RTI Connext DDS

Components Overview

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RTI Connext DDS Overview

RTI® Connext® DDS is a connectivity framework optimized to meet the stringent requirements of the Industrial Internet of Things (IIoT). It delivers low-latency, real-time Quality of Service (QoS), non-stop availability, reliable multicast, configurable delivery, automatic discovery, multiple level durability, load balancing, security, and interoperability. Its core implementation complies with the Data Distribution Service (DDS) specification from the Object Management Group (OMG). It is supported by a powerful set of RTI Tools and a rich set of RTI Services.

The *RTI Connext DDS* product suite consists of three sub-categories of components: **Libraries, APIs, and Adapters**; **Infrastructure Services**; and **Developer Tools**. For installation instructions, see the *RTI Connext DDS Installation Guide*. Then see the *RTI Connext DDS Core Libraries Getting Started Guide*.

Libraries, APIs, and Adapters

for building DDS-based applications

- **RTI Core Libraries** provide a rich set of APIs/functionality to integrate DDS-based connectivity with applications. They support different communication paradigms and programming interfaces for a wide variety of processors and operating systems.
- **RTI Connext DDS Micro** provides a small-footprint, modular connectivity framework for resource-constrained IIoT systems consisting of devices that have minimal memory, Flash, or CPU power, or no operating system.
- **RTI Connext DDS Cert** is a connectivity framework that enables Industrial (IoT) system architects to build safety-critical IIoT systems of systems. *Connext DDS Cert* is the only off-the-shelf connectivity framework certifiable for the highest levels of the DO-178C standard.

- **RTI Security Plugins** is a robust set of security capabilities, including authentication, encryption, access control and logging for *Connext DDS*. Security Plugins can also be customized through the optional Security Plugins SDK.
- **RTI Transport Layer Security (TLS) Support** provides secure communication over the Internet using the standard 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 DDS*.
- **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 DDS Toolkit for LabVIEW** combines National Instruments® LabVIEW™ and *Connext DDS* to simplify system integration, data communication, network bandwidth management, and redundancy.
- **RTI Connector** provides a simplified *Connext DDS* API in JavaScript, Python, and other languages to easily prototype ideas, create test applications, and integrate with the Connext Databus.

Infrastructure Services

for integrating and scaling systems

- **RTI Routing Service** is an out-of-the-box solution for integrating and scaling DDS-based applications across domains, LANs, and WANs, including firewall and NAT traversal. You can optionally use the RTI Routing Service Adapter SDK to bridge DDS systems with non-DDS systems.
- **RTI Recording and Replay Service** 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. You can also replay the recorded data to replicate the original data flow.
- **RTI Database Integration Service** is the integration of two complementary technologies: data-centric publish-subscribe middleware and relational database management systems (RDBMS). This powerful integration allows your applications to uniformly access data from real-time/embedded and enterprise data sources via *Connext DDS* or via database interfaces.
- **RTI Persistence Service** saves data from *Connext DDS* 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 Web Integration Service** is an out-of-the-box solution which provides a REST/HTTP interface to enable easy integration with Web applications and scripting languages.

- **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.
- **RTI Cloud Discovery Service (Experimental)** is a stand-alone application you can use to deploy *Connext DDS* applications in dynamic environments where UDP/IP multicast is not available. This is typical of wide area networks or some cloud-based environments where the routers and switches may disable IP multicast forwarding.

Developer Tools

for debugging, testing, integrating, optimizing

- **RTI Launcher** is a graphical application that allows you to run and configure any *Connext DDS* component. It automatically detects which components are installed and enables their launch buttons.
- **RTI Code Generator** generates DDS code, makefiles and IDE project from IDL and XML description files of your data type. You can even define multiple data types in the same type-definition file. *Code Generator* greatly accelerates your development effort.
- **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 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 Monitor** provides a detailed, graphical view into your entire *Connext DDS* application. It displays the Quality of Service (QoS) parameters for every DDS entity in the system as well as detailed statistics on connections, traffic, errors, and resource usage. *Monitor* simplifies troubleshooting and integration.
- **RTI Spreadsheet Add-in for Microsoft Excel** integrates *Connext DDS* 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 Shapes Demo** is an application that illustrates the powerful real-time messaging and application integration capabilities of *Connext DDS*, 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 DDS Ping** helps you discover quickly if firewall settings on the network are preventing DDS discovery traffic. Specifically, it checks if the ports needed for DDS discovery are open.

- **RTI DDS Spy** enables inspection of data that applications are publishing. It is a command-line utility that can subscribe to select DDS topics and display data samples it receives to the terminal.
- **Wireshark®**, available at https://www.wireshark.org/, is a network packet analyzer with extensions that analyze *Connext DDS* traffic.
- **RTI Prototyper (Experimental)** can quickly simulate your system components for testing your applications and assessing scalability before development is complete. It enables you to simulate simple scenarios by writing samples and reading them. It also lets you simulate more complex scenarios using the Lua scripting languages. *Prototyper* enables testing and development to happen in parallel.
- **RTI System Designer (Experimental)** allows you to graphically design and configure *Connext DDS* systems. You can use it as a user interface to *XML-Based Application Creation*, a technology that allows you to specify all the aspects of a DDS system in XML format.

Resources

To learn more about each component, see its documentation at https://community.rti.com/documentation.

We also recommend these online resources:

- The RTI Customer Portal (https://support.rti.com) allows you to download RTI software 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 Portal (https://community.rti.com) provides a wealth of knowledge to help you use *Connext DDS*, including:
  - Documentation, at https://community.rti.com/documentation
  - 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,
- Whitepapers and other articles are available from http://www.rti.com/resources.