RTI Connext DDS Cert

First Connectivity Software Designed for Safety-Critical IIoT Systems

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RTI Connext® DDS Cert is a connectivity framework that enables Industrial Internet of Things (IIoT) system architects to build safety-critical systems of systems. Connext DDS Cert is the only off-the-shelf connectivity framework certifiable for the highest levels of the DO-178C standard. Using Connext DDS Cert can save tens of thousands of lines of application software code and millions of dollars in associated certification costs.

Highlights:

Meets stringent certification standards for safety critical systems

Reusable certification evidence available for

- DO-178C DAL A
- ISO 26262 ASIL D
- IEC 61508 SIL 3
- Other safety standards

Eliminates custom communication and networking code

High-level publish/subscribe APIs simplify application logic

Small memory footprint

Bundled source code

Highly portable across operating systems and CPUs

Completely decentralized architecture with no message brokers

UDP multicast for efficient, broad data distribution

Pluggable transport interface for other connection types

Due to demanding requirements, safety-critical systems have traditionally used custom software to communicate between different subsystems, applications and modules. Developing this software, and any necessary certification evidence, is time-consuming and expensive. Production of certification artifacts can take months to years of effort.

Connext DDS Cert provides an off-the-shelf alternative. It is built on the Connext databus and is available with a complete Certification Package for the flight-critical avionics standard DO-178C Design Assurance Level A (DAL A), one of the most stringent safety standards. This package also provides the basis for certification to other standards including IEC 61508 for industrial systems, IEC 62304 for medical devices and ISO 26262 for automotive systems.

Connext DDS Cert replaces traditional low-level networking code with high-level publish/subscribe APIs based on the Object Management Group (OMG) Data Distribution Service (DDS) standard. Modules communicate by simply publishing the data and commands they produce, and subscribing to the data they need. Connext DDS Cert handles all of the communication details including discovery, messaging, routing, redundancy, serialization and state synchronization for late joiners.

Support for well-defined and interoperable interfaces make Connext DDS Cert an ideal foundation for an open architecture – reducing ongoing integration, maintenance and upgrade costs. Its DDS support aligns with many Open Architecture initiatives including the Future Airborne Capability Environment (FACE), UAS Control Segment (UCS) Architecture and Open Mission Systems (OMS).

DDS Standards Compliance

The Connext DDS Cert API and network protocol support the DDS standard. Application code is portable across Connext DDS Cert and other DDS implementations. Connext DDS Cert also interoperates peer-to-peer with Connext DDS Professional, Connext DDS Micro and with other DDS solutions, using RTI Routing Service as a bridge.

Future Airborne Capability Environment (FACE)

Connext DDS Cert supports all of the FACE Operating Systems Segment (OSS) profiles: Security, Safety Base, Safety Extended and General Purpose. It is also compatible with RTI's Transport Services Segment (TSS) Reference Implementation, providing the foundation for a DO-178C certifiable TSS.

Comprehensive Connectivity Solution

Peer-to-peer communication
Connext DDS Cert is completely decentralized for low latency, high throughput and high scalability. Applications directly exchange data in a true peer-to-peer manner – no servers, message brokers or daemon processes act as bottlenecks or single points of failure.

Real-time Quality of Service (QoS)
Applications have comprehensive control over and visibility into real-time behavior including timing, deadlines, resource utilization and system state. QoS can be specified per topic and per subscriber.

Optimized Publish/Subscribe
Data can be reliably multicast to multiple applications and devices for extremely efficient streaming data distribution. With multicast, messages can be routed and filtered by the network switch instead of by the application software.

Wire efficiency
The DDS Real-Time Publish-Subscribe (DDS-RTPS) protocol is extremely wire efficient. Data is sent in a compact binary representation.

Optimized for Small-Footprint Applications

Low memory requirement
The Connext DDS Cert library links with your application. The library size is optimized for small footprint applications and memory allocation is kept to a minimum.

Highly portable
Bundled source code enables developers to port Connext DDS Cert to new operating systems, compilers or processor architectures. RTI Connext DDS Cert has no built-in dependency on operating system services. Applications can be implemented on platforms with minimal operating system capabilities or no operating system at all. Processor support ranges from 16-bit microcontrollers with 32-bit integer support to multicore Intel and PowerPC CPUs. Leading enterprise operating systems, including Linux and Windows, are supported as well to ease application development and testing.

Designed for Safety-Critical Applications

Certification Package
Connext DDS Cert is designed to be certifiable as a component of a complete system undergoing certification to RTCA DO-178C (EUROCAE ED-12C). The optional DO-178C Level A Certification Package is produced in partnership with Verocel, a leader in mission-critical software verification with a proven track record of dozens of DO-178 certifications. All of the certification evidence is contained in a DVD or ISO image with hyperlinks to facilitate navigation.

Small code size
With minimized lines of source code, Connext DDS Cert provides a cost-effective foundation for rigorous certifications.

Deterministic behavior
The code is developed using process guidelines that ensure deterministic behavior. All memory allocation is done at startup and no memory is freed at run-time.

About RTI

Real-Time Innovations (RTI) is the Industrial Internet of Things (IIoT) connectivity company. The RTI Connext® databus is a software framework that shares information in real time, making applications work together as one, integrated system. It connects across field, fog and cloud. Its reliability, security, performance and scalability are proven in the most demanding industrial systems. Deployed systems include medical devices and imaging; wind, hydro and solar power; autonomous planes, trains and cars; traffic control; Oil and Gas; robotics, ships and defense.

RTI lives at the intersection of functional artificial intelligence and pervasive networking[SM].

RTI is the largest vendor of products based on the Object Management Group (OMG) Data Distribution Service™ (DDS) standard. RTI is privately held and headquartered in Sunnyvale, Calif.

rti
Your systems. Working as one.

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