RTI TLS Support

Release Notes

Version 6.1.1
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The security features of this product include software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/). This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). This product includes software written by Tim Hudson (tjh@cryptsoft.com).

Notice

Any deprecations noted in this document serve as notice under the Real-Time Innovations, Inc. Maintenance Policy #4220.

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Chapter 1 Supported Platforms

This release of RTI® TLS Support is supported on the platforms in Table 1.1 Supported Platforms. For details on these platforms, see the RTI Connext DDS Core Libraries Platform Notes.

Note: POSIX®-compliant architectures that end with "FACE_GP" are not supported.

Table 1.1 Supported Platforms

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Android®</td>
<td>All Android platforms listed in the RTI Connext DDS Core Libraries Release Notes for the same version number.</td>
</tr>
<tr>
<td>Linux®</td>
<td>All Linux platforms in the RTI Connext DDS Core Libraries Release Notes for the same version number, except SUSE® Linux Enterprise Server.</td>
</tr>
<tr>
<td>macOS®</td>
<td>All macOS platforms listed in the RTI Connext DDS Core Libraries Release Notes for the same version number.</td>
</tr>
<tr>
<td>QNX®</td>
<td>All QNX Neutrino® 6.5 - 7.0.4 platforms listed in the RTI Connext DDS Core Libraries Release Notes for the same version number.</td>
</tr>
<tr>
<td>Windows®</td>
<td>All Windows platforms listed in the RTI Connext DDS Core Libraries Release Notes for the same version number.</td>
</tr>
</tbody>
</table>

TLS Support is also supported on the platforms in Table 1.2 Custom Supported Platforms; these are target platforms for which RTI offers custom support. If you are interested in these platforms, please contact your local RTI representative or email sales@rti.com.


Table 1.2 Custom Supported Platforms

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Version</th>
<th>CPU</th>
<th>RTI Architecture Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux</td>
<td>RedHawk™ Linux 6.5</td>
<td>x86</td>
<td>i86RedHawk6.5gcc4.9.2</td>
</tr>
<tr>
<td></td>
<td>Available on demand</td>
<td>x64</td>
<td>x64RedHawk6.5gcc4.9.2</td>
</tr>
<tr>
<td></td>
<td>Wind River® Linux 8</td>
<td>Arm v7</td>
<td>armv7aWRLinux8gcc5.2.0</td>
</tr>
<tr>
<td></td>
<td>Yocto Project® 2.5</td>
<td>Arm v8</td>
<td>armv8Linux4gcc7.3.0</td>
</tr>
<tr>
<td>QNX</td>
<td>QNX Neutrino 6.6</td>
<td>Arm v7</td>
<td>armv7aQNX6.6.0qcc_cpp4.7.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>x86</td>
<td>i86QNX6.6qcc_cpp4.7.3</td>
</tr>
<tr>
<td></td>
<td>QNX Neutrino 7.0.4</td>
<td>Arm v7</td>
<td>armv7QNX7.0.0qcc_cxx5.4.0^</td>
</tr>
</tbody>
</table>

^armv7QNX7.0.0qcc_cxx5.4.0 was tested with QNX Neutrino 7.0.0 kernel.
Chapter 2 Compatibility

TLS Support is designed for use with the TCP transport that is included with RTI Connext DDS. If you choose to use TLS Support, it must be installed on top of an existing TLS Support installation with the same version number. It can only be used on architectures that support the TCP transport (see the RTI Connext DDS Core Libraries Platform Notes).

TLS Support 6.1.1 is API-compatible with OpenSSL® versions 1.1.0 through 1.1.1n, not with versions earlier than OpenSSL 1.1.0. Note that TLS Support 6.1.1 has only been tested by RTI using OpenSSL 1.1.1n. If you need TLS Support 6.1.1 to run against older versions of OpenSSL, please contact support@rti.com.

TLS Support 6.1.1 uses TLS 1.3. When communicating with TLS Support 6.0.0 or below, TLS Support 6.1.1 uses TLS 1.1.

If you are upgrading from OpenSSL 1.0.1 to OpenSSL 1.0.2 or above: The number of bits of any Diffie-Hellman (DH) parameters must now be at least 1024 (see https://www.openssl.org/blog/blog/2015/05/20/logjam-freak-upcoming-changes/). Therefore, if you are using the property tls.cipher.dh_param_files and there is a DH parameter file that has fewer than 1024 bits, you must regenerate the file with at least 1024 bits.

For backward compatibility information between 6.1.1 and previous releases, see the Migration Guide on the RTI Community Portal (https://community.rti.com/documentation).
Chapter 3 What's New in 6.1.1

3.1 New Platform

This release adds support for the following new platform.

Table 1 Added Platforms

<table>
<thead>
<tr>
<th>Operating System</th>
<th>CPU</th>
<th>Compiler</th>
<th>RTI Architecture Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>macOS 11</td>
<td>Arm v8</td>
<td>clang 12.0</td>
<td>arm64Darwin20clang12.0</td>
</tr>
</tbody>
</table>

3.2 Third-Party Software Upgrade

This release of TLS Support uses OpenSSL® 1.1.1n (the previous release used 1.1.1k).
Chapter 4 What's Fixed in 6.1.1

4.1 hello_world_tcp example root and intermediate CAs expired too early

In rti_workspace/examples/connext_dds/c/hello_world_tcp, the README.txt states:

Example certificates for two peers are included in dds_security/cert/tls_rsa01.

But the root CA certificate ca_rsa01RootCaCert.pem, which was the intended command-line argument for --tls-cert, expired only 30 days after it was created. The root CA certificate was therefore unusable and led to communication failure along with the following errors:

```
RTITLS_ConnectionEndpointTLSv4_doHandshake:OpenSSL protocol error:1416F086:SSL routines:tls_process_server_certificate:certificate verify failed
RTITLS_ConnectionEndpointTLSv4_doHandshake:OpenSSL protocol error:14094415:SSL routines:ssl3_read_bytes:sslv3 alert certificate expired
```

In the identities folder, the files rsa01Peer01.pem and rsa01Peer02.pem have intermediate CAs in them, and those intermediate CAs have also expired.

These problems only affected release 6.1.0 and have been fixed by changing all of the certificates in dds_security/cert/tls_rsa01. The root CA and intermediate CA certificates now expire in 5 years instead of 30 days.

[RTI Issue ID COREPLG-554]

4.2 Significant performance regression on Windows systems when using OpenSSL 1.1.1k libraries provided in 6.1.0

Previously, OpenSSL was built using compiler flags that enabled the usage of assembly instructions for certain operations on certain operating systems like Windows 64-bit (but not 32-bit).

The OpenSSL 1.1.1k libraries for Windows systems, provided with Connext DDS 6.1.0, were missing those compiler flags. This resulted in degraded performance in TLS Support for the TCP transport, which relies on those libraries.
This problem has been fixed, as this release uses OpenSSL 1.1.1n (see 1.2 Third-Party Software Upgrade on page 1).

[RTI Issue ID COREPLG-565]
Chapter 5 Previous Release

5.1 What's New in 6.1.0

5.1.1 Added Platforms

This release adds support for these platforms:

- macOS 10.15 (x64) (x64Darwin17clang9.0)
- QNX Neutrino 7.0.4 (Arm v8) (armv8QNX7.0.0qcc_gpp5.4.0, armv8QNX7.0.0qcc_cxx5.4.0)
- QNX Neutrino 7.0.4 (x64) (x64QNX7.0.0qcc_gpp5.4.0, x64QNX7.0.0qcc_cxx5.4.0)
- QNX Neutrino 7.0.4 (Arm v7) (custom supported platform armv7QNX7.0.0qcc_cxx5.4.0)
- Red Hat® Enterprise Linux 7.6 (x64) (x64Linux3gcc4.8.2)
- Ubuntu® 18.04 LTS (Arm v7) (armv7Linux4gcc7.5.0)
- Ubuntu 18.04 LTS (Arm v8) (armv8Linux4gcc7.3.0)
- Ubuntu 20.04 LTS (x64) (x64Linux4gcc7.3.0)
- Yocto Project 2.5 (Arm v8) (custom supported platform armv8Linux4gcc7.3.0)

5.1.2 Removed Platforms

These platforms are no longer supported:

- Android™ 5.0, 5.1
- Debian 7 (custom supported platform)
- iOS®
- macOS 10.12
5.1.3 Updated OpenSSL Version

This release uses OpenSSL® 1.1.1k (instead of 1.1.1d).

5.1.4 Target OpenSSL Bundles Distributed as .rtipkg Files

Target OpenSSL bundles are now distributed as .rtipkg files. Once installed, the OpenSSL files are available in <installation_folder>/third_party.

5.1.5 Changes to OpenSSL Static Library Names

The OpenSSL static library names no longer have a "z" suffix. libcryptoz has been renamed to libcrypto, and libsslz has been renamed to libssl. When including the static libraries in a makefile, we recommend including the whole path to the OpenSSL static libraries in order to avoid confusion with the dynamic libraries. Here is an example:

```bash
```

In addition, the Android static library librtisslsupportz has been removed. You may use libcrypto and libssl instead.

5.2 What's Fixed in 6.1.0

This section describes bugs fixed in 6.1.0. These fixes have been made since 6.0.1 was released.

5.2.1 Still reachable memory leaks

After shutting down an application using (D)TLS, memory profilers, such as Valgrind™, may have reported memory leaks categorized as still reachable memory leaks. These leaks were harmless and could not lead to unbounded memory growth. This problem has been fixed.

[RTI Issue ID COREPLG-510]

5.2.2 No way to configure TLS 1.3 ciphers

The property tls.cipher.cipher_list applies only to TLS 1.2 communication, which occurs when either DomainParticipant is using a Connext DDS version older than 6.0.1. When both DomainParticipants are using Connext DDS 6.0.1 or later, they use TLS 1.3 communication, and the tls.cipher.cipher_list property does not apply. There was no way to configure the list of ciphers to be used when using TLS 1.3. This problem has been fixed by introducing a new property, tls.cipher.ciphersuites. See the OpenSSL manual page for SSL_CTX_set_ciphersuites for more information on the format of this string.
5.2.2 No way to configure TLS 1.3 ciphers

[RTI Issue ID COREPLG-534]
Chapter 6 Known Issues

6.1 Possible Valgrind still-reachable leaks when loading dynamic libraries

If you load any dynamic libraries, you may see "still reachable" memory leaks in "dlopen" and "dlclose". These leaks are a result of a bug in Valgrind (https://bugs.launchpad.net/ubuntu/+source/valgrind/+bug/1160352).

This issue affects the Core Libraries, Security Plugins, Secure WAN, and TLS Support.

[RTI Issue IDs CORE-9941, SEC-1026, and COREPLG-510]