RTI Limited Bandwidth Plugins Release Notes

Version 7.3.0

Contents

Chapter 1 Copyrights and Notices

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Chapter 2 Supported Platforms

See Supported Platforms, in the RTI Connext Core Libraries Release Notes.

2.1 Requirements when Using Microsoft Visual Studio

You must have the appropriate Microsoft® Visual Studio® Redistributable Package installed on the machine where you are *running* an application linked with dynamic libraries. For details, see the RTI Connext Core Libraries Platform Notes.

Chapter 3 Compatibility

Limited Bandwidth Plugins is an optional product for use with *Connext* with the same version number.

The plugins are not fully tested and supported in combination with *RTI DDS Spy (rtiddsspy)*, *RTI Recording Service*, *RTI Shapes Demo*, *RTI Persistence Service*, or *RTI Database Integration Service*.

When using the LBPD plugin with *RTI Routing Service*, either the **key** or **participant_name** property may be used. If the **participant_name** property is used, it must match the participant name generated by *Routing Service*, which uses this format for naming participants: "RTI Routing Service: <service name>.<domain_route name>#{1,2}".

For backward-compatibility information between this and previous releases, see the Migration Guide.

Chapter 4 What's New in 7.3.0 LTS

Connext 7.3.0 LTS is a long-term support release that is built upon and combines all of the features in releases 7.0.0, 7.1.0, and 7.2.0 (see *Previous Releases*). See the Connext Releases page on the RTI website for more information on RTI's software release model.

There are no changes to *RTI Limited Bandwidth Plugins* in this release. The most recent changes are in *What's New in 7.1.0*.

Chapter 5 What's Fixed in 7.3.0 LTS

This section describes bugs fixed in *Connext* 7.3.0 LTS. These are fixes since 7.2.0. For information on fixes and features in releases 7.0.0, 7.1.0, and 7.2.0, which are all also part of 7.3.0 LTS, see *Previous Releases*.

[Critical]: System-stopping issue, such as a crash or data loss. [Major]: Significant issue with no easy workaround. [Minor]: Issue that usually has a workaround. [Trivial]: Small issue, such as a typo in a log.

5.1 [Critical] Limited Bandwidth ZRTPS transport crashed if an external compression library failed to load

The *RTI Limited Bandwidth Plugins*' ZRTPS transport could have crashed when attempting to use an external library. If there was a failure while loading an external compression library (for example, if a function name did not match the expected name), the external library was silently closed. The error and the closure were not propagated upstream; therefore, the ZRTPS transport used an invalid library handler, leading to a crash.

The transport will now be notified if there is a failure to load an external library.

[RTI Issue ID COREPLG-719]

Chapter 6 Previous Releases

6.1 What's Fixed in 7.2.0

[Critical]: System-stopping issue, such as a crash or data loss. [Major]: Significant issue with no easy workaround. [Minor]: Issue that usually has a workaround. [Trivial]: Small issue, such as a typo in a log.

6.1.1 [Critical] Undefined behavior in LBRTPS with UDPv4 if message was received at same time that receiving thread was unblocking

If an application used the Limited Bandwidth RTPS Transport Plugin (LBRTPS) with UDPv4 configured as a subtransport, its behavior could be undefined if a message was received while the receiving thread was being unblocked (for example, a message was received while shutting down the application). In the worst case, this could lead to a crash.

This issue is fixed. Receiving a message while the receiving thread is being unblocked is now safe.

[RTI Issue ID COREPLG-703]

6.2 What's New in 7.1.0

6.2.1 RTI Limited Bandwidth Endpoint Discovery now installed with RTI Connext Professional

Starting in 7.1.0, *RTI Limited Bandwidth Endpoint Discovery (LBED)* is installed with the *RTI Connext Professional* bundle. You no longer need to purchase and install LBED separately. It is installed with your **rti_connext_dds-7.1.0-pro-<host or target>-<host platform or target architecture>.<extension or rtipkg>** bundle.

Due to this change, the LBED libraries have been removed from *Limited Bandwidth Plugins*. Release notes related to LBED are now included in the RTI Connext Core Libraries Release Notes. For more information on LBED, see Limited Bandwidth Endpoint Discovery in the RTI Connext Core Libraries User's Manual.

6.3 What's New in 7.0.0

6.3.1 DDS-XML format for Limited Bandwidth Endpoint Discovery Plugin

The *Limited Bandwidth Endpoint Discovery* (LBED) plug-in uses an XML file to statically specify the QoS (and other information, such as the *Topic* or type being used) of the endpoints that should be "discovered." However, in previous versions, this XML (the way to specify the configuration, the labels, the schema, etc.) did not follow the OMG's DDS Consolidated XML Syntax, unlike other RTI elements such as **USER_QOS_PRO-FILES.xml**, *XML-Based Application Creation*, or *RTI System Designer*. This created in the RTI ecosystem the coexistence of two different ways to define DDS systems using XML: the standardized one used by most tools and the one that only LBED uses.

Since it is possible to represent the LBED configuration using DDS-XML, this release has updated the LBED plugin to follow the DDS-XML standard. This way, if you already have a DDS-XML description of your system, it can be used directly for LBED, without needing to translate it to another schema. If you don't have the DDS-XML description of your system, now you can create it using *RTI System Designer*: the resultant XML file will be compatible with LBED.

The usage of the DDS-XML standard gives the plug-in more flexibility in specifying QoS for your endpoints: QoS libraries and profiles (including the built-in ones) can be used. Also, it is possible to take advantage of the inheritance between profiles.

While improving the LBED XML configuration, other changes were made to improve ease of use and LBED functionality:

- In previous versions of the plugin, a separate XML file was required for specifying the LBED information of the endpoints that needed to be discovered. Now, the usage of an external XML file is optional and it is possible to specify the LBED information in the same XML file in which you specify the QoS policies of your entities (e.g., **USER_QOS_PROFILES.xml**). In this way, **USER_QOS_PROFILES.xml** could act as an "XML database of DDS Entities", containing information of a local application's entities (like their QoS profiles or *XML-Based Application Creation* definitions) as well as the information that the plug-in requires of other applications' entities that need to be discovered.

- In addition to the LBED properties, in the new version of the plugin there is an alternative way of enabling the LBED plugin for a *DomainParticipant* that requires fewer changes in the configuration: setting the Builtin Discovery Plugins mask with the DPSE (**D**ynamic **P**articipant discovery, **S**tatic **E**ndpoint discovery) value.

- When LBED is used, you need to manually define an RTPS object ID for each endpoint in the application. Now, if you use *XML-Based Application Creation* in your applications, you don't need to specify the RTPS object ID; the new version of LBED is able to automatically determine the corresponding RTPS Object ID of each endpoint.

- In previous versions of the plug-in, the TRANSPORT_MULTICAST and TRANSPORT_UNICAST QoS policies only supported the UDPv4 transport. Now, both QoS policies support all *Connext* builtin transport plugins:

  - Multicast supports UDPv4 and UDPv6.

  - Unicast supports UDPv4, UDPv6, and SHMEM. It also supports the *RTI Real-Time WAN Transport* (UDPv4_WAN).

- RTI has improved the debuggability of the LBED plugin with more meaningful log messages and the usage of Activity Contexts.

To learn more about how the new LBED plug-in works and its features, see the RTI Limited Bandwidth Plugins User's Manual. The new "Limited Bandwidth Endpoint Discovery Plugin" chapter guides you step by step to modify a generated *Connext* project to use the *Limited Bandwidth Endpoint Discovery* plugin.

6.3.2 Third-Party Software Upgrades

The following third-party software used by *Limited Bandwidth Plugins* has been upgraded.

Third-Party Software	Previous Version	Current Version
Zlib	1.2.11	1.2.12

This upgrade may fix potential vulnerabilities. See *Fixes Related to Vulnerabilities*.

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**.

6.4 What's Fixed in 7.0.0

[Critical]: System-stopping issue, such as a crash or data loss. [Major]: Significant issue with no easy workaround. [Minor]: Issue that usually has a workaround. [Trivial]: Small issue, such as a typo in a log.

6.4.1 [Critical] Memory leak when ZRTPS or LBRTPS sub-transport library was set

When using the ZRTPS and LBRTPS transport plugins, and a sub-transport was set using the `dds. transport.<lbrtps|zrtps>.subtransport` properties, the library defined in these properties was opened and never closed, causing a memory leak.

This behavior has been fixed. Now the sub-transport library is correctly closed when the ZRTPS or LBRTPS transport is destroyed.

[RTI Issue ID COREPLG-602]

6.4.2 [Critical] Crash when installing some DataReader listeners in DomainParticipant that used LBPD

The Limited Bandwidth Participant Discovery (LBPD) Plugin internally creates a *DataWriter* and a *DataReader* for exchanging the static discovery information. These endpoints are created using the user *DomainParticipant* (the one in which you enabled the plugin).

If you installed a *DataReader* listener in your *DomainParticipant* with LBPD, that listener was also installed for LBPD's internal *DataReader*. When the listener's associated event was triggered for the internal *DataReader*, a crash occurred because the internal endpoints did not have all the information required for exercising the user listeners.

The issue did not occur for *DataWriter* listeners because none of the currently available events can be triggered for the internal LBPD *DataWriter*. Not all *DataReader* listeners caused a crash. The internal *DataReader* has some listeners already installed which override the user's listeners. The latter are as follows:

- `on_data_available()`

- `on_sample_lost()`

- `on_sample_rejected()`

- `on_requested_incompatible_qos()`

The issue has been fixed. Now, users' listeners installed at the *DomainParticipant* level are not invoked for the internal LBPD endpoints.

[RTI Issue ID COREPLG-604]

6.4.3 [Critical] Segmentation fault if participant with ZRTPS or LBRTPS transports enabled also used TCP sub-transport

Participants with the ZRTPS or LBRTPS transport plugins enabled, used in combination with TCP as a sub-transport (achieved by loading the property `dds.transport.<lbrtps|zrtps>.subtransport`) would fail with a segmentation fault on the receiving thread after processing the received message. This problem has been fixed.

[RTI Issue ID COREPLG-620]

6.4.4 [Major] Memory leak when external compression library set and used for ZRTPS transport

When using the ZRTPS transport plugin and an external compression library (the property `dds.transport.zrtps.compression_library` was set to EXTERNAL_COMPRESSION), the library set in the property `dds.transport.zrtps.external_library` was opened and never closed, causing a memory leak.

This problem has been resolved. Now the external library is correctly closed when the ZRTPS transport is destroyed.

[RTI Issue ID COREPLG-629]

6.4.5 Fixes Related to Vulnerabilities

This release fixes some potential vulnerabilities, described below.

[Critical] Potential memory corruption when using Zlib compression due to vulnerability in Zlib

The ZRTPS transport in the *Limited Bandwidth Plugins* had a third-party dependency on Zlib version 1.2.11, which is known to be affected by one publicly disclosed vulnerability.

This vulnerability has been fixed by upgrading Zlib to the latest stable version, 1.2.12. See *Third-Party Software Upgrades*.

The impacts on *Connext* applications of using the previous version were:

- Out-of-bounds memory accesses, crashing the application

- Exploitable by triggering compression of an RTPS message with a malicious payload

- CVSS v3.1 Score: 7.5 HIGH

- CVSS v3.1 Vector: AV:N/AC:L/PR:N/UI:N/S:U/C:N/I:N/A:H

[RTI Issue ID COREPLG-631]

Chapter 7 Known Issues

Note: For an updated list of critical known issues, see the Critical Issues List on the RTI Customer Portal.

7.1 Transport-Related Limitations for ZRTPS

The following are known transport-interaction limitations when using the ZRTPS transport plugin:

- Neither Shared Memory (SHMEM) nor UDPv6 may be used as sub-transports.

- The UDPv4 transport may not be used simultaneously as a transport and a ZRTPS sub-transport.

7.2 Some Features not Supported

The following features are not currently supported by the LBPD Plugin:

- Security

- TopicQueries

- The **locator_reachability_lease_duration** in the DiscoveryConfigQosPolicy

- Propagation of properties in the PropertyQosPolicy during discovery

Chapter 8 Available Documentation

The following documentation is provided with *Limited Bandwidth Plugins*:

- *Installation Guide*: **<NDDSHOME>/doc/manuals/addon_products/limited_bandwidth_plugins/RTI_LimitedBandwidthPlugins_InstallationGuide.pdf**

- *User's Manual*: **<NDDSHOME>/doc/manuals/addon_products/limited_bandwidth_plugins/RTI_LimitedBandwidthPlugins_UsersManual.pdf**

- Example code: **<path to examples>/connext_dds/<c or c++11>/limited_bandwidth_plugins**

<NDDSHOME> refers to the installation directory for *Connext*.

<path to examples> is **/home/<your user name>/rti_workspace/version/examples** for Linux® and **<your Windows documents folder>\rti_workspace\version\examples** for Windows®.

See "Paths Mentioned in Documentation" in the RTI Limited Bandwidth Plugins User's Manual.