



**USE CASE**

## Lumada Edge Intelligence Reduces Downtime and Enhances Customer Safety in Smart Spaces Industries

**Challenge:** Existing maintenance services model was hindered by lack of integration between OT and IT environments.

**Solution:** A new data management capability performs fixed and mobile asset management and predictive maintenance.

**Outcome:** Simple, easy-to-use management, reporting and analytics are integrated into the core IT enterprise architecture.

### The Challenge

The smart spaces industry organization was working with a maintenance services model, which was adopted three decades ago and had received only minimal updates. The organization did not have an internet of things (IoT) solution, and its digitalization efforts were hindered by lack of integration between the operational technology (OT) and IT environments.

To transform its maintenance services and operations as well as rider safety and the overall customer experience, the company wanted to employ a predictive maintenance solution to deliver next-generation transport control and asset management.

### The Solution

This smart spaces industry organization had an OT environment that required a new data management capability to perform fixed and mobile asset management and predictive maintenance through analytics and digital twins. Hitachi's Lumada

Edge Intelligence, Lumada Video Insights and Pentaho Internet of Things Analytics with Hitachi hardware provide a real-time solution with edge processing.

Lumada solutions for digital innovation from Hitachi as well as the Pentaho platform were chosen to support a predictive maintenance solution and ensure "occupancy safety," to maximize the overall rider experience. A high-volume facility area with an existing control system environment was converted into a data-driven operation. It provides asset management and a maintenance-centric system for connected vehicles through the Lumada Edge Intelligence product.

The solution includes the following capabilities:

- **IoT device management.** Each of the vehicles was already equipped with various programmable logic controller (PLC)-based OT sensors. These sensors send data streams, including telemetry data, vibration, temperature, humidity and so forth, to the controller.

### INDUSTRY

Smart Spaces Industries

### SOLUTIONS

Digital Transformation, Digital Workspace

### HARDWARE

Hitachi Virtual Storage Platform F Series

### SOFTWARE

Lumada Edge Intelligence

Lumada Video Insights

Pentaho Internet of Things Analytics

### SERVICES

Co-Creation Services From Hitachi Vantara

### Outcomes

- Increased rider safety.
- Reduced risk of mechanical failure and lower cost of maintenance.
- Reduced delay time for riders, with the aid of predictive maintenance.

In addition, Hitachi's internet protocol (IP)-based, wireless video cameras have already been deployed as IoT end-point sensors and are 100% directly managed by the smart spaces organization. This step bypassed the need for deploying and managing additional sensors or control devices.

■ **Integration tools and management.**

Data is acquired at the OT networks gateways in the Electric Equipment Room (EER), which serves as a communications hub for the vehicles. Usually, each vehicle has its own EER, but some vehicles may share an EER with others. Data has been already protocol-converted as it comes into switches of OT networks, which only allow passive data access. Lumada Edge Intelligence then ingests data into the platform through the corporate network via the firewall using the MQTT and RabbitMQ protocols. The gateway also runs edge analytics and sends insights to an operator console for monitoring. This ensures "occupancy safety" for riders. For example, if a rider in the vehicle in motion accidentally drops his phone outside and leans out to see where it is, his body parts have crossed over the invisible line for the predefined safety zone. This information is captured at the OT networks gateways in the EER, and then sent to the operator console.

- **IoT data management.** The customer uses Hitachi's pre-integrated set of IoT software components for data management and data engineering. Hosted on premises in a user-administered data center, they reduce data volume at the edge, clean and transform the data streams, and enrich and blend data both within and across data streams.

- **Hitachi's Lumada solutions for digital innovation** also provide the user with the ability to determine and direct where the data is stored. For any data model that handles physical safety, storing unaltered state data, such as binary raw data, is a requirement for forensic purposes. Raw information is stored along with digital or IT format data, cleansed data, blended data models and others. The data is stored in Hadoop and other proprietary storage today. The company, which is a long-term user of Hitachi storage solutions in other areas of its business, is considering Hitachi for storing data residing in hybrid environments.

- **Analytics.** Leveraging Lumada, the customer builds predictive and operational models and creates asset management groups for each standardized data model. With these asset management groups established, modeling different conditions can be run as needed through Lumada's digital twin capabilities. All the initial predictive analytics models being assessed map back to desired business outcomes for this multiyear project.

- **Application enablement and management:** Lumada allows the system to issue alerts against analytics models derived from an OT network to reduce maintenance response times, troubleshoot failures, and protect worker and rider safety. It also enables dashboards to show the process key performance indicators (KPIs) based on the collected data. The users gain access to both historical analysis and operational dashboards. They can also create standardized and customized reporting based on the requirements of each user group.

- **Security.** Security is a top priority for the company. The organization is using

its own proprietary (and confidential) approaches to secure its OT and IT networks. Lumada accesses data for ingestion through secured firewalls and uses encryption and role-based access control for additional layers of security.

- **Ease of use.** Lumada's data management capabilities provide users with a simple and intuitive way to manage a wide range of data sources through standardized, blueprinted methodology. Not only does this help users perform data modeling easily, but it also offers pre-engineered data management tools to help ensure that machine learning (ML) and artificial intelligence (AI) algorithms are based on sound data management models.

## The Outcome

The smart spaces organization already sees value against its project goals through simple, easy-to-use management and analytics tools. As the IoT platform is being integrated into the core IT enterprise architecture, a wide range of reporting and analytics are being implemented across the organization. The solution is being adopted over a multiyear project plan through a close working relationship between Hitachi and the organization.

Overall, the new system helps the facility operator build a management environment that enhances the users' experience and provides for safe, secure transportation that is optimized for uptime and maintenance.

## Hitachi Vantara at a Glance

Your data is the key to new revenue, better customer experiences and lower costs. With technology and expertise, Hitachi Vantara drives data to meaningful outcomes.

## Hitachi Vantara

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