

CAPABILITY BRIEF

Mining Network Operations

SECURE AND SCALABLE DATA CONNECTIVITY

HIGHLIGHTS

Delivers reliable, secure and scalable data connectivity to increase efficiency and safety for Mining Operations

Enables deployment and management of autonomous, semi-autonomous and human-operated systems and equipment

Enables real-time data exchange for improved decision-making, remote monitoring and predictive maintenance

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

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

The key requirements for mining networks include optimization of production costs, reduction of human intervention, improved safety and the integration of data to enable AI analysis. To truly innovate in this industry, operators need real-time, data-based decision-making. From remote site operations to central control centers to cloud computing and analysis, RTI Connex[®] 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. The integration of AI in conjunction with autonomous and data-centric architectures has come to represent the most cost-effective way to add real-time decision-making. This approach also introduces predictive maintenance and monitoring capabilities to the 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 Connex can help. Already a trusted part of networks run by industry-leading, billion-dollar mining companies, Connex delivers 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, central command centers and cloud infrastructure can significantly improve remote monitoring and teleoperation. Integrating the various connected systems (human, machinery and infrastructure) 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. The Connex framework provides a basis to deploy fine-grained security with inherent reliability across complex systems, enabling connectivity from the vehicle control units to the cloud.

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. ConnexT provides a suite of software services that facilitates seamless deployment of teleoperated systems.

One of the trickiest aspects of mining is anticipating what technology will be needed for projects that still are years away from completion that will be deployed for years to come. Here too, ConnexT can help pave the way with a future-proof network environment that can evolve and adapt over time. ConnexT ensures data is delivered to the AI engines, from vehicles and various systems to the network and up to the cloud, for immediate insights and improved decision-making. Additionally, the ConnexT framework allows for scalability after deployment. This ensures that Mining operators can add new applications and data sources as needed and in a modular fashion. This capability helps further 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 on missions by third-party software known as the Traffic Management System (TMS), with many different flavors of it out there. A further challenge is interoperating with the 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 and can create issues due to higher latency and integrity of data. This applies to:

- Surface and subsurface applications
- Teleoperation 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, equipment and infrastructure to integrate seamlessly with any TMS in any mining network and work together as one. ConnexT also offers a path to 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 TMS. 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 infrastructure software company for smart-world systems. Across industries, RTI ConnexT® is the leading software framework for intelligent distributed systems. RTI runs a smarter world.

RTI is the market leader in products compliant with the Data Distribution Service (DDS™) standard. RTI is privately held and headquartered in Silicon Valley with regional offices in Colorado, Spain, and Singapore.

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