



## CUSTOMER SNAPSHOT

# GE Transportation

## Modernizing and Securing Today's Transportation Infrastructure

GE Transportation is the division of GE working to define and lead the future of transportation by providing digital solutions for some of the world's most critical infrastructure. The company manufactures equipment for the railroad, marine, mining, drilling and energy generation industries, earning \$5.8 billion in revenue.

In the locomotive industry GE is driving high-tech innovation in an effort to reduce costs, streamline operations and increase performance. The company is the largest producer of diesel-electric locomotives for both freight and passenger applications in North America. GE's Evolution Locomotive Series is the most technologically advanced, diesel-electric, heavy-haul locomotive in the world. In 2016, GE announced the GE Evolution Series Tier 4 Locomotive, which meets the latest and most stringent U.S. Environmental Protection Agency (EPA) emission-level standard for locomotives. GE is now upgrading the Evolution series with software as a part of the Rail Connect™ 360 initiative to provide a flexible, powerful platform that will increase efficiency while decreasing rail production and management costs.

### Challenge

GE's freight trains have approximately 20 Central Processing Units (CPUs) connected to more than 200 sensors on-board that monitor weather, temperature, oil, traction, pressure, speed and more — processing more than one billion instructions per second. This connected software suite provides data-driven insights that the company can use to reduce unplanned downtime and improve velocity, productivity and fuel efficiency. Every 1 percent increase in efficiency in the rail industry is worth \$1.8 billion, and every 1 mph increase in rail network speed saves \$200 million in annual capital and operating expenses.

GE Transportation's software suite is installed in more than 6,000 GE locomotives around the world and provides approximately 10 GB of data per locomotive per year. As a part of the software upgrade, GE Transportation was looking for a connectivity solution that was standardized, was

proven by other critical real-world applications and that provided an open architecture to allow easy implementation of third-party plugins. The locomotive control system also required software that could manage all of the system's data flows while providing oversight from one, central platform. Additionally, GE Transportation was looking for security technology that provided their engineers the ability to optimize the level of security by function, as some parts of their system require full encryption while others may just require message authentication and integrity. With all of these functionalities, GE Transportation would be able to provide an architecture with increased reliability, security, scalability, modularity, efficiency and serviceability in the field.

*"We have a vision for a connected rail enterprise that leverages advanced software and powerful analytics, providing enhanced visibility into the control architecture."*

**Tab Mong,**  
System Architect at GE  
Transportation

## Solution

GE Research, another division of GE building an open architecture system, recommended that GE Transportation look into RTI's connectivity technology built on the Object Management Group (OMG) Data Distribution Service (DDS) standard. After a successful evaluation, GE Transportation realized that five different messaging solutions it was previously using could all be managed through RTI Connex DDS. By unifying this technology, GE is able to save on both time and cost for the development and maintenance of the architecture.

GE Transportation deployed Connex DDS Professional, the first connectivity software built for designing Industrial Internet of Things (IIoT) systems. This software manages all of the data on the control network including train control data, streaming data and train sensor data, which then communicates wirelessly with the Rail Connect 360 system. Due to the nature of the standardized open architecture, GE Transportation is also able to use additional tools, such as National Instruments LabVIEW and MathWorks Simulink, while integrating with the GE Predix Cloud software for backend data analytics.

## Benefits

Deploying RTI's connectivity software is improving the safety and security of GE's locomotives around the world. If a freight or passenger train were to experience a disruption in its connectivity, such as for a system upgrade or a security threat. RTI Connex DDS enables the GE Transportation team to seamlessly connect all data management systems together, plug in additional DDS standards-based components for increased functionality and rely on software that meets stringent security certifications.

“We have a vision for a connected rail enterprise that leverages advanced software and powerful analytics, providing enhanced visibility into the control architecture,” said Tab Mong, System Architect at GE Transportation. “This system will enable us to make more intelligent train control decisions while decreasing maintenance time and increasing railroad profitability. The reliance on freight rail is continuing to increase, creating a need for a system that is more connected, efficient and secure. By replacing our previous messaging software with RTI Connex DDS, we were able to increase efficiency by 30% while providing a secure, open architecture that will make it easy for us to monitor the system remotely into the future. Together with RTI we are building locomotives that leverage the full power of the Industrial Internet.”

GE Transportation is also working with additional modeling tools and Simulink to further advance the control architecture. Future phases of the upgrade will integrate a Time Sensitive Networking (TSN) interface that provides determinism with standard Ethernet, allowing even the most time-critical functions to take advantage of standard DDS and network interfaces.

## About RTI

Real-Time Innovations (RTI) is the Industrial Internet of Things (IIoT) connectivity company. The RTI Connex<sup>®</sup> 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<sup>SM</sup>.

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



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