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Chapter 1  Welcome to RTI Connext DDS Professional

RTI® Connext™ DDS Professional includes these components:

- **RTI Connext Messaging**
  - **RTI Core Libraries and Utilities** provide publish-subscribe networking middleware for a wide variety of processors and operating systems. Connext Messaging also includes support for a request-reply communication pattern. The Core Libraries are delivered as linkable binary libraries (target libraries) with development tools and documentation.
  - **RTI Message Service** is publish/subscribe networking middleware that implements the Java Message Service (JMS) specification. Message Service is specifically designed for high-performance distributed applications.
  - **RTI Persistence Service** saves data from Connext publishing applications to memory or permanent storage such as MySQL, so it can be delivered to subscribing applications that join the system at a later time—even if the publishing application has already terminated.
  - **RTI Secure WAN Transport**, like TLS Support, provides secure communication over the Internet. Instead of TLS it uses the Datagram Transport Layer Security (DTLS) protocol, which can be run over UDP.
  - **RTI Shapes Demo** is an application that illustrates the powerful real-time messaging and application integration capabilities of Connext, including data-centric publish/subscribe, real-time Quality of Service, extensible types, fault tolerance and automatic discovery. Shapes Demo is a turnkey, graphical application and does not require any programming.
  - **RTI Spreadsheet Add-in for Microsoft Excel** integrates Connext with Microsoft® Excel®. By using cell functions, Excel can publish and subscribe to topic data and display it in real-time. You can use this live data for formulas, graphs and other Excel features, just like any other regular cell data. (Available for Windows systems only.)
  - **RTI TLS Support**, like TLS Support, provides secure communication over the Internet using the standard Transport Layer Security (TLS) protocol. The transport allows applications to communicate in a way that is designed to prevent eavesdropping, tampering, or data forgery. TLS Support is designed for use with the TCP transport that is included with Connext.
  - **Wireshark** is a network-level analysis tool that can capture RTPS packets, show their contents, and analyze network usage. (Note: For Windows Systems, WinPcap is also included with this component.)

1. Available for download in a separate distribution; not included with the Connext DDS Professional installer.
RTI Connext Integrator:

- **RTI Routing Service** is an out-of-the-box solution for integrating disparate and geographically dispersed systems. It scales Connext applications across domains, LANs and WANs, including firewall and NAT traversal. Routing Service also supports Connext-to-Connext bridging by allowing you to make transformations in the data along the way. This allows unmodified Connext applications to communicate even if they were developed using incompatible interface definitions. This is often the case when integrating new and legacy applications or independently developed systems.

- **RTI Routing Service Adapter SDK** allows you to quickly build and deploy bridges to integrate Connext and non-Connext systems. These bridges automatically inherit advanced Connext capabilities, including automatic discovery of applications; data transformation and filtering; data lifecycle management and support across operating systems; programming languages and network transports. Routing Service Adapter SDK offers an out-of-the-box solution for interfacing with third-party protocols and technology. It includes prebuilt adapters that can be used to interface with third-party Java Message Service (JMS) providers or legacy code written to the network socket API.

- **RTI Real-Time Connect** provides bidirectional integration between Connext and a database. The database can be used to log and persist real-time data and messages, to provide a SQL interface to Connext applications, and for integration between Connext and enterprise applications. Real-Time Connect uses Connext and supports three databases: Oracle Database, Oracle TimesTen In-Memory Database, and MySQL. Real-Time Connect provides low latency messaging—as fast as 43 microseconds between nodes, high throughput—up to 80,000 messages or 950 megabits of data per second, and embedded and real-time operating system support—for use in intelligent devices and sensors.

RTI Connext Tools:

- **RTI Administration Console** is a centralized tool for monitoring and administering your distributed system. Admin Console collects various system health information and summarizes it in one easy-to-read table. You will see the number of hosts participating in your distributed system, the number of RTI services and applications running on those hosts, and whether there are any errors or warnings. You can use Admin Console to remotely administer RTI services (for those services that support remote administration). Admin Console also displays log messages from any RTI services or applications that use RTI Distributed Logger.

- **RTI Analyzer** is a powerful system-level debugging tool that can find Connext objects in a running system, organize them, and display their communication parameters. Analyzer provides an easy way to see the topology of a Connext application and diagnose peer-to-peer communication problems.

- **RTI Distributed Logger** is a library that enables applications to publish their log messages to Connext. The log message data can be visualized with RTI Monitor, a separate GUI application that can run on the same host as your application or on a different host. Since the data is provided in a Connext topic, you can also use rtiddsppy\(^1\) or even write your own visualization tool.

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1. The *rtiddsppy* utility allows you to monitor groups of publications available on any Connext domain. It is provided with the Core Libraries and Utilities.
• **RTI Monitor** provides a detailed, graphical view into your entire Connext application. It displays the Quality of Service (QoS) parameters for every Connext entity in the system as well as detailed statistics on connections, traffic, errors, and resource usage. *Monitor* simplifies troubleshooting and integration.

• **RTI Monitoring Library** is a plug-in that enables Connext applications to provide monitoring data to *Monitor*.

• **RTI Recording Service** can record high-rate data arriving in real time with minimal impact on system behavior. It can reliably record large amounts of real-time data without having prior knowledge of the data-types or topics in the system. *Recording Service* is operating-system and programming-language agnostic, recording data from a heterogeneous networked system running Connext applications. You can also replay the recorded data by injecting it back into the cloud. The replay feature even allows you to change data rates and QoS settings and provides fidelity to within 10 milliseconds of the recorded data rate.

  The *Recording Console* provides a point-and-click interface for *Recording Service*, making it easy to use *Recording Service* for testing algorithms and other processing logic against pre-recorded test data, conducting regression testing from 'golden' data inputs, or recording live data from the field for post-mission analysis.

• **RTI Launcher** is a graphical application that allows you to run and configure any Connext component. It automatically detects which Connext components are installed and enables their launch buttons.

For more information, we recommend these online resources:

• Use the RTI Customer Portal (http://support.rti.com) to download RTI software, access documentation and contact RTI Support. The RTI Customer Portal requires a username and password. You will receive this in the email confirming your purchase. If you do not have this email, please contact license@rti.com. Resetting your login password can be done directly at the RTI Customer Portal.

• The RTI Community website (http://community.rti.com) provides a wealth of knowledge to help you use *RTI Connext DDS*, including:
  • Best Practices
  • Example code for specific features, as well as more complete use-case examples,
  • Solutions to common questions,
  • A glossary,
  • Downloads of experimental software,
  • And more.

• Whitepapers and other articles are available from http://www.rti.com/resources.
Chapter 2  Installation

2.1  Before You Install

If you are about to install a version of Connext DDS Professional that is not license-managed, you must remove any previously installed versions of the same release that are license-managed.

2.2  Installing on a Linux System

Connext DDS Professional’s components (except RTI Secure WAN Transport and RTI TLS Support, which can be downloaded separately) are provided in a single self-extracting file, one per architecture. You do not need to be root to run the self-extracting file. However, if you are installing into root space (such as /opt), then root permission is required. In other words, you must have permission to modify whatever directory you select.

In the following example commands, we refer to version number 5.x.y; the x and y represent part of the version number; use your version number instead.

The installer will guide you through the installation process and allow you to specify an installation location (the default is your $HOME directory)—the directory RTI will be added to the location you specify. This is not a GUI-based installer.

1. Make sure the self-extracting file has execute permission. For example:
   
   chmod a+x RTI_Connext_DDS_Professional-5.x.y-RHEL5_32_lic.sh

2. Run the self-extracting file for your architecture. For example:
   
   ./RTI_Connext_DDS_Professional-5.x.y-RHEL5_32_lic.sh

Assuming you have selected /opt as your installation directory, you will end up with the following components under /opt/RTI. The RTI directory is appended to your installation path automatically. Note: If you want the resulting /opt/RTI directory to be accessible by non-root users, manually change the permission of the directory as follows:

   chmod -R a+x+r /opt/RTI

Components in the Installation Directory (such as /opt/RTI):

- docs_<version>/RTI_Connext_DDS_Professional_GettingStarted.pdf — This document.
- installers_<version>/Wireshark_<version> — This directory contains a compressed distribution (.tar.gz) file for Wireshark and the Wireshark Getting Started Guide.
• **ndds.<version>** — This directory includes the Connext Core Libraries and Utilities, Distributed Logger, Message Service, Monitoring Library, and Persistence Service.

• **RTI_Admin_Console <version>**

• **RTI_Analyzer_<version>**

• **RTI_Launcher_<version>**

• **RTI_Monitor_<version>**

• **RTI_Real-Time.Connect_<version>**

• **RTI_Recording_Service_<version>**

• **RTI_Routing_Service_<version>** — This directory includes Routing Service and the Routing Service Adapter SDK.

• **rti_set_bash_<version>** — You can run the “source” command with this filename to set some of the environment variables in bash.

• **rti_set_tcsh_<version>** — You can run the “source” command with this filename to set some of the environment variables in tcsh.

• **RTI_Shapes_Demo_<version>**

3. You will be asked if you want to open the Getting Started Guide. Enter either y (for yes) or n (for no). To view the Getting Started Guide, you must have an application capable of reading PDF documents, such as Evince.

4. You will also be asked if you want to start Launcher. Enter either y (for yes) or n (for no). To run Launcher, you must be running a graphical environment (such as X11, GNOME or KDE). See the RTI Launcher Getting Started Guide (<installation directory>/RTI_Launcher_<version>/RTI_Launcher_GettingStarted.pdf).

5. Optionally, install Wireshark:

   Wireshark is not automatically installed because doing so requires root privilege. You will find its installer in the installers_<version>/Wireshark_<version> directory. See the installation instructions in installers_<version>/Wireshark_<version>/RTI_Wireshark_GettingStarted.pdf.


7. See Installing the License File (Section 2.4).

**After Installation:**

- See the documentation for each component. Each of the components may have Release Notes, a Getting Started Guide or Installation Guide, and a User’s Manual.

While you can skip the installation instructions in each component’s Getting Started or Installation Guide, please read the rest of the document. These documents may describe other required steps for setting up the components.


- Launcher provides a convenient way to run and configure all of your Connext DDS Professional components. See the RTI Launcher Getting Started Guide (<installation directory>/RTI_Launcher_<version>/RTI_Launcher_GettingStarted.pdf).
To build and run your first Connext application, see Chapter 3 in the RTI Core Libraries and Utilities Getting Started Guide.

2.3 Installing on a Windows System

Connext DDS Professional’s components are provided in a single self-extracting file, one per architecture (except for TLS Support and Secure WAN Transport, which can be downloaded separately.)

Connext DDS Professional is provided as an installer, one for 32-bit Windows architectures and another for 64-bit Windows architectures. You do not need to have administrator privilege to run the installer.

If you run the installer with administrator privilege, Connext DDS Professional will be installed for all users on the same machine.

If you run the installer without administrator privilege, Connext DDS Professional will be installed for the current user only. The Real-Time Connext Daemons will be installed, but not as Windows services.

Note: If you need to install both the 32- and 64-bit versions on the same machine, see Section 2.3.1 before continuing with the installation instructions below.

1. Open the .exe file to run the installer, which will guide you through the installation process and allow you to select an installation directory.

The default installation directory is C:\Program Files\RTI if you have administrator privilege, or C:\Documents and Settings\<user>\My Documents\RTI if you do not have administrator privilege.
You will end up with the following components in your installation directory:

- **docs <version>\RTI_Connext_DDS_Professional_Getting Started.pdf** — This document.
- **installers <version>**
  - **Microsoft Redist** — This directory contains installers for the Microsoft Visual C++ 2005 Service Pack 1 Redistributable Package MFC Security Update. You will need the x86 version if you plan to use RTI Launcher.
  - **Spreadsheet Add-in for Microsoft Excel <version>** — This directory contains the installer for RTI Spreadsheet Add-in for Microsoft Excel and its Getting Started Guide.
  - **Wireshark <version>** — This directory contains the installer for Wireshark and its Getting Started Guide.
  - **ndds.<version>** — This directory includes Core Libraries and Utilities, Distributed Logger, Message Service, Monitoring Library, and Persistence Service.
- **RTI Admin Console <version>**
- **RTI Analyzer <version>**
- **RTI Real-Time Connect <version>**
- **RTI Recording Service <version>**
- **RTI Shapes Demo <version>**
- **RTI_Launcher_<version>**
- **RTI_Monitor_<version>**
- **RTI_Routing_Service <version>** — This directory includes Routing Service and the Routing Service Adapter SDK.
- **rti_set_env_<version>.bat** — You can use this batch file to set some of the environment variables.
- **uninstall_RTI_Connext_DDS_Professional_<version>.exe**

2. Optionally, install Spreadsheet Add-in for Microsoft Excel:
   
   Spreadsheet Add-in for Microsoft Excel is not automatically installed because doing so requires administrator privilege. You will find its installer in the installers <version>\RTI Spreadsheet Add-in for Microsoft Excel <version> directory.

   See the installation instructions in installers <version>\RTI Spreadsheet Add-in for Microsoft Excel <version>\RTI_Spreadsheet_Addin_GettingStarted.pdf.

3. Optionally, install Wireshark:
   
   Wireshark is not automatically installed because doing so requires administrator privilege. You will find its installer in the installers <version>\Wireshark <version> directory.

   See the installation instructions in:
   installers <version>\Wireshark <version>\RTI_Wireshark_GettingStarted.pdf.

   
   You may download them from the RTI Support Portal: https://support.rti.com/. Enter your username and password, then select the Downloads tab.

5. See Installing the License File (Section 2.4).
After Installation:

- See the documentation for each component. Each of the components may have Release Notes, a Getting Started Guide or Installation Guide, and a User’s Manual.

You can access the documentation for each component from the Start menu:

- RTI Connext <version>
  - RTI Connext DDS Professional <version> Command Prompt
  - RTI Connext DDS Professional <version> Getting Started Guide (this document)
  - RTI Launcher <version>
  - Uninstall RTI Connext DDS Professional <version>
  - RTI Connext Messaging <version> Components
    - RTI Core Libraries and Utilities <version>
    - RTI Message Service <version>
    - RTI Persistence Service <version>
    - RTI Shapes Demo <version>
  - RTI Connext Integrator <version> Components
    - RTI Real-Time Connect <version>
    - RTI Routing Service <version>
  - RTI Connext Tools <version> Components
    - RTI Administration Console <version>
    - RTI Analyzer <version>
    - RTI Distributed Logger <version>
    - RTI Monitor <version>
    - RTI Monitoring Library <version>
    - RTI Recording Service <version>

While you can skip the installation instructions in each component’s Getting Started or Installation Guide, please read the rest of the document. These documents may describe other required steps for setting up the components.

One of the first documents to read is the RTI Core Libraries and Utilities Getting Started Guide.

- Launcher provides a convenient way to run and configure all of your Connext DDS Professional components. See the RTI Launcher Getting Started Guide (installation directory)/RTI_Launcher_<version>/RTI_Launcher_GettingStarted.pdf).

- To build and run your first Connext application, see Chapter 3 in the RTI Core Libraries and Utilities Getting Started Guide.

2.3.1 Installing 32-bit and 64-bit Packages on the Same Machine

This section describes a special situation not applicable to most users.

If you need to install both the 32-bit and 64-bit packages on the same machine (for example, if you need 32-bit and 64-bit libraries on the same machine for cross compilation), we recommend installing both packages under the same directory.
Note: The 64-bit libraries for Real-Time Connect, Persistence Service, and Routing Service cannot be used on a 32-bit machine. Therefore, if you run the 64-bit version of the Connext DDS Professional installer on a 32-bit machine, Real-Time Connect, Persistence Service, and Routing Service will not be installed. In this situation, if you had previously installed the 32-bit version of these services, they would still be present.

2.4 Installing the License File

You will receive a license file in an email from RTI.

To install the license file, follow these steps:

1. Put the license file named rti_license.dat in the top-level directory where you installed Connext DDS Professional (such as /opt/rti on Linux systems or C:\Program Files\RTI on Windows systems).

2. Set the environment variable RTI_LICENSE_FILE to the full path of the license file, including the filename (such as /opt/rti/rti_license.dat on Linux systems or C:\Program Files\RTI\rti_license.dat on Windows systems).

If you have any problems with your license file, please email support@rti.com.

Note: Even if your distribution of Connext DDS Professional is not license-managed, you always need a license file to run Analyzer, Monitor, and Spreadsheet Add-in for Microsoft Excel (available for Windows systems only).

2.5 Uninstalling Connext DDS Professional

On a Linux System:

No uninstaller is provided for Connext DDS Professional on Linux systems. Simply remove the directories that you want to uninstall.

To remove the entire contents of the installation directory, enter the following (if you changed any files that you want to save, copy them to a new location first):

```
rm -rf <installation directory>
```

On a Windows System:

The Connext DDS Professional uninstaller will remove all the components that were previously installed by the Connext DDS Professional installer. It will remove both 32-bit and 64-bit installations, as well as all files that you added to any of the component directories.

Run the uninstaller by selecting Start, RTI Connext <version>, Uninstall RTI Connext DDS Professional <version>.

This will not uninstall Wireshark or Spreadsheet Add-in for Microsoft Excel, since they were not installed by the Connext DDS Professional installer. To uninstall these two components, see the instructions in their individual Getting Started Guides.