

CAPABILITY BRIEF

Mining and Construction Operations

SECURE DATA TRAFFIC MANAGEMENT FOR COMMUNICATION SYSTEMS AND MINING NETWORKS

HIGHLIGHTS

Strengthens, accelerates and secures communications between the mine network and the equipment manufacturer

Delivers interoperability for autonomous, semi-autonomous and tele-operations systems and equipment

Integrates seamlessly with a wide variety of third-party Traffic Management Systems

Provides tools to share and manage telemetry and analytics data

Secure data communications are a common challenge for mining operations. When incompatible systems and geographical distance begin to negatively impact operations, it's time to explore other options. Introducing RTI Connex[®] DDS, a software framework that enables real-time data exchange and seamless interoperability for vehicles and equipment in today's complex mining networks.

REAL-TIME INTEROPERABILITY AND AUTONOMY FOR MINING AND CONSTRUCTION VEHICLES

In modern mining operations, service providers have to be ready for anything. For one thing, many of today's mining sites are situated in distant and potentially dangerous terrain, making jobs in these remote locations an HR and finance challenge. And the task of establishing a secure and reliable interface with a mining company's existing network can at times seem just as precarious.

Data traffic management can be a huge priority for Mine Operators who run autonomous, semi-autonomous and tele-operations systems. These are the key reasons:

- Vehicles, drilling equipment and other resources are constantly generating and consuming data
- To have real value, telemetry and analytics data must be available both onsite and remotely for the mine operator and other stakeholders
- New and innovative subsurface or surface applications need to be quickly blended and integrated with a mine's critical applications and legacy network to accelerate data transport and avoid project risk

The solution? Interoperability. To achieve this crucial interoperability, RTI Connex[®] DDS provides fast, scalable, reliable and secure connectivity across any data network at a transport-agnostic level. This is possible because Connex DDS is built on the widely used Data Distribution Service[™] (DDS) standard, which promotes rapid integration and seamless communication across networks and machines within the mine, out to remote operations centers and up to the cloud. With its ability to solve each of these challenges, an autonomous system could be the key to economic viability for mining.

NAVIGATING EVERY TURN IN TODAY'S TRAFFIC MANAGEMENT SYSTEMS

Increasingly, mining and heavy construction vehicles are sent missions by a third-party piece of software called the Traffic Management System (TMS). Like each mining company's own unique network setup, these systems are widely varied because TMS software is made by multiple companies.

Here too, DDS provides a distinct advantage. Transport-agnostic communication through DDS enables service providers to provide a set data model and Quality of Service

(QoS) profiles for their trucks that integrate seamlessly with any TMS in any mining network. This “skeleton key” approach is also advantageous down the road, as many mines maintain a patchwork of equipment by different manufacturers. DDS also opens up the opportunity to share previously siloed data that could offer new analytical insights and greater efficiency by utilizing disparate mining equipment such as trucks, excavators and any other equipment in the mine. This applies to:

- Surface applications
- Sub-surface applications
- Tele-operation applications for remote truck operation
- Autonomy and sensor-fusion applications for self-driving vehicles
- Applications for AI and predictive maintenance
- Applications that bridge communications between mining and service provider networks

SECURELY MANAGING REMOTE COMMAND CENTERS

Because mining networks are cyber-physical systems, the opportunity to improve remote operation and communication is not only an attractive technological goal, but has also increasingly become an economic imperative. Keeping a maintenance crew on site hundreds of miles from civilization for extended periods of time is not always practical, so this move has the potential to reduce the cost and complexity of deploying and housing onsite maintenance crews and “hot-swapping” parts in the hope of avoiding expensive unplanned downtime.

Establishing a remote command center – sometimes located many states away – can help monitor and manage all aspects of tele-operations and maintenance to avoid wrong turns. A DDS-based approach can help participants gain a

centralized overview of all mining operations, while paving the way for a future-proof environment that can leverage AI and telemetry data.

Connex DDS provides a proven autonomy framework to seamlessly manage sensor fusion data and analytics data at scale and in real or near-real time, depending on network requirements. Connex DDS also offers industry leading safety certification evidence and security tools to protect critical data as it moves through networks and TMS systems, ensuring that each end point on the network receives only the data it needs, when it is needed.

USE CASE: COMPANY A

Company A is a customer that was looking for a software architecture and modular infrastructure that would provide the company with the ability to easily add applications and software to their machines and focus on predictive analytics.

The team’s goal with off-line analytics was capturing black box data from previously disconnected mining machines when they come back to the surface or come back into range. RTI Connex DDS enabled them to leverage important historical data while preserving the original timestamps.

USE CASE: COMPANY B

Company B is a customer currently working on adding autonomy to its large off-road haulage trucks. The main selling point of Connex DDS for this customer came while the company was working with third-party TMS vendors to establish compatibility for its trucks across any Traffic Management System.

The company is also exploring DDS as an ecosystem for interoperability over the long haul, with the objective of extending autonomous capabilities to all assets in the mine, so that ultimately excavators and cranes can also communicate over DDS.

ABOUT RTI

Real-Time Innovations (RTI) is the largest software framework provider for smart machines and real-world systems. The company’s RTI Connex[®] product enables intelligent architecture by sharing information in real time, making large applications work together as one.

With over 1,500 deployments, RTI software runs the largest power plants in North America, connects perception to control in vehicles, coordinates combat management on US Navy ships, drives a new generation of medical robotics, controls hyperloop and flying cars, and provides 24/7 medical intelligence for hospital patients and emergency victims.

RTI is the best in the world at connecting intelligent, distributed systems. These systems improve medical care, make our roads safer, improve energy use, and protect our freedom.

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 headquarters in 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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2 • rti.com