

RTI Queuing Service

Getting Started Guide

Version 6.0.1



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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/>).

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Chapter 1 Welcome to RTI Queuing Service

RTI® Queuing Service is a broker that provides a queuing communication model in which a sample is stored in a queue until it is consumed by one QueueConsumer. If there are no QueueConsumers available when the sample is sent, the sample is kept in the queue until a QueueConsumer is available to process it. If a QueueConsumer receives a sample and does not acknowledge it before a specified amount of time or acknowledges it negatively, the sample will be redelivered to a different QueueConsumer.

Queuing Service provides an “at-most-once” and “at-least once” delivery semantic.

By default, *Queuing Service* keeps the samples in memory. To provide fault tolerance, *Queuing Service* can be configured to keep the samples on disk.

For high availability, *Queuing Service* provides mechanisms to replicate its state so that samples can survive the loss of any particular service and/or computer.

1.1 Paths Mentioned in Documentation

The documentation refers to:

- **<NDDSHOME>**

This refers to the installation directory for *RTI® Connex® DDS*. The default installation paths are:

- macOS® systems:
/Applications/rti_connex_dds-6.0.1
- Linux systems, non-*root* user:
/home/<your user name>/rti_connex_dds-6.0.1
- Linux systems, *root* user:
/opt/rti_connex_dds-6.0.1

- Windows® systems, user without Administrator privileges:
`<your home directory>\rti_connex_tdds-6.0.1`
- Windows systems, user with Administrator privileges:
`C:\Program Files\rti_connex_tdds-6.0.1`

You may also see `$NDDSHOME` or `%NDDSHOME%`, which refers to an environment variable set to the installation path.

Wherever you see `<NDDSHOME>` used in a path, replace it with your installation path.

Note for Windows Users: When using a command prompt to enter a command that includes the path `C:\Program Files` (or any directory name that has a space), enclose the path in quotation marks. For example:

```
"C:\Program Files\rti_connex_tdds-6.0.1\bin\rtiddsgen"
```

Or if you have defined the `NDDSHOME` environment variable:

```
"%NDDSHOME%\bin\rtiddsgen"
```

- *<path to examples>*

By default, examples are copied into your home directory the first time you run *RTI Launcher* or any script in `<NDDSHOME>/bin`. This document refers to the location of the copied examples as *<path to examples>*.

Wherever you see *<path to examples>*, replace it with the appropriate path.

Default path to the examples:

- macOS systems: `/Users/<your user name>/rti_workspace/6.0.1/examples`
- Linux systems: `/home/<your user name>/rti_workspace/6.0.1/examples`
- Windows systems: `<your Windows documents folder>\rti_workspace\6.0.1\examples`

Where 'your Windows documents folder' depends on your version of Windows. For example, on Windows 10, the folder is `C:\Users\<your user name>\Documents`.

Note: You can specify a different location for `rti_workspace`. You can also specify that you do not want the examples copied to the workspace. For details, see *Controlling Location for RTI Workspace and Copying of Examples* in the *RTI Connex TDDS Installation Guide*.

Chapter 2 Installing Queuing Service

This chapter describes:

- [2.1 Installing on a UNIX-Based System below](#)
- [2.2 Installing on a Windows System on the next page](#)

2.1 Installing on a UNIX-Based System

Install *Queuing Service* on top of *Connex DDS*. There are two ways to install it, from *RTI Launcher* or from the command line.

From *RTI Launcher*:

1. Start *RTI Launcher* from the command line:

```
cd <NDDSHOME>/bin  
./rtilauncher
```

<NDDSHOME> is described in [1.1 Paths Mentioned in Documentation on page 1](#).

2. From the **Configuration** tab, select **Install RTI Packages**.
3. In the resulting dialog, use the + sign to add the **.rtipkg** file that you want to install.
4. Click **Install**.

From the command line:

```
cd <NDDSHOME>/bin  
./rtipkginstall <path to .rtipkg file>
```

If you want to install *Queuing Service* without user interaction (unattended mode), use the **-u** flag when installing from the command line:

```
cd <NDDSHOME>/bin  
./rtipkginstall -u <path to .rtipkg file>
```

Queuing Service will be installed in the <NDDSHOME> directory (see [1.1 Paths Mentioned in Documentation on page 1](#)).

2.2 Installing on a Windows System

Install *Queuing Service* on top of *Connex DDS*. There are two ways to install it, from *RTI Launcher* or from the command line.

From *RTI Launcher*:

1. Start *RTI Launcher* from the Start menu or the command line:

```
cd <NDDSHOME>\bin
rtilauncher
```

<NDDSHOME> is described in [1.1 Paths Mentioned in Documentation on page 1](#).

2. From the **Configuration** tab, select **Install RTI Packages**.
3. In the resulting dialog, use the + sign to add the **.rtipkg** file that you want to install.
4. Click **Install**.

From the command line:

```
cd <NDDSHOME>\bin
rtipkginstall <path to .rtipkg file>
```

If you want to install *Queuing Service* without user interaction (unattended mode), use the **-u** flag when installing from the command line:

```
cd <NDDSHOME>/bin
./rtipkginstall -u <path to .rtipkg file>
```

Queuing Service will be installed in the <NDDSHOME> directory (see [1.1 Paths Mentioned in Documentation on page 1](#)).

Chapter 3 Using the Examples

Queuing Service includes two examples to show its most relevant functionality:

- **hello_world**: A Hello World application, in which is shown how to send/receive samples from/to *Queuing Service*. The example also shows how to use other relevant features such as persistence and replication.
- **remote_config**: A Remote Configuration example, in which is shown how to remotely create/delete resources, query their status, get a message, or flushing SharedReaderQueues. This example uses the Request/Reply API.

The examples are in `<path to examples>/queuing_service/<language>`, where `<path to examples>` is described in [1.1 Paths Mentioned in Documentation on page 1](#) and `<language>` is `c++` for C++ or `cs` for .NET. There are some differences between the versions:

- The .NET **hello_world** example uses the *Queuing Service* wrapper API, while the C++ example uses *DataWriters* and *DataReaders* directly to interact with *Queuing Service*, since the wrapper API is not available for C++.
- The .NET **hello_world** example uses two SharedReaderQueues: a request and a reply SharedReaderQueue. The C++ example only uses a request SharedReaderQueue.
- The .NET **hello_world** example is also a performance test, measuring requests and replies per second, The C++ version sends one message per second.

By default, the .NET **hello_world** example's SharedReaderQueues use different types than the C++ example.

Because of these differences, you will need to make some modifications in the examples in order for a **hello_world** C++ Producer to interoperate with a **hello_world** .NET Replier, and vice-versa.

To run the examples, please follow the instructions in the **README.txt** file included in the example's directory.

Chapter 4 Running Queuing Service

Queuing Service runs as a separate application. The script to run the executable is in `<NDDSHOME>/bin`. There are four ways to start *Queuing Service*:

- [4.1 Starting from Launcher below](#)
- [4.2 Starting Manually from the Command Line on the next page](#)
- [4.3 Using Queuing Service as a Windows Service on page 9](#)

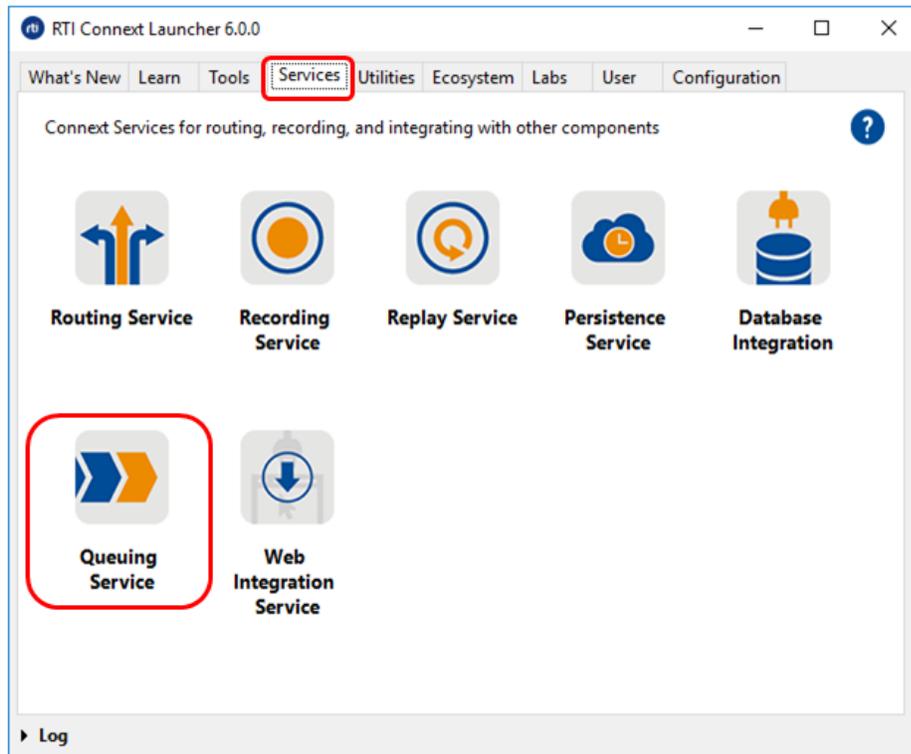
If you are starting *Queuing Service* as a Windows Service, also read [4.3.3 Notes when Running as a Windows Service on page 10](#).

4.1 Starting from Launcher

1. Start *RTI Launcher* from the Start menu (on Windows systems) or on the command line, type:

```
<NDDSHOME>/bin/rtilauncher
```

2. From the **Services** tab, select **Queuing Service**.



4.2 Starting Manually from the Command Line

To start **Queuing Service**, enter:

```
cd <NDDSHOME>
bin/rtiqueuingervice [options]
```

Example:

```
cd <NDDSHOME>
bin/rtiqueuingervice -cfgFile example.xml -cfgName QueuingService_1
```

[Table 4.1 RTI Queuing Service Command-Line Options](#) describes the command-line options.

Table 4.1 RTI Queuing Service Command-Line Options

Option	Description
<code>-appName <name></code>	<p>Assigns a name to the execution of <i>Queuing Service</i>.</p> <p>Remote commands will refer to the queuing service using this name.</p> <p>In addition, the name of <i>DomainParticipants</i> created by <i>Queuing Service</i> will be based on this name.</p> <p>Default: The name given with <code>-cfgName</code>, if present, otherwise it is <code>RTI_Queuing_Service</code>.</p>

Table 4.1 RTI Queuing Service Command-Line Options

Option	Description
-cfgFile <name>	<p>Specifies a configuration file to be loaded.</p> <p>This parameter is required.</p> <p>See Section 3.1 How to Load the XML Configuration from a File in the <i>Queuing Service User's Manual</i>.</p>
-cfgName <name>	<p>Specifies a configuration name. <i>Queuing Service</i> will look for a matching <queuing_service> tag in the configuration file.</p> <p>This parameter is required unless -cfgRemote is used.</p>
-cfgRemote	<p>Specifies that the initial configuration of the service must be obtained remotely from other running instances.</p> <p>Using this option also requires the use of -remoteAdministrationDomainId to enable remote administration, because the initial configuration will be received in the remote administration domain ID.</p> <p>If you use this option and -cfgName, the service will wait until a configuration with that name is received. Otherwise, the service will use the first configuration that it receives.</p> <p>If the service does not receive the initial configuration after a configurable timeout (see -cfgRemoteTimeout), it will load the configuration from the input configuration file(s).</p>
-cfgRemoteTimeout <n>	<p>Specifies the maximum amount of time, in seconds, that <i>Queuing Service</i> will wait for an initial configuration when using -cfgRemote.</p> <p>Default: 20 seconds</p>
-daemon	<p>Runs <i>Queuing Service</i> as a daemon/Windows service. When this flag is present, <i>Queuing Service</i> will start in the background. Note that some systems may require special privileges to do this.</p>
-domainIdBase <ID>	<p>Sets the base domain ID.</p> <p>This value is added to the domain IDs in the configuration file. For example, if you set -domainIdBase to 50 and use domainIDs 0 and 1 in the configuration file, then <i>Queuing Service</i> will use domains 50 and 51.</p> <p>Default: 0</p>
-heapSnapshotPeriod	<p>Enables heap monitoring.</p> <p><i>Queuing Service</i> will generate a heap snapshot every <sec>.</p> <p>Default: heap monitoring is disabled.</p>
-heapSnapshotDir	<p>When heap monitoring is enabled, this parameter configures the directory where the snapshots will be stored. The snapshot filename format is RTI_<configurationName><processId><index>.log.</p> <p>Default: current working directory</p>
-help	<p>Displays help information.</p>
-remoteAdministrationDomainId <ID>	<p>Enables remote administration and sets the domain ID for remote communication.</p> <p>When remote administration is enabled, <i>Queuing Service</i> will create a <i>DomainParticipant</i>, <i>Publisher</i>, <i>Subscriber</i>, <i>DataWriter</i>, and <i>DataReader</i> in the designated domain.</p> <p>See Chapter 5, Administering Queuing Service from a Remote Location, in the <i>Queuing Service User's Manual</i>.</p> <p>This option overrides the value of the tag <domain_id> within a <administration> tag.</p> <p>This parameter is required when using -cfgRemote.</p> <p>Default: Remote administration is not enabled unless it is enabled from the XML file.</p>

Table 4.1 RTI Queuing Service Command-Line Options

Option	Description
-persistentFilePrefix	Specifies a name prefix to use with all files created by <i>Queuing Service</i> . This option overrides the value of the tag <code><file_prefix></code> within <code><persistence_settings>/<filesystem></code> . Default: Value in <code><persistence_settings>/<filesystem>/<file_prefix></code> .
-persistentStoragePath	Configures the directory for persistent storage. This option overrides the value of the tag <code><directory></code> within <code><persistence_settings>/<filesystem></code> . Default: Value in <code><persistence_settings>/<filesystem>/<directory></code> .
-var <name>=<value>	Sets the value of the variable <code><name></code> . This variable can be referenced within the XML configuration files using the <code>\$(<name>)</code> notation. See Section 3.4, Using Variables in XML, in the <i>Queuing Service User's Manual</i> for more information on configuration variables. You may have more than one <code>-var</code> flag on the command line. On Windows platforms, you will need to put quotation marks around the variable name and value, like this: <code>-var "MY_VAR=myvalue"</code>
-verbosity <n>	Controls what type of messages are logged: 0 - Silent 1 - Exceptions (<i>Connex DDS</i> and <i>Queuing Service</i>) (default) 2 - Warnings (<i>Queuing Service</i>) 3 - Information (<i>Queuing Service</i>) 4 - Warnings (<i>Connex DDS</i> and <i>Queuing Service</i>) 5 - Tracing (<i>Queuing Service</i>) 6 - Tracing (<i>Connex DDS</i> and <i>Queuing Service</i>) Each verbosity level, <code>n</code> , includes all the verbosity levels smaller than <code>n</code> .
-version	Prints the <i>Queuing Service</i> version number.

4.3 Using Queuing Service as a Windows Service

Windows Services automatically run in the background when the system reboots.

4.3.1 Enabling Queuing Service to Run as a Windows Service

If you want to run *Queuing Service* as a Windows Service, you must install it as such before running it. To install it as a Windows Service, run the following command in a terminal with Administrator privileges:

```
<NDDSHOME>\bin\rtiqueuingervice -installService
```

By default, *Queuing Service* is installed with the service name `rtiqueuingervice523`. If you want to install it with a different service name, you can use the `-serviceName` flag. For instance (you would enter this all on one line):

```
<NDDSHOME>\bin\rtiqueuingervice -installService -serviceName mycustomservicename
```

Using the **-serviceName** parameter with different names allows you to install multiple *Queuing Service* instances on the same host.

4.3.2 Running RTI Queuing Service as a Windows Service

If you added *Queuing Service* as a Windows Service and want to run it without rebooting, you can start it as a service from the command line with the Windows **sc** utility:

```
sc <serviceName> start
```

By default, it will start *Queuing Service* with the "defaultService" configuration that is stored in `<NDDSHOME>\resource\xml\RTI_QUEUEING_SERVICE.xml`. This configuration contains a service running with an empty SharedSubscriber with remote administration and monitoring enabled.

If you want to start *Queuing Service* with different parameters, you can use the utility **nssm**. You can specify the parameters from the command line by setting the option **AppParameters**. For example (you would enter this all on one line):

```
%NDDSHOME%\resource\app\bin\x64Win64VS2008\nssm.exe set <serviceName> AppParameters "<queuing service arguments>"
```

For more information and examples, see [4.3.3 Notes when Running as a Windows Service below](#).

Additionally, you can start *Queuing Service* from the Windows Services Control Manager. From the Start Menu, select **Control Panel, Administrative Services, Services**. Click on the service in the list, then right-click to select **Start**.

4.3.3 Notes when Running as a Windows Service

Here are some things to consider when running *Queuing Service* as a Windows Service:

- All AppParameters arguments must be enclosed in quotation marks.
- To refer to variables in the XML configuration file, use the *Queuing Service* command-line option **-var** to set the variable's value. The syntax for referring to a variable in the XML file is:

```
<name>$(NAME) </name>
```

- For the AppParameters passed to nssm, use **-var** like this:

```
-var MY_DOMAIN=10
```

For example (you would enter this all on one line):

```
%NDDSHOME%\resource\app\bin\x64Win64VS2008\nssm.exe set rtiqueuingervice523
AppParameters
"-cfgFile \"C:\dir with spaces\qsconf-with-vars.xml\"
-cfgName MyCustomConf -var MY_DOMAIN=10"
```

- If a variable value includes spaces, you must enclose the value in escaped quotes. For example (you would enter this all on one line):

```
%NDDSHOME%\resource\app\bin\x64Win64VS2008\nssm.exe
set rtiqueuingervice523 AppParameters
"-cfgFile \"C:\dir with spaces\qsconf-with-vars.xml\"
-cfgName MyCustomConf -var \"NAME=My QS name\""
```

- If you use environment variables instead of the **-var** command-line option, you may need to restart your Windows machine.
- If you specify **-cfgFile** in the Start Parameters field, you must use the full path to the file.
- Some versions of Windows do not allow Windows Services to communicate with other services/applications using shared memory. For this reason, if you plan to run *Queuing Service* as Windows Service, you should disable the shared-memory transport in all the DomainParticipants created by *Queuing Service* and in the applications communicating with *Queuing Service*. For more information on setting builtin transports, see the *RTI Connex DDS Core Libraries User's Manual* (see the section, "Builtin Transport Plugins").
- In some scenarios, you may need to add a multicast address (e.g., builtin.udpv4://239.255.0.1) to your discovery peers. For details on setting the discovery peers, see the *RTI Connex DDS Core Libraries Getting Started Guide* (see the section, "How to Set Your Discovery Peers").

4.3.4 Stopping Queuing Service when it is Running as a Windows Service

To stop *Queuing Service* when it is running as a Windows Service, use this command:

```
sc rtiqueuingervice523 stop
```

You can also start/stop *Queuing Service* from the Windows Services Control Manager. From the Start menu, select **Control Panel, Administrative Services, Services**. Click on the service in the list, then right-click to select **Start** or **Stop**.

4.3.5 Disabling Queuing Service from Running as a Windows Service

To remove *Queuing Service* from the list of Windows Services on your system, run this command in a terminal with Administrator privileges:

```
<NDDSHOME>\bin\rtiqueuingervice -uninstallService
```

By default, the service **rtiqueuingervice523** is uninstalled. If you want to uninstall a different service instance, add the **-serviceName** option to the above command.