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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.
Chapter 2 Installing Queuing Service

This chapter describes:

- Paths Mentioned in Documentation (Section 2.1)
- Installing on a UNIX-Based System (Section 2.2)
- Installing on a Windows System (Section 2.3)

2.1 Paths Mentioned in Documentation

The documentation refers to:

- `<NDDSHOME>`
  
  This refers to the installation directory for Connext DDS.
  
  The default installation paths are:
  
  - Mac OS X systems:
    `/Applications/rti_connext_dds-version`
  
  - UNIX-based systems, non-root user:
    `/home/your user name/rti_connext_dds-version`
  
  - UNIX-based systems, root user:
    `/opt/rti_connext_dds-version`
  
  - Windows systems, user without Administrator privileges:
    `<your home directory>\rti_connext_dds-version`
  
  - Windows systems, user with Administrator privileges:
    `C:\Program Files\rti_connext_dds-version` (for 64-bits machines) or
    `C:\Program Files (x86)\rti_connext_dds-version` (for 32-bit machines)

  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_connext_dds-version\bin\rtiddsgen"

or if you have defined the NDDSHOME environment variable:
"%NDDSHOME%\bin\rtiddsgen"

▌ RTI Workspace directory, rti_workspace

The RTI Workspace is where all configuration files for the applications and example files are located. All configuration files and examples are copied here the first time you run RTI Launcher or any script in <NDDSHOME>/bin. The default path to the RTI Workspace directory is:

- Mac OS X systems:
  /Users/your user name/rti_workspace
- UNIX-based systems:
  /home/your user name/rti_workspace
- Windows systems:
  your Windows documents folder\rti_workspace

Note: 'your Windows documents folder' depends on your version of Windows. For example, on Windows 7, the folder is C:\Users\your user name\Documents; on Windows Server 2003, the folder is C:\Documents and Settings\your user name\Documents.

You can specify a different location for the rti_workspace directory. See the RTI Connect DDS Core Libraries Getting Started Guide for instructions.

▌ <path to examples>

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

By default, the examples are copied to rti_workspace/version/examples

So the paths are:

- Mac OS X systems:
  /Users/your user name/rti_workspace/version/examples
- UNIX-based systems:
  /home/your user name/rti_workspace/version/examples
- Windows systems:
  your Windows documents folder\rti_workspace\version\examples

Note: 'your Windows documents folder' is described above.

You can specify that you do not want the examples copied to the workspace. See the RTI Connect DDS Core Libraries Getting Started Guide for instructions.
2.2 Installing on a UNIX-Based System

Install Queuing Service on top of Connext 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
./rti launcher
   ```
   <NDDSHOME> is described in Paths Mentioned in Documentation (Section 2.1).

2. From the Utilities tab, select RTI Package Installer.

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
./rtipkg install <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
./rtipkg install -u <path to .rtipkg file>
```

Queuing Service will be installed in the <NDDSHOME> directory (see Paths Mentioned in Documentation (Section 2.1)).

2.3 Installing on a Windows System

Install RTI Queuing Service on top of RTI Connext™ 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 Paths Mentioned in Documentation (Section 2.1).

2. From the Services tab, select Queuing Service.

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 Paths Mentioned in Documentation (Section 2.1)).
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 Paths Mentioned in Documentation (Section 2.1) 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:

- Starting from Launcher (Section 4.1)
- Starting Manually from the Command Line (Section 4.2)
- Using Queuing Service as a Windows Service (Section 4.3)

If you are starting Queuing Service as a Windows Service, also read Notes when Running as a Windows Service (Section 4.3.3).

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:

```bash
cd <NDDSHOME>
bin/rtiqueuingservice [options]
```

**Example:**

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

Table 4.1 describes the command-line options.

#### Table 4.1 RTI Queuing Service Command-Line Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-appName &lt;name&gt;</code></td>
<td>Assigns a name to the execution of Queuing Service. Remote commands will refer to the queuing service using this name. In addition, the name of DomainParticipants created by Queuing Service will be based on this name. Default: The name given with <code>-cfgName</code>, if present, otherwise it is <code>RTI_Queuing_Service</code>.</td>
</tr>
<tr>
<td><code>-cfgFile &lt;name&gt;</code></td>
<td>Specifies a configuration file to be loaded. This parameter is required. See Section 3.1, How to Load the XML Configuration, in the Queuing Service User's Manual.</td>
</tr>
<tr>
<td><code>-cfgName &lt;name&gt;</code></td>
<td>Specifies a configuration name. Queuing Service will look for a matching <code>&lt;queuing_service&gt;</code> tag in the configuration file. This parameter is required unless <code>-cfgRemote</code> is used.</td>
</tr>
<tr>
<td><code>-cfgRemote</code></td>
<td>Specifies that the initial configuration of the service must be obtained remotely from other running instances. Using this option also requires the use of <code>-remoteAdministrationDomainId</code> to enable remote administration, because the initial configuration will be received in the remote administration domain ID. If you use this option and <code>-cfgName</code>, the service will wait until a configuration with that name is received. Otherwise, the service will use the first configuration that it receives. If the service does not receive the initial configuration after a configurable timeout (see <code>-cfgRemoteTimeout</code>), it will load the configuration from the input configuration file(s).</td>
</tr>
<tr>
<td><code>-cfgRemoteTimeout &lt;n&gt;</code></td>
<td>Specifies the maximum amount of time, in seconds, that Queuing Service will wait for an initial configuration when using <code>-cfgRemote</code>. Default: 20 seconds</td>
</tr>
<tr>
<td><code>-daemon</code></td>
<td>Runs Queuing Service as a daemon/Windows service. When this flag is present, Queuing Service will start in the background. Note that some systems may require special privileges to do this.</td>
</tr>
<tr>
<td><code>-domainIdBase &lt;ID&gt;</code></td>
<td>Sets the base domain ID. This value is added to the domain IDs in the configuration file. For example, if you set <code>-domainIdBase</code> to 50 and use domainIDs 0 and 1 in the configuration file, then Queuing Service will use domains 50 and 51. Default: 0</td>
</tr>
<tr>
<td><code>-help</code></td>
<td>Displays help information.</td>
</tr>
</tbody>
</table>
Starting Manually from the Command Line

Table 4.1   RTI Queuing Service Command-Line Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>-remoteAdministrationDomainId</strong>&lt;ID&gt;</td>
<td>Enables remote administration and sets the domain ID for remote communication. When remote administration is enabled, Queuing Service will create a DomainParticipant, Publisher, Subscriber, DataWriter, and DataReader in the designated domain. See Chapter 5, Administering Queuing Service from a Remote Location, in the Queuing Service User’s Manual. This option overrides the value of the tag &lt;domain_id&gt; within a &lt;administration&gt; tag. This parameter is required when using -cfgRemote. Default: Remote administration is not enabled unless it is enabled from the XML file.</td>
</tr>
<tr>
<td><strong>-persistentFilePrefix</strong></td>
<td>Specifies a name prefix to use with all files created by Queuing Service. This option overrides the value of the tag &lt;file_prefix&gt; within &lt;persistence_settings&gt;/&lt;filesystem&gt;. Default: Value in &lt;persistence_settings&gt;/&lt;filesystem&gt;/&lt;file_prefix&gt;.</td>
</tr>
<tr>
<td><strong>-persistentStoragePath</strong></td>
<td>Configures the directory for persistent storage. This option overrides the value of the tag &lt;directory&gt; within &lt;persistence_settings&gt;/&lt;filesystem&gt;. Default: Value in &lt;persistence_settings&gt;/&lt;filesystem&gt;/&lt;directory&gt;.</td>
</tr>
</tbody>
</table>
| **-var <name>=<value>**                   | Sets the value of the variable <name>. This variable can be referenced within the XML configuration files using the $(<name>) notation. See Section 3.4, Using Variables in XML, in the Queuing Service User’s Manual for more information on configuration variables. You may have more than one -var flag on the command line. On Windows platforms, you will need to put quotation marks around the variable name and value, like this: -var "MY_VAR=myvalue"

**-verbosity <n>**                           | Controls what type of messages are logged:

0 - Silent
1 - Exceptions (Connext DDS and Queuing Service) (default)
2 - Warnings (Queuing Service)
3 - Information (Queuing Service)
4 - Warnings (Connext DDS and Queuing Service)
5 - Tracing (Queuing Service)
6 - Tracing (Connext DDS and Queuing Service)

Each verbosity level, n, includes all the verbosity levels smaller than n. |
| **-version**                               | Prints the Queuing Service 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\rtiqueuingservice -installService
```

By default, Queuing Service is installed with the service name `rtiqueuingservice520`. 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\rtiqueuingservice -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_QUEUING_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 Notes when Running as a Windows Service (Section 4.3.3).

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
rtiqueuingservice520 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 rtiqueuingservice520 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 Connext DDS Core Libraries User's Manual (Section 15.1, 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 Connext DDS Core Libraries Getting Started Guide (Section 4.1.2, 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:

```sh
sc rtiqueuingservice520 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:

```sh
<NDDSHOME>\bin\rtiqueuingservice -uninstallService
```

By default, the service rtiqueuingservice520 is uninstalled. If you want to uninstall a different service instance, add the -serviceName option to the above command.