - receive\_address, 1154
  - receive\_port, 1154
  - transports, 1154
- DDS\_TransportMulticastSettingsSeq, 1155
- DDS\_TRANSPORTPRIORITY\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_TRANSPORTPRIORITY\_QOS\_POLICY\_NAME
  - TRANSPORT\_PRIORITY, 450
- DDS\_TransportPriorityQosPolicy, 1155
  - value, 1157
- DDS\_TRANSPORTSELECTION\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_TRANSPORTSELECTION\_QOS\_POLICY\_NAME
  - TRANSPORT\_SELECTION, 450
- DDS\_TransportSelectionQosPolicy, 1157
  - enabled\_transports, 1158
- DDS\_TRANSPORTUNICAST\_QOS\_POLICY\_ID

- QoS Policies, 362
- DDS\_TRANSPORTUNICAST\_QOS\_POLICY\_NAME
  - TRANSPORT\_UNICAST, 451
- DDS\_TransportUnicastQosPolicy, 1158
  - value, 1160
- DDS\_TransportUnicastSettings\_t, 1160
  - receive\_port, 1161
  - transports, 1161
- DDS\_TransportUnicastSettingsSeq, 1161
- DDS\_TRUNCATE\_PERSISTENT\_JOURNAL
  - DURABILITY, 399
- DDS\_TrustAlgorithmBit
  - Built-in Topic's Trust Types, 97
- DDS\_TrustAlgorithmRequirements, 1162
  - Built-in Topic's Trust Types, 98
  - required\_mask, 1162
  - supported\_mask, 1162
- DDS\_TrustAlgorithmSet
  - Built-in Topic's Trust Types, 98
- DDS\_TYPE\_CODE\_PRINT\_KIND\_IDL
  - Type Code Support, 86
- DDS\_TYPE\_CODE\_PRINT\_KIND\_XML
  - Type Code Support, 86
- DDS\_TYPE\_CONSISTENCY\_ENFORCEMENT\_QOS\_POLICY\_NAME
  - QoS Policies, 361
- DDS\_TYPE\_CONSISTENCY\_ENFORCEMENT\_QOS\_POLICY\_NAME
  - TYPE\_CONSISTENCY\_ENFORCEMENT, 453
- DDS\_TypeAllocationParams\_t, 1163
  - allocate\_optional\_members, 1164
  - allocate\_pointers, 1164
  - set\_allocate\_optional\_members, 1164
  - set\_allocate\_pointers, 1163
- DDS\_TypeCode, 1164
  - add\_member, 1199
  - add\_member\_ex, 1201
  - add\_member\_to\_enum, 1197
  - add\_member\_to\_union, 1198
  - array\_dimension, 1186
  - array\_dimension\_count, 1185
  - cdr\_serialized\_sample\_key\_max\_size, 1195, 1197
  - cdr\_serialized\_sample\_max\_size, 1194, 1195
  - cdr\_serialized\_sample\_min\_size, 1194, 1196
  - concrete\_base\_type, 1189
  - content\_type, 1187
  - default\_index, 1189
  - default\_value, 1202
  - discriminator\_type, 1184
  - element\_count, 1187
  - equal, 1171
  - extensibility\_kind, 1168
  - find\_member\_by\_id, 1192
  - find\_member\_by\_name, 1174
  - get\_cdr\_serialized\_sample\_max\_size, 1193
  - get\_type\_object\_serialized\_size, 1193
  - is\_alias\_pointer, 1188
  - is\_member\_bitfield, 1181
  - is\_member\_key, 1178
  - is\_member\_pointer, 1180
  - is\_member\_required, 1180
  - kind, 1168
  - length, 1184
  - max\_value, 1204
  - member\_bitfield\_bits, 1182
  - member\_count, 1172
  - member\_default\_value, 1205
  - member\_id, 1191
  - member\_label, 1176
  - member\_label\_count, 1175
  - member\_max\_value, 1206
  - member\_min\_value, 1205
  - member\_name, 1173
  - member\_ordinal, 1177
  - member\_type, 1175
  - member\_visibility, 1183
  - min\_value, 1203
  - name, 1172
  - print, 1207
  - Print\_IDL, 1207
  - to\_string, 1208, 1209
  - VisibilityModifier, 1190
- DDS\_TYPECODE\_INDEX\_INVALID
  - Type Code Support, 81
- DDS\_TYPECODE\_KEY\_MEMBER
  - Type Code Support, 83
- DDS\_TYPECODE\_MEMBER\_ID\_INVALID
  - Type Code Support, 81
- DDS\_TYPECODE\_NONKEY\_MEMBER
  - Type Code Support, 83
- DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER
  - Type Code Support, 84
- DDS\_TYPECODE\_NOT\_BITFIELD
  - Type Code Support, 81
- DDS\_TypeCode\_PrintFormat\_INITIALIZER
  - Type Code Support, 84
- DDS\_TypeCodeFactory, 1210
  - clone\_tc, 1212
  - create\_alias\_tc, 1221
  - create\_array\_tc, 1223, 1224
  - create\_enum\_tc, 1218, 1220
  - create\_sequence\_tc, 1222
  - create\_string\_tc, 1221
  - create\_struct\_tc, 1214, 1215
  - create\_union\_tc, 1217, 1218
  - create\_value\_tc, 1215, 1216
  - create\_wstring\_tc, 1222
  - delete\_tc, 1213
  - get\_instance, 1212
  - get\_primitive\_tc, 1213

- DDS\_TypeCodePrintFormatKind
  - Type Code Support, 85
- DDS\_TypeCodePrintFormatProperty, 1224
  - indent, 1225
  - print\_complete\_type, 1227
  - print\_kind, 1226
  - print\_ordinals, 1225
- DDS\_TypeConsistencyEnforcementQosPolicy, 1228
  - force\_type\_validation, 1230
  - ignore\_enum\_literal\_names, 1230
  - ignore\_member\_names, 1230
  - ignore\_sequence\_bounds, 1229
  - ignore\_string\_bounds, 1229
  - kind, 1229
  - prevent\_type\_widening, 1230
- DDS\_TypeConsistencyKind
  - TYPE\_CONSISTENCY\_ENFORCEMENT, 452
- DDS\_TypeDeallocationParams\_t, 1231
  - delete\_optional\_members, 1232
  - delete\_pointers, 1232
  - set\_delete\_optional\_members, 1232
  - set\_delete\_pointers, 1231
- DDS\_TYPESUPPORT\_CPP
  - User Data Type Support, 72
- DDS\_TYPESUPPORT\_QOS\_POLICY\_ID
  - QoS Policies, 362
- DDS\_TYPESUPPORT\_QOS\_POLICY\_NAME
  - TYPESUPPORT, 455
- DDS\_TypeSupportQosPolicy, 1232
  - cdr\_padding\_kind, 1234
  - plugin\_data, 1234
- DDS\_UInt8
  - DDS-Specific Primitive Types, 318
- DDS\_UInt8Seq, 1234
- DDS\_UNICAST\_ONLY\_TRANSPORT\_MULTICAST\_QOS
  - TRANSPORT\_MULTICAST, 448
- DDS\_UnionMember, 1235
  - is\_pointer, 1235
  - labels, 1235
  - name, 1235
  - type, 1236
- DDS\_UnionMemberSeq, 1236
- DDS\_UNKNOWN\_SAMPLE\_IDENTITY
  - WriteParams, 479
- DDS\_UNKNOWN\_SERVICE\_REQUEST\_ID
  - ServiceRequest Built-in Topic, 302
- DDS\_UNREGISTERED\_INSTANCE\_REPLACEMENT
  - DATA\_WRITER\_RESOURCE\_LIMITS, 383
- DDS\_UnsignedLong
  - DDS-Specific Primitive Types, 318
- DDS\_UnsignedLongLong
  - DDS-Specific Primitive Types, 319
- DDS\_UnsignedLongLongSeq, 1236
- DDS\_UnsignedLongSeq, 1237
- DDS\_UnsignedShort
  - DDS-Specific Primitive Types, 318
- DDS\_UnsignedShortSeq, 1237
- DDS\_USER\_EXCEPTION\_CODE
  - Exception Codes, 334
- DDS\_USERDATA\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_USERDATA\_QOS\_POLICY\_NAME
  - USER\_DATA, 455
- DDS\_UserDataQosPolicy, 1237
  - value, 1238
- DDS\_ValueMember, 1239
  - access, 1240
  - bits, 1240
  - id, 1241
  - is\_key, 1240
  - is\_optional, 1241
  - is\_pointer, 1240
  - name, 1240
  - type, 1240
- DDS\_ValueMemberSeq, 1241
- DDS\_ValueModifier
  - Type Code Support, 85
- DDS\_VENDOR\_ID\_LENGTH\_MAX
  - Common types and functions, 306
- DDS\_VendorEndpointTrustAttributesMask
  - Built-in Topic's Trust Types, 97
- DDS\_VendorId\_t, 1241
  - vendorId, 1242
- DDS\_ViewStateKind
  - View States, 158
- DDS\_ViewStateMask
  - View States, 158
- DDS\_Visibility
  - Type Code Support, 85
- DDS\_VM\_ABSTRACT
  - Type Code Support, 82
- DDS\_VM\_CUSTOM
  - Type Code Support, 81
- DDS\_VM\_NONE
  - Type Code Support, 81
- DDS\_VM\_TRUNCATABLE
  - Type Code Support, 82
- DDS\_VOLATILE\_DURABILITY\_QOS
  - DURABILITY, 400
- DDS\_WaitSetProperty\_t, 1242
  - max\_event\_count, 1243
  - max\_event\_delay, 1243
- DDS\_WaitSetProperty\_t\_INITIALIZER
  - Conditions and WaitSets, 472
- DDS\_WAL\_PERSISTENT\_JOURNAL
  - DURABILITY, 399
- DDS\_Wchar
  - DDS-Specific Primitive Types, 317

- DDS\_WcharSeq, 1243
- DDS\_WEB\_INTEGRATION\_SERVICE\_QOS
  - SERVICE, 439
- DDS\_WIREPROTOCOL\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_WIREPROTOCOL\_QOS\_POLICY\_NAME
  - WIRE\_PROTOCOL, 461
- DDS\_WireProtocolQosPolicy, 1244
  - check\_crc, 1250
  - compute\_crc, 1250
  - participant\_id, 1247
  - rtps\_app\_id, 1248
  - rtps\_auto\_id\_kind, 1250
  - rtps\_host\_id, 1248
  - rtps\_instance\_id, 1249
  - rtps\_reserved\_port\_mask, 1250
  - rtps\_well\_known\_ports, 1249
- DDS\_WireProtocolQosPolicyAutoKind
  - WIRE\_PROTOCOL, 460
- DDS\_WRITEPARAMS\_DEFAULT
  - WriteParams, 479
- DDS\_WriteParams\_reset
  - WriteParams, 478
- DDS\_WriteParams\_t, 1251
  - cookie, 1253
  - flag, 1254
  - handle, 1253
  - identity, 1252
  - priority, 1253
  - related\_reader\_guid, 1255
  - related\_sample\_identity, 1252
  - related\_source\_guid, 1255
  - replace\_auto, 1251
  - source\_guid, 1254
  - source\_timestamp, 1252
- DDS\_WRITER\_REMOVED\_BATCH\_SAMPLE
  - Sample Flags, 475
- DDS\_WRITERDATALIFECYCLE\_QOS\_POLICY\_ID
  - QoS Policies, 361
- DDS\_WRITERDATALIFECYCLE\_QOS\_POLICY\_NAME
  - WRITER\_DATA\_LIFECYCLE, 456
- DDS\_WriterDataLifecycleQosPolicy, 1256
  - autodispose\_unregistered\_instances, 1257
  - autopurge\_disposed\_instances\_delay, 1258
  - autopurge\_unregistered\_instances\_delay, 1257
- DDS\_Wstring\_alloc
  - String Support, 555
- DDS\_Wstring\_copy
  - String Support, 556
- DDS\_Wstring\_copy\_and\_widen
  - String Support, 556
- DDS\_Wstring\_dup
  - String Support, 557
- DDS\_Wstring\_dup\_and\_widen
  - String Support, 557
- DDS\_Wstring\_free
  - String Support, 557
- DDS\_Wstring\_length
  - String Support, 555
- DDS\_WstringSeq, 1259
- DDS\_XCDR2\_DATA\_REPRESENTATION
  - DATA\_REPRESENTATION, 371
- DDS\_XCDR\_DATA\_REPRESENTATION
  - DATA\_REPRESENTATION, 370
- DDS\_XML\_DATA\_REPRESENTATION
  - DATA\_REPRESENTATION, 370
- DDS\_XML\_PRINT\_FORMAT
  - Topics, 65
- DDS\_ZERO\_CDR\_PADDING
  - TYPESUPPORT, 454
- DDSAsyncWaitSet, 1259
  - ~DDSAsyncWaitSet, 1264
  - attach\_condition, 1267
  - attach\_condition\_with\_completion\_token, 1269
  - create\_completion\_token, 1272
  - DDSAsyncWaitSet, 1263, 1264
  - delete\_completion\_token, 1272
  - detach\_condition, 1268
  - detach\_condition\_with\_completion\_token, 1269
  - get\_conditions, 1271
  - get\_property, 1271
  - start, 1265
  - start\_with\_completion\_token, 1265
  - stop, 1266
  - stop\_with\_completion\_token, 1267
  - unlock\_condition, 1270
- DDSAsyncWaitSetCompletionToken, 1273
  - wait, 1274
- DDSAsyncWaitSetListener, 1275
  - on\_thread\_deleted, 1275
  - on\_thread\_spawned, 1275
  - on\_wait\_timeout, 1276
- DDSCondition, 1276
  - dispatch, 1278
  - get\_handler, 1278
  - get\_trigger\_value, 1277
  - set\_handler, 1277
- DDSConditionHandler, 1278
  - on\_condition\_triggered, 1279
- DDSConditionSeq, 1279
- DDSContentFilter, 1280
  - compile, 1280
  - evaluate, 1282
  - finalize, 1282
- DDSContentFilteredTopic, 1283
  - append\_to\_expression\_parameter, 1286
  - get\_expression\_parameters, 1285
  - get\_filter\_expression, 1284



- get\_related\_topic, 1288
- narrow, 1284
- remove\_from\_expression\_parameter, 1287
- set\_expression, 1286
- set\_expression\_parameters, 1285
- DDSDataReader, 1288
  - acknowledge\_all, 1297, 1298
  - acknowledge\_sample, 1296, 1297
  - create\_querycondition, 1293
  - create\_querycondition\_w\_params, 1294
  - create\_readcondition, 1293
  - create\_readcondition\_w\_params, 1293
  - create\_topic\_query, 1309
  - delete\_contained\_entities, 1295
  - delete\_readcondition, 1294
  - delete\_topic\_query, 1310
  - enable, 1312
  - get\_datareader\_cache\_status, 1305
  - get\_datareader\_protocol\_status, 1305
  - get\_instance\_handle, 1314
  - get\_listener, 1309
  - get\_liveliness\_changed\_status, 1302
  - get\_matched\_publication\_data, 1300
  - get\_matched\_publication\_datareader\_protocol\_status, 1305
  - get\_matched\_publication\_participant\_data, 1301
  - get\_matched\_publications, 1299
  - get\_qos, 1307
  - get\_requested\_deadline\_missed\_status, 1303
  - get\_requested\_incompatible\_qos\_status, 1303
  - get\_sample\_lost\_status, 1304
  - get\_sample\_rejected\_status, 1302
  - get\_status\_changes, 1314
  - get\_statuscondition, 1313
  - get\_subscriber, 1302
  - get\_subscription\_matched\_status, 1304
  - get\_topicdescription, 1301
  - is\_matched\_publication\_alive, 1300
  - lookup\_topic\_query, 1310
  - set\_listener, 1309
  - set\_property, 1308
  - set\_qos, 1306
  - set\_qos\_with\_profile, 1307
  - take\_discovery\_snapshot, 1311
  - wait\_for\_historical\_data, 1296
- DDSDataReaderListener, 1315
  - on\_data\_available, 1317
  - on\_liveliness\_changed, 1316
  - on\_requested\_deadline\_missed, 1316
  - on\_requested\_incompatible\_qos, 1316
  - on\_sample\_lost, 1317
  - on\_sample\_rejected, 1316
  - on\_subscription\_matched, 1317
- DDSDataReaderSeq, 1317
- DDSDataReaderStatusConditionHandler, 1318
  - ~DDSDataReaderStatusConditionHandler, 1319
  - DDSDataReaderStatusConditionHandler, 1319
  - on\_condition\_triggered, 1320
- DDSDataTagQosPolicyHelper, 1320
- DDSDataWriter, 1321
  - assert\_liveliness, 1329
  - enable, 1342
  - flush, 1339
  - get\_datawriter\_cache\_status, 1326
  - get\_datawriter\_protocol\_status, 1327
  - get\_instance\_handle, 1343
  - get\_listener, 1339
  - get\_liveliness\_lost\_status, 1324
  - get\_matched\_subscription\_data, 1332
  - get\_matched\_subscription\_datawriter\_protocol\_status, 1327
  - get\_matched\_subscription\_datawriter\_protocol\_status\_by\_locator, 1329
  - get\_matched\_subscription\_locators, 1330
  - get\_matched\_subscription\_participant\_data, 1333
  - get\_matched\_subscriptions, 1331
  - get\_offered\_deadline\_missed\_status, 1324
  - get\_offered\_incompatible\_qos\_status, 1325
  - get\_publication\_matched\_status, 1325
  - get\_publisher, 1334
  - get\_qos, 1338
  - get\_reliable\_reader\_activity\_changed\_status, 1326
  - get\_reliable\_writer\_cache\_changed\_status, 1326
  - get\_service\_request\_accepted\_status, 1328
  - get\_status\_changes, 1343
  - get\_statuscondition, 1343
  - get\_topic, 1333
  - is\_matched\_subscription\_active, 1328
  - is\_sample\_app\_acknowledged, 1335
  - set\_listener, 1339
  - set\_property, 1337
  - set\_qos, 1336
  - set\_qos\_with\_profile, 1337
  - take\_discovery\_snapshot, 1340, 1341
  - wait\_for\_acknowledgments, 1334
  - wait\_for\_asynchronous\_publishing, 1335
- DDSDataWriterListener, 1344
  - on\_application\_acknowledgment, 1349
  - on\_instance\_replaced, 1349
  - on\_liveliness\_lost, 1346
  - on\_offered\_deadline\_missed, 1345
  - on\_offered\_incompatible\_qos, 1346
  - on\_publication\_matched, 1347
  - on\_reliable\_reader\_activity\_changed, 1348
  - on\_reliable\_writer\_cache\_changed, 1347
  - on\_sample\_removed, 1348
  - on\_service\_request\_accepted, 1350
- DDSDomainEntity, 1350

- DDSDomainParticipant, 1351
  - add\_peer, 1409
  - assert\_liveliness, 1399
  - banish\_ignored\_participants, 1394
  - contains\_entity, 1406
  - create\_contentfilteredtopic, 1385
  - create\_contentfilteredtopic\_with\_filter, 1386
  - create\_datareader, 1418
  - create\_datareader\_with\_profile, 1419
  - create\_datawriter, 1415
  - create\_datawriter\_with\_profile, 1416
  - create\_flowcontroller, 1391
  - create\_multitopic, 1388
  - create\_publisher, 1376
  - create\_publisher\_with\_profile, 1377
  - create\_subscriber, 1379
  - create\_subscriber\_with\_profile, 1380
  - create\_topic, 1382
  - create\_topic\_with\_profile, 1383
  - delete\_contained\_entities, 1401
  - delete\_contentfilteredtopic, 1387
  - delete\_datareader, 1420
  - delete\_datawriter, 1417
  - delete\_durable\_subscription, 1399
  - delete\_flowcontroller, 1392
  - delete\_multitopic, 1389
  - delete\_publisher, 1378
  - delete\_subscriber, 1380
  - delete\_topic, 1385
  - find\_topic, 1389
  - get\_builtin\_subscriber, 1393
  - get\_current\_time, 1398
  - get\_default\_datareader\_qos, 1360
  - get\_default\_datawriter\_qos, 1358
  - get\_default\_flowcontroller\_property, 1362
  - get\_default\_library, 1366
  - get\_default\_profile, 1366
  - get\_default\_profile\_library, 1366
  - get\_default\_publisher\_qos, 1371
  - get\_default\_subscriber\_qos, 1373
  - get\_default\_topic\_qos, 1368
  - get\_discovered\_participant\_data, 1403
  - get\_discovered\_participant\_subject\_name, 1404
  - get\_discovered\_participants, 1402
  - get\_discovered\_participants\_from\_subject\_name, 1402
  - get\_discovered\_topic\_data, 1405
  - get\_discovered\_topics, 1405
  - get\_dns\_tracker\_polling\_period, 1412
  - get\_domain\_id, 1397
  - get\_implicit\_publisher, 1414
  - get\_implicit\_subscriber, 1414
  - get\_listener, 1414
  - get\_participant\_protocol\_status, 1407
  - get\_publishers, 1381
  - get\_qos, 1409
  - get\_subscribers, 1382
  - ignore\_participant, 1393
  - ignore\_publication, 1396
  - ignore\_subscription, 1396
  - ignore\_topic, 1395
  - lookup\_contentfilter, 1365
  - lookup\_datareader\_by\_name, 1423
  - lookup\_datawriter\_by\_name, 1422
  - lookup\_flowcontroller, 1392
  - lookup\_publisher\_by\_name, 1421
  - lookup\_subscriber\_by\_name, 1422
  - lookup\_topicdescription, 1390
  - register\_contentfilter, 1364
  - register\_durable\_subscription, 1398
  - remove\_peer, 1411
  - resume\_endpoint\_discovery, 1400
  - set\_default\_datareader\_qos, 1361
  - set\_default\_datareader\_qos\_with\_profile, 1362
  - set\_default\_datawriter\_qos, 1359
  - set\_default\_datawriter\_qos\_with\_profile, 1359
  - set\_default\_flowcontroller\_property, 1363
  - set\_default\_library, 1367
  - set\_default\_profile, 1368
  - set\_default\_publisher\_qos, 1372
  - set\_default\_publisher\_qos\_with\_profile, 1372
  - set\_default\_subscriber\_qos, 1374
  - set\_default\_subscriber\_qos\_with\_profile, 1375
  - set\_default\_topic\_qos, 1369
  - set\_default\_topic\_qos\_with\_profile, 1370
  - set\_dns\_tracker\_polling\_period, 1412
  - set\_listener, 1413
  - set\_property, 1407
  - set\_qos, 1408
  - set\_qos\_with\_profile, 1408
  - take\_discovery\_snapshot, 1424, 1425
  - unregister\_contentfilter, 1365
- DDSDomainParticipantFactory, 1426
  - create\_participant, 1442
  - create\_participant\_from\_config, 1449
  - create\_participant\_from\_config\_w\_params, 1450
  - create\_participant\_with\_profile, 1443
  - delete\_participant, 1445
  - finalize\_instance, 1429
  - get\_datareader\_qos\_from\_profile, 1439
  - get\_datareader\_qos\_from\_profile\_w\_topic\_name, 1440
  - get\_datawriter\_qos\_from\_profile, 1438
  - get\_datawriter\_qos\_from\_profile\_w\_topic\_name, 1438
  - get\_default\_library, 1433
  - get\_default\_participant\_qos, 1432
  - get\_default\_profile, 1435

- get\_default\_profile\_library, 1435
- get\_instance, 1429
- get\_participant\_factory\_qos\_from\_profile, 1435
- get\_participant\_qos\_from\_profile, 1436
- get\_participants, 1452
- get\_publisher\_qos\_from\_profile, 1437
- get\_qos, 1447
- get\_qos\_profile\_libraries, 1442
- get\_qos\_profiles, 1442
- get\_subscriber\_qos\_from\_profile, 1437
- get\_topic\_qos\_from\_profile, 1440
- get\_topic\_qos\_from\_profile\_w\_topic\_name, 1441
- get\_typecode\_from\_config, 1449
- load\_profiles, 1447
- lookup\_participant, 1445
- lookup\_participant\_by\_name, 1451
- register\_type\_support, 1451
- reload\_profiles, 1447
- set\_default\_library, 1433
- set\_default\_participant\_qos, 1430
- set\_default\_participant\_qos\_with\_profile, 1431
- set\_default\_profile, 1434
- set\_qos, 1446
- set\_thread\_factory, 1453
- unload\_profiles, 1448
- unregister\_thread, 1448
- DDSDomainParticipantFactory\_RegisterTypeFunction
  - DomainParticipantFactory, 42
- DDSDomainParticipantListener, 1454
  - on\_invalid\_local\_identity\_status\_advance\_notice, 1455
- DDSDynamicDataReader, 1456
- DDSDynamicDataTypeSupport, 1456
  - ~DDSDynamicDataTypeSupport, 1458
  - copy\_data, 1461
  - create\_data, 1460
  - DDSDynamicDataTypeSupport, 1457
  - delete\_data, 1461
  - get\_data\_type, 1460
  - get\_type\_name, 1460
  - is\_valid, 1459
  - print\_data, 1461
  - register\_type, 1459
  - unregister\_type, 1459
- DDSDynamicDataWriter, 1462
- DDSEntity, 1463
  - enable, 1466
  - get\_instance\_handle, 1468
  - get\_status\_changes, 1467
  - get\_statuscondition, 1467
- DDSFlowController, 1468
  - get\_name, 1471
  - get\_participant, 1471
  - get\_property, 1470
  - set\_property, 1469
  - trigger\_flow, 1470
- DDSGuardCondition, 1471
  - ~DDSGuardCondition, 1472
  - DDSGuardCondition, 1472
  - get\_trigger\_value, 1473
  - set\_trigger\_value, 1473
- DDSKeyedOctetsDataReader, 1473
  - get\_key\_value, 1480, 1481
  - lookup\_instance, 1481
  - narrow, 1482
  - read, 1476
  - read\_instance, 1477
  - read\_instance\_w\_condition, 1478
  - read\_next\_instance, 1479
  - read\_next\_instance\_w\_condition, 1479
  - read\_next\_sample, 1477
  - read\_w\_condition, 1476
  - return\_loan, 1480
  - take, 1476
  - take\_instance, 1478
  - take\_instance\_w\_condition, 1478
  - take\_next\_instance, 1479
  - take\_next\_instance\_w\_condition, 1480
  - take\_next\_sample, 1477
  - take\_w\_condition, 1476
- DDSKeyedOctetsDataWriter, 1482
  - create\_data, 1488
  - delete\_data, 1488
  - dispose, 1493
  - dispose\_w\_timestamp, 1493
  - get\_key\_value, 1494
  - lookup\_instance, 1494, 1495
  - narrow, 1485
  - register\_instance, 1485
  - register\_instance\_w\_timestamp, 1486
  - unregister\_instance, 1486, 1487
  - unregister\_instance\_w\_timestamp, 1487
  - write, 1488, 1489
  - write\_w\_params, 1491, 1492
  - write\_w\_timestamp, 1490, 1491
- DDSKeyedOctetsTypeSupport, 1495
  - data\_to\_string, 1501
  - deserialize\_data\_from\_cdr\_buffer, 1500
  - get\_type\_name, 1499
  - get\_typecode, 1500
  - print\_data, 1499
  - register\_type, 1496
  - serialize\_data\_to\_cdr\_buffer, 1500
  - serialize\_data\_to\_cdr\_buffer\_ex, 1500
  - unregister\_type, 1498
- DDSKeyedStringDataReader, 1501
  - get\_key\_value, 1508, 1509
  - lookup\_instance, 1509

- narrow, 1510
- read, 1504
- read\_instance, 1505
- read\_instance\_w\_condition, 1506
- read\_next\_instance, 1507
- read\_next\_instance\_w\_condition, 1507
- read\_next\_sample, 1505
- read\_w\_condition, 1504
- return\_loan, 1508
- take, 1504
- take\_instance, 1506
- take\_instance\_w\_condition, 1506
- take\_next\_instance, 1507
- take\_next\_instance\_w\_condition, 1508
- take\_next\_sample, 1505
- take\_w\_condition, 1504
- DDSKeyedStringDataWriter, 1510
  - create\_data, 1515
  - delete\_data, 1515
  - dispose, 1518
  - dispose\_w\_timestamp, 1518, 1519
  - get\_key\_value, 1519
  - lookup\_instance, 1520
  - narrow, 1512
  - register\_instance, 1513
  - register\_instance\_w\_timestamp, 1513
  - unregister\_instance, 1514
  - unregister\_instance\_w\_timestamp, 1514, 1515
  - write, 1516
  - write\_w\_params, 1517
  - write\_w\_timestamp, 1516, 1517
- DDSKeyedStringTypeSupport, 1520
  - data\_to\_string, 1526
  - deserialize\_data\_from\_cdr\_buffer, 1525
  - get\_type\_name, 1524
  - get\_typecode, 1525
  - print\_data, 1524
  - register\_type, 1521
  - serialize\_data\_to\_cdr\_buffer, 1525
  - serialize\_data\_to\_cdr\_buffer\_ex, 1525
  - unregister\_type, 1523
- DDSListener, 1526
- DDSMultiTopic, 1529
  - get\_expression\_parameters, 1531
  - get\_subscription\_expression, 1531
  - narrow, 1531
  - set\_expression\_parameters, 1532
- DDSOctetsDataReader, 1532
  - narrow, 1536
  - read, 1534
  - read\_next\_sample, 1535
  - read\_w\_condition, 1534
  - return\_loan, 1535
  - take, 1534
  - take\_next\_sample, 1535
  - take\_w\_condition, 1534
- DDSOctetsDataWriter, 1536
  - create\_data, 1538
  - delete\_data, 1538
  - narrow, 1538
  - write, 1539, 1540
  - write\_w\_params, 1541, 1542
  - write\_w\_timestamp, 1540, 1541
- DDSOctetsTypeSupport, 1543
  - data\_to\_string, 1547
  - deserialize\_data\_from\_cdr\_buffer, 1547
  - get\_type\_name, 1545
  - get\_typecode, 1546
  - print\_data, 1546
  - register\_type, 1544
  - serialize\_data\_to\_cdr\_buffer, 1546
  - serialize\_data\_to\_cdr\_buffer\_ex, 1546
  - unregister\_type, 1544
- DDSParticipantBuiltinTopicDataDataReader, 1548
- DDSParticipantBuiltinTopicDataTypeSupport, 1548
- DDSPROPERTYQOSPolicyHelper, 1549
- DDSPublicationBuiltinTopicDataDataReader, 1549
- DDSPublicationBuiltinTopicDataTypeSupport, 1550
- DDSPublisher, 1550
  - begin\_coherent\_changes, 1564
  - copy\_from\_topic\_qos, 1566
  - create\_datawriter, 1558
  - create\_datawriter\_with\_profile, 1559
  - delete\_contained\_entities, 1565
  - delete\_datawriter, 1561
  - end\_coherent\_changes, 1565
  - get\_all\_datawriters, 1562
  - get\_default\_datawriter\_qos, 1553
  - get\_default\_library, 1556
  - get\_default\_profile, 1557
  - get\_default\_profile\_library, 1558
  - get\_listener, 1570
  - get\_participant, 1565
  - get\_qos, 1569
  - lookup\_datawriter, 1561
  - lookup\_datawriter\_by\_name, 1571
  - resume\_publications, 1563
  - set\_default\_datawriter\_qos, 1554
  - set\_default\_datawriter\_qos\_with\_profile, 1555
  - set\_default\_library, 1555
  - set\_default\_profile, 1556
  - set\_listener, 1570
  - set\_qos, 1568
  - set\_qos\_with\_profile, 1569
  - suspend\_publications, 1562
  - wait\_for\_acknowledgments, 1567
  - wait\_for\_asynchronous\_publishing, 1567
- DDSPublisherListener, 1571

- DDSPublisherSeq, 1572
- DDSQueryCondition, 1573
  - get\_query\_expression, 1574
  - get\_query\_parameters, 1574
  - set\_query\_parameters, 1574
- DDSReadCondition, 1574
  - get\_datareader, 1576
  - get\_instance\_state\_mask, 1576
  - get\_sample\_state\_mask, 1575
  - get\_stream\_kind\_mask, 1576
  - get\_view\_state\_mask, 1576
- DDSServiceRequestDataReader, 1577
- DDSServiceRequestTypeSupport, 1577
- DDSStatusCondition, 1578
  - get\_enabled\_statuses, 1578
  - get\_entity, 1579
  - set\_enabled\_statuses, 1579
- DDSStringDataReader, 1580
  - narrow, 1583
  - read, 1581
  - read\_next\_sample, 1582
  - read\_w\_condition, 1581
  - return\_loan, 1583
  - take, 1581
  - take\_next\_sample, 1582
  - take\_w\_condition, 1582
- DDSStringDataWriter, 1584
  - create\_data, 1585
  - delete\_data, 1585
  - narrow, 1585
  - write, 1586
  - write\_w\_params, 1586
  - write\_w\_timestamp, 1586
- DDSStringTypeSupport, 1587
  - data\_to\_string, 1591
  - deserialize\_data\_from\_cdr\_buffer, 1591
  - get\_type\_name, 1589
  - get\_typecode, 1590
  - print\_data, 1590
  - register\_type, 1588
  - serialize\_data\_to\_cdr\_buffer, 1590
  - serialize\_data\_to\_cdr\_buffer\_ex, 1591
  - unregister\_type, 1589
- DDSSubscriber, 1592
  - begin\_access, 1605
  - copy\_from\_topic\_qos, 1608
  - create\_datareader, 1599
  - create\_datareader\_with\_profile, 1601
  - delete\_contained\_entities, 1603
  - delete\_datareader, 1602
  - end\_access, 1606
  - get\_all\_datareaders, 1607
  - get\_datareaders, 1606
  - get\_default\_datareader\_qos, 1595
  - get\_default\_library, 1598
  - get\_default\_profile, 1599
  - get\_default\_profile\_library, 1599
  - get\_listener, 1612
  - get\_participant, 1608
  - get\_qos, 1611
  - lookup\_datareader, 1604
  - lookup\_datareader\_by\_name, 1612
  - notify\_datareaders, 1608
  - set\_default\_datareader\_qos, 1595
  - set\_default\_datareader\_qos\_with\_profile, 1596
  - set\_default\_library, 1597
  - set\_default\_profile, 1598
  - set\_listener, 1611
  - set\_qos, 1609
  - set\_qos\_with\_profile, 1610
- DDSSubscriberListener, 1613
  - on\_data\_on\_readers, 1614
- DDSSubscriberSeq, 1614
- DDSSubscriptionBuiltinTopicDataDataReader, 1614
- DDSSubscriptionBuiltinTopicDataTypeSupport, 1615
- DDSTheParticipantFactory
  - DomainParticipantFactory, 41
- DDSThreadFactory, 1615
  - create\_thread, 1616
  - delete\_thread, 1616
- DDSThreadFactory\_OnSpawnedFunction
  - User-managed Threads, 519
- DDSTopic, 1617
  - get\_inconsistent\_topic\_status, 1619
  - get\_listener, 1622
  - get\_qos, 1621
  - narrow, 1619
  - set\_listener, 1621
  - set\_qos, 1619
  - set\_qos\_with\_profile, 1620
- DDSTopicBuiltinTopicDataDataReader, 1622
- DDSTopicBuiltinTopicDataTypeSupport, 1623
- DDSTopicDescription, 1624
  - get\_name, 1625
  - get\_participant, 1625
  - get\_type\_name, 1624
- DDSTopicListener, 1626
  - on\_inconsistent\_topic, 1627
- DDSTopicQuery, 1627
  - get\_guid, 1627
- DDSTopicQueryHelper, 1628
  - topic\_query\_data\_from\_service\_request, 1628
- DDSTypeSupport, 1629
- DDSWaitSet, 1629
  - ~DDSWaitSet, 1632
  - attach\_condition, 1635
  - DDSWaitSet, 1633
  - detach\_condition, 1635

- get\_conditions, 1636
- get\_property, 1637
- set\_property, 1636
- wait, 1634
- DDSWriterContentFilter, 1637
  - writer\_attach, 1640
  - writer\_compile, 1638
  - writer\_detach, 1641
  - writer\_evaluate, 1639
  - writer\_finalize, 1640
  - writer\_return\_loan, 1641
- DEADLINE, 385
  - DDS\_DEADLINE\_QOS\_POLICY\_NAME, 386
- deadline
  - DDS\_DataReaderQos, 648
  - DDS\_DataWriterQos, 693
  - DDS\_PublicationBuiltinTopicData, 1013
  - DDS\_SubscriptionBuiltinTopicData, 1111
  - DDS\_TopicBuiltinTopicData, 1131
  - DDS\_TopicQos, 1138
- debug
  - NDDConfigLogger, 1829
- dedicated\_participant
  - DDS\_MonitoringDistributionSettings, 951
- default\_domain\_announcement\_period
  - DDS\_DiscoveryConfigQosPolicy, 723
- default\_index
  - DDS\_TypeCode, 1189
- default\_unicast
  - DDS\_DomainParticipantQos, 744
- default\_unicast\_locators
  - DDS\_ParticipantBuiltinTopicData, 981
- default\_value
  - DDS\_TypeCode, 1202
- delete\_completion\_token
  - DDSAsyncWaitSet, 1272
- delete\_contained\_entities
  - DDSDataReader, 1295
  - DDSDomainParticipant, 1401
  - DDSPublisher, 1565
  - DDSSubscriber, 1603
- delete\_contentfilteredtopic
  - DDSDomainParticipant, 1387
- delete\_data
  - DDSDynamicDataTypeSupport, 1461
  - DDSKeyedOctetsDataWriter, 1488
  - DDSKeyedStringDataWriter, 1515
  - DDSOctetsDataWriter, 1538
  - DDSStringDataWriter, 1585
  - FooDataWriter, 1694
  - FooTypeSupport, 1716
  - rti::flat::Sample< OffsetType >, 1919
- delete\_data\_ex
  - FooTypeSupport, 1717
- delete\_datareader
  - DDSDomainParticipant, 1420
  - DDSSubscriber, 1602
- delete\_datawriter
  - DDSDomainParticipant, 1417
  - DDSPublisher, 1561
- delete\_durable\_subscription
  - DDSDomainParticipant, 1399
- delete\_flowcontroller
  - DDSDomainParticipant, 1392
- delete\_multitopic
  - DDSDomainParticipant, 1389
- delete\_optional\_members
  - DDS\_TypeDeallocationParams\_t, 1232
- delete\_participant
  - DDSDomainParticipantFactory, 1445
- delete\_pointers
  - DDS\_TypeDeallocationParams\_t, 1232
- delete\_publisher
  - DDSDomainParticipant, 1378
- delete\_readcondition
  - DDSDataReader, 1294
- delete\_subscriber
  - DDSDomainParticipant, 1380
- delete\_tc
  - DDS\_TypeCodeFactory, 1213
- delete\_thread
  - DDSThreadFactory, 1616
- delete\_topic
  - DDSDomainParticipant, 1385
- delete\_topic\_query
  - DDSDataReader, 1310
- deny\_interfaces\_list
  - NDDS\_Transport\_Property\_t, 1780
- deny\_interfaces\_list\_length
  - NDDS\_Transport\_Property\_t, 1781
- deny\_multicast\_interfaces\_list
  - NDDS\_Transport\_Property\_t, 1782
- deny\_multicast\_interfaces\_list\_length
  - NDDS\_Transport\_Property\_t, 1782
- depth
  - DDS\_HistoryQosPolicy, 921
- deserialize\_data\_from\_cdr\_buffer
  - DDSKeyedOctetsTypeSupport, 1500
  - DDSKeyedStringTypeSupport, 1525
  - DDSOctetsTypeSupport, 1547
  - DDSStringTypeSupport, 1591
  - FooTypeSupport, 1722
- deserialized\_type\_object\_dynamic\_allocation\_threshold
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 761
- DESTINATION\_ORDER, 386
  - DDS\_BY\_RECEPTION\_TIMESTAMP\_DESTINATIONORDER\_QOS, 387

- DDS\_BY\_SOURCE\_TIMESTAMP\_DESTINATIONORDER\_QOS, 387
- DDS\_DESTINATIONORDER\_QOS\_POLICY\_NAME, 388
- DDS\_DestinationOrderQosPolicyKind, 387
- DDS\_DestinationOrderQosPolicyScopeKind, 388
- DDS\_INSTANCE\_SCOPE\_DESTINATIONORDER\_QOS, 388
- DDS\_TOPIC\_SCOPE\_DESTINATIONORDER\_QOS, 388
- destination\_order
  - DDS\_DataReaderQos, 649
  - DDS\_DataWriterQos, 693
  - DDS\_PublicationBuiltinTopicData, 1015
  - DDS\_SubscriptionBuiltinTopicData, 1112
  - DDS\_TopicBuiltinTopicData, 1132
  - DDS\_TopicQos, 1138
- detach\_condition
  - DDSAsyncWaitSet, 1268
  - DDSWaitSet, 1635
- detach\_condition\_with\_completion\_token
  - DDSAsyncWaitSet, 1269
- detached\_instance\_count
  - DDS\_DataReaderCacheStatus, 629
- detached\_instance\_count\_peak
  - DDS\_DataReaderCacheStatus, 629
- difference\_type
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1930
- direct\_communication
  - DDS\_DurabilityQosPolicy, 770
- disable
  - NDDSUtilityHeapMonitoring, 1843
  - NDDSUtilityNetworkCapture, 1848
- disable\_asynchronous\_batch
  - DDS\_AsynchronousPublisherQosPolicy, 592
- disable\_asynchronous\_write
  - DDS\_AsynchronousPublisherQosPolicy, 592
- disable\_fragmentation\_support
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 608
  - DDS\_DataReaderResourceLimitsQosPolicy, 659
- disable\_heap\_monitoring
  - NDDSUtility, 1841
- disable\_inline\_keyhash
  - DDS\_DataWriterProtocolQosPolicy, 675
- disable\_interface\_tracking
  - NDDS\_Transport\_UDPv4\_Property\_t, 1796
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1804
  - NDDS\_Transport\_UDPv6\_Property\_t, 1815
- disable\_positive\_acks
  - DDS\_DataReaderProtocolQosPolicy, 632
  - DDS\_DataWriterProtocolQosPolicy, 675
  - DDS\_PublicationBuiltinTopicData, 1018
  - DDS\_SubscriptionBuiltinTopicData, 1116
- disable\_positive\_acks\_decrease\_sample\_keep\_duration\_factor
  - DDS\_RtpsReliableWriterProtocol\_t, 1071
- disable\_positive\_acks\_enable\_adaptive\_sample\_keep\_duration
  - DDS\_RtpsReliableWriterProtocol\_t, 1071
- disable\_positive\_acks\_increase\_sample\_keep\_duration\_factor
  - DDS\_RtpsReliableWriterProtocol\_t, 1072
- disable\_positive\_acks\_max\_sample\_keep\_duration
  - DDS\_RtpsReliableWriterProtocol\_t, 1070
- disable\_positive\_acks\_min\_sample\_keep\_duration
  - DDS\_RtpsReliableWriterProtocol\_t, 1070
- disable\_repair\_piggyback\_heartbeat
  - DDS\_RtpsReliableWriterProtocol\_t, 1076
- disable\_topic\_query\_publication
  - DDS\_AsynchronousPublisherQosPolicy, 593
- disabled\_metrics\_selection
  - DDS\_MonitoringMetricSelection, 959
- discard
  - rti::flat::AbstractBuilder, 580
- discard\_builder
  - FlatData Builders, 561
- discard\_loan
  - FooDataWriter, 1696
- DISCOVERY, 388
  - DDS\_DISCOVERY\_QOS\_POLICY\_NAME, 389
- discovery
  - DDS\_DomainParticipantQos, 744
- DISCOVERY\_CONFIG, 389
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_ALL, 392
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_DEFAULT, 391
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_CHANNEL\_MASK\_NONE, 391
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_DPSE, 394
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_PLUGIN\_MASK\_DEFAULT, 391
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_PLUGIN\_MASK\_NONE, 391
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_SDP, 393
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_SDP2, 394
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_SEDP, 393
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_SPDP, 393
  - DDS\_DISCOVERYCONFIG\_BUILTIN\_SPDP2, 394
  - DDS\_DISCOVERYCONFIG\_QOS\_POLICY\_NAME, 396
  - DDS\_DISCOVERYCONFIG\_SERVICE\_REQUEST\_CHANNEL, 394
  - DDS\_DiscoveryConfigBuiltinChannelKind, 394
  - DDS\_DiscoveryConfigBuiltinChannelKindMask, 392
  - DDS\_DiscoveryConfigBuiltinPluginKind, 393
  - DDS\_DiscoveryConfigBuiltinPluginKindMask, 392
- DDS\_LIVELINESS\_BASED\_REMOTE\_PARTICIPANT\_PURGE, 395
- DDS\_NO\_REMOTE\_PARTICIPANT\_PURGE, 396
- DDS\_RemoteParticipantPurgeKind, 394

- discovery\_config
  - DDS\_DomainParticipantQos, 745
- discriminator\_type
  - DDS\_TypeCode, 1184
- dispatch
  - DDSCondition, 1278
- dispose
  - DDSKeyedOctetsDataWriter, 1493
  - DDSKeyedStringDataWriter, 1518
  - FooDataWriter, 1689
- dispose\_w\_params
  - FooDataWriter, 1691
- dispose\_w\_timestamp
  - DDSKeyedOctetsDataWriter, 1493
  - DDSKeyedStringDataWriter, 1518, 1519
  - FooDataWriter, 1690
- disposed\_generation\_count
  - DDS\_SampleInfo, 1087
- disposed\_instance\_count
  - DDS\_DataReaderCacheStatus, 628
  - DDS\_DataWriterCacheStatus, 672
- disposed\_instance\_count\_peak
  - DDS\_DataReaderCacheStatus, 629
  - DDS\_DataWriterCacheStatus, 672
- disposed\_instance\_removal
  - DDS\_DataReaderResourceLimitsInstanceReplacementSettings, 653
- distribution\_settings
  - DDS\_MonitoringQosPolicy, 963
- dll
  - DDS\_TransportMulticastMappingFunction\_t, 1148
- dns\_tracker\_polling\_period
  - DDS\_DiscoveryConfigQosPolicy, 728
- Documentation Roadmap, 235
- Domain Module, 39
- domain\_entity\_qos\_library\_name
  - DDS\_DomainParticipantConfigParams\_t, 736
- domain\_entity\_qos\_profile\_name
  - DDS\_DomainParticipantConfigParams\_t, 736
- domain\_id
  - DDS\_DomainParticipantConfigParams\_t, 735
  - DDS\_MonitoringDedicatedParticipantSettings, 949
  - DDS\_ParticipantBuiltinTopicData, 981
- domain\_id\_gain
  - DDS\_RtpsWellKnownPorts\_t, 1078
- DOMAIN\_PARTICIPANT\_RESOURCE\_LIMITS, 396
  - DDS\_AUTO\_COUNT, 397
  - DDS\_DOMAINPARTICIPANTRESOURCELIMITS\_QOS\_POLICY\_NAME, 398
  - DDS\_DomainParticipantResourceLimitsIgnoredEntityReplacementSettings, 397
  - DDS\_NO\_REPLACEMENT\_IGNORED\_ENTITY\_REPLACEMENT, 397
- DDS\_NOT\_ALIVE\_FIRST\_IGNORED\_ENTITY\_REPLACEMENT, 397
- DomainParticipantConfigParams, 517
  - DDS\_DOMAIN\_ID\_USE\_XML\_CONFIG, 518
  - DDS\_DomainParticipantConfigParams\_t\_INITIALIZER, 518
  - DDS\_ENTITY\_NAME\_USE\_XML\_CONFIG, 518
  - DDS\_QOS\_ELEMENT\_NAME\_USE\_XML\_CONFIG, 518
- DomainParticipantFactory, 40
  - DDS\_DomainParticipantFactoryQos\_equals, 42
  - DDS\_PARTICIPANT\_CONFIG\_PARAMS\_DEFAULT, 48
  - DDS\_PARTICIPANT\_QOS\_DEFAULT, 48
  - DDSDomainParticipantFactory\_RegisterTypeFunction, 42
  - DDSTheParticipantFactory, 41
  - print, 43
  - to\_string, 43–47
- DomainParticipants, 49
  - DDS\_DomainId\_t, 51
  - DDS\_DomainParticipantQos\_equals, 51
  - DDS\_FLOW\_CONTROLLER\_PROPERTY\_DEFAULT, 58
  - DDS\_PUBLISHER\_QOS\_DEFAULT, 57
  - DDS\_SQLFILTER\_NAME, 59
  - DDS\_STRINGMATCHFILTER\_NAME, 59
  - DDS\_SUBSCRIBER\_QOS\_DEFAULT, 57
  - DDS\_TOPIC\_QOS\_DEFAULT, 56
  - print, 51
  - to\_string, 52–55
- drop\_incomplete\_coherent\_set
  - DDS\_PresentationQosPolicy, 1000
- dropped\_content
  - NDDS\_Utility\_NetworkCaptureParams\_t, 1818
- dropped\_fragment\_count
  - DDS\_DataReaderProtocolStatus, 643
- duplicate\_sample\_bytes
  - DDS\_DataReaderProtocolStatus, 638
- duplicate\_sample\_bytes\_change
  - DDS\_DataReaderProtocolStatus, 638
- duplicate\_sample\_count
  - DDS\_DataReaderProtocolStatus, 637
- duplicate\_sample\_count\_change
  - DDS\_DataReaderProtocolStatus, 637
- DURABILITY, 398
  - DDS\_AUTO\_WRITER\_DEPTH, 401
  - DDS\_DURABILITY\_PERSISTENT\_JOURNAL, 399
  - DDS\_DURABILITY\_QOS\_POLICY\_NAME, 401
  - DDS\_DurabilityQosPolicyKind, 400
  - DDS\_FULL\_PERSISTENT\_SYNCHRONIZATION, 400
  - DDS\_MEMORY\_PERSISTENT\_JOURNAL, 399



- DDS\_NORMAL\_PERSISTENT\_SYNCHRONIZATION, 400
- DDS\_OFF\_PERSISTENT\_JOURNAL, 399
- DDS\_OFF\_PERSISTENT\_SYNCHRONIZATION, 400
- DDS\_PERSIST\_PERSISTENT\_JOURNAL, 399
- DDS\_PERSISTENT\_DURABILITY\_QOS, 401
- DDS\_PersistentJournalKind, 399
- DDS\_PersistentSynchronizationKind, 399
- DDS\_TRANSIENT\_DURABILITY\_QOS, 401
- DDS\_TRANSIENT\_LOCAL\_DURABILITY\_QOS, 401
- DDS\_TRUNCATE\_PERSISTENT\_JOURNAL, 399
- DDS\_VOLATILE\_DURABILITY\_QOS, 400
- DDS\_WAL\_PERSISTENT\_JOURNAL, 399
- durability
  - DDS\_DataReaderQos, 648
  - DDS\_DataWriterQos, 692
  - DDS\_PublicationBuiltinTopicData, 1013
  - DDS\_SubscriptionBuiltinTopicData, 1111
  - DDS\_TopicBuiltinTopicData, 1130
  - DDS\_TopicQos, 1137
- Durability and Persistence, 191
- DURABILITY\_SERVICE, 402
  - DDS\_DURABILITYSERVICE\_QOS\_POLICY\_NAME, 402
- durability\_service
  - DDS\_DataWriterQos, 692
  - DDS\_PublicationBuiltinTopicData, 1013
  - DDS\_TopicBuiltinTopicData, 1131
  - DDS\_TopicQos, 1137
- duration
  - DDS\_LatencyBudgetQosPolicy, 931
  - DDS\_LifespanQosPolicy, 932
- Dynamic Data, 99
  - DDS\_DYNAMIC\_DATA\_JSON\_PARSER\_PROPERTIES\_DEFAULT, 102
  - DDS\_DYNAMIC\_DATA\_MEMBER\_ID\_UNSPECIFIED, 101
  - DDS\_DYNAMIC\_DATA\_PROPERTY\_DEFAULT, 102
  - DDS\_DYNAMIC\_DATA\_TYPE\_PROPERTY\_DEFAULT, 102
  - DDS\_DynamicDataMemberId, 101
- dynamically\_allocate\_fragmented\_samples
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 609
  - DDS\_DataReaderResourceLimitsQosPolicy, 661
- element\_count
  - DDS\_DynamicDataMemberInfo, 894
  - DDS\_TypeCode, 1187
  - rti::flat::AbstractListBuilder< DHeaderGen >, 582
  - rti::flat::AbstractSequenceBuilder< DHeaderGen >, 584
  - rti::flat::PrimitiveArrayOffset< T, N >, 1862
  - rti::flat::PrimitiveSequenceOffset< T >, 1868
  - rti::flat::SequenceOffset< ElementOffset >, 1935
  - rti::flat::StringOffset, 1946
- element\_kind
  - DDS\_DynamicDataMemberInfo, 894
- emergency
  - NDDSSConfigLogger, 1827
- empty\_reliable\_writer\_cache
  - DDS\_ReliableWriterCacheChangedStatus, 1047
- enable
  - DDS\_BatchQosPolicy, 601
  - DDS\_MonitoringDedicatedParticipantSettings, 949
  - DDS\_MonitoringQosPolicy, 962
  - DDS\_PersistentStorageSettings, 993
  - DDS\_TopicQueryDispatchQosPolicy, 1142
  - DDSDataReader, 1312
  - DDSDataWriter, 1342
  - DDSEntity, 1466
  - NDDSSUtilityHeapMonitoring, 1843
  - NDDSSUtilityNetworkCapture, 1847
- enable\_data\_consistency\_check
  - DDS\_DataWriterShmemRefTransferModeSettings, 705
- enable\_endpoint\_discovery
  - DDS\_DiscoveryQosPolicy, 734
- enable\_heap\_monitoring
  - NDDSSUtility, 1841
- enable\_multicast\_periodic\_heartbeat
  - DDS\_RtpsReliableWriterProtocol\_t, 1075
- enable\_required\_subscriptions
  - DDS\_AvailabilityQosPolicy, 599
- enable\_udp\_debugging
  - NDDSS\_Transport\_Shmem\_Property\_t, 1786
- enable\_v4mapped
  - NDDSS\_Transport\_UDPv6\_Property\_t, 1812
- enable\_builtin\_channels
  - DDS\_DiscoveryConfigQosPolicy, 721
- enabled\_metrics\_selection
  - DDS\_MonitoringMetricSelection, 959
- enabled\_transports
  - DDS\_DiscoveryQosPolicy, 732
  - DDS\_TransportSelectionQosPolicy, 1158
- end
  - connext::LoanedSamples< T >, 1735, 1736
  - rti::flat::AbstractAlignedList< ElementOffset >, 578
- end\_access
  - DDSSubscriber, 1606
- end\_coherent\_changes
  - DDSPublisher, 1565
- endpoint\_type\_object\_lb\_serialization\_threshold
  - DDS\_DiscoveryConfigQosPolicy, 728
- ensure\_length
  - FooSeq, 1706
- Entity Support, 471

- Entity Use Cases, 213
- ENTITY\_FACTORY, 402
  - DDS\_ENTITYFACTORY\_QOS\_POLICY\_NAME, 403
- entity\_factory
  - DDS\_DomainParticipantFactoryQos, 739
  - DDS\_DomainParticipantQos, 744
  - DDS\_PublisherQos, 1024
  - DDS\_SubscriberQos, 1107
- ENTITY\_NAME, 403
  - DDS\_ENTITYNAME\_QOS\_POLICY\_NAME, 404
- enum\_as\_int
  - DDS\_PrintFormatProperty, 1002
- equal
  - DDS\_DynamicData, 793
  - DDS\_TypeCode, 1171
- error
  - NDDConfigLogger, 1828
- evaluate
  - DDSContentFilter, 1282
- EVENT, 404
  - DDS\_EVENT\_QOS\_POLICY\_NAME, 404
- event
  - DDS\_DomainParticipantQos, 745
- event\_settings
  - DDS\_MonitoringDistributionSettings, 951
- Exception Codes, 333
  - DDS\_BAD\_MEMBER\_ID\_USER\_EXCEPTION\_CODE, 335
  - DDS\_BAD\_MEMBER\_NAME\_USER\_EXCEPTION\_CODE, 335
  - DDS\_BAD\_PARAM\_SYSTEM\_EXCEPTION\_CODE, 334
  - DDS\_BAD\_TYPECODE\_SYSTEM\_EXCEPTION\_CODE, 334
  - DDS\_BADKIND\_USER\_EXCEPTION\_CODE, 334
  - DDS\_BOUNDS\_USER\_EXCEPTION\_CODE, 334
  - DDS\_ExceptionCode\_t, 334
  - DDS\_IMMUTABLE\_TYPECODE\_SYSTEM\_EXCEPTION\_CODE, 334
  - DDS\_NO\_EXCEPTION\_CODE, 334
  - DDS\_NO\_MEMORY\_SYSTEM\_EXCEPTION\_CODE, 334
  - DDS\_SYSTEM\_EXCEPTION\_CODE, 334
  - DDS\_USER\_EXCEPTION\_CODE, 334
- ExceptionHelper.hpp, 1972
- expects\_inline\_qos
  - DDS\_DataReaderProtocolQosPolicy, 631
- expiration\_time
  - DDS\_InvalidLocalIdentityAdvanceNoticeStatus, 924
- expired\_dropped\_sample\_count
  - DDS\_DataReaderCacheStatus, 626
- expression\_parameters
  - DDS\_ContentFilterProperty\_t, 618
- Extended Qos Support, 462
  - extensibility\_kind
    - DDS\_TypeCode, 1168
  - facility
    - NDDS\_Config\_LogMessage, 1774
  - fast\_heartbeat\_period
    - DDS\_RtpsReliableWriterProtocol\_t, 1064
  - file\_name
    - DDS\_PersistentStorageSettings, 993
  - Filter Use Cases, 219
  - filter\_class\_name
    - DDS\_ContentFilterProperty\_t, 617
    - DDS\_TopicQuerySelection, 1143
  - filter\_expression
    - DDS\_ChannelSettings\_t, 611
    - DDS\_ContentFilterProperty\_t, 617
    - DDS\_LocatorFilter\_t, 941
    - DDS\_TopicQuerySelection, 1143
  - filter\_name
    - DDS\_LocatorFilterQosPolicy, 942
    - DDS\_MultiChannelQosPolicy, 966
  - filter\_parameters
    - DDS\_TopicQuerySelection, 1144
  - filtered\_sample\_bytes
    - DDS\_DataReaderProtocolStatus, 638
    - DDS\_DataWriterProtocolStatus, 681
  - filtered\_sample\_bytes\_change
    - DDS\_DataReaderProtocolStatus, 639
    - DDS\_DataWriterProtocolStatus, 681
  - filtered\_sample\_count
    - DDS\_DataReaderProtocolStatus, 638
    - DDS\_DataWriterProtocolStatus, 681
  - filtered\_sample\_count\_change
    - DDS\_DataReaderProtocolStatus, 638
    - DDS\_DataWriterProtocolStatus, 681
  - finalize
    - DDSContentFilter, 1282
  - finalize\_data
    - FooTypeSupport, 1719
  - finalize\_data\_ex
    - FooTypeSupport, 1719
  - finalize\_instance
    - DDSDomainParticipantFactory, 1429
    - NDDConfigLogger, 1824
  - find\_member\_by\_id
    - DDS\_TypeCode, 1192
  - find\_member\_by\_name
    - DDS\_TypeCode, 1174
  - find\_topic
    - DDSDomainParticipant, 1389
  - finish
    - MyFlatMutableBuilder, 1753
    - MyFlatUnionBuilder, 1765

- rti::flat::FinalSequenceBuilder< ElementOffset >, 1647
- rti::flat::MutableArrayBuilder< ElementBuilder, N >, 1741
- rti::flat::MutableSequenceBuilder< ElementBuilder >, 1745
- rti::flat::PrimitiveSequenceBuilder< T >, 1867
- rti::flat::StringBuilder, 1944
- finish\_sample
  - MyFlatMutableBuilder, 1753
  - MyFlatUnionBuilder, 1765
- first\_available\_sample\_sequence\_number
  - DDS\_DataReaderProtocolStatus, 642
  - DDS\_DataWriterProtocolStatus, 686
- first\_available\_sample\_virtual\_sequence\_number
  - DDS\_DataWriterProtocolStatus, 687
- first\_unacknowledged\_sample\_sequence\_number
  - DDS\_DataWriterProtocolStatus, 686
- first\_unacknowledged\_sample\_subscription\_handle
  - DDS\_DataWriterProtocolStatus, 687
- first\_unacknowledged\_sample\_virtual\_sequence\_number
  - DDS\_DataWriterProtocolStatus, 687
- first\_unelapsed\_keep\_duration\_sample\_sequence\_number
  - DDS\_DataWriterProtocolStatus, 687
- flag
  - DDS\_SampleInfo, 1091
  - DDS\_WriteParams\_t, 1254
- FlatData Builders, 558
  - build\_data, 560
  - discard\_builder, 561
- FlatData Offsets, 564
  - plain\_cast, 566, 568
- FlatData Samples, 561
  - MyFlatFinal, 562
  - MyFlatMutable, 562
  - MyFlatUnion, 563
- FlatData Topic-Types, 568
- FlatSample.hpp, 1975
- FlatSampleImpl.hpp, 1977
- FlatTypeTraits.hpp, 1978
- Flow Controllers, 118
  - DDS\_DEFAULT\_FLOW\_CONTROLLER\_NAME, 121
  - DDS\_EDF\_FLOW\_CONTROLLER\_SCHED\_POLICY, 120
  - DDS\_FIXED\_RATE\_FLOW\_CONTROLLER\_NAME, 122
  - DDS\_FlowControllerSchedulingPolicy, 119
  - DDS\_HPF\_FLOW\_CONTROLLER\_SCHED\_POLICY, 121
  - DDS\_ON\_DEMAND\_FLOW\_CONTROLLER\_NAME, 123
  - DDS\_RR\_FLOW\_CONTROLLER\_SCHED\_POLICY, 120
- flow\_controller\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 754
  - flow\_controller\_hash\_buckets
    - DDS\_DomainParticipantResourceLimitsQosPolicy, 757
  - flow\_controller\_name
    - DDS\_PublishModeQosPolicy, 1027
  - FlowController Use Cases, 204
  - flush
    - DDSDataWriter, 1339
  - Foo, 1648
  - FooDataReader, 1649
    - get\_key\_value, 1673
    - is\_data\_consistent, 1675
    - lookup\_instance, 1674
    - narrow, 1651
    - read, 1651
    - read\_instance, 1661
    - read\_instance\_w\_condition, 1664
    - read\_next\_instance, 1667
    - read\_next\_instance\_w\_condition, 1670
    - read\_next\_sample, 1659
    - read\_w\_condition, 1657
    - return\_loan, 1672
    - take, 1652
    - take\_instance, 1663
    - take\_instance\_w\_condition, 1665
    - take\_next\_instance, 1668
    - take\_next\_instance\_w\_condition, 1671
    - take\_next\_sample, 1660
    - take\_w\_condition, 1658
  - FooDataWriter, 1676
    - create\_data, 1694
    - delete\_data, 1694
    - discard\_loan, 1696
    - dispose, 1689
    - dispose\_w\_params, 1691
    - dispose\_w\_timestamp, 1690
    - get\_key\_value, 1691
    - get\_loan, 1695
    - lookup\_instance, 1692
    - narrow, 1678
    - register\_instance, 1678
    - register\_instance\_w\_params, 1680
    - register\_instance\_w\_timestamp, 1679
    - unregister\_instance, 1680
    - unregister\_instance\_w\_params, 1683
    - unregister\_instance\_w\_timestamp, 1682
    - write, 1683
    - write\_w\_params, 1688
    - write\_w\_timestamp, 1687
  - FooSeq, 1697
    - ~FooSeq, 1698
    - copy\_no\_alloc, 1702

- ensure\_length, 1706
- FooSeq, 1699, 1700
- from\_array, 1703
- get\_contiguous\_buffer, 1710
- get\_discontiguous\_buffer, 1710
- has\_ownership, 1711
- length, 1705
- loan\_contiguous, 1708
- loan\_discontiguous, 1709
- maximum, 1707
- operator=, 1700
- operator[], 1704
- to\_array, 1703
- unloan, 1709
- FooTypeSupport, 1711
  - copy\_data, 1716
  - create\_data, 1715
  - create\_data\_ex, 1715
  - data\_to\_string, 1723
  - delete\_data, 1716
  - delete\_data\_ex, 1717
  - deserialize\_data\_from\_cdr\_buffer, 1722
  - finalize\_data, 1719
  - finalize\_data\_ex, 1719
  - get\_type\_name, 1720
  - get\_typecode, 1723
  - initialize\_data, 1718
  - initialize\_data\_ex, 1718
  - print\_data, 1720
  - register\_type, 1713
  - serialize\_data\_to\_cdr\_buffer, 1721
  - serialize\_data\_to\_cdr\_buffer\_ex, 1722
  - unregister\_type, 1714
- force\_interface\_poll\_detection
  - NDDS\_Transport\_UDPv4\_Property\_t, 1795
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1804
  - NDDS\_Transport\_UDPv6\_Property\_t, 1814
- force\_type\_validation
  - DDS\_TypeConsistencyEnforcementQosPolicy, 1230
- frame\_queue\_size
  - NDDS\_Utility\_NetworkCaptureParams\_t, 1819
- from\_array
  - FooSeq, 1703
- from\_cdr\_buffer
  - DDS\_DynamicData, 798
- from\_micros
  - Time Support, 322, 323
- from\_millis
  - Time Support, 322, 323
- from\_nanos
  - Time Support, 323
- from\_seconds
  - Time Support, 323, 324
- from\_string
  - DDS\_DynamicData, 800
- full\_reliable\_writer\_cache
  - DDS\_ReliableWriterCacheChangedStatus, 1047
- function\_name
  - DDS\_TransportMulticastMappingFunction\_t, 1149
- gather\_send\_buffer\_count\_max
  - NDDS\_Transport\_Property\_t, 1779
- General Utilities and Compliance Configuration, 185
- generation\_rank
  - DDS\_SampleInfo, 1088
- get
  - rti::flat::PrimitiveConstOffset< T >, 1863
- get\_all\_datareaders
  - DDSSubscriber, 1607
- get\_all\_datawriters
  - DDSPublisher, 1562
- get\_api\_build\_version
  - connext::MessagingVersion, 1739
- get\_api\_version
  - connext::MessagingVersion, 1739
- get\_api\_version\_string
  - connext::MessagingVersion, 1739
- get\_boolean
  - DDS\_DynamicData, 817
- get\_boolean\_array
  - DDS\_DynamicData, 832
- get\_boolean\_seq
  - DDS\_DynamicData, 845
- get\_buffer
  - rti::flat::OffsetBase, 1857
- get\_buffer\_size
  - rti::flat::OffsetBase, 1858
- get\_builtin\_subscriber
  - DDSDomainParticipant, 1393
- get\_builtin\_transport\_property
  - NDDSTransportSupport, 1837
- get\_c\_api\_version
  - NDDSConfigVersion, 1832
- get\_cdr\_buffer
  - DDS\_DynamicData, 796
- get\_cdr\_serialized\_sample\_max\_size
  - DDS\_TypeCode, 1193
- get\_char
  - DDS\_DynamicData, 818
- get\_char\_array
  - DDS\_DynamicData, 833
- get\_char\_seq
  - DDS\_DynamicData, 846
- get\_complex\_member
  - DDS\_DynamicData, 826
- get\_conditions
  - DDSAsyncWaitSet, 1271
  - DDSWaitSet, 1636

get\_contiguous\_buffer  
    FooSeq, 1710

get\_core\_version  
    NDDSSConfigVersion, 1832

get\_cpp\_api\_version  
    NDDSSConfigVersion, 1832

get\_current\_time  
    DDSDomainParticipant, 1398

get\_data\_type  
    DDSDynamicDataTypeSupport, 1460

get\_datareader  
    DDSReadCondition, 1576

get\_datareader\_cache\_status  
    DDSDataReader, 1305

get\_datareader\_protocol\_status  
    DDSDataReader, 1305

get\_datareader\_qos\_from\_profile  
    DDSDomainParticipantFactory, 1439

get\_datareader\_qos\_from\_profile\_w\_topic\_name  
    DDSDomainParticipantFactory, 1440

get\_datareaders  
    DDSSubscriber, 1606

get\_datawriter\_cache\_status  
    DDSDataWriter, 1326

get\_datawriter\_protocol\_status  
    DDSDataWriter, 1327

get\_datawriter\_qos\_from\_profile  
    DDSDomainParticipantFactory, 1438

get\_datawriter\_qos\_from\_profile\_w\_topic\_name  
    DDSDomainParticipantFactory, 1438

get\_default\_datareader\_qos  
    DDSDomainParticipant, 1360  
    DDSSubscriber, 1595

get\_default\_datawriter\_qos  
    DDSDomainParticipant, 1358  
    DDSPublisher, 1553

get\_default\_flowcontroller\_property  
    DDSDomainParticipant, 1362

get\_default\_library  
    DDSDomainParticipant, 1366  
    DDSDomainParticipantFactory, 1433  
    DDSPublisher, 1556  
    DDSSubscriber, 1598

get\_default\_participant\_qos  
    DDSDomainParticipantFactory, 1432

get\_default\_profile  
    DDSDomainParticipant, 1366  
    DDSDomainParticipantFactory, 1435  
    DDSPublisher, 1557  
    DDSSubscriber, 1599

get\_default\_profile\_library  
    DDSDomainParticipant, 1366  
    DDSDomainParticipantFactory, 1435  
    DDSPublisher, 1558

    DDSSubscriber, 1599

get\_default\_publisher\_qos  
    DDSDomainParticipant, 1371

get\_default\_subscriber\_qos  
    DDSDomainParticipant, 1373

get\_default\_topic\_qos  
    DDSDomainParticipant, 1368

get\_discontiguous\_buffer  
    FooSeq, 1710

get\_discovered\_participant\_data  
    DDSDomainParticipant, 1403

get\_discovered\_participant\_subject\_name  
    DDSDomainParticipant, 1404

get\_discovered\_participants  
    DDSDomainParticipant, 1402

get\_discovered\_participants\_from\_subject\_name  
    DDSDomainParticipant, 1402

get\_discovered\_topic\_data  
    DDSDomainParticipant, 1405

get\_discovered\_topics  
    DDSDomainParticipant, 1405

get\_dns\_tracker\_polling\_period  
    DDSDomainParticipant, 1412

get\_domain\_id  
    DDSDomainParticipant, 1397

get\_double  
    DDS\_DynamicData, 816

get\_double\_array  
    DDS\_DynamicData, 832

get\_double\_seq  
    DDS\_DynamicData, 845

get\_element  
    rti::flat::AbstractPrimitiveList< T >, 583  
    rti::flat::FinalAlignedArrayOffset< ElementOffset, N >, 1643  
    rti::flat::FinalArrayOffset< ElementOffset, N >, 1644  
    rti::flat::MutableArrayOffset< ElementOffset, N >, 1743  
    rti::flat::SequenceOffset< ElementOffset >, 1935

get\_enabled\_statuses  
    DDSStatusCondition, 1578

get\_entity  
    DDSStatusCondition, 1579

get\_expression\_parameters  
    DDSContentFilteredTopic, 1285  
    DDSMultiTopic, 1531

get\_filter\_expression  
    DDSContentFilteredTopic, 1284

get\_float  
    DDS\_DynamicData, 815

get\_float\_array  
    DDS\_DynamicData, 831

get\_float\_seq  
    DDS\_DynamicData, 844

get\_guid  
     DDSTopicQuery, 1627  
 get\_handler  
     DDSCondition, 1278  
 get\_implicit\_publisher  
     DDSDomainParticipant, 1414  
 get\_implicit\_subscriber  
     DDSDomainParticipant, 1414  
 get\_inconsistent\_topic\_status  
     DDSTopic, 1619  
 get\_info  
     DDS\_DynamicData, 801  
 get\_instance  
     DDS\_TypeCodeFactory, 1212  
     DDSDomainParticipantFactory, 1429  
     NDDConfigLogger, 1823  
     NDDConfigVersion, 1831  
 get\_instance\_handle  
     DDSDataReader, 1314  
     DDSDataWriter, 1343  
     DDSEntity, 1468  
 get\_instance\_state\_mask  
     DDSReadCondition, 1576  
 get\_int8  
     DDS\_DynamicData, 825  
 get\_int8\_array  
     DDS\_DynamicData, 839  
 get\_int8\_seq  
     DDS\_DynamicData, 851  
 get\_key\_value  
     DDSKeyedOctetsDataReader, 1480, 1481  
     DDSKeyedOctetsDataWriter, 1494  
     DDSKeyedStringDataReader, 1508, 1509  
     DDSKeyedStringDataWriter, 1519  
     FooDataReader, 1673  
     FooDataWriter, 1691  
 get\_listener  
     DDSDataReader, 1309  
     DDSDataWriter, 1339  
     DDSDomainParticipant, 1414  
     DDSPublisher, 1570  
     DDSSubscriber, 1612  
     DDSTopic, 1622  
 get\_liveliness\_changed\_status  
     DDSDataReader, 1302  
 get\_liveliness\_lost\_status  
     DDSDataWriter, 1324  
 get\_loan  
     FooDataWriter, 1695  
 get\_long  
     DDS\_DynamicData, 812  
 get\_long\_array  
     DDS\_DynamicData, 827  
 get\_long\_seq  
     DDS\_DynamicData, 840  
 get\_longdouble  
     DDS\_DynamicData, 821  
 get\_longdouble\_array  
     DDS\_DynamicData, 837  
 get\_longdouble\_seq  
     DDS\_DynamicData, 850  
 get\_longlong  
     DDS\_DynamicData, 819  
 get\_longlong\_array  
     DDS\_DynamicData, 835  
 get\_longlong\_seq  
     DDS\_DynamicData, 848  
 get\_matched\_publication\_data  
     DDSDataReader, 1300  
 get\_matched\_publication\_datareader\_protocol\_status  
     DDSDataReader, 1305  
 get\_matched\_publication\_participant\_data  
     DDSDataReader, 1301  
 get\_matched\_publications  
     DDSDataReader, 1299  
 get\_matched\_subscription\_data  
     DDSDataWriter, 1332  
 get\_matched\_subscription\_datawriter\_protocol\_status  
     DDSDataWriter, 1327  
 get\_matched\_subscription\_datawriter\_protocol\_status\_by\_locator  
     DDSDataWriter, 1329  
 get\_matched\_subscription\_locators  
     DDSDataWriter, 1330  
 get\_matched\_subscription\_participant\_data  
     DDSDataWriter, 1333  
 get\_matched\_subscriptions  
     DDSDataWriter, 1331  
 get\_member\_count  
     DDS\_DynamicData, 806  
 get\_member\_info  
     DDS\_DynamicData, 808  
 get\_member\_info\_by\_index  
     DDS\_DynamicData, 810  
 get\_member\_type  
     DDS\_DynamicData, 810  
 get\_name  
     DDSFlowController, 1471  
     DDSTopicDescription, 1625  
 get\_number\_of\_properties  
     PROPERTY, 423  
 get\_number\_of\_tags  
     DATA\_TAG, 378  
 get\_octet  
     DDS\_DynamicData, 819  
 get\_octet\_array  
     DDS\_DynamicData, 834  
 get\_octet\_seq  
     DDS\_DynamicData, 847

get\_offered\_deadline\_missed\_status  
    DDSDataWriter, 1324

get\_offered\_incompatible\_qos\_status  
    DDSDataWriter, 1325

get\_output\_device  
    NDDSSConfigLogger, 1826

get\_output\_file  
    NDDSSConfigLogger, 1825

get\_participant  
    DDSFlowController, 1471  
    DDSPublisher, 1565  
    DDSSubscriber, 1608  
    DDSTopicDescription, 1625

get\_participant\_factory\_qos\_from\_profile  
    DDSDomainParticipantFactory, 1435

get\_participant\_protocol\_status  
    DDSDomainParticipant, 1407

get\_participant\_qos\_from\_profile  
    DDSDomainParticipantFactory, 1436

get\_participants  
    DDSDomainParticipantFactory, 1452

get\_primitive\_tc  
    DDS\_TypeCodeFactory, 1213

get\_print\_format  
    NDDSSConfigLogger, 1827

get\_print\_format\_by\_log\_level  
    NDDSSConfigLogger, 1827

get\_product\_version  
    NDDSSConfigVersion, 1831

get\_properties  
    PROPERTY, 428

get\_property  
    DDSAsyncWaitSet, 1271  
    DDSFlowController, 1470  
    DDSWaitSet, 1637

get\_publication\_matched\_status  
    DDSDataWriter, 1325

get\_publisher  
    DDSDataWriter, 1334

get\_publisher\_qos\_from\_profile  
    DDSDomainParticipantFactory, 1437

get\_publishers  
    DDSDomainParticipant, 1381

get\_qos  
    DDSDataReader, 1307  
    DDSDataWriter, 1338  
    DDSDomainParticipant, 1409  
    DDSDomainParticipantFactory, 1447  
    DDSPublisher, 1569  
    DDSSubscriber, 1611  
    DDSTopic, 1621

get\_qos\_profile\_libraries  
    DDSDomainParticipantFactory, 1442

get\_qos\_profiles  
    DDSDomainParticipantFactory, 1442

get\_query\_expression  
    DDSQueryCondition, 1574

get\_query\_parameters  
    DDSQueryCondition, 1574

get\_related\_topic  
    DDSContentFilteredTopic, 1288

get\_reliable\_reader\_activity\_changed\_status  
    DDSDataWriter, 1326

get\_reliable\_writer\_cache\_changed\_status  
    DDSDataWriter, 1326

get\_reply\_datareader  
    connext::Requester< TReq, TRep >, 1906

get\_reply\_datawriter  
    connext::Replier< TReq, TRep >, 1880

get\_request\_datareader  
    connext::Replier< TReq, TRep >, 1879

get\_request\_datawriter  
    connext::Requester< TReq, TRep >, 1906

get\_requested\_deadline\_missed\_status  
    DDSDataReader, 1303

get\_requested\_incompatible\_qos\_status  
    DDSDataReader, 1303

get\_sample\_lost\_status  
    DDSDataReader, 1304

get\_sample\_rejected\_status  
    DDSDataReader, 1302

get\_sample\_state\_mask  
    DDSReadCondition, 1575

get\_service\_request\_accepted\_status  
    DDSDataWriter, 1328

get\_short  
    DDS\_DynamicData, 813

get\_short\_array  
    DDS\_DynamicData, 828

get\_short\_seq  
    DDS\_DynamicData, 841

get\_spin\_per\_microsecond  
    NDDSSUtility, 1841

get\_status\_changes  
    DDSDataReader, 1314  
    DDSDataWriter, 1343  
    DDSEntity, 1467

get\_statuscondition  
    DDSDataReader, 1313  
    DDSDataWriter, 1343  
    DDSEntity, 1467

get\_stream\_kind\_mask  
    DDSReadCondition, 1576

get\_string  
    DDS\_DynamicData, 823  
    rti::flat::StringOffset, 1945

get\_subscriber  
    DDSDataReader, 1302

get\_subscriber\_qos\_from\_profile  
     DDSDomainParticipantFactory, 1437  
 get\_subscribers  
     DDSDomainParticipant, 1382  
 get\_subscription\_expression  
     DDSMultiTopic, 1531  
 get\_subscription\_matched\_status  
     DDSDataReader, 1304  
 get\_topic  
     DDSDataWriter, 1333  
 get\_topic\_qos\_from\_profile  
     DDSDomainParticipantFactory, 1440  
 get\_topic\_qos\_from\_profile\_w\_topic\_name  
     DDSDomainParticipantFactory, 1441  
 get\_topicdescription  
     DDSDataReader, 1301  
 get\_transport\_plugin  
     NDDSTransportSupport, 1839  
 get\_trigger\_value  
     DDSCondition, 1277  
     DDSGuardCondition, 1473  
 get\_type  
     DDS\_DynamicData, 806  
 get\_type\_kind  
     DDS\_DynamicData, 806  
 get\_type\_name  
     DDSDynamicDataTypeSupport, 1460  
     DDSKeyedOctetsTypeSupport, 1499  
     DDSKeyedStringTypeSupport, 1524  
     DDSOctetsTypeSupport, 1545  
     DDSStringTypeSupport, 1589  
     DDSTopicDescription, 1624  
     FooTypeSupport, 1720  
 get\_type\_object\_serialized\_size  
     DDS\_TypeCode, 1193  
 get\_typecode  
     DDSKeyedOctetsTypeSupport, 1500  
     DDSKeyedStringTypeSupport, 1525  
     DDSOctetsTypeSupport, 1546  
     DDSStringTypeSupport, 1590  
     FooTypeSupport, 1723  
 get\_typecode\_from\_config  
     DDSDomainParticipantFactory, 1449  
 get\_uint8  
     DDS\_DynamicData, 825  
 get\_uint8\_array  
     DDS\_DynamicData, 840  
 get\_uint8\_seq  
     DDS\_DynamicData, 852  
 get\_ulong  
     DDS\_DynamicData, 814  
 get\_ulong\_array  
     DDS\_DynamicData, 829  
 get\_ulong\_seq  
     DDS\_DynamicData, 842  
 get\_ulonglong  
     DDS\_DynamicData, 820  
 get\_ulonglong\_array  
     DDS\_DynamicData, 836  
 get\_ulonglong\_seq  
     DDS\_DynamicData, 849  
 get\_ushort  
     DDS\_DynamicData, 815  
 get\_ushort\_array  
     DDS\_DynamicData, 830  
 get\_ushort\_seq  
     DDS\_DynamicData, 843  
 get\_verbosity  
     NDDSSConfigLogger, 1824  
 get\_verbosity\_by\_category  
     NDDSSConfigLogger, 1824  
 get\_view\_state\_mask  
     DDSReadCondition, 1576  
 get\_wchar  
     DDS\_DynamicData, 822  
 get\_wchar\_array  
     DDS\_DynamicData, 838  
 get\_wchar\_seq  
     DDS\_DynamicData, 850  
 get\_wstring  
     DDS\_DynamicData, 824  
 get\_xtypes\_mask  
     NDDSSConfigCompliance, 1820  
 group\_coherent\_set\_sequence\_number  
     DDS\_CoherentSetInfo\_t, 614  
 GROUP\_DATA, 406  
     DDS\_GROUPDATA\_QOS\_POLICY\_NAME, 407  
 group\_data  
     DDS\_PublicationBuiltinTopicData, 1016  
     DDS\_PublisherQos, 1024  
     DDS\_SubscriberQos, 1107  
     DDS\_SubscriptionBuiltinTopicData, 1113  
 group\_guid  
     DDS\_CoherentSetInfo\_t, 613  
 GUID Support, 328  
     DDS\_GUID\_AUTO, 331  
     DDS\_GUID\_compare, 330  
     DDS\_GUID\_copy, 330  
     DDS\_GUID\_equals, 329  
     DDS\_GUID\_t, 329  
     DDS\_GUID\_UNKNOWN, 331  
     DDS\_GUID\_ZERO, 331  
     DDS\_RTTPS\_EntityId\_t, 329  
     DDS\_RTTPS\_GUID\_t, 329  
     DDS\_RTTPS\_GuidPrefix\_t, 329  
 handle  
     DDS\_WriteParams\_t, 1253



- has\_ownership
  - FooSeq, 1711
- Heap Monitoring, 539
  - NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_FORMAT, 540
  - NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_FORMAT, 540
  - NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_FORMAT, 540
  - NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_FORMAT, 540
  - NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_FORMAT, 540
  - NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_FORMAT, 540
  - NDDS\_UTILITY\_HEAP\_MONITORING\_SNAPSHOT\_CONTENT\_FORMAT, 540
- Heap Support in C, 479
  - DDS\_Heap\_malloc, 480
  - DDS\_Heap\_free, 480
  - DDS\_Heap\_malloc, 480
- heartbeat\_period
  - DDS\_RtpsReliableWriterProtocol\_t, 1064
- heartbeat\_suppression\_duration
  - DDS\_RtpsReliableReaderProtocol\_t, 1058
- heartbeats\_per\_max\_samples
  - DDS\_RtpsReliableWriterProtocol\_t, 1067
- high
  - DDS\_SequenceNumber\_t, 1096
- high\_watermark
  - DDS\_RtpsReliableWriterProtocol\_t, 1063
- high\_watermark\_reliable\_writer\_cache
  - DDS\_ReliableWriterCacheChangedStatus, 1048
- HISTORY, 405
  - DDS\_HISTORY\_QOS\_POLICY\_NAME, 406
  - DDS\_HistoryQosPolicyKind, 405
  - DDS\_KEEP\_ALL\_HISTORY\_QOS, 406
  - DDS\_KEEP\_LAST\_HISTORY\_QOS, 406
- history
  - DDS\_DataReaderQos, 649
  - DDS\_DataWriterQos, 693
  - DDS\_TopicBuiltinTopicData, 1132
  - DDS\_TopicQos, 1138
- history\_depth
  - DDS\_DurabilityServiceQosPolicy, 773
- history\_kind
  - DDS\_DurabilityServiceQosPolicy, 773
- host\_port
  - NDDS\_Transport\_UDP\_WAN\_CommPortsMappingInfo, 1788
- id
  - DDS\_StructMember, 1104
  - DDS\_ValueMember, 1241
- identity
  - connext::Sample< T >, 1914
- connext::SampleRef< T >, 1925
- connext::WriteSample< T >, 1951
- connext::WriteSampleRef< T >, 1955
- DDS\_BuiltinTopicData, 1252
- DDS\_DiscoveryConditionQosPolicy, 724
- DDS\_TypeConsistencyEnforcementQosPolicy, 1230
- DDS\_DefaultQosPolicy, 1005
- DDS\_Middleware, 1791
- NDDS\_Transport\_UDPv4\_Property\_t, 1791
- NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1800
- NDDS\_Transport\_UDPv6\_Property\_t, 1811
- ignore\_default\_domain\_announcements
- ignore\_enum\_literal\_names
- ignore\_environment\_profile
- ignore\_loopback\_interface
- ignore\_member\_names
- DDS\_TypeConsistencyEnforcementQosPolicy, 1230
- ignore\_nonrunning\_interfaces
- NDDS\_Transport\_UDPv4\_Property\_t, 1792
- NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1801
- NDDS\_Transport\_UDPv6\_Property\_t, 1811
- ignore\_nonup\_interfaces
- NDDS\_Transport\_UDPv4\_Property\_t, 1792
- NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1800
- ignore\_participant
- DDSDomainParticipant, 1393
- ignore\_publication
- DDSDomainParticipant, 1396
- ignore\_resource\_profile
- DDS\_ProfileQosPolicy, 1005
- ignore\_sequence\_bounds
- DDS\_TypeConsistencyEnforcementQosPolicy, 1229
- ignore\_string\_bounds
- DDS\_TypeConsistencyEnforcementQosPolicy, 1229
- ignore\_subscription
- DDSDomainParticipant, 1396
- ignore\_topic
- DDSDomainParticipant, 1395
- ignore\_user\_profile
- DDS\_ProfileQosPolicy, 1005
- ignored\_entity\_allocation
- DDS\_DomainParticipantResourceLimitsQosPolicy, 753
- ignored\_entity\_hash\_buckets
- DDS\_DomainParticipantResourceLimitsQosPolicy, 757
- ignored\_entity\_replacement\_kind
- DDS\_DomainParticipantResourceLimitsQosPolicy, 764
- inactivate\_nonprogressing\_readers
- DDS\_RtpsReliableWriterProtocol\_t, 1067
- inactive\_count
- DDS\_ReliableReaderActivityChangedStatus, 1045
- inactive\_count\_change
- DDS\_ReliableReaderActivityChangedStatus, 1046

- include\_root\_elements
  - DDS\_PrintFormatProperty, 1002
- incomplete\_coherent\_set
  - DDS\_CoherentSetInfo\_t, 614
- incremental\_count
  - DDS\_AllocationSettings\_t, 589
- indent
  - DDS\_QosPrintFormat, 1032
  - DDS\_TypeCodePrintFormatProperty, 1225
- info
  - connext::Sample< T >, 1915
  - connext::SampleRef< T >, 1923
  - connext::WriteSample< T >, 1951
  - connext::WriteSampleRef< T >, 1954
- informational
  - NDDSConfigLogger, 1829
- Infrastructure, 188
  - make\_valid\_sample\_iterator, 189
  - move, 190
- Infrastructure Module, 162
  - DDS\_QOS\_PRINT\_ALL, 164
- initial\_active\_topic\_queries
  - DDS\_DataWriterResourceLimitsQosPolicy, 703
- initial\_batches
  - DDS\_DataWriterResourceLimitsQosPolicy, 700
- initial\_concurrent\_blocking\_threads
  - DDS\_DataWriterResourceLimitsQosPolicy, 699
- initial\_count
  - DDS\_AllocationSettings\_t, 589
  - DDS\_EventQosPolicy, 909
- initial\_fragmented\_samples
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 608
  - DDS\_DataReaderResourceLimitsQosPolicy, 660
- initial\_infos
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 606
  - DDS\_DataReaderResourceLimitsQosPolicy, 658
- initial\_instances
  - DDS\_ResourceLimitsQosPolicy, 1056
- initial\_objects\_per\_thread
  - DDS\_SystemResourceLimitsQosPolicy, 1121
- initial\_outstanding\_reads
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 607
  - DDS\_DataReaderResourceLimitsQosPolicy, 658
- initial\_participant\_announcements
  - DDS\_DiscoveryConfigQosPolicy, 716
- initial\_peers
  - DDS\_DiscoveryQosPolicy, 732
- initial\_records
  - DDS\_DatabaseQosPolicy, 621
- initial\_remote\_virtual\_writers
  - DDS\_DataReaderResourceLimitsQosPolicy, 662
- initial\_remote\_virtual\_writers\_per\_instance
  - DDS\_DataReaderResourceLimitsQosPolicy, 663
- initial\_remote\_writers
  - DDS\_DataReaderResourceLimitsQosPolicy, 657
- initial\_remote\_writers\_per\_instance
  - DDS\_DataReaderResourceLimitsQosPolicy, 658
- initial\_samples
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 606
  - DDS\_ResourceLimitsQosPolicy, 1055
- initial\_topic\_queries
  - DDS\_DataReaderResourceLimitsQosPolicy, 665
- initial\_virtual\_sequence\_number
  - DDS\_DataWriterProtocolQosPolicy, 677
- initial\_virtual\_writers
  - DDS\_DataWriterResourceLimitsQosPolicy, 702
- initial\_weak\_references
  - DDS\_DatabaseQosPolicy, 622
- initialize\_data
  - FooTypeSupport, 1718
- initialize\_data\_ex
  - FooTypeSupport, 1718
- initialize\_writer\_loaned\_sample
  - DDS\_DataWriterResourceLimitsQosPolicy, 704
- Installing Transport Plugins, 172
  - NDDS\_Transport\_create\_plugin, 176
  - NDDS\_Transport\_Handle\_is\_nil, 177
  - NDDS\_TRANSPORT\_HANDLE\_NIL, 177
  - NDDS\_Transport\_Handle\_t, 176
- Instance States, 159
  - DDS\_ALIVE\_INSTANCE\_STATE, 161
  - DDS\_ANY\_INSTANCE\_STATE, 161
  - DDS\_InstanceStateKind, 160
  - DDS\_InstanceStateMask, 160
  - DDS\_NOT\_ALIVE\_DISPOSED\_INSTANCE\_STATE, 161
  - DDS\_NOT\_ALIVE\_INSTANCE\_STATE, 161
  - DDS\_NOT\_ALIVE\_NO\_WRITERS\_INSTANCE\_STATE, 161
- instance\_handle
  - DDS\_SampleInfo, 1087
- instance\_hash\_buckets
  - DDS\_ResourceLimitsQosPolicy, 1056
- instance\_id
  - DDS\_ServiceRequest, 1098
- instance\_replacement
  - DDS\_DataReaderResourceLimitsQosPolicy, 666
  - DDS\_DataWriterResourceLimitsQosPolicy, 701
- instance\_state
  - DDS\_SampleInfo, 1086
- instance\_state\_consistency\_kind
  - DDS\_ReliabilityQosPolicy, 1044
- instance\_states
  - DDS\_ReadConditionParams, 1035
- interceptor
  - DDS\_EndpointTrustAlgorithmInfo, 901
  - DDS\_ParticipantTrustAlgorithmInfo, 985
- Interface, 244

- NDDS\_TRANSPORT\_INTERFACE\_OFF, 245
- NDDS\_TRANSPORT\_INTERFACE\_ON, 245
- NDDS\_Transport\_Interface\_Status\_t, 245
- interface\_poll\_period
  - NDDS\_Transport\_UDPv4\_Property\_t, 1795
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1804
  - NDDS\_Transport\_UDPv6\_Property\_t, 1814
- Interpreter.hpp, 2009
- is\_alias\_pointer
  - DDS\_TypeCode, 1188
- is\_cdr
  - DDS\_DynamicData, 796
- is\_cpp\_compatible
  - rti::flat::OffsetBase, 1857
- is\_data\_consistent
  - FooDataReader, 1675
- is\_key
  - DDS\_StructMember, 1104
  - DDS\_ValueMember, 1240
- is\_matched\_publication\_alive
  - DDSDataReader, 1300
- is\_matched\_subscription\_active
  - DDSDataWriter, 1328
- is\_member\_bitfield
  - DDS\_TypeCode, 1181
- is\_member\_key
  - DDS\_DynamicData, 811
  - DDS\_TypeCode, 1178
- is\_member\_pointer
  - DDS\_TypeCode, 1180
- is\_member\_required
  - DDS\_TypeCode, 1180
- is\_nested
  - rti::flat::AbstractBuilder, 580
- is\_nil\_data
  - connext::SampleRef< T >, 1925
  - connext::WriteSampleRef< T >, 1955
- is\_nil\_info
  - connext::SampleRef< T >, 1925
- is\_null
  - rti::flat::OffsetBase, 1857
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1930
- is\_optional
  - DDS\_StructMember, 1104
  - DDS\_ValueMember, 1241
- is\_pointer
  - DDS\_StructMember, 1104
  - DDS\_UnionMember, 1235
  - DDS\_ValueMember, 1240
- is\_sample\_app\_acknowledged
  - DDSDataWriter, 1335
- is\_security\_message
  - NDDS\_Config\_LogMessage, 1773
- is\_standalone
  - DDS\_QosPrintFormat, 1031
- is\_valid
  - DDS\_DynamicData, 791
  - DDSDynamicDataTypeSupport, 1459
  - rti::flat::AbstractBuilder, 580
- IsReplyRelatedPredicate
  - connext::IsReplyRelatedPredicate< T >, 1726
- iterator
  - connext::LoanedSamples< T >, 1729
  - rti::flat::AbstractAlignedList< ElementOffset >, 578
- iterator\_category
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1929
- join\_multicast\_group\_timeout
  - NDDS\_Transport\_UDPv4\_Property\_t, 1796
  - NDDS\_Transport\_UDPv6\_Property\_t, 1815
- journal\_kind
  - DDS\_PersistentStorageSettings, 993
- keep\_minimum\_state\_for\_instances
  - DDS\_DataReaderResourceLimitsQosPolicy, 664
- key
  - DDS\_KeyedOctets, 926
  - DDS\_KeyedString, 928
  - DDS\_ParticipantBuiltinTopicData, 980
  - DDS\_PublicationBuiltinTopicData, 1012
  - DDS\_SubscriptionBuiltinTopicData, 1110
  - DDS\_TopicBuiltinTopicData, 1130
- key\_establishment
  - DDS\_ParticipantTrustAlgorithmInfo, 985
- key\_only\_filter
  - DDS\_ExpressionProperty, 910
- KeyedOctets Built-in Type, 314
  - DDS\_KeyedOctets, 315
- KeyedString Built-in Type, 312
  - DDS\_KeyedString, 313
- kind
  - DDS\_DestinationOrderQosPolicy, 711
  - DDS\_DurabilityQosPolicy, 770
  - DDS\_HistoryQosPolicy, 921
  - DDS\_LivelinessQosPolicy, 938
  - DDS\_Locator\_t, 939
  - DDS\_OwnershipQosPolicy, 977
  - DDS\_PrintFormatProperty, 1001
  - DDS\_PublishModeQosPolicy, 1027
  - DDS\_ReliabilityQosPolicy, 1043
  - DDS\_ServiceQosPolicy, 1097
  - DDS\_TopicQuerySelection, 1144
  - DDS\_TransportMulticastQosPolicy, 1152
  - DDS\_TypeCode, 1168
  - DDS\_TypeConsistencyEnforcementQosPolicy, 1229
- labels
  - DDS\_UnionMember, 1235
- Large Data Use Cases, 225

- last\_available\_sample\_sequence\_number
  - DDS\_DataReaderProtocolStatus, 642
  - DDS\_DataWriterProtocolStatus, 686
- last\_available\_sample\_virtual\_sequence\_number
  - DDS\_DataWriterProtocolStatus, 687
- last\_committed\_sample\_sequence\_number
  - DDS\_DataReaderProtocolStatus, 642
- last\_corrupted\_message\_timestamp
  - DDS\_DomainParticipantProtocolStatus, 740
- last\_instance\_handle
  - DDS\_OfferedDeadlineMissedStatus, 971
  - DDS\_ReliableReaderActivityChangedStatus, 1046
  - DDS\_RequestedDeadlineMissedStatus, 1050
  - DDS\_SampleRejectedStatus, 1095
- last\_policy\_id
  - DDS\_OfferedIncompatibleQosStatus, 972
  - DDS\_RequestedIncompatibleQosStatus, 1052
- last\_publication\_handle
  - DDS\_LivelinessChangedStatus, 934
  - DDS\_SubscriptionMatchedStatus, 1119
- last\_reason
  - DDS\_SampleLostStatus, 1094
  - DDS\_SampleRejectedStatus, 1095
- last\_request\_handle
  - DDS\_ServiceRequestAcceptedStatus, 1100
- last\_subscription\_handle
  - DDS\_PublicationMatchedStatus, 1021
- late\_joiner\_heartbeat\_period
  - DDS\_RtpsReliableWriterProtocol\_t, 1065
- LATENCY\_BUDGET, 407
  - DDS\_LATENCYBUDGET\_QOS\_POLICY\_NAME, 408
- latency\_budget
  - DDS\_DataReaderQos, 648
  - DDS\_DataWriterQos, 693
  - DDS\_PublicationBuiltinTopicData, 1014
  - DDS\_SubscriptionBuiltinTopicData, 1111
  - DDS\_TopicBuiltinTopicData, 1131
  - DDS\_TopicQos, 1138
- lease\_duration
  - DDS\_LivelinessQosPolicy, 938
- length
  - connext::LoanedSamples< T >, 1734
  - DDS\_KeyedOctets, 926
  - DDS\_Octets, 968
  - DDS\_TypeCode, 1184
  - FooSeq, 1705
- level
  - DDS\_AsyncWaitSetProperty\_t, 596
  - NDDS\_Config\_LogMessage, 1773
- LIFESPAN, 408
  - DDS\_LIFESPAN\_QOS\_POLICY\_NAME, 408
- lifespan
  - DDS\_DataWriterQos, 694
- DDS\_PublicationBuiltinTopicData, 1014
- DDS\_TopicBuiltinTopicData, 1132
- DDS\_TopicQos, 1139
- LIVELINESS, 409
  - DDS\_AUTOMATIC\_LIVELINESS\_QOS, 410
  - DDS\_LIVELINESS\_QOS\_POLICY\_NAME, 410
  - DDS\_LivelinessQosPolicyKind, 409
  - DDS\_MANUAL\_BY\_PARTICIPANT\_LIVELINESS\_QOS, 410
  - DDS\_MANUAL\_BY\_TOPIC\_LIVELINESS\_QOS, 410
- liveliness
  - DDS\_DataReaderQos, 648
  - DDS\_DataWriterQos, 693
  - DDS\_PublicationBuiltinTopicData, 1014
  - DDS\_SubscriptionBuiltinTopicData, 1111
  - DDS\_TopicBuiltinTopicData, 1131
  - DDS\_TopicQos, 1138
- load\_compliance\_masks
  - NDDSSConfigCompliance, 1821
- load\_profiles
  - DDSDomainParticipantFactory, 1447
- loan\_contiguous
  - FooSeq, 1708
- loan\_discontiguous
  - FooSeq, 1709
- LoanedSamples
  - connext::LoanedSamples< T >, 1730
- local\_publisher\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 751
- local\_publisher\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 755
- local\_reader\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 750
- local\_reader\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 755
- local\_subscriber\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 751
- local\_subscriber\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 755
- local\_topic\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 751
- local\_topic\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 755
- local\_writer\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy,

- 750
- local\_writer\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 754
- locator\_filter
  - DDS\_PublicationBuiltinTopicData, 1018
- locator\_filters
  - DDS\_LocatorFilterQosPolicy, 942
- locator\_reachability\_assert\_period
  - DDS\_DiscoveryConfigQosPolicy, 725
- locator\_reachability\_change\_detection\_period
  - DDS\_DiscoveryConfigQosPolicy, 726
- locator\_reachability\_lease\_duration
  - DDS\_DiscoveryConfigQosPolicy, 726
- LOCATORFILTER, 410
  - DDS\_LOCATORFILTER\_QOS\_POLICY\_NAME, 411
- locators
  - DDS\_LocatorFilter\_t, 941
- LOGGING, 411
- Logging, 523
  - NDDS\_CONFIG\_LOG\_CATEGORY\_ALL, 527
  - NDDS\_CONFIG\_LOG\_CATEGORY\_API, 527
  - NDDS\_CONFIG\_LOG\_CATEGORY\_COMMUNICATION, 527
  - NDDS\_CONFIG\_LOG\_CATEGORY\_DATABASE, 527
  - NDDS\_CONFIG\_LOG\_CATEGORY\_DISCOVERY, 527
  - NDDS\_CONFIG\_LOG\_CATEGORY\_ENTITIES, 527
  - NDDS\_CONFIG\_LOG\_CATEGORY\_PLATFORM, 527
  - NDDS\_CONFIG\_LOG\_CATEGORY\_SECURITY, 527
  - NDDS\_CONFIG\_LOG\_CATEGORY\_USER, 527
  - NDDS\_CONFIG\_LOG\_FACILITY\_MIDDLEWARE, 528
  - NDDS\_CONFIG\_LOG\_FACILITY\_SECURITY\_EVENT, 528
  - NDDS\_CONFIG\_LOG\_FACILITY\_SERVICE, 528
  - NDDS\_CONFIG\_LOG\_FACILITY\_USER, 528
  - NDDS\_CONFIG\_LOG\_LEVEL\_DEBUG, 525
  - NDDS\_CONFIG\_LOG\_LEVEL\_ERROR, 525
  - NDDS\_CONFIG\_LOG\_LEVEL\_FATAL\_ERROR, 525
  - NDDS\_CONFIG\_LOG\_LEVEL\_STATUS\_LOCAL, 525
  - NDDS\_CONFIG\_LOG\_LEVEL\_STATUS\_REMOTE, 525
  - NDDS\_CONFIG\_LOG\_LEVEL\_WARNING, 525
  - NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_DEBUG, 528
  - NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_DEFAULT, 527
  - NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_MAXIMAL, 528
  - NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_MINIMAL, 528
  - NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_TIMESTAMPED, 527
  - NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_VERBOSE, 528
  - NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_VERBOSE\_TIMESTAMPED, 528
  - NDDS\_CONFIG\_LOG\_VERBOSITY\_ERROR, 525
  - NDDS\_CONFIG\_LOG\_VERBOSITY\_SILENT, 525
  - NDDS\_CONFIG\_LOG\_VERBOSITY\_STATUS\_ALL, 525
  - NDDS\_CONFIG\_LOG\_VERBOSITY\_STATUS\_LOCAL, 525
  - NDDS\_CONFIG\_LOG\_VERBOSITY\_STATUS\_REMOTE, 525
  - NDDS\_CONFIG\_LOG\_VERBOSITY\_WARNING, 525
  - NDDS\_Config\_LogCategory, 526
  - NDDS\_Config\_LogFacility, 528
  - NDDS\_Config\_LogLevel, 525
  - NDDS\_Config\_LogPrintFormat, 527
  - NDDS\_Config\_LogVerbosity, 524
  - NDDS\_CONFIG\_SYSLOG\_LEVEL\_ALERT, 526
  - NDDS\_CONFIG\_SYSLOG\_LEVEL\_CRITICAL, 526
  - NDDS\_CONFIG\_SYSLOG\_LEVEL\_DEBUG, 526
  - NDDS\_CONFIG\_SYSLOG\_LEVEL\_EMERGENCY, 526
  - NDDS\_CONFIG\_SYSLOG\_LEVEL\_ERROR, 526
  - NDDS\_CONFIG\_SYSLOG\_LEVEL\_INFORMATIONal, 526
  - NDDS\_CONFIG\_SYSLOG\_LEVEL\_NOTICE, 526
  - NDDS\_CONFIG\_SYSLOG\_LEVEL\_WARNING, 526
  - NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_ALERT, 529
  - NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_CRITICAL, 529
  - NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_DEBUG, 529
  - NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_EMERGENCY, 529
  - NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_ERROR, 529
  - NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_INFORMATIONal, 529
  - NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_NOTICE, 529
  - NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_SILENT, 529
  - NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_WARNING, 529
  - NDDS\_Config\_SyslogLevel, 526
  - NDDS\_Config\_SyslogVerbosity, 528
- logging

- DDS\_DomainParticipantFactoryQos, 739
- Logging and Version, 185
- logging\_settings
  - DDS\_MonitoringDistributionSettings, 951
- logs
  - DDS\_MonitoringTelemetryData, 964
- lookup\_contentfilter
  - DDSDomainParticipant, 1365
- lookup\_datareader
  - DDSSubscriber, 1604
- lookup\_datareader\_by\_name
  - DDSDomainParticipant, 1423
  - DDSSubscriber, 1612
- lookup\_datawriter
  - DDSPublisher, 1561
- lookup\_datawriter\_by\_name
  - DDSDomainParticipant, 1422
  - DDSPublisher, 1571
- lookup\_flowcontroller
  - DDSDomainParticipant, 1392
- lookup\_instance
  - DDSKeyedOctetsDataReader, 1481
  - DDSKeyedOctetsDataWriter, 1494, 1495
  - DDSKeyedStringDataReader, 1509
  - DDSKeyedStringDataWriter, 1520
  - FooDataReader, 1674
  - FooDataWriter, 1692
- lookup\_participant
  - DDSDomainParticipantFactory, 1445
- lookup\_participant\_by\_name
  - DDSDomainParticipantFactory, 1451
- lookup\_property
  - PROPERTY, 427
- lookup\_publisher\_by\_name
  - DDSDomainParticipant, 1421
- lookup\_subscriber\_by\_name
  - DDSDomainParticipant, 1422
- lookup\_tag
  - DATA\_TAG, 379
- lookup\_topic\_query
  - DDSDataReader, 1310
- lookup\_topicdescription
  - DDSDomainParticipant, 1390
- lookup\_transport
  - NDDSTransportSupport, 1835
- low
  - DDS\_SequenceNumber\_t, 1096
- low\_watermark
  - DDS\_RtpsReliableWriterProtocol\_t, 1063
- low\_watermark\_reliable\_writer\_cache
  - DDS\_ReliableWriterCacheChangedStatus, 1047
- major
  - DDS\_ProductVersion\_t, 1003
- DDS\_ProtocolVersion\_t, 1010
- NDDS\_Config\_LibraryVersion\_t, 1771
- major\_version
  - connext::MessagingLibraryVersion, 1738
- make\_valid\_sample\_iterator
  - Infrastructure, 189
- mapping\_function
  - DDS\_TransportMulticastMapping\_t, 1148
- mask
  - DDS\_ThreadSettings\_t, 1123
  - DDS\_TransportBuiltinQosPolicy, 1145
- matching\_reader\_writer\_pair\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 752
- matching\_reader\_writer\_pair\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 756
- matching\_writer\_reader\_pair\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 752
- matching\_writer\_reader\_pair\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 756
- max\_active\_topic\_queries
  - DDS\_DataWriterResourceLimitsQosPolicy, 703
- max\_app\_ack\_remote\_readers
  - DDS\_DataWriterResourceLimitsQosPolicy, 703
- max\_app\_ack\_response\_length
  - DDS\_DataReaderResourceLimitsQosPolicy, 664
- max\_batches
  - DDS\_DataWriterResourceLimitsQosPolicy, 700
- max\_blocking\_time
  - DDS\_ReliabilityQosPolicy, 1043
- max\_bytes\_per\_file
  - DDS\_LoggingQosPolicy, 946
- max\_bytes\_per\_nack\_response
  - DDS\_RtpsReliableWriterProtocol\_t, 1069
- max\_concurrent\_blocking\_threads
  - DDS\_DataWriterResourceLimitsQosPolicy, 699
- max\_count
  - DDS\_AllocationSettings\_t, 589
  - DDS\_EventQosPolicy, 909
- max\_data\_availability\_waiting\_time
  - DDS\_AvailabilityQosPolicy, 599
- max\_data\_bytes
  - DDS\_BatchQosPolicy, 601
- max\_endpoint\_availability\_waiting\_time
  - DDS\_AvailabilityQosPolicy, 599
- max\_endpoint\_group\_cumulative\_characters
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 764
- max\_endpoint\_groups
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 764

- max\_event\_count
  - DDS\_WaitSetProperty\_t, 1243
- max\_event\_delay
  - DDS\_WaitSetProperty\_t, 1243
- max\_files
  - DDS\_LoggingQosPolicy, 946
- max\_flush\_delay
  - DDS\_BatchQosPolicy, 602
- max\_fragmented\_samples
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 608
  - DDS\_DataReaderResourceLimitsQosPolicy, 659
- max\_fragmented\_samples\_per\_remote\_writer
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 609
  - DDS\_DataReaderResourceLimitsQosPolicy, 660
- max\_fragments\_per\_sample
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 609
  - DDS\_DataReaderResourceLimitsQosPolicy, 660
- max\_gather\_destinations
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 757
- max\_heartbeat\_response\_delay
  - DDS\_RtpsReliableReaderProtocol\_t, 1058
- max\_heartbeat\_retries
  - DDS\_RtpsReliableWriterProtocol\_t, 1066
- max\_historical\_logs
  - DDS\_MonitoringLoggingDistributionSettings, 955
- max\_infos
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 607
  - DDS\_DataReaderResourceLimitsQosPolicy, 657
- max\_initial\_participant\_announcement\_period
  - DDS\_DiscoveryConfigQosPolicy, 717
- max\_instances
  - DDS\_DurabilityServiceQosPolicy, 773
  - DDS\_ResourceLimitsQosPolicy, 1055
- max\_interface\_count
  - NDDS\_Transport\_Property\_t, 1783
- max\_liveliness\_loss\_detection\_period
  - DDS\_DiscoveryConfigQosPolicy, 716
- max\_nack\_response\_delay
  - DDS\_RtpsReliableWriterProtocol\_t, 1069
- max\_objects\_per\_thread
  - DDS\_SystemResourceLimitsQosPolicy, 1121
- max\_outstanding\_reads
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 607
  - DDS\_DataReaderResourceLimitsQosPolicy, 659
- max\_partition\_cumulative\_characters
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 759
- max\_partitions
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 759
- max\_query\_condition\_filters
  - DDS\_DataReaderResourceLimitsQosPolicy, 664
- max\_remote\_reader\_filters
  - DDS\_DataWriterResourceLimitsQosPolicy, 700
- max\_remote\_readers
  - DDS\_DataWriterResourceLimitsQosPolicy, 703
- max\_remote\_virtual\_writers
  - DDS\_DataReaderResourceLimitsQosPolicy, 662
- max\_remote\_virtual\_writers\_per\_instance
  - DDS\_DataReaderResourceLimitsQosPolicy, 663
- max\_remote\_writers
  - DDS\_DataReaderResourceLimitsQosPolicy, 656
- max\_remote\_writers\_per\_instance
  - DDS\_DataReaderResourceLimitsQosPolicy, 656
- max\_remote\_writers\_per\_sample
  - DDS\_DataReaderResourceLimitsQosPolicy, 663
- max\_samples
  - DDS\_BatchQosPolicy, 602
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 606
  - DDS\_DurabilityServiceQosPolicy, 773
  - DDS\_ResourceLimitsQosPolicy, 1055
- max\_samples\_per\_instance
  - DDS\_DurabilityServiceQosPolicy, 774
  - DDS\_ResourceLimitsQosPolicy, 1055
- max\_samples\_per\_read
  - DDS\_BuiltinTopicReaderResourceLimits\_t, 607
  - DDS\_DataReaderResourceLimitsQosPolicy, 659
- max\_samples\_per\_remote\_writer
  - DDS\_DataReaderResourceLimitsQosPolicy, 657
- max\_send\_window\_size
  - DDS\_RtpsReliableWriterProtocol\_t, 1073
- max\_size\_serialized
  - DDS\_DynamicDataTypeSerializationProperty\_t, 898
- max\_skiplist\_level
  - DDS\_DatabaseQosPolicy, 621
- max\_tokens
  - DDS\_FlowControllerTokenBucketProperty\_t, 915
- max\_topic\_queries
  - DDS\_DataReaderResourceLimitsQosPolicy, 665
- max\_total\_instances
  - DDS\_DataReaderResourceLimitsQosPolicy, 661
- max\_value
  - DDS\_TypeCode, 1204
- max\_virtual\_writers
  - DDS\_DataWriterResourceLimitsQosPolicy, 702
- max\_weak\_references
  - DDS\_DatabaseQosPolicy, 622
- maximum
  - FooSeq, 1707
- member\_bitfield\_bits
  - DDS\_TypeCode, 1182
- member\_count
  - DDS\_DynamicDataInfo, 892
  - DDS\_TypeCode, 1172
- member\_default\_value
  - DDS\_TypeCode, 1205
- member\_exists

- DDS\_DynamicData, 807
- DDS\_DynamicDataMemberInfo, 894
- member\_exists\_in\_type
  - DDS\_DynamicData, 808
- member\_id
  - DDS\_DynamicDataMemberInfo, 893
  - DDS\_TypeCode, 1191
- member\_kind
  - DDS\_DynamicDataMemberInfo, 894
- member\_label
  - DDS\_TypeCode, 1176
- member\_label\_count
  - DDS\_TypeCode, 1175
- member\_max\_value
  - DDS\_TypeCode, 1206
- member\_min\_value
  - DDS\_TypeCode, 1205
- member\_name
  - DDS\_DynamicDataMemberInfo, 893
  - DDS\_TypeCode, 1173
- member\_ordinal
  - DDS\_TypeCode, 1177
- member\_type
  - DDS\_TypeCode, 1175
- member\_visibility
  - DDS\_TypeCode, 1183
- message\_auth
  - DDS\_ParticipantTrustSignatureAlgorithmInfo, 989
- message\_id
  - NDDS\_Config\_LogMessage, 1773
- message\_size\_max
  - DDS\_TransportInfo\_t, 1146
  - NDDS\_Transport\_Property\_t, 1779
- metatraffic\_transport\_priority
  - DDS\_DiscoveryQosPolicy, 733
- metrics
  - DDS\_MonitoringTelemetryData, 964
- middleware\_forwarding\_level
  - DDS\_MonitoringLoggingForwardingSettings, 957
- min\_app\_ack\_response\_keep\_duration
  - DDS\_RtpsReliableReaderProtocol\_t, 1060
- min\_heartbeat\_response\_delay
  - DDS\_RtpsReliableReaderProtocol\_t, 1058
- min\_initial\_participant\_announcement\_period
  - DDS\_DiscoveryConfigQosPolicy, 717
- min\_nack\_response\_delay
  - DDS\_RtpsReliableWriterProtocol\_t, 1068
- min\_send\_window\_size
  - DDS\_RtpsReliableWriterProtocol\_t, 1072
- min\_size\_serialized
  - DDS\_DynamicDataTypeSerializationProperty\_t, 898
- min\_value
  - DDS\_TypeCode, 1203
- minimum\_separation
  - DDS\_TimeBasedFilterQosPolicy, 1128
- minor
  - DDS\_ProductVersion\_t, 1003
  - DDS\_ProtocolVersion\_t, 1010
  - NDDS\_Config\_LibraryVersion\_t, 1771
- minor\_version
  - connext::MessagingLibraryVersion, 1738
- MONITORING, 412
  - DDS\_MONITORING\_QOS\_POLICY\_NAME, 413
- monitoring
  - DDS\_DomainParticipantFactoryQos, 739
- move
  - Infrastructure, 190
- move\_construct\_from\_loans
  - connext::LoanedSamples< T >, 1731
- Multi-channel DataWriters, 165
- multi\_channel
  - DDS\_DataWriterQos, 697
- multicast
  - DDS\_DataReaderQos, 651
- Multicast Mapping, 463
- Multicast Settings, 463
- multicast\_enabled
  - NDDS\_Transport\_UDPv4\_Property\_t, 1791
  - NDDS\_Transport\_UDPv6\_Property\_t, 1810
- multicast\_locators
  - DDS\_SubscriptionBuiltinTopicData, 1114
- multicast\_loopback\_disabled
  - NDDS\_Transport\_UDPv4\_Property\_t, 1791
  - NDDS\_Transport\_UDPv6\_Property\_t, 1810
- multicast\_mapping
  - DDS\_DomainParticipantQos, 746
- multicast\_receive\_addresses
  - DDS\_DiscoveryQosPolicy, 733
- multicast\_resend\_threshold
  - DDS\_RtpsReliableWriterProtocol\_t, 1075
- multicast\_settings
  - DDS\_ChannelSettings\_t, 611
- multicast\_ttl
  - NDDS\_Transport\_UDPv4\_Property\_t, 1791
  - NDDS\_Transport\_UDPv6\_Property\_t, 1810
- MULTICHANNEL, 413
  - DDS\_MULTICHANNEL\_QOS\_POLICY\_NAME, 413
- my\_complex
  - MyFlatFinalOffset, 1748, 1749
- my\_complex\_array
  - MyFlatFinalOffset, 1748, 1749
- my\_final
  - MyFlatMutableOffset, 1760, 1762
  - MyFlatUnionOffset, 1769, 1770
- my\_final\_array
  - MyFlatMutableOffset, 1760, 1762
- my\_final\_seq
  - MyFlatMutableOffset, 1760, 1762



- my\_mutable
  - MyFlatMutableOffset, 1760, 1763
  - MyFlatUnionOffset, 1769, 1770
- my\_mutable\_array
  - MyFlatMutableOffset, 1761, 1763
- my\_mutable\_seq
  - MyFlatMutableOffset, 1761, 1763
- my\_optional\_primitive
  - MyFlatMutableOffset, 1759
- my\_primitive
  - MyFlatFinalOffset, 1748, 1749
  - MyFlatMutableOffset, 1759, 1761
  - MyFlatUnionOffset, 1769, 1770
- my\_primitive\_array
  - MyFlatFinalOffset, 1748, 1749
  - MyFlatMutableOffset, 1759, 1762
- my\_primitive\_seq
  - MyFlatMutableOffset, 1760, 1762
- my\_string
  - MyFlatMutableOffset, 1761, 1763
- my\_string\_seq
  - MyFlatMutableOffset, 1761, 1763
- MyFlatFinal
  - FlatData Samples, 562
- MyFlatFinalOffset, 1746
  - ConstOffset, 1747
  - my\_complex, 1748, 1749
  - my\_complex\_array, 1748, 1749
  - my\_primitive, 1748, 1749
  - my\_primitive\_array, 1748, 1749
  - MyFlatFinalOffset, 1748
- MyFlatMutable
  - FlatData Samples, 562
- MyFlatMutableBuilder, 1750
  - add\_my\_final, 1755
  - add\_my\_final\_array, 1755
  - add\_my\_optional\_primitive, 1754
  - add\_my\_primitive, 1754
  - add\_my\_primitive\_array, 1754
  - build\_my\_final\_seq, 1755
  - build\_my\_mutable, 1756
  - build\_my\_mutable\_array, 1756
  - build\_my\_mutable\_seq, 1756
  - build\_my\_primitive\_seq, 1755
  - build\_my\_string, 1756
  - build\_my\_string\_seq, 1756
  - finish, 1753
  - finish\_sample, 1753
  - MyFlatMutableBuilder, 1752
  - Offset, 1752
- MyFlatMutableOffset, 1757
  - ConstOffset, 1758
  - my\_final, 1760, 1762
  - my\_final\_array, 1760, 1762
  - my\_final\_seq, 1760, 1762
  - my\_mutable, 1760, 1763
  - my\_mutable\_array, 1761, 1763
  - my\_mutable\_seq, 1761, 1763
  - my\_optional\_primitive, 1759
  - my\_primitive, 1759, 1761
  - my\_primitive\_array, 1759, 1762
  - my\_primitive\_seq, 1760, 1762
  - my\_string, 1761, 1763
  - my\_string\_seq, 1761, 1763
  - MyFlatMutableOffset, 1759
- MyFlatUnion
  - FlatData Samples, 563
- MyFlatUnionBuilder, 1764
  - add\_my\_final, 1766
  - add\_my\_primitive, 1766
  - build\_my\_mutable, 1766
  - finish, 1765
  - finish\_sample, 1765
  - MyFlatUnionBuilder, 1765
  - Offset, 1765
- MyFlatUnionOffset, 1767
  - \_d, 1768
  - ConstOffset, 1768
  - my\_final, 1769, 1770
  - my\_mutable, 1769, 1770
  - my\_primitive, 1769, 1770
  - MyFlatUnionOffset, 1768
- nack\_period
  - DDS\_RtpsReliableReaderProtocol\_t, 1059
- nack\_suppression\_duration
  - DDS\_RtpsReliableWriterProtocol\_t, 1069
- name
  - DDS\_EntityNameQosPolicy, 906
  - DDS\_EnumMember, 907
  - DDS\_PartitionQosPolicy, 991
  - DDS\_Property\_t, 1006
  - DDS\_StructMember, 1103
  - DDS\_Tag, 1122
  - DDS\_TopicBuiltinTopicData, 1130
  - DDS\_TypeCode, 1172
  - DDS\_UnionMember, 1235
  - DDS\_ValueMember, 1240
- nanosec
  - DDS\_Duration\_t, 775
  - DDS\_Time\_t, 1125
- narrow
  - DDSContentFilteredTopic, 1284
  - DDSKeyedOctetsDataReader, 1482
  - DDSKeyedOctetsDataWriter, 1485
  - DDSKeyedStringDataReader, 1510
  - DDSKeyedStringDataWriter, 1512
  - DDSMultiTopic, 1531

- DDSOctetsDataReader, 1536
- DDSOctetsDataWriter, 1538
- DDSStringDataReader, 1583
- DDSStringDataWriter, 1585
- DDSTopic, 1619
- FooDataReader, 1651
- FooDataWriter, 1678
- NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_DOMAIN\_ID
  - Logging, 525
- Activity Context, 534
- NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_ENTITY\_KIND
  - Logging, 525
- Activity Context, 534
- NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_ENTITY\_NAME
  - Logging, 525
- Activity Context, 534
- NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_GUID\_PREFIX
  - Logging, 525
- Activity Context, 533
- NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_ALL
  - Logging, 525
- Activity Context, 532
- NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_DEEP
  - Logging, 525
- Activity Context, 531
- NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_MASK\_NONE
  - Logging, 528
- Activity Context, 532
- NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_TOPIC
  - Logging, 527
- Activity Context, 533
- NDDS\_CONFIG\_ACTIVITY\_CONTEXT\_ATTRIBUTE\_TYPE
  - Logging, 528
- Activity Context, 533
- NDDS\_Config\_ActivityContextAttributeKind
  - Activity Context, 532
- NDDS\_Config\_ActivityContextAttributeKindMask
  - Activity Context, 532
- NDDS\_Config\_LibraryVersion\_t, 1771
  - build, 1772
  - major, 1771
  - minor, 1771
  - release, 1771
- NDDS\_CONFIG\_LOG\_CATEGORY\_ALL
  - Logging, 527
- NDDS\_CONFIG\_LOG\_CATEGORY\_API
  - Logging, 527
- NDDS\_CONFIG\_LOG\_CATEGORY\_COMMUNICATION
  - Logging, 527
- NDDS\_CONFIG\_LOG\_CATEGORY\_DATABASE
  - Logging, 527
- NDDS\_CONFIG\_LOG\_CATEGORY\_DISCOVERY
  - Logging, 527
- NDDS\_CONFIG\_LOG\_CATEGORY\_ENTITIES
  - Logging, 527
- NDDS\_CONFIG\_LOG\_CATEGORY\_PLATFORM
  - Logging, 527
- NDDS\_CONFIG\_LOG\_CATEGORY\_SECURITY
  - Logging, 527
- NDDS\_CONFIG\_LOG\_CATEGORY\_USER
  - Logging, 527
- NDDS\_CONFIG\_LOG\_FACILITY\_MIDDLEWARE
  - Logging, 528
- NDDS\_CONFIG\_LOG\_FACILITY\_SECURITY\_EVENT
  - Logging, 528
- NDDS\_CONFIG\_LOG\_FACILITY\_SERVICE
  - Logging, 528
- NDDS\_CONFIG\_LOG\_FACILITY\_USER
  - Logging, 528
- NDDS\_CONFIG\_LOG\_LEVEL\_DEBUG
  - Logging, 525
- NDDS\_CONFIG\_LOG\_LEVEL\_ERROR
  - Logging, 525
- NDDS\_CONFIG\_LOG\_LEVEL\_FATAL\_ERROR
  - Logging, 525
- NDDS\_CONFIG\_LOG\_LEVEL\_STATUS\_LOCAL
  - Logging, 525
- NDDS\_CONFIG\_LOG\_LEVEL\_STATUS\_REMOTE
  - Logging, 525
- NDDS\_CONFIG\_LOG\_LEVEL\_WARNING
  - Logging, 525
- NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_DEBUG
  - Logging, 528
- NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_DEFAULT
  - Logging, 528
- NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_MAXIMAL
  - Logging, 528
- NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_MINIMAL
  - Logging, 528
- NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_TIMESTAMPED
  - Logging, 527
- NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_VERBOSE
  - Logging, 528
- NDDS\_CONFIG\_LOG\_PRINT\_FORMAT\_VERBOSE\_TIMESTAMPED
  - Logging, 528
- NDDS\_CONFIG\_LOG\_VERBOSITY\_ERROR
  - Logging, 525
- NDDS\_CONFIG\_LOG\_VERBOSITY\_SILENT
  - Logging, 525
- NDDS\_CONFIG\_LOG\_VERBOSITY\_STATUS\_ALL
  - Logging, 525
- NDDS\_CONFIG\_LOG\_VERBOSITY\_STATUS\_LOCAL
  - Logging, 525
- NDDS\_CONFIG\_LOG\_VERBOSITY\_STATUS\_REMOTE
  - Logging, 525
- NDDS\_CONFIG\_LOG\_VERBOSITY\_WARNING
  - Logging, 525
- NDDS\_Config\_LogCategory
  - Logging, 526
- NDDS\_Config\_LogFacility
  - Logging, 528
- NDDS\_Config\_LogLevel
  - Logging, 525
- NDDS\_Config\_LogMessage, 1772
  - facility, 1774
  - is\_security\_message, 1773
  - level, 1773

- message\_id, 1773
- text, 1772
- timestamp, 1773
- NDDS\_Config\_LogPrintFormat
  - Logging, 527
- NDDS\_Config\_LogVerbosity
  - Logging, 524
- NDDS\_CONFIG\_SYSLOG\_LEVEL\_ALERT
  - Logging, 526
- NDDS\_CONFIG\_SYSLOG\_LEVEL\_CRITICAL
  - Logging, 526
- NDDS\_CONFIG\_SYSLOG\_LEVEL\_DEBUG
  - Logging, 526
- NDDS\_CONFIG\_SYSLOG\_LEVEL\_EMERGENCY
  - Logging, 526
- NDDS\_CONFIG\_SYSLOG\_LEVEL\_ERROR
  - Logging, 526
- NDDS\_CONFIG\_SYSLOG\_LEVEL\_INFORMATIONAL
  - Logging, 526
- NDDS\_CONFIG\_SYSLOG\_LEVEL\_NOTICE
  - Logging, 526
- NDDS\_CONFIG\_SYSLOG\_LEVEL\_WARNING
  - Logging, 526
- NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_ALERT
  - Logging, 529
- NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_CRITICAL
  - Logging, 529
- NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_DEBUG
  - Logging, 529
- NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_EMERGENCY
  - Logging, 529
- NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_ERROR
  - Logging, 529
- NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_INFORMATIONAL
  - Logging, 529
- NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_NOTICE
  - Logging, 529
- NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_SILENT
  - Logging, 529
- NDDS\_CONFIG\_SYSLOG\_VERBOSITY\_WARNING
  - Logging, 529
- NDDS\_Config\_SyslogLevel
  - Logging, 526
- NDDS\_Config\_SyslogVerbosity
  - Logging, 528
- NDDS\_CONFIG\_XTYPES\_COMPLIANCE\_MASK\_DEFAULT
  - Compliance Configuration, 536
- NDDS\_CONFIG\_XTYPES\_COMPLIANCE\_MASK\_VENDOR
  - Compliance Configuration, 536
- NDDS\_CONFIG\_XTYPES\_DHEADER\_IN\_NON\_PRIMITIVE\_COLLECTIONS\_WITH\_PADDING\_BIT
  - Compliance Configuration, 538
- NDDS\_CONFIG\_XTYPES\_ENCAPSULATION\_OPTIONS\_WITH\_PADDING\_BIT
  - Compliance Configuration, 539
- NDDS\_CONFIG\_XTYPES\_ENUM\_AS\_PRIMITIVE\_IN\_COLLECTIONS
  - Compliance Configuration, 538
- NDDS\_CONFIG\_XTYPES\_PARAMETER\_LENGTH\_WITH\_PADDING\_BIT
  - Compliance Configuration, 538
- NDDS\_Config\_XTypesComplianceMask
  - Compliance Configuration, 536
- NDDS\_Config\_XTypesComplianceMaskBits
  - Compliance Configuration, 537
- NDDS\_DISCOVERY\_PEERS, 464
- NDDS\_Transport\_Address\_from\_string
  - Transport Address, 256
- NDDS\_TRANSPORT\_ADDRESS\_INVALID
  - Transport Address, 258
- NDDS\_TRANSPORT\_ADDRESS\_INVALID\_INITIALIZER
  - Transport Address, 254
- NDDS\_Transport\_Address\_is\_ipv4
  - Transport Address, 257
- NDDS\_Transport\_Address\_is\_multicast
  - Transport Address, 257
- NDDS\_Transport\_Address\_print
  - Transport Address, 256
- NDDS\_TRANSPORT\_ADDRESS\_STRING\_BUFFER\_SIZE
  - Transport Address, 254
- NDDS\_Transport\_Address\_t, 1774
  - network\_ordered\_value, 1774
- NDDS\_Transport\_Address\_to\_string
  - Transport Address, 255
- NDDS\_Transport\_Address\_to\_string\_with\_protocol\_family\_format
  - Transport Address, 255
- NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_DEFAULT
  - Transport Plugins Configuration, 248
- NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_INCREMENTAL\_COUNT
  - Transport Plugins Configuration, 248
- NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_MAX\_COUNT\_UNLIMITED
  - Transport Plugins Configuration, 248
- NDDS\_TRANSPORT\_CLASSID\_INVALID
  - Transport Plugins Configuration, 249
- NDDS\_TRANSPORT\_CLASSID\_RESERVED\_RANGE
  - Transport Plugins Configuration, 251
- NDDS\_TRANSPORT\_CLASSID\_SHMEM
  - Transport Plugins Configuration, 249
- NDDS\_TRANSPORT\_CLASSID\_SHMEM\_510
  - Transport Plugins Configuration, 249
- NDDS\_Transport\_ClassId\_t
  - Transport Plugins Configuration, 252
- NDDS\_TRANSPORT\_CLASSID\_TCPV4\_LAN
  - Transport Plugins Configuration, 250
- NDDS\_TRANSPORT\_CLASSID\_TCPV4\_WAN
  - Transport Plugins Configuration, 250
- NDDS\_TRANSPORT\_CLASSID\_TLSV4\_LAN
  - Transport Plugins Configuration, 250
- NDDS\_TRANSPORT\_CLASSID\_TLSV4\_WAN
  - Transport Plugins Configuration, 251
- NDDS\_TRANSPORT\_CLASSID\_UDPv4
  - Transport Plugins Configuration, 249

- NDDS\_TRANSPORT\_CLASSID\_UDPv4\_WAN
  - Transport Plugins Configuration, 251
- NDDS\_TRANSPORT\_CLASSID\_UDPv6
  - Transport Plugins Configuration, 250
- NDDS\_TRANSPORT\_CLASSID\_UDPv6\_510
  - Transport Plugins Configuration, 250
- NDDS\_TRANSPORT\_CLASSNAME\_TCPV4\_WAN
  - Transport Plugins Configuration, 250
- NDDS\_Transport\_create\_plugin
  - Installing Transport Plugins, 176
- NDDS\_Transport\_Handle\_is\_nil
  - Installing Transport Plugins, 177
- NDDS\_TRANSPORT\_HANDLE\_NIL
  - Installing Transport Plugins, 177
- NDDS\_Transport\_Handle\_t
  - Installing Transport Plugins, 176
- NDDS\_TRANSPORT\_INTERFACE\_OFF
  - Interface, 245
- NDDS\_TRANSPORT\_INTERFACE\_ON
  - Interface, 245
- NDDS\_TRANSPORT\_INTERFACE\_RANK\_UNKNOWN
  - Transport Plugins Configuration, 248
- NDDS\_Transport\_Interface\_Status\_t
  - Interface, 245
- NDDS\_Transport\_Interface\_t, 1775
  - address, 1775
  - rank, 1776
  - status, 1776
  - transport\_classid, 1775
- NDDS\_TRANSPORT\_LENGTH\_UNLIMITED
  - Transport Plugins Configuration, 248
- NDDS\_TRANSPORT\_PORT\_INVALID
  - Transport Plugins Configuration, 247
- NDDS\_Transport\_Port\_t
  - Transport Plugins Configuration, 252
- NDDS\_TRANSPORT\_PROPERTY\_BIT\_BUFFER\_ALWAYS\_DISABLED
  - Transport Plugins Configuration, 251
- NDDS\_TRANSPORT\_PROPERTY\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT
  - Transport Plugins Configuration, 251
- NDDS\_Transport\_Property\_t, 1776
  - address\_bit\_count, 1778
  - allow\_interfaces\_list, 1779
  - allow\_interfaces\_list\_length, 1780
  - allow\_multicast\_interfaces\_list, 1781
  - allow\_multicast\_interfaces\_list\_length, 1782
  - classid, 1777
  - deny\_interfaces\_list, 1780
  - deny\_interfaces\_list\_length, 1781
  - deny\_multicast\_interfaces\_list, 1782
  - deny\_multicast\_interfaces\_list\_length, 1782
  - gather\_send\_buffer\_count\_max, 1779
  - max\_interface\_count, 1783
  - message\_size\_max, 1779
  - properties\_bitmap, 1778
  - thread\_name\_prefix, 1783
  - transport\_uuid, 1783
- NDDS\_TRANSPORT\_SHMEM\_ADDRESS\_BIT\_COUNT
  - Shared Memory Transport, 264
- NDDS\_Transport\_Shmem\_create
  - Shared Memory Transport, 266
- NDDS\_TRANSPORT\_SHMEM\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT
  - Shared Memory Transport, 264
- NDDS\_TRANSPORT\_SHMEM\_MAJOR\_AFTER\_BUG\_14240\_FIX
  - Shared Memory Transport, 265
- NDDS\_TRANSPORT\_SHMEM\_MESSAGE\_SIZE\_MAX\_DEFAULT
  - Shared Memory Transport, 264
- NDDS\_Transport\_Shmem\_new
  - Shared Memory Transport, 265
- NDDS\_TRANSPORT\_SHMEM\_PROPERTIES\_BITMAP\_DEFAULT
  - Shared Memory Transport, 264
- NDDS\_TRANSPORT\_SHMEM\_PROPERTY\_DEFAULT
  - Shared Memory Transport, 265
- NDDS\_Transport\_Shmem\_Property\_t, 1784
  - enable\_udp\_debugging, 1786
  - parent, 1785
  - receive\_buffer\_size, 1785
  - received\_message\_count\_max, 1785
  - udp\_debugging\_address, 1786
  - udp\_debugging\_port, 1787
- NDDS\_TRANSPORT\_SHMEM\_RECEIVE\_BUFFER\_SIZE\_DEFAULT
  - Shared Memory Transport, 265
- NDDS\_TRANSPORT\_SHMEM\_RECEIVED\_MESSAGE\_COUNT\_MAX\_DEFAULT
  - Shared Memory Transport, 265
- NDDS\_TRANSPORT\_UDP\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT
  - UDP Transport Plugin definitions, 259
- NDDS\_TRANSPORT\_UDP\_MULTICAST\_TTL\_DEFAULT
  - UDP Transport Plugin definitions, 260
- NDDS\_Transport\_UDP\_Port
  - UDP Transport Plugin definitions, 260
- NDDS\_TRANSPORT\_UDP\_PROPERTIES\_BITMAP\_DEFAULT
  - UDP Transport Plugin definitions, 259
- NDDS\_TRANSPORT\_UDP\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT
  - UDP Transport Plugin definitions, 260
- NDDS\_TRANSPORT\_UDP\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT
  - UDP Transport Plugin definitions, 259
- NDDS\_TRANSPORT\_UDP\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT
  - UDP Transport Plugin definitions, 259
- NDDS\_Transport\_UDP\_WAN\_CommPortsMappingInfo, 1787
  - host\_port, 1788
  - public\_port, 1788
  - rtps\_port, 1787
- NDDS\_TRANSPORT\_UDPv4\_ADDRESS\_BIT\_COUNT
  - UDPv4 Transport, 271
- NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_ALWAYS
  - UDPv4 Transport, 273
- NDDS\_TRANSPORT\_UDPv4\_BLOCKING\_DEFAULT
  - UDPv4 Transport, 273

- NDDS\_TRANSPORT\_UDPV4\_BLOCKING\_NEVER
  - UDPv4 Transport, 273
- NDDS\_Transport\_UDPv4\_create
  - UDPv4 Transport, 275
- NDDS\_Transport\_UDPv4\_create\_from\_properties\_with\_prefix
  - UDPv4 Transport, 276
- NDDS\_TRANSPORT\_UDPV4\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT
  - UDPv4 Transport, 271
- NDDS\_TRANSPORT\_UDPV4\_MESSAGE\_SIZE\_MAX\_DEFAULT
  - UDPv4 Transport, 272
- NDDS\_TRANSPORT\_UDPV4\_MULTICAST\_TTL\_DEFAULT
  - UDPv4 Transport, 272
- NDDS\_Transport\_UDPv4\_new
  - UDPv4 Transport, 274
- NDDS\_TRANSPORT\_UDPV4\_PAYLOAD\_SIZE\_MAX
  - UDPv4 Transport, 272
- NDDS\_TRANSPORT\_UDPV4\_PROPERTIES\_BITMAP\_DEFAULT
  - UDPv4 Transport, 271
- NDDS\_TRANSPORT\_UDPV4\_PROPERTY\_DEFAULT
  - UDPv4 Transport, 273
- NDDS\_Transport\_UDPv4\_Property\_t, 1788
  - disable\_interface\_tracking, 1796
  - force\_interface\_poll\_detection, 1795
  - ignore\_loopback\_interface, 1791
  - ignore\_nonrunning\_interfaces, 1792
  - ignore\_nonup\_interfaces, 1792
  - interface\_poll\_period, 1795
  - join\_multicast\_group\_timeout, 1796
  - multicast\_enabled, 1791
  - multicast\_loopback\_disabled, 1791
  - multicast\_ttl, 1791
  - no\_zero\_copy, 1793
  - parent, 1790
  - port\_offset, 1797
  - protocol\_overhead\_max, 1796
  - public\_address, 1797
  - recv\_socket\_buffer\_size, 1790
  - reuse\_multicast\_receive\_resource, 1795
  - send\_blocking, 1793
  - send\_ping, 1795
  - send\_socket\_buffer\_size, 1790
  - transport\_priority\_mapping\_high, 1794
  - transport\_priority\_mapping\_low, 1794
  - transport\_priority\_mask, 1794
  - unicast\_enabled, 1790
  - use\_checksum, 1793
- NDDS\_TRANSPORT\_UDPV4\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT
  - UDPv4 Transport, 272
- NDDS\_TRANSPORT\_UDPV4\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT
  - UDPv4 Transport, 272
- NDDS\_TRANSPORT\_UDPV4\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT
  - UDPv4 Transport, 271
- NDDS\_Transport\_UDPv4\_string\_to\_address\_cEA
  - UDPv4 Transport, 273
- NDDS\_TRANSPORT\_UDPV4\_WAN\_ADDRESS\_BIT\_COUNT
  - UDPv4 Transport, 271
- NDDS\_Transport\_UDPv4\_WAN\_create
  - Real-Time WAN Transport, 281
- NDDS\_Transport\_UDPv4\_WAN\_create\_from\_properties\_with\_prefix
  - Real-Time WAN Transport, 282
- NDDS\_Transport\_UDPv4\_WAN\_new
  - Real-Time WAN Transport, 280
- NDDS\_TRANSPORT\_UDPV4\_WAN\_PROPERTY\_DEFAULT
  - Real-Time WAN Transport, 280
- NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1798
  - binding\_ping\_period, 1807
  - comm\_ports\_list, 1805
  - comm\_ports\_list\_length, 1806
  - disable\_interface\_tracking, 1804
  - force\_interface\_poll\_detection, 1804
  - ignore\_loopback\_interface, 1800
  - ignore\_nonrunning\_interfaces, 1801
  - ignore\_nonup\_interfaces, 1800
  - interface\_poll\_period, 1804
  - no\_zero\_copy, 1801
  - parent, 1799
  - port\_offset, 1807
  - protocol\_overhead\_max, 1804
  - public\_address, 1805
  - recv\_socket\_buffer\_size, 1800
  - send\_blocking, 1802
  - send\_ping, 1803
  - send\_socket\_buffer\_size, 1799
  - transport\_priority\_mapping\_high, 1803
  - transport\_priority\_mapping\_low, 1803
  - transport\_priority\_mask, 1802
  - use\_checksum, 1802
- NDDS\_TRANSPORT\_UDPV6\_ADDRESS\_BIT\_COUNT
  - UDPv6 Transport, 287
- NDDS\_TRANSPORT\_UDPV6\_BLOCKING\_ALWAYS
  - UDPv6 Transport, 289
- NDDS\_TRANSPORT\_UDPV6\_BLOCKING\_NEVER
  - UDPv6 Transport, 288
- NDDS\_Transport\_UDPv6\_create
  - UDPv6 Transport, 291
- NDDS\_Transport\_UDPv6\_create\_from\_properties\_with\_prefix
  - UDPv6 Transport, 292
- NDDS\_TRANSPORT\_UDPV6\_GATHER\_SEND\_BUFFER\_COUNT\_MAX\_DEFAULT
  - UDPv6 Transport, 287
- NDDS\_TRANSPORT\_UDPV6\_MESSAGE\_SIZE\_MAX\_DEFAULT
  - UDPv6 Transport, 288
- NDDS\_TRANSPORT\_UDPV6\_MULTICAST\_TTL\_DEFAULT
  - UDPv6 Transport, 288
- NDDS\_Transport\_UDPv6\_new
  - UDPv6 Transport, 290
- NDDS\_TRANSPORT\_UDPV6\_PAYLOAD\_SIZE\_MAX
  - UDPv6 Transport, 288
- NDDS\_TRANSPORT\_UDPV6\_PROPERTIES\_BITMAP\_DEFAULT



- get\_verbosity, 1824
- get\_verbosity\_by\_category, 1824
- informational, 1829
- notice, 1828
- set\_output\_device, 1826
- set\_output\_file, 1825
- set\_output\_file\_set, 1825
- set\_print\_format, 1827
- set\_print\_format\_by\_log\_level, 1827
- set\_verbosity, 1824
- set\_verbosity\_by\_category, 1825
- warning, 1828
- NDDSConfigLoggerDevice, 1829
  - close, 1830
  - write, 1830
- NDDSConfigVersion, 1831
  - get\_c\_api\_version, 1832
  - get\_core\_version, 1832
  - get\_cpp\_api\_version, 1832
  - get\_instance, 1831
  - get\_product\_version, 1831
  - to\_string, 1832
- NDDSLM, 1832
  - unload\_activation\_library, 1833
- NDDSTransportSupport, 1833
  - add\_receive\_route, 1836
  - add\_send\_route, 1836
  - get\_builtin\_transport\_property, 1837
  - get\_transport\_plugin, 1839
  - lookup\_transport, 1835
  - register\_transport, 1834
  - set\_builtin\_transport\_property, 1838
- NDDSUtility, 1839
  - disable\_heap\_monitoring, 1841
  - enable\_heap\_monitoring, 1841
  - get\_spin\_per\_microsecond, 1841
  - pause\_heap\_monitoring, 1842
  - resume\_heap\_monitoring, 1842
  - sleep, 1840
  - spin, 1840
  - take\_heap\_snapshot, 1842
- NDDSUtilityHeapMonitoring, 1842
  - disable, 1843
  - enable, 1843
  - pause, 1844
  - resume, 1844
  - take\_heap\_snapshot, 1844
- NDDSUtilityNetworkCapture, 1846
  - disable, 1848
  - enable, 1847
  - pause, 1853
  - resume, 1854
  - set\_default\_params, 1848
  - start, 1849–1851
  - stop, 1852
- Network Capture, 540
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_ENCRYPTED\_D, 545
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_ALL, 543
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_DEFAULT, 543
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_MASK\_NONE, 543
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_CONTENT\_USER\_SERIALI, 545
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_PARAMETERS\_DEFAULT, 546
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_IN, 546
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_ALL, 544
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_DEFAULT, 543
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_MASK\_NONE, 544
  - NDDS\_UTILITY\_NETWORK\_CAPTURE\_TRAFFIC\_OUT, 546
  - NDDS\_Utility\_NetworkCaptureContentKind, 545
  - NDDS\_Utility\_NetworkCaptureContentKindMask, 544
  - NDDS\_Utility\_NetworkCaptureParams\_t, 545
  - NDDS\_Utility\_NetworkCaptureTrafficKind, 545
  - NDDS\_Utility\_NetworkCaptureTrafficKindMask, 544
- network\_ordered\_value
  - NDDS\_Transport\_Address\_t, 1774
- new\_remote\_participant\_announcements
  - DDS\_DiscoveryConfigQosPolicy, 716
- no\_writers\_generation\_count
  - DDS\_SampleInfo, 1087
- no\_writers\_instance\_count
  - DDS\_DataReaderCacheStatus, 628
- no\_writers\_instance\_count\_peak
  - DDS\_DataReaderCacheStatus, 628
- no\_writers\_instance\_removal
  - DDS\_DataReaderResourceLimitsInstanceReplacementSettings, 654
- no\_zero\_copy
  - NDDS\_Transport\_UDPv4\_Property\_t, 1793
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1801
  - NDDS\_Transport\_UDPv6\_Property\_t, 1812
- not\_alive\_count
  - DDS\_LivelinessChangedStatus, 933
- not\_alive\_count\_change
  - DDS\_LivelinessChangedStatus, 934
- notice
  - NDDSConfigLogger, 1828
- notify\_datareaders

- DDSSubscriber, 1608
- Observability, 186
- Observability Library, 520
  - RTI\_MONITORING\_EVENT\_TOPIC\_NAME, 521
  - RTI\_Monitoring\_initialize, 521
  - RTI\_MONITORING\_LOGGING\_TOPIC\_NAME, 522
  - RTI\_MONITORING\_PERIODIC\_TOPIC\_NAME, 521
- Octet Buffer Support, 547
  - DDS\_OctetBuffer\_alloc, 548
  - DDS\_OctetBuffer\_dup, 549
  - DDS\_OctetBuffer\_free, 549
- Octets Built-in Type, 313
  - DDS\_Octets, 314
- Offset
  - MyFlatMutableBuilder, 1752
  - MyFlatUnionBuilder, 1765
  - rti::flat::MutableArrayBuilder< ElementBuilder, N >, 1741
  - rti::flat::MutableSequenceBuilder< ElementBuilder >, 1745
  - rti::flat::Sample< OffsetType >, 1917
- Offset.hpp, 1980
- old\_source\_timestamp\_dropped\_sample\_count
  - DDS\_DataReaderCacheStatus, 625
- on\_application\_acknowledgment
  - DDSDataWriterListener, 1349
- on\_condition\_triggered
  - DDSConditionHandler, 1279
  - DDSDataReaderStatusConditionHandler, 1320
- on\_data\_available
  - DDSDataReaderListener, 1317
- on\_data\_on\_readers
  - DDSSubscriberListener, 1614
- on\_inconsistent\_topic
  - DDSTopicListener, 1627
- on\_instance\_replaced
  - DDSDataWriterListener, 1349
- on\_invalid\_local\_identity\_status\_advance\_notice
  - DDSDomainParticipantListener, 1455
- on\_liveliness\_changed
  - DDSDataReaderListener, 1316
- on\_liveliness\_lost
  - DDSDataWriterListener, 1346
- on\_offered\_deadline\_missed
  - DDSDataWriterListener, 1345
- on\_offered\_incompatible\_qos
  - DDSDataWriterListener, 1346
- on\_publication\_matched
  - DDSDataWriterListener, 1347
- on\_reliable\_reader\_activity\_changed
  - DDSDataWriterListener, 1348
- on\_reliable\_writer\_cache\_changed
  - DDSDataWriterListener, 1347
- on\_request\_available
  - connext::ReplierListener< TReq, TRep >, 1881
  - connext::SimpleReplierListener< TReq, TRep >, 1938
- on\_requested\_deadline\_missed
  - DDSDataReaderListener, 1316
- on\_requested\_incompatible\_qos
  - DDSDataReaderListener, 1316
- on\_sample\_lost
  - DDSDataReaderListener, 1317
- on\_sample\_rejected
  - DDSDataReaderListener, 1316
- on\_sample\_removed
  - DDSDataWriterListener, 1348
- on\_service\_request\_accepted
  - DDSDataWriterListener, 1350
- on\_subscription\_matched
  - DDSDataReaderListener, 1317
- on\_thread\_deleted
  - DDSAsyncWaitSetListener, 1275
- on\_thread\_spawned
  - DDSAsyncWaitSetListener, 1275
- on\_wait\_timeout
  - DDSAsyncWaitSetListener, 1276
- operator LoanMemento
  - connext::LoanedSamples< T >, 1734
- operator T&
  - connext::SampleRef< T >, 1924
- operator!=
  - DDS\_DataReaderQos, 647
  - DDS\_DataWriterQos, 692
  - DDS\_DomainParticipantFactoryQos, 738
  - DDS\_DomainParticipantQos, 743
  - DDS\_PublisherQos, 1023
  - DDS\_SubscriberQos, 1106
  - DDS\_TopicQos, 1137
  - rti::flat::OffsetBase, 1860
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1933
- operator<
  - rti::flat::OffsetBase, 1858
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1932
- operator<=
  - rti::flat::OffsetBase, 1859
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1933
- operator>
  - rti::flat::OffsetBase, 1858
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1932
- operator>=
  - rti::flat::OffsetBase, 1859
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1933
- operator\*
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1931
- operator()
  - connext::IsReplyRelatedPredicate< T >, 1726



- operator++
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1931, 1932
- operator->
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1931
- operator=
  - connext::SampleRef< T >, 1923
  - DDS\_DynamicData, 793
  - FooSeq, 1700
- operator==
  - DDS\_DataReaderQos, 647
  - DDS\_DataWriterQos, 692
  - DDS\_DomainParticipantFactoryQos, 738
  - DDS\_DomainParticipantQos, 743
  - DDS\_DynamicData, 793
  - DDS\_PublisherQos, 1023
  - DDS\_SubscriberQos, 1106
  - DDS\_TopicQos, 1136
  - rti::flat::OffsetBase, 1859
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1933
- operator[]
  - connext::LoanedSamples< T >, 1733
  - FooSeq, 1704
- ordered\_access
  - DDS\_PresentationQosPolicy, 1000
- ordinal
  - DDS\_EnumMember, 907
- original\_publication\_virtual\_guid
  - DDS\_SampleInfo, 1090
- original\_publication\_virtual\_sequence\_number
  - DDS\_SampleInfo, 1090
- original\_related\_reader\_guid
  - DDS\_TopicQueryData, 1140
- Other Utilities, 546
- out\_of\_range\_rejected\_sample\_count
  - DDS\_DataReaderProtocolStatus, 643
- output\_file
  - DDS\_LoggingQosPolicy, 945
- output\_file\_suffix
  - DDS\_LoggingQosPolicy, 945
- outstanding\_asynchronous\_sample\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 754
- OWNERSHIP, 414
  - DDS\_EXCLUSIVE\_OWNERSHIP\_QOS, 415
  - DDS\_OWNERSHIP\_QOS\_POLICY\_NAME, 415
  - DDS\_OwnershipQosPolicyKind, 414
  - DDS\_SHARED\_OWNERSHIP\_QOS, 415
- ownership
  - DDS\_DataReaderQos, 649
  - DDS\_DataWriterQos, 694
  - DDS\_PublicationBuiltinTopicData, 1014
  - DDS\_SubscriptionBuiltinTopicData, 1112
  - DDS\_TopicBuiltinTopicData, 1132
  - DDS\_TopicQos, 1139
  - ownership\_dropped\_sample\_count
    - DDS\_DataReaderCacheStatus, 625
  - OWNERSHIP\_STRENGTH, 415
    - DDS\_OWNERSHIPSTRENGTH\_QOS\_POLICY\_NAME, 416
  - ownership\_strength
    - DDS\_DataWriterQos, 694
    - DDS\_PublicationBuiltinTopicData, 1015
- parent
  - NDDS\_Transport\_Shmem\_Property\_t, 1785
  - NDDS\_Transport\_UDPv4\_Property\_t, 1790
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1799
  - NDDS\_Transport\_UDPv6\_Property\_t, 1809
- parse\_encrypted\_content
  - NDDS\_Utility\_NetworkCaptureParams\_t, 1818
- partial\_configuration
  - DDS\_ParticipantBuiltinTopicData, 983
- Participant Built-in Topics, 294
  - DDS\_PARTICIPANT\_TOPIC\_NAME, 295
  - DDS\_ParticipantBuiltinTopicData, 295
- Participant Use Cases, 201
- participant\_announcement\_period
  - DDS\_DiscoveryConfigQosPolicy, 715
- participant\_configuration\_reader
  - DDS\_DiscoveryConfigQosPolicy, 730
- participant\_configuration\_reader\_resource\_limits
  - DDS\_DiscoveryConfigQosPolicy, 730
- participant\_configuration\_writer
  - DDS\_DiscoveryConfigQosPolicy, 729
- participant\_configuration\_writer\_data\_lifecycle
  - DDS\_DiscoveryConfigQosPolicy, 730
- participant\_configuration\_writer\_publish\_mode
  - DDS\_DiscoveryConfigQosPolicy, 729
- participant\_id
  - DDS\_WireProtocolQosPolicy, 1247
- participant\_id\_gain
  - DDS\_RtpsWellKnownPorts\_t, 1080
- participant\_key
  - DDS\_PublicationBuiltinTopicData, 1012
  - DDS\_SubscriptionBuiltinTopicData, 1110
- participant\_liveliness\_assert\_period
  - DDS\_DiscoveryConfigQosPolicy, 715
- participant\_liveliness\_lease\_duration
  - DDS\_DiscoveryConfigQosPolicy, 714
- participant\_message\_reader
  - DDS\_DiscoveryConfigQosPolicy, 721
- participant\_message\_reader\_reliability\_kind
  - DDS\_DiscoveryConfigQosPolicy, 721
- participant\_message\_writer
  - DDS\_DiscoveryConfigQosPolicy, 722
- participant\_name
  - DDS\_DomainParticipantConfigParams\_t, 735

- DDS\_DomainParticipantQos, 745
- DDS\_ParticipantBuiltinTopicData, 981
- participant\_property\_list\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 762
- participant\_property\_string\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 762
- participant\_qos\_library\_name
  - DDS\_DomainParticipantConfigParams\_t, 735
- participant\_qos\_profile\_name
  - DDS\_DomainParticipantConfigParams\_t, 736
  - DDS\_MonitoringDedicatedParticipantSettings, 949
- participant\_reader\_resource\_limits
  - DDS\_DiscoveryConfigQosPolicy, 717
- participant\_user\_data\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 758
- PARTITION, 416
  - DDS\_PARTITION\_QOS\_POLICY\_NAME, 416
- partition
  - DDS\_DomainParticipantQos, 746
  - DDS\_ParticipantBuiltinTopicData, 982
  - DDS\_PublicationBuiltinTopicData, 1015
  - DDS\_PublisherQos, 1024
  - DDS\_SubscriberQos, 1107
  - DDS\_SubscriptionBuiltinTopicData, 1113
- pause
  - NDDSUtilityHeapMonitoring, 1844
  - NDDSUtilityNetworkCapture, 1853
- pause\_heap\_monitoring
  - NDDSUtility, 1842
- period
  - DDS\_DeadlineQosPolicy, 708
  - DDS\_FlowControllerTokenBucketProperty\_t, 915
- periodic\_settings
  - DDS\_MonitoringDistributionSettings, 951
- plain\_cast
  - FlatData Offsets, 566, 568
- plugin\_bitmask
  - DDS\_EndpointTrustProtectionInfo, 903
  - DDS\_ParticipantTrustProtectionInfo, 988
- plugin\_data
  - DDS\_TypeSupportQosPolicy, 1234
- pointer
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1930
- policies
  - DDS\_OfferedIncompatibleQosStatus, 972
  - DDS\_RequestedIncompatibleQosStatus, 1052
- policy\_id
  - DDS\_QosPolicyCount, 1030
- polling\_period
  - DDS\_MonitoringPeriodicDistributionSettings, 961
- port
  - DDS\_Locator\_t, 940
- port\_base
  - DDS\_RtpsWellKnownPorts\_t, 1078
- port\_offset
  - NDDS\_Transport\_UDPv4\_Property\_t, 1797
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1807
  - NDDS\_Transport\_UDPv6\_Property\_t, 1816
- PRESENTATION, 417
  - DDS\_GROUP\_PRESENTATION\_QOS, 418
  - DDS\_HIGHEST\_OFFERED\_PRESENTATION\_QOS, 418
  - DDS\_INSTANCE\_PRESENTATION\_QOS, 418
  - DDS\_PRESENTATION\_QOS\_POLICY\_NAME, 418
  - DDS\_PresentationQosPolicyAccessScopeKind, 417
  - DDS\_TOPIC\_PRESENTATION\_QOS, 418
- presentation
  - DDS\_PublicationBuiltinTopicData, 1015
  - DDS\_PublisherQos, 1024
  - DDS\_SubscriberQos, 1107
  - DDS\_SubscriptionBuiltinTopicData, 1112
- pretty\_print
  - DDS\_PrintFormatProperty, 1001
- prevent\_type\_widening
  - DDS\_TypeConsistencyEnforcementQosPolicy, 1230
- print
  - Data Writers, 113
  - DataReaders, 142
  - DDS\_DynamicData, 801
  - DDS\_TypeCode, 1207
  - DomainParticipantFactory, 43
  - DomainParticipants, 51
  - Publishers, 105
  - Subscribers, 128
  - Topics, 65
- print\_complete\_type
  - DDS\_TypeCodePrintFormatProperty, 1227
- print\_data
  - DDSDynamicDataTypeSupport, 1461
  - DDSKeyedOctetsTypeSupport, 1499
  - DDSKeyedStringTypeSupport, 1524
  - DDSOctetsTypeSupport, 1546
  - DDSStringTypeSupport, 1590
  - FooTypeSupport, 1720
- print\_format
  - DDS\_LoggingQosPolicy, 945
- print\_IDL
  - DDS\_TypeCode, 1207
- print\_kind
  - DDS\_TypeCodePrintFormatProperty, 1226
- print\_ordinals
  - DDS\_TypeCodePrintFormatProperty, 1225
- print\_private
  - DDS\_QosPrintFormat, 1032
- priority

- DDS\_ChannelSettings\_t, 611
- DDS\_PublishModeQosPolicy, 1028
- DDS\_ThreadSettings\_t, 1123
- DDS\_WriteParams\_t, 1253
- product\_version
  - DDS\_ParticipantBuiltinTopicData, 981
  - DDS\_PublicationBuiltinTopicData, 1018
  - DDS\_SubscriptionBuiltinTopicData, 1116
- PROFILE, 418
  - DDS\_PROFILE\_QOS\_POLICY\_NAME, 419
- profile
  - DDS\_DomainParticipantFactoryQos, 739
- Programming How-To's, 243
- propagate
  - DDS\_Property\_t, 1007
- propagate\_app\_ack\_with\_no\_response
  - DDS\_DataWriterProtocolQosPolicy, 676
- propagate\_dispose\_of\_unregistered\_instances
  - DDS\_DataReaderProtocolQosPolicy, 632
- propagate\_unregister\_of\_disposed\_instances
  - DDS\_DataReaderProtocolQosPolicy, 633
- properties\_bitmap
  - NDDS\_Transport\_Property\_t, 1778
- PROPERTY, 419
  - add\_pointer\_property, 426
  - add\_property, 424
  - assert\_pointer\_property, 425
  - assert\_property, 424
  - DDS\_PROPERTY\_QOS\_IMMUTABLE, 422
  - DDS\_PROPERTY\_QOS\_MUTABLE, 422
  - DDS\_PROPERTY\_QOS\_MUTABLE\_UNTIL\_ENABLE, 422
  - DDS\_PROPERTY\_QOS\_POLICY\_NAME, 428
  - DDS\_PropertyQosPolicy, 421
  - DDS\_PropertyQosPolicyHelper\_get\_property\_mutability, 423
  - DDS\_PropertyQosPolicyMutability, 422
  - get\_number\_of\_properties, 423
  - get\_properties, 428
  - lookup\_property, 427
  - remove\_property, 427
- property
  - DDS\_DataReaderQos, 651
  - DDS\_DataWriterQos, 696
  - DDS\_DomainParticipantQos, 745
  - DDS\_ParticipantBuiltinTopicData, 980
  - DDS\_PublicationBuiltinTopicData, 1016
  - DDS\_SubscriptionBuiltinTopicData, 1114
- protocol
  - DDS\_DataReaderQos, 651
  - DDS\_DataWriterQos, 695
- protocol\_overhead\_max
  - NDDS\_Transport\_UDPv4\_Property\_t, 1796
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1804
- NDDS\_Transport\_UDPv6\_Property\_t, 1815
- public\_address
  - NDDS\_Transport\_UDPv4\_Property\_t, 1797
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1805
  - NDDS\_Transport\_UDPv6\_Property\_t, 1816
- public\_port
  - NDDS\_Transport\_UDP\_WAN\_CommPortsMappingInfo, 1788
- Publication Built-in Topics, 297
  - DDS\_PUBLICATION\_TOPIC\_NAME, 298
  - DDS\_PublicationBuiltinTopicData, 298
- Publication Example, 199
- Publication Module, 103
- publication\_handle
  - DDS\_SampleInfo, 1087
- publication\_name
  - DDS\_DataWriterQos, 697
  - DDS\_PublicationBuiltinTopicData, 1018
- publication\_period
  - DDS\_MonitoringEventDistributionSettings, 953
  - DDS\_MonitoringLoggingDistributionSettings, 956
  - DDS\_TopicQueryDispatchQosPolicy, 1142
- publication\_reader
  - DDS\_DiscoveryConfigQosPolicy, 718
- publication\_reader\_resource\_limits
  - DDS\_DiscoveryConfigQosPolicy, 718
- publication\_sequence\_number
  - DDS\_SampleInfo, 1089
- publication\_writer
  - DDS\_DiscoveryConfigQosPolicy, 719
- publication\_writer\_data\_lifecycle
  - DDS\_DiscoveryConfigQosPolicy, 719
- publication\_writer\_publish\_mode
  - DDS\_DiscoveryConfigQosPolicy, 723
- PUBLISH\_MODE, 429
  - DDS\_ASYNCHRONOUS\_PUBLISH\_MODE\_QOS, 431
  - DDS\_PUBLICATION\_PRIORITY\_AUTOMATIC, 430
  - DDS\_PUBLICATION\_PRIORITY\_UNDEFINED, 430
  - DDS\_PUBLISHMODE\_QOS\_POLICY\_NAME, 431
  - DDS\_PublishModeQosPolicyKind, 430
  - DDS\_SYNCHRONOUS\_PUBLISH\_MODE\_QOS, 431
- publish\_mode
  - DDS\_DataWriterQos, 696
- publisher
  - connext::ReplierParams< TReq, TRep >, 1884
  - connext::RequesterParams, 1910
  - connext::SimpleReplierParams< TReq, TRep >, 1942
- Publisher Use Cases, 206
- publisher\_group\_data\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 758

- publisher\_key
  - DDS\_PublicationBuiltinTopicData, 1016
- publisher\_name
  - DDS\_PublisherQos, 1025
- publisher\_qos\_profile\_name
  - DDS\_MonitoringDistributionSettings, 951
- Publishers, 103
  - DDS\_DATAWRITER\_QOS\_DEFAULT, 110
  - DDS\_DATAWRITER\_QOS\_USE\_TOPIC\_QOS, 110
  - DDS\_PublisherQos\_equals, 105
  - print, 105
  - to\_string, 105–109
- pulled\_fragment\_bytes
  - DDS\_DataWriterProtocolStatus, 688
- pulled\_fragment\_count
  - DDS\_DataWriterProtocolStatus, 688
- pulled\_sample\_bytes
  - DDS\_DataWriterProtocolStatus, 683
- pulled\_sample\_bytes\_change
  - DDS\_DataWriterProtocolStatus, 683
- pulled\_sample\_count
  - DDS\_DataWriterProtocolStatus, 682
- pulled\_sample\_count\_change
  - DDS\_DataWriterProtocolStatus, 683
- push\_on\_write
  - DDS\_DataWriterProtocolQosPolicy, 675
- pushed\_fragment\_bytes
  - DDS\_DataWriterProtocolStatus, 688
- pushed\_fragment\_count
  - DDS\_DataWriterProtocolStatus, 688
- pushed\_sample\_bytes
  - DDS\_DataWriterProtocolStatus, 680
- pushed\_sample\_bytes\_change
  - DDS\_DataWriterProtocolStatus, 681
- pushed\_sample\_count
  - DDS\_DataWriterProtocolStatus, 680
- pushed\_sample\_count\_change
  - DDS\_DataWriterProtocolStatus, 680
- QoS Policies, 353
  - DDS\_ASYNCHRONOUSPUBLISHER\_QOS\_POLICY\_ID, 362
  - DDS\_AVAILABILITY\_QOS\_POLICY\_ID, 362
  - DDS\_BATCH\_QOS\_POLICY\_ID, 362
  - DDS\_DATA\_REPRESENTATION\_QOS\_POLICY\_ID, 361
  - DDS\_DATABASE\_QOS\_POLICY\_ID, 362
  - DDS\_DATAREADERPROTOCOL\_QOS\_POLICY\_ID, 362
  - DDS\_DATAREADERRESOURCELIMITS\_QOS\_POLICY\_ID, 361
  - DDS\_DATATAG\_QOS\_POLICY\_ID, 361
  - DDS\_DATAWRITERPROTOCOL\_QOS\_POLICY\_ID, 362
  - DDS\_DATAWRITERRESOURCELIMITS\_QOS\_POLICY\_ID, 361
  - DDS\_DATAWRITERTRANSFERMODE\_QOS\_POLICY\_ID, 363
  - DDS\_DEADLINE\_QOS\_POLICY\_ID, 361
  - DDS\_DESTINATIONORDER\_QOS\_POLICY\_ID, 361
  - DDS\_DISCOVERY\_QOS\_POLICY\_ID, 361
  - DDS\_DISCOVERYCONFIG\_QOS\_POLICY\_ID, 362
  - DDS\_DOMAINPARTICIPANTRESOURCELIMITS\_QOS\_POLICY\_ID, 362
  - DDS\_DURABILITY\_QOS\_POLICY\_ID, 361
  - DDS\_DURABILITYSERVICE\_QOS\_POLICY\_ID, 361
  - DDS\_ENTITYFACTORY\_QOS\_POLICY\_ID, 361
  - DDS\_ENTITYNAME\_QOS\_POLICY\_ID, 362
  - DDS\_EVENT\_QOS\_POLICY\_ID, 362
  - DDS\_GROUPDATA\_QOS\_POLICY\_ID, 361
  - DDS\_HISTORY\_QOS\_POLICY\_ID, 361
  - DDS\_INVALID\_QOS\_POLICY\_ID, 361
  - DDS\_LATENCYBUDGET\_QOS\_POLICY\_ID, 361
  - DDS\_LIFESPAN\_QOS\_POLICY\_ID, 361
  - DDS\_LIVELINESS\_QOS\_POLICY\_ID, 361
  - DDS\_LOCATORFILTER\_QOS\_POLICY\_ID, 362
  - DDS\_LOGGING\_QOS\_POLICY\_ID, 363
  - DDS\_MONITORING\_QOS\_POLICY\_ID, 363
  - DDS\_MULTICHANNEL\_QOS\_POLICY\_ID, 362
  - DDS\_OWNERSHIP\_QOS\_POLICY\_ID, 361
  - DDS\_OWNERSHIPSTRENGTH\_QOS\_POLICY\_ID, 361
  - DDS\_PARTITION\_QOS\_POLICY\_ID, 361
  - DDS\_PRESENTATION\_QOS\_POLICY\_ID, 361
  - DDS\_PROFILE\_QOS\_POLICY\_ID, 362
  - DDS\_PROPERTY\_QOS\_POLICY\_ID, 362
  - DDS\_PUBLISHMODE\_QOS\_POLICY\_ID, 362
  - DDS\_QOS\_POLICY\_COUNT, 360
  - DDS\_QosPolicyId\_t, 360
  - DDS\_QosPrintFormat\_INITIALIZER, 360
  - DDS\_READERDATALIFECYCLE\_QOS\_POLICY\_ID, 361
  - DDS\_RECEIVERPOOL\_QOS\_POLICY\_ID, 362
  - DDS\_RELIABILITY\_QOS\_POLICY\_ID, 361
  - DDS\_RESOURCELIMITS\_QOS\_POLICY\_ID, 361
  - DDS\_SYSTEMRESOURCELIMITS\_QOS\_POLICY\_ID, 362
  - DDS\_TIMEBASEDFILTER\_QOS\_POLICY\_ID, 361
  - DDS\_TOPICDATA\_QOS\_POLICY\_ID, 361
  - DDS\_TOPICQUERYDISPATCH\_QOS\_POLICY\_ID, 363
  - DDS\_TRANSPORTBUILTIN\_QOS\_POLICY\_ID, 362
  - DDS\_TRANSPORTMULTICAST\_QOS\_POLICY\_ID, 362
  - DDS\_TRANSPORTMULTICASTMAPPING\_QOS\_POLICY\_ID, 362

- DDS\_TRANSPORTPRIORITY\_QOS\_POLICY\_ID, 361
- DDS\_TRANSPORTSELECTION\_QOS\_POLICY\_ID, 362
- DDS\_TRANSPORTUNICAST\_QOS\_POLICY\_ID, 362
- DDS\_TYPE\_CONSISTENCY\_ENFORCEMENT\_QOS\_POLICY\_ID, 361
- DDS\_TYPESUPPORT\_QOS\_POLICY\_ID, 362
- DDS\_USERDATA\_QOS\_POLICY\_ID, 361
- DDS\_WIREPROTOCOL\_QOS\_POLICY\_ID, 361
- DDS\_WRITERDATALIFECYCLE\_QOS\_POLICY\_ID, 361
- qos\_profile
  - connext::ReplierParams< TReq, TRep >, 1883
  - connext::RequesterParams, 1909
  - connext::SimpleReplierParams< TReq, TRep >, 1941
- Queries and Filters Syntax, 179
- Query Conditions, 148
- query\_condition\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 754
- query\_expression
  - DDS\_QueryConditionParams, 1034
- query\_parameters
  - DDS\_QueryConditionParams, 1034
- quorum\_count
  - DDS\_EndpointGroup\_t, 900
- rank
  - NDDS\_Transport\_Interface\_t, 1776
- reachability\_lease\_duration
  - DDS\_ParticipantBuiltinTopicData, 982
- read
  - DDSKeyedOctetsDataReader, 1476
  - DDSKeyedStringDataReader, 1504
  - DDSOctetsDataReader, 1534
  - DDSStringDataReader, 1581
  - FooDataReader, 1651
- Read Conditions, 147
- read\_condition\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 753
- read\_instance
  - DDSKeyedOctetsDataReader, 1477
  - DDSKeyedStringDataReader, 1505
  - FooDataReader, 1661
- read\_instance\_w\_condition
  - DDSKeyedOctetsDataReader, 1478
  - DDSKeyedStringDataReader, 1506
  - FooDataReader, 1664
- read\_next\_instance
  - DDSKeyedOctetsDataReader, 1479
- DDSKeyedStringDataReader, 1507
- FooDataReader, 1667
- read\_next\_instance\_w\_condition
  - DDSKeyedOctetsDataReader, 1479
  - DDSKeyedStringDataReader, 1507
  - FooDataReader, 1670
- read\_octets
  - DDSKeyedOctetsDataReader, 1477
- read\_string
  - DDSKeyedStringDataReader, 1505
  - DDSOctetsDataReader, 1535
  - DDSStringDataReader, 1582
  - FooDataReader, 1659
- read\_replies
  - connext::Requester< TReq, TRep >, 1904, 1905
- read\_reply
  - connext::Requester< TReq, TRep >, 1903–1905
- read\_request
  - connext::Replier< TReq, TRep >, 1879
- read\_requests
  - connext::Replier< TReq, TRep >, 1879
- read\_w\_condition
  - DDSKeyedOctetsDataReader, 1476
  - DDSKeyedStringDataReader, 1504
  - DDSOctetsDataReader, 1534
  - DDSStringDataReader, 1581
  - FooDataReader, 1657
- reader\_checkpoint\_frequency
  - DDS\_PersistentStorageSettings, 996
- READER\_DATA\_LIFECYCLE, 432
  - DDS\_READERDATALIFECYCLE\_QOS\_POLICY\_NAME, 432
- reader\_data\_lifecycle
  - DDS\_DataReaderQos, 650
- reader\_data\_tag\_list\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 766
- reader\_data\_tag\_string\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 766
- reader\_property\_list\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 763
- reader\_property\_string\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 763
- reader\_resource\_limits
  - DDS\_DataReaderQos, 650
- reader\_user\_data\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 759
- Real-Time WAN Transport, 276
  - NDDS\_Transport\_UDPv4\_WAN\_create, 281
  - NDDS\_Transport\_UDPv4\_WAN\_create\_from\_properties\_with\_prefix, 282

- NDDS\_Transport\_UDPv4\_WAN\_new, 280
- NDDS\_TRANSPORT\_UDPv4\_WAN\_PROPERTY\_DEFAULT, 280
- reassembled\_sample\_count
  - DDS\_DataReaderProtocolStatus, 643
- receive\_address
  - DDS\_TransportMulticastSettings\_t, 1154
- receive\_buffer\_size
  - NDDS\_Transport\_Shmem\_Property\_t, 1785
- receive\_port
  - DDS\_TransportMulticastSettings\_t, 1154
  - DDS\_TransportUnicastSettings\_t, 1161
- receive\_replies
  - connext::Requester< TReq, TRep >, 1894, 1895
- receive\_reply
  - connext::Requester< TReq, TRep >, 1893, 1894
- receive\_request
  - connext::Replier< TReq, TRep >, 1875, 1876
- receive\_requests
  - connext::Replier< TReq, TRep >, 1876
- receive\_window\_size
  - DDS\_RtpsReliableReaderProtocol\_t, 1059
- received\_ack\_bytes
  - DDS\_DataWriterProtocolStatus, 684
- received\_ack\_bytes\_change
  - DDS\_DataWriterProtocolStatus, 684
- received\_ack\_count
  - DDS\_DataWriterProtocolStatus, 683
- received\_ack\_count\_change
  - DDS\_DataWriterProtocolStatus, 684
- received\_fragment\_count
  - DDS\_DataReaderProtocolStatus, 643
- received\_gap\_bytes
  - DDS\_DataReaderProtocolStatus, 641
- received\_gap\_bytes\_change
  - DDS\_DataReaderProtocolStatus, 641
- received\_gap\_count
  - DDS\_DataReaderProtocolStatus, 641
- received\_gap\_count\_change
  - DDS\_DataReaderProtocolStatus, 641
- received\_heartbeat\_bytes
  - DDS\_DataReaderProtocolStatus, 639
- received\_heartbeat\_bytes\_change
  - DDS\_DataReaderProtocolStatus, 639
- received\_heartbeat\_count
  - DDS\_DataReaderProtocolStatus, 639
- received\_heartbeat\_count\_change
  - DDS\_DataReaderProtocolStatus, 639
- received\_message\_count\_max
  - NDDS\_Transport\_Shmem\_Property\_t, 1785
- received\_nack\_bytes
  - DDS\_DataWriterProtocolStatus, 684
- received\_nack\_bytes\_change
  - DDS\_DataWriterProtocolStatus, 685
- received\_nack\_count
  - DDS\_DataWriterProtocolStatus, 684
- received\_nack\_count\_change
  - DDS\_DataWriterProtocolStatus, 684
- received\_nack\_fragment\_bytes
  - DDS\_DataWriterProtocolStatus, 689
- received\_nack\_fragment\_count
  - DDS\_DataWriterProtocolStatus, 688
- received\_sample\_bytes
  - DDS\_DataReaderProtocolStatus, 637
- received\_sample\_bytes\_change
  - DDS\_DataReaderProtocolStatus, 637
- received\_sample\_count
  - DDS\_DataReaderProtocolStatus, 636
- received\_sample\_count\_change
  - DDS\_DataReaderProtocolStatus, 636
- RECEIVER\_POOL, 432
  - DDS\_LENGTH\_AUTO, 433
  - DDS\_RECEIVERPOOL\_QOS\_POLICY\_NAME, 433
- receiver\_pool
  - DDS\_DomainParticipantQos, 745
- reception\_sequence\_number
  - DDS\_SampleInfo, 1090
- reception\_timestamp
  - DDS\_SampleInfo, 1089
- recv\_socket\_buffer\_size
  - NDDS\_Transport\_UDPv4\_Property\_t, 1790
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1800
  - NDDS\_Transport\_UDPv6\_Property\_t, 1809
- reference
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1929
- register\_contentfilter
  - DDSDomainParticipant, 1364
- register\_durable\_subscription
  - DDSDomainParticipant, 1398
- register\_instance
  - DDSKeyedOctetsDataWriter, 1485
  - DDSKeyedStringDataWriter, 1513
  - FooDataWriter, 1678
- register\_instance\_w\_params
  - FooDataWriter, 1680
- register\_instance\_w\_timestamp
  - DDSKeyedOctetsDataWriter, 1486
  - DDSKeyedStringDataWriter, 1513
  - FooDataWriter, 1679
- register\_transport
  - NDDSTransportSupport, 1834
- register\_type
  - DDSDynamicDataTypeSupport, 1459
  - DDSKeyedOctetsTypeSupport, 1496
  - DDSKeyedStringTypeSupport, 1521
  - DDSOctetsTypeSupport, 1544
  - DDSStringTypeSupport, 1588
  - FooTypeSupport, 1713

- register\_type\_support
  - DDSDomainParticipantFactory, 1451
- rejected\_sample\_count
  - DDS\_DataReaderProtocolStatus, 642
  - DDS\_DataWriterProtocolStatus, 685
- rejected\_sample\_count\_change
  - DDS\_DataReaderProtocolStatus, 642
  - DDS\_DataWriterProtocolStatus, 686
- related\_identity
  - connext::Sample< T >, 1914
  - connext::SampleRef< T >, 1926
- related\_original\_publication\_virtual\_guid
  - DDS\_SampleInfo, 1090
- related\_original\_publication\_virtual\_sequence\_number
  - DDS\_SampleInfo, 1091
- related\_reader\_guid
  - DDS\_FilterSampleInfo, 911
  - DDS\_WriteParams\_t, 1255
- related\_sample\_identity
  - DDS\_FilterSampleInfo, 911
  - DDS\_WriteParams\_t, 1252
- related\_source\_guid
  - DDS\_FilterSampleInfo, 911
  - DDS\_SampleInfo, 1091
  - DDS\_WriteParams\_t, 1255
- related\_subscription\_guid
  - DDS\_SampleInfo, 1092
- related\_topic\_name
  - DDS\_ContentFilterProperty\_t, 617
- release
  - connext::LoanedSamples< T >, 1732
  - DDS\_ProductVersion\_t, 1003
  - NDDS\_Config\_LibraryVersion\_t, 1771
- release\_version
  - connext::MessagingLibraryVersion, 1738
- RELIABILITY, 433
  - DDS\_APPLICATION\_AUTO\_ACKNOWLEDGMENT\_MODE, 435
  - DDS\_APPLICATION\_EXPLICIT\_ACKNOWLEDGMENT\_MODE, 436
  - DDS\_BEST\_EFFORT\_RELIABILITY\_QOS, 435
  - DDS\_InstanceStateConsistencyKind, 436
  - DDS\_NO\_RECOVER\_INSTANCE\_STATE\_CONSISTENCY, 436
  - DDS\_PROTOCOL\_ACKNOWLEDGMENT\_MODE, 435
  - DDS\_RECOVER\_INSTANCE\_STATE\_CONSISTENCY, 436
  - DDS\_RELIABILITY\_QOS\_POLICY\_NAME, 437
  - DDS\_ReliabilityQosPolicyAcknowledgmentModeKind, 435
  - DDS\_ReliabilityQosPolicyKind, 434
  - DDS\_RELIABLE\_RELIABILITY\_QOS, 435
- reliability
  - DDS\_DataReaderQos, 649
  - DDS\_DataWriterQos, 693
  - DDS\_PublicationBuiltinTopicData, 1014
  - DDS\_SubscriptionBuiltinTopicData, 1111
  - DDS\_TopicBuiltinTopicData, 1131
  - DDS\_TopicQos, 1138
- reload\_profiles
  - DDSDomainParticipantFactory, 1447
- remote\_participant\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 752
- remote\_participant\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 756
- remote\_participant\_purge\_kind
  - DDS\_DiscoveryConfigQosPolicy, 715
- remote\_reader\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 752
- remote\_reader\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 756
- remote\_topic\_query\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 765
- remote\_topic\_query\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 765
- remote\_writer\_allocation
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 751
- remote\_writer\_hash\_buckets
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 755
- remove\_from\_expression\_parameter
  - DDSContentFilteredTopic, 1287
- remove\_peer
  - DDSDomainParticipant, 1411
- remove\_property
  - PROPERTY, 427
- remove\_tag
  - DATA\_TAG, 380
- replace\_auto
  - DDS\_WriteParams\_t, 1251
- replace\_empty\_instances
  - DDS\_DataWriterResourceLimitsQosPolicy, 701
- replaced\_dropped\_sample\_count
  - DDS\_DataReaderCacheStatus, 627
- replaced\_unacknowledged\_sample\_count
  - DDS\_ReliableWriterCacheChangedStatus, 1048
- Replier, 187
  - connext::Replier< TReq, TRep >, 1872, 1873
- replier\_listener
  - connext::ReplierParams< TReq, TRep >, 1882

- ReplierParams
  - connext::ReplierParams< TReq, TRep >, 1882
- Reply
  - connext::Replier< TReq, TRep >, 1871
  - connext::Requester< TReq, TRep >, 1889
- reply\_topic\_name
  - connext::ReplierParams< TReq, TRep >, 1883
  - connext::RequesterParams, 1909
  - connext::SimpleReplierParams< TReq, TRep >, 1941
- reply\_type\_support
  - connext::ReplierParams< TReq, TRep >, 1885
  - connext::RequesterParams, 1911
  - connext::SimpleReplierParams< TReq, TRep >, 1943
- ReplyDataReader
  - connext::Requester< TReq, TRep >, 1890
- ReplyDataWriter
  - connext::Replier< TReq, TRep >, 1871
- ReplyTypeSupport
  - connext::Requester< TReq, TRep >, 1890
- representation
  - DDS\_DataReaderQos, 650
  - DDS\_DataWriterQos, 695
  - DDS\_PublicationBuiltinTopicData, 1016
  - DDS\_SubscriptionBuiltinTopicData, 1113
  - DDS\_TopicBuiltinTopicData, 1133
  - DDS\_TopicQos, 1139
- Request
  - connext::Replier< TReq, TRep >, 1871
  - connext::Requester< TReq, TRep >, 1889
- Request-Reply Examples, 226
- Request-Reply Pattern, 186
- request\_body
  - DDS\_ServiceRequest, 1098
- request\_topic\_name
  - connext::ReplierParams< TReq, TRep >, 1883
  - connext::RequesterParams, 1909
  - connext::SimpleReplierParams< TReq, TRep >, 1940
- request\_type\_support
  - connext::ReplierParams< TReq, TRep >, 1885
  - connext::RequesterParams, 1911
  - connext::SimpleReplierParams< TReq, TRep >, 1942
- RequestDataReader
  - connext::Replier< TReq, TRep >, 1871
- RequestDataWriter
  - connext::Requester< TReq, TRep >, 1890
- Requester, 187
  - connext::Requester< TReq, TRep >, 1890, 1891
- RequesterParams
  - connext::RequesterParams, 1908
- RequestTypeSupport
  - connext::Requester< TReq, TRep >, 1890
  - connext::Replier< TReq, TRep >, 1871
  - connext::RequesterParams, 1908
  - connext::SimpleReplierParams< TReq, TRep >, 1941
  - connext::SimpleReplierListener< TReq, TRep >, 1938
  - DDS\_ReturnCode\_t, 336
  - DDS\_RequestedResourceInfo, 902
  - DDS\_TrustAlgorithmRequirements, 1162
  - required\_mask
    - DDS\_EndpointTrustInterceptorAlgorithmInfo, 902
    - DDS\_TrustAlgorithmRequirements, 1162
  - required\_matched\_endpoint\_groups
    - DDS\_AvailabilityQosPolicy, 599
  - RESOURCE\_LIMITS, 437
    - DDS\_LENGTH\_UNLIMITED, 438
    - DDS\_RESOURCELIMITS\_QOS\_POLICY\_NAME, 437
  - resource\_limits
    - DDS\_DataReaderQos, 649
    - DDS\_DataWriterQos, 694
    - DDS\_DomainParticipantFactoryQos, 739
    - DDS\_DomainParticipantQos, 744
    - DDS\_TopicBuiltinTopicData, 1132
    - DDS\_TopicQos, 1139
  - resource\_selection
    - DDS\_MonitoringMetricSelection, 958
  - response\_data
    - DDS\_AcknowledgmentInfo, 587
  - restore
    - DDS\_PersistentStorageSettings, 994
  - resume
    - NDDSUtilityHeapMonitoring, 1844
    - NDDSUtilityNetworkCapture, 1854
  - resume\_endpoint\_discovery
    - DDSDomainParticipant, 1400
  - resume\_heap\_monitoring
    - NDDSUtility, 1842
  - resume\_publications
    - DDSPublisher, 1563
  - Return Codes, 335
    - DDS\_RETCODE\_ALREADY\_DELETED, 337
    - DDS\_RETCODE\_BAD\_PARAMETER, 336
    - DDS\_RETCODE\_ERROR, 336
    - DDS\_RETCODE\_ILLEGAL\_OPERATION, 337
    - DDS\_RETCODE\_IMMUTABLE\_POLICY, 337
    - DDS\_RETCODE\_INCONSISTENT\_POLICY, 337
    - DDS\_RETCODE\_NO\_DATA, 337
    - DDS\_RETCODE\_NOT\_ALLOWED\_BY\_SECURITY, 337
    - DDS\_RETCODE\_NOT\_ENABLED, 337
    - DDS\_RETCODE\_OK, 336
    - DDS\_RETCODE\_OUT\_OF\_RESOURCES, 337
    - DDS\_RETCODE\_PRECONDITION\_NOT\_MET, 336
    - DDS\_RETCODE\_TIMEOUT, 337
    - DDS\_RETCODE\_UNSUPPORTED, 336
    - DDS\_ReturnCode\_t, 336
  - return\_loan
    - connext::LoanedSamples< T >, 1734
    - connext::SimpleReplierListener< TReq, TRep >, 1938
    - DDSKeyedOctetsDataReader, 1480



- DDSKeyedStringDataReader, 1508
- DDSOctetsDataReader, 1535
- DDSStringDataReader, 1583
- FooDataReader, 1672
- reuse\_multicast\_receive\_resource
  - NDDS\_Transport\_UDPv4\_Property\_t, 1795
  - NDDS\_Transport\_UDPv6\_Property\_t, 1814
- revision
  - DDS\_ProductVersion\_t, 1004
- role\_name
  - DDS\_EndpointGroup\_t, 900
  - DDS\_EntityNameQosPolicy, 906
- root
  - rti::flat::Sample< OffsetType >, 1918
- round\_trip\_time
  - DDS\_RtpsReliableReaderProtocol\_t, 1059
- rti, 573
- RTI Connex DDS API Reference, 239
- RTI Connex Exceptions, 37
- rti::flat, 573
- rti::flat::AbstractAlignedList< ElementOffset >, 577
  - begin, 578
  - end, 578
  - iterator, 578
- rti::flat::AbstractBuilder, 579
  - ~AbstractBuilder, 579
  - capacity, 580
  - check\_failure, 581
  - discard, 580
  - is\_nested, 580
  - is\_valid, 580
- rti::flat::AbstractListBuilder< DHeaderGen >, 581
  - element\_count, 582
- rti::flat::AbstractPrimitiveList< T >, 582
  - get\_element, 583
  - set\_element, 583
- rti::flat::AbstractSequenceBuilder< DHeaderGen >, 584
  - element\_count, 584
- rti::flat::AggregationBuilder, 585
- rti::flat::FinalAlignedArrayOffset< ElementOffset, N >, 1641
  - get\_element, 1643
- rti::flat::FinalArrayOffset< ElementOffset, N >, 1643
  - get\_element, 1644
- rti::flat::FinalOffset< T >, 1645
- rti::flat::FinalSequenceBuilder< ElementOffset >, 1645
  - add\_n, 1647
  - add\_next, 1646
  - finish, 1647
- rti::flat::flat\_type\_traits< T >, 1647
- rti::flat::MutableArrayBuilder< ElementBuilder, N >, 1740
  - build\_next, 1741
  - finish, 1741
  - Offset, 1741
- rti::flat::MutableArrayOffset< ElementOffset, N >, 1742
  - get\_element, 1743
- rti::flat::MutableOffset, 1743
- rti::flat::MutableSequenceBuilder< ElementBuilder >, 1744
  - build\_next, 1745
  - finish, 1745
  - Offset, 1745
- rti::flat::OffsetBase, 1856
  - get\_buffer, 1857
  - get\_buffer\_size, 1858
  - is\_cpp\_compatible, 1857
  - is\_null, 1857
  - operator!=, 1860
  - operator<, 1858
  - operator<=, 1859
  - operator>, 1858
  - operator>=, 1859
  - operator==, 1859
- rti::flat::PrimitiveArrayOffset< T, N >, 1861
  - element\_count, 1862
- rti::flat::PrimitiveConstOffset< T >, 1862
  - get, 1863
- rti::flat::PrimitiveOffset< T >, 1863
  - set, 1864
- rti::flat::PrimitiveSequenceBuilder< T >, 1864
  - add\_n, 1865, 1866
  - add\_next, 1865
  - finish, 1867
- rti::flat::PrimitiveSequenceOffset< T >, 1867
  - element\_count, 1868
- rti::flat::Sample< OffsetType >, 1916
  - clone, 1919
  - ConstOffset, 1917
  - create\_data, 1918
  - delete\_data, 1919
  - Offset, 1917
  - root, 1918
- rti::flat::SequencerIterator< E, OffsetKind >, 1926
  - advance, 1931
  - difference\_type, 1930
  - is\_null, 1930
  - iterator\_category, 1929
  - operator!=, 1933
  - operator<, 1932
  - operator<=, 1933
  - operator>, 1932
  - operator>=, 1933
  - operator\*, 1931
  - operator++, 1931, 1932
  - operator->, 1931
  - operator==, 1933
  - pointer, 1930
  - reference, 1929

- Sequenceliterator, 1930
  - value\_type, 1929
- rti::flat::SequenceOffset< ElementOffset >, 1934
  - element\_count, 1935
  - get\_element, 1935
- rti::flat::StringBuilder, 1943
  - finish, 1944
  - set\_string, 1944
- rti::flat::StringOffset, 1945
  - element\_count, 1946
  - get\_string, 1945
- rti::flat::UnionBuilder< Discriminator >, 1947
- RTI\_MONITORING\_EVENT\_TOPIC\_NAME
  - Observability Library, 521
- RTI\_Monitoring\_initialize
  - Observability Library, 521
- RTI\_MONITORING\_LOGGING\_TOPIC\_NAME
  - Observability Library, 522
- RTI\_MONITORING\_PERIODIC\_TOPIC\_NAME
  - Observability Library, 521
- rtiflat.hpp, 1989
- rtps\_app\_id
  - DDS\_WireProtocolQosPolicy, 1248
- rtps\_auto\_id\_kind
  - DDS\_WireProtocolQosPolicy, 1250
- rtps\_host\_id
  - DDS\_WireProtocolQosPolicy, 1248
- rtps\_instance\_id
  - DDS\_WireProtocolQosPolicy, 1249
- rtps\_object\_id
  - DDS\_DataReaderProtocolQosPolicy, 631
  - DDS\_DataWriterProtocolQosPolicy, 674
- rtps\_port
  - NDDS\_Transport\_UDP\_WAN\_CommPortsMappingInfo, 1787
- rtps\_protocol\_version
  - DDS\_ParticipantBuiltinTopicData, 980
  - DDS\_PublicationBuiltinTopicData, 1017
  - DDS\_SubscriptionBuiltinTopicData, 1115
- rtps\_reliable\_reader
  - DDS\_DataReaderProtocolQosPolicy, 633
- rtps\_reliable\_writer
  - DDS\_DataWriterProtocolQosPolicy, 677
- rtps\_reserved\_port\_mask
  - DDS\_WireProtocolQosPolicy, 1250
- rtps\_vendor\_id
  - DDS\_ParticipantBuiltinTopicData, 980
  - DDS\_PublicationBuiltinTopicData, 1017
  - DDS\_SubscriptionBuiltinTopicData, 1115
- rtps\_well\_known\_ports
  - DDS\_WireProtocolQosPolicy, 1249
- Sample
  - connext::Sample< T >, 1913
- Sample Flags, 473
  - DDS\_DISCOVERY\_SERVICE\_SAMPLE, 475
  - DDS\_INTERMEDIATE\_REPLY\_SEQUENCE\_SAMPLE, 475
  - DDS\_INTERMEDIATE\_TOPIC\_QUERY\_SAMPLE, 475
  - DDS\_LAST\_SHARED\_READER\_QUEUE\_SAMPLE, 475
  - DDS\_REDELIVERED\_SAMPLE, 475
  - DDS\_REPLICATE\_SAMPLE, 475
  - DDS\_SampleFlag, 474
  - DDS\_SampleFlagBits, 474, 475
  - DDS\_WRITER\_REMOVED\_BATCH\_SAMPLE, 475
- Sample States, 155
  - DDS\_ANY\_SAMPLE\_STATE, 157
  - DDS\_NOT\_READ\_SAMPLE\_STATE, 157
  - DDS\_READ\_SAMPLE\_STATE, 157
  - DDS\_SampleStateKind, 156
  - DDS\_SampleStateMask, 156
- sample\_count
  - DDS\_DataReaderCacheStatus, 625
  - DDS\_DataWriterCacheStatus, 672
- sample\_count\_peak
  - DDS\_DataReaderCacheStatus, 624
  - DDS\_DataWriterCacheStatus, 672
- sample\_identity
  - DDS\_AcknowledgmentInfo, 587
- sample\_rank
  - DDS\_SampleInfo, 1088
- sample\_state
  - DDS\_SampleInfo, 1085
- sample\_states
  - DDS\_ReadConditionParams, 1035
- SampleProcessor, 550
- SampleRef
  - connext::SampleRef< T >, 1921, 1922
- samples\_per\_app\_ack
  - DDS\_RtpsReliableReaderProtocol\_t, 1060
- samples\_per\_period
  - DDS\_TopicQueryDispatchQosPolicy, 1142
- samples\_per\_virtual\_heartbeat
  - DDS\_RtpsReliableWriterProtocol\_t, 1066
- scheduling\_policy
  - DDS\_FlowControllerProperty\_t, 913
- scope
  - DDS\_DestinationOrderQosPolicy, 711
- sec
  - DDS\_Duration\_t, 775
  - DDS\_Time\_t, 1125
- secure\_volatile\_reader
  - DDS\_DiscoveryConfigQosPolicy, 728
- secure\_volatile\_writer
  - DDS\_DiscoveryConfigQosPolicy, 727
- secure\_volatile\_writer\_publish\_mode

- DDS\_DiscoveryConfigQosPolicy, 728
- security\_event\_forwarding\_level
  - DDS\_MonitoringLoggingForwardingSettings, 957
- send\_blocking
  - NDDS\_Transport\_UDPv4\_Property\_t, 1793
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1802
  - NDDS\_Transport\_UDPv6\_Property\_t, 1812
- send\_ping
  - NDDS\_Transport\_UDPv4\_Property\_t, 1795
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1803
  - NDDS\_Transport\_UDPv6\_Property\_t, 1814
- send\_reply
  - connext::Replier< TReq, TRep >, 1874, 1875
- send\_request
  - connext::Requester< TReq, TRep >, 1892, 1893
- send\_socket\_buffer\_size
  - NDDS\_Transport\_UDPv4\_Property\_t, 1790
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1799
  - NDDS\_Transport\_UDPv6\_Property\_t, 1809
- send\_window\_decrease\_factor
  - DDS\_RtpsReliableWriterProtocol\_t, 1074
- send\_window\_increase\_factor
  - DDS\_RtpsReliableWriterProtocol\_t, 1074
- send\_window\_size
  - DDS\_DataWriterProtocolStatus, 686
- send\_window\_update\_period
  - DDS\_RtpsReliableWriterProtocol\_t, 1073
- sent\_ack\_bytes
  - DDS\_DataReaderProtocolStatus, 640
- sent\_ack\_bytes\_change
  - DDS\_DataReaderProtocolStatus, 640
- sent\_ack\_count
  - DDS\_DataReaderProtocolStatus, 640
- sent\_ack\_count\_change
  - DDS\_DataReaderProtocolStatus, 640
- sent\_gap\_bytes
  - DDS\_DataWriterProtocolStatus, 685
- sent\_gap\_bytes\_change
  - DDS\_DataWriterProtocolStatus, 685
- sent\_gap\_count
  - DDS\_DataWriterProtocolStatus, 685
- sent\_gap\_count\_change
  - DDS\_DataWriterProtocolStatus, 685
- sent\_heartbeat\_bytes
  - DDS\_DataWriterProtocolStatus, 682
- sent\_heartbeat\_bytes\_change
  - DDS\_DataWriterProtocolStatus, 682
- sent\_heartbeat\_count
  - DDS\_DataWriterProtocolStatus, 682
- sent\_heartbeat\_count\_change
  - DDS\_DataWriterProtocolStatus, 682
- sent\_nack\_bytes
  - DDS\_DataReaderProtocolStatus, 641
- sent\_nack\_bytes\_change
  - DDS\_DataReaderProtocolStatus, 641
- sent\_nack\_count
  - DDS\_DataReaderProtocolStatus, 640
- sent\_nack\_count\_change
  - DDS\_DataReaderProtocolStatus, 640
- sent\_nack\_fragment\_bytes
  - DDS\_DataReaderProtocolStatus, 644
- sent\_nack\_fragment\_count
  - DDS\_DataReaderProtocolStatus, 644
- Sequence Number Support, 331
  - DDS\_AUTO\_SEQUENCE\_NUMBER, 333
  - DDS\_SEQUENCE\_NUMBER\_MAX, 333
  - DDS\_SEQUENCE\_NUMBER\_UNKNOWN, 332
  - DDS\_SEQUENCE\_NUMBER\_ZERO, 332
  - DDS\_SequenceNumber\_t, 332
- Sequence Support, 550
- sequence\_number
  - WriteParams, 478
- SequenceBuilders.hpp, 1989
- Sequenceliterator
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1930
- Sequenceliterator.hpp, 1998
- SequenceOffsets.hpp, 2001
- serialization
  - DDS\_DynamicDataTypeProperty\_t, 897
- serialize\_data\_to\_cdr\_buffer
  - DDSKeyedOctetsTypeSupport, 1500
  - DDSKeyedStringTypeSupport, 1525
  - DDSOctetsTypeSupport, 1546
  - DDSStringTypeSupport, 1590
  - FooTypeSupport, 1721
- serialize\_data\_to\_cdr\_buffer\_ex
  - DDSKeyedOctetsTypeSupport, 1500
  - DDSKeyedStringTypeSupport, 1525
  - DDSOctetsTypeSupport, 1546
  - DDSStringTypeSupport, 1591
  - FooTypeSupport, 1722
- serialize\_key\_with\_dispose
  - DDS\_DataWriterProtocolQosPolicy, 676
- serialized\_type\_object\_dynamic\_allocation\_threshold
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 760
- SERVICE, 438
  - DDS\_DATABASE\_INTEGRATION\_SERVICE\_QOS, 439
  - DDS\_NO\_SERVICE\_QOS, 439
  - DDS\_OBSERVABILITY\_COLLECTOR\_SERVICE\_QOS, 439
  - DDS\_PERSISTENCE\_SERVICE\_QOS, 439
  - DDS\_QUEUEING\_SERVICE\_QOS, 439
  - DDS\_RECORDING\_SERVICE\_QOS, 439
  - DDS\_REPLAY\_SERVICE\_QOS, 439
  - DDS\_ROUTING\_SERVICE\_QOS, 439
  - DDS\_SERVICE\_QOS\_POLICY\_NAME, 439

- DDS\_ServiceQosPolicyKind, 439
- DDS\_WEB\_INTEGRATION\_SERVICE\_QOS, 439
- service
  - DDS\_DataReaderQos, 652
  - DDS\_DataWriterQos, 696
  - DDS\_DomainParticipantQos, 746
  - DDS\_PublicationBuiltinTopicData, 1017
  - DDS\_SubscriptionBuiltinTopicData, 1115
- service\_cleanup\_delay
  - DDS\_DurabilityServiceQosPolicy, 773
- service\_forwarding\_level
  - DDS\_MonitoringLoggingForwardingSettings, 957
- service\_id
  - DDS\_ServiceRequest, 1098
  - DDS\_ServiceRequestAcceptedStatus, 1100
- service\_name
  - connext::ReplierParams< TReq, TRep >, 1883
  - connext::RequesterParams, 1909
  - connext::SimpleReplierParams< TReq, TRep >, 1940
- service\_request\_reader
  - DDS\_DiscoveryConfigQosPolicy, 725
- service\_request\_writer
  - DDS\_DiscoveryConfigQosPolicy, 724
- service\_request\_writer\_data\_lifecycle
  - DDS\_DiscoveryConfigQosPolicy, 725
- service\_request\_writer\_publish\_mode
  - DDS\_DiscoveryConfigQosPolicy, 725
- ServiceRequest Built-in Topic, 300
  - DDS\_INSTANCE\_STATE\_SERVICE\_REQUEST\_ID, 302
  - DDS\_LOCATOR\_REACHABILITY\_SERVICE\_REQUEST\_ID, 302
  - DDS\_MONITORING\_LIBRARY\_COMMAND\_SERVICE\_REQUEST\_ID, 302
  - DDS\_MONITORING\_LIBRARY\_REPLY\_SERVICE\_REQUEST\_ID, 302
  - DDS\_SERVICE\_REQUEST\_TOPIC\_NAME, 303
  - DDS\_ServiceRequest, 301
  - DDS\_TOPIC\_QUERY\_SERVICE\_REQUEST\_ID, 302
  - DDS\_UNKNOWN\_SERVICE\_REQUEST\_ID, 302
- set
  - rti::flat::PrimitiveOffset< T >, 1864
- set\_allocate\_optional\_members
  - DDS\_TypeAllocationParams\_t, 1164
- set\_allocate\_pointers
  - DDS\_TypeAllocationParams\_t, 1163
- set\_attribute\_mask
  - Activity Context, 534
- set\_boolean
  - DDS\_DynamicData, 857
- set\_boolean\_array
  - DDS\_DynamicData, 872
- set\_boolean\_seq
  - DDS\_DynamicData, 884
- set\_builtin\_transport\_property
  - NDDSTransportSupport, 1838
- set\_cdr\_buffer
  - DDS\_DynamicData, 797
- set\_char
  - DDS\_DynamicData, 858
- set\_char\_array
  - DDS\_DynamicData, 873
- set\_char\_seq
  - DDS\_DynamicData, 885
- set\_complex\_member
  - DDS\_DynamicData, 865
- set\_data
  - connext::SampleRef< T >, 1924
  - connext::WriteSampleRef< T >, 1954
- set\_default\_datareader\_qos
  - DDSDomainParticipant, 1361
  - DDSSubscriber, 1595
- set\_default\_datareader\_qos\_with\_profile
  - DDSDomainParticipant, 1362
  - DDSSubscriber, 1596
- set\_default\_datawriter\_qos
  - DDSDomainParticipant, 1359
  - DDSPublisher, 1554
- set\_default\_datawriter\_qos\_with\_profile
  - DDSDomainParticipant, 1359
  - DDSPublisher, 1555
- set\_default\_flowcontroller\_property
  - DDSDomainParticipant, 1363
- set\_default\_library
  - DDSDomainParticipant, 1367
- set\_default\_main\_participant\_factory
  - DDSDomainParticipantFactory, 1433
- set\_default\_qos
  - DDSPublisher, 1555
  - DDSSubscriber, 1597
- set\_default\_params
  - NDDUtilityNetworkCapture, 1848
- set\_default\_participant\_qos
  - DDSDomainParticipantFactory, 1430
- set\_default\_participant\_qos\_with\_profile
  - DDSDomainParticipantFactory, 1431
- set\_default\_profile
  - DDSDomainParticipant, 1368
  - DDSDomainParticipantFactory, 1434
- set\_default\_publisher\_qos
  - DDSPublisher, 1556
- set\_default\_publisher\_qos\_with\_profile
  - DDSSubscriber, 1598
- set\_default\_publisher\_qos\_with\_profile
  - DDSDomainParticipant, 1372
- set\_default\_publisher\_qos\_with\_profile
  - DDSDomainParticipant, 1372
- set\_default\_subscriber\_qos
  - DDSDomainParticipant, 1374
- set\_default\_subscriber\_qos\_with\_profile
  - DDSDomainParticipant, 1374

- DDSDomainParticipant, 1375
- set\_default\_topic\_qos
  - DDSDomainParticipant, 1369
- set\_default\_topic\_qos\_with\_profile
  - DDSDomainParticipant, 1370
- set\_delete\_optional\_members
  - DDS\_TypeDeallocationParams\_t, 1232
- set\_delete\_pointers
  - DDS\_TypeDeallocationParams\_t, 1231
- set\_dns\_tracker\_polling\_period
  - DDSDomainParticipant, 1412
- set\_double
  - DDS\_DynamicData, 857
- set\_double\_array
  - DDS\_DynamicData, 871
- set\_double\_seq
  - DDS\_DynamicData, 884
- set\_element
  - rti::flat::AbstractPrimitiveList< T >, 583
- set\_enabled\_statuses
  - DDSStatusCondition, 1579
- set\_expression
  - DDSContentFilteredTopic, 1286
- set\_expression\_parameters
  - DDSContentFilteredTopic, 1285
  - DDSMultiTopic, 1532
- set\_float
  - DDS\_DynamicData, 856
- set\_float\_array
  - DDS\_DynamicData, 870
- set\_float\_seq
  - DDS\_DynamicData, 883
- set\_handler
  - DDSCondition, 1277
- set\_info
  - connext::SampleRef< T >, 1925
  - connext::WriteSampleRef< T >, 1955
- set\_int8
  - DDS\_DynamicData, 864
- set\_int8\_array
  - DDS\_DynamicData, 878
- set\_int8\_seq
  - DDS\_DynamicData, 890
- set\_listener
  - DDSDataReader, 1309
  - DDSDataWriter, 1339
  - DDSDomainParticipant, 1413
  - DDSPublisher, 1570
  - DDSSubscriber, 1611
  - DDSTopic, 1621
- set\_long
  - DDS\_DynamicData, 853
- set\_long\_array
  - DDS\_DynamicData, 867
- set\_long\_seq
  - DDS\_DynamicData, 880
- set\_longdouble
  - DDS\_DynamicData, 861
- set\_longdouble\_array
  - DDS\_DynamicData, 876
- set\_longdouble\_seq
  - DDS\_DynamicData, 888
- set\_longlong
  - DDS\_DynamicData, 859
- set\_longlong\_array
  - DDS\_DynamicData, 874
- set\_longlong\_seq
  - DDS\_DynamicData, 887
- set\_octet
  - DDS\_DynamicData, 859
- set\_octet\_array
  - DDS\_DynamicData, 874
- set\_octet\_seq
  - DDS\_DynamicData, 886
- set\_output\_device
  - NDDSSConfigLogger, 1826
- set\_output\_file
  - NDDSSConfigLogger, 1825
- set\_output\_file\_set
  - NDDSSConfigLogger, 1825
- set\_print\_format
  - NDDSSConfigLogger, 1827
- set\_print\_format\_by\_log\_level
  - NDDSSConfigLogger, 1827
- set\_property
  - DDSDataReader, 1308
  - DDSDataWriter, 1337
  - DDSDomainParticipant, 1407
  - DDSFlowController, 1469
  - DDSWaitSet, 1636
- set\_qos
  - DDSDataReader, 1306
  - DDSDataWriter, 1336
  - DDSDomainParticipant, 1408
  - DDSDomainParticipantFactory, 1446
  - DDSPublisher, 1568
  - DDSSubscriber, 1609
  - DDSTopic, 1619
- set\_qos\_with\_profile
  - DDSDataReader, 1307
  - DDSDataWriter, 1337
  - DDSDomainParticipant, 1408
  - DDSPublisher, 1569
  - DDSSubscriber, 1610
  - DDSTopic, 1620
- set\_query\_parameters
  - DDSQueryCondition, 1574
- set\_short

- DDS\_DynamicData, 854
- set\_short\_array
  - DDS\_DynamicData, 868
- set\_short\_seq
  - DDS\_DynamicData, 880
- set\_string
  - DDS\_DynamicData, 862
  - rti::flat::StringBuilder, 1944
- set\_thread\_factory
  - DDSDomainParticipantFactory, 1453
- set\_trigger\_value
  - DDSGuardCondition, 1473
- set\_uint8
  - DDS\_DynamicData, 864
- set\_uint8\_array
  - DDS\_DynamicData, 879
- set\_uint8\_seq
  - DDS\_DynamicData, 891
- set\_ulong
  - DDS\_DynamicData, 854
- set\_ulong\_array
  - DDS\_DynamicData, 868
- set\_ulong\_seq
  - DDS\_DynamicData, 881
- set\_ulonglong
  - DDS\_DynamicData, 860
- set\_ulonglong\_array
  - DDS\_DynamicData, 875
- set\_ulonglong\_seq
  - DDS\_DynamicData, 888
- set\_ushort
  - DDS\_DynamicData, 855
- set\_ushort\_array
  - DDS\_DynamicData, 869
- set\_ushort\_seq
  - DDS\_DynamicData, 882
- set\_verbosity
  - NDDSConfigLogger, 1824
- set\_verbosity\_by\_category
  - NDDSConfigLogger, 1825
- set\_wchar
  - DDS\_DynamicData, 862
- set\_wchar\_array
  - DDS\_DynamicData, 877
- set\_wchar\_seq
  - DDS\_DynamicData, 889
- set\_wstring
  - DDS\_DynamicData, 863
- set\_xtypes\_mask
  - NDDSConfigCompliance, 1821
- Shared Memory Transport, 260
  - NDDS\_TRANSPORT\_SHMEM\_ADDRESS\_BIT\_COUNT, 264
  - NDDS\_Transport\_Shmem\_create, 266
  - NDDS\_TRANSPORT\_SHMEM\_GATHER\_SEND\_BUFFER\_COUNT, 264
  - NDDS\_TRANSPORT\_SHMEM\_MAJOR\_AFTER\_BUG\_14240\_FIX, 265
  - NDDS\_TRANSPORT\_SHMEM\_MESSAGE\_SIZE\_MAX\_DEFAULT, 264
  - NDDS\_Transport\_Shmem\_new, 265
  - NDDS\_TRANSPORT\_SHMEM\_PROPERTIES\_BITMAP\_DEFAULT, 264
  - NDDS\_TRANSPORT\_SHMEM\_PROPERTY\_DEFAULT, 265
  - NDDS\_TRANSPORT\_SHMEM\_RECEIVE\_BUFFER\_SIZE\_DEFAULT, 265
  - NDDS\_TRANSPORT\_SHMEM\_RECEIVED\_MESSAGE\_COUNT\_MAX, 265
- shared\_secret
  - DDS\_ParticipantTrustKeyEstablishmentAlgorithmInfo, 987
- shmem\_ref\_settings
  - DDS\_DataWriterTransferModeQosPolicy, 706
- shmem\_ref\_transfer\_mode\_attached\_segment\_allocation
  - DDS\_DataReaderResourceLimitsQosPolicy, 665
- shmem\_ref\_transfer\_mode\_max\_segments
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 766
- shutdown\_cleanup\_period
  - DDS\_DatabaseQosPolicy, 621
- shutdown\_timeout
  - DDS\_DatabaseQosPolicy, 620
- signature
  - DDS\_ParticipantTrustAlgorithmInfo, 984
- SimpleReplier
  - connext::SimpleReplier< TReq, TRep >, 1936
- SimpleReplierParams
  - connext::SimpleReplierParams< TReq, TRep >, 1940
- skip\_deserialization
  - DDS\_DynamicDataTypeSerializationProperty\_t, 899
- sleep
  - NDDUtility, 1840
- source\_guid
  - DDS\_SampleInfo, 1091
  - DDS\_WriteParams\_t, 1254
- source\_timestamp
  - DDS\_SampleInfo, 1086
  - DDS\_WriteParams\_t, 1252
- source\_timestamp\_resolution
  - DDS\_BatchQosPolicy, 602
- source\_timestamp\_tolerance
  - DDS\_DestinationOrderQosPolicy, 711
- spin
  - NDDUtility, 1840
- stack\_size
  - DDS\_ThreadSettings\_t, 1124

- start
  - DDSAsyncWaitSet, 1265
  - NDDUtilityNetworkCapture, 1849–1851
- start\_with\_completion\_token
  - DDSAsyncWaitSet, 1265
- status
  - NDDS\_Transport\_Interface\_t, 1776
- Status Kinds, 337
  - DDS\_DATA\_AVAILABLE\_STATUS, 345
  - DDS\_DATA\_ON\_READERS\_STATUS, 345
  - DDS\_DATA\_READER\_CACHE\_STATUS, 350
  - DDS\_DATA\_READER\_PROTOCOL\_STATUS, 350
  - DDS\_DATA\_WRITER\_APPLICATION\_ACKNOWLEDGMENT\_STATUS, 348
  - DDS\_DATA\_WRITER\_CACHE\_STATUS, 349
  - DDS\_DATA\_WRITER\_INSTANCE\_REPLACED\_STATUS, 348
  - DDS\_DATA\_WRITER\_PROTOCOL\_STATUS, 349
  - DDS\_DATA\_WRITER\_SAMPLE\_REMOVED\_STATUS, 350
  - DDS\_INCONSISTENT\_TOPIC\_STATUS, 343
  - DDS\_INVALID\_LOCAL\_IDENTITY\_ADVANCE\_NOTICE\_STATUS, 347
  - DDS\_LIVELINESS\_CHANGED\_STATUS, 346
  - DDS\_LIVELINESS\_LOST\_STATUS, 346
  - DDS\_OFFERED\_DEADLINE\_MISSED\_STATUS, 343
  - DDS\_OFFERED\_INCOMPATIBLE\_QOS\_STATUS, 344
  - DDS\_PUBLICATION\_MATCHED\_STATUS, 347
  - DDS\_RELIABLE\_READER\_ACTIVITY\_CHANGED\_STATUS, 349
  - DDS\_RELIABLE\_WRITER\_CACHE\_CHANGED\_STATUS, 349
  - DDS\_REQUESTED\_DEADLINE\_MISSED\_STATUS, 344
  - DDS\_REQUESTED\_INCOMPATIBLE\_QOS\_STATUS, 344
  - DDS\_SAMPLE\_LOST\_STATUS, 345
  - DDS\_SAMPLE\_REJECTED\_STATUS, 345
  - DDS\_SERVICE\_REQUEST\_ACCEPTED\_STATUS, 348
  - DDS\_STATUS\_MASK\_ALL, 341
  - DDS\_STATUS\_MASK\_NONE, 341
  - DDS\_StatusKind, 342
  - DDS\_StatusMask, 341
  - DDS\_SUBSCRIPTION\_MATCHED\_STATUS, 347
- stop
  - DDSAsyncWaitSet, 1266
  - NDDUtilityNetworkCapture, 1852
- stop\_with\_completion\_token
  - DDSAsyncWaitSet, 1267
- storage\_settings
  - DDS\_DurabilityQosPolicy, 771
- stored\_size
  - DDS\_DynamicDataInfo, 892
- Stream Kinds, 161
  - DDS\_LIVE\_STREAM, 162
  - DDS\_StreamKind, 162
  - DDS\_StreamKindMask, 162
  - DDS\_TOPIC\_QUERY\_STREAM, 162
- Stream.hpp, 2012
- stream\_kinds
  - DDS\_ReadConditionParams, 1035
- String Built-in Type, 312
- String Support, 551
  - DDS\_String\_alloc, 553
  - DDS\_String\_dup, 553
  - DDS\_String\_free, 554
  - DDS\_String\_replace, 554
  - DDS\_Wstring\_alloc, 555
  - DDS\_Wstring\_copy, 556
  - DDS\_Wstring\_copy\_and\_widen, 556
  - DDS\_Wstring\_dup, 557
  - DDS\_Wstring\_dup\_and\_widen, 557
  - DDS\_Wstring\_free, 557
  - DDS\_Wstring\_length, 555
- string\_profile
  - DDS\_ProfileQosPolicy, 1005
- subscriber
  - connext::ReplierParams< TReq, TRep >, 1885
  - connext::RequesterParams, 1911
  - connext::SimpleReplierParams< TReq, TRep >, 1942
- Subscriber Use Cases, 208
- subscriber\_group\_data\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 758
- subscriber\_key
  - DDS\_SubscriptionBuiltinTopicData, 1114
- subscriber\_name
  - DDS\_SubscriberQos, 1108
- Subscribers, 126
  - DDS\_DATAREADER\_QOS\_DEFAULT, 132
  - DDS\_DATAREADER\_QOS\_USE\_TOPIC\_QOS, 133
  - DDS\_SubscriberQos\_equals, 127
- print, 128
- to\_string, 128–132
- Subscription Built-in Topics, 298
  - DDS\_SUBSCRIPTION\_TOPIC\_NAME, 300
  - DDS\_SubscriptionBuiltinTopicData, 299
- Subscription Example, 200
- Subscription Module, 124
- subscription\_handle
  - DDS\_AcknowledgmentInfo, 587
- subscription\_name
  - DDS\_DataReaderQos, 652
  - DDS\_SubscriptionBuiltinTopicData, 1116

- subscription\_reader
  - DDS\_DiscoveryConfigQosPolicy, 718
- subscription\_reader\_resource\_limits
  - DDS\_DiscoveryConfigQosPolicy, 718
- subscription\_writer
  - DDS\_DiscoveryConfigQosPolicy, 720
- subscription\_writer\_data\_lifecycle
  - DDS\_DiscoveryConfigQosPolicy, 720
- subscription\_writer\_publish\_mode
  - DDS\_DiscoveryConfigQosPolicy, 723
- supported\_mask
  - DDS\_EndpointTrustInterceptorAlgorithmInfo, 902
  - DDS\_ParticipantTrustInterceptorAlgorithmInfo, 986
  - DDS\_TrustAlgorithmRequirements, 1162
- suspend\_publications
  - DDSPublisher, 1562
- synchronization\_kind
  - DDS\_PersistentStorageSettings, 994
- System Properties, 196
- SYSTEM\_RESOURCE\_LIMITS, 440
  - DDS\_SYSTEMRESOURCELIMITS\_QOS\_POLICY\_NAME, 440
- tags
  - DDS\_DataTags, 670
- take
  - DDSKeyedOctetsDataReader, 1476
  - DDSKeyedStringDataReader, 1504
  - DDSOctetsDataReader, 1534
  - DDSStringDataReader, 1581
  - FooDataReader, 1652
- take\_discovery\_snapshot
  - DDSDataReader, 1311
  - DDSDataWriter, 1340, 1341
  - DDSDomainParticipant, 1424, 1425
- take\_heap\_snapshot
  - NDDSUtility, 1842
  - NDDSUtilityHeapMonitoring, 1844
- take\_instance
  - DDSKeyedOctetsDataReader, 1478
  - DDSKeyedStringDataReader, 1506
  - FooDataReader, 1663
- take\_instance\_w\_condition
  - DDSKeyedOctetsDataReader, 1478
  - DDSKeyedStringDataReader, 1506
  - FooDataReader, 1665
- take\_next\_instance
  - DDSKeyedOctetsDataReader, 1479
  - DDSKeyedStringDataReader, 1507
  - FooDataReader, 1668
- take\_next\_instance\_w\_condition
  - DDSKeyedOctetsDataReader, 1480
  - DDSKeyedStringDataReader, 1508
  - FooDataReader, 1671
- take\_next\_sample
  - DDSKeyedOctetsDataReader, 1477
  - DDSKeyedStringDataReader, 1505
  - DDSOctetsDataReader, 1535
  - DDSStringDataReader, 1582
  - FooDataReader, 1660
- take\_replies
  - connext::Requester< TReq, TRep >, 1899, 1901, 1903
- take\_reply
  - connext::Requester< TReq, TRep >, 1898, 1900, 1901
- take\_request
  - connext::Replier< TReq, TRep >, 1878
- take\_requests
  - connext::Replier< TReq, TRep >, 1878
- take\_w\_condition
  - DDSKeyedOctetsDataReader, 1476
  - DDSKeyedStringDataReader, 1504
  - DDSOctetsDataReader, 1534
  - DDSStringDataReader, 1582
  - FooDataReader, 1658
- telemetry\_data
  - DDS\_MonitoringQosPolicy, 963
- text
  - NDDS\_Config\_LogMessage, 1772
- thread
  - DDS\_AsynchronousPublisherQosPolicy, 592
  - DDS\_DatabaseQosPolicy, 620
  - DDS\_EventQosPolicy, 909
  - DDS\_MonitoringEventDistributionSettings, 953
  - DDS\_MonitoringLoggingDistributionSettings, 955
  - DDS\_MonitoringPeriodicDistributionSettings, 961
  - DDS\_ReceiverPoolQosPolicy, 1039
- Thread Settings, 350
  - DDS\_THREAD\_SETTINGS\_CANCEL\_ASYNCHRONOUS, 352
  - DDS\_THREAD\_SETTINGS\_CPU\_NO\_ROTATION, 353
  - DDS\_THREAD\_SETTINGS\_CPU\_RR\_ROTATION, 353
  - DDS\_THREAD\_SETTINGS\_FLOATING\_POINT, 352
  - DDS\_THREAD\_SETTINGS\_KIND\_MASK\_DEFAULT, 351
  - DDS\_THREAD\_SETTINGS\_PRIORITY\_ENFORCE, 352
  - DDS\_THREAD\_SETTINGS\_REALTIME\_PRIORITY, 352
  - DDS\_THREAD\_SETTINGS\_STDIO, 352
  - DDS\_ThreadSettingsCpuRotationKind, 352
  - DDS\_ThreadSettingsKind, 352
  - DDS\_ThreadSettingsKindMask, 351
- thread\_name\_prefix



- DDS\_AsyncWaitSetProperty\_t, 595
- NDDS\_Transport\_Property\_t, 1783
- thread\_pool\_size
  - DDS\_AsyncWaitSetProperty\_t, 594
- thread\_safe\_write
  - DDS\_BatchQosPolicy, 603
- thread\_settings
  - DDS\_AsyncWaitSetProperty\_t, 595
- Time Support, 320
  - DDS\_DURATION\_AUTO, 327
  - DDS\_DURATION\_AUTO\_NSEC, 327
  - DDS\_DURATION\_AUTO\_SEC, 326
  - DDS\_DURATION\_INFINITE, 326
  - DDS\_DURATION\_INFINITE\_NSEC, 326
  - DDS\_DURATION\_INFINITE\_SEC, 326
  - DDS\_Duration\_is\_auto, 325
  - DDS\_Duration\_is\_infinite, 324
  - DDS\_Duration\_is\_zero, 325
  - DDS\_DURATION\_ZERO, 327
  - DDS\_DURATION\_ZERO\_NSEC, 327
  - DDS\_DURATION\_ZERO\_SEC, 327
  - DDS\_TIME\_INVALID, 326
  - DDS\_TIME\_INVALID\_NSEC, 326
  - DDS\_TIME\_INVALID\_SEC, 325
  - DDS\_Time\_is\_invalid, 324
  - DDS\_Time\_is\_zero, 324
  - DDS\_TIME\_MAX, 325
  - DDS\_TIME\_ZERO, 322
  - from\_micros, 322, 323
  - from\_millis, 322, 323
  - from\_nanos, 323
  - from\_seconds, 323, 324
- TIME\_BASED\_FILTER, 440
  - DDS\_TIMEBASEDFILTER\_QOS\_POLICY\_NAME, 441
- time\_based\_filter
  - DDS\_DataReaderQos, 650
  - DDS\_SubscriptionBuiltinTopicData, 1112
- time\_based\_filter\_dropped\_sample\_count
  - DDS\_DataReaderCacheStatus, 626
- timestamp
  - NDDS\_Config\_LogMessage, 1773
- to\_array
  - FooSeq, 1703
- to\_cdr\_buffer
  - DDS\_DynamicData, 798
- to\_cdr\_buffer\_ex
  - DDS\_DynamicData, 799
- to\_pointer
  - Cookie, 473
- to\_string
  - Data Writers, 113–117
  - DataReaders, 143–146
  - DDS\_DynamicData, 799
  - DDS\_TypeCode, 1208, 1209
  - DomainParticipantFactory, 43–47
  - DomainParticipants, 52–55
  - NDDSConfigVersion, 1832
  - Publishers, 105–109
  - Subscribers, 128–132
  - Topics, 65–69
- token\_bucket
  - DDS\_FlowControllerProperty\_t, 913
- tokens\_added\_per\_period
  - DDS\_FlowControllerTokenBucketProperty\_t, 915
- tokens\_leaked\_per\_period
  - DDS\_FlowControllerTokenBucketProperty\_t, 915
- tolerance\_source\_timestamp\_dropped\_sample\_count
  - DDS\_DataReaderCacheStatus, 625
- Topic Built-in Topics, 295
  - DDS\_TOPIC\_TOPIC\_NAME, 297
  - DDS\_TopicBuiltinTopicData, 296
- Topic Module, 61
- Topic Queries, 151
  - DDS\_TOPIC\_QUERY\_SELECTION\_KIND\_CONTINUOUS, 155
  - DDS\_TOPIC\_QUERY\_SELECTION\_KIND\_HISTORY\_SNAPSHOT, 155
  - DDS\_TOPIC\_QUERY\_SELECTION\_SELECT\_ALL, 155
  - DDS\_TOPIC\_QUERY\_SELECTION\_USE\_READER\_CONTENT\_FILTER, 155
  - DDS\_TopicQueryData, 154
  - DDS\_TopicQuerySelection, 154
  - DDS\_TopicQuerySelectionKind, 154
- Topic Use Cases, 203
- TOPIC\_DATA, 441
  - DDS\_TOPICDATA\_QOS\_POLICY\_NAME, 442
- topic\_data
  - DDS\_PublicationBuiltinTopicData, 1015
  - DDS\_SubscriptionBuiltinTopicData, 1113
  - DDS\_TopicBuiltinTopicData, 1132
  - DDS\_TopicQos, 1137
- topic\_data\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 758
- topic\_expression
  - DDS\_TransportMulticastMapping\_t, 1147
- topic\_name
  - DDS\_PublicationBuiltinTopicData, 1012
  - DDS\_SubscriptionBuiltinTopicData, 1110
  - DDS\_TopicQueryData, 1140
- topic\_query\_data\_from\_service\_request
  - DDSTopicQueryHelper, 1628
- TOPIC\_QUERY\_DISPATCH, 442
  - DDS\_TOPICQUERYDISPATCH\_QOS\_POLICY\_NAME, 442
- topic\_query\_dispatch

- DDS\_DataWriterQos, 697
- topic\_query\_guid
  - DDS\_SampleInfo, 1092
- topic\_query\_publication\_thread
  - DDS\_AsynchronousPublisherQosPolicy, 593
- topic\_query\_selection
  - DDS\_TopicQueryData, 1140
- Topics, 62
  - DDS\_DEFAULT\_PRINT\_FORMAT, 65
  - DDS\_JSON\_PRINT\_FORMAT, 65
  - DDS\_PRINT\_FORMAT\_PROPERTY\_DEFAULT, 70
  - DDS\_PrintFormatKind, 64
  - DDS\_PrintFormatProperty, 64
  - DDS\_TopicQos\_equals, 65
  - DDS\_XML\_PRINT\_FORMAT, 65
  - print, 65
  - to\_string, 65–69
- total\_count
  - DDS\_InconsistentTopicStatus, 922
  - DDS\_LivelinessLostStatus, 935
  - DDS\_OfferedDeadlineMissedStatus, 970
  - DDS\_OfferedIncompatibleQosStatus, 972
  - DDS\_PublicationMatchedStatus, 1020
  - DDS\_ReliableWriterCacheEventCount, 1049
  - DDS\_RequestedDeadlineMissedStatus, 1050
  - DDS\_RequestedIncompatibleQosStatus, 1051
  - DDS\_SampleLostStatus, 1093
  - DDS\_SampleRejectedStatus, 1094
  - DDS\_ServiceRequestAcceptedStatus, 1100
  - DDS\_SubscriptionMatchedStatus, 1118
- total\_count\_change
  - DDS\_InconsistentTopicStatus, 922
  - DDS\_LivelinessLostStatus, 935
  - DDS\_OfferedDeadlineMissedStatus, 971
  - DDS\_OfferedIncompatibleQosStatus, 972
  - DDS\_PublicationMatchedStatus, 1021
  - DDS\_ReliableWriterCacheEventCount, 1049
  - DDS\_RequestedDeadlineMissedStatus, 1050
  - DDS\_RequestedIncompatibleQosStatus, 1052
  - DDS\_SampleLostStatus, 1093
  - DDS\_SampleRejectedStatus, 1095
  - DDS\_ServiceRequestAcceptedStatus, 1100
  - DDS\_SubscriptionMatchedStatus, 1119
- total\_samples\_dropped\_by\_instance\_replacement
  - DDS\_DataReaderCacheStatus, 627
- trace\_file\_name
  - DDS\_PersistentStorageSettings, 993
- traffic
  - NDDS\_Utility\_NetworkCaptureParams\_t, 1818
- transfer\_mode
  - DDS\_DataWriterQos, 697
- Transport Address, 252
  - NDDS\_Transport\_Address\_from\_string, 256
  - NDDS\_TRANSPORT\_ADDRESS\_INVALID, 258
  - NDDS\_TRANSPORT\_ADDRESS\_INVALID\_INITIALIZER, 254
  - NDDS\_Transport\_Address\_is\_ipv4, 257
  - NDDS\_Transport\_Address\_is\_multicast, 257
  - NDDS\_Transport\_Address\_print, 256
  - NDDS\_TRANSPORT\_ADDRESS\_STRING\_BUFFER\_SIZE, 254
  - NDDS\_Transport\_Address\_to\_string, 255
  - NDDS\_Transport\_Address\_to\_string\_with\_protocol\_family\_format, 255
  - Transport Plugins Configuration, 245
  - NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_DEFAULT, 248
  - NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_INCREMENTAL\_COUNT, 248
  - NDDS\_TRANSPORT\_ALLOCATION\_SETTINGS\_MAX\_COUNT\_UNLIMITED, 248
  - NDDS\_TRANSPORT\_CLASSID\_INVALID, 249
  - NDDS\_TRANSPORT\_CLASSID\_RESERVED\_RANGE, 251
  - NDDS\_TRANSPORT\_CLASSID\_SHMEM, 249
  - NDDS\_TRANSPORT\_CLASSID\_SHMEM\_510, 249
  - NDDS\_Transport\_ClassId\_t, 252
  - NDDS\_TRANSPORT\_CLASSID\_TCPV4\_LAN, 250
  - NDDS\_TRANSPORT\_CLASSID\_TCPV4\_WAN, 250
  - NDDS\_TRANSPORT\_CLASSID\_TLSV4\_LAN, 250
  - NDDS\_TRANSPORT\_CLASSID\_TLSV4\_WAN, 251
  - NDDS\_TRANSPORT\_CLASSID\_UDPv4, 249
  - NDDS\_TRANSPORT\_CLASSID\_UDPv4\_WAN, 251
  - NDDS\_TRANSPORT\_CLASSID\_UDPv6, 250
  - NDDS\_TRANSPORT\_CLASSID\_UDPv6\_510, 250
  - NDDS\_TRANSPORT\_CLASSNAME\_TCPV4\_WAN, 250
  - NDDS\_TRANSPORT\_INTERFACE\_RANK\_UNKNOWN, 248
  - NDDS\_TRANSPORT\_LENGTH\_UNLIMITED, 248
  - NDDS\_TRANSPORT\_PORT\_INVALID, 247
  - NDDS\_Transport\_Port\_t, 252
  - NDDS\_TRANSPORT\_PROPERTY\_BIT\_BUFFER\_ALWAYS\_LOADED, 251
  - NDDS\_TRANSPORT\_PROPERTY\_GATHER\_SEND\_BUFFER\_COUNT, 251
  - NDDS\_TRANSPORT\_UUID\_SIZE, 247
  - NDDS\_TRANSPORT\_UUID\_UNKNOWN, 248
  - Transport Use Cases, 216
  - TRANSPORT\_BUILTIN, 443
    - DDS\_TRANSPORTBUILTIN\_MASK\_ALL, 445
    - DDS\_TRANSPORTBUILTIN\_MASK\_DEFAULT, 444
    - DDS\_TRANSPORTBUILTIN\_MASK\_NONE, 444
    - DDS\_TRANSPORTBUILTIN\_QOS\_POLICY\_NAME, 446
    - DDS\_TRANSPORTBUILTIN\_SHMEM, 446
    - DDS\_TRANSPORTBUILTIN\_SHMEM\_ALIAS, 446
    - DDS\_TRANSPORTBUILTIN\_UDPv4, 446

- DDS\_TRANSPORTBUILTIN\_UDPv4\_ALIAS, 446
- DDS\_TRANSPORTBUILTIN\_UDPv4\_WAN, 446
- DDS\_TRANSPORTBUILTIN\_UDPv4\_WAN\_ALIAS, 446
- DDS\_TRANSPORTBUILTIN\_UDPv6, 446
- DDS\_TRANSPORTBUILTIN\_UDPv6\_ALIAS, 446
- DDS\_TransportBuiltinKind, 445
- DDS\_TransportBuiltinKindMask, 445
- transport\_builtin
  - DDS\_DomainParticipantQos, 744
- transport\_classid
  - NDDS\_Transport\_Interface\_t, 1775
- transport\_info
  - DDS\_ParticipantBuiltinTopicData, 981
- transport\_info\_list\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 764
- TRANSPORT\_MULTICAST, 447
  - DDS\_AUTOMATIC\_TRANSPORT\_MULTICAST\_QOS, 448
  - DDS\_TRANSPORTMULTICAST\_QOS\_POLICY\_NAME, 448
  - DDS\_TransportMulticastQosPolicyKind, 448
  - DDS\_UNICAST\_ONLY\_TRANSPORT\_MULTICAST\_QOS, 448
- TRANSPORT\_MULTICAST\_MAPPING, 448
  - DDS\_TRANSPORTMULTICASTMAPPING\_QOS\_POLICY\_NAME, 449
- TRANSPORT\_PRIORITY, 449
  - DDS\_TRANSPORTPRIORITY\_QOS\_POLICY\_NAME, 450
- transport\_priority
  - DDS\_DataReaderQos, 652
  - DDS\_DataWriterQos, 694
  - DDS\_TopicBuiltinTopicData, 1131
  - DDS\_TopicQos, 1139
- transport\_priority\_mapping\_high
  - NDDS\_Transport\_UDPv4\_Property\_t, 1794
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1803
  - NDDS\_Transport\_UDPv6\_Property\_t, 1813
- transport\_priority\_mapping\_low
  - NDDS\_Transport\_UDPv4\_Property\_t, 1794
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1803
  - NDDS\_Transport\_UDPv6\_Property\_t, 1813
- transport\_priority\_mask
  - NDDS\_Transport\_UDPv4\_Property\_t, 1794
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1802
  - NDDS\_Transport\_UDPv6\_Property\_t, 1813
- TRANSPORT\_SELECTION, 450
  - DDS\_TRANSPORTSELECTION\_QOS\_POLICY\_NAME, 450
- transport\_selection
  - DDS\_DataReaderQos, 651
  - DDS\_DataWriterQos, 695
- TRANSPORT\_UNICAST, 451
  - DDS\_TRANSPORTUNICAST\_QOS\_POLICY\_NAME, 451
- transport\_uuid
  - NDDS\_Transport\_Property\_t, 1783
- TransportAllocationSettings\_t, 1947
- Transports, 167
- transports
  - DDS\_TransportMulticastSettings\_t, 1154
  - DDS\_TransportUnicastSettings\_t, 1161
  - NDDS\_Utility\_NetworkCaptureParams\_t, 1818
- trigger\_flow
  - DDSFlowController, 1470
- trim\_to\_size
  - DDS\_DynamicDataTypeSerializationProperty\_t, 899
- trust\_algorithm\_info
  - DDS\_ParticipantBuiltinTopicData, 982
  - DDS\_PublicationBuiltinTopicData, 1019
  - DDS\_SubscriptionBuiltinTopicData, 1116
- trust\_chain
  - DDS\_ParticipantTrustSignatureAlgorithmInfo, 988
- trust\_protection\_info
  - DDS\_ParticipantBuiltinTopicData, 982
  - DDS\_PublicationBuiltinTopicData, 1018
  - DDS\_SubscriptionBuiltinTopicData, 1116
- type
  - DDS\_StructMember, 1103
  - DDS\_UnionMember, 1236
  - DDS\_ValueMember, 1240
- Code Support, 76
- DDS\_ExtensibilityKind, 86
- DDS\_EXTENSIBLE\_EXTENSIBILITY, 87
- DDS\_FINAL\_EXTENSIBILITY, 87
- DDS\_g\_tc\_boolean, 89
- DDS\_g\_tc\_char, 90
- DDS\_g\_tc\_double, 89
- DDS\_g\_tc\_float, 89
- DDS\_g\_tc\_long, 88
- DDS\_g\_tc\_longdouble, 91
- DDS\_g\_tc\_longlong, 90
- DDS\_g\_tc\_null, 87
- DDS\_g\_tc\_octet, 90
- DDS\_g\_tc\_short, 87
- DDS\_g\_tc\_ulong, 88
- DDS\_g\_tc\_ulonglong, 91
- DDS\_g\_tc\_ushort, 88
- DDS\_g\_tc\_wchar, 91
- DDS\_MUTABLE\_EXTENSIBILITY, 87
- DDS\_PRIVATE\_MEMBER, 82
- DDS\_PUBLIC\_MEMBER, 83
- DDS\_TCKind, 86
- DDS\_TK\_ALIAS, 86
- DDS\_TK\_ARRAY, 86
- DDS\_TK\_BOOLEAN, 86

- DDS\_TK\_CHAR, 86
- DDS\_TK\_DOUBLE, 86
- DDS\_TK\_ENUM, 86
- DDS\_TK\_FLOAT, 86
- DDS\_TK\_LONG, 86
- DDS\_TK\_LONGDOUBLE, 86
- DDS\_TK\_LONGLONG, 86
- DDS\_TK\_NULL, 86
- DDS\_TK\_OCTET, 86
- DDS\_TK\_SEQUENCE, 86
- DDS\_TK\_SHORT, 86
- DDS\_TK\_STRING, 86
- DDS\_TK\_STRUCT, 86
- DDS\_TK\_ULONG, 86
- DDS\_TK\_ULONGLONG, 86
- DDS\_TK\_UNION, 86
- DDS\_TK\_USHORT, 86
- DDS\_TK\_VALUE, 86
- DDS\_TK\_WCHAR, 86
- DDS\_TK\_WSTRING, 86
- DDS\_TYPE\_CODE\_PRINT\_KIND\_IDL, 86
- DDS\_TYPE\_CODE\_PRINT\_KIND\_XML, 86
- DDS\_TYPECODE\_INDEX\_INVALID, 81
- DDS\_TYPECODE\_KEY\_MEMBER, 83
- DDS\_TYPECODE\_MEMBER\_ID\_INVALID, 81
- DDS\_TYPECODE\_NONKEY\_MEMBER, 83
- DDS\_TYPECODE\_NONKEY\_REQUIRED\_MEMBER, 84
- DDS\_TYPECODE\_NOT\_BITFIELD, 81
- DDS\_TypeCode\_PrintFormat\_INITIALIZER, 84
- DDS\_TypeCodePrintFormatKind, 85
- DDS\_ValueModifier, 85
- DDS\_Visibility, 85
- DDS\_VM\_ABSTRACT, 82
- DDS\_VM\_CUSTOM, 81
- DDS\_VM\_NONE, 81
- DDS\_VM\_TRUNCATABLE, 82
- type\_code
  - DDS\_PublicationBuiltinTopicData, 1016
  - DDS\_SubscriptionBuiltinTopicData, 1114
- type\_code\_max\_serialized\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 760
- type\_consistency
  - DDS\_DataReaderQos, 650
  - DDS\_SubscriptionBuiltinTopicData, 1113
- TYPE\_CONSISTENCY\_ENFORCEMENT, 451
  - DDS\_ALLOW\_TYPE\_COERCION, 453
  - DDS\_AUTO\_TYPE\_COERCION, 453
  - DDS\_DISALLOW\_TYPE\_COERCION, 453
  - DDS\_TYPE\_CONSISTENCY\_ENFORCEMENT\_QOS\_POLICY\_NAME, 453
  - DDS\_TypeConsistencyKind, 452
- type\_modifier
  - DDS\_TypeCode, 1190
- type\_name
  - DDS\_PublicationBuiltinTopicData, 1013
  - DDS\_SubscriptionBuiltinTopicData, 1110
  - DDS\_TopicBuiltinTopicData, 1130
- type\_object\_max\_deserialized\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 761
- type\_object\_max\_serialized\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 760
- type\_support
  - DDS\_DataReaderQos, 652
  - DDS\_DataWriterQos, 697
  - DDS\_DomainParticipantQos, 746
- TYPESUPPORT, 453
  - DDS\_AUTO\_CDR\_PADDING, 454
  - DDS\_CdrPaddingKind, 454
  - DDS\_NOT\_SET\_CDR\_PADDING, 454
  - DDS\_TYPESUPPORT\_QOS\_POLICY\_NAME, 455
  - DDS\_ZERO\_CDR\_PADDING, 454
- UDP Transport Plugin definitions, 258
  - NDDS\_TRANSPORT\_UDP\_GATHER\_SEND\_BUFFER\_COUNT\_MAX, 259
  - NDDS\_TRANSPORT\_UDP\_MULTICAST\_TTL\_DEFAULT, 260
  - NDDS\_Transport\_UDP\_Port, 260
  - NDDS\_TRANSPORT\_UDP\_PROPERTIES\_BITMAP\_DEFAULT, 259
  - NDDS\_TRANSPORT\_UDP\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT, 260
  - NDDS\_TRANSPORT\_UDP\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT, 259
  - NDDS\_TRANSPORT\_UDP\_SOCKET\_BUFFER\_SIZE\_OS\_DEFAULT, 259
- udp\_debugging\_address
  - NDDS\_Transport\_Shmem\_Property\_t, 1786
- udp\_debugging\_port
  - NDDS\_Transport\_Shmem\_Property\_t, 1787
- UDPv4 Transport, 266
  - NDDS\_TRANSPORT\_UDPV4\_ADDRESS\_BIT\_COUNT, 271
  - NDDS\_TRANSPORT\_UDPV4\_BLOCKING\_ALWAYS, 273
  - NDDS\_TRANSPORT\_UDPV4\_BLOCKING\_DEFAULT, 273
  - NDDS\_TRANSPORT\_UDPV4\_BLOCKING\_NEVER, 273
  - NDDS\_Transport\_UDPv4\_create, 275
  - NDDS\_Transport\_UDPv4\_create\_from\_properties\_with\_prefix, 276
  - NDDS\_TRANSPORT\_UDPV4\_GATHER\_SEND\_BUFFER\_COUNT\_MAX, 271

NDDS\_TRANSPORT\_UDPv4\_MESSAGE\_SIZE\_MAX\_DEFAULT, 272  
 NDDS\_TRANSPORT\_UDPv4\_MULTICAST\_TTL\_DEFAULT, 272  
 NDDS\_Transport\_UDPv4\_new, 274  
 NDDS\_TRANSPORT\_UDPv4\_PAYLOAD\_SIZE\_MAX, 272  
 NDDS\_TRANSPORT\_UDPv4\_PROPERTIES\_BITMAP\_DEFAULT, 271  
 NDDS\_TRANSPORT\_UDPv4\_PROPERTY\_DEFAULT, 273  
 NDDS\_TRANSPORT\_UDPv4\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT, 272  
 NDDS\_TRANSPORT\_UDPv4\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT, 272  
 NDDS\_TRANSPORT\_UDPv4\_SOCKET\_BUFFER\_SIZE\_DEFAULT, 271  
 NDDS\_Transport\_UDPv4\_string\_to\_address\_cEA, 273  
 NDDS\_TRANSPORT\_UDPv4\_WAN\_ADDRESS\_BIT\_COUNT, 271  
 UDPv6 Transport, 283  
 NDDS\_TRANSPORT\_UDPv6\_ADDRESS\_BIT\_COUNT, 287  
 NDDS\_TRANSPORT\_UDPv6\_BLOCKING\_ALWAYS, 289  
 NDDS\_TRANSPORT\_UDPv6\_BLOCKING\_NEVER, 288  
 NDDS\_Transport\_UDPv6\_create, 291  
 NDDS\_Transport\_UDPv6\_create\_from\_properties\_with\_prefix, 292  
 NDDS\_TRANSPORT\_UDPv6\_GATHER\_SEND\_BUFFER\_SIZE\_DEFAULT, 287  
 NDDS\_TRANSPORT\_UDPv6\_MESSAGE\_SIZE\_MAX\_DEFAULT, 288  
 NDDS\_TRANSPORT\_UDPv6\_MULTICAST\_TTL\_DEFAULT, 288  
 NDDS\_Transport\_UDPv6\_new, 290  
 NDDS\_TRANSPORT\_UDPv6\_PAYLOAD\_SIZE\_MAX, 288  
 NDDS\_TRANSPORT\_UDPv6\_PROPERTIES\_BITMAP\_DEFAULT, 287  
 NDDS\_TRANSPORT\_UDPv6\_PROPERTY\_DEFAULT, 289  
 NDDS\_TRANSPORT\_UDPv6\_RECV\_SOCKET\_BUFFER\_SIZE\_DEFAULT, 288  
 NDDS\_TRANSPORT\_UDPv6\_SEND\_SOCKET\_BUFFER\_SIZE\_DEFAULT, 287  
 NDDS\_TRANSPORT\_UDPv6\_SOCKET\_BUFFER\_SIZE\_DEFAULT, 287  
 NDDS\_Transport\_UDPv6\_string\_to\_address\_cEA, 289  
 unacknowledged\_sample\_count  
 DDS\_ReliableWriterCacheChangedStatus, 1048  
 DDS\_Acknowledged\_sample\_count\_peak  
 DDS\_ReliableWriterCacheChangedStatus, 1048  
 builtin\_complex\_member  
 DDS\_DynamicData, 805  
 unbind\_type  
 DDS\_DynamicData, 803  
 uncommitted\_sample\_count  
 DDS\_DataReaderProtocolStatus, 643  
 unicast  
 DDS\_DataReaderQos, 651  
 DDS\_DataWriterQos, 696  
 DDS\_DefaultUnicastEnabled  
 unicast\_enabled  
 DDS\_Transport\_UDPv4\_Property\_t, 1790  
 NDDS\_Transport\_UDPv6\_Property\_t, 1810  
 DDS\_DefaultUnicastEnabled  
 DDS\_PublicationBuiltinTopicData, 1017  
 DDS\_SubscriptionBuiltinTopicData, 1114  
 unload\_activation\_library  
 DDS\_SLM, 1833  
 unload\_profiles  
 DDSDomainParticipantFactory, 1448  
 unloan  
 FooSeq, 1709  
 unlock\_condition  
 DDSAsyncWaitSet, 1270  
 unregister\_contentfilter  
 DDSDomainParticipant, 1365  
 unregister\_instance  
 DDSKeyedOctetsDataWriter, 1486, 1487  
 DDSKeyedStringDataWriter, 1514  
 FooDataWriterDefault  
 unregister\_instance\_w\_params  
 FooDataWriter, 1683  
 unregister\_instance\_w\_timestamp  
 DDSKeyedOctetsDataWriter, 1487  
 DDSKeyedStringDataWriter, 1514, 1515  
 FooDataWriter, 1682  
 unregister\_thread  
 DDSDomainParticipantFactory, 1448  
 DDS\_PublisherType  
 DDSDynamicDataTypeSupport, 1459  
 DDSKeyedOctetsTypeSupport, 1498  
 DDSKeyedStringTypeSupport, 1523  
 DDSStringTypeSupport, 1544  
 DDSStringTypeSupport, 1589  
 DDSTypeSupport, 1714  
 unregistered\_instance\_count  
 DDS\_DefaultUnicastEnabled  
 DDSDataWriterCacheStatus, 673  
 unregistered\_instance\_count\_peak  
 DDS\_DataWriterCacheStatus, 673  
 url\_profile  
 DDS\_ProfileQosPolicy, 1005  
 use\_42e\_compatible\_alignment

- DDS\_DynamicDataTypeSerializationProperty\_t, 898
- use\_checksum
  - NDDS\_Transport\_UDPv4\_Property\_t, 1793
  - NDDS\_Transport\_UDPv4\_WAN\_Property\_t, 1802
- User Data Type Support, 71
  - DDS\_DATAREADER\_W\_DATA\_CONSISTENCY\_CHECK, 73
  - DDS\_DATAWRITER\_CPP, 72
  - DDS\_HANDLE\_NIL, 76
  - DDS\_InstanceHandle\_compare, 74
  - DDS\_InstanceHandle\_copy, 75
  - DDS\_InstanceHandle\_equals, 74
  - DDS\_InstanceHandle\_is\_nil, 75
  - DDS\_InstanceHandle\_t, 74
  - DDS\_TYPESUPPORT\_CPP, 72
- User-managed Threads, 519
  - DDSThreadFactory\_OnSpawnedFunction, 519
- USER\_DATA, 455
  - DDS\_USERDATA\_QOS\_POLICY\_NAME, 455
- user\_data
  - DDS\_DataReaderQos, 649
  - DDS\_DataWriterQos, 694
  - DDS\_DomainParticipantQos, 743
  - DDS\_ParticipantBuiltinTopicData, 980
  - DDS\_PublicationBuiltinTopicData, 1014
  - DDS\_SubscriptionBuiltinTopicData, 1112
- user\_endpoints\_default\_required\_mask
  - DDS\_ParticipantTrustInterceptorAlgorithmInfo, 986
- user\_forwarding\_level
  - DDS\_MonitoringLoggingForwardingSettings, 957
- user\_multicast\_port\_offset
  - DDS\_RtpsWellKnownPorts\_t, 1080
- user\_unicast\_port\_offset
  - DDS\_RtpsWellKnownPorts\_t, 1081
- Using DDS:: Namespace, 238
- Utilities, 190
- vacuum
  - DDS\_PersistentStorageSettings, 994
- valid\_data
  - DDS\_SampleInfo, 1089
- valid\_response\_data
  - DDS\_AcknowledgmentInfo, 587
- value
  - DDS\_AckResponseData\_t, 588
  - DDS\_BuiltinTopicKey\_t, 605
  - DDS\_Cookie\_t, 618
  - DDS\_DataRepresentationQosPolicy, 669
  - DDS\_GroupDataQosPolicy, 918
  - DDS\_GUID\_t, 918
  - DDS\_KeyedOctets, 926
  - DDS\_KeyedString, 929
  - DDS\_Octets, 969
  - DDS\_OwnershipStrengthQosPolicy, 978
  - DDS\_Property\_t, 1006
  - DDS\_PropertyQosPolicy, 1009
  - DDS\_Tag, 1122
  - DDS\_TopicDataQosPolicy, 1134
  - DDS\_TransportMulticastMappingQosPolicy, 1151
  - DDS\_TransportMulticastQosPolicy, 1152
  - DDS\_TransportPriorityQosPolicy, 1157
  - DDS\_TransportUnicastQosPolicy, 1160
  - DDS\_UserDataQosPolicy, 1238
- value\_type
  - rti::flat::Sequenceliterator< E, OffsetKind >, 1929
- vendorId
  - DDS\_VendorId\_t, 1242
- verbosity
  - DDS\_LoggingQosPolicy, 944
- Version, 522
- View States, 157
  - DDS\_ANY\_VIEW\_STATE, 159
  - DDS\_NEW\_VIEW\_STATE, 159
  - DDS\_NOT\_NEW\_VIEW\_STATE, 159
  - DDS\_ViewStateKind, 158
  - DDS\_ViewStateMask, 158
- view\_state
  - DDS\_SampleInfo, 1086
- view\_states
  - DDS\_ReadConditionParams, 1035
- virtual\_duplicate\_dropped\_sample\_count
  - DDS\_DataReaderCacheStatus, 626
- virtual\_guid
  - DDS\_DataReaderProtocolQosPolicy, 631
  - DDS\_DataWriterProtocolQosPolicy, 674
  - DDS\_PublicationBuiltinTopicData, 1017
  - DDS\_SubscriptionBuiltinTopicData, 1115
- virtual\_heartbeat\_period
  - DDS\_RtpsReliableWriterProtocol\_t, 1066
- wait
  - DDSAsyncWaitSetCompletionToken, 1274
  - DDSWaitSet, 1634
- wait\_for\_acknowledgments
  - DDSDDataWriter, 1334
  - DDSPublisher, 1567
- wait\_for\_asynchronous\_publishing
  - DDSDDataWriter, 1335
  - DDSPublisher, 1567
- wait\_for\_historical\_data
  - DDSDDataReader, 1296
- wait\_for\_replies
  - connext::Requester< TReq, TRep >, 1896, 1897
- wait\_for\_requests
  - connext::Replier< TReq, TRep >, 1877
- wait\_timeout
  - DDS\_AsyncWaitSetProperty\_t, 595
- Waitset Use Cases, 215

- waitset\_property
  - DDS\_AsyncWaitSetProperty\_t, 594
- warning
  - NDDConfigLogger, 1828
- WIRE\_PROTOCOL, 456
  - DDS\_INTEROPERABLE RTPS\_WELL\_KNOWN\_PORTS, 461
  - DDS\_RTI\_BACKWARDS\_COMPATIBLE RTPS\_WELL\_KNOWN\_PORTS, 460
  - DDS RTPS\_AUTO\_ID\_FROM\_IP, 460
  - DDS RTPS\_AUTO\_ID\_FROM\_MAC, 460
  - DDS RTPS\_AUTO\_ID\_FROM\_UUID, 460
  - DDS RTPS\_RESERVED\_PORT\_BUILTIN\_MULTICAST, 460
  - DDS RTPS\_RESERVED\_PORT\_BUILTIN\_UNICAST, 460
  - DDS RTPS\_RESERVED\_PORT\_MASK\_ALL, 458
  - DDS RTPS\_RESERVED\_PORT\_MASK\_DEFAULT, 457
  - DDS RTPS\_RESERVED\_PORT\_MASK\_NONE, 458
  - DDS RTPS\_RESERVED\_PORT\_USER\_MULTICAST, 460
  - DDS RTPS\_RESERVED\_PORT\_USER\_UNICAST, 460
  - DDS RtpsReservedPortKind, 459
  - DDS RtpsReservedPortKindMask, 459
  - DDS\_WIREPROTOCOL\_QOS\_POLICY\_NAME, 461
  - DDS\_WireProtocolQosPolicyAutoKind, 460
- wire\_protocol
  - DDS\_DomainParticipantQos, 744
- write
  - DDSKeyedOctetsDataWriter, 1488, 1489
  - DDSKeyedStringDataWriter, 1516
  - DDSOctetsDataWriter, 1539, 1540
  - DDSStringDataWriter, 1586
  - FooDataWriter, 1683
  - NDDConfigLoggerDevice, 1830
- write\_w\_params
  - DDSKeyedOctetsDataWriter, 1491, 1492
  - DDSKeyedStringDataWriter, 1517
  - DDSOctetsDataWriter, 1541, 1542
  - DDSStringDataWriter, 1586
  - FooDataWriter, 1688
- write\_w\_timestamp
  - DDSKeyedOctetsDataWriter, 1490, 1491
  - DDSKeyedStringDataWriter, 1516, 1517
  - DDSOctetsDataWriter, 1540, 1541
  - DDSStringDataWriter, 1586
  - FooDataWriter, 1687
- WriteParams, 476
  - DDS\_AUTO\_SAMPLE\_IDENTITY, 478
  - DDS\_SampleIdentity\_equals, 476
  - DDS\_UNKNOWN\_SAMPLE\_IDENTITY, 479
  - DDS\_WRITEPARAMS\_DEFAULT, 479
  - DDS\_WriteParams\_reset, 478
  - sequence\_number, 478
  - writer\_guid, 478
- writer\_attach
  - DDSWriterContentFilter, 1640
- writer\_compile
  - DDSWriterContentFilter, 1638
- writer\_compression\_level
  - DDS\_CompressionSettings\_t, 615
- writer\_compression\_threshold
  - DDS\_CompressionSettings\_t, 616
- WRITER\_DATA\_LIFECYCLE, 456
  - DDS\_WRITERDATA\_LIFECYCLE\_QOS\_POLICY\_NAME, 456
- writer\_data\_lifecycle
  - DDS\_DataWriterQos, 695
- writer\_data\_tag\_list\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 765
- writer\_data\_tag\_string\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 766
- writer\_depth
  - DDS\_DurabilityQosPolicy, 770
- writer\_detach
  - DDSWriterContentFilter, 1641
- writer\_evaluate
  - DDSWriterContentFilter, 1639
- writer\_finalize
  - DDSWriterContentFilter, 1640
- writer\_guid
  - WriteParams, 478
- writer\_instance\_cache\_allocation
  - DDS\_PersistentStorageSettings, 994
- writer\_loaned\_sample\_allocation
  - DDS\_DataWriterResourceLimitsQosPolicy, 704
- writer\_memory\_state
  - DDS\_PersistentStorageSettings, 995
- writer\_property\_list\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 763
- writer\_property\_string\_max\_length
  - DDS\_DomainParticipantResourceLimitsQosPolicy, 763
- writer\_removed\_batch\_sample\_dropped\_sample\_count
  - DDS\_DataReaderCacheStatus, 627
- writer\_resource\_limits
  - DDS\_DataWriterQos, 695
- writer\_return\_loan
  - DDSWriterContentFilter, 1641
- writer\_sample\_cache\_allocation
  - DDS\_PersistentStorageSettings, 995
- writer\_side\_filter\_optimization

DDS\_ExpressionProperty, 910  
writer\_user\_data\_max\_length  
  DDS\_DomainParticipantResourceLimitsQosPolicy,  
  759  
WriteSample  
  connext::WriteSample< T >, 1949, 1950  
WriteSampleRef  
  connext::WriteSampleRef< T >, 1953  
Zero Copy Transfer Over Shared Memory, 70