RTI Persistence Service

Release Notes

Version 7.2.0

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1 Supported Platforms

RTI® Persistence Service is included with *RTI Connext®*. If you choose to use it, it must be installed on top of *Connext* with the same version number.

See the column for *Persistence Service* in the table of Supported Platforms for Compiler-Dependent Products, in the RTI Connext Core Libraries Release Notes.

RTI tests *Persistence Service* with a file-system only, using PERSISTENT mode.

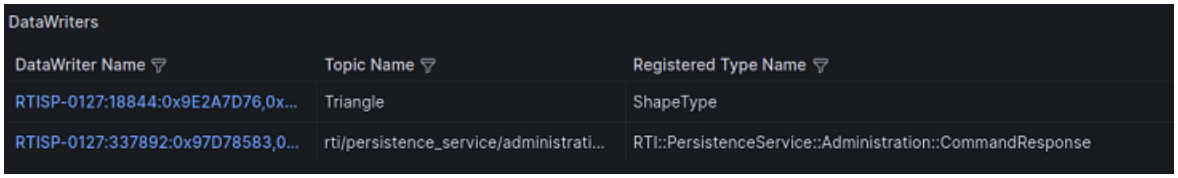
2 Compatibility

For backward-compatibility information between this and previous releases, see the *Migration Guide* on the RTI Community Portal (https://community.rti.com/documentation).

3 What's New in 7.2.0

3.1 Persistence Service compatible with Monitoring Library 2.0

RTI Monitoring Library 2.0 can now be enabled in *Persistence Service* so that all DDS entities created by this service will provide monitoring data to *RTI Observability Framework*.



To enable *Monitoring Library 2.0* in *Persistence Service*, add the XML code snippet shown below to an XML QoS profile, then run *Persistence Service* from the folder containing the profile. Add the snippet to any of the following XML files:

- **NDDS_QOS_PROFILES.xml**, located in the *Persistence Service* working directory
- **USER_QOS_PROFILES.xml**, located in the *Persistence Service* working directory
- Any XML file included in the **NDDS_QOS_PROFILES** environment variable

```
<?xml version="1.0"?>
<dds>
    <qos_library name="MonitoringEnabledLibrary">
        <qos_profile name="MonitoringEnabledProfile"
                     is_default_participant_factory_profile="true">
            <participant_factory_qos>
                <monitoring>
                    <enable>true</enable>
                </monitoring>
            </participant_factory_qos>
        </qos_profile>
    </qos_library>
</dds>
```

For more information, see "How to Load XML-Specified QoS Settings" in the *Configuring QoS with XML* chapter of the RTI Connext DDS Core Libraries User's Manual. See also the Monitoring Library 2.0 chapter of the *RTI Observability Framework* documentation .

3.2 Support for dynamic certificate revocation and renewal without needing to restart Persistence Service

A running Persistence Service instance can use the new **authentication.crl_file_poll_period.millisec** and **authentication.identity_certificate_file_poll_period.millisec** properties in the *RTI Security Plugins* to specify certificate revocations and renewals without the need to restart the service. The **authentication.crl_file_poll_period.millisec** property must have a value greater than zero for the participant to periodically poll the provided CRL file for changes, and the **authentication.identity_certificate_file_poll_period.millisec** property must have a value greater than zero for the participant to periodically poll the provided identity certificate file for changes.

For more information, see the "Advanced Authentication Concepts" section in the *RTI Security Plugins User's Manual*.

3.3 New Library API functions in C allow get/set QoS operations on internal DomainParticipants

Persistence Service supports a new set of Library API functions in C that allow updating the QoS values *DomainParticipants* use to receive and publish data for the Persistence Groups contained in participants (<participant> is the corresponding tag in the XML configuration). These new APIs can provide additional flexibility in use cases that require changing a *DomainParticipant* QoS. For example, you could use them to update:

- QoS properties
- Transport configuration
- Participant partitions

In addition, you can use these APIs to change the configuration of the two *DomainParticipants* associated with a <participant> tag in XML separately. This option was not possible using XML.

The new Library API names are:

- **RTI_PersistenceService_get_participant_qos**
- **RTI_PersistenceService_set_participant_qos**

For more details, refer to the Persistence Service API Reference.

3.4 New Library API functions in C allow get/set QoS operations on internal Publisher/Subscriber entities

Persistence Service supports a new set of Library API functions in C that allow updating the QoS values of the *Publisher/Subscriber* entities belonging to Persistence Groups (<persistence_group> is the corresponding tag in the XML configuration). These new APIs can provide additional flexibility in use cases that require changing the *Publisher/Subscriber* QoS. For example, you could use them to update:

- QoS properties
- Endpoint partitions

The new Library API names are:

- **RTI_PersistenceService_get_publisher_qos**
- **RTI_PersistenceService_set_publisher_qos**
- **RTI_PersistenceService_get_subscriber_qos**
- **RTI_PersistenceService_set_subscriber_qos**

For more details, refer to the Persistence Service API Reference.

3.5 Persistence Service now allows you to set rtps_app_id, giving you greater control over value of DomainParticipant's GUID prefix

Persistence Service now allows you to set the value for **rtps_app_id** in a *DomainParticipant's* WIRE PROTOCOL QoS policy. In previous releases, if you tried to set this value, *Persistence Service* would log an exception and override the value with DDS_RTPS_AUTO_ID.

This new capability allows you to have greater control over the value of a *DomainParticipant's* GUID prefix. It can especially be helpful if you want to use your own **rtps_app_id** to identify the *DomainParticipants* created by an instance of *Persistence Service* by looking at the GUID prefix encapsulated as part of the RTPS wire packet's header. For example, a layer 7 load balancer could make routing decisions based on the value of the **rtps_app_id** of the *DomainParticipant's* GUID prefixes.

Note that *Persistence Service* still ensures that the GUID prefixes for all its *DomainParticipants* are unique, even if they share the same **rtps_app_id**, by automatically generating the **rtps_instance_id**, which is the last part of the GUID prefix. This last part is not user-configurable.

4 What's Fixed in 7.2.0

4.1 Error creating a persistence group DataWriter when setting dds.data_writer.history.odbc_plugin.builtin.sample_cache_max_size to -1

Creating a persistence group *DataWriter* could fail with the following error if the property **dds.data_writer.history.odbc_plugin.builtin.sample_cache_max_size** was set to -1 in the <datawriter_qos>:

```
"!allocate sample buffer pool"
```

Even if the *DataWriter* creation did not fail, the value of **dds.data_writer.history.odbc_plugin.builtin.sample_cache_max_size** would be incorrectly applied. Instead, it would be set to **dds.data_writer.history.odbc_plugin.builtin.instance_cache_max_size** for keyed topics and 1 for unkeyed topics.

This problem has been resolved.

[RTI Issue ID PERSISTENCE-296]

4.2 Segmentation fault issue with Persistence Service and Distributed Logger

Previous releases encountered a segmentation fault when using the *Persistence Service* library. This issue occurred when attempting to use the Distributed Logger after deleting an **RTI_PersistenceService** object. The problem occurred because the call to the **RTI_PersistenceService_delete** operation was deleting the Distributed Logger instance.

This problem is now fixed. If the user application creates the Distributed Logger instance instead of relying on its creation through the <distributed_logger> XML tag by *Persistence Service*, the deletion of the *Persistence Service* instance will no longer attempt to delete it.

[RTI Issue ID PERSISTENCE-297]

4.3 <reader_ checkpoint_ frequency> may not have been applied correctly

There was an issue applying the configuration parameter <reader_checkpoint_frequency> when the value was different than 1. The desired frequency for storing the PRSTDataReader state might not have been accurately applied, resulting in a delayed storage process. This problem has been resolved.

[RTI Issue ID PERSISTENCE-307]

5 Previous Releases

5.1 What's New in 7.1.0

5.1.1 Persistence Service support as a library for all supported architectures

This release adds support for *Persistence Service* Library API (static and dynamic), as an alternative to the standalone executable available in previous releases. Now you can run a *Persistence Service* instance within your application by linking with the new library and using the C API offered by the library on all supported architectures. Previously this support was available only for Integrity®.

For additional information on the *Persistence Service* Library API, see the *API Reference HTML documentation in* ***<NDDSHOME>/doc/api/persistence_service/index.html***. For an example on how to use *Persistence Service* as a library see https://-github.com/rticommunity/rticonnextdds-examples/tree/release/<version>/examples/persistence_service/library_api.

5.1.2 Removed ability to share a database connection in Persistence Service and durable writer history

This release removes the ability to share a database connection in *RTI Persistence Service* (which is done by setting the tag <share_database_connection> to true for a <persistence_group>). It also removes the ability to share a database connection when using durable writer history and setting the property **dds.data_writer.history.odbc_plugin.builtin.shared** to 1.

Note that sharing a database connection was only allowed for external databases, and support for external databases was removed in 7.0.0 (see *RTI Connext Core Libraries What's New* in 7.1.0).

5.1.3 Third-party software upgrade

The following third-party software used by *Persistence Service* has been upgraded:

Third-Party Software	Previous Version	Current Version
SQLite®	3.39.0	3.39.4

For information on third-party software used by *Connext* products, see the "3rdPartySoftware" documents in your installation: **<NDDSHOME>/doc/manuals/connext_dds_professional/release_notes_3rdparty**.

5.2 What's Fixed in 7.1.0

5.2.1 Persistence Service stored/forwarded samples multiple times when there were two or more equivalent versions of a type for a Topic

Persistence Service stored and forwarded incoming samples multiple times when there were two or more equivalent versions of a type for a given *Topic* in the system.

Two types are equivalent when they only differ on typedef. For example, MyType and MyType2 are equivalent in this IDL snippet:

```
struct MyType {
    long m1;
};

typedef long MyLong;

struct MyType2 {
    MyLong m1;
};
```

This problem has been fixed.

[RTI Issue ID PERSISTENCE-269]

5.2.2 Persistence Service XSD schema was broken

In release 7.0.0, the *Persistence Service* XSD schema was broken due to an additional closing tag. This was a regression that only affected the 7.0.0 release. This issue has been fixed.

[RTI Issue ID PERSISTENCE-276]

5.2.3 Unexpected fatal error when number of instances reached the limit

In 7.0.0, an unexpected fatal error could be logged when the following occurred:

- *Persistence Service* was running in PERSISTENT mode.
- The number of instances reached the **max_instances** limit set in one of the *Persistence Service DataWriters'* RESOURCE_LIMITS QoS.
- *Connext* could not find an instance to delete (such as an unregistered one), to replace with the new instance. So the new instance could not be added.

This log message is expected, but it is not a fatal error, so its verbosity has been updated to WARNING, as follows:

```
WriterHistoryOdbcPlugin_createResources:FIND FAILURE | Instance for replacement
WriterHistoryOdbcPlugin_addInstance:OUT OF RESOURCES | Exceeded the number of instances.
Current registered instances (128), maximum number of instances (128)(writer_qos.resource_
limits.max_instances)
```

[RTI Issue ID CORE-13496]

5.2.4 Fixes related to vulnerabilities

5.2.4.1 Potential arbitrary SQL query execution when enabling database locking

There was the potential for arbitrary SQL query execution in *Persistence Service* running with database locking enabled (which is not the default setting). This issue has been fixed.

5.2.4.1.1 User Impact without Security

A SQL Injection vulnerability in *Persistence Service* could have resulted in the following:

- Arbitrary SQL query execution.
- Exploitable from the same host Persistence Service is running.
- Potential impact on integrity and confidentiality of Persistence Service.
- CVSS Base Score: 7.1 HIGH
- CVSS v3.1 Vector: AV:L/AC:L/PR:L/UI:N/S:U/C:H/I:H/A:N

5.2.4.1.2 User Impact with Security

Same impact as described for "User Impact without Security" above.

[RTI Issue ID PERSISTENCE-272]

5.3 What's New in 7.0.0

5.3.1 Support for external databases is discontinued

External databases are no longer supported by Persistence Service.

The Release Notes for 6.1.1 included a deprecation notice, in keeping with the Real-Time Innovations, Inc. Maintenance Policy #4220.

5.3.2 Default journal_mode and synchronization changed to WAL and NORMAL, respectively

In this release, the default values for the following configuration parameters have changed:

- <journal_mode> has changed from DELETE to WAL
- <synchronization> has changed from OFF to NORMAL

This change provides the best out-of-the-box performance without sacrificing database integrity in the event of a crash or power failure.

5.3.3 Third-party software upgrade

The following third-party software used by *Persistence Service* has been upgraded:

Third-Party Software	Previous Version	Current Version
SQLite®	3.37.2	3.39.0

For information on third-party software used by *Connext* products, see the "3rdPartySoftware" documents in your installation: **<NDDSHOME>/doc/manuals/connext_dds_professional/release_notes_3rdparty**.

5.4 What's Fixed in 7.0.0

5.4.1 Schema files not compliant with DDS-XML specification

The following change has been made to the schema file **rti_persistence_service.xsd**, and its included files, to make them compliant with the DDS-XML specification (https://www.omg.org/spec/DDS-XML/1.0/PDF):

- Renamed <participant_qos> to <domain_participant_qos>

The old tag is still accepted by the Connext XML parser and the XSD schema to maintain backward compatibility.

[RTI Issue ID PERSISTENCE-213]

5.4.2 Samples published out of order from same virtual GUID were dropped

If *Persistence Service* received samples for a given virtual GUID with sequence numbers out of order, *Persistence Service* dropped samples with sequence numbers lower than the highest received sequence number. This issue has been resolved.

[RTI Issue ID PERSISTENCE-250]

5.4.3 Fatal error when persisting unkeyed Topics upon restore or IP mobility event

Persistence Service generated the following fatal error and shut down when persisting unkeyed Topics if all of the following conditions were met:

- <use_durability_service> was set to true in the <persistence_group> OR <writer_qos>/<writer_data_lifecycle>/<autopurge_disposed_instances_delay> was set to zero in the <persistence_group>
- <writer_in_memory_state> was set to false in the <persistence_group>.
- There was an IP mobility event (for instance, an interface went down) OR *Persistence Service* was started with the **-restore** command-line option set to true.

The error backtrace was as follows:

```
#4  WriterHistoryOdbcPlugin_logAndCheckODBCError ??:? [0x31590B]
#5  WriterHistoryOdbcPlugin_handleODBCError ??:? [0x315CE5]
#6  WriterHistoryOdbcPlugin_beginDisposedInstanceIteration ??:? [0x34B202]
```

This problem has been resolved.

[RTI Issue ID PERSISTENCE-255]

6 Known Issues

Note: For an updated list of critical known issues, see the Critical Issues List on the RTI Customer Portal at https://support.rti.com.

6.1 Coherent Changes not Propagated as Coherent Set

Persistence Service will propagate the samples inside a coherent change. However, it will propagate these samples individually, not as a coherent set.

6.2 TopicQueries not Supported in PERSISTENT Mode

Getting TopicQuery data from a *Persistence Service* instance configured to store data on disk is not currently supported.

> **Note:** Getting TopicQuery data from a *Persistence Service* instance running in TRANSIENT (storing data in memory) mode is supported.

[RTI Issue ID PERSISTENCE-143]

6.3 <comm_ports> not Supported when Using Real-Time WAN Transport

Persistence Service can use the *RTI Real-Time WAN Transport*. However, the port configuration using <comm_ports> or the property **dds.transport.UDPv4_WAN.builtin.comm_ports** is not currently supported by *Persistence Service*.

[RTI Issue ID PERSISTENCE-206]

6.4 Persistence Service DataReaders Ignore Serialized Key Propagated with Dispose Updates

Persistence Service DataReaders ignore the serialized key propagated with dispose updates. *Persistence Service DataWriters* cannot propagate the serialized key with dispose, and therefore ignore the **serialize_key_with_dispose** setting on the *DataWriter* QoS.

[RTI Issue ID PERSISTENCE-221]

7 Available Documentation

The following documentation is provided with the *Persistence Service* distribution. (The paths show where the files are located after *Persistence Service* has been installed in **<NDDSHOME>**):

- General information, configuration, use cases, and execution of *Persistence Service*: *RTI Connext Core Libraries User's Manual* (**<NDDSHOME>/doc/manuals/connext_dds_professional/users_manual/RTI_ConnextDDS_CoreLibraries_UsersManual.pdf**)

- Example code

  By default, the *Persistence Service* examples are copied here:

  - macOS systems:

    /Users/*your user name*/rti_workspace/*version*/examples/persistence_service/<*language*>/hello_world_persistence
  - Linux systems:

    /home/*your user name*/rti_workspace/*version*/examples/persistence_service/<*language*>/hello_world_persistence
  - Windows systems:

    <*your home directory*>\rti_workspace*version*\examples\persistence_service\<*language*>/hello_world_persistence
- Overview of persistence and durability features:
  Open **<NDDSHOME>/ReadMe.html**, choose your desired API (C, C++, or Java), then select **Modules**, **RTI Connext API Reference**, **Durability and Persistence**.