

CAPABILITY BRIEF

Medical Robotics

DRIVING INNOVATION IN MEDICAL ROBOTICS THROUGH DATA CENTRICITY

HIGHLIGHTS

Proven, secure, high-performance, medical-grade connectivity framework for reliable, interoperable data exchange throughout complex medical devices.

True real-time performance in large complex systems via the flexible Quality of Service (QoS) setting available.

Capable of running 1kHz-4kHz control loops and transferring 40GB/s of imaging data throughout the system.

Enables teleoperation with strong QoS that allows for deadlines in communication time.

Built-in DDS security that aligns with FDA cybersecurity guidance to protect data and patient privacy requirements.

DEVELOPING NEXT GENERATION MEDICAL ROBOTICS

Medical robotics – a technology once thought of as science fiction – is now a reality. Medical professionals use robots for everything from surgery and rehabilitation to non-invasive general hospital and pharmacy applications. The medical robotics space is growing at a rapid pace, and developers are looking for ways to innovate while meeting operational demands. These objectives require the following capabilities:

1. The ability to process, analyze and act on high-volume, real-time data with low latency in a redundant, fault-tolerant architecture.
2. The ability to align internal engineering teams (and ecosystems partners) on a single common architecture with well-defined interfaces.
3. Alignment with FDA guidance on patient safety, data protection and patient privacy requirements.
4. Maintaining a future-proof architecture by ensuring that the underlying connectivity infrastructure can support teleoperation and automation.

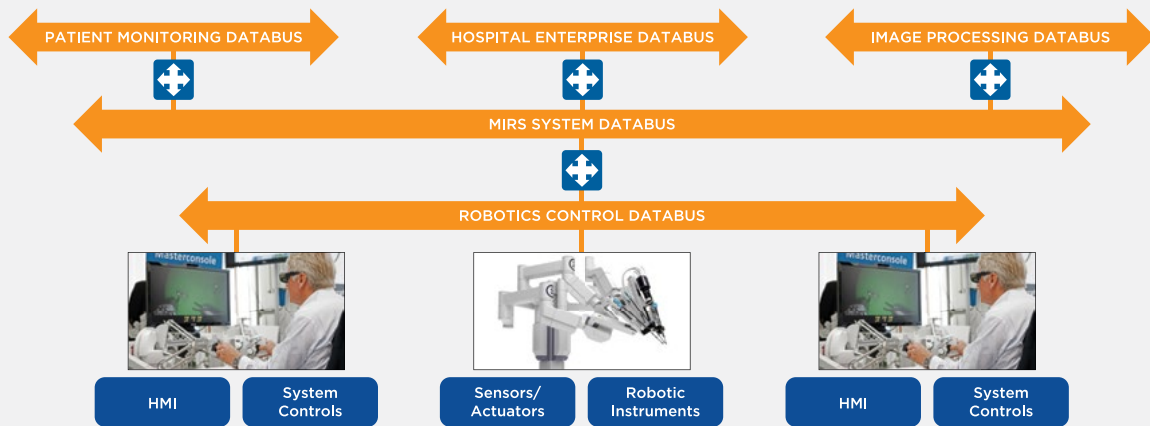
RTI Connex[®] DDS enables the data-driven medical systems of modern healthcare. It provides the medical-grade connectivity platform for the development of next generation medical robotics systems. Built on the robust OMG[®] DDS standard, Connex DDS allows all of the robotic subsystems to work as a single integrated solution by providing data connectivity between systems reliably, securely and in real time (<ms and deterministic).

Connex DDS is the connectivity framework for interconnected human-controlled, collaborative and fully-autonomous robotic medical systems. It provides real-time information exchange between complex system components and high-precision robotics, while meeting stringent patient privacy, safety certification and security requirements. Connex DDS provides the framework to process, analyze and act on high-volume, real-time data with low latency in a redundant, fault-tolerant architecture.

Robotic and haptic systems built on Connex DDS are resilient, self-forming and self-healing with no single point of failure. Built-in security based on the proven DDS Security standard provides the foundation for confidentiality, authentication, nonrepudiation and access control, keeping robots safe from security breaches.

CONNEX DDS IN ACTION

RTI has deep experience in supporting distributed systems within highly-regulated markets. Connex DDS users rely on RTI software to manage the connectivity aspect of their systems, decreasing time to market and lowering costs. For more information, please visit www.rti.com.



Example of a Medical Robotic Architecture



RMC MiroLab: Minimally Invasive Robotic Surgery (MIRS) with the DLR MiroSurge

MiroLab, an advanced robotic assistance research laboratory, is part of the Robotics and Mechatronics Center (RMC) at the German Aerospace Center (DLR). It is making significant advances to conventional Minimally Invasive Surgery (MIS) with Connex DDS. The software provides the communications infrastructure between the three MIRO robots, the endoscope, the surgeon's robot controllers and the surgeon's and technician's user interfaces, facilitating synchronization and coordination between them.

The MiroLab adopted Connex DDS for its ability to deliver high-performance distributed communications with decoupled systems architecture. With Connex DDS, MiroLab could implement a deterministic solution functioning at rates between 1KHz and 3KHz, thus enabling the development of the distributed haptic closed control loops.



The MiroLab MIRS system

"RTI Connex DDS is the perfect tool,... Its simple data-centric architecture delivers a wonderful high-performance platform with an extreme degree of flexibility and adaptability."

Stefan Jörg

Research Engineer, Robotics and Mechatronics Center (RMC)

ABOUT RTI

Real-Time Innovations (RTI) is the largest software framework company for autonomous systems. RTI Connex[®] is the world's leading architecture for developing intelligent distributed systems. Uniquely, Connex shares data directly, connecting AI algorithms to real-time networks of devices to build autonomous systems.

RTI is the best in the world at ensuring our customers' success in deploying production systems. With over 1,500 designs, RTI software runs over 250 autonomous vehicle programs, controls the largest power plants in North America, coordinates combat management on U.S. Navy ships, drives a new generation of medical robotics, enables flying cars, and provides 24/7 intelligence for hospital and emergency medicine. RTI runs a smarter world.

RTI is the leading vendor of products compliant with the Object Management Group[®] (OMG[®]) Data Distribution Service[™] (DDS) standard. RTI is privately held and headquartered in Sunnyvale, California with regional offices in Colorado, Spain and Singapore.

Download a free 30-day trial of the latest, fully-functional Connex DDS software today: <https://www.rti.com/downloads>.

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