

# *RTI Connex DDS Professional*

## **Getting Started Guide**

Version 5.1.0



Your systems. Working as one.



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# Chapter 1 Welcome to RTI Connexst DDS Professional

RTI® Connexst™ DDS Professional includes these components:

❑ *RTI Connexst Messaging:*

- **RTI Core Libraries and Utilities** provide publish-subscribe networking middleware for a wide variety of processors and operating systems. *Connexst 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 *Connexst* 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<sup>1</sup>**, 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 *Connexst*, 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 *Connexst* 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<sup>1</sup>** 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 *Connexst*.
- **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.)

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1. Available for download in a separate distribution; not included with the *Connexst DDS Professional* installer.

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❑ *RTI Connexst Integrator:*

- **RTI Routing Service** is an out-of-the-box solution for integrating disparate and geographically dispersed systems. It scales *Connexst* applications across domains, LANs and WANs, including firewall and NAT traversal. *Routing Service* also supports *Connexst-to-Connexst* bridging by allowing you to make transformations in the data along the way. This allows unmodified *Connexst* 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 *Connexst* and non-*Connexst* systems. These bridges automatically inherit advanced *Connexst* 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 *Connexst* and a database. The database can be used to log and persist real-time data and messages, to provide a SQL interface to *Connexst* applications, and for integration between *Connexst* and enterprise applications. *Real-Time Connect* uses *Connexst* 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 Connexst 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 *Connexst* objects in a running system, organize them, and display their communication parameters. *Analyzer* provides an easy way to see the topology of a *Connexst* application and diagnose peer-to-peer communication problems.
- **RTI Distributed Logger** is a library that enables applications to publish their log messages to *Connexst*. 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 *Connexst* topic, you can also use *rtiddsspy*<sup>1</sup> or even write your own visualization tool.

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1. The *rtiddsspy* utility allows you to monitor groups of publications available on any *Connexst* domain. It is provided with the *Core Libraries and Utilities*.

- **RTI Monitor** provides a detailed, graphical view into your entire *Connex*t application. It displays the Quality of Service (QoS) parameters for every *Connex*t 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 *Connex*t 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 *Connex*t 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 apply *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 *Connex*t component. It automatically detects which *Connex*t 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](mailto: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 Connex*t 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

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### 2.1 Before You Install

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

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### 2.2 Installing on a Linux System

*Connex 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 *Connexx 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\_tclsh\_<version>** — You can run the “source” command with this filename to set some of the environment variables in tclsh.
  - **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`.
  6. Optionally, download and install *Secure WAN Transport* and *TLS Support*.  
You may download them from the RTI Support Portal: <https://support.rti.com/>. Enter your username and password, then select the Downloads tab.
  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.](#)

One of the first documents to read is the *RTI Core Libraries and Utilities Getting Started Guide*: (`<installation directory>/ndds.<version>/doc/pdf/RTI_CoreLibrariesAndUtilities_GettingStarted.pdf`).

- ❑ *Launcher* provides a convenient way to run and configure all of your *Connexx 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 *Connex* application, see Chapter 3 in the *RTI Core Libraries and Utilities Getting Started Guide*.

## 2.3 Installing on a Windows System

*Connex* 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.)

*Connex* 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, *Connex* DDS Professional will be installed for all users on the same machine.

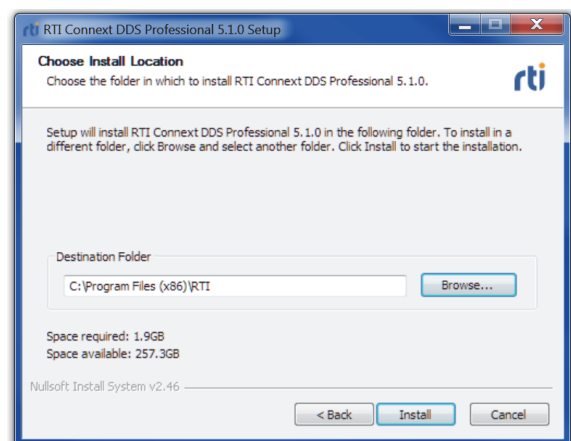
If you run the installer without administrator privilege, *Connex* DDS Professional will be installed for the current user only. The Real-Time Connex Daemons will be installed, but not as Windows services.

**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\_GettingStarted.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**.
  4. Optionally, download and install *Secure WAN Transport* and *TLS Support*.  
 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 Connex <version>**
  - **RTI Connex DDS Professional <version> Command Prompt**
  - **RTI Connex DDS Professional <version> Getting Started Guide** (*this document*)
  - **RTI Launcher <version>**
  - **Uninstall RTI Connex DDS Professional <version>**
  - **RTI Connex Messaging <version> Components**
    - **RTI Core Libraries and Utilities <version>**
    - **RTI Message Service <version>**
    - **RTI Persistence Service <version>**
    - **RTI Shapes Demo <version>**
  - **RTI Connex Integrator <version> Components**
    - **RTI Real-Time Connect <version>**
    - **RTI Routing Service <version>**
  - **RTI Connex 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 *Connex 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 *Connex* 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 *Connexx 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.

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## 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 *Connexx 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 *Connexx 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).

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## 2.5 Uninstalling Connexx DDS Professional

**On a Linux System:**

No uninstaller is provided for *Connexx 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 *Connexx DDS Professional* uninstaller will remove all the components that were previously installed by the *Connexx 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 Connexx <version>, Uninstall RTI Connexx DDS Professional <version>**.

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