CAPABILITY BRIEF

# Mining Network Operations

REMOTE AND CONNECTED: THE SOFTWARE FUTURE OF AUTONOMOUS MINING

## HIGHLIGHTS

Delivers reliable, scalable data connectivity for autonomous, semi-autonomous and tele-operations systems and equipment

Enables real-time data exchange for improved decision-making and reliable remote monitoring

Helps reduce labor costs and equipment downtime in distant and dangerous locations

Supports communication over any transport protocols for collaboration with external mine or partner networks and equipment

Optimization of production costs, reduction of human intervention and improved safety are the key requirements for mining networks. To truly innovate in this industry, operators also need real-time, data-based decision-making. From remote site operations to central control centers, RTI Connext® software supports the continuous innovation needed to compete successfully.

### REAL-TIME INTEROPERABILITY AND AUTONOMY FOR MINING NETWORKS

The opportunity to improve remote operation and network communication is not just an attractive technological goal: It's increasingly becoming an economic imperative. Autonomous and data-centric architectures have come to represent the most cost-effective way to add real-time decision-making and monitoring to the sometimes unpredictable and often challenging business of large-scale mining operations.

When incompatible systems and geographical distance begin to negatively impact operations, it's time to explore other options. Modernization and automation technologies are the crucial next step. If this is unfamiliar terrain, RTI Connext® can help. Already a trusted part of networks run by industry-leading, billion-dollar mining companies, Connext is a software connectivity framework with the power to support secure and robust real-time communication for mining networks and equipment, even in bandwidth-constrained or unreliable wireless environments.

### SECURELY MANAGE REMOTE SITES AND CENTRAL COMMAND CENTERS

Establishing fast, secure and reliable communications between remote sites and central command centers can significantly improve remote monitoring and tele-operations. Integrating many (or various) machines into one mining network that controls drilling, hauling and other mining equipment creates operational efficiency. This capability reduces remote maintenance costs, decreases the risk of costly unplanned downtime and reduces the cost of housing onsite crews for weeks or months at a time. These are major savings that can affect the bottom line.

From a technology standpoint, the need to innovate can also drive progress. Industry trends suggest that the use of automated mining technologies can serve to curb direct labor, insurance and maintenance expenses, and also enable significant gains in production growth and operational efficiency. Some mine operators are already realizing that the use of remotely operated vehicles can save them as much as 500 work hours per year — the equivalent of about three months.

One of the trickiest aspects of mining is anticipating what will be needed for projects that still are years away from completion. Here too, Connext can help pave the way with a future-proof network environment that can leverage AI and telemetry data — from vehicles to the network and up to the cloud — for immediate insights and improved decision-making. Being able to add new applications and data sources as needed and in a modular fashion can position mining companies for improved flexibility, easier collaboration with mine owners and greater economic viability going forward.

### NAVIGATING EVERY TURN IN TODAY'S TRAFFIC MANAGEMENT SYSTEMS

Increasingly, mining and heavy construction vehicles are sent missions by third-party software known as the Traffic Management System (TMS), and there are many different flavors of it out there. A further challenge is interoperating with a mine owner's proprietary network infrastructure, which may not have access to multicast and may have limited bandwidth. These are all factors that complicate deployment, create higher latency and undermine both the performance and integrity of data. This applies to:

- Surface and subsurface applications
- Tele-operation applications for remote truck operation
- Autonomy and sensor-fusion applications for self-driving vehicles
- Applications for AI and predictive maintenance

Connext provides a distinct advantage for navigating these hurdles, as it establishes a transport-agnostic communication framework that enables service providers to offer set data models and Quality of Service (QoS) policies to ensure that data always goes where it is needed. This approach allows trucks and equipment to integrate seamlessly with any TMS in any mining network and work together as one. Connext also includes cloud integration and Wide Area Network (WAN) tools that can be a vital capability when using third-party communication networks to connect your site to back-end and cloud services.

### USE CASE A

Company A is a large multinational mining equipment company with a system built on legacy technologies. They needed to develop a software architecture that would provide the ability to easily add applications and software to their machines to enable improved predictive analytics-gathering, as well as capabilities to support autonomous vehicle control and remote command center operations in the future. Their initial system had performance challenges in working with third-party networks and remote control capabilities, which limited their ability to bid on projects with remote site requirements. By adopting Connext, Company A gained a standards-based approach that enables them to connect their autonomous network to remote command centers. Their existing applications now support any network topology and provide reliable, secure connectivity to remote sites.

### USE CASE B

Company B needed to build autonomy into its large, off-road hauling truck. With RTI Connext, they were able to use the same standards-based interface to integrate their autonomy application with a back-end monitoring center and a Traffic Management System. Now, each sub-system speaks the same 'language' and is modular and interoperable, enabling them to support any TMS provider. In addition, the modular, data-centric framework means Company B is ready to provide new solutions and benefits to their customers quickly, and leverage new advances in autonomy and AI technologies faster than the competition.

## ABOUT RTI

Real-Time Innovations (RTI) is the largest software framework company for autonomous systems. RTI Connext® is the world's leading architecture for developing intelligent distributed systems. Uniquely, Connext 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 Connext DDS software today: https://www.rti.com/downloads.





Your systems. Working as one.

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