

# **RTI Connex DDS Core Libraries**

**Platform Notes**

**Version 6.1.0**



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# Chapter 1 Supported Platforms

This document provides platform-specific instructions on how to compile, link, and run *RTI*<sup>®</sup> *Connex*<sup>®</sup> *DDS* applications.

For each platform, this document provides information on:

- Supported operating systems and compilers
- Required *Connex DDS* and system libraries
- Required compiler and linker flags, and environment variables for running the application (if any)
- Details on how the *Connex DDS* libraries were built
- Modern C++ API support
- Multicast support
- Supported transports
- Monotonic clock support
- Thread configuration
- Durable Writer History and Durable Reader State features support
- Support for 'Find Package' CMake script
- Backtrace support
- Remote Procedure Call support
- Required libraries for using additional features (such as Distributed Logger, Monitoring, Real-Time WAN Transport, Secure WAN Transport, TLS Support, Zero Copy Transfer Over Shared Memory)



**Table 1.1 Supported Platforms**

Operating System	Version
Android™ (target only) <i>Available on demand.</i>	Android 9.0
INTEGRITY® (target only)	INTEGRITY 10.0.2, 11.0.4, 11.4.4
Linux® (Arm® CPU)	NI™ Linux 3 Ubuntu® 16.04 LTS, 18.04 LTS
Linux (Intel® CPU)	CentOS™ 6.0, 6.2 - 6.4, 7.0 Red Hat® Enterprise Linux 6.0 - 6.5, 6.7, 6.8, 7.0, 7.3, 7.5, 7.6, 8.0 SUSE® Linux Enterprise Server 12 SP2 Ubuntu 14.04, 16.04, 18.04, 20.04 LTS  POSIX-compliant platforms, made available with <i>RTI ConnexT TSS</i> : CentOS 7.0 Red Hat Enterprise Linux 7, 7.3, 7.5, 7.6, 8 Ubuntu 14.04, 18.04 LTS
macOS®	macOS 10.13 - 10.15
QNX® (target only)	QNX Neutrino® 6.4.1, 6.5, 6.5 SP1, 7.0.4
VxWorks® (target only)	VxWorks 6.9.3.2, 6.9.4.2, 6.9.4.6, 7.0 SR0510, 7.0 SR0630
Windows®	Windows 8, 10 <sup>a</sup> Windows Server 2012 R2 Windows Server 2016

The following table lists additional target libraries available for *ConnexT DDS*, for which RTI offers custom support. If you are interested in using one of these platforms, please contact your local RTI sales representative or email [sales@rti.com](mailto:sales@rti.com).

**Table 1.2 Custom Supported Platforms**

Operating System	Version
INtime <i>Available on demand</i>	INtime 6.3 on 64-bit Windows 10

<sup>a</sup>Per Microsoft, this should be compatible with Windows 10 IoT Enterprise with Windows native app.

**Table 1.2 Custom Supported Platforms**

Operating System	Version
Linux	RedHawk™ Linux 6.0 on x64 CPU
	RedHawk Linux 6.5 on x86 and x64 CPUs
	Wind River® Linux 8 on Arm v7 CPU
	Yocto Project® 2.5 on Arm v8 CPU
QNX	QNX Neutrino 6.5 on PPC e500v2 CPU
	QNX Neutrino 6.6 on Arm v7 and x86 CPUs
	QNX Neutrino 7.0.4 on Arm v7 CPU
VxWorks	VxWorks 7.0 SR0540 on x86 CPU

## 1.1 Paths Mentioned in Documentation

The documentation refers to:

- **<NDDSHOME>**

This refers to the installation directory for *RTI® Connex® DDS*. The default installation paths are:

- macOS® systems:  
/Applications/rti\_connex\_dds-6.1.0
- Linux systems, non-*root* user:  
/home/<your user name>/rti\_connex\_dds-6.1.0
- Linux systems, *root* user:  
/opt/rti\_connex\_dds-6.1.0
- Windows® systems, user without Administrator privileges:  
<your home directory>\rti\_connex\_dds-6.1.0
- Windows systems, user with Administrator privileges:  
C:\Program Files\rti\_connex\_dds-6.1.0

You may also see \$NDDSHOME or %NDDSHOME%, which refers to an environment variable set to the installation path.

Wherever you see <NDDSHOME> used in a path, replace it with your installation path.

**Note for Windows Users:** When using a command prompt to enter a command that includes the path **C:\Program Files** (or any directory name that has a space), enclose the path in quotation marks. For example:

```
"C:\Program Files\rti_connex_dds-6.1.0\bin\rtiddsgen"
```

Or if you have defined the NDDSHOME environment variable:

```
"%NDDSHOME%\bin\rtiddsgen"
```

- **<path to examples>**

By default, examples are copied into your home directory the first time you run *RTI Launcher* or any script in <NDDSHOME>/bin. This document refers to the location of the copied examples as <path to examples>.

Wherever you see <path to examples>, replace it with the appropriate path.

Default path to the examples:

- macOS systems: /Users/<your user name>/rti\_workspace/6.1.0/examples
- Linux systems: /home/<your user name>/rti\_workspace/6.1.0/examples

- Windows systems: **<your Windows documents folder>\rti\_workspace\6.1.0\examples**

Where 'your Windows documents folder' depends on your version of Windows. For example, on Windows 10, the folder is **C:\Users\<your user name>\Documents**.

Note: You can specify a different location for **rti\_workspace**. You can also specify that you do not want the examples copied to the workspace. For details, see *Controlling Location for RTI Workspace and Copying of Examples* in the *RTI Connex DDS Installation Guide*.

## Chapter 2 Android Platforms

[Table 2.1 Supported Android Target Platforms](#) lists the architectures supported on the Android operating system.

**Table 2.1 Supported Android Target Platforms**

Operating System	CPU	Compiler <sup>a</sup>	RTI Architecture Abbreviation
Android 9.0  (Available on demand)	Arm v7a	Clang 8.0 (NDK r19b)	armv7Android9.0clang8.0ndkr19b
		Java® Platform, Standard Edition JDK 11	
	Arm v8a	Clang 8.0 (NDK r19b)	arm64Android9.0clang8.0ndkr19b
		Java Platform, Standard Edition JDK 11	

See [Table 2.2 Building Instructions for Android Architectures](#) for a list of the compiler flags and libraries you will need to link into your application. For other libraries you may need, see:

- [2.8 Libraries Required for Using Distributed Logger on page 13](#)
- [2.9 Libraries Required for Using Monitoring on page 14](#)
- [2.10 Libraries Required for Using RTI Real-Time WAN Transport APIs on page 14](#)
- [2.11 Libraries Required for Using RTI Secure WAN Transport APIs on page 15](#)
- [2.12 Libraries Required for Using RTI TCP Transport and TLS Support APIs on page 15](#)

Make sure you are consistent in your use of debug and release versions of the libraries. Do not mix release and debug libraries.

---

<sup>a</sup>For Java: Dalvik VM is JDK 1.5 with some features from 1.6 (See Android documentation for details.)

[Table 2.3 Running Instructions for Android Architectures](#) provides details on the environment variables that must be set at run time for an Android architecture.

[Table 2.4 Library-Creation Details for Android Architectures](#) provides details on how the libraries were built. This table is provided strictly for informational purposes; you do not need to use these parameters to compile your application. You may find this information useful if you are involved in any in-depth debugging.

*Connex DDS* supports the Android operating system as a *target* platform. The target can be in one of two configurations: a consumer device (e.g., a Google™ Nexus™ 7 tablet) or as a "raw" Linux distribution. Building applications for the target occurs on a development machine using an Android SDK and, for C/C++, an Android NDK.

For a consumer device, all programs (applications and DDS utilities) must be installed on the device as Apps (\*.apk files). All Android Apps are loaded and executed by an instance of the Dalvik VM running as a Linux process. No *Connex DDS* components or libraries have to be pre-installed on the device—that is taken care of by the Android build and packaging tools. See the Android documentation for a full description of building and packaging Android Apps.

For a raw Linux distribution, all programs are executables that are linked with the necessary *Connex DDS* libraries (see [Table 2.1 Supported Android Target Platforms](#)). The build process is similar to other Linux variants, see Linux Platforms in the *Building Applications* chapter in the [RTI Connex DDS Core Libraries User's Manual](#).

### **‘Release’ and ‘Debug’ Terminology:**

Android and *Connex DDS* use these terms differently. For Android, "release" and "debug" refer to how application packages (\*.apk) are signed as part of the Android Security Model. A "release" package is cryptographically signed by a key that can be trusted by virtue of some certificate chain. A "debug" package is signed by a key distributed with the SDK. It says nothing about the origin of the package. It allows the package to be installed during development testing, hence "debug." For *Connex DDS*, debug means libraries created with debug symbols to facilitate debugging with gdb, for example. A "release" library does not contain debug information.

### **Additional Documentation:**

See the [RTI Connex DDS Core Libraries Getting Started Guide Addendum for Android Systems](#).

Table 2.2 Building Instructions for Android Architectures

API	Library Format	Required RTI Libraries and JAR Files <sup>ab</sup>	Required System Libraries	Required Compiler Flags
C++ (Traditional and Modern APIs)	Dynamic Release	libnddscore.so libnddsc.so libnddscpp.so or libnddscpp2.so librticonnextmsgcpp.so libc++_shared.so	For Android 9 on Arm v7a platforms:  -sysroot=\$(ANDROID_NDK_PATH)/platforms/android28/arch-arm-LL\$(ANDROID_NDK_PATH)/toolchains/llvm/prebuilt/linux-x86_64/sysroot/usr/lib/arm-linux-androideabi/28 -llog -lc -lm -L\$(ANDROID_NDK_PATH)/sources/cxx-stl/llvm-libc++/libs/armeabi-v7a -lc++_shared <sup>c</sup>	For Android 9 on Arm v7a platforms:  -march=armv7-a -DRTI_UNIX -DRTI_ANDROID -DRTI_ANDROID9
	Dynamic Debug	libnddscored.so libnddscd.so libnddscppd.so or libnddscpp2d.so librticonnextmsgcppd.so libc++_shared.so	For Android 9.0 on Arm v8a platforms:  -sysroot=\$(ANDROID_NDK_PATH)/platforms/android28/arch-arm-LL\$(ANDROID_NDK_PATH)/toolchains/llvm/prebuilt/linux-x86_64/sysroot/usr/lib/arm-linux-androideabi/28 -llog -lc -lm -L\$(ANDROID_NDK_PATH)/sources/cxx-stl/llvm-libc++/libs/arm64-v8a -lc++_shared <sup>d</sup>	For Android 9 on Arm v8a platforms:  -march=arm64v8-a -DRTI_UNIX -DRTI_ANDROID -DRTI_ANDROID9 -DRTI_64BIT
C	Dynamic Release	libnddscore.so libnddsc.so librticonnextmsgc.so	For Android 9 on Arm v7a platforms:  -sysroot=\$(ANDROID_NDK_PATH)/platforms/android28/arch-arm-LL\$(ANDROID_NDK_PATH)/toolchains/llvm/prebuilt/linux-x86_64/sysroot/usr/lib/arm-linux-androideabi/28 -llog -lc -lm -L\$(ANDROID_NDK_PATH)/sources/cxx-stl/llvm-libc++/libs/armeabi-v7a  For Android 9 on Arm v8a platforms:  -sysroot=\$(ANDROID_NDK_PATH)/platforms/android28/arch-arm64-LL\$(ANDROID_NDK_PATH)/toolchains/llvm/prebuilt/linux-x86_64/sysroot/usr/lib/arm-linux-androideabi/28 -llog -lc -lm -L\$(ANDROID_NDK_PATH)/sources/cxx-stl/llvm-libc++/libs/arm64-v8a	For Android 9 on Arm v7a platforms:  -march=armv7-a -DRTI_UNIX -DRTI_ANDROID -DRTI_ANDROID9  For Android 9 on Arm v8a platforms:  -march=arm64v8-a -DRTI_UNIX -DRTI_ANDROID -DRTI_ANDROID9 -DRTI_64BIT
	Dynamic Debug	libnddscored.so libnddscd.so librticonnextmsgcd.so		

<sup>a</sup>Choose libnddscpp\*.\* for the Traditional C++ API or libnddscpp2\*.\* for the Modern C++ API.

<sup>b</sup>The RTI C/C++/Java libraries are in \$(NDDSHOME)/lib/<architecture>.

<sup>c</sup>The library **libc++\_shared.so** is always required when using C++ RTI Connex libraries and must be included in your application APK.

<sup>d</sup>The library **libc++\_shared.so** is always required when using C++ RTI Connex libraries and must be included in your application APK.

**Table 2.2 Building Instructions for Android Architectures**

API	Library Format	Required RTI Libraries and JAR Files <sup>ab</sup>	Required System Libraries	Required Compiler Flags
Java	Release	When not building Apps (*.apk): nddsjava.jar rticonnextmsg.jar  When building Apps (*.apk): nddsjava.jar libnddsjava.so libnddscore.so libnddsc.so rticonnextmsg.jar	N/A	None required
	Debug	When not building Apps (*.apk): nddsjavad.jar rticonnextmsgd.jar  When building Apps (*.apk): nddsjavad.jar libnddsjavad.so libnddscored.so libnddscd.so rticonnextmsgd.jar		

**Table 2.3 Running Instructions for Android Architectures**

RTI Architecture	Library Format	Required Environment Variables
All supported Android architectures when not using Java	App (*.apk)	None
	Dynamic	LD_LIBRARY_PATH=\$LD_LIBRARY_PATH: <path-to-ndds-libs>
All supported Android architectures when using Java	App (*.apk)	None
	Dex	LD_LIBRARY_PATH=\$LD_LIBRARY_PATH: <path-to-ndds-libs> CLASSPATH=<path-to-dex>/classes.dex

<sup>a</sup>Choose libnddscpp\*.\* for the Traditional C++ API or libnddscpp2\*.\* for the Modern C++ API.

<sup>b</sup>The RTI C/C++/Java libraries are in \$(NDDSHOME)/lib/<architecture>.



Table 2.4 Library-Creation Details for Android Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
arm64Android9.0clang8.0ndkr19b	Release	-target=aarch64-none-linux-android28 -DLINUX -DPtrIntType=long -DTARGET-T="arm64Android9.0clang8.0ndkr19b" -O2 -Wall -Wno-unknown-pragmas -Wno-deprecated-declarations -Wno-macro-redefined -Wno-tautological-pointer-compare -Wno-logical-not-parentheses -Wno-constant-conversion -Wno-return-type-c-linkage -Wno-deprecated-register -Wno-tautological-constant-out-of-range-compare -Wno-enum-conversion -Wno-format-security -Wno-switch-bool -Wno-instantiation-after-specialization -Wno-exceptions -Wno-non-literal-null-conversion -Wstrict-prototypes -Wunused-parameter -funwind-tables -no-canonical-prefixes -fexceptions -O2 -DNDEBUG -fPIC
	Debug	-target=aarch64-none-linux-android28 -DLINUX -DPtrIntType=long -DTARGET-T="arm64Android9.0clang8.0ndkr19b" -O0 -Wall -Wno-unknown-pragmas -Wno-deprecated-declarations -Wno-macro-redefined -Wno-tautological-pointer-compare -Wno-logical-not-parentheses -Wno-constant-conversion -Wno-return-type-c-linkage -Wno-deprecated-register -Wno-tautological-constant-out-of-range-compare -Wno-enum-conversion -Wno-format-security -Wno-switch-bool -Wno-instantiation-after-specialization -Wno-exceptions -Wno-non-literal-null-conversion -Wstrict-prototypes -Wunused-parameter -funwind-tables -no-canonical-prefixes -fexceptions -O0 -g -fPIC
armv7Android9.0clang8.0ndkr19b	Release	-target=armv7-none-linux-androideabi28 -DLINUX -DPtrIntType=long -DTARGET-T="armv7Android9.0clang8.0ndkr19b" -O2 -Wall -Wno-unknown-pragmas -Wno-deprecated-declarations -Wno-macro-redefined -Wno-tautological-pointer-compare -Wno-logical-not-parentheses -Wno-constant-conversion -Wno-return-type-c-linkage -Wno-deprecated-register -Wno-tautological-constant-out-of-range-compare -Wno-enum-conversion -Wno-format-security -Wno-switch-bool -Wno-instantiation-after-specialization -Wno-exceptions -Wno-non-literal-null-conversion -Wstrict-prototypes -Wunused-parameter -march=armv7-a -mthumb -mfpv3-d16 -mfloat-abi=softfp -funwind-tables -no-canonical-prefixes -fexceptions -O2 -DNDEBUG -fPIC
	Debug	-target=armv7-none-linux-androideabi28 -DLINUX -DPtrIntType=long -DTARGET-T="armv7Android9.0clang8.0ndkr19b" -O0 -Wall -Wno-unknown-pragmas -Wno-deprecated-declarations -Wno-macro-redefined -Wno-tautological-pointer-compare -Wno-logical-not-parentheses -Wno-constant-conversion -Wno-return-type-c-linkage -Wno-deprecated-register -Wno-tautological-constant-out-of-range-compare -Wno-enum-conversion -Wno-format-security -Wno-switch-bool -Wno-instantiation-after-specialization -Wno-exceptions -Wno-non-literal-null-conversion -Wstrict-prototypes -Wunused-parameter -march=armv7-a -mthumb -mfpv3-d16 -mfloat-abi=softfp -funwind-tables -no-canonical-prefixes -fexceptions -O0 -g -fPIC
All supported Android architectures for Java	Release	-target 1.8 -source 1.8
	Debug	-target 1.8 -source 1.8 -g

## 2.1 Support for Modern C++ API

*Connex DDS* provides two different C++ APIs, which we refer to as the "Traditional C++" and "Modern C++" APIs.

The Modern C++ API is available for all Android platforms and has been tested with both C++03 and C++11.

**Notes:**

- Support for C++03 is deprecated starting with release 6.1.0, which is the last release that supports non-C++11-compliant compilers. After release 6.1.0, the Modern C++ API will require a C++11 compiler (or newer). The Traditional C++ API is not affected and continues to support C++98 compilers (or newer).
- Only the default plugin is supported. The legacy plugin has been removed from *Code Generator* starting with release 6.1.0.

For more information, see [Traditional vs. Modern C++, in the RTI Connex DDS Core Libraries User's Manual](#).

## 2.2 Multicast Support

Multicast is available on supported Android platforms and is configured out of the box. That is, the default value for the initial peers list (NDDS\_DISCOVERY\_PEERS) includes a multicast address. See the API Reference HTML documentation for more information. Multicast has not been tested for this release and so, though available, is not officially supported. This should be addressed in a future release.

## 2.3 Transports

- **Shared memory:** Not supported for this release. For a consumer device, shared memory communication between Apps is often not desirable.
- **UDPv4:** Supported and enabled by default.
- **UDPv6:** Supported for Android 9 platforms only.
- **TCP/IPv4:** Supported.

## 2.4 Unsupported Features

These features are not supported on Android platforms:

- Backtrace
- Controlling CPU Core Affinity
- 'Find Package' CMake script
- Distributed Logger (supported on Android 9 only)
- Durable Writer History and Durable Reader State
- Setting of thread names by *Connex DDS* at the operating-system level

- Using DDS\_WireProtocolQosPolicyAutoKind's RTPS\_AUTO\_ID\_FROM\_MAC to calculate the GUID prefix is not supported.
- Zero Copy Transfer Over Shared Memory

## 2.5 Monotonic Clock Support

The monotonic clock (described in *Clock Selection* in the [RTI Connex DDS Core Libraries User's Manual](#)) is supported on all Android platforms.

## 2.6 Thread Configuration

See [Table 2.5 Thread Settings for Android Platforms](#) and [Table 2.6 Thread-Priority Definitions for Android Platforms](#).

**Table 2.5 Thread Settings for Android Platforms**

Applicable Threads	DDS_ThreadSettings_t	Platform-Specific Setting
Asynchronous Publisher, Asynchronous flushing thread	mask	OS default thread type
	priority	OS default thread priority
	stack_size	OS default stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	
Database thread	mask	DDS_THREAD_SETTINGS_STDIO
	priority	OS default thread priority
	stack_size	OS default stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	
Event thread	mask	DDS_THREAD_SETTINGS_STDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	OS default thread priority
	stack_size	OS default stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	

**Table 2.5 Thread Settings for Android Platforms**

Applicable Threads	DDS_ThreadSettings_t	Platform-Specific Setting
ReceiverPool threads	mask	DDS_THREAD_SETTINGS_STDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	OS default thread priority
	stack_size	OS default stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	

**Table 2.6 Thread-Priority Definitions for Android Platforms**

Thread-Priority Definition	Operating-System Priority
THREAD_PRIORITY_DEFAULT	If any of these constants are used to set the priority of the thread in the QoS, the OS's default thread priority will be used.
THREAD_PRIORITY_HIGH	
THREAD_PRIORITY_ABOVE_NORMAL	
THREAD_PRIORITY_NORMAL	
THREAD_PRIORITY_BELOW_NORMAL	
THREAD_PRIORITY_LOW	

## 2.7 Support for Remote Procedure Calls (RPC)

RPC is an experimental feature available only for the C++11 API. It is supported on Android architectures.

See *Remote Procedure Calls (RPC)* in the [RTI Connex DDS Core Libraries User's Manual](#).

## 2.8 Libraries Required for Using Distributed Logger

*RTI Distributed Logger* is supported on all the platforms in [Table 2.1 Supported Android Target Platforms](#).

To use the Distributed Logger APIs, link against the additional libraries in [Table 2.7 Additional Libraries for using RTI Distributed Logger](#).

Select the files appropriate for your chosen library format. Make sure you are consistent in your use of debug and release versions of the libraries. Do not mix release and debug libraries.

**Table 2.7 Additional Libraries for using RTI Distributed Logger**

Language	Dynamic	
	Release	Debug
C	librtidlc.so	librtidcd.so
C++ (Traditional API)	librtidlc.so librtidlcpp.so	librtidlcd.so librtidlcppd.so
Java	distlog.jar distlogdatamodel.jar	distlogd.jar distlogdatamodeld.jar

## 2.9 Libraries Required for Using Monitoring

Make sure you are consistent in your use of debug and release versions of the libraries. For example, if your *Connex DDS* application is linked with the release version of the *Connex DDS* libraries, you will need to also use the release version of the monitoring library. Do not mix release and debug libraries.

**Table 2.8 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>a</sup>
Dynamic Release	librtmonitoring.so
Dynamic Debug	librtmonitoringd.so

## 2.10 Libraries Required for Using RTI Real-Time WAN Transport APIs

If you choose to use *RTI Real-Time WAN Transport*, you must download and install a separate package that contains the transport libraries. See the [RTI Real-Time WAN Transport Installation Guide](#) for details.

Using *Real-Time WAN Transport* requires using one of the libraries in [Table 2.9 Additional Libraries for Using RTI Real-Time WAN Transport APIs](#). Select the file appropriate for your chosen library format.

For more information, see the "Enabling Real-Time WAN Transport" section in the *RTI Real-Time WAN Transport* part of the [RTI Connex DDS Core Libraries User's Manual](#).

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

**Table 2.9 Additional Libraries for Using RTI Real-Time WAN Transport APIs**

Library Format	Real-Time WAN Transport Libraries <sup>a</sup>
Dynamic Release	libnddsrt.so
Dynamic Debug	libnddsrt.d.so

## 2.11 Libraries Required for Using RTI Secure WAN Transport APIs

*RTI Secure WAN Transport* is only available on specific architectures. See the [RTI Secure WAN Transport Release Notes](#) and [RTI Secure WAN Transport Installation Guide](#) for details.

To use the *Secure WAN Transport* APIs, link against the additional libraries in [Table 2.10 Additional Libraries for Using RTI Secure WAN Transport APIs](#). Select the files appropriate for your chosen library format.

**Table 2.10 Additional Libraries for Using RTI Secure WAN Transport APIs**

Library Format	Secure WAN Transport Libraries <sup>b</sup>	OpenSSL Libraries <sup>c</sup>
Dynamic Release	libnddstransportwan.so libnddstransporttls.so	libtisslsupport.so
Dynamic Debug	libnddstransportwand.so libnddstransporttlsd.so	

## 2.12 Libraries Required for Using RTI TCP Transport and TLS Support APIs

To use the TCP Transport APIs, link against the additional libraries in [Table 2.11 Additional Libraries for Using RTI TCP Transport APIs](#). If you are using *RTI TLS Support*, also link against the libraries in [Table 2.12 Additional Libraries for Using RTI TCP Transport APIs with TLS Enabled](#). Select the files appropriate for your chosen library format.

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>c</sup>OpenSSL libraries are in <NDDSHOME>/third\_party/openssl-1.1.1k/<architecture>/<format>/lib.

**Table 2.11 Additional Libraries for Using RTI TCP Transport APIs**

Library Format	TCP Transport Libraries <sup>a</sup>
Dynamic Release	libnddstransporttcp.so
Dynamic Debug	libnddstransporttcpd.so

**Table 2.12 Additional Libraries for Using RTI TCP Transport APIs with TLS Enabled**

Library Format	TCP Transport Libraries <sup>b</sup>	OpenSSL Libraries <sup>c</sup>
Dynamic Release	libnddstls.so	librtisslsupport.so
Dynamic Debug	libnddstlsd.so	

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>c</sup>OpenSSL libraries are in <NDDSHOME>/third\_party/openssl-1.1.1k/<architecture>/<format>/lib.

# Chapter 3 INTEGRITY Platforms

[Table 3.1 Supported INTEGRITY Target Platforms](#) lists the architectures supported on the INTEGRITY<sup>®</sup> operating system<sup>a</sup>.

**Table 3.1 Supported INTEGRITY Target Platforms**

Operating System	CPU	Compiler	IP Stack	RTI Architecture Abbreviation
INTEGRITY 10.0.2	x86	Multi 5.0.6	GHNet IPv4 stack	pentiumInty10.0.2.pcx86
INTEGRITY 11.0.4	P4080	Multi 6.1.4	GHNet2 v2	p4080Inty11.devtree-fsle500m-c.comp2013.5.4
	x86	Multi 6.1.4	GHNet2	pentiumInty11.pcx86-smp
INTEGRITY 11.4.4	x64	Multi 7.1.6	GHNet2	pentiumInty11.pcx64

[Table 3.2 Building Instructions for INTEGRITY Architectures](#) lists the compiler flags and the libraries you will need to link into your application.

Make sure you are consistent in your use of release and debug versions of the libraries. Do not mix release and debug libraries.

See also:

- [3.1 Required Patches for INTEGRITY 10.0.2 and 11.0.4 on the next page](#)
- [3.7 Libraries Required for Using Distributed Logger on page 23](#)
- [3.8 Libraries Required for Using Monitoring on page 24](#)

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<sup>a</sup>For use with Windows hosts, as supported by Green Hills Software.



- [3.9 Libraries Required for Using RTI Real-Time WAN Transport APIs on page 24](#)
- [3.10 Libraries Required for Zero Copy Transfer Over Shared Memory on page 25](#)

[Table 3.3 Running Instructions for INTEGRITY Architectures](#) provides details on the environment variables that must be set at run time for an INTEGRITY architecture.

[Table 3.4 Library-Creation Details for INTEGRITY Architectures](#) provides details on how the libraries were built. This table is provided strictly for informational purposes; you do not need to use these parameters to compile your application. You may find this information useful if you are involved in any in-depth debugging.

### 3.1 Required Patches for INTEGRITY 10.0.2 and 11.0.4

For INTEGRITY 10.0.2 and 11.0.4 platforms, you must install these patches from Green Hills Software:

- INTEGRITY 10.0.2 Platforms
  - pentiumInty10.0.2.pcx86: **patch\_6901.iff**
- INTEGRITY 11.0.4 Platforms
  - p4080Inty11.devtree-fsl-e500mc.comp2013.5.4: **patch\_8154.iff, patch\_8155.iff, patch\_8246.iff**

For more information on these patches, please contact your Green Hills Software representative.

Table 3.2 Building Instructions for INTEGRITY Architectures

API	Library Format	Required RTI Libraries <sup>abc</sup>	Required System Libraries <sup>d</sup>	Required Compiler Flags
C++ (Traditional and Modern APIs)	Static Release	libniddscorez.a libniddscz.a libniddscppz.a or libniddscpp2z.a librticonnextmsgcppz.a or librticonnextmsgcpp2z.a	libsocket.a libnet.a libposix.a	All others: -DRTI_INTY -exceptions
	Static Debug	libniddscorezd.a libniddsczd.a libniddscppzd.a or libniddscpp2zd.a librticonnextmsgcppzd.a or librticonnextmsgcpp2zd.a (libniddscorezd.dba) (libniddsczd.dba) (libniddscppzd.dba or libniddscpp2zd.dba) (librticonnextmsgczd.dba)		
C	Static Release	libniddscorez.a libniddscz.a librticonnextmsgcz.a		
	Static Debug	libniddscorezd.a libniddsczd.a librticonnextmsgczd.a (libniddscorezd.dba) (libniddsczd.dba) (librticonnextmsgczd.dba)		

<sup>a</sup>Choose \*cpp\*.\* for the Traditional C++ API or \*cpp2\*.\* for the Modern C++ API.

<sup>b</sup>The \*.dba files contain the debugging information. You can link without these, as long as they are located in the same directory as the matching \*.d.a file (so that the MULTI® IDE can find the debug information).

<sup>c</sup>The RTI C/C++ libraries are in \$(NDDSHOME)/lib/<architecture>.

<sup>d</sup>Transports (other than the default IP transport) such as StarFabric may require linking in additional libraries. For further details, see the API Reference HTML documentation or contact support@rti.com.

**Table 3.3 Running Instructions for INTEGRITY Architectures**

RTI Architecture	Required Environment Variables
All INTEGRITY architectures	None

**Table 3.4 Library-Creation Details for INTEGRITY Architectures**

RTI Architecture	Library Format	Compiler Flags Used by RTI
p4080Inty11.devtree-fsl-e500mc.comp2013.5.4	Static Release	-DPtrIntType=long -DTARGET="p4080Inty11.devtree-fsl-e500mc.comp2013.5.4" -O2 --unknown_pragma_silent --link_once_templates -fexceptions --diag_error 223 --prototype_warnings --exceptions -bsp=devtree-fsl-e500mc
	Static Debug	-DPtrIntType=long -DTARGET="p4080Inty11.devtree-fsl-e500mc.comp2013.5.4" -O0 --unknown_pragma_silent --link_once_templates -fexceptions --diag_error 223 --prototype_warnings --exceptions -bsp=devtree-fsl-e500mc
pentiumInty10.0.2.pcx86	Static Release	-DPtrIntType=long -DTARGET="pentiumInty10.0.2.pcx86" -O2 --unknown_pragma_silent --link_once_templates -fexceptions --diag_error 223 -prefixed_msgs -bsp=pcx86
	Static Debug	-DPtrIntType=long -DTARGET="pentiumInty10.0.2.pcx86" -O0 --unknown_pragma_silent --link_once_templates -fexceptions --diag_error 223 -prefixed_msgs -bsp=pcx86
pentiumInty11.pcx64	Static Release	-DPtrIntType=long -DTARGET="pentiumInty11.pcx64" -O2 --unknown_pragma_silent --link_once_templates -fexceptions --diag_error 223 -prefixed_msgs -x86_64 -cpu=pentium4 -bsp=p=pcx64
	Static Debug	-DPtrIntType=long -DTARGET="pentiumInty11.pcx64" -O0 --unknown_pragma_silent --link_once_templates -fexceptions --diag_error 223 -prefixed_msgs -x86_64 -cpu=pentium4 -bsp=p=pcx64
pentiumInty11.pcx86-smp	Static Release	-DPtrIntType=long -DTARGET="pentiumInty11.pcx86-smp" -O2 --unknown_pragma_silent --link_once_templates -fexceptions --diag_error 223 -prefixed_msgs -bsp=pcx86-smp
	Static Debug	-DPtrIntType=long -DTARGET="pentiumInty11.pcx86-smp" -O0 --unknown_pragma_silent --link_once_templates -fexceptions --diag_error 223 -prefixed_msgs -bsp=pcx86-smp

## 3.2 Support for Modern C++ API

*Connex DDS* provides two different C++ APIs, which we refer to as the "Traditional C++" and "Modern C++" APIs.

The Modern C++ API is available for all INTEGRITY platforms and has been tested with C++03. The INTEGRITY 11.4.4 architecture (pentiumInty11.pcx64) has also been tested with C++11.

**Notes:**

- Support for C++03 is deprecated starting with release 6.1.0, which is the last release that supports non-C++11-compliant compilers. After release 6.1.0, the Modern C++ API will require a C++11 compiler (or newer). The Traditional C++ API is not affected and continues to support C++98 compilers (or newer).
- Only the default plugin is supported. The legacy plugin has been removed from *Code Generator* starting with release 6.1.0.

For more information, see [Traditional vs. Modern C++, in the RTI Connext DDS Core Libraries User's Manual](#).

## 3.3 Multicast Support

Multicast is supported on all INTEGRITY platforms.

### 3.4 Supported Transports

- **Shared memory:** Supported, enabled by default. To clean up shared memory resources, reboot the kernel.
- **UDPv4:** Supported, enabled by default.
- **UDPv6:** Not supported.
- **TCP/IPv4:** Not supported.

### 3.5 Unsupported Features

The Modern C++ API for Request-Reply Communication is not supported on INTEGRITY 10.0.2 (pentiumInty10.0.2.pcx86) platforms. The Traditional C++ API for Request-Reply is supported.

These features are not supported on any INTEGRITY platform:

- Backtrace
- Controlling CPU Core Affinity
- Durable Writer History and Durable Reader State
- 'Find Package' CMake script
- Monotonic clock
- Remote Procedure Calls (an experimental feature)

## 3.6 Thread Configuration

See these tables:

- [Table 3.5 Thread Settings for INTEGRITY Platforms](#)
- [Table 3.6 Thread-Priority Definitions for INTEGRITY Platforms](#)

**Table 3.5 Thread Settings for INTEGRITY Platforms**

Applicable Thread	DDS_ ThreadSettings_t	Platform-Specific Setting
Asynchronous Publisher, Asynchronous flushing thread	mask	OS default thread type
	priority	16
	stack_size	64*1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
Database thread	mask	DDS_THREAD_SETTINGS_STUDIO
	priority	60
	stack_size	64*1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
Event thread	mask	DDS_THREAD_SETTINGS_STUDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	80
	stack_size	4*64*1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
ReceiverPool threads	mask	DDS_THREAD_SETTINGS_STUDIO
	priority	100
	stack_size	4*64*1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported

**Table 3.6 Thread-Priority Definitions for INTEGRITY Platforms**

Thread-Priority Definition	Operating-System Priority
THREAD_PRIORITY_DEFAULT	16
THREAD_PRIORITY_HIGH	120
THREAD_PRIORITY_ABOVE_NORMAL	100
THREAD_PRIORITY_NORMAL	90
THREAD_PRIORITY_BELOW_NORMAL	80
THREAD_PRIORITY_LOW	60

### 3.6.1 Socket-Enabled and POSIX-Enabled Threads are Required

On INTEGRITY platforms, *Connex DDS* internally relies on the POSIX API for many of its system calls. As a result, any thread calling *Connex DDS* must be POSIX-enabled. By default, the 'Initial' thread of an address space is POSIX-enabled, provided the address space has been linked with **libposix.a**. Additional user threads that call *Connex DDS* must be spawned from the Initial thread using **pthread\_create**. Only then is the created thread also POSIX-enabled. Note that tasks created at build time using the Integrate utility are *not* POSIX-enabled.

Furthermore, threads calling *Connex DDS* must be socket-enabled. This can be achieved by calling **InitLibSocket()** before making any *Connex DDS* calls and calling **ShutdownLibSocket** before the thread terminates. Note that an Initial thread is, by default, socket-enabled when the address space is linked with **libsocket.a**. Please refer to the *INTEGRITY Development Guide* for more information.

## 3.7 Libraries Required for Using Distributed Logger

*RTI Distributed Logger* is supported on INTEGRITY 11.0.4 on a P4080 CPU (p4080Inty11.devtree-fsl-e500mc.comp2013.5.4) and INTEGRITY 11.4.4 on an x64 CPU (pentiumInty11.pcx64). It is not supported on other INTEGRITY platforms.

[Table 3.7 Additional Libraries for using RTI Distributed Logger](#) lists the additional libraries you will need in order to use *Distributed Logger*.

**Table 3.7 Additional Libraries for using RTI Distributed Logger**

Language	Static	
	Release	Debug <sup>a</sup>
C	librtidlcz.a	librtidlczd.a (librtidlczd.dba)
C++ (Traditional API)	librtidlcz.a librtidlcppz.a	librtidlczd.a librtidlcppzd.a (librtidlczd.dba) (librtidlcppzd.dba)

### 3.8 Libraries Required for Using Monitoring

Make sure you are consistent in your use of debug and release versions of the libraries. For example, if your *Connex DDS* application is linked with the release version of the *Connex DDS* libraries, you will need to also use the release version of the monitoring library.

#### Notes:

- The RTI library in [Table 3.8 Additional Libraries for Using Monitoring](#) must appear *first* in the list of libraries to be linked.
- Automatic loading of the dynamic monitoring library through QoS is not supported.
- Memory and CPU usage is not available in monitoring data.

**Table 3.8 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>b</sup>
Static Release	librtimonitoringz.a
Static Debug	librtimonitoringzd.a

### 3.9 Libraries Required for Using RTI Real-Time WAN Transport APIs

If you choose to use *RTI Real-Time WAN Transport*, you must download and install a separate package that contains the transport libraries. See the [RTI Real-Time WAN Transport Installation Guide](#) for details.

<sup>a</sup>The \*.dba files contain the debugging information. You can link without these, as long as they are located in the same directory as the matching \*.d.a file (so that the MULTI® IDE can find the debug information).

<sup>b</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

Using *Real-Time WAN Transport* requires using one of the libraries in [Table 3.9 Additional Libraries for Using RTI Real-Time WAN Transport APIs](#). Select the file appropriate for your chosen library format.

For more information, see the "Enabling Real-Time WAN Transport" section in the *RTI Real-Time WAN Transport* part of the [RTI Connex DDS Core Libraries User's Manual](#).

**Table 3.9 Additional Libraries for Using RTI Real-Time WAN Transport APIs**

Library Format	Real-Time WAN Transport Libraries <sup>a</sup>
Static Release	libnddsrtwz.a
Static Debug	libnddsrtwzd.a

### 3.10 Libraries Required for Zero Copy Transfer Over Shared Memory

To use the Zero Copy Transfer Over Shared Memory feature, link against the additional library in [Table 3.10 Additional Libraries for Zero Copy Transfer Over Shared Memory](#).

**Table 3.10 Additional Libraries for Zero Copy Transfer Over Shared Memory**

Library Format	Zero Copy Transfer Over Shared Memory Libraries <sup>b</sup>
Static Release	libnddsmpz.a
Static Debug	libnddsmpzd.a

### 3.11 Running over IP Backplane on a Dy4 Champ-AVII Board

*Connex DDS* can run on all four CPUs, provided the following hold true:

- *Connex DDS* applications on CPUs B, C and D only exchange data with applications on a different CPU or off-board.
- The IP backplane and associated routing has been properly configured. *Connex DDS* has been tested with the following libraries built into the INTEGRITY kernel: **debug**, **res**, **load**, **socket**, **itcpip**, **lbp**, **queue**, **ifbp**, **idb**, **bsl**.

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>/lib/<architecture>.



## 3.12 Out-of-the-box Transport Compatibility with Other Connex DDS Platforms

Due to some default kernel parameters on INTEGRITY platforms, the default value for **message\_size\_max** for the UDPv4 transport, and the default values for **message\_size\_max**, **received\_message\_count\_max**, and **recv\_buffer\_size** for the shared-memory transport, are different than those for other platforms. This will cause out-of-the-box compatibility issues that may result in lack of communication. The mismatch in transport configuration between INTEGRITY and other platforms applies to *Connex DDS* 5.1.0 and higher. For more information, see the "Transport Compatibility" section in the *RTI Connex DDS Core Libraries Release Notes* for 5.3.1.

To address the compatibility issues, you can change the default transport settings of other platforms to match those of the INTEGRITY platform. Alternatively, you can update the INTEGRITY kernel parameters as described below so that the INTEGRITY platform will support larger transport settings.

The directive, `GM_IP_FRAG_ENTRY_MAX_SIZE`, limits the size of UDP packets that can be sent and received by INTEGRITY platforms. For details on this directive, please see Section 5.4.2 in the `networking.pdf` manual provided with the INTEGRITY kernel. The default value of `GM_IP_FRAG_ENTRY_MAX_SIZE` is 9216 bytes (not 16,000 bytes as is stated in the INTEGRITY documentation), which is why the default **message\_size\_max** for all transports supported for INTEGRITY is 9216 bytes.

If you want to send UDP messages larger than 9k, you must increase the value of `GM_IP_FRAG_ENTRY_MAX_SIZE` and rebuild the kernel. (You may also have to reconfigure other kernel parameters such as the socket, stack, and heap sizes to accommodate the larger value for `GM_IP_FRAG_ENTRY_MAX_SIZE`.) Failing to increase this value will cause failures when sending large UDP packets, and in some cases the `sendto()` call will fail silently.

### 3.12.1 Smaller Shared-Memory Receive-Resource Queue Size

INTEGRITY's shared-memory pluggable transport uses the shared-memory POSIX API. This API is part of the standard INTEGRITY distribution and is shipped as a library. The current version (5.0.4) of this library uses a hard-coded value for the total amount of memory that can be shared with an address space. This limits the overall buffer space that can be used by the *DomainParticipants* within the same address space to communicate over shared memory with other *DomainParticipants*.

To allow more *DomainParticipants* to run within the same address space, we reduced the default size of the queue for each receive resource of the shared memory transport. The queue size is reduced to eight messages. This change only applies to INTEGRITY architectures and this default value can be overwritten through the shared memory transport QoS.

### 3.12.2 Using Shared Memory on INTEGRITY Systems

*Connex DDS* uses the single address-space POSIX library to implement the shared-memory transport on INTEGRITY operating systems.

To use shared-memory, you must configure your system to include the POSIX shared-memory library. The **posix\_shm\_manager** must be running in an "AddressSpace" solely dedicated to it. After building any *Connex DDS* application that uses shared memory, you must use the **intex** utility (provided with the INTEGRITY development environment) to pack the application with multiple address-spaces: one (or more) to contain the *Connex DDS* application(s), and another one to contain the **posix\_shm\_manager**.

*Connex DDS* will run on a target without the **posix\_shm\_manager**, but the POSIX functions will fail and return **ENOSYS**, and the participants will fail to communicate through shared memory.

To include the POSIX Shared-Memory Manager in its own Address Space:

The project files generated by *rtiddsgen* for MULTI will create the shared-memory manager for you. Please follow these steps:

1. Specify the path to your INTEGRITY distribution in the **\_default.gpj** top-level project file by adding the following line (modify it according to the path to your INTEGRITY distribution):

```
-os_dir=/local/applications/integrity/integrity-10.0.2
```

2. Build the project.
3. Before running your *Connex DDS* application on a target, download the **posix\_shm\_manager** file (generated by the build) onto the target.

The POSIX Shared Memory Manager will start automatically after the download and your applications will be able to use shared memory.

#### Notes:

- Only *one* **posix\_shm\_manager** is needed on a particular target. INTEGRITY offers the option of building this **posix\_shm\_manager** *inside* the kernel. Please refer to the INTEGRITY documentation.
- If you are already using shared memory through the POSIX library, there may be a possible conflict.
- INTEGRITY has two different types of POSIX libraries: a single-address space one (or 'light') and another one (complete POSIX implementation). *Connex DDS* uses the first one, but will work if you are using the complete POSIX implementation.

### 3.12.3 Shared Memory Limitations on INTEGRITY Systems

If several applications are running on the same INTEGRITY node and are using shared memory, once an application is stopped, it cannot be restarted. When the application is stopped (gracefully or ungracefully), any new application on the same domain index within the same DDS domain will fail to start until the shared memory manager is also restarted.

Additionally, if the application is stopped ungracefully, the remaining applications will print several error messages such as the following until *Connex DDS* purges the stopped application from its database:

```
Resource Manager send error = 0x9
```

This error message is logged from INTEGRITY's POSIX shared memory manager, *not* from *Connex* *DDS*. The error message is benign and will not prevent the remaining applications from communicating with each other or with application on other nodes.

The workaround is to either restart the stopped application with a different participant index or shut down all the other applications and the shared memory manager, then restart everything.

## 3.13 Using `rtiddsping` and `rtiddsspy` on INTEGRITY Systems

While the RTI libraries for INTEGRITY can be used with any BSP, providing the processor falls under the same category (for example, the `ppc7400...` RTI libraries can be used on any target with a PPC74xx processor), `rtiddsping` and `rtiddsspy` are provided as executables, and therefore are BSP-dependent. You will not be able to run them successfully on your target if it is not compatible with the BSP listed in the architecture name (such as `pcx86-smp`). In this case, you will need to re-integrate the `rtiddsping` and `rtiddsspy` applications. Please refer to your hardware documentation for peripheral compatibility across BSPs.

## 3.14 Issues with INTEGRITY Systems

### 3.14.1 Delay When Writing to Unreachable Peers

On INTEGRITY systems, if a publishing application's initial peers list includes a nonexistent (or simply unreachable) host, calls to `write()` may block for approximately 1 second.

This long block is caused by the stack trying to resolve the invalid/unreachable host. Most IP stacks do not block the sending thread because of this reason, and you may include invalid/unreachable hosts in your initial-peers list. If you find that your stack does block the sending thread, please consult your IP stack vendor on how to change its behavior. [RTI Issue ID CORE-1637]

### 3.14.2 Linking with 'libivfs.a' without a File System

If you link your application with `libivfs.a` and are using a system that does not have a file system, you may notice the application blocks for 2 seconds at start-up.

### 3.14.3 Compiler Warnings Regarding Unrecognized `#pragma` Directives

Building *Connex* *DDS* projects for INTEGRITY causes the compiler to produce several warnings about `#pragma` directives not recognized in some *Connex* *DDS* header files. For example:

```
Building default.bld
"C:/ndds/ndds.4.4x/include/ndds/dds_c/dds_c_infrastructure.h", line 926:
warning: unrecognized #pragma
    #pragma warning(push)
        ^
"C:/ndds/ndds.4.4x/include/ndds/dds_c/dds_c_infrastructure.h", line 927:
warning: unrecognized #pragma
```

### 3.14.3 Compiler Warnings Regarding Unrecognized #pragma Directives

---

```
#pragma warning(disable:4190)
    ^
"C:/ndds/ndds.4.4x/include/ndds/dds_c/dds_c_infrastructure.h", line 945:
warning: unrecognized #pragma
    #pragma warning(pop)
    ^
```

These warnings do not compromise the final application produced and can be safely ignored.

# Chapter 4 INtime Platforms

Table 4.1 Custom Supported INtime Platforms lists the supported INtime® platforms.

**Table 4.1 Custom Supported INtime Platforms**

Operating System	CPU	Compiler	RTI Architecture Abbreviation
INtime 6.3 on 64-bit Windows 10 (Available on demand)	x86	Microsoft Visual Studio 2017 (32-bit)	i86INtime6.3VS2017

For more information on using this platform, including important prerequisites, see the [RTI Connex DDS Core Libraries Getting Started Guide Addendum for INtime Systems](#).

Required INtime flags are also needed; see [http://support.tenasys.com/INtimeHelp/62/Using\\_Develop.html#i-in-this-topic-2da985ef-15c5-40a0-9567-9902d909929f](http://support.tenasys.com/INtimeHelp/62/Using_Develop.html#i-in-this-topic-2da985ef-15c5-40a0-9567-9902d909929f).

Table 4.2 Building Instructions lists the compiler flags and libraries you will need to link into your application.

Table 4.3 Running Instructions shows the environment variables required to be set at run time.

Table 4.4 Library-Creation Details provides details on how these custom libraries were built. This table is provided strictly for informational purposes; you do not need to use these parameters to compile your application. You may find this information useful if you are involved in any in-depth debugging.

See also:

- [4.7 Libraries Required for Using Distributed Logger Support on page 37](#)
- [4.8 Libraries Required for Using Monitoring on page 37](#)

- [4.9 Libraries Required for Using RTI Real-Time WAN Transport APIs on page 38](#)
- [4.10 Libraries Required for Zero Copy Transfer over Shared Memory on page 38](#)

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

Table 4.2 Building Instructions

API	Library Format	Required RTI Libraries <sup>ab</sup>	Required INtime Libraries	Required Compiler Flags
C++ (Traditional and Modern APIs)	Static Release	nddscorez.lib nddscz.lib nddscppz.lib or nddscpp2z.lib rticonnextmsgcppz.lib or rticonnextmsgcpp2z.lib	iwin32.lib cpplib17.lib rt.lib pcibus.lib netlib.lib clib.lib vshelper.lib	/Gd /GR /EHa /MT /D "RTI_INTIME" /D "NDEBUG" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /D "RTI_STATIC"
	Static Debug	nddscorezd.lib nddsczd.lib nddscppzd.lib or nddscpp2zd.lib rticonnextmsgcppzd.lib or rticonnextmsgcpp2zd.lib	iwin32.lib cpplib17d.lib rt.lib pcibus.lib netlib.lib clib.lib vshelper.lib	/Gd /GR /EHa /MT /D "RTI_INTIME" /D "_DEBUG" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /D "RTI_STATIC"
	Dynamic Release	nddscore.lib nddsc.lib nddscpp.lib or nddscpp2.lib rticonnextmsgcpp.lib or rticonnextmsgcpp2.lib	iwin32.lib cpplib17.lib rt.lib pcibus.lib netlib.lib clib.lib vshelper.lib	/Gd /GR /EHa /MT /D "RTI_INTIME" /D "NDEBUG" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /D "NDDS_DLL_VARIABLE"
	Dynamic Debug	nddscored.lib nddscd.lib nddscppd.lib or nddscpp2d.lib rticonnextmsgcppd.lib or rticonnextmsgcpp2d.lib	iwin32.lib cpplib17d.lib rt.lib pcibus.lib netlib.lib clib.lib vshelper.lib	/Gd /GR /EHa /MT /D "RTI_INTIME" /D "_DEBUG" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /D "NDDS_DLL_VARIABLE"

<sup>a</sup>The C/C++ libraries are in <NDDSHOME>/lib/<architecture> (where <NDDSHOME> is where *Connex DDS* is installed, such as /home/your user name/rti\_connex\_dds-6.x.y).

<sup>b</sup>Choose \*cpp\*.\* for the Traditional C++ API or \*cpp2\*.\* for the Modern C++ API.

Table 4.2 Building Instructions

API	Library Format	Required RTI Libraries <sup>ab</sup>	Required INtime Libraries	Required Compiler Flags
C	Static Release	nddscorez.lib nddscz.lib rticonnextmsgcz.lib	iwin32.lib rt.lib pcibus.lib netlib.lib clib.lib vshelper.lib	/Gd /GR /EHa /MT /D "RTI_INTIME" /D "NDEBUG" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /D "RTI_STATIC"
	Static Debug	nddscorezd.lib nddsczd.lib rticonnextmsgczd.lib	iwin32.lib rt.lib pcibus.lib netlib.lib clib.lib vshelper.lib	/Gd /GR /EHa /MT /D "RTI_INTIME" /D "_DEBUG" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /D "RTI_STATIC"
	Dynamic Release	nddscore.lib nddsc.lib rticonnextmsgc.lib	iwin32.lib rt.lib pcibus.lib netlib.lib clib.lib vshelper.lib	/Gd /GR /EHa /MT /D "RTI_INTIME" /D "NDEBUG" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /D "NDDS_DLL_VARIABLE"
	Dynamic Debug	nddscored.lib nddscd.lib rticonnextmsgcd.lib	iwin32.lib rt.lib pcibus.lib netlib.lib clib.lib vshelper.lib	/Gd /GR /EHa /MT /D "RTI_INTIME" /D "_DEBUG" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /D "NDDS_DLL_VARIABLE"

<sup>a</sup>The C/C++ libraries are in <NDDSHOME>/lib/<architecture> (where <NDDSHOME> is where *Connex DDS* is installed, such as /home/your user name/rti\_connex\_dds-6.x.y).

<sup>b</sup>Choose \*cpp\*.\* for the Traditional C++ API or \*cpp2\*.\* for the Modern C++ API.



Table 4.3 Running Instructions

RTI Architecture	Library Format (Release and Debug)	Environment Variables <sup>a</sup>
i86INtime6.3VS2017	Static	None required
	Dynamic	Path=%NDDSHOME%\lib\ <i>architecture</i> ; %Path%

Table 4.4 Library-Creation Details

RTI Architecture	API	Library Format	Compiler Flags Used by RTI
i86INtime6.3VS2017	C	Dynamic Release	/nologo /D "__C99__" /D "__INTIME__" /W3 /FS /WX- /FC /X /Zi /openmp- /Gy- /Zc:inline /fp:except- /Gm- /Oy- -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=180586 -DTARGET="i86INtime6.3VS2017" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /std:c++latest /O2 /MT /GS- -DNDEBUG
		Dynamic Debug	/nologo /D "__C99__" /D "__INTIME__" /W3 /FS /WX- /FC /X /Zi /openmp- /Gy- /Zc:inline /fp:except- /Gm- /Oy- -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=180586 -DTARGET="i86INtime6.3VS2017" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /std:c++latest /Od /MT /GS /D "_DEBUG"
		Static Release	/nologo /D "__C99__" /D "__INTIME__" /W3 /FS /WX- /FC /X /Zi /openmp- /Gy- /Zc:inline /fp:except- /Gm- /Oy- -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=180586 -DTARGET="i86INtime6.3VS2017" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /std:c++latest /O2 /MT /GS- -DNDEBUG
		Static Debug	/nologo /D "__C99__" /D "__INTIME__" /W3 /FS /WX- /FC /X /Zi /openmp- /Gy- /Zc:inline /fp:except- /Gm- /Oy- -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=180586 -DTARGET="i86INtime6.3VS2017" /FI"windows.h" /FI"iwin32.h" /FI"winbase.h" /std:c++latest /Od /MT /GS /D "_DEBUG"

<sup>a</sup>%Path% represents the value of the Path variable prior to changing it to support *Connexx DDS*.

Table 4.4 Library-Creation Details

RTI Architecture	API	Library Format	Compiler Flags Used by RTI
i86INtime6.3VS2017	C++	Dynamic Release	/TP/EHa/D"__INTIME_CPP17"/D"_HAS_NAMESPACE" /D"_SILENCE_ALL_CXX17_DEPRECATION_WARNINGS"/D"UNICODE"/D"_UNICODE" /D"__INTIME_CPP17_ITERATORS"/nologo/D"__C99__"/D"__INTIME__" /W3/FS/WX-/FC/X/Zi/openmp-/Gy-/Zc:inline/fp:except-/Gm-/Oy--DPtrIntType=long -DCSREAL_IS_FLOAT-DCPU=i80586-DTARGET="\i86INtime6.3VS2017\ /FI"windows.h"/FI"win32.h"/FI"winbase.h"/std:c++latest /O2/MT/GS--DNDEBUG
		Dynamic Debug	/TP/EHa/D"__INTIME_CPP17"/D"_HAS_NAMESPACE" /D"_SILENCE_ALL_CXX17_DEPRECATION_WARNINGS"/D"UNICODE"/D"_UNICODE" /D"__INTIME_CPP17_ITERATORS"/nologo/D"__C99__"/D"__INTIME__" /W3/FS/WX-/FC/X/Zi/openmp-/Gy-/Zc:inline/fp:except-/Gm-/Oy--DPtrIntType=long -DCSREAL_IS_FLOAT-DCPU=i80586-DTARGET="\i86INtime6.3VS2017\ /FI"windows.h"/FI"win32.h"/FI"winbase.h"/std:c++latest /Od/MT/GS/D"_DEBUG"
		Static Release	/TP/EHa/D"__INTIME_CPP17"/D"_HAS_NAMESPACE" /D"_SILENCE_ALL_CXX17_DEPRECATION_WARNINGS"/D"UNICODE"/D"_UNICODE" /D"__INTIME_CPP17_ITERATORS"/nologo/D"__C99__"/D"__INTIME__" /W3/FS/WX-/FC/X/Zi/openmp-/Gy-/Zc:inline/fp:except-/Gm-/Oy--DPtrIntType=long -DCSREAL_IS_FLOAT-DCPU=i80586-DTARGET="\i86INtime6.3VS2017\ /FI"windows.h"/FI"win32.h"/FI"winbase.h"/std:c++latest /O2/MT/GS--DNDEBUG
		Static Debug	/TP/EHa/D"__INTIME_CPP17"/D"_HAS_NAMESPACE" /D"_SILENCE_ALL_CXX17_DEPRECATION_WARNINGS"/D"UNICODE" /D"_UNICODE"/D"__INTIME_CPP17_ITERATORS"/nologo/D"__C99__"/D"__INTIME__" /W3/FS/WX-/FC/X/Zi/openmp-/Gy-/Zc:inline/fp:except-/Gm-/Oy--DPtrIntType=long -DCSREAL_IS_FLOAT-DCPU=i80586-DTARGET="\i86INtime6.3VS2017\ /FI"windows.h"/FI"win32.h"/FI"winbase.h"/std:c++latest /Od/MT/GS/D"_DEBUG"

## 4.1 Support for Modern C++ API

*Connex DDS* provides two different C++ APIs, which we refer to as the "Traditional C++" and "Modern C++" APIs.

The Modern C++ API is available for INtime platforms. Both C++03 and C++11 have been tested.

### Notes:

- Support for C++03 is deprecated starting with release 6.1.0, which is the last release that supports non-C++11-compliant compilers. After release 6.1.0, the Modern C++ API will require a C++11 compiler (or newer). The Traditional C++ API is not affected and continues to support C++98 compilers (or newer).
- Only the default plugin is supported. The legacy plugin has been removed, starting with release 6.1.0.

For more information, see [Traditional vs. Modern C++, in the RTI Connex DDS Core Libraries User's Manual](#).

## 4.2 Multicast Support

Multicast is supported and is configured out of the box. That is, the default value for the initial peers list (`NDDS_DISCOVERY_PEERS`) includes a multicast address. See the online documentation for more information.

## 4.3 Supported Transports

- **Shared memory:** Supported and enabled by default
- **UDPv4:** Supported and enabled by default
- **UDPv6:** Supported, with traffic class support. The transport is not enabled by default; the peers list must be modified to support IPv6.
- **TCP/IPv4:** Not supported.

## 4.4 Unsupported Features

These features are not supported on INtime platforms:

- Backtrace
- Controlling CPU Core Affinity
- Durable Writer History and Durable Reader State
- 'Find Package' CMake script
- Setting of thread names by *Connex DDS* at the operating-system level

## 4.5 Monotonic Clock Support

The monotonic clock (described in *Clock Selection* in the [RTI Connex DDS Core Libraries User's Manual](#)) is supported on INtime platforms.

## 4.6 Support for Remote Procedure Calls (RPC)

RPC is an experimental feature available only for the C++11 API. It is supported on INtime architectures.

See *Remote Procedure Calls(RPC)* in the [RTI Connex DDS Core Libraries User's Manual](#).

## 4.7 Libraries Required for Using Distributed Logger Support

*RTI Distributed Logger* is supported on INtime platforms. [Table 4.5 Additional Libraries for using RTI Distributed Logger](#) lists the additional libraries you will need in order to use *Distributed Logger*.

**Table 4.5 Additional Libraries for using RTI Distributed Logger**

Language	Static		Dynamic	
	Release	Debug	Release	Debug
C	rtidlcz.lib	rtidlczd.lib	rtidlc.rsl	rtidlcd.rsl
C++ (Traditional API)	rtidlcz.lib rtidlcppz.lib	rtidlczd.lib rtidlcppzd.lib	rtidlc.rsl rtidlcpp.rsl	rtidlcd.rsl rtidlcppd.rsl

## 4.8 Libraries Required for Using Monitoring

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. For example, if your *Connex* DDS application is linked with the static release version of the *Connex* DDS libraries, you will need to also use the static release version of the monitoring library. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

If you are statically linking your application with DDS libraries and you want to add monitoring to your application, you will also need to statically link the monitoring library. The library cannot be loaded dynamically strictly through the QoS profile because it also depends on DDS to publish its data. Therefore, it depends on DDS; the DDS functionality would cause duplicate symbols to be found resulting, in the termination of the process.

**Table 4.6 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>a</sup>
Dynamic Release	rtimonitoring.lib rtimonitoring.rsl
Dynamic Debug	rtimonitoringd.lib rtimonitoringd.rsl
Static Release	rtimonitoringz.lib Psapi.lib
Static Debug	rtimonitoringzd.lib Psapi.lib

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

## 4.9 Libraries Required for Using RTI Real-Time WAN Transport APIs

If you choose to use *RTI Real-Time WAN Transport*, you must download and install a separate package that contains the transport libraries. See the [RTI Real-Time WAN Transport Installation Guide](#) for details.

Using *Real-Time WAN Transport* requires one of the libraries in [Table 4.7 Additional Libraries for Using RTI Real-Time WAN Transport APIs](#). Select the file appropriate for your chosen library format.

For more information, see the "Enabling Real-Time WAN Transport" section in the *RTI Real-Time WAN Transport* part of the [RTI Connex DDS Core Libraries User's Manual](#).

**Table 4.7 Additional Libraries for Using RTI Real-Time WAN Transport APIs**

Library Format	Real-Time WAN Transport Libraries <sup>a</sup>
Dynamic Release	nddsrwt.rsl
Dynamic Debug	nddsrwtd.rsl
Static Release	nddsrwtz.lib
Static Debug	nddsrwtzd.lib

## 4.10 Libraries Required for Zero Copy Transfer over Shared Memory

To use the Zero Copy Transfer Over Shared Memory feature, link against the additional library in [Table 4.8 Additional Libraries for Zero Copy Transfer Over Shared Memory](#).

**Table 4.8 Additional Libraries for Zero Copy Transfer Over Shared Memory**

Library Format	Zero Copy Transfer Over Shared Memory Libraries <sup>b</sup>
Dynamic Release	nddsmetp.rsl
Dynamic Debug	ddsmetpd.rsl
Static Release	nddsmetpz.lib
Static Debug	nddsmetpzd.lib

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

# Chapter 5 Linux Platforms

First, see the basic instructions for compiling Linux Platforms in the *Building Applications* chapter in the [RTI Connex DDS Core Libraries User's Manual](#). The following tables provide supplemental information.

[Table 5.1 Linux Platforms on Intel CPUs below](#) and [Table 5.2 Linux Platforms on Other CPUs on page 41](#) list the supported Linux architectures.

**Table 5.1 Linux Platforms on Intel CPUs**

Operating System	CPU	Compiler	RTI Architecture Abbreviation
CentOS™ 6.0, 6.2-6.4 (2.6 kernel)	x64	gcc 4.4.5	x64Linux2.6gcc4.4.5
		Java Platform, Standard Edition JDK 11	
CentOS 7.0 (3.x kernel)	x64	gcc 4.8.2	x64Linux3gcc4.8.2 x64Linux3gcc4.8.2FACE_ GP <sup>a</sup>
		Java Platform, Standard Edition JDK 11	x64Linux3gcc4.8.2
Red Hat Enterprise Linux 6.0-6.5, 6.7, 6.8 (2.6 kernel)	x64	gcc 4.4.5	x64Linux2.6gcc4.4.5
		Java Platform, Standard Edition JDK 11	

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<sup>a</sup>The architecture x64Linux3gcc4.8.2FACE\_GP is made available with *RTI Connex TSS*. See [5.5 Limitations of FACE Architectures on page 52](#).

Table 5.1 Linux Platforms on Intel CPUs

Operating System	CPU	Compiler	RTI Architecture Abbreviation
Red Hat Enterprise Linux 7.0, 7.3, 7.5, 7.6 (3.x kernel)	x64	gcc 4.8.2	x64Linux3gcc4.8.2 x64Linux3gcc4.8.2FACE_GP <sup>a</sup>
		Java Platform, Standard Edition JDK 11	x64Linux3gcc4.8.2
Red Hat Enterprise Linux 8.0	x64	gcc 7.3.0	x64Linux4gcc7.3.0 x64Linux4gcc7.3.0FACE_GP <sup>b</sup>
		Java Platform, Standard Edition JDK 11	x64Linux4gcc7.3.0
RedHawk Linux 6.0 <i>Custom-supported target platform. Contact your RTI sales representative or sales@rti.com for more information.</i>	x64	gcc 4.4.5	x64Linux2.6gcc4.4.5
RedHawk Linux 6.5 <i>Custom-supported target platform. Contact your RTI sales representative or sales@rti.com for more information.</i>	x86	gcc 4.9.2	i86RedHawk6.5gcc4.9.2
	x64	gcc 4.9.2	x86RedHawk6.5gcc4.9.2
Java Platform, Standard Edition JDK 11			
SUSE Linux Enterprise Server 12 SP2 (2.6 kernel)	x64	gcc 4.3.4	x64Linux2.6gcc4.3.4
		Java Platform, Standard Edition JDK 11	
Ubuntu 14.04 LTS	x64	gcc 4.8.2	x64Linux3gcc4.8.2 x64Linux3gcc4.8.2FACE_GP <sup>c</sup>
		Java Platform, Standard Edition JDK 11	x64Linux3gcc4.8.2
Ubuntu 16.04 LTS	x64	gcc 5.4.0	x64Linux3gcc5.4.0
		Java Platform, Standard Edition JDK 11	

<sup>a</sup>The architecture x64Linux3gcc4.8.2FACE\_GP is made available with *RTI ConnexT TSS*. See [5.5 Limitations of FACE Architectures on page 52](#).

<sup>b</sup>The architecture x64Linux4gcc7.3.0FACE\_GP is made available with *RTI ConnexT TSS*. See [5.5 Limitations of FACE Architectures on page 52](#).

<sup>c</sup>The architecture x64Linux3gcc4.8.2FACE\_GP is made available with *RTI ConnexT TSS*. See [5.5 Limitations of FACE Architectures on page 52](#).

Table 5.1 Linux Platforms on Intel CPUs

Operating System	CPU	Compiler	RTI Architecture Abbreviation
Ubuntu 18.04 LTS	x64	gcc 7.3.0	x64Linux4gcc7.3.0 x64Linux4gcc7.3.0FACE_ GP <sup>a</sup>
		Java Platform, Standard Edition JDK 11	x64Linux4gcc7.3.0
Ubuntu 20.04 LTS	x64	gcc 7.3.0	x64Linux4gcc7.3.0
		Java Platform, Standard Edition JDK 11	

Table 5.2 Linux Platforms on Other CPUs

Operating System	CPU	Compiler	RTI Architecture Abbreviation
NI Linux 3	Arm v7	gcc 4.4.1	armv7AngstromLinux3.2gcc4.4.1.cortex- a9 <sup>b</sup>
Ubuntu 16.04 LTS	Arm v8	gcc 5.4.0	armv8Linux4.4gcc5.4.0
		Java Platform, Standard Edition JDK 11	
Ubuntu 18.04 LTS	Arm v7	gcc 7.5.0	armv7Linux4gcc7.5.0
		Java Platform, Standard Edition JDK 11	
	Arm v8	gcc 7.3.0	armv8Linux4gcc7.3.0
		Java Platform, Standard Edition JDK 11	
Wind River Linux 8 <i>Custom-supported target platform. Contact your RTI sales representative or sales@rti.com for more information.</i>	Arm v7	gcc 5.2.0	armv7aWRLinux8gcc5.2.0
		Java Platform, Standard Edition JDK 11	

<sup>a</sup>The architecture x64Linux4gcc7.3.0FACE\_GP is made available with *RTI ConnexT TSS*. See [5.5 Limitations of FACE Architectures on page 52](#).

<sup>b</sup>These libraries require a hardware FPU in the processor and are compatible with systems that have soft-float libc. See platform notes for compiler flag details.



**Table 5.2 Linux Platforms on Other CPUs**

Operating System	CPU	Compiler	RTI Architecture Abbreviation
Yocto Project 2.5 <i>Custom-supported target platform. Contact your RTI sales representative or sales@rti.com for more information.</i>	Arm v8	gcc 7.3.0	armv8Linux4gcc7.3.0

[Table 5.3 Building Instructions for Linux Architectures on the next page](#) lists the compiler flags and libraries you will need to link into your application.

See these sections for other libraries you may need:

- [5.12 Libraries Required for Using Distributed Logger on page 58](#)
- [5.13 Libraries Required for Using Monitoring on page 58](#)
- [5.14 Libraries Required for Using RTI Real-Time WAN Transport APIs on page 59](#)
- [5.15 Libraries Required for Using RTI Secure WAN Transport APIs on page 59](#)
- [5.16 Libraries Required for Using RTI TCP Transport and TLS Support APIs on page 60](#)
- [5.17 Libraries Required for Zero Copy Transfer Over Shared Memory on page 61](#)

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

Table 5.3 Building Instructions for Linux Architectures

API	Library Format	Required RTI Libraries or Jar Files <sup>ab</sup>	Required System Libraries	Required Compiler Flags	
C++ (Traditional and Modern APIs)	Static Release	libniddscorez.a libniddscz.a libniddscppz.a or libniddscpp2z.a  librticonnextmsgcppz.a or librticonnextmsgcpp2z.a	-ldl -lm -lpthread -lrt	For 64-bit architectures (except Yocto Project): -DRTI_UNIX -m64  For 32-bit architectures: -DRTI_UNIX -m32	
	Static Debug	libniddscorezd.a libniddsczd.a libniddscppzd.a or libniddscpp2zd.a  librticonnextmsgcppzd.a or librticonnextmsgcpp2zd.a		For any Linux with GCC 6 or higher, linker flag (see <b>Note</b> below table): -no-pie  For Ubuntu 18.04 LTS on Arm v7: -march=armv7 -mthumb -mfloat-abi=hard -mabi=aapcs-linux -funwind-tables	
	Dynamic Release	libniddscore.so libniddsc.so libniddscpp.so or libniddscpp2.so  librticonnextmsgcpp.so or librticonnextmsgcpp2.so		For Yocto Project, also add:  -L/usr/lib/nptl	For Wind River Linux 7/8 on Arm v7: -DRTI_UNIX  For Yocto Project: -DRTI_UNIX -m32 --sysroot =SYSROOT
	Dynamic Debug	libniddscored.so libniddscd.so libniddscppd.so or libniddscpp2d.so  librticonnextmsgcppd.so or librticonnextmsgcpp2d.so			For all architectures, if you want backtrace information, also add:  <b>Compiler flag:</b> -fno-omit-frame-pointer  <b>Linker flag:</b> -rdynamic  <b>Arm architectures:</b> -funwind-tables  (see <a href="#">5.10 Backtrace Support on page 56</a> )

<sup>a</sup>Choose `*cpp*.*` for the Traditional C++ API or `*cpp2*.*` for the Modern C++ API.

<sup>b</sup>RTI C/C++/Java libraries are in `<NDDSHOME>/lib/<architecture>`. The jar files are in `<NDDSHOME>/lib/java`.

Table 5.3 Building Instructions for Linux Architectures

API	Library Format	Required RTI Libraries or Jar Files <sup>ab</sup>	Required System Libraries	Required Compiler Flags	
C	Static Release	libnndscorez.a libnndscz.a librticonnextmsgcz.a	-ldl -lm -lpthread -lrt	For 64-bit architectures (except Yocto Project): -DRTI_UNIX -m64  For 32-bit architectures: -DRTI_UNIX -m32  For any Linux with GCC 6 or higher, linker flag (see <b>Note</b> below table): -no-pie  For Ubuntu 18.04 LTS on Arm v7: -march=armv7 -mthumb -mfloat-abi=hard -mabi=aapcs-linux -funwind-tables	
	Static Debug	libnndscorezd.a libnndsczd.a librticonnextmsgczd.a		For Yocto Project, also add: -L/usr/lib/nptl	For Wind River Linux 7/8 on Arm v7: -DRTI_UNIX  For Yocto Project: -DRTI_UNIX -m32 --sysroot=SYSROOT
	Dynamic Release	libnndscore.so libnndsc.so librticonnextmsgc.so			For all architectures, if you want backtrace information, also add: <b>Compiler flag:</b> -fno-omit-frame-pointer <b>Linker flag:</b> -rdynamic <b>Arm architectures:</b> -funwind-tables (see <a href="#">5.10 Backtrace Support on page 56</a> )
	Dynamic Debug	libnndscored.so libnndscd.so librticonnextmsgcd.so			
Java	Release	nndsjava.jar rticonnextmsg.jar	N/A	None required	
	Debug	nndsjavad.jar rticonnextmsgd.jar			

**Note:** For any Linux with GCC 6 or higher: Starting with GCC 6, it's possible to configure the compiler driver to link, by default, executables with PIE (position independent executable) support on the amd64 and ppc64el architectures. Depending on the distributor of the GCC package, the automatic PIE

<sup>a</sup>Choose \*cpp\*.\* for the Traditional C++ API or \*cpp2\*.\* for the Modern C++ API.

<sup>b</sup>RTI C/C++/Java libraries are in <NDDSHOME>/lib/<architecture>. The jar files are in <NDDSHOME>/lib/java.

generation may or may not be enabled. PIE executables cannot be used with RTI's libraries, due to Address Space Layout Randomization (ASLR). For this reason, RTI has linked Linux executables using the **-no-pie** flag when the GCC version is 6 or higher. If you are using GCC 6 or newer, you must link the executable with **-no-pie** to prevent PIE generation.

[Table 5.4 Running Instructions for Linux Architectures below](#) provides details on the environment variables that must be set at run time for a Linux architecture.

**Table 5.4 Running Instructions for Linux Architectures**

RTI Architecture	Library Format	Environment Variables
All supported Linux architectures when using Java	N/A	LD_LIBRARY_PATH= \${NDDSHOME}/lib/<architecture>: \${LD_LIBRARY_PATH} <b>Note:</b> For all 64-bit Java architectures (...64Linux...), use <b>-d64</b> in the command line.
All supported Linux architectures when <u>not</u> using Java	Static (Release & Debug)	None required
	Dynamic (Release & Debug)	LD_LIBRARY_PATH= \${NDDSHOME}/lib/<architecture>: \${LD_LIBRARY_PATH}

[Table 5.5 Library-Creation Details for Linux Architectures below](#) provides details on how the Linux libraries were built. This table is provided strictly for informational purposes; you do not need to use these parameters to compile your application. You may find this information useful if you are involved in any in-depth debugging.

**Table 5.5 Library-Creation Details for Linux Architectures**

RTI Architecture	Library Format	Compiler Flags Used by RTI
armv6vfphLinux3.x gcc4.7.2 (deprecated, available on demand)	Static Release	-O0 -Wall -Wno-unknown-pragmas -march=armv6 -mfpv=vfp -mfloat-abi=hard -mlong-calls -fno-omit-frame-pointer -funwind-tables -O0 -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\armv6vfphLinux3.xgcc4.7.2"
	Static Debug	-O0 -Wall -Wno-unknown-pragmas -march=armv6 -mfpv=vfp -mfloat-abi=hard -mlong-calls -fno-omit-frame-pointer -funwind-tables -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\armv6vfphLinux3.xgcc4.7.2"
	Dynamic Release	-O0 -Wall -Wno-unknown-pragmas -march=armv6 -mfpv=vfp -mfloat-abi=hard -mlong-calls -fno-omit-frame-pointer -funwind-tables -O0 -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\armv6vfphLinux3.xgcc4.7.2"
	Dynamic Debug	-O0 -Wall -Wno-unknown-pragmas -march=armv6 -mfpv=vfp -mfloat-abi=hard -mlong-calls -fno-omit-frame-pointer -funwind-tables -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\armv6vfphLinux3.xgcc4.7.2"

Table 5.5 Library-Creation Details for Linux Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
armv7Angstrom Linux3.2 gcc4.4.1.cortex-a9	Static Release	-O -march=armv7-a -mtune=cortex-a9 -mfloat-abi=softfp -mcpu=vfpv3 -mthumb -mlong-calls -fno-omit-frame-pointer -funwind-tables -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\armv7AngstromLinux3.2gcc4.4.1.cortex-a9"
	Static Debug	-O0 -march=armv7-a -mtune=cortex-a9 -mfloat-abi=softfp -mcpu=vfpv3 -mthumb -mlong-calls -fno-omit-frame-pointer -funwind-tables -O0 -g -DLINUX -DPtrIntType=long -DTARGET-T="\armv7AngstromLinux3.2gcc4.4.1.cortex-a9"
	Dynamic Release	-O -march=armv7-a -mtune=cortex-a9 -mfloat-abi=softfp -mcpu=vfpv3 -mthumb -mlong-calls -fno-omit-frame-pointer -funwind-tables -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\armv7AngstromLinux3.2gcc4.4.1.cortex-a9"
	Dynamic Debug	-O0 -march=armv7-a -mtune=cortex-a9 -mfloat-abi=softfp -mcpu=vfpv3 -mthumb -mlong-calls -fno-omit-frame-pointer -funwind-tables -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET-T="\armv7AngstromLinux3.2gcc4.4.1.cortex-a9"
armv7aWRLinux8 gcc5.2.0	Static Release	-O -Wall -Wno-unknown-pragmas -march=armv7-a -mfloat-abi=hard -mcpu=neon -marm -mtune=cortex-a7 -fno-omit-frame-pointer -funwind-tables -O -DNDEBUG -DLINUX -DPtrIntType=e=long -DTARGET="\armv7aWRLinux8gcc5.2.0"
	Static Debug	-O0 -Wall -Wno-unknown-pragmas -march=armv7-a -mfloat-abi=hard -mcpu=neon -marm -mtune=cortex-a7 -fno-omit-frame-pointer -funwind-tables -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\armv7aWRLinux8gcc5.2.0"
	Dynamic Release	-O -Wall -Wno-unknown-pragmas -march=armv7-a -mfloat-abi=hard -mcpu=neon -marm -mtune=cortex-a7 -fno-omit-frame-pointer -funwind-tables -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\armv7aWRLinux8gcc5.2.0"
	Dynamic Debug	-O0 -Wall -Wno-unknown-pragmas -march=armv7-a -mfloat-abi=hard -mcpu=neon -marm -mtune=cortex-a7 -fno-omit-frame-pointer -funwind-tables -O0 -g -fPIC -DLINUX -DPtrIntType=e=long -DTARGET="\armv7aWRLinux8gcc5.2.0"
armv7Linuxgcc7.3.0	Release	Available on demand. Contact support@rti.com.
	Debug	
armv7Linux4gcc7.5.0	Release (static and dynamic)	-Wall -Wno-unknown-pragmas -march=armv7 -mthumb -mfloat-abi=hard -mabi=aapcs-linux -fno-omit-frame-pointer -funwind-tables -O -DNDEBUG -fPIC
	Debug (static and dynamic)	-Wall -Wno-unknown-pragmas -march=armv7 -mthumb -mfloat-abi=hard -mabi=aapcs-linux -fno-omit-frame-pointer -funwind-tables -O0 -g -fPIC
armv8Linux4gcc7.3.0	Static Release	-O -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -funwind-tables -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\armv8Linux4gcc7.3.0"
	Static Debug	-O0 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -funwind-tables -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\armv8Linux4gcc7.3.0"
	Dynamic Release	-O -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -funwind-tables -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\armv8Linux4gcc7.3.0"
	Dynamic Debug	-O0 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -funwind-tables -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\armv8Linux4gcc7.3.0"

Table 5.5 Library-Creation Details for Linux Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
armv8Linux4.4gcc5.4.0	Static Release	-O -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -funwind-tables -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\armv8Linux4.4gcc5.4.0\"
	Static Debug	-O0 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -funwind-tables -g -DLINUX -DPtrIntType=long -DTARGET="\armv8Linux4.4gcc5.4.0\"
	Dynamic Release	-O -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -funwind-tables -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\armv8Linux4.4gcc5.4.0\"
	Dynamic Debug	-O0 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -funwind-tables -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\armv8Linux4.4gcc5.4.0\"
i86Linux2.6gcc4.4.5 (deprecated, available on demand)	Static Release	-O -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\i86Linux2.6gcc4.4.5\"
	Static Debug	-O0 -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\i86Linux2.6gcc4.4.5\"
	Dynamic Release	-O -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\i86Linux2.6gcc4.4.5\"
	Dynamic Debug	-O0 -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\i86Linux2.6gcc4.4.5\"
i86Linux3gcc4.8.2 (deprecated, available on demand)	Static Release	-O -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\i86Linux3gcc4.8.2\"
	Static Debug	-O0 -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\i86Linux3gcc4.8.2\"
	Dynamic Release	-O -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\i86Linux3gcc4.8.2\"
	Dynamic Debug	-O0 -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\i86Linux3gcc4.8.2\"
i86Linux3gcc5.4.0 (deprecated, available on demand)	Static Release	-O -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\i86Linux3gcc5.4.0\"
	Static Debug	-O0 -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\i86Linux3gcc5.4.0\"
	Dynamic Release	-O -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\i86Linux3gcc5.4.0\"
	Dynamic Debug	-O0 -m32 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\i86Linux3gcc5.4.0\"

Table 5.5 Library-Creation Details for Linux Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
i86RedHawk6.5gcc4.9.2	Static Release	-O -m32 -Wall -Wno-unknown-pragmas -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\i86RedHawk6.5gcc4.9.2\"
	Static Debug	-O0 -m32 -Wall -Wno-unknown-pragmas -O0 -g -DLINUX -DPtrIntType=long -DTARGET-T="\i86RedHawk6.5gcc4.9.2\"
	Dynamic Release	-O -m32 -Wall -Wno-unknown-pragmas -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\i86RedHawk6.5gcc4.9.2\"
	Dynamic Debug	-O0 -m32 -Wall -Wno-unknown-pragmas -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET-T="\i86RedHawk6.5gcc4.9.2\"
ppc32e6500Linuxgcc4.9.1	Release	Available on demand. Contact support@rti.com.
	Debug	
ppce6500Linuxgcc5.2.0	Release	Available on demand. Contact support@rti.com.
	Debug	
x64Linux2.6gcc4.3.4	Static Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\x64Linux2.6gcc4.3.4\"
	Static Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=e=long -DTARGET="\x64Linux2.6gcc4.3.4\"
	Dynamic Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux2.6gcc4.3.4\"
	Dynamic Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux2.6gcc4.3.4\"
x64Linux2.6gcc4.4.5	Static Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\x64Linux2.6gcc4.4.5\" -DwxDEBUG_LEVEL=0
	Static Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=e=long -DTARGET="\x64Linux2.6gcc4.4.5\"
	Dynamic Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux2.6gcc4.4.5\" -DwxDEBUG_LEVEL=0
	Dynamic Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux2.6gcc4.4.5\"

Table 5.5 Library-Creation Details for Linux Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
x64Linux3gcc4.8.2	Static Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc4.8.2"
	Static Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc4.8.2"
	Dynamic Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc4.8.2"
	Dynamic Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc4.8.2"
x64Linux3gcc4.8.2FACE_GP	Static Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc4.8.2FACE_GP" -DFACE_COMPLIANCE_LEVEL_GENERAL=4 -DENABLE_FACE_COMPLIANCE=FACE_COMPLIANCE_LEVEL_GENERAL
	Static Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc4.8.2FACE_GP" -DFACE_COMPLIANCE_LEVEL_GENERAL=4 -DENABLE_FACE_COMPLIANCE=FACE_COMPLIANCE_LEVEL_GENERAL
	Dynamic Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc4.8.2FACE_GP" -DFACE_COMPLIANCE_LEVEL_GENERAL=4 -DENABLE_FACE_COMPLIANCE=FACE_COMPLIANCE_LEVEL_GENERAL
	Dynamic Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc4.8.2FACE_GP" -DFACE_COMPLIANCE_LEVEL_GENERAL=4 -DENABLE_FACE_COMPLIANCE=FACE_COMPLIANCE_LEVEL_GENERAL
x64Linux3gcc5.4.0	Static Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc5.4.0"
	Static Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc5.4.0"
	Dynamic Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc5.4.0"
	Dynamic Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux3gcc5.4.0"
x64Linux4gcc7.3.0	Static Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\x64Linux4gcc7.3.0"
	Static Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\x64Linux4gcc7.3.0"
	Dynamic Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux4gcc7.3.0"
	Dynamic Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux4gcc7.3.0"



Table 5.5 Library-Creation Details for Linux Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
x64Linux4gcc7.3.0FACE_GP	Static Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\x64Linux4gcc7.3.0FACE_GP" -DFACE_COMPLIANCE_LEVEL_GENERAL=4 -DENABLE_FACE_COMPLIANCE=FACE_COMPLIANCE_LEVEL_GENERAL
	Static Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\x64Linux4gcc7.3.0FACE_GP" -DFACE_COMPLIANCE_LEVEL_GENERAL=4 -DENABLE_FACE_COMPLIANCE=FACE_COMPLIANCE_LEVEL_GENERAL
	Dynamic Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux4gcc7.3.0FACE_GP" -DFACE_COMPLIANCE_LEVEL_GENERAL=4 -DENABLE_FACE_COMPLIANCE=FACE_COMPLIANCE_LEVEL_GENERAL
	Dynamic Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64Linux4gcc7.3.0FACE_GP" -DFACE_COMPLIANCE_LEVEL_GENERAL=4 -DENABLE_FACE_COMPLIANCE=FACE_COMPLIANCE_LEVEL_GENERAL
x64Linuxgcc7.4.1	Release	Available on demand. Contact support@rti.com.
	Debug	
x64RedHawk6.5gcc4.9.2	Static Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -DLINUX -DPtrIntType=long -DTARGET="\x64RedHawk6.5gcc4.9.2"
	Static Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -DLINUX -DPtrIntType=long -DTARGET="\x64RedHawk6.5gcc4.9.2"
	Dynamic Release	-O -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O -DNDEBUG -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64RedHawk6.5gcc4.9.2"
	Dynamic Debug	-O0 -m64 -Wall -Wno-unknown-pragmas -fno-omit-frame-pointer -O0 -g -fPIC -DLINUX -DPtrIntType=long -DTARGET="\x64RedHawk6.5gcc4.9.2"
All supported Linux architectures for Java	Dynamic Release	-target 1.8 -source 1.8
	Dynamic Debug	-target 1.8 -source 1.8 -g

## 5.1 Support for Modern C++ API

*Connex DDS* provides two different C++ APIs, which we refer to as the "Traditional C++" and "Modern C++" APIs. The Modern C++ API is available for all the platforms in [Table 5.1 Linux Platforms on Intel CPUs on page 39](#) and [Table 5.2 Linux Platforms on Other CPUs on page 41](#) except the POSIX®-compliant architectures that end with "FACE\_GP".

Some platforms have been tested only on C++03, whereas others have been tested with both C++03 and C++11. C++03 is typically supported with gcc3.4.2 and above. C++11 is typically supported with gcc4.7.2 and above.

**Notes:**

- Support for C++03 is deprecated starting with release 6.1.0, which is the last release that supports non-C++11-compliant compilers. After release 6.1.0, the Modern C++ API will require a C++11 compiler (or newer). The Traditional C++ API is not affected and continues to support C++98 compilers (or newer).
- Only the default plugin is supported. The legacy plugin has been removed from *Code Generator* starting with release 6.1.0.

For more information, see [Traditional vs. Modern C++, in the RTI Connex DDS Core Libraries User's Manual](#).

## 5.2 Multicast Support

Multicast is supported on all Linux platforms and is configured out of the box. That is, the default value for the initial peers list (**NDDS\_DISCOVERY\_PEERS**) includes a multicast address. See the API Reference HTML documentation for more information.

## 5.3 Supported Transports

- **Shared memory:** Supported and enabled by default. To clean up shared memory resources, reboot the kernel.
- **UDPv4:** Supported and enabled by default.
- **UDPv6:** Supported for all platforms *except* Raspbian Wheezy 7.0 and NI Linux 3.

The UDPv6 transport is not enabled by default, and the peers list must be modified to support IPv6.

Traffic Class support is only provided on architectures with gcc 4.1.0 or later that support the UDPv6 transport.

- **TCP/IPv4:** Supported for all Linux platforms. This is *not* a built-in transport.

### 5.3.1 Shared Memory Support

To see a list of shared memory resources in use, please use the **'ipcs'** command. To clean up shared memory and shared semaphore resources, please use the **'ipcrm'** command.

The shared memory keys used by *Connex DDS* are in the range of 0x400000. For example:

```
ipcs -m | grep 0x004
```

The shared semaphore keys used by *Connex DDS* are in the range of 0x800000; the shared mutex keys are in the range of 0xb00000. For example:

```
ipcs -s | grep 0x008
ipcs -s | grep 0x00b
```

Please refer to the shared-memory transport online documentation for details on the shared memory and semaphore keys used by *Connex* DDS.

## 5.4 Unsupported Features

The setting of thread names at the operating-system level by *Connex* DDS is not supported on the following architectures:

- armv6vfpLinux3.xgcc4.7.2
- armv7AngstromLinux3.2gcc4.4.1.cortex-a9
- i86Linux2.6gcc4.4.5
- x64Linux2.6gcc4.3.4
- x64Linux2.6gcc4.4.5

## 5.5 Limitations of FACE Architectures

This section describes limitations when using the FACE architectures. These are POSIX-compliant architectures, which are made available with *RTI Connex TSS*:

- x64Linux3gcc4.8.2FACE\_GP
- x64Linux4gcc7.3.0FACE\_GP

The builtin shared memory transport of these architectures will not interoperate with non-FACE architectures.

When using the shared memory transport, shared memory resources may not be cleaned up by *Connex* DDS. Consequently, each application should clean up its own shared memory resources by removing the files in `/dev/shm/RTIOsapiSharedMemorySegment`.

The following features, utilities, and tools are not supported by the FACE architectures:

- Backtrace
- Cmake find package
- Distributed Logger
- Durable writer history and durable reader state
- Modern C++
- Monitoring
- Real-time clock

- Request/Reply communication pattern
- Remote Procedure Calls
- RTI DDS Ping, Spy, and Prototyper
- Setting thread names by *Connex DDS* at the operating-system level
- TCP transport

## 5.6 Monotonic Clock Support

The monotonic clock (described in *Clock Selection*, in the [RTI Connex DDS Core Libraries User's Manual](#)) is supported.

## 5.7 Thread Configuration

[Table 5.6 Thread Settings for Linux Platforms below](#) lists the thread settings for Linux platforms.

See also: [Table 5.7 Thread-Priority Definitions for Linux Platforms on the next page](#) and [Table 5.8 Thread Kinds for Linux Platforms on page 55](#).

### 5.7.1 Support for Controlling CPU Core Affinity for RTI Threads

Support for controlling CPU core affinity (described in "[Controlling CPU Core Affinity](#)" in the [User's Manual](#)) is available on all supported Linux/SUSE platforms.

**Table 5.6 Thread Settings for Linux Platforms**

Applicable Thread	DDS_ ThreadSettings_t	Platform-Specific Setting
Asynchronous Publisher, Asynchronous flushing thread	mask	OS default thread type
	priority	OS default thread priority
	stack_size	OS default thread stack size
	cpu_list	Empty CPU list (Supported on Linux and SUSE platforms)
	cpu_rotation	DDS_THREAD_SETTINGS_CPU_NO_ROTATION (Supported on Linux and SUSE platforms)

**Table 5.6 Thread Settings for Linux Platforms**

Applicable Thread	DDS_ ThreadSettings_t	Platform-Specific Setting
Database thread	mask	DDS_THREAD_SETTINGS_STDIO
	priority	OS default thread priority
	stack_size	OS default thread stack size
	cpu_list	Empty CPU list (Supported on Linux and SUSE platforms)
	cpu_rotation	DDS_THREAD_SETTINGS_CPU_NO_ROTATION (Supported on Linux and SUSE platforms)
Event thread	mask	DDS_THREAD_SETTINGS_STDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	OS default thread priority
	stack_size	OS default thread stack size
	cpu_list	Empty CPU list (Supported on Linux and SUSE platforms)
	cpu_rotation	DDS_THREAD_SETTINGS_CPU_NO_ROTATION (Supported on Linux and SUSE platforms)
ReceiverPool threads	mask	DDS_THREAD_SETTINGS_STDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	OS default thread priority
	stack_size	OS default thread stack size
	cpu_list	Empty CPU list (Supported on Linux and SUSE platforms)
	cpu_rotation	DDS_THREAD_SETTINGS_CPU_NO_ROTATION (Supported on Linux and SUSE platforms)

**Table 5.7 Thread-Priority Definitions for Linux Platforms**

Thread-Priority Definition	Operating-System Priority
THREAD_PRIORITY_DEFAULT	If any of these constants are used to set the priority of the thread in the QoS, the OS's default thread priority will be used.
THREAD_PRIORITY_HIGH	
THREAD_PRIORITY_ABOVE_NORMAL	
THREAD_PRIORITY_NORMAL	
THREAD_PRIORITY_BELOW_NORMAL	
THREAD_PRIORITY_LOW	

**Table 5.8 Thread Kinds for Linux Platforms**

Thread Kinds	Operating-System Configuration <sup>a</sup>
DDS_THREAD_SETTINGS_FLOATING_POINT	N/A
DDS_THREAD_SETTINGS_STDIO	N/A
DDS_THREAD_SETTINGS_REALTIME_PRIORITY	Set schedule policy to SCHED_FIFO
DDS_THREAD_SETTINGS_PRIORITY_ENFORCE	N/A

## 5.7.2 Using REALTIME\_PRIORITY

If the **mask** field includes `DDS_THREAD_SETTINGS_REALTIME_PRIORITY`, a value must also be explicitly specified for the "priority" field in the QoS. (This is because using `DDS_THREAD_SETTINGS_REALTIME_PRIORITY` changes the scheduler used by Linux for the thread to `SCHED_FIFO`. If the **priority** field is not explicitly set, it will default to a value of 0, but this is an invalid value for a priority when using `SCHED_FIFO`.) Note that running with `REALTIME_PRIORITY` requires the appropriate privileges: the process will need to be run with root privileges on Linux in order to set the scheduler.

## 5.8 Durable Writer History and Durable Reader State Features

The Durable Writer History and Durable Reader State features have been tested with the following Linux architecture:

- x64Linux2.6gcc4.4.5

To use the Durable Writer History and Durable Reader State features, you must install a relational database. Only MySQL® is supported.

For information on database setup and the versions supported, please see the [RTI Connex DDS Core Libraries Database Setup](#).

## 5.9 Support for 'Find Package' CMake Script

The 'Find Package' CMake script is supported on Linux platforms on Intel CPUs (see [Table 5.1 Linux Platforms on Intel CPUs on page 39](#)).

For information on using this script, see *Building Applications Using CMake*, in the [RTI Connex DDS Core Libraries Users Manual](#).

---

<sup>a</sup>See the Linux programmer's manuals for more information.

## 5.10 Backtrace Support

- If you are using GCC 6 or newer, recall you must link the executable with **-no-pie** to prevent PIE generation. See the **Note** below [Table 5.3 Building Instructions for Linux Architectures](#).
- You will also need to compile with **-fno-omit-frame-pointer**.
- For Linux architectures on Arm CPUs, also use the **-funwind-tables** compiler option. This creates a table that allows the program to walk back through the function call stack from a given execution point.
- Symbol names may be unavailable without the use of special linker options. RTI has compiled Linux architectures using the linker option **-rdynamic** to display backtrace information. To display backtrace information on your Linux architecture, you must also compile with **-rdynamic**.
- 32-bit Windows architectures<sup>a</sup> are compiled using the additional **/Oy**- optimization flag.

See [Logging a Backtrace for Failures, in the RTI Connex DDS Core Libraries User's Manual](#).

### 5.10.1 Disabling/re-enabling backtrace functionality on Wind River Linux platforms

For most architectures, the backtrace functionality is enabled by default.

Some Wind River Linux 7 platforms, however, have not had their C standard library (**libc**) built with backtrace enabled, by default. So when the backtrace is logged on these platforms, your application may fail, printing the following error at run time:

```
./app: relocation error:
./app: symbol backtrace, version GLIBC_2.1 not defined in file libc.so.6 with link time
reference
```

Some Wind River Linux platforms can have the **libc** optionally built with the backtrace feature by modifying the `DISTRO_FEATURES_LIBC` variable:

```
DISTRO_FEATURES_LIBC += "libc-backtrace"
```

#### 5.10.1.1 Disabling backtrace feature in the code

If your Wind River Linux platform has *not* modified the **libc** to include the backtrace feature, you should disable the backtrace feature in the code (unless you have ppc32e6500Linuxgcc4.9.1; see [5.10.1.2 Forcing backtrace feature in the code on the next page](#)) in order to avoid the runtime error. The backtrace is part of the format used to output *Connex DDS* logging, so just modify the `NDDS_Config_LogPrintFormat` for `NDDS_CONFIG_LOG_LEVEL_FATAL_ERROR` by using `NDDS_Config_Logger_set_print_format_by_log_level()`:

---

<sup>a</sup>32-bit Windows architectures are available on demand, but are deprecated.

```
NDDS_Config_Logger *logger = NDDS_Config_Logger_get_instance();
NDDS_Config_Logger_set_print_format_by_log_level(
    logger,
    NDDS_CONFIG_LOG_PRINT_FORMAT_DEFAULT,
    NDDS_CONFIG_LOG_LEVEL_FATAL_ERROR);
```

### 5.10.1.2 Forcing backtrace feature in the code

For the Wind River Linux platform ppc32e6500Linuxgcc4.9.1, RTI has already disabled the backtrace functionality, so you don't have to. For this platform, if you set an `NDDS_Config_LogPrintFormat`, which contains the backtrace, the bit for the backtrace will be ignored.

If, however, you know that the **libc** for your platform has been built with "libc-backtrace" and you would like to force the use of the backtrace functionality in the code, for ppc32e6500Linuxgcc4.9.1 only, you can do so using a special `NDDS_Config_LogPrintFormat`.

To force the backtrace for ppc32e6500Linuxgcc4.9.1, use the bit "0x80". For example:

```
NDDS_Config_Logger_set_print_format_by_log_level(
    NDDS_Config_Logger_get_instance(),
    NDDS_CONFIG_LOG_PRINT_FORMAT_DEBUG | 0x80,
    NDDS_CONFIG_LOG_LEVEL_FATAL_ERROR);
```

## 5.11 Support for Remote Procedure Calls (RPC)

RPC is an experimental feature available only for the C++11 API. It is supported on these Linux architectures:

- armv7aWRLinux8gcc5.2.0
- armv7Linux4gcc7.5.0
- armv8Linux4gcc7.3.0
- armv8Linux4.4gcc5.4.0
- i86RedHawk6.5gcc4.9.2
- ppc32e6500Linuxgcc4.9.1
- ppc6500Linuxgcc5.2.0
- x64Linux3gcc5.4.0
- x64Linux4gcc7.3.0
- x64Linuxgcc7.4.1
- x64RedHawk6.5gcc4.9.2

See *Remote Procedure Calls (RPC)* in the [RTI Connexx DDS Core Libraries User's Manual](#).



## 5.12 Libraries Required for Using Distributed Logger

*RTI Distributed Logger* is supported on all the platforms in [Table 5.1 Linux Platforms on Intel CPUs on page 39](#) and [Table 5.2 Linux Platforms on Other CPUs on page 41](#) *except* RedHawk Linux 6.0.

To use the Distributed Logger APIs, link against the additional libraries in [Table 5.9 Additional Libraries for using RTI Distributed Logger](#).

**Table 5.9 Additional Libraries for using RTI Distributed Logger**

Language	Static		Dynamic	
	Release	Debug	Release	Debug
C	librtidlc.a	librtidlcd.a	librtidlc.so	librtidcd.so
C++ (Traditional API)	librtidlc.a librtidlcppz.a	librtidlcd.a librtidlcppzd.a	librtidlc.so librtidlcpp.so	librtidcd.so librtidlcppd.so
Java	N/A	N/A	distlog.jar distlogdatamodel.jar	distlogd.jar distlogdatamodeld.jar

## 5.13 Libraries Required for Using Monitoring

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. For example, if your *Connex DDS* application is linked with the static release version of the *Connex DDS* libraries, you will need to also use the static release version of the monitoring library. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

If you are statically linking your application with DDS libraries and you want to add monitoring to your application, you will also need to statically link the monitoring library. The library cannot be loaded dynamically strictly through the QoS profile because it also depends on DDS to publish its data. Therefore, it depends on DDS; the DDS functionality would cause duplicate symbols to be found resulting, in the termination of the process.

**Note:** If you plan to use *static* libraries, the RTI library in [Table 5.10 Additional Libraries for Using Monitoring below](#) must appear *first* in the list of libraries to be linked.

**Table 5.10 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>a</sup>
Dynamic Release	librtimonitoring.so

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

**Table 5.10 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>a</sup>
Dynamic Debug	librtimonitoringd.so
Static Release	librtimonitoringz.a
Static Debug	librtimonitoringzd.a

## 5.14 Libraries Required for Using RTI Real-Time WAN Transport APIs

If you choose to use *RTI Real-Time WAN Transport*, you must download and install a separate package that contains the transport libraries. See the [RTI Real-Time WAN Transport Installation Guide](#) for details.

Using *Real-Time WAN Transport* requires one of the libraries in [Table 5.11 Additional Libraries for Using RTI Real-Time WAN Transport APIs](#). Select the file appropriate for your chosen library format.

For more information, see the "Enabling Real-Time WAN Transport" section in the *RTI Real-Time WAN Transport* part of the [RTI Connex DDS Core Libraries User's Manual](#).

**Table 5.11 Additional Libraries for Using RTI Real-Time WAN Transport APIs**

Library Format	Real-Time WAN Transport Libraries <sup>b</sup>
Dynamic Release	libnnddsrwt.so
Dynamic Debug	libnnddsrwt.d.so
Static Release	libnnddsrwtz.a
Static Debug	libnnddsrwtzd.a

## 5.15 Libraries Required for Using RTI Secure WAN Transport APIs

If you choose to use *RTI Secure WAN Transport*, it must be downloaded and installed separately.

It is only available for specific architectures. See the [RTI Secure WAN Transport Release Notes](#) and [RTI Secure WAN Transport Installation Guide](#) for details. (Or if it is not already installed, you can find the documentation here: <https://community.rti.com/documentation>).

To use the *Secure WAN Transport* APIs, link against the additional libraries in [Table 5.12 Additional Libraries for using RTI Secure WAN Transport APIs on the next page](#). Select the files appropriate for your chosen library format.

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

**Table 5.12 Additional Libraries for using RTI Secure WAN Transport APIs**

Library Format	RTI Secure WAN Transport Libraries <sup>a</sup>	OpenSSL Libraries <sup>b</sup>
Dynamic Release	libniddtransportwan.so libniddtransporttls.so	libssl.so libcrypto.so
Dynamic Debug	libniddtransportwand.so libniddtransporttlsd.so	
Static Release	libniddtransporttlsz.a libniddtransporttlszd.a	
Static Debug	libniddtransportwanz.a libniddtransportwanzd.a	

## 5.16 Libraries Required for Using RTI TCP Transport and TLS Support APIs

To use the TCP Transport APIs, link against the additional libraries in [Table 5.13 Additional Libraries for using RTI TCP Transport APIs below](#).

If you are using *RTI TLS Support*, see [Table 5.14 Additional Libraries for using RTI TCP Transport APIs with TLS Enabled on the next page](#). Select the files appropriate for your chosen library format.

*RTI TLS Support* is an optional product for use with the TCP transport that is included with *RTI Connex*® *DDS*. If you choose to use *TLS Support*, it must be installed on top of a *Connex DDS* installation with the same version number; it can only be used on architectures that support TCP transport (see the [RTI TLS Support Release Notes](#)).

**Table 5.13 Additional Libraries for using RTI TCP Transport APIs**

Library Format	RTI TCP Transport Libraries <sup>c</sup>
Dynamic Release	libniddtransporttcp.so
Dynamic Debug	libniddtransporttcpd.so
Static Release	libniddtransporttcpz.a
Static Debug	libniddtransporttcpzd.a

<sup>a</sup>The libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>OpenSSL libraries are in <NDDSHOME>/third\_party/openssl-1.1.1k/<architecture>/<format>/lib.

<sup>c</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

**Table 5.14 Additional Libraries for using RTI TCP Transport APIs with TLS Enabled**

Library Format	RTI TLS Libraries <sup>a</sup>	OpenSSL Libraries <sup>b</sup>
Dynamic Release	libnddstls.so	libssl.so libcrypto.so
Dynamic Debug	libnddstlsd.so	
Static Release	libnddstlsz.a	
Static Debug	libnddstlszd.a	

## 5.17 Libraries Required for Zero Copy Transfer Over Shared Memory

To use the Zero Copy Transfer Over Shared Memory feature, link against the additional library in [Table 5.15 Additional Libraries for Zero Copy Transfer Over Shared Memory](#) below.

**Table 5.15 Additional Libraries for Zero Copy Transfer Over Shared Memory**

Library Format	Zero Copy Transfer Over Shared Memory Libraries <sup>c</sup>
Dynamic Release	libnddsmetp.so
Dynamic Debug	libnddsmetpd.so
Static Release	libnddsmetpz.a
Static Debug	libnddsmetpzd.a

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>OpenSSL libraries are in <NDDSHOME>/third\_party/openssl-1.1.1k/<architecture>/<format>/lib.

<sup>c</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

# Chapter 6 macOS Platforms

[Table 6.1 Supported macOS Platforms](#) lists the architectures supported on macOS operating systems.

**Table 6.1 Supported macOS Platforms**

Operating System	CPU	Compiler	RTI Architecture Abbreviation
macOS 10.13, 10.14, 10.15	x64	clang 9.0, 10.0, 11.0	x64Darwin17clang9.0
		Java Platform, Standard Edition JDK 11	

[Table 6.2 Building Instructions for macOS Architectures](#) lists the compiler flags and libraries you will need to link into your application.

Other libraries you may need are described here:

- [6.11 Libraries Required for Using Distributed Logger on page 72](#)
- [6.12 Libraries Required for Using Monitoring on page 72](#)
- [6.13 Libraries Required for Using RTI Real-Time WAN Transport APIs on page 73](#)
- [6.14 Libraries Required for Using RTI Secure WAN Transport APIs on page 73](#)
- [6.15 Libraries Required for Using RTI TCP Transport APIs on page 74](#)
- [6.16 Libraries Required for Zero Copy Transfer Over Shared Memory on page 75](#)

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

[Table 6.3 Running Instructions for macOS Architectures](#) provides details on the environment variables that must be set at run time for a macOS architecture.

[Table 6.4 Library-Creation Details for macOS Architectures](#) provides details on how the libraries were built by RTI. This table is provided strictly for informational purposes; you do not need to use these parameters to compile your application. You may find this information useful if you are involved in any in-depth debugging.

Table 6.2 Building Instructions for macOS Architectures

API	Library Format	Required RTI Libraries <sup>ab</sup>	Required System Libraries	Required Compiler Flags
C++ (Traditional and Modern APIs)	Static Release	libnddscorez.a libnddscz.a libnddscppz.a or libnddscpp2z.a librticonnextmsgcppz.a or librticonnextmsgcpp2z.a	-ldl -lm -lpthread	-dynamic -lpthread -lc -single_module -DRTI_UNIX -DRTI_DARWIN -DRTI_64BIT
	Static Debug	libnddscorezd.a libnddsczd.a libnddscppzd.a or libnddscpp2zd.a librticonnextmsgcppzd.a or librticonnextmsgcpp2zd.a		
	Dynamic Release	libnddscore.dylib libnddsc.dylib libnddscpp.dylib or libnddscpp2.dylib librticonnextmsgcpp.dylib or librticonnextmsgcpp2.dylib		
	Dynamic Debug	libnddscored.dylib libnddscd.dylib libnddscppd.dylib or libnddscpp2d.dylib librticonnextmsgcppd.dylib or librticonnextmsgcpp2d.dylib		

<sup>a</sup>Choose `*cpp*.*` for the Traditional C++ API or `*cpp2*.*` for the Modern C++ API.

<sup>b</sup>The *Connex DDS C/C++* libraries are in `<NDDSHOME>/lib/<architecture>/`.

`<NDDSHOME>` is where *Connex DDS* is installed, see [1.1 Paths Mentioned in Documentation on page 4](#)

Table 6.2 Building Instructions for macOS Architectures

API	Library Format	Required RTI Libraries <sup>ab</sup>	Required System Libraries	Required Compiler Flags
C	Static Release	libnddscorez.a libnddscz.a librticonnextmsgcz.a	-ldl -lm -lpthread	-dynamic -lpthread -lc -single_module -DRTI_UNIX -DRTI_DARWIN -DRTI_64BIT
	Static Debug	libnddscorezd.a libnddsczd.a librticonnextmsgczd.a		
	Dynamic Release	libnddscore.dylib libnddsc.dylib librticonnextmsgc.dylib		
	Dynamic Debug	libnddscored.dylib libnddscd.dylib librticonnextmsgcd.dylib		
Java	Release	nddsjava.jar rticonnextmsg.jar	N/A	None required
	Debug	nddsjavad.jar rticonnextmsgd.jar		

<sup>a</sup>Choose `*cpp*.*` for the Traditional C++ API or `*cpp2*.*` for the Modern C++ API.

<sup>b</sup>The *Connex* DDS C/C++ libraries are in `<NDDSHOME>/lib/<architecture>/`.

`<NDDSHOME>` is where *Connex* DDS is installed, see [1.1 Paths Mentioned in Documentation on page 4](#)



Table 6.3 Running Instructions for macOS Architectures

RTI Architecture	Library Format (Release & Debug)	Required Environment Variables <sup>a</sup>
x64Darwin17clang9.0	Static	None required
	Dynamic	DYLD_LIBRARY_PATH=\${NDDSHOME}/lib/x64Darwin17clang9.0:\${DYLD_LIBRARY_PATH}
x64Darwin17clang9.0 for Java	N/A	DYLD_LIBRARY_PATH=\${NDDSHOME}/lib/x64Darwin17clang9.0:\${DYLD_LIBRARY_PATH}

Table 6.4 Library-Creation Details for macOS Architectures

RTI Architecture	Library Format (Static & Dynamic)	Compiler Flags Used by RTI
x64Darwin17clang9.0	Release	-arch x86_64 -mtune=core2 -Wno-trigraphs -fpascal-strings -fasm-blocks -O -Wall -Wno-unknown-pragmas -DPrintType=long -DTARGET="x64Darwin17clang9.0" -DNDEBUG
	Debug	-arch x86_64 -mtune=core2 -Wno-trigraphs -fpascal-strings -fasm-blocks -g -O -Wall -Wno-unknown-pragmas -DPrintType=long -DTARGET="x64Darwin17clang9.0"
x64Darwin17clang9.0 for Java	Release	-target 1.8 -source 1.8
	Debug	-target 1.8 -source 1.8 -g

## 6.1 Support for Modern C++ API

*Connex DDS* provides two different C++ APIs, which we refer to as the "Traditional C++" and "Modern C++" APIs.

The Modern C++ API is available for all macOS platforms and has been tested with both C++03 and C++11.

### Notes:

<sup>a</sup>`{NDDSHOME}` is where *Connex DDS* is installed. `{DYLD_LIBRARY_PATH}` represents the value of the `DYLD_LIBRARY_PATH` variable prior to changing it to support *Connex DDS*. When using `nddsjava.jar`, the Java virtual machine (JVM) will attempt to load release versions of the native libraries (`nddsjava.dylib`, `nddscore.dylib`, `nddsc.dylib`). When using `nddsjava.d.jar`, the JVM will attempt to load debug versions of the native libraries (`nddsjava.dylib`, `nddscore.dylib`, `nddsc.dylib`).

- Support for C++03 is deprecated starting with release 6.1.0, which is the last release that supports non-C++11-compliant compilers. After release 6.1.0, the Modern C++ API will require a C++11 compiler (or newer). The Traditional C++ API is not affected and continues to support C++98 compilers (or newer).
- Only the default plugin is supported. The legacy plugin has been removed from *Code Generator* starting with release 6.1.0.

For more information, see [Traditional vs. Modern C++, in the RTI Connex DDS Core Libraries User's Manual](#).

## 6.2 Multicast Support

Multicast is supported on macOS platforms and is configured out of the box. That is, the default value for the initial peers list (`NDDS_DISCOVERY_PEERS`) includes a multicast address. See the online documentation for more information.

## 6.3 Supported Transports

- **Shared memory:** Supported and enabled by default.
- **UDPv4:** Supported and enabled by default.
- **UDPv6:** Supported.
- **TCP/IPv4:** Supported.

## 6.4 Unsupported Features

These features are not supported on macOS platforms:

- Controlling CPU Core Affinity
- Durable Writer History and Durable Reader State
- Monotonic clock

## 6.5 System Integrity Protection (SIP)

A feature called System Integrity Protection (SIP) was introduced in macOS 10.11. If enabled, this feature strips out the environment variable `DYLD_LIBRARY_PATH`, which is used to specify the location of shared libraries for a program. For more details, see <https://support.apple.com/en-us/HT204899>.

### 6.5.1 SIP and Java Applications

If you run *Connex DDS* applications using a Java Runtime Environment located under one of the paths protected by SIP (e.g., `/usr/bin`) and rely on the `DYLD_LIBRARY_PATH` environment variable to set

the path to the *Connex* DDS run-time libraries (or any other third party run-time libraries, such as OpenSSL), Java will fail to load them with an error message such as:

```
The library libnddsjava.dylib could not be loaded by your operating system
```

To overcome this limitation, when running Java applications on macOS systems, you must use the **java.library.path** variable instead of the DYLD\_LIBRARY\_PATH environment variable to indicate the path to the *Connex* DDS libraries. This is automatically performed by the scripts to run applications generated by the *RTI Code Generator*. However, if you are manually running your *Connex* DDS application using the Java Runtime Environment, or you are writing our own scripts to run your Java application, you can indicate it as follows:

```
java -Djava.library.path="<installation_dir>/lib/<architecture>" -classpath .:"<installation_dir>/lib/java/nddsjava.jar" <your_class>
```

Additionally, some *Connex* DDS applications may need to dynamically load functionality that is implemented in separate libraries (e.g., for the RTI Monitoring Library or transport plugins such as *RTI Secure WAN Transport* or *RTI TLS Support*). In that case, specifying the path to the **lib** directory using **java.library.path** is not sufficient, because the path to those libraries is not exposed to the underlying *Connex* DDS infrastructure.

To work around this limitation, you must provide the full path and extension of the dynamic libraries that are loaded at run time. In the case of the RTI Monitoring Library, this implies adding the following to your XML configuration file:

```
<domain_participant_qos>
  <property>
    <value>
      <element>
        <name>rti.monitor.library</name>
        <value>/full-path-to-librtimonitoring.dylib</value>
      </element>
      <!-- ... -->
    </value>
  </property>
</domain_participant_qos>
```

Likewise, for transport plugins that are loaded dynamically (e.g., the TCP transport plugin), you must add the full path to the XML configuration file:

```
<domain_participant_qos>
  <property>
    <!-- ... -->
    <value>
      <element>
        <name>dds.transport.TCPv4.tcp1.library</name>
        <value>/full-path-to-libnddstransporttcp.dylib</value>
      </element>
      <!-- ... -->
    </value>
  </property>
```

```
</domain_participant_qos>
```

For more on transport plugins, see [6.14 Libraries Required for Using RTI Secure WAN Transport APIs on page 73](#) and [6.15 Libraries Required for Using RTI TCP Transport APIs on page 74](#).

## 6.5.2 SIP and Connex Tools, Infrastructure Services, and Utilities

The SIP feature also makes it impossible for the scripts under `<installation_dir>/bin` to pick up the value of the `DYLD_LIBRARY_PATH` environment variable at run time. To work around this issue, *Connex DDS* tools, infrastructure services, and utilities rely on `RTI_LD_LIBRARY_PATH`, an alternative environment variable that can be used in lieu of `DYLD_LIBRARY_PATH` and `LD_LIBRARY_PATH` to add library paths on Linux systems.

For example, to add `<OPENSSLHOME>/lib` and `<NDDSHOME>/lib/<architecture>` (i.e., the library paths required for running *RTI Routing Service* with the Secure WAN or TLS transports) to your library path, you can export the `RTI_LD_LIBRARY_PATH` environment variable and run *Routing Service* as follows:

```
export RTI_LD_LIBRARY_PATH=<OPENSSLHOME>/lib:<NDDSHOME>/lib/<ARCHITECTURE>;
./<installation_dir>/bin/rtiroutingservice -cfgName <your_configuration>
```

## 6.6 Thread Configuration

See [Table 6.5 Thread Settings for macOS Platforms](#) and [Table 6.6 Thread-Priority Definitions for macOS Platforms](#).

**Table 6.5 Thread Settings for macOS Platforms**

Applicable Thread	DDS_ ThreadSettings_t	Platform-Specific Setting
Asynchronous Publisher, Asynchronous flushing thread	mask	OS default thread type
	priority	OS default thread priority
	stack_size	OS default thread stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
Database thread	mask	DDS_THREAD_SETTINGS_STUDIO
	priority	OS default thread priority
	stack_size	OS default thread stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported

Table 6.5 Thread Settings for macOS Platforms

Applicable Thread	DDS_ ThreadSettings_t	Platform-Specific Setting
Event thread	mask	DDS_THREAD_SETTINGS_STUDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	OS default thread priority
	stack_size	OS default thread stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
ReceiverPool threads	mask	DDS_THREAD_SETTINGS_STUDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	OS default thread priority
	stack_size	OS default thread stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported

Table 6.6 Thread-Priority Definitions for macOS Platforms

Thread-Priority Definition	Operating-System Priority
THREAD_PRIORITY_DEFAULT	If any of these constants are used to set the priority of the thread in the QoS, the OS's default thread priority will be used.
THREAD_PRIORITY_HIGH	
THREAD_PRIORITY_ABOVE_NORMAL	
THREAD_PRIORITY_NORMAL	
THREAD_PRIORITY_BELOW_NORMAL	
THREAD_PRIORITY_LOW	

## 6.7 Support for 'Find Package' CMake Script

The 'Find Package' CMake script is supported on all macOS platforms in [Table 6.1 Supported macOS Platforms](#).

For information on using this script, see *Building Applications Using CMake*, in the [RTI Connex DDS Core Libraries Users Manual](#).

## 6.8 Backtrace Support

Backtrace is supported on macOS platforms and is configured out of the box. See [Logging a Backtrace for Failures, in the RTI Connex DDS Core Libraries User's Manual](#).

## 6.9 Resolving `NDDStility_sleep()` Issues

When running on a macOS system, you may experience timing issues in your calls to `NDDStility_sleep()`. If you request to sleep for a small enough time period, you will notice that the actual sleep time is significantly longer.

macOS systems have a timer coalescing feature, enabled by default. This is a power-saving technique that reduces the precision of software timers, achieving a reduction in CPU usage.

What effect does this have on your *Connex DDS* application? Suppose you send samples from your publisher at a 5 ms rate, using `NDDStility_sleep()` to calculate that wait time. You have a subscriber with a deadline set to 6 ms. The timer coalescing feature could make your sleep last much longer than 5-6 ms, so when the next sample reaches the subscriber, the deadline period has expired and you will experience missed samples.

If you are having similar issues, see if your kernel has timer coalescing enabled. You can tell by using this command:

```
user@osx:~$ /usr/sbin/sysctl -a | grep coalescing_enabled
```

In the reply, a 1 means enabled, 0 means disabled.

```
kern.timer.coalescing_enabled: 1
```

To overcome this situation, you must disable timer coalescing in the kernel configuration. (Note that you must have **sudo** or **root** access to be able to edit this kernel parameter.)

```
user@osx:~$ sudo /usr/sbin/sysctl -w kern.timer.coalescing_enabled=0
```

The reply should be:

```
kern.timer.coalescing_enabled: 1 -> 0
```

This change won't be permanent though, and will go back to the default when the system is rebooted.

To make this change permanent, add the configuration line in the file `/etc/sysctl.conf`. You can use your favorite editor to do it, or use this command:

```
user@osx:~$ sudo echo "kern.timer.coalescing_enabled=0" >> /etc/sysctl.conf
```

## 6.10 Support for Remote Procedure Calls (RPC)

RPC is an experimental feature available only for the C++11 API. It is supported on the following macOS architecture:

- x64Darwin17clang9.0

See *Remote Procedure Calls (RPC)* in the [RTI Connex DDS Core Libraries User's Manual](#).

## 6.11 Libraries Required for Using Distributed Logger

*RTI Distributed Logger* is supported on macOS platforms. [Table 6.7 Additional Libraries for using RTI Distributed Logger](#) lists the additional libraries you will need in order to use *Distributed Logger*.

**Table 6.7 Additional Libraries for using RTI Distributed Logger**

Language	Static		Dynamic	
	Release	Debug	Release	Debug
C++ (Traditional API)	librtidlcz.a librtidlcppz.a	librtidlczd.a librtidlcppzd.a	librtidlc.dylib librtidlcpp.dylib	librtidlcd.dylib librtidlcppd.dylib
C	librtidlcz.a	librtidlczd.a	librtidlc.dylib	librtidlcd.dylib
Java	N/A	N/A	distlog.jar distlogdatamodel.jar	distlogd.jar distlogdatamodeld.jar

## 6.12 Libraries Required for Using Monitoring

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. For example, if your *Connex DDS* application is linked with the static release version of the *Connex DDS* libraries, you will need to also use the static release version of the monitoring library. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

If you are statically linking your application with DDS libraries and you want to add monitoring to your application, you will also need to statically link the monitoring library. The library cannot be loaded dynamically strictly through the QoS profile because it also depends on DDS to publish its data. Therefore, it depends on DDS; the DDS functionality would cause duplicate symbols to be found resulting, in the termination of the process.

**Note:** If you are plan to use *static* libraries, the RTI library in [Table 6.8 Additional Libraries for Using Monitoring](#) must appear *first* in the list of libraries to be linked.

**Table 6.8 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>a</sup>
Dynamic Release	librtimonitoring.dylib
Dynamic Debug	librtimonitoringd.dylib
Static Release	librtimonitoringz.a
Static Debug	librtimonitoringzd.a

## 6.13 Libraries Required for Using RTI Real-Time WAN Transport APIs

If you choose to use *RTI Real-Time WAN Transport*, you must download and install a separate package that contains the transport libraries. See the [RTI Real-Time WAN Transport Installation Guide](#) for details.

Using *Real-Time WAN Transport* requires one of the libraries in [Table 6.9 Additional Libraries for Using RTI Real-Time WAN Transport APIs](#). Select the file appropriate for your chosen library format.

For more information, see the "Enabling Real-Time WAN Transport" section in the *RTI Real-Time WAN Transport* part of the [RTI Connex DDS Core Libraries User's Manual](#).

**Table 6.9 Additional Libraries for Using RTI Real-Time WAN Transport APIs**

Library Format	Real-Time WAN Transport Libraries <sup>b</sup>
Dynamic Release	libnnddsrwt.dylib
Dynamic Debug	libnnddsrwt.d.dylib
Static Release	libnnddsrwtz.a
Static Debug	libnnddsrwtzd.a

## 6.14 Libraries Required for Using RTI Secure WAN Transport APIs

If you choose to use *RTI Secure WAN Transport*, it must be downloaded and installed separately. It is available on all macOS architectures. See the [RTI Secure WAN Transport Release Notes](#) and [RTI Secure WAN Transport Installation Guide](#) for details.

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>/lib/<architecture>.



To use the Secure WAN Transport APIs, link against the additional libraries in [Table 6.10 Additional Libraries for using RTI Secure WAN Transport APIs](#). Select the files appropriate for your chosen library format.

**Table 6.10 Additional Libraries for using RTI Secure WAN Transport APIs**

Library Format	RTI Secure WAN Transport Libraries <sup>a</sup>	OpenSSL Libraries <sup>b</sup>
Dynamic Release	libnddstransportwan.dylib libnddstransporttls.dylib	libssl.dylib libcrypto.dylib
Dynamic Debug	libnddstransportwand.dylib libnddstransporttlsd.dylib	
Static Release	libnddstransporttlsz.a libnddstransporttlszd.a	libsslz.a libcryptoz.a
Static Debug	libnddstransportwanz.a libnddstransportwanzd.a	

## 6.15 Libraries Required for Using RTI TCP Transport APIs

To use the TCP Transport APIs, link against the additional libraries in [Table 6.11 Additional Libraries for using RTI TCP Transport APIs](#). If you are using *RTI TLS Support*, see [Table 6.12 Additional Libraries for using RTI TCP Transport APIs with TLS Enabled](#). Select the files appropriate for your chosen library format.

**Table 6.11 Additional Libraries for using RTI TCP Transport APIs**

Library Format	RTI TCP Transport Libraries <sup>c</sup>
Dynamic Release	libnddstransporttcp.dylib
Dynamic Debug	libnddstransporttcpd.dylib
Static Release	libnddstransporttcpz.a
Static Debug	libnddstransporttcpzd.a

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>OpenSSL libraries are in <NDDSHOME>/third\_party/openssl-1.1.1k/<architecture>/<format>/lib.

<sup>c</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

**Table 6.12 Additional Libraries for using RTI TCP Transport APIs with TLS Enabled**

Library Format	RTI TLS Libraries <sup>a</sup>	OpenSSL Libraries <sup>b</sup>
Dynamic Release	libnddstls.dylib	libssl.dylib
Dynamic Debug	libnddstlsd.dylib	libcrypto.dylib
Static Release	libnddstlsz.a	libssl.a
Static Debug	libnddstlszd.a	libcryptoz.a

## 6.16 Libraries Required for Zero Copy Transfer Over Shared Memory

To use the Zero Copy Transfer Over Shared Memory feature, link against the additional library in [Table 6.13 Additional Libraries for Zero Copy Transfer Over Shared Memory](#).

**Table 6.13 Additional Libraries for Zero Copy Transfer Over Shared Memory**

Library Format	Zero Copy Transfer Over Shared Memory Library
Dynamic Release	libnddsmetp.dylib
Dynamic Debug	libnddsmetpd.dylib
Static Release	libnddsmetpz.a
Static Debug	libnddsmetpzd.a

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>OpenSSL libraries are in <NDDSHOME>/third\_party/openssl-1.1.1k/<architecture>/<format>/lib.

# Chapter 7 QNX Platforms

Table 7.1 Supported QNX Platforms lists the architectures supported on QNX operating systems.<sup>a</sup>

**Table 7.1 Supported QNX Platforms**

Operating System	CPU	Compiler	RTI Architecture
QNX Neutrino 6.4.1	x86	qcc 4.3.3 with GNU C++ libraries	i86QNX6.4.1qcc_gpp
QNX Neutrino 6.5	x86	qcc 4.4.2 with GNU C++ libraries	i86QNX6.5qcc_gpp4.4.2
	PowerPC™ E500 V2 core <i>Custom-supported target platform. Contact your RTI sales representative or sales@rti.com for more information.</i>	qcc (gcc 4.4.2)	ppce500v2QNX6.5.0qcc_cpp4.4.2
QNX Neutrino 6.5 SP1	Arm v7	qcc 4.4.2 with Dinkumware libraries	armv7aQNX6.5.0SP1qcc_cpp4.4.2

---

<sup>a</sup>For use with Windows or Linux hosts as supported by QNX and RTI.

Table 7.1 Supported QNX Platforms

Operating System	CPU	Compiler	RTI Architecture
QNX Neutrino 6.6.0	Arm v7 See note regarding patches below. <i>Custom-supported target platform. Contact your RTI sales representative or sales@rti.com for more information.</i>	qcc_cpp 4.7.3 with Dinkumware libraries	armv7aQNX6.6.0qcc_cpp4.7.3
	x86 See note regarding patches below. <i>Custom-supported target platform. Contact your RTI sales representative or sales@rti.com for more information.</i>	qcc_cpp 4.7.3 with Dinkumware libraries	i86QNX6.6qcc_cpp4.7.3
QNX Neutrino 7.0.4	Arm v7 <i>Custom-supported target platform. Contact your RTI sales representative or sales@rti.com for more information.</i>	qcc 5.4.0 with LLVM default libraries	armv7QNX7.0.0qcc_cxx5.4.0 <sup>a</sup>
	Arm v8	qcc 5.4.0 with LLVM default libraries	armv8QNX7.0.0qcc_cxx5.4.0
		qcc 5.4.0 with GNU C++ libraries	armv8QNX7.0.0qcc_gpp5.4.0
	x64	qcc 5.4.0 with LLVM default libraries	x64QNX7.0.0qcc_cxx5.4.0
		qcc 5.4.0 with GNU C++ libraries	x64QNX7.0.0qcc_gpp5.4.0

The libraries on Arm v7 and v8 CPUs require a hardware FPU in the processor and are compatible with systems that have hard-float libc. See [Table 7.4 Library-Creation Details for QNX Architectures](#) for compiler flags details.

**Note regarding patches:** The libraries for QNX Neutrino 6.6.0 on Arm v7 (armv7aQNX6.6.0qcc\_cpp4.7.3), x86 (i86QNX6.6qcc\_cpp4.7.3), and QNX Neutrino 7.0.4 on Arm v7 (armv7QNX7.0.0qcc\_cxx5.4.0) were built with the following patches and tested on systems that have these patches installed:

- QNX Software Development Platform 6.6 Graphics Patch (Patch ID 3875)
- QNX Software Development Platform 6.6 Header Files Patch (Patch ID 3851)

<sup>a</sup>armv7QNX7.0.0qcc\_cxx5.4.0 was tested with QNX Neutrino 7.0.0 kernel.

- Patch-660-3885-diskimage.tar for the BSP

[Table 7.2 Building Instructions for QNX Architectures](#) lists the libraries you will need to link into your application.

See also:

- [7.9 Libraries Required for Using Distributed Logger on page 88](#)
- [7.10 Libraries Required for Using Monitoring on page 89](#)
- [7.11 Libraries Required for Using RTI Real-Time WAN Transport APIs on page 89](#)
- [7.12 Libraries Required for Using RTI Secure WAN Transport APIs on page 90](#)
- [7.13 Libraries Required for Using RTI TCP Transport APIs and TLS Support on page 91](#)
- [7.14 Libraries Required for Zero Copy Transfer Over Shared Memory on page 91](#)

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

[Table 7.3 Running Instructions for QNX Architectures](#) provides details on the environment variables that must be set at run time for a QNX architecture.

[Table 7.4 Library-Creation Details for QNX Architectures](#) provides details on how the QNX libraries were built.

Starting with release 6.0.1, you will need the **dirname** tool to run the scripts in the **bin** directory.

Table 7.2 Building Instructions for QNX Architectures

API	Library Format	RTI Libraries <sup>ab</sup>	Required System Libraries	Required Compiler Flags
C++ (Traditional and Modern APIs)	Static Release	libnddscorez.a libnddscz.a libnddscppz.a or libnddscpp2z.a librticonnextmsgcppz.a or librticonnextmsgcpp2z.a	-lm -lsocket	-DRTI_QNX
	Static Debug	libnddscorezd.a libnddsczd.a libnddscppzd.a or libnddscpp2zd.a librticonnextmsgcppzd.a or librticonnextmsgcpp2zd.a		
	Dynamic Release	libnddscore.so libnddsc.so libnddscpp.so or libnddscpp2.so librticonnextmsgcpp.so or librticonnextmsgcpp2.so		
	Dynamic Debug	libnddscored.so libnddscd.so libnddscppd.so or libnddscpp2d.so librticonnextmsgcppd.so or librticonnextmsgcpp2d.so		

<sup>a</sup>Choose \*cpp\*.\* for the Traditional C++ API or \*cpp2\*.\* for the Modern C++ API.

<sup>b</sup>The DDS C/C++ libraries are in \$(NDDSHOME)/lib/<architecture>.

Table 7.2 Building Instructions for QNX Architectures

API	Library Format	RTI Libraries <sup>ab</sup>	Required System Libraries	Required Compiler Flags
C	Static Release	libnddscorez.a libnddscz.a librticonnextmsgcz.a	-lm -lsocket	-DRTI_QNX
	Static Debug	libnddscorezd.a libnddsczd.a librticonnextmsgczd.a		
	Dynamic Release	libnddscoreso libnddscso librticonnextmsgcso		
	Dynamic Debug	libnddscoredso libnddscdso librticonnextmsgcdso		

Table 7.3 Running Instructions for QNX Architectures

RTI Architecture	Library Format (Release & Debug)	Environment Variables
All supported QNX architectures	Static	None required
	Dynamic	LD_LIBRARY_PATH= \${NDDSHOME}/lib/<architecture>:\${LD_LIBRARY_PATH} <sup>c</sup>

<sup>a</sup>Choose `*cpp*.*` for the Traditional C++ API or `*cpp2*.*` for the Modern C++ API.

<sup>b</sup>The DDS C/C++ libraries are in `$(NDDSHOME)/lib/<architecture>`.

<sup>c</sup>`${NDDSHOME}` represents the root directory of your *Connex DDS* installation. `LD_LIBRARY_PATH` represents the value of the `LD_LIBRARY_PATH` variable prior to changing it to support *Connex DDS*. When using `nddsjava.jar`, the Java virtual machine (JVM) will attempt to load release versions of the native libraries. When using `nddsjavad.jar`, the JVM will attempt to load debug versions of the native libraries.

Table 7.4 Library-Creation Details for QNX Architectures

RTI Architecture	Library Format (Static & Dynamic)	Compiler Flags Used by RTI
armv7aQNX6.5.0SP1qcc_cpp4.4.2	Static Release	-Vgcc/4.4.2,gcc_ontoarmv7le_cpp-DFD_SETSIZE=512-DPTrIntType=long-DTARGET-T="armv7aQNX6.5.0SP1qcc_cpp4.4.2"-O-Wall-Wno-unknown-pragmas-fexceptions-v-O-DNDEBUG
	Static De- bug	-Vgcc/4.4.2,gcc_ontoarmv7le_cpp-DFD_SETSIZE=512-DPTrIntType=long-DTARGET-T="armv7aQNX6.5.0SP1qcc_cpp4.4.2"-O0-Wall-Wno-unknown-pragmas-fexceptions-v-O0-g
	Dynamic Release	-Vgcc/4.4.2,gcc_ontoarmv7le_cpp-DFD_SETSIZE=512-DPTrIntType=long-DTARGET-T="armv7aQNX6.5.0SP1qcc_cpp4.4.2"-O-Wall-Wno-unknown-pragmas-fexceptions-v-O-DNDEBUG-fPIC
	Dynamic De- bug	-Vgcc/4.4.2,gcc_ontoarmv7le_cpp-DFD_SETSIZE=512-DPTrIntType=long-DTARGET-T="armv7aQNX6.5.0SP1qcc_cpp4.4.2"-O0-Wall-Wno-unknown-pragmas-fexceptions-v-O0-g-fPIC
armv7aQNX6.6.0qcc_cpp4.7.3	Static Release	-Vgcc/4.7.3,gcc_ontoarmv7le-DFD_SETSIZE=512-DPTrIntType=long-DTARGET="armv7aQNX6.6.0qcc_cpp4.7.3"-O-Wall-Wno-unknown-pragmas-fexceptions-v-Y_cpp-O-DNDEBUG
	Static De- bug	-Vgcc/4.7.3,gcc_ontoarmv7le-DFD_SETSIZE=512-DPTrIntType=long-DTARGET="armv7aQNX6.6.0qcc_cpp4.7.3"-O0-Wall-Wno-unknown-pragmas-fexceptions-v-Y_cpp-O0-g
	Dynamic Release	-Vgcc/4.7.3,gcc_ontoarmv7le-DFD_SETSIZE=512-DPTrIntType=long-DTARGET="armv7aQNX6.6.0qcc_cpp4.7.3"-O-Wall-Wno-unknown-pragmas-fexceptions-v-Y_cpp-O-DNDEBUG-fPIC
	Dynamic De- bug	-Vgcc/4.7.3,gcc_ontoarmv7le-DFD_SETSIZE=512-DPTrIntType=long-DTARGET="armv7aQNX6.6.0qcc_cpp4.7.3"-O0-Wall-Wno-unknown-pragmas-fexceptions-v-Y_cpp-O0-g-fPIC
armv7aQNX7qcc_cxx	Release	Available on demand. Contact support@rti.com.
	Debug	
armv7QNX7.0.0qcc_cxx5.4.0	Static Release	-Vgcc/5.4.0,gcc_ontoarmv7le-DCPU=ARMV7-DFD_SETSIZE=512-DPTrIntType=long-DTARGET-T="armv7QNX7.0.0qcc_cxx5.4.0"-O-Wall-Wno-unknown-pragmas-fexceptions-v-Y_cxx-O-DNDEBUG
	Static De- bug	-Vgcc/5.4.0,gcc_ontoarmv7le-DCPU=ARMV7-DFD_SETSIZE=512-DPTrIntType=long-DTARGET-T="armv7QNX7.0.0qcc_cxx5.4.0"-O0-Wall-Wno-unknown-pragmas-fexceptions-v-Y_cxx-O0-g
	Dynamic Release	-Vgcc/5.4.0,gcc_ontoarmv7le-DCPU=ARMV7-DFD_SETSIZE=512-DPTrIntType=long-DTARGET-T="armv7QNX7.0.0qcc_cxx5.4.0"-O-Wall-Wno-unknown-pragmas-fexceptions-v-Y_cxx-O-DNDEBUG-fPIC
	Dynamic De- bug	-Vgcc/5.4.0,gcc_ontoarmv7le-DCPU=ARMV7-DFD_SETSIZE=512-DPTrIntType=long-DTARGET-T="armv7QNX7.0.0qcc_cxx5.4.0"-O0-Wall-Wno-unknown-pragmas-fexceptions-v-Y_cxx-O0-g-fPIC



Table 7.4 Library-Creation Details for QNX Architectures

RTI Architecture	Library Format (Static & Dynamic)	Compiler Flags Used by RTI
armv8QNX7.0.0 qcc_cxx5.4.0	Static Release	-Vgcc/5.4.0,gcc_ntoaarch64le -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\armv8QNX7.0.0qcc_cxx5.4.0\" -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cxx -O -DNDEBUG
	Static De-bug	-Vgcc/5.4.0,gcc_ntoaarch64le -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\armv8QNX7.0.0qcc_cxx5.4.0\" -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cxx -O0 -g
	Dynamic Release	-Vgcc/5.4.0,gcc_ntoaarch64le -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\armv8QNX7.0.0qcc_cxx5.4.0\" -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cxx -O -DNDEBUG -fPIC
	Dynamic De-bug	-Vgcc/5.4.0,gcc_ntoaarch64le -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\armv8QNX7.0.0qcc_cxx5.4.0\" -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cxx -O0 -g -fPIC
armv8QNX7.0.0 qcc_gpp5.4.0	Static Release	-Vgcc/5.4.0,gcc_ntoaarch64le -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\armv8QNX7.0.0qcc_gpp5.4.0\" -D_GLIBCXX_USE_C99 -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O -DNDEBUG
	Static De-bug	-Vgcc/5.4.0,gcc_ntoaarch64le -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\armv8QNX7.0.0qcc_gpp5.4.0\" -D_GLIBCXX_USE_C99 -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O0 -g
	Dynamic Release	-Vgcc/5.4.0,gcc_ntoaarch64le -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\armv8QNX7.0.0qcc_gpp5.4.0\" -D_GLIBCXX_USE_C99 -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O -DNDEBUG -fPIC
	Dynamic De-bug	-Vgcc/5.4.0,gcc_ntoaarch64le -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\armv8QNX7.0.0qcc_gpp5.4.0\" -D_GLIBCXX_USE_C99 -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O0 -g -fPIC
i86QNX6.4.1 qcc_gpp	Static Release	-Vgcc/4.3.3,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.4.1qcc_gpp\" -D_GLIBCXX_USE_C99 -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O -DNDEBUG
	Static De-bug	-Vgcc/4.3.3,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.4.1qcc_gpp\" -D_GLIBCXX_USE_C99 -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O0 -g
	Dynamic Release	-Vgcc/4.3.3,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.4.1qcc_gpp\" -D_GLIBCXX_USE_C99 -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O -DNDEBUG -fPIC
	Dynamic De-bug	-Vgcc/4.3.3,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.4.1qcc_gpp\" -D_GLIBCXX_USE_C99 -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O0 -g -fPIC

Table 7.4 Library-Creation Details for QNX Architectures

RTI Architecture	Library Format (Static & Dynamic)	Compiler Flags Used by RTI
i86QNX6.5 qcc_gpp4.4.2	Static Release	-Vgcc/4.4.2,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.5qcc_gpp4.4.2\" -D_GLIBCXX_USE_C99 -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -m32 -march=i386 -mtune=generic -O -DNDEBUG
	Static De- bug	-Vgcc/4.4.2,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.5qcc_gpp4.4.2\" -D_GLIBCXX_USE_C99 -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -m32 -march=i386 -mtune=generic -O0 -g
	Dynamic Release	-Vgcc/4.4.2,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.5qcc_gpp4.4.2\" -D_GLIBCXX_USE_C99 -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -m32 -march=i386 -mtune=generic -O -DNDEBUG -fPIC
	Dynamic De- bug	-Vgcc/4.4.2,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.5qcc_gpp4.4.2\" -D_GLIBCXX_USE_C99 -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -m32 -march=i386 -mtune=generic -O0 -g -fPIC
i86QNX6.6 qcc_cpp4.7.3	Static Release	-Vgcc/4.7.3,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.6qcc_cpp4.7.3\" -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cpp -m32 -march=i386 -mtune=generic -O -DNDEBUG
	Static De- bug	-Vgcc/4.7.3,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.6qcc_cpp4.7.3\" -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cpp -m32 -march=i386 -mtune=generic -O0 -g
	Dynamic Release	-Vgcc/4.7.3,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.6qcc_cpp4.7.3\" -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cpp -m32 -march=i386 -mtune=generic -O -DNDEBUG -fPIC
	Dynamic De- bug	-Vgcc/4.7.3,gcc_ntox86 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\i86QNX6.6qcc_cpp4.7.3\" -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cpp -m32 -march=i386 -mtune=generic -O0 -g -fPIC
i86QNX7.0.0 qcc_gpp5.4.0	Release	Available on demand. Contact support@rti.com.
	Debug	
ppce500v2QNX6.5.0 qcc_cpp4.4.2	Static Release	-Vgcc/4.4.2,gcc_ntoppbespe -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET-T="\ppce500v2QNX6.5.0qcc_cpp4.4.2\" -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cpp -mcpu-u=8540 -me500v2 -mno-isel -mspe -mhard-float -WI,-relax -O -DNDEBUG
	Static De- bug	-Vgcc/4.4.2,gcc_ntoppbespe -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET-T="\ppce500v2QNX6.5.0qcc_cpp4.4.2\" -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cpp -mcpu-u=8540 -me500v2 -mno-isel -mspe -mhard-float -WI,-relax -O0 -g
	Dynamic Release	-Vgcc/4.4.2,gcc_ntoppbespe -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET-T="\ppce500v2QNX6.5.0qcc_cpp4.4.2\" -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cpp -mcpu-u=8540 -me500v2 -mno-isel -mspe -mhard-float -WI,-relax -O -DNDEBUG -fPIC
	Dynamic De- bug	-Vgcc/4.4.2,gcc_ntoppbespe -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET-T="\ppce500v2QNX6.5.0qcc_cpp4.4.2\" -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cpp -mcpu-u=8540 -me500v2 -mno-isel -mspe -mhard-float -WI,-relax -O0 -g -fPIC

Table 7.4 Library-Creation Details for QNX Architectures

RTI Architecture	Library Format (Static & Dynamic)	Compiler Flags Used by RTI
x64QNX7.0.0 qcc_cxx5.4.0	Static Release	-Vgcc/5.4.0,gcc_ntox86_64 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\x64QNX7.0.0qcc_cxx5.4.0" -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cxx -O -DNDEBUG
	Static De- bug	-Vgcc/5.4.0,gcc_ntox86_64 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\x64QNX7.0.0qcc_cxx5.4.0" -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cxx -O0 -g
	Dynamic Release	-Vgcc/5.4.0,gcc_ntox86_64 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\x64QNX7.0.0qcc_cxx5.4.0" -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cxx -O -DNDEBUG -fPIC
	Dynamic De- bug	-Vgcc/5.4.0,gcc_ntox86_64 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\x64QNX7.0.0qcc_cxx5.4.0" -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_cxx -O0 -g -fPIC
x64QNX7.0.0 qcc_gpp5.4.0	Static Release	-Vgcc/5.4.0,gcc_ntox86_64 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\x64QNX7.0.0qcc_gpp5.4.0" -D_GLIBCXX_USE_C99 -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O -DNDEBUG
	Static De- bug	-Vgcc/5.4.0,gcc_ntox86_64 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\x64QNX7.0.0qcc_gpp5.4.0" -D_GLIBCXX_USE_C99 -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O0 -g
	Dynamic Release	-Vgcc/5.4.0,gcc_ntox86_64 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\x64QNX7.0.0qcc_gpp5.4.0" -D_GLIBCXX_USE_C99 -O -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O -DNDEBUG -fPIC
	Dynamic De- bug	-Vgcc/5.4.0,gcc_ntox86_64 -DFD_SETSIZE=512 -DPtrIntType=long -DTARGET="\x64QNX7.0.0qcc_gpp5.4.0" -D_GLIBCXX_USE_C99 -O0 -Wall -Wno-unknown-pragmas -fexceptions -v -Y_gpp -O0 -g -fPIC

## 7.1 Required Change for Building with C++ Libraries for QNX Platforms

The C++ libraries are built *without* the **-fno-rtti** flag and *with* the **-fexceptions** flag. You must build your C++ applications *without* **-fno-exceptions** in order to link with the RTI libraries. In summary:

- Do *not* use **-fno-exceptions** when building a C++ application or the build will fail. It is not necessary to use **-fexceptions**, but doing so will not cause a problem.
- It is no longer necessary to use **-fno-rtti**, but doing so will not cause a problem.

## 7.2 Support for Modern C++ API

*Connex* DDS provides two different C++ APIs, which we refer to as the "Traditional C++" and "Modern C++" APIs.

Some platforms have been tested only on C++03, whereas others have been tested with both C++03 and C++11. C++03 is typically supported with gcc3.4.2 and above. C++11 is typically supported with gcc4.7.2 and above.

**Notes:**

- Support for C++03 is deprecated starting with release 6.1.0, which is the last release that supports non-C++11-compliant compilers. After release 6.1.0, the Modern C++ API will require a C++11 compiler (or newer). The Traditional C++ API is not affected and continues to support C++98 compilers (or newer).
- Only the default plugin is supported. The legacy plugin has been removed from *Code Generator* starting with release 6.1.0.

For more information, see [Traditional vs. Modern C++, in the RTI Connex DDS Core Libraries User's Manual](#).

## 7.3 Multicast Support

Multicast is supported on QNX platforms and is configured out of the box. That is, the default value for the initial peers list (NDDS\_DISCOVERY\_PEERS) includes a multicast address. See the online documentation for more information.

## 7.4 Supported Transports

- **Shared Memory:** Supported and enabled by default.

To see a list of the shared memory resources, enter:

```
'ls /dev/shmem/RTIOsapiSharedMemorySegment-*
```

To clean up the shared memory resources, remove the files listed in **dev/shmem/**. The shared resource names used by *Connex DDS* begin with **'RTIOsapiSharedMemorySem-'**. To see a list of shared semaphores, enter:

```
'ls /dev/sem/RTIOsapiSharedMemorySemMutex*'
```

To clean up the shared semaphore resources, remove the files listed in **/dev/sem/**.

The permissions for the semaphores created by *Connex DDS* are modified by the process' **umask** value. If you want to have shared memory support between different users, run the command **"umask 000"** to change the default **umask** value to 0 before running your *Connex DDS* application.

- **UDPv4:** Supported and enabled by default.
- **UDPv6:** Supported. The transport is not enabled by default; the peers list must be modified to support IPv6. No Traffic Class support.

To use the UDPv6 transport, the network stack must provide IPv6 capability. Enabling UDPv6 may involve switching the network stack server and setting up IPv6 route entries.

- **TCP/IPv4:** Supported on all platforms except:
  - i86QNX6.4.1qcc\_gpp
  - ppce500v2QNX6.5.0qcc\_cpp4.4.2

## 7.5 Unsupported Features

These features are not supported on QNX platforms:

- Backtrace
- Durable Writer History and Durable Reader State
- 'Find Package' CMake script

## 7.6 Monotonic Clock Support

The monotonic clock (described in *Clock Selection* in the [RTI Connex DDS Core Libraries User's Manual](#)) is supported on all QNX platforms.

## 7.7 Thread Configuration

See [Table 7.5 Thread Settings for QNX Platforms](#) and [Table 7.6 Thread-Priority Definitions for QNX Platforms](#).

**Table 7.5 Thread Settings for QNX Platforms**

Applicable Thread	DDS_ThreadSettings_t	Platform-Specific Setting
Asynchronous Publisher, Asynchronous flushing thread	mask	OS default thread type
	priority	10
	stack_size	64 * 1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
Database thread	mask	DDS_THREAD_SETTINGS_STUDIO
	priority	8
	stack_size	64 * 1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported

Table 7.5 Thread Settings for QNX Platforms

Applicable Thread	DDS_ThreadSettings_t	Platform-Specific Setting
Event thread	mask	DDS_THREAD_SETTINGS_STUDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	9
	stack_size	4 * 64 * 1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
ReceiverPool threads	mask	DDS_THREAD_SETTINGS_STUDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	12
	stack_size	4 * 64 * 1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported

Table 7.6 Thread-Priority Definitions for QNX Platforms

Thread-Priority Definition	Operating-System Priority
THREAD_PRIORITY_DEFAULT	10
THREAD_PRIORITY_HIGH	14
THREAD_PRIORITY_ABOVE_NORMAL	12
THREAD_PRIORITY_NORMAL	10
THREAD_PRIORITY_BELOW_NORMAL	8
THREAD_PRIORITY_LOW	6

## 7.7.1 Support for Controlling CPU Core Affinity for RTI Threads

Support for controlling CPU core affinity (described in *Controlling CPU Core Affinity* in the [RTI Connex DDS Core Libraries User's Manual](#)) is available on the following platforms:

- armv7aQNX6.6.0qcc\_cpp4.7.3
- i86QNX6.6qcc\_cpp4.7.3
- i86QNX7.0.0qcc\_gpp5.4.0
- x64QNX7.0.0qcc\_cxx5.4.0
- x64QNX7.0.0qcc\_gpp5.4.0

## 7.8 Support for Remote Procedure Calls (RPC)

RPC is an experimental feature available only for the C++11 API. It is supported on these QNX architectures:

- arm7aQNX7qcc\_cxx
- armv7QNX7.0.0qcc\_cxx5.4.0
- armv8QNX7.0.0qcc\_cxx5.4.0
- armv8QNX7.0.0qcc\_gpp5.4.0
- i86QNX7.0.0qcc\_gpp5.4.0
- x64QNX7.0.0qcc\_cxx5.4.0
- x64QNX7.0.0qcc\_gpp5.4.0

See *Remote Procedure Calls (RPC)* in the [RTI Connex DDS Core Libraries User's Manual](#).

## 7.9 Libraries Required for Using Distributed Logger

*RTI Distributed Logger* is supported on all QNX platforms except QNX Neutrino 6.5 SP1 on Arm v7 (armv7aQNX6.5.0SP1qcc\_cpp4.4.2).

[Table 7.7 Additional Libraries for using RTI Distributed Logger](#) lists the additional libraries you will need in order to use *Distributed Logger*.

**Table 7.7 Additional Libraries for using RTI Distributed Logger**

Language	Static		Dynamic	
	Release	Debug	Release	Debug
C	librtidlc.a	librtidlczd.a	librtidlc.so	librtidcd.so
C++ (Traditional API)	librtidlc.a librtidlcppz.a	librtidlczd.a librtidlcppzd.a	librtidlc.so librtidlcpp.so	librtidlcd.so librtidlcppd.so

## 7.10 Libraries Required for Using Monitoring

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. For example, if your *Connex DDS* application is linked with the static release version of the *Connex DDS* libraries, you will need to also use the static release version of the monitoring library. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

If you are statically linking your application with DDS libraries and you want to add monitoring to your application, you will also need to statically link the monitoring library. The library cannot be loaded dynamically strictly through the QoS profile because it also depends on DDS to publish its data. Therefore, it depends on DDS; the DDS functionality would cause duplicate symbols to be found resulting, in the termination of the process.

### Notes:

- To use *static* libraries: the RTI library from [Table 7.8 Additional Libraries for Using Monitoring](#) must appear *first* in the list of libraries to be linked.
- To use *dynamic* libraries: make sure the permissions on the .so library files are readable by everyone.

**Table 7.8 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>a</sup>
Dynamic Release	librtimonitoring.so
Dynamic Debug	librtimonitoringd.so
Static Release	librtimonitoringz.a
Static Debug	librtimonitoringzd.a

## 7.11 Libraries Required for Using RTI Real-Time WAN Transport APIs

If you choose to use *RTI Real-Time WAN Transport*, you must download and install a separate package that contains the transport libraries. See the [RTI Real-Time WAN Transport Installation Guide](#) for details.

Using *Real-Time WAN Transport* requires one of the libraries in [Table 7.9 Additional Libraries for Using RTI Real-Time WAN Transport APIs](#). Select the file appropriate for your chosen library format.

For more information, see the "Enabling Real-Time WAN Transport" section in the *RTI Real-Time WAN Transport* part of the [RTI Connex DDS Core Libraries User's Manual](#).

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.



**Table 7.9 Additional Libraries for Using RTI Real-Time WAN Transport APIs**

Library Format	Real-Time WAN Transport Libraries <sup>a</sup>
Dynamic Release	libnndsrwt.so
Dynamic Debug	libnndsrwtd.so
Static Release	libnndsrwtz.a
Static Debug	libnndsrwtzd.a

## 7.12 Libraries Required for Using RTI Secure WAN Transport APIs

*RTI Secure WAN Transport* is only available specific QNX architectures, which are listed in the [RTI Secure WAN Transport Release Notes](#).

If you choose to use *RTI Secure WAN Transport*, it must be downloaded and installed separately. See the [RTI Secure WAN Transport Installation Guide](#).

To use the Secure WAN Transport APIs, link against the additional libraries in [Table 7.10 Additional Libraries for using RTI Secure WAN Transport APIs on QNX Systems](#). (Select the files appropriate for your chosen library format.)

**Table 7.10 Additional Libraries for using RTI Secure WAN Transport APIs on QNX Systems**

Library Format	RTI Secure WAN Transport Libraries <sup>b</sup>	OpenSSL Libraries <sup>c</sup>
Dynamic Release	libnndstransportwan.so libnndstransporttls.so	libssl.so libcrypto.so
Dynamic Debug	libnndstransportwand.so libnndstransporttlsd.so	
Static Release	libnndstransporttlsz.a libnndstransporttlszd.a	
Static Debug	libnndstransportwanz.a libnndstransportwanzd.a	

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>The libraries are in <NDDSHOME>/lib/<architecture>.

<sup>c</sup>OpenSSL libraries are in <NDDSHOME>/third\_party/openssl-1.1.1k/<architecture>/<format>/lib.

## 7.13 Libraries Required for Using RTI TCP Transport APIs and TLS Support

To use the TCP Transport APIs, link against the additional libraries in [Table 7.11 Additional Libraries for using RTI TCP Transport APIs](#).

Note: Not all platforms support the TCP Transport - see [7.4 Supported Transports on page 85](#).

**Table 7.11 Additional Libraries for using RTI TCP Transport APIs**

Library Format	RTI TCP Transport Libraries <sup>a</sup>
Dynamic Release	libnddstransporttcp.so
Dynamic Debug	libnddstransporttcpd.so
Static Release	libnddstransporttcpz.a
Static Debug	libnddstransporttcpzd.a

If you are using *RTI TLS Support*, also see [Table 7.12 Additional Libraries for using RTI TCP Transport APIs with TLS Enabled](#). (Select the files appropriate for your chosen library format.) See the [RTI TLS Support Release Notes](#) for a list of supported platforms.

**Table 7.12 Additional Libraries for using RTI TCP Transport APIs with TLS Enabled**

Library Format	RTI TLS Libraries <sup>b</sup>	OpenSSL Libraries <sup>c</sup>
Dynamic Release	libnddstls.so	libssl.so libcrypto.so
Dynamic Debug	libnddstlsd.so	
Static Release	libnddstlsz.a	
Static Debug	libnddstlszd.a	

## 7.14 Libraries Required for Zero Copy Transfer Over Shared Memory

To use the Zero Copy Transfer Over Shared Memory feature, link against the additional library in [Table 7.13 Additional Libraries for Zero Copy Transfer Over Shared Memory](#).

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>c</sup>OpenSSL libraries are in <NDDSHOME>/third\_party/openssl-1.1.1k/<architecture>/<format>/lib.

**Table 7.13 Additional Libraries for Zero Copy Transfer Over Shared Memory**

Library Format	Zero Copy Transfer Over Shared Memory Libraries <sup>a</sup>
Dynamic Release	libn-ddsmetp.so
Dynamic Debug	libn-ddsmetpd.so
Static Release	libn-ddsmetpz.a
Static Debug	libn-ddsmetpzd.a

## 7.15 Restarting Applications on QNX Systems

Due to a limitation in the POSIX API, if a process is unexpectedly interrupted in the middle of a critical section of code that is protected by a shared mutex semaphore, the OS is unable to automatically release the semaphore, making it impossible to reuse it by another application.

The *Connex* DDS shared-memory transport uses a shared mutex to protect access to the shared memory area across multiple processes.

It is possible under some extreme circumstances that if one application crashes or terminates ungracefully while executing code inside a critical section, the other applications sharing the same resource will not be able to continue their execution. If this situation occurs, you must manually delete the shared-memory mutex before re-launching any application in the same DDS domain.

---

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

# Chapter 8 VxWorks Platforms

Table 8.1 [VxWorks Target Platforms](#) lists the architectures supported on VxWorks operating systems. You can build a VxWorks application by cross-compiling from your development host.

**Table 8.1 VxWorks Target Platforms**

Operating System	CPU	Compiler	RTI Architecture <sup>a</sup>
VxWorks 6.9.3.2	x64	gcc 4.3.3	For Kernel Modules: pentium64Vx6.9gcc4.3.3 For Real Time Processes: pentium64Vx6.9gcc4.3.3_rtp
VxWorks 6.9.4.2	PPC (e500v2)	gcc 4.3.3	For Kernel Modules: ppce500v2Vx6.9.4gcc4.3.3 For Real-Time Processes: ppce500v2Vx6.9.4gcc4.3.3_rtp
	Any PowerPC CPU with floating-point hardware that is backwards-compatible with 32-bit PowerPC 604	gcc 4.3.3	For Kernel Modules: ppc604Vx6.9.4gcc4.3.3 For Real Time Processes: ppc604Vx6.9.4gcc4.3.3_rtp
VxWorks 6.9.4.6	PowerPC®	Diab 5.9.1	For Kernel Modules: ppce6500Vx6.9.4.6diab5.9.1 For Real-Time Processes: ppce6500Vx6.9.4.6diab5.9.1_rtp
VxWorks 7.0 SR0510	x64	gcc 4.8.1.6	For Kernel Modules: pentium64Vx7.0gcc4.8.1 For Real Time Processes: pentium64Vx7.0gcc4.8.1_rtp

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<sup>a</sup>For use with Windows hosts as supported by Wind River Systems.

**Table 8.1 VxWorks Target Platforms**

Operating System	CPU	Compiler	RTI Architecture <sup>a</sup>
VxWorks 7.0 SR0540 <i>Custom-supported target platform. Contact your RTI sales representative or sales@rti.com for more information.</i>	x86	gcc 4.8.1.10	For Kernel Modules: pentiumVx7.0SR0540gcc4.8.1.10 Real-Time Processes not supported.
VxWorks® 7.0 SR0630	x64	llvm 8.0.0.2	For Kernel Modules: x64Vx7SR0630llvm8.0.0.2 For Real Time Processes: x64Vx7SR0630llvm8.0.0.2_rtp

[Table 8.2 Building Instructions for VxWorks Architectures on the next page](#) lists the libraries you will need to link into your application and the required compiler flags.

For other libraries that you may need, see:

- [8.15 Libraries Required for Using Distributed Logger on page 109](#)
- [8.16 Libraries Required for Using Monitoring on page 109](#)
- [8.17 Libraries Required for Using RTI Real-Time WAN Transport APIs on page 110](#)
- [8.18 Libraries Required for Zero Copy Transfer Over Shared Memory on page 110](#)

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

[Table 8.3 Running Instructions for VxWorks Architectures on page 96](#) provides details on the environment variables that must be set at run time for a VxWorks architecture.

Compiling a *Connex DDS* application for VxWorks depends on the development platform. For more information, such as specific compiler flags, see the *VxWorks Programmer's Guide*. [Table 8.4 Library-Creation Details for VxWorks Architectures on page 97](#) provides details on how the VxWorks libraries were built. We recommend that you use similar settings.

Cross-compiling for any VxWorks platform is similar to building for a Linux target. To build a VxWorks application, create a makefile that reflects the compiler and linker for your target with appropriate flags defined. There will be several target-specific compile flags you must set to build correctly. For more information, see the *VxWorks Programmer's Guide*.

<sup>a</sup>For use with Windows hosts as supported by Wind River Systems.

Table 8.2 Building Instructions for VxWorks Architectures

API	Library Format	Required RTI Libraries <sup>ab</sup>	Required Kernel Components	Required Compiler Flags
C++ (Traditional and Modern APIs)	Static Release	libnddscorez.a libnddscz.a libnddscppz.a or libnddscpp2z.a librticonnextmsgcppz.a or librticonnextmsgcpp2z.a	INCLUDE_TIMESTAMP INCLUDE_POSIX_CLOCKS For RTI architectures with SMP support also use: INCLUDE_TLS	-DRTI_VXWORKS  For all x64 platforms, also use: -DRTI_64BIT
	Static Debug	libnddscorezd.a libnddsczd.a libnddscppzd.a or libnddscpp2zd.a librticonnextmsgcppzd.a or librticonnextmsgcpp2zd.a		
	Dynamic Release	libnddscore.so libnddsc.so libnddscpp.so or libnddscpp2.so librticonnextmsgcpp.so or librticonnextmsgcpp2.so		
	Dynamic Debug	libnddscored.so libnddscd.so libnddscppd.so or libnddscpp2d.so librticonnextmsgcppd.so or librticonnextmsgcpp2d.so		

<sup>a</sup>Choose \*cpp\*.\* for the Traditional C++ API or \*cpp2\*.\* for the Modern C++ API.

<sup>b</sup>The *Connex* DDS C/C++ libraries are in <NDDSHOME>/lib/<architecture>.

Table 8.2 Building Instructions for VxWorks Architectures

API	Library Format	Required RTI Libraries <sup>ab</sup>	Required Kernel Components	Required Compiler Flags
C	Static Release	libnddscorez.a libnddscz.a librticonnextmsgcz.a	INCLUDE_TIMESTAMP INCLUDE_POSIX_CLOCKS  For RTI architectures with SMP support, also use: INCLUDE_TLS	-DRTI_VXWORKS  For all x64 platforms, also use: -DRTI_64BIT
	Static Debug	libnddscorezd.a libnddsczd.a librticonnextmsgczd.a		
	Dynamic Release	libnddscore.so libnddsc.so librticonnextmsgc.so		
	Dynamic Debug	libnddscored.so libnddscd.so librticonnextmsgcd.so		

Table 8.3 Running Instructions for VxWorks Architectures

RTI Architecture	Library Format (Release & Debug)	Environment Variables
VxWorks Kernel mode architectures	DKM	None required
VxWorks RTP architectures	Dynamic	LD_LIBRARY_PATH= <path_to_connex_libs>;<path_to_libc>" C
	Static	None required

<sup>a</sup>Choose `*cpp*.*` for the Traditional C++ API or `*cpp2*.*` for the Modern C++ API.

<sup>b</sup>The *Connex DDS C/C++* libraries are in `<NDDSHOME>/lib/<architecture>`.

<sup>c</sup>In order to run dynamic RTP executables, you need to have the runtime `libc.so` library accessible. See the VxWorks Application Programmer's guide for more information.

Table 8.4 Library-Creation Details for VxWorks Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
armv7aVx6.9.4gcc4.3.3	Release	Available on demand. Contact support@rti.com.
	Debug	
armv7aVx6.9.4gcc4.3.3_rtp	Release	Available on demand. Contact support@rti.com.
	Debug	
pentium64Vx6.9gcc4.3.3	Release	-DCPU=X86_64 -DPtrIntType=long -DTARGET="\pentium64Vx6.9gcc4.3.3\" -DTOOL=gnu -DTOOL_FAMILY=gnu -D_WRS_KERNEL -O -march=x86-64 -m64 -mcmmodel=large -mno-red-zone -fno-builtin -ansi -Wreturn-type -Wconversion -Wformat -Wsystem-headers -Wno-sign-conversion -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O -DNDEBUG
	Debug	-DCPU=X86_64 -DPtrIntType=long -DTARGET="\pentium64Vx6.9gcc4.3.3\" -DTOOL=gnu -DTOOL_FAMILY=gnu -D_WRS_KERNEL -O0 -march=x86-64 -m64 -mcmmodel=large -mno-red-zone -fno-builtin -ansi -Wreturn-type -Wconversion -Wformat -Wsystem-headers -Wno-sign-conversion -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O0 -g
pentium64Vx6.9gcc4.3.3_rtp	Static Release	-DCPU=X86_64 -DPtrIntType=long -DTARGET="\pentium64Vx6.9gcc4.3.3_rtp\" -DTOOL=gnu -DTOOL_FAMILY=gnu -O -march=x86-64 -m64 -mcmmodel=small -ansi -fno-builtin -Wsystem-headers -Wreturn-type -Wconversion -Wformat -Wno-sign-conversion -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O -DNDEBUG
	Static Debug	-DCPU=X86_64 -DPtrIntType=long -DTARGET="\pentium64Vx6.9gcc4.3.3_rtp\" -DTOOL=gnu -DTOOL_FAMILY=gnu -O0 -march=x86-64 -m64 -mcmmodel=small -ansi -fno-builtin -Wsystem-headers -Wreturn-type -Wconversion -Wformat -Wno-sign-conversion -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O0 -g
	Dynamic Release	-DCPU=X86_64 -DPtrIntType=long -DTARGET="\pentium64Vx6.9gcc4.3.3_rtp\" -DTOOL=gnu -DTOOL_FAMILY=gnu -O -march=x86-64 -m64 -mcmmodel=small -ansi -fno-builtin -Wsystem-headers -Wreturn-type -Wconversion -Wformat -Wno-sign-conversion -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O -DNDEBUG -fPIC
	Dynamic Debug	-DCPU=X86_64 -DPtrIntType=long -DTARGET="\pentium64Vx6.9gcc4.3.3_rtp\" -DTOOL=gnu -DTOOL_FAMILY=gnu -O0 -march=x86-64 -m64 -mcmmodel=small -ansi -fno-builtin -Wsystem-headers -Wreturn-type -Wconversion -Wformat -Wno-sign-conversion -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O0 -g -fPIC
pentium64Vx7.0gcc4.8.1	Release	-DCPU=_VX_NEHALEM -DPtrIntType=long -DTARGET="\pentium64Vx7.0gcc4.8.1\" -DTOOL-L=gnu -DTOOL_FAMILY=gnu -D_WRS_KERNEL -O -march=atom -mpopcnt -nostdlib -fno-builtin -fno-defer-pop -m64 -fno-omit-frame-pointer -mcmmodel=kemel -mno-red-zone -ansi -fno-implicit-fp -fno-zero-initialized-in-bss -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O -DNDEBUG
	Debug	-DCPU=_VX_NEHALEM -DPtrIntType=long -DTARGET="\pentium64Vx7.0gcc4.8.1\" -DTOOL-L=gnu -DTOOL_FAMILY=gnu -D_WRS_KERNEL -O0 -march=atom -mpopcnt -nostdlib -fno-builtin -fno-defer-pop -m64 -fno-omit-frame-pointer -mcmmodel=kemel -mno-red-zone -ansi -fno-implicit-fp -fno-zero-initialized-in-bss -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O0 -g



Table 8.4 Library-Creation Details for VxWorks Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
pentium64Vx7.0gcc4.8.1_rtp	Static Release	-DPtrIntType=long -DTARGET="\pentium64Vx7.0gcc4.8.1_rtp" -DTOOL_FAMILY=gnu -DVX_TOOL=gnu -D_C99 -D_HAS_C9X -D_SO64_SMALL__ -D_VX_CPU=_VX_NEHALEM -O -march=h=atom -mpopcnt -m64 -mcmmodel=small -fno-builtin -fno-omit-frame-pointer -fno-strict-aliasing -MD -MP -std=c99 -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O -DNDEBUG
	Static Debug	-DPtrIntType=long -DTARGET="\pentium64Vx7.0gcc4.8.1_rtp" -DTOOL_FAMILY=gnu -DVX_TOOL=gnu -D_C99 -D_HAS_C9X -D_SO64_SMALL__ -D_VX_CPU=_VX_NEHALEM -O0 -march=atom -mpopcnt -m64 -mcmmodel=small -fno-builtin -fno-omit-frame-pointer -fno-strict-aliasing -MD -MP -std=c99 -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O0 -g
	Dynamic Release	-DPtrIntType=long -DTARGET="\pentium64Vx7.0gcc4.8.1_rtp" -DTOOL_FAMILY=gnu -DVX_TOOL=gnu -D_C99 -D_HAS_C9X -D_SO64_SMALL__ -D_VX_CPU=_VX_NEHALEM -D__SO_PICABILINUX__ -O -march=atom -mpopcnt -m64 -mcmmodel=small -fno-builtin -fno-omit-frame-pointer -fno-strict-aliasing -MD -MP -std=c99 -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O -DNDEBUG -fPIC
	Dynamic Debug	-DPtrIntType=long -DTARGET="\pentium64Vx7.0gcc4.8.1_rtp" -DTOOL_FAMILY=gnu -DVX_TOOL=gnu -D_C99 -D_HAS_C9X -D_SO64_SMALL__ -D_VX_CPU=_VX_NEHALEM -D__SO_PICABILINUX__ -O0 -march=atom -mpopcnt -m64 -mcmmodel=small -fno-builtin -fno-omit-frame-pointer -fno-strict-aliasing -MD -MP -std=c99 -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O0 -g -fPIC
pentiumVx7.0SR0540gcc4.8.1.10	Release	-DCPU=_VX_PENTIUM4 -DPtrIntType=long -DTARGET="\pentiumVx7.0SR0540gcc4.8.1.10" -DTOOL=gnu -DTOOL_FAMILY=gnu -D_WRS_CONFIG_SMP -D_WRS_KERNEL -O -fno-builtin -march=pentium4 -mfpmath=sse -nostdlib -fno-omit-frame-pointer -fno-defer-pop -fno-implicit-fp-ansi -fno-zero-initialized-in-bss -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O -DNDEBUG
	Debug	-DCPU=_VX_PENTIUM4 -DPtrIntType=long -DTARGET="\pentiumVx7.0SR0540gcc4.8.1.10" -DTOOL=gnu -DTOOL_FAMILY=gnu -D_WRS_CONFIG_SMP -D_WRS_KERNEL -O0 -fno-builtin -march=pentium4 -mfpmath=sse -nostdlib -fno-omit-frame-pointer -fno-defer-pop -fno-implicit-fp-ansi -fno-zero-initialized-in-bss -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O0 -g
ppc32Vx7SR0541gcc4.8.1.11_rtp	Release	Available on demand. Contact support@rti.com.
	Debug	
ppc604Vx6.9.4gcc4.3.3	Release	-DCPU=PPC32 -DPtrIntType=long -DTARGET="\ppc604Vx6.9.4gcc4.3.3" -DTOOL=gnu -DTOOL_FAMILY=gnu -D_WRS_KERNEL -O2 -mhard-float -m32 -mstrict-align -ansi -fno-builtin -mlongcall -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O2 -DNDEBUG
	Debug	-DCPU=PPC32 -DPtrIntType=long -DTARGET="\ppc604Vx6.9.4gcc4.3.3" -DTOOL=gnu -DTOOL_FAMILY=gnu -D_WRS_KERNEL -O0 -mhard-float -m32 -mstrict-align -ansi -fno-builtin -mlongcall -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O0 -g

Table 8.4 Library-Creation Details for VxWorks Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
ppc604Vx6.9.4gcc4.3.3_rtp	Static Release	-DCPU=PPC32 -DPtrIntType=long -DTARGET=\ppc604Vx6.9.4gcc4.3.3_rtp\ -DTOOL=gnu -DTOOL_FAMILY=gnu -O2 -mhard-float -m32 -mstrict-align -mregnames -ansi -mlongcall -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O2 -DNDEBUG
	Static Debug	-DCPU=PPC32 -DPtrIntType=long -DTARGET=\ppc604Vx6.9.4gcc4.3.3_rtp\ -DTOOL=gnu -DTOOL_FAMILY=gnu -O0 -mhard-float -m32 -mstrict-align -mregnames -ansi -mlongcall -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O0 -g
	Dynamic Release	DYNAMIC MODE NOT SUPPORTED,
	Dynamic Debug	
ppce500v2Vx6.9.4gcc4.3.3	Release	-DCPU=PPC32 -DPtrIntType=long -DTARGET=\ppce500v2Vx6.9.4gcc4.3.3\ -DTOOL-L=e500v2gnu -DTOOL_FAMILY=gnu -D_WRS_KERNEL -O2 -m32 -mstrict-align -ansi -fno-builtin -mlongcall -te500v2 -mcpu=8548 -mfloat-gprs=double -mspe=yes -mabi=spe -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O2 -DNDEBUG
	Debug	-DCPU=PPC32 -DPtrIntType=long -DTARGET=\ppce500v2Vx6.9.4gcc4.3.3\ -DTOOL-L=e500v2gnu -DTOOL_FAMILY=gnu -D_WRS_KERNEL -O0 -m32 -mstrict-align -ansi -fno-builtin -mlongcall -te500v2 -mcpu=8548 -mfloat-gprs=double -mspe=yes -mabi=spe -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O0 -g
ppce500v2Vx6.9.4gcc4.3.3_rtp	Static Release	-DCPU=PPC32 -DPtrIntType=long -DTARGET=\ppce500v2Vx6.9.4gcc4.3.3_rtp\ -DTOOL-L=e500v2gnu -DTOOL_FAMILY=gnu -O2 -m32 -mstrict-align -ansi -mregnames -mlongcall -te500v2 -mcpu=8548 -mfloat-gprs=double -mspe=yes -mabi=spe -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O2 -DNDEBUG
	Static Debug	-DCPU=PPC32 -DPtrIntType=long -DTARGET=\ppce500v2Vx6.9.4gcc4.3.3_rtp\ -DTOOL-L=e500v2gnu -DTOOL_FAMILY=gnu -O0 -m32 -mstrict-align -ansi -mregnames -mlongcall -te500v2 -mcpu=8548 -mfloat-gprs=double -mspe=yes -mabi=spe -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -mrtp -O0 -g
	Dynamic Release	DYNAMIC MODE NOT SUPPORTED.
	Dynamic Debug	
ppce6500Vx6.9.4.6diab5.9.1	Release	-DCPU=_VX_PPC85XX -DCPU_VARIANT=_e6500 -DPtrIntType=long -DTARGET-T=\ppce6500Vx6.9.4.6diab5.9.1\ -DTOOL=diab -DTOOL_FAMILY=diab -D_WRS_KERNEL -O0 -Xdata-absolute-far -Xcode-absolute-far -tPPCE6500FV:vxworks69 -Xkeywords=0x0ffffde -ew1547,1551,1552,1554 -Xforce-prototypes -O0
	Debug	-DCPU=_VX_PPC85XX -DCPU_VARIANT=_e6500 -DPtrIntType=long -DTARGET-T=\ppce6500Vx6.9.4.6diab5.9.1\ -DTOOL=diab -DTOOL_FAMILY=diab -D_WRS_KERNEL -O0 -Xdata-absolute-far -Xcode-absolute-far -tPPCE6500FV:vxworks69 -Xkeywords=0x0ffffde -ew1547,1551,1552,1554 -Xforce-prototypes -O0 -g

Table 8.4 Library-Creation Details for VxWorks Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
ppce6500Vx6.9.4.6diab5.9.1_rtp	Static Release	-DCPU=_VX_PPC32 -DPtrIntType=long -DTARGET="\ppce6500Vx6.9.4.6diab5.9.1_rtp" -DTOOL=diab -DTOOL_FAMILY=diab -O0 -Xforce-declarations -Xmake-dependency=0xd -tPPCEH:rtp -Xansi -Xstsw-slow -Xdata-absolute-far -Xcode-absolute-far -Xforce-prototypes -ef4223 -O0
	Static De- bug	-DCPU=_VX_PPC32 -DPtrIntType=long -DTARGET="\ppce6500Vx6.9.4.6diab5.9.1_rtp" -DTOOL=diab -DTOOL_FAMILY=diab -O0 -Xforce-declarations -Xmake-dependency=0xd -tPPCEH:rtp -Xansi -Xstsw-slow -Xdata-absolute-far -Xcode-absolute-far -Xforce-prototypes -ef4223 -O0 -g
	Dynamic Release	DYNAMIC MODE NOT SUPPORTED.
	Dynamic Debug	
x64Vx7SR0630llvm8.0.0.2	Release	-DCPU=_VX_CORE -DPtrIntType=long -DTARGET="\x64Vx7SR0630llvm8.0.0.2" -DTOOL=llvm -DTOOL_FAMILY=llvm -D_HAVE_TOOL_XTORS -D_USE_INIT_ARRAY -D_WRS_CONFIG_SMP -D_WRS_KERNEL -D__ELF__ -D__VXWORKS__ -D__vxworks -O --target=x86_64 -m64 -mc-model=kernel -mno-red-zone -nostdlib -fno-omit-frame-pointer -march=core2 -nostdlibinc -nostdinc++ -mno-implicit-float -ftls-model=local-exec -fno-builtin -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O -DNDEBUG -std=c11
	Debug	-DCPU=_VX_CORE -DPtrIntType=long -DTARGET="\x64Vx7SR0630llvm8.0.0.2" -DTOOL=llvm -DTOOL_FAMILY=llvm -D_HAVE_TOOL_XTORS -D_USE_INIT_ARRAY -D_WRS_CONFIG_SMP -D_WRS_KERNEL -D__ELF__ -D__VXWORKS__ -D__vxworks -O0 --target=x86_64 -m64 -mc-model=kernel -mno-red-zone -nostdlib -fno-omit-frame-pointer -march=core2 -nostdlibinc -nostdinc++ -mno-implicit-float -ftls-model=local-exec -fno-builtin -fno-strict-aliasing -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O0 -g -std=c11
x64Vx7SR0630llvm8.0.0.2_rtp	Static Release	-DCPU=_VX_CORE -DPtrIntType=long -DTARGET="\x64Vx7SR0630llvm8.0.0.2_rtp" -DTOOL=L=llvm -DTOOL_FAMILY=llvm -D_HAVE_TOOL_XTORS -D_USE_INIT_ARRAY -D__ELF__ -D__RTP__ -D__VXWORKS__ -D__vxworks -O --target=x86_64 -m64 -mcmodel=small -fno-omit-frame-pointer -march=core2 -fno-strict-aliasing -fno-builtin -nostdlibinc -nostdinc++ -fasm -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O -DNDEBUG -std=c11
	Static De- bug	-DCPU=_VX_CORE -DPtrIntType=long -DTARGET="\x64Vx7SR0630llvm8.0.0.2_rtp" -DTOOL=L=llvm -DTOOL_FAMILY=llvm -D_HAVE_TOOL_XTORS -D_USE_INIT_ARRAY -D__ELF__ -D__RTP__ -D__VXWORKS__ -D__vxworks -O0 --target=x86_64 -m64 -mcmodel=small -fno-omit-frame-pointer -march=core2 -fno-strict-aliasing -fno-builtin -nostdlibinc -nostdinc++ -fasm -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O0 -g -std=c11
	Dynamic Release	-DCPU=_VX_CORE -DPtrIntType=long -DTARGET="\x64Vx7SR0630llvm8.0.0.2_rtp" -DTOOL=L=llvm -DTOOL_FAMILY=llvm -D_HAVE_TOOL_XTORS -D_USE_INIT_ARRAY -D__ELF__ -D__RTP__ -D__VXWORKS__ -D__vxworks -O --target=x86_64 -m64 -mcmodel=small -fno-omit-frame-pointer -march=core2 -fno-strict-aliasing -fno-builtin -nostdlibinc -nostdinc++ -fasm -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O -DNDEBUG -fPIE -std=c11
	Dynamic Debug	-DCPU=_VX_CORE -DPtrIntType=long -DTARGET="\x64Vx7SR0630llvm8.0.0.2_rtp" -DTOOL=L=llvm -DTOOL_FAMILY=llvm -D_HAVE_TOOL_XTORS -D_USE_INIT_ARRAY -D__ELF__ -D__RTP__ -D__VXWORKS__ -D__vxworks -O0 --target=x86_64 -m64 -mcmodel=small -fno-omit-frame-pointer -march=core2 -fno-strict-aliasing -fno-builtin -nostdlibinc -nostdinc++ -fasm -Wall -Wno-unknown-pragmas -Werror=implicit-function-declaration -O0 -g -fPIE -std=c11

## 8.1 Notes for VxWorks 7 Platforms

- Required Makefile Change

For VxWorks 7.0 platforms only: After you run *rtiddsgen*, either edit the generated makefile to specify which VxWorks Source Build (VSB) you want to use or set an environment variable called `VSB_DIR` that points to the VSB. In the generated makefile, find this line and change it to match your VSB directory:

```
VSB_DIR = # Specify your VSB directory here.
```

**Note:** RTI uses a VSB based on the `itl_generic` BSP (provided by Wind River) to build the *Connex DDS* libraries for VxWorks 7.0 x64.

- For VxWorks 7 SR0600 and newer releases:

To run VxWorks tasks with Thread Local Storage, the kernel must be configured in advance with an explicit size for the TLS variables through the kernel parameter, `DKM_TLS_SIZE`. To run *Connex DDS* in a VxWorks task, `DKM_TLS_SIZE` must be 160 or higher to fit the TLS variables. For more information, see the **tlsLib** API reference in your VxWorks 7 documentation.

- To avoid symbol duplication in applications generated with *rtiddsgen*, in statically linked Downloadable Kernel Modules (DKMs):

When using *rtiddsgen* to generate a Connex DDS application, publisher and subscriber are created. By default, the generated makefile will create a separate application for the publisher and the subscriber. This poses a problem when linking static kernel modules. In this case, you would have a static DKM containing the publisher application + Connex DDS libraries, and another static DKM containing the subscriber application + Connex DDS libraries. When those two modules are loaded into the kernel, all the Connex DDS symbols will be duplicated and you will likely run into issues.

To overcome this limitation, an additional target is created in the Makefile for the VxWorks kernel architectures called **pubsub**. This target will create a single DKM containing both the publisher and subscriber application, plus the Connex DDS libraries. With this approach, you can link this single DKM and still have the publisher and subscriber applications available in the kernel without duplication of symbols.

## 8.2 Known Defects

- When using VxWorks 7.0 64-bit RTP mode, there is a bug in the **getsockopt()** function: the **optlen** parameter is not properly set. Refer to Wind River defect V7NET-1293
- When using VxWorks 7.0 64-bit RTP mode, an incorrect number of sections is introduced in the resulting ELF binaries, so the VxWorks kernel cannot load them. Refer to Wind River defect VXW7-3771.
- When using VxWorks 6 or 7, a too-small `SO_RCVBUF` causes packet loss in polled receiving in VxWorks SMP

Due to a potential bug in the VxWorks Network stack (V7NET-2540), creating a socket with a very small `SO_RCVBUF` might cause packet loss when receiving over that socket in a non-blocking way (polling). This problem has been reproduced in SMP kernels.

To work around this, create the receiving sockets with a `SO_RCVBUF` size of at least 4000. This is twice the minimum size allowed by VxWorks (`IPNET_MIN_RCVBUF_SIZE`, which is 2000).

- There is a known issue (Wind River Defect ID V7PRO-6555) with VxWorks kernels where `clock_gettime` may take more time than expected on Intel boards. This can happen when setting the kernel parameter "`HIGH_RES_POSIX_CLOCK`" to `TRUE` (`FALSE` by default). We recommend leaving that parameter set to the default value (`FALSE`).

## 8.3 Increasing the Stack Size

*Connex* DDS applications may require more than the default stack size on VxWorks.

To prevent stack overrun, you can create/enable the *DomainParticipant* in a thread with a larger stack, or increase the default stack size of the shell task by recompiling the kernel. For more information, please see the Solutions on the RTI Community portal, accessible from <https://community.rti.com/kb>.

## 8.4 Enabling Floating Point Coprocessor in Kernel Tasks

Some applications may require you to spawn the kernel with floating-point coprocessor support. To do so, you must pass the `VX_FP_TASK` option to the "options" argument of `taskSpawn` (please refer to Wind River documentation for more information about `taskSpawn` arguments).

If you spawn the task from the c-shell, the `VX_FP_TASK` definition is not available and you must provide a numeric value: `0x1000000` for VxWorks 6.x and newer versions. If the target system runs a PowerPC e500v2 CPU, you need to pass `VX_SPE_TASK` instead, whose value is `0x4000000`.

## 8.5 Downloadable Kernel Modules (DKM) for Kernel Mode on VxWorks Systems

The *Connex* DDS Professional, Research, and Evaluation packages include support for the Request-Reply Communication Pattern, for all platforms in [Table 8.1 VxWorks Target Platforms on page 93](#) and all programming languages, with one exception: VxWorks 6.9.4.6 supports Request-Reply in the C API only.

In VxWorks kernel mode, dynamic libraries are not supported. Instead, Downloadable Kernel Modules (DKMs) are used. Once a DKM has been loaded into the kernel, all the symbols from that DKM will be accessible from the kernel.

In VxWorks kernel mode, before a C++ DKM can be downloaded to the VxWorks kernel, it must undergo an additional host processing step known as *munching*. This step is necessary for proper initialization of static objects and to ensure that the C++ run-time support calls the correct

constructor/destructors in the correct order for all static objects. All the *Connex* DDS DKMs (**libnndscore.so**, **libnndsc.so**, **libnndscpp.so**, etc) are shipped already munched.

When you create an application as a DKM for use in kernel mode, you have two options for linking:

- Perform a static linkage: This involves linking all the needed *Connex* DDS libraries inside the DKM (such as **libnndscorez.a**). Note that if you plan to load several statically linked DKMs into the kernel, you will have issues related to duplicate symbols, because the symbols from *Connex* DDS will be loaded once per DKM.
- Perform a partial linkage: This involves building your application without linking against the *Connex* DDS libraries. Later, at load time, you will need to load into the kernel the required *Connex* DDS libraries and your application DKM. This is recommended if you plan to have more than one DKM using *Connex* DDS.

For both options, you will need to munch your application DKMs.

## 8.6 Libraries for RTP Mode on VxWorks Systems

Dynamic libraries are *not* available for VxWorks systems with Real Time Processes (RTP mode) on PowerPC (PPC) CPUs. This is due to a platform limitation in VxWorks PPC platforms that puts an upper bound on the size of the Global Offset Table (GOT) for any single library, which limits how many symbols the library can export. Some *Connex* DDS libraries (in particular, **libnndsc**) export a number of symbols that exceed this upper bound.

Dynamic libraries *are* available for VxWorks systems with RTP mode on Intel and Arm CPUs.

## 8.7 Requirement for Restarting Applications

When restarting a VxWorks application, you may need to change the ‘appId’ value. In general, this is only required if you still have other *Connex* DDS applications running on other systems that were talking to the restarted application. If all the *Connex* DDS applications are restarted, there should be no problem.

This section explains why this is necessary and how to change the appId.

All *Connex* DDS applications must have a unique GUID (globally unique ID). This GUID is composed of a hostId and an appId. RTI implements unique appIds by using the process ID of the application. On VxWorks systems, an application’s process ID will often be the same across reboots. This may cause logged errors during the discovery process, or discovery may not complete successfully for the restarted application.

The workaround is to manually provide a unique appId each time the application starts. The appId is stored in the *DomainParticipant’s* WireProtocol QosPolicy. There are two general approaches to providing a unique appId. The first approach is to save the appId in NVRAM or the file system, and then incre-

ment the appId across reboots. The second approach is to base the appId on something that is likely to be different across reboots, such as a time-based register.

## 8.8 Support for Modern C++ API

*Connex DDS* provides two different C++ APIs, which we refer to as the "Traditional C++" and "Modern C++" APIs. The Modern C++ API is available for all VxWorks platforms except:

- VxWorks 6.9.4.2 on PPC e500v2: ppce500v2Vx6.9.4gcc4.3.3[\_rtp]
- VxWorks 6.9.4.6 on PPC e6500: ppce6500Vx6.9.4.6diab5.9.1[\_rtp]

These platforms have only been tested with C++11:

- VxWorks 7.0 SR0541: ppc32Vx7SR0541gcc4.8.1.11\_rtp
- VxWorks 7.0 SR0510: pentium64Vx7.0gcc4.8.1\_rtp
- VxWorks 7.0 SR0630: x64Vx7SR0630llvm8.0.0.2\_rtp

All other VxWorks platforms have been tested with C++03 only.

### Notes:

- Support for C++03 is deprecated starting with release 6.1.0, which is the last release that supports non-C++11-compliant compilers. After release 6.1.0, the Modern C++ API will require a C++11 compiler (or newer). The Traditional C++ API is not affected and continues to support C++98 compilers (or newer).
- Only the default plugin is supported. The legacy plugin has been removed from *Code Generator* starting with release 6.1.0.

For more information, see [Traditional vs. Modern C++, in the RTI Connex DDS Core Libraries User's Manual](#).

## 8.9 Multicast Support

Multicast is supported on all VxWorks architectures.

It is configured out of the box. That is, the default value for the initial peers list (NDDS\_DISCOVERY\_PEERS) includes a multicast address. See the API Reference HTML documentation for more information.

**Known Defects related to multicast:**

- If you have a Wind River account, you can find more information about defect VXW6-19089 (also known as WIND00418701) here:  
<https://support2.windriver.com/index.php?page=defects&on=view&id=VXW6-19089>.

If you need a patch for your version of VxWorks, or for more information about this issue, please contact Wind River.

## 8.10 Supported Transports

- **Shared memory:** Shared memory is supported and enabled by default on all VxWorks 6.x and higher architectures. See also:
  - [8.10.1 Shared-Memory Communication between Applications Running in Kernel Mode and RTP Requires Explicitly Set Participant ID below](#)
  - [8.10.2 How To Run Connex DDS Libraries in Kernels Built without Shared Memory below](#)
- **UDPv4:** Supported and enabled by default.
- **UDPv6:** Supported on VxWorks 6.7 and higher platforms, except VxWorks 6.9.4.6. No Traffic Class support.
- **TCP/IPv4:** Not supported.

### 8.10.1 Shared-Memory Communication between Applications Running in Kernel Mode and RTP Requires Explicitly Set Participant ID

By default, applications using the auto-generated Participant ID (-1) cannot communicate between user space and kernel space on the same host via SHMEM. The root cause is that the participants use the same participant ID. Therefore the workaround for this issue is to explicitly provide a participant ID when creating the *DomainParticipants*. The participant ID is set in the *DomainParticipant's* WireProtocol QoS policy.

### 8.10.2 How To Run Connex DDS Libraries in Kernels Built without Shared Memory

Since *Connex DDS* libraries support shared memory as a built-in transport, building a kernel without shared-memory support will cause loading or linking errors, depending on whether the *Connex DDS* libraries are loaded after boot, or linked at kernel build time.

The most straightforward way to fix these errors is to include shared-memory support in the kernel (INCLUDE\_SHARED\_DATA in the kernel build parameters ).



However, in some versions of VxWorks, it is not possible to include shared-memory support without also including RTP support. If you are unwilling or unable to include shared-memory support in your configuration, you will need to do the following:

1. Add the component `INCLUDE_POSIX_SEM`
2. Define stubs that return failure for the missing symbols **sdOpen** and **sdUnmap** as described below:
  - For **sdOpen**, we recommend providing an implementation that returns `NULL`, and sets `errno` to `ENOSYS`. For the function prototype, refer to the file **sdLib.h** in the VxWorks distribution.
  - For **sdUnmap**, we recommend providing an implementation that returns `ERROR` and sets `errno` to `ENOSYS`. For the function prototype, refer to the file **sdLibCommon.h** in the VxWorks distribution.

In addition to providing the symbol stubs for **sdOpen** and **sdUnmap**, we also recommend disabling the SHMEM transport by using the **transport\_builtin** mask in the QoS configuration.

## 8.11 Unsupported Features

The Modern C++ API for Request-Reply Communication is not supported on VxWorks 6.9.4.6 platforms. The Traditional C++ API for Request-Reply is supported.

These features are not supported on any VxWorks platforms:

- Backtrace
- Controlling CPU Core Affinity
- Durable Writer History and Durable Reader State
- 'Find Package' CMake script
- Persistence Service
- Dynamic loading of *RTI Security Plugins* in kernel mode on VxWorks 7.0 (SR0630) platforms
- Remote Procedure Calls (an experimental feature)

## 8.12 Monotonic Clock Support

The monotonic clock (described in *Clock Selection*, in the *Domains* chapter of the [RTI Connex DDS Core Libraries User's Manual](#)) is supported on VxWorks 6.x and higher platforms.

## 8.13 Use of Real-Time Clock

Starting with 5.3.0, *Connex DDS* uses the Real Time Clock to get the time from the System Clock on VxWorks 6.x and higher platforms. Previously **tickGet()** was used for the system clock.

## 8.14 Thread Configuration

See these tables:

- [Table 8.5 Thread Setting for VxWorks Platforms \(Applies to Kernel Tasks or Real-Time Process Threads\) below](#)
- [Table 8.6 Thread-Priority Definitions for VxWorks Platforms on the next page](#)
- [Table 8.7 Thread Kinds for VxWorks Platforms on the next page](#)

**Table 8.5 Thread Setting for VxWorks Platforms (Applies to Kernel Tasks or Real-Time Process Threads)**

Applicable Thread	DDS_ThreadSettings_t	Platform-Specific Setting
Asynchronous Publisher, Asynchronous flushing thread	mask	OS default thread type
	priority	100
	stack_size	30 * 1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
Database thread	mask	DDS_THREAD_SETTINGS_STDIO
	priority	120
	stack_size	30 * 1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
Event thread	mask	DDS_THREAD_SETTINGS_STDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	110
	stack_size	4 * 30 * 1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported

**Table 8.5 Thread Setting for VxWorks Platforms (Applies to Kernel Tasks or Real-Time Process Threads)**

Applicable Thread	DDS_ThreadSettings_t	Platform-Specific Setting
ReceiverPool threads	mask	DDS_THREAD_SETTINGS_STUDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	71
	stack_size	4 * 30 * 1024
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported

**Table 8.6 Thread-Priority Definitions for VxWorks Platforms**

Thread-Priority Definition	Operating-System Priority
THREAD_PRIORITY_DEFAULT	100
THREAD_PRIORITY_HIGH	68
THREAD_PRIORITY_ABOVE_NORMAL	71
THREAD_PRIORITY_NORMAL	100
THREAD_PRIORITY_BELOW_NORMAL	110
THREAD_PRIORITY_LOW	120

**Table 8.7 Thread Kinds for VxWorks Platforms**

Thread Kinds	Operating-System Configuration <sup>a</sup>
DDS_THREAD_SETTINGS_FLOATING_POINT	Uses VX_FP_TASK when calling taskSpawn()
DDS_THREAD_SETTINGS_STUDIO	Uses VX_STUDIO when calling taskSpawn() (Kernel mode only)
DDS_THREAD_SETTINGS_REALTIME_PRIORITY	Configures the schedule policy to SCHED_FIFO.
DDS_THREAD_SETTINGS_PRIORITY_ENFORCE	N/A

<sup>a</sup>See VxWorks manuals for more information.

## 8.15 Libraries Required for Using Distributed Logger

*RTI Distributed Logger* is supported all VxWorks architectures.

[Table 8.8 Additional Libraries for using RTI Distributed Logger](#) lists the additional libraries you will need in order to use *Distributed Logger*.

**Table 8.8 Additional Libraries for using RTI Distributed Logger**

Language	Static <sup>a</sup>		Dynamic <sup>b</sup>	
	Release	Debug	Release	Debug
C	librtidlc.z.a	librtidlc.z.d.a	librtidlc.so	librtidlc.d.so
C++ (Traditional API)	librtidlc.z.a librtidlc.p.z.a	librtidlc.z.d.a librtidlc.p.z.d.a	librtidlc.so librtidlc.p.so	librtidlc.d.so librtidlc.p.d.so

## 8.16 Libraries Required for Using Monitoring

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. For example, if your *Connex DDS* application is linked with the static release version of the *Connex DDS* libraries, you will need to also use the static release version of the monitoring library. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

If you are statically linking your application with DDS libraries and you want to add monitoring to your application, you will also need to statically link the monitoring library. The library cannot be loaded dynamically strictly through the QoS profile because it also depends on DDS to publish its data. Therefore, it depends on DDS; the DDS functionality would cause duplicate symbols to be found resulting, in the termination of the process.

### Notes:

- Automatic loading of the dynamic monitoring library through QoS is not supported.
- Memory and CPU usage is not available in monitoring data.
- If you plan to use *static* libraries, the RTI library from [Table 8.9 Additional Libraries for Using Monitoring](#) must appear *first* in the list of libraries to be linked.

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

**Table 8.9 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>a</sup>
Dynamic Release	librtmonitoring.so <sup>b</sup>
Dynamic Debug	librtmonitoringd.so <sup>c</sup>
Static Release	librtmonitoringz.a
Static Debug	librtmonitoringzd.a

## 8.17 Libraries Required for Using RTI Real-Time WAN Transport APIs

If you choose to use *RTI Real-Time WAN Transport*, you must download and install a separate package that contains the transport libraries. See the [RTI Real-Time WAN Transport Installation Guide](#) for details.

Using *Real-Time WAN Transport* requires one of the libraries in [Table 8.10 Additional Libraries for Using RTI Real-Time WAN Transport APIs](#). Select the file appropriate for your chosen library format.

For more information, see the "Enabling Real-Time WAN Transport" section in the *RTI Real-Time WAN Transport* part of the [RTI Connex DDS Core Libraries User's Manual](#).

**Table 8.10 Additional Libraries for Using RTI Real-Time WAN Transport APIs**

Library Format	Real-Time WAN Transport Libraries <sup>d</sup>
Dynamic Release	libnddsrt.so
Dynamic Debug	libnddsrt.d.so
Static Release	libnddsrtz.a
Static Debug	libnddsrtzd.a

## 8.18 Libraries Required for Zero Copy Transfer Over Shared Memory

To use the Zero Copy Transfer Over Shared Memory feature, link against the additional library in [Table 8.11 Additional Libraries for Zero Copy Transfer Over Shared Memory](#).

<sup>a</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

<sup>b</sup>Dynamic libraries are not supported for VxWorks platforms on PPC CPUs using RTP mode.

<sup>c</sup>Dynamic libraries are not supported for VxWorks platforms on PPC CPUs using RTP mode.

<sup>d</sup>These libraries are in <NDDSHOME>/lib/<architecture>.

**Table 8.11 Additional Libraries for Zero Copy Transfer Over Shared Memory**

Library Format	Zero Copy Over Shared Memory Libraries <sup>a</sup>
Dynamic Release	libnddsnetp.so
Dynamic Debug	libnddsnetpd.so
Static Release	libnddsnetpz.a
Static Debug	libnddsnetpzd.a

## 8.19 Increasing the Receive Socket Buffer Size

For *Connex DDS* applications running on VxWorks 6.7 or higher systems and using UDPv4, we recommend setting the property `dds.transport.UDPv4.builtin.recv_socket_buffer_size` to a value of 128000 or higher. This recommendation is due to Wind River's usage of extra receive socket buffer space to correct Wind River defect number WIND00135312.

<sup>a</sup>These libraries are in `<NDDSHOME>/lib/<architecture>`.

# Chapter 9 Windows Platforms

First, see the basic instructions for compiling Windows Platforms in the *Building Applications* chapter in the [RTI Connex DDS Core Libraries User's Manual](#).

The following tables provide supplemental information. [Table 9.1 Supported Windows Platforms](#) lists the architectures supported on Windows operating systems.

**Table 9.1 Supported Windows Platforms**

Operating System	CPU	Visual Studio® Version	RTI Architecture Abbreviation	.NET Version <sup>a</sup>	JDK Version
Windows 8	x64	VS 2012 Update 4	x64Win64VS2012	4.5	JDK 11
		VS 2013 Update 4	x64Win64VS2013	4.5.1	
Windows 10	x64	VS 2015 Update 3	x64Win64VS2015	4.6	JDK 11
		VS 2017 Update 2	x64Win64VS2017	4.6.1	
		VS 2019 Version 16.0.0			
Windows Server 2012 R2	x64	VS 2012 Update 4	x64Win64VS2012	4.5	JDK 11
		VS 2013 Update 4	x64Win64VS2013	4.5.1	
		VS 2015 Update 3	x64Win64VS2015	4.6	
Windows Server 2016	x64	VS 2015 Update 3	x64Win64VS2015	4.6	JDK 11
		VS 2017 Update 2	x64Win64VS2017	4.6.1	
		VS 2019 Version 16.0.0			

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<sup>a</sup>The RTI .NET assemblies are supported for both the C++/CLI and C# languages. The type support code generated by riddsgen is in C++/CLI; compiling the generated type support code requires Microsoft Visual C++. Calling the assembly from C# requires Microsoft Visual C#.

**Note regarding .NET API Support:** The .NET API is supported Windows 8 and Windows 10, but it doesn't support Visual Studio 2012-2015 for development. Development is supported in Visual Studio 2017-2019, Visual Studio Code and the .NET CLI.

The compiler flags and the libraries you will need to link into your application are in the following tables:

- [Table 9.2 Building Instructions for Windows Host Architectures](#)
- [Table 9.3 Building Instructions for Windows Target Architectures](#)

See also:

- [9.15 Libraries Required for Using Distributed Logger Support on page 129](#)
- [9.16 Libraries Required for Using Monitoring on page 130](#)
- [9.17 Libraries Required for Using RTI Real-Time WAN Transport APIs on page 131](#)
- [9.18 Libraries Required for Using RTI Secure WAN Transport APIs on page 131](#)
- [9.19 Libraries Required for Using RTI TCP Transport APIs on page 132](#)
- [9.20 Libraries Required for Zero Copy Transfer Over Shared Memory on page 133](#)

Make sure you are consistent in your use of static (.lib), dynamic (.dll), debug and release versions of the libraries. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

[Table 9.4 Running Instructions for Windows Architectures on page 119](#) provides details on the environment variables that must be set at run time for a Windows architecture.

For details on how the libraries were built by RTI, see [Table 9.5 Library-Creation Details for Windows Architectures](#). This information is provided strictly for informational purposes; you do not need to use these parameters to compile your application. You may find this information useful if you are involved in any in-depth debugging.



Table 9.2 Building Instructions for Windows Host Architectures

API	Library Format	RTI Libraries or Jar Files <sup>a b c</sup>	Required System Libraries	Required Compiler Flags
C	Static Release	nddscorz.lib nddscz.lib rticonnextmsgcz.lib	netapi32.lib advapi32.lib	/D "RTI_WIN32" /MD
	Static Debug	nddscorzd.lib nddsczd.lib rticonnextmsgczd.lib		/D "RTI_WIN32" /MDd
	Dynamic Release	nddscore.lib nddsc.lib rticonnextmsgc.lib	user32.lib ws2_32.lib	/D "RTI_WIN32" /D "NDDS_DLL_VARIABLE" /MD
	Dynamic Debug	nddscord.lib nddscd.lib rticonnextmsgcd.lib		/D "RTI_WIN32" /D "NDDS_DLL_VARIABLE" /MDd

<sup>a</sup>Choose **\*cpp\*.\*** for the Traditional C++ API or **\*cpp2\*.\*** for the Modern C++ API.

<sup>b</sup>The RTI C/C++/Java libraries are in `<NDDSHOME>\lib<architecture>`. Jar files are in `<NDDSHOME>\lib\java`.

<sup>c</sup>For C++/CLI and C#: The **nddsdotnet** and **rticonnextmsgdotnet** library names include a `<version>`, which depends on your version of .NET. Use the digits, such as 451 or 46. See [Table 9.1 Supported Windows Platforms on page 112](#) for supported .NET versions.

Table 9.2 Building Instructions for Windows Host Architectures

API	Library Format	RTI Libraries or Jar Files <sup>a b c</sup>	Required System Libraries	Required Compiler Flags
C++ (Traditional and Modern APIs)	Static Release	nddscorz.lib nddscz.lib nddscppz.lib or nddscpp2z.lib rticonnextmsgcppz.lib or rticonnextmsgcpp2z.lib	netapi32.lib advapi32.lib user32.lib ws2_32.lib	/D "RTI_WIN32" /MD
	Static Debug	nddscorzd.lib nddsczd.lib nddscppzd.lib or nddscpp2zd.lib rticonnextmsgcppzd.lib or rticonnextmsgcpp2zd.lib		/D "RTI_WIN32" /MDd
	Dynamic Release	nddscore.lib nddsc.lib nddscpp.lib or nddscpp2.lib rticonnextmsgcpp.lib or rticonnextmsgcpp2.lib		/D "RTI_WIN32" /D "NDDS_DLL_VARIABLE" /MD
	Dynamic Debug	nddscord.lib nddscd.lib nddscppd.lib or nddscpp2d.lib rticonnextmsgcppd.lib or rticonnextmsgcpp2d.lib		/D "RTI_WIN32" /D "NDDS_DLL_VARIABLE" /MDd

<sup>a</sup>Choose **\*cpp\*.\*** for the Traditional C++ API or **\*cpp2\*.\*** for the Modern C++ API.

<sup>b</sup>The RTI C/C++/Java libraries are in `<NDDSHOME>\lib<architecture>`. Jar files are in `<NDDSHOME>\lib\java`.

<sup>c</sup>For C++/CLI and C#: The **nddsdotnet** and **rticonnextmsgdotnet** library names include a `<version>`, which depends on your version of .NET. Use the digits, such as 451 or 46. See [Table 9.1 Supported Windows Platforms on page 112](#) for supported .NET versions.

Table 9.2 Building Instructions for Windows Host Architectures

API	Library Format	RTI Libraries or Jar Files <sup>a b c</sup>	Required System Libraries	Required Compiler Flags
C++/CLI	Release	nddscore.lib nddsc.lib nddscpp.lib nddsdotnet<version>.dll rticonnextmsgdotnet<version>.dll	N/A	/D "RTI_WIN32" /D "NDDS_DLL_VARIABLE" /MD /D "WIN32_LEAN_AND_MEAN"
	Debug	nddscored.lib nddscd.lib nddscppd.lib nddsdotnet<version>d.dll rticonnextmsgdotnet<version>d.dll		/D "RTI_WIN32" /D "NDDS_DLL_VARIABLE" /MDd /D "WIN32_LEAN_AND_MEAN"
C#	Release	nddsdotnet<version>.dll rticonnextmsgdotnet<version>.dll	N/A	N/A
	Debug	nddsdotnet<version>d.dll rticonnextmsgdotnet<version>d.dll		
Java	Release	nddsjava.jar rticonnextmsg.jar	N/A	N/A
	Debug	nddsjavad.jar rticonnextmsgd.jar		

<sup>a</sup>Choose **\*cpp\*.\*** for the Traditional C++ API or **\*cpp2\*.\*** for the Modern C++ API.

<sup>b</sup>The RTI C/C++/Java libraries are in <NDDSHOME>\lib<architecture>. Jar files are in <NDDSHOME>\lib\java.

<sup>c</sup>For C++/CLI and C#: The **nddsdotnet** and **rticonnextmsgdotnet** library names include a <version>, which depends on your version of .NET. Use the digits, such as 451 or 46. See [Table 9.1 Supported Windows Platforms on page 112](#) for supported .NET versions.

Table 9.3 Building Instructions for Windows Target Architectures

API	Library Format	RTI Libraries or Jar Files <sup>a b</sup>	Required System Libraries	Required Compiler Flags
C	Static Release	nddscorez.lib nddscz.lib rticonnextmsgcz.lib	netapi32.lib advapi32.lib user32.lib ws2_32.lib	/Gd /MD /D "WIN32" /D "RTI_WIN32" /D "NDEBUG"
	Static Debug	nddscorezd.lib nddsczd.lib rticonnextmsgczd.lib		/Gd /MDd /D "WIN32" /D "RTI_WIN32"
	Dynamic Release	nddscore.lib nddsc.lib rticonnextmsgc.lib		/Gd /MD /D "WIN32" /D "NDDS_DLL_VARIABLE" /D "RTI_WIN32" /D "NDEBUG"
	Dynamic Debug	nddscored.lib nddscd.lib rticonnextmsgcd.lib		/Gd /MDd /D "WIN32" /D "NDDS_DLL_VARIABLE" /D "RTI_WIN32"

<sup>a</sup>The RTI C/C++/Java libraries are in <NDDSHOME>\lib\<architecture>. Jar files are in <NDDSHOME>\lib\java.

<sup>b</sup>For C++/CLI and C#: The **nddsdotnet** and **rticonnextmsgdotnet** library names include a <version>, which depends on your version of .NET. Use the digits, such as 451 or 46. See [Table 9.1 Supported Windows Platforms on page 112](#) for supported .NET versions.

Table 9.3 Building Instructions for Windows Target Architectures

API	Library Format	RTI Libraries or Jar Files <sup>a b</sup>	Required System Libraries	Required Compiler Flags
C++ (Traditional and Modern APIs)	Static Release	nddscorez.lib nddscz.lib nddscppz.lib or nddscpp2z.lib rticonnextmsgcppz.lib or rticonnextmsgcpp2z.lib		/Gd /EHsc /MD /D "WIN32" /D "RTI_WIN32" /D "NDEBUG"
	Static Debug	nddscorezd.lib nddsczd.lib nddscppzd.lib or nddscpp2zd.lib rticonnextmsgcppzd.lib or rticonnextmsgcpp2zd.lib	netapi32.lib advapi32.lib	/Gd /EHsc /MDd /D "WIN32" /D "RTI_WIN32"
	Dynamic Release	nddscore.lib nddsc.lib nddscpp.lib or nddscpp2.lib rticonnextmsgcpp.lib or rticonnextmsgcpp2.lib	user32.lib ws2_32.lib	/Gd /EHsc /MD /D "WIN32" /D "NDDS_DLL_ VARIABLE" /D "RTI_WIN32" /D "NDEBUG"
	Dynamic Debug	nddscored.lib nddscd.lib nddscppd.lib or nddscpp2d.lib rticonnextmsgcppd.lib or rticonnextmsgcpp2d.lib		/Gd /EHsc /MDd /D "WIN32" /D "NDDS_DLL_ VARIABLE" /D "RTI_WIN32"

<sup>a</sup>The RTI C/C++/Java libraries are in <NDDSHOME>\lib\<architecture>. Jar files are in <NDDSHOME>\lib\java.

<sup>b</sup>For C++/CLI and C#: The **nddsdotnet** and **rticonnextmsgdotnet** library names include a <version>, which depends on your version of .NET. Use the digits, such as 451 or 46. See [Table 9.1 Supported Windows Platforms on page 112](#) for supported .NET versions.

Table 9.3 Building Instructions for Windows Target Architectures

API	Library Format	RTI Libraries or Jar Files <sup>a b</sup>	Required System Libraries	Required Compiler Flags
C#	Release	nddsdotnet<version>.dll rticonnextmsgdotnet<version>.dll	N/A	N/A
	Debug	nddsdotnet<version>d.dll rticonnextmsgdotnet<version>d.dll		
C++/CLI	Release	nddscore.lib nddsc.lib nddscpp.lib rticonnextmsgdotnet<version>.dll	netapi32.lib advapi32.lib	/Gd /EHsc /MD /D "WIN32" /D "NDDS_DLL_ VARIABLE" /D "RTI_WIN32" /D "NDEBUG"
	Debug	nddscored.lib nddscd.lib nddscppd.lib rticonnextmsgdotnet<version>d.dll	user32.lib ws2_32.lib	/Gd /EHsc /MDd /D "WIN32" /D "NDDS_DLL_ VARIABLE" /D "RTI_WIN32"
Java	Release	nddsjava.jar rticonnextmsg.jar	N/A	N/A
	Debug	nddsjavad.jar rticonnextmsgd.jar		

Table 9.4 Running Instructions for Windows Architectures

RTI Architecture	Library Format	Environment Variables <sup>c</sup>
All supported Windows architectures for Java	N/A	Path=%NDDSHOME%\lib\ <i>architecture</i> ; %Path%
All other supported Windows architectures	Static (Release and Debug)	None required
	Dynamic (Release and Debug)	Path=%NDDSHOME%\lib\ <i>architecture</i> ; %Path%

<sup>a</sup>The RTI C/C++/Java libraries are in <NDDSHOME>\lib\*architecture*. Jar files are in <NDDSHOME>\lib\java.

<sup>b</sup>For C++/CLI and C#: The **nddsdotnet** and **rticonnextmsgdotnet** library names include a <version>, which depends on your version of .NET. Use the digits, such as 451 or 46. See [Table 9.1 Supported Windows Platforms on page 112](#) for supported .NET versions.

<sup>c</sup>**%Path%** represents the value of the **Path** variable prior to changing it to support *Connex DDS*. When using **nddsjava.jar**, the Java virtual machine (JVM) will attempt to load release versions of the native libraries. When using **nddsjavad.jar**, the JVM will attempt to load debug versions of the native libraries.

Table 9.5 Library-Creation Details for Windows Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
x64Win64VS2012  Note: linker requires /MACHINE:X64 option.	Static Release	/W3 -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2012\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Zi /MD /nodefaultlib:"libcmt.lib" /defaultlib:"msvcr.lib" /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Dynamic Release	/W3 -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2012\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Zi /MD /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Static Debug	/W3 -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2012\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /nodefaultlib:"libcmt.lib" /defaultlib:"msvcrd.lib" /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
	Dynamic Debug	/W3 -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2012\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
x64Win64VS2013  Note: linker requires /MACHINE:X64 option.	Static Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2013\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Zi /MD /nodefaultlib:"libcmt.lib" /defaultlib:"msvcr.lib" /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Dynamic Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2013\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Zi /MD /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Static Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2013\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /nodefaultlib:"libcmt.lib" /defaultlib:"msvcrd.lib" /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
	Dynamic Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2013\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c

Table 9.5 Library-Creation Details for Windows Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
x64Win64VS2015  Note: linker requires /MACHINE:X64 option.	Static Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2015\ " -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Zi /MD /nodefaultlib:"libcmt.lib" /defaultlib:"msvcrt.lib" /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Dynamic Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2015\ " -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Zi /MD /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Static Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2015\ " -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /nodefaultlib:"libcmtd.lib" /defaultlib:"msvcrtd.lib" /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
	Dynamic Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2015\ " -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
x64Win64VS2017  Note: linker requires /MACHINE:X64 option.	Static Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2017\ " -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Zi /MD /nodefaultlib:"libcmt.lib" /defaultlib:"msvcrt.lib" /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Dynamic Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2017\ " -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Zi /MD /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Static Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2017\ " -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /nodefaultlib:"libcmtd.lib" /defaultlib:"msvcrtd.lib" /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
	Dynamic Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=AMD64 -DTARGET="\x64Win64VS2017\ " -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
All 64-bit Windows architectures for .NET	Dynamic Release	/O2 /GL /D "WIN64" /D "NDEBUG" /D "NDDS_DLL_VARIABLE" /D "_WINDLL" /D "_UNICODE" /D "UNICODE" /FD /EHa /MD /c /Zi /clr /TP
	Dynamic Debug	/Od /D "WIN64" /D "_DEBUG" /D "NDDS_DLL_VARIABLE" /D "_WINDLL" /D "_UNICODE" /D "UNICODE" /FD /EHa /MDd /c /Zi /clr /TP
All 64-bit Windows architectures for Java	Dynamic Release	-target 1.8 -source 1.8
	Dynamic Debug	-target 1.8 -source 1.8 -g



Table 9.5 Library-Creation Details for Windows Architectures

RTI Architecture	Library Format	Compiler Flags Used by RTI
i86Win32VS2012 (deprecated, available on demand)	Static Release	-DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="i86Win32VS2012" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Oy- /Zi /MD /nodefaultlib:"libcmt.lib" /defaultlib:"msvcr.lib" /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Dynamic Release	-DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="i86Win32VS2012" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Oy- /Zi /MD /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Static Debug	-DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="i86Win32VS2012" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /nodefaultlib:"libcmtd.lib" /defaultlib:"msvcrd.lib" /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
	Dynamic Debug	-DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="i86Win32VS2012" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
i86Win32VS2013 (deprecated, available on demand)	Static Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="i86Win32VS2013" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Oy- /Zi /MD /nodefaultlib:"libcmt.lib" /defaultlib:"msvcr.lib" /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Dynamic Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="i86Win32VS2013" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Oy- /Zi /MD /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Static Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="i86Win32VS2013" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /nodefaultlib:"libcmtd.lib" /defaultlib:"msvcrd.lib" /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
	Dynamic Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="i86Win32VS2013" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
i86Win32VS2015 (deprecated, available on demand)	Static Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="x86Win32VS2015" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Oy- /Zi /MD /nodefaultlib:"libcmt.lib" /defaultlib:"msvcr.lib" /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Dynamic Release	/W3 -DSTDC99 -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="x86Win32VS2015" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Oy- /Zi /MD /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Static Debug	/W3 -DSTDC99 -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="x86Win32VS2015" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /nodefaultlib:"libcmtd.lib" /defaultlib:"msvcrd.lib" /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
	Dynamic Debug	/W3 -DSTDC99 -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="x86Win32VS2015" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c

**Table 9.5 Library-Creation Details for Windows Architectures**

RTI Architecture	Library Format	Compiler Flags Used by RTI
i86Win32VS2017 (deprecated, available on demand)	Static Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="\x86Win32VS2017\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Oy- /Zi /MD /nodefaultlib:"libcmt.lib" /defaultlib:"msvcr.lib" /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Dynamic Release	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="\x86Win32VS2017\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /O2 /Oy- /Zi /MD /EHsc -D_CRT_SECURE_NO_DEPRECATED -DNDEBUG -c
	Static Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="\x86Win32VS2017\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /nodefaultlib:"libcmtd.lib" /defaultlib:"msvcrd.lib" /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
	Dynamic Debug	/W3 -DSTDC99 /FS -DPtrIntType=long -DCSREAL_IS_FLOAT -DCPU=I80586 -DTARGET="\x86Win32VS2017\" -DWIN32 -D_WINDOWS -D_WIN32_WINNT=0x0501 -DWIN32_LEAN_AND_MEAN /Od /Zi /MDd /EHsc /RTC1 -D_CRT_SECURE_NO_DEPRECATED -c
All 32-bit Windows architectures for .NET (deprecated, available on demand)	Dynamic Release	/O2 /Oy- /GL /D "WIN32" /D "NDEBUG" /D "NDDS_DLL_VARIABLE" /D "_WINDLL" /D "_UNICODE" /D "UNICODE" /FD /EHa /MD /c /Zi /clr /TP
	Dynamic Debug	/Od /D "WIN32" /D "_DEBUG" /D "NDDS_DLL_VARIABLE" /D "_WINDLL" /D "_UNICODE" /D "UNICODE" /FD /EHa /MDd /c /Zi /clr /TP

## 9.1 Requirements when Using Microsoft Visual Studio

**Note:** Debug versions of applications and the various Visual C++ DLLs are not redistributable. Therefore, if you want to run debug versions, you must have the compiler installed.

### When Using Visual Studio 2012 — Update 4 Redistributable Package Requirement

You must have the Visual C++ Redistributable for Visual Studio 2012 Update 4 installed on the machine where you are *running* an application linked with dynamic libraries. This includes dynamically linked C/C++ and all .NET and Java applications.

You can download Visual C++ Redistributable for Visual Studio 2012 Update 4 from this Microsoft website: <http://www.microsoft.com/en-ca/download/details.aspx?id=30679>

### When Using Visual Studio 2013 — Redistributable Package Requirement

You must have Visual C++ Redistributable for Visual Studio 2013 installed on the machine where you are *running* an application linked with dynamic libraries. This includes C/C++ dynamically linked and all .NET and Java applications.

You can download Visual C++ Redistributable for Visual Studio 2013 from this Microsoft website: <https://www.microsoft.com/en-us/download/details.aspx?id=40784>

### When Using Visual Studio 2015 — Update 3 Redistributable Package Requirement

You must have the Visual C++ Redistributable for Visual Studio 2015 Update 3 installed on the machine where you are running an application linked with dynamic libraries. This includes C/C++ dynamically linked and all .NET and Java applications.

You can download the Visual C++ Redistributable for Visual Studio 2015 Update 3 from this Microsoft website: <https://www.microsoft.com/en-us/download/details.aspx?id=53840>.

### When Using Visual Studio 2017 — Redistributable Package Requirement

You must have the Visual C++ Redistributable for Visual Studio 2017 installed on the machine where you are running an application linked with dynamic libraries. This includes C/C++ dynamically linked and all .NET and Java applications.

You can download the Visual C++ Redistributable for Visual Studio 2017 from this Microsoft website: <https://visualstudio.microsoft.com/vs/older-downloads/>. Then look in this section: "Redistributables and Build Tools" for "Microsoft Visual C++ Redistributable for Visual Studio 2017".

### When Using Visual Studio 2019 — Redistributable Package Requirement

You must have the Visual C++ Redistributable for Visual Studio 2019 installed on the machine where you are running an application linked with dynamic libraries. This includes C/C++ dynamically linked and all .NET and Java applications.

You can download the Visual C++ Redistributable for Visual Studio 2019 from this Microsoft website: <https://www.visualstudio.com/downloads/>. Then look in this section: "Other Tools and Frameworks" for "Microsoft Visual C++ Redistributable for Visual Studio 2019".

## 9.2 Linking with Libraries for Windows Platforms

Starting with *Connex DDS 5.2.5*, all *Connex DDS* libraries for Windows platforms (static release/debug, dynamic release/debug) now link with the dynamic Windows C Run-Time (CRT). Previously, the static *Connex DDS* libraries statically linked the CRT.

If you have an existing Windows project that was linking with the *Connex DDS* static libraries, you will need to change the RunTime Library settings:

- In Visual Studio, select C/C++, Code Generation, Runtime Library and use Multi-threaded DLL (**/MD**) instead of Multi-threaded (**/MT**) for static release libraries, and Multi-threaded Debug DLL (**/MDd**) instead of Multi-threaded Debug (**/MTd**) for static debug libraries.
- For command-line compilation, use **/MD** instead of **/MT** for static release libraries, and **/MDd** instead of **/MTd** for static debug libraries.

In addition, you may need to ignore the static run-time libraries in their static configurations:

- In Visual Studio, select **Linker, Input** in the project properties and add **libcmtd;libcmt** to the **'Ignore Specific Default Libraries'** entry.
- For command-line linking, add **/NODEFAULTLIB:"libcmtd" /NODEFAULTLIB:"libcmt"** to the linker options.

## 9.3 Use Dynamic MFC Library, Not Static

To avoid communication problems in your *Connex DDS* application, use the dynamic MFC library, not the static version.

If you use the static version, your *Connex DDS* application may stop receiving DDS samples once the Windows sockets are initialized.

## 9.4 .NET API Requires Thread Affinity

To maintain proper concurrency control, .NET threads that call a *Connex DDS* API must correspond one-to-one with operating system threads. In most applications, this will always be the case. However, it may not be the case if the threads you are using are managed in a more advanced way—for example, Microsoft SQL Server does this, or you may do so in your own application.

If you intend to call *Connex DDS* APIs from explicitly managed threads, you must first call **Thread.BeginThreadAffinity()** in each such thread to ensure that it remains attached to a single operating system thread. See <http://msdn.microsoft.com/en-us/library/system.threading.thread.beginthreadaffinity.aspx>.

When you are done making RTI calls from a given thread, call **Thread.EndThreadAffinity()**.

In any case, be sure to consult the API Reference HTML documentation for more information about the thread safety contracts of the operations you use.

## 9.5 Support for Modern C++ API

*Connex DDS* provides two different C++ APIs, which we refer to as the "Traditional C++" and "Modern C++" APIs. The Modern C++ API is available for all Windows platforms.

Both C++03 and C++11 have been tested.

### Notes:

- Support for C++03 is deprecated starting with release 6.1.0, which is the last release that supports non-C++11-compliant compilers. After release 6.1.0, the Modern C++ API will require a C++11 compiler (or newer). The Traditional C++ API is not affected and continues to support C++98 compilers (or newer).
- Only the default plugin is supported. The legacy plugin has been removed from *Code Generator* starting with release 6.1.0.

For more information, see [Traditional vs. Modern C++, in the RTI Connex DDS Core Libraries User's Manual](#).

## 9.6 Multicast Support

Multicast is supported on all platforms and is configured out of the box. That is, the default value for the initial peers list (`NDDS_DISCOVERY_PEERS`) includes a multicast address. See the online documentation for more information.

## 9.7 Supported Transports

- **Shared memory:** Shared memory is supported and enabled by default. The Windows operating system manages the shared memory resources automatically. Cleanup is not required.
- **UDPv4:** Supported and enabled by default.
- **UDPv6:** Supported but disabled on architectures that use Visual Studio. The peers list (`NDDS_DISCOVERY_PEERS`) must be modified to support UDPv6. No Traffic Class support.
- **TCP/IPv4:** Supported on architectures that use Visual Studio. (This is *not* a built-in transport.)

## 9.8 Unsupported Features

These features are not supported on Windows platforms:

- Controlling CPU Core Affinity
- Durable Writer History and Durable Reader State is only supported on x64Win64VS2012 platforms
- Setting thread names by *Connex DDS* at the operating-system level in release mode

## 9.9 Monotonic Clock Support

The monotonic clock (described in *Clock Selection* in the [RTI Connex DDS Core Libraries User's Manual](#)) is supported on all Windows platforms.

## 9.10 Thread Configuration

See [Table 9.6 Thread Settings for Windows Platforms](#), [Table 9.7 Thread-Priority Definitions for Windows Platforms](#), and [Table 9.8 Thread Kinds for Windows Platforms](#).

**Table 9.6 Thread Settings for Windows Platforms**

Applicable Thread	DDS_ThreadSettings_t	Platform-Specific Setting
Asynchronous Publisher, Asynchronous flushing thread,	mask	OS default thread type
	priority	0
	stack_size	OS default thread stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
Database thread	mask	DDS_THREAD_SETTINGS_STDIO
	priority	-3
	stack_size	OS default thread stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
Event thread	mask	DDS_THREAD_SETTINGS_STDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	-2
	stack_size	OS default thread stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported
ReceiverPool threads	mask	DDS_THREAD_SETTINGS_STDIO   DDS_THREAD_SETTINGS_FLOATING_POINT
	priority	2
	stack_size	OS default thread stack size
	cpu_list	CPU core affinity not supported
	cpu_rotation	CPU core affinity not supported

**Table 9.7 Thread-Priority Definitions for Windows Platforms**

Thread-Priority Definition	Operating-System Priority
THREAD_PRIORITY_DEFAULT	0
THREAD_PRIORITY_HIGH	3

**Table 9.7 Thread-Priority Definitions for Windows Platforms**

Thread-Priority Definition	Operating-System Priority
THREAD_PRIORITY_ABOVE_NORMAL	2
THREAD_PRIORITY_NORMAL	0
THREAD_PRIORITY_BELOW_NORMAL	-2
THREAD_PRIORITY_LOW	-3

**Table 9.8 Thread Kinds for Windows Platforms**

Thread Kinds	Operating-System Configuration <sup>a</sup>
DDS_THREAD_SETTINGS_FLOATING_POINT	N/A
DDS_THREAD_SETTINGS_STUDIO	
DDS_THREAD_SETTINGS_REALTIME_PRIORITY	
DDS_THREAD_SETTINGS_PRIORITY_ENFORCE	

## 9.11 Support for 'Find Package' CMake Script

The 'Find Package' CMake script is supported on all Windows platforms in [Table 9.1 Supported Windows Platforms](#).

For information on using this script, see *Building Applications Using CMake*, in the [RTI Connex DDS Core Libraries Users Manual](#).

## 9.12 Durable Writer History and Durable Reader State Features

The Durable Writer History and Durable Reader State features have been tested with the following Windows architecture:

- x64Win64VS2012

To use the Durable Writer History and Durable Reader State features, you must install a relational database. Only MySQL® is supported.

For information on database setup and the versions supported, please see the [RTI Connex DDS Core Libraries Database Setup](#).

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<sup>a</sup>See Windows manuals for additional information.

## 9.13 Backtrace Support

To support the display of the backtrace on Windows systems, you need the **Dbghelp.dll** and **Ntdll.dll** libraries. Without these libraries, the backtrace will not be available.

- To obtain the latest version of **DbgHelp.dll**, go to <https://developer.microsoft.com/en-us/windows/downloads/downloads/windows-10-sdk> and download Debugging Tools for Windows. Refer to “Calling the DbgHelp Library” for information on proper installation.
- **Ntdll.dll** exports the Windows Native API. It is installed automatically during the installation of the Windows operating system.

When using release-mode libraries, backtrace support on Windows 32-bit architectures requires you to use the **/Oy-** optimization flag to disable "Frame-Pointer Omission" optimization.

See <https://docs.microsoft.com/en-us/cpp/build/reference/oy-frame-pointer-omission?view=vs-2019>.

See also [Logging a Backtrace for Failures, in the RTI Connex DDS Core Libraries User's Manual](#).

## 9.14 Support for Remote Procedure Calls (RPC)

RPC is an experimental feature available only for the C++11 API. It is supported on these Windows architectures:

- i86Win32VS2015
- i86Win32VS2017
- x64Win64VS2015
- x64Win64VS2017

See *Remote Procedure Calls (RPC)* in the [RTI Connex DDS Core Libraries User's Manual](#).

## 9.15 Libraries Required for Using Distributed Logger Support

*RTI Distributed Logger* is supported on all Windows platforms. [Table 9.9 Additional Libraries for using RTI Distributed Logger](#) lists the additional libraries you will need to use *Distributed Logger*.



**Table 9.9 Additional Libraries for using RTI Distributed Logger**

Language	Static <sup>a</sup>		Dynamic <sup>b</sup>	
	Release	Debug	Release	Debug
C	rtidlcz.lib	rtidlczd.lib	rtidlc.lib rtidlc.dll	rtidlcd.lib rtidlcd.dll
C++ (Traditional API)	rtidlcz.lib rtidlcppz.lib	rtidlczd.lib rtidlcppzd.lib	rtidlc.lib rtidlc.dll rtidlcpp.lib rtidlcpp.dll	rtidlcd.lib rtidlcd.dll rtidlcppd.lib rtidlcppd.dll
Java	N/A	N/A	distlog.jar distlogdatamodel.jar	distlogd.jar distlogdatamodeld.jar

## 9.16 Libraries Required for Using Monitoring

To use the Monitoring APIs, reference the libraries in [Table 9.10 Additional Libraries for Using Monitoring](#).

Make sure you are consistent in your use of static, dynamic, debug and release versions of the libraries. For example, if your *Connex* DDS application is linked with the static release version of the *Connex* DDS libraries, you will need to also use the static release version of the monitoring library. Do not link both static and dynamic libraries. Similarly, do not mix release and debug libraries.

If you are statically linking your application with DDS libraries and you want to add monitoring to your application, you will also need to statically link the monitoring library. The library cannot be loaded dynamically strictly through the QoS profile because it also depends on DDS to publish its data. Therefore, it depends on DDS; the DDS functionality would cause duplicate symbols to be found resulting, in the termination of the process.

**Table 9.10 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>c</sup>
Dynamic Release	rtimonitoring.lib rtimonitoring.dll
Dynamic Debug	rtimonitoringd.lib rtimonitoringd.dll

<sup>a</sup>These libraries are in <NDDSHOME>\lib<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>\lib<architecture>.

<sup>c</sup>These libraries are in <NDDSHOME>\lib<architecture>.

**Table 9.10 Additional Libraries for Using Monitoring**

Library Format	Monitoring Libraries <sup>a</sup>
Static Release	rtimonitoringz.lib Psapi.lib
Static Debug	rtimonitoringzd.lib Psapi.lib

## 9.17 Libraries Required for Using RTI Real-Time WAN Transport APIs

If you choose to use *RTI Real-Time WAN Transport*, you must download and install a separate package that contains the transport libraries. See the [RTI Real-Time WAN Transport Installation Guide](#) for details.

Using *Real-Time WAN Transport* requires one of the libraries in [Table 9.11 Additional Libraries for Using RTI Real-Time WAN Transport APIs](#). Select the file appropriate for your chosen library format.

For more information, see the "Enabling Real-Time WAN Transport" section in the *RTI Real-Time WAN Transport* part of the [RTI Connex DDS Core Libraries User's Manual](#).

**Table 9.11 Additional Libraries for Using RTI Real-Time WAN Transport APIs**

Library Format	Real-Time WAN Transport Libraries <sup>b</sup>
Dynamic Release	nddsrwt.dll
Dynamic Debug	nddsrwtd.dll
Static Release	nddsrwtz.lib
Static Debug	nddsrwtzd.lib

## 9.18 Libraries Required for Using RTI Secure WAN Transport APIs

To use the *RTI Secure WAN Transport* APIs, reference the libraries in [Table 9.12 Additional Libraries for Using RTI Secure WAN Transport APIs](#). See the [RTI Secure WAN Transport Release Notes](#) and [RTI Secure WAN Transport Installation Guide](#) for details.

For details on the OpenSSL libraries, see [9.18.1 Location for OpenSSL Libraries on the next page](#).

<sup>a</sup>These libraries are in <NDDSHOME>\lib\<architecture>.

<sup>b</sup>These libraries are in <NDDSHOME>\lib\<architecture>.

**Table 9.12 Additional Libraries for Using RTI Secure WAN Transport APIs**

Library Format	RTI Secure WAN Transport Libraries <sup>a</sup>	OpenSSL Libraries	System Libraries
Dynamic Release	nddstransportwan.lib nddstransportwan.dll nddstransporttls.lib nddstransporttls.dll	libssl.lib libssl-<version>.dll	(none)
Dynamic Debug	nddstransporttlsd.lib nddstransporttlsd.dll nddstransportwand.lib nddstransportwand.dll	libcrypto.lib libcrypto-<version>.dll	
Static Release	nddstransportwanz.lib nddstransporttlsz.lib	libsslz.lib	crypt32.lib
Static Debug	nddstransportwanzd.lib nddstransporttlszd.lib	libcryptoz.lib	

### 9.18.1 Location for OpenSSL Libraries

OpenSSL **.lib** files are in <NDDSHOME>\third\_party\openssl-1.1.1k\<architecture>\<format>\lib.

OpenSSL **.dll** files are in <NDDSHOME>\third\_party\openssl-1.1.1k\<architecture>\<format>\bin.

Where:

- <architecture> is your architecture string, as listed in [Table 9.1 Supported Windows Platforms on page 112](#), such as **x64Win64VS2017**.
- <format> is **debug**, **release**, **static\_debug**, or **static\_release**.

The **.dll** filenames have a <version> suffix. For example, **libssl-1\_1-x64.dll** is for OpenSSL 1.1 on an x64 CPU.

## 9.19 Libraries Required for Using RTI TCP Transport APIs

To use the TCP Transport APIs, reference the libraries in [Table 9.13 Additional Libraries for Using RTI TCP Transport APIs](#).

<sup>a</sup>These libraries are in <NDDSHOME>\lib\<architecture>.

**Table 9.13 Additional Libraries for Using RTI TCP Transport APIs**

Library Format	RTI TCP Transport Libraries <sup>a</sup>
Dynamic Release	nddstransporttcp.lib nddstransporttcp.dll
Dynamic Debug	nddstransporttcpd.lib nddstransporttcpd.dll
Static Release	nddstransportcpz.lib
Static Debug	nddstransportcpzd.lib

If you are also using *RTI TLS Support*, see [Table 9.14 Additional Libraries for using RTI TCP Transport APIs with TLS Enabled](#). (Select the files appropriate for your chosen library format.)

For details on the OpenSSL libraries, see [9.18.1 Location for OpenSSL Libraries on the previous page](#).

**Table 9.14 Additional Libraries for using RTI TCP Transport APIs with TLS Enabled**

Library Format	RTI TLS Libraries <sup>b</sup>	OpenSSL Libraries	System Libraries
Dynamic Release	nddstls.lib nddstls.dll	libssl.lib libssl-<version>.dll	(none)
Dynamic Debug	nddstlsd.lib nddstlsd.dll	libcrypto.lib libcrypto-<version>.dll	
Static Release	nddstlsz.lib	libsslz.lib	crypt32.lib
Static Debug	nddstlszd.lib	libcryptoz.lib	

## 9.20 Libraries Required for Zero Copy Transfer Over Shared Memory

To use the Zero Copy Transfer Over Shared Memory feature, reference the libraries in [Table 9.15 Additional Libraries for Zero Copy Transfer Over Shared Memory](#).

**Table 9.15 Additional Libraries for Zero Copy Transfer Over Shared Memory**

Library Format	Zero Copy Transfer Over Shared Memory Libraries <sup>c</sup>
Dynamic Release	nddsmetp.lib nddsmetp.dll

<sup>a</sup>The libraries are in <NDDSHOME>\lib\<architecture>.

<sup>b</sup>The libraries are in <NDDSHOME>\lib\<architecture>.

<sup>c</sup>The libraries are in <NDDSHOME>\lib\<architecture>.

**Table 9.15 Additional Libraries for Zero Copy Transfer Over Shared Memory**

Library Format	Zero Copy Transfer Over Shared Memory Libraries <sup>a</sup>
Dynamic Debug	nddsmetpd.lib nddsmetpd.dll
Static Release	nddsmetpz.lib
Static Debug	nddsmetpzd.lib

## 9.21 Domain ID Support

On Windows platforms, you should avoid using ports 49152 through 65535 for inbound traffic. *Connex* DDS's ephemeral ports (see *Ports Used for Discovery*, in the *Discovery* chapter of the [RTI Connex DDS Core Libraries 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 platforms introduces the risk of a port collision and failure to create the *DomainParticipant* 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.
```

<sup>a</sup>The libraries are in `<NDDSHOME>\lib\<architecture>`.