![fintego — A DXC Technology Company logo]

Secure Digital Communication Solution for Next-Generation Express Trains

Satisfying customer needs and minimizing costly downtime

Client: An experienced manufacturer of advanced networking solutions based on Industrial Ethernet
Industry: Telecommunications
Project Type: Internal communications solution with embedded software development

Overview

1 Challenge:

Our confidential client provides operating system software for network devices that are used in modern trains. They needed a partner to design and implement a robust, reliable communications solution for a new fleet of express trains. The infotainment, CCTV and WiFi design had to include separate audio/video/data streams as well as redundancy inside, and between, train wagons.

With an impressive track record in delivering redundant coupling network solutions, **Fintego** was the ideal strategic partner for the task.

2 Approach:

Luxoft's uniquely qualified team ticked all the relevant skill boxes, including developing advanced networking solutions and embedded software development. The team created a prototype for the train software, received feedback from the client and deployed the final product. This, plus an easy flow of knowledge between **Fintego** and the in-house engineering team, delivered top-quality code for the project. In line with our agile scrum methodology, the project was divided into manageable sprints that produced beta releases to optimize time-to-completion.

3 Solution:

Fintego proposed creating a Multiple Spanning Tree Protocol (MSTP)-based solution to couple MSTP with other redundancy protocols.

The solution was developed around two protocols:
• Multiple Spanning Tree
• Redundant Coupling

This networking solution offered multimedia streaming divided between separate MSTP instances inside one train wagon. Using a coupling mechanism allows the LAN network to couple with networks from other wagons.

4 Result:

Our client gained the following benefits from their new communication software solution:
• Significant cost savings and improved efficiency
• Fast topology recovery and flexibility, with switchover times of **under 3 seconds** and recovery times of **50 seconds maximum**
• Predictive maintenance to minimize costly downtime
• An innovative design that sets new standards in availability and passenger comfort

Challenge

State-of-the-art software for trains

Our confidential client provides operating system software for network devices that are used in modern trains. Built specifically to meet the safety requirements of the automation sector, their software has unique fast-recovery redundancy and security features (such as HSR, PRP and other protocols) that enable it to supply high-network availability and data security for efficient production processes.

Our client was tasked by a major European customer to design and implement a robust, reliable communications solution for a new fleet of express trains. The infotainment, CCTV and WiFi design had to include separate audio/video/data streams as well as redundancy inside, and between, train wagons.

With an impressive track record in delivering redundant coupling network solutions, **Fintego** was the ideal strategic partner for the task.

Approach

Delivering high-quality code through collaboration and Agile

Luxoft's uniquely qualified team ticked all the relevant skill boxes, including developing advanced networking solutions and embedded software development. The team created a prototype for the train software, received feedback from the client and deployed the final product. This, plus an easy flow of knowledge between **Fintego** and the in-house engineering team, delivered top-quality code for the project.

In line with our agile scrum methodology, the project was divided into manageable sprints that produced beta releases to optimize time-to-completion.
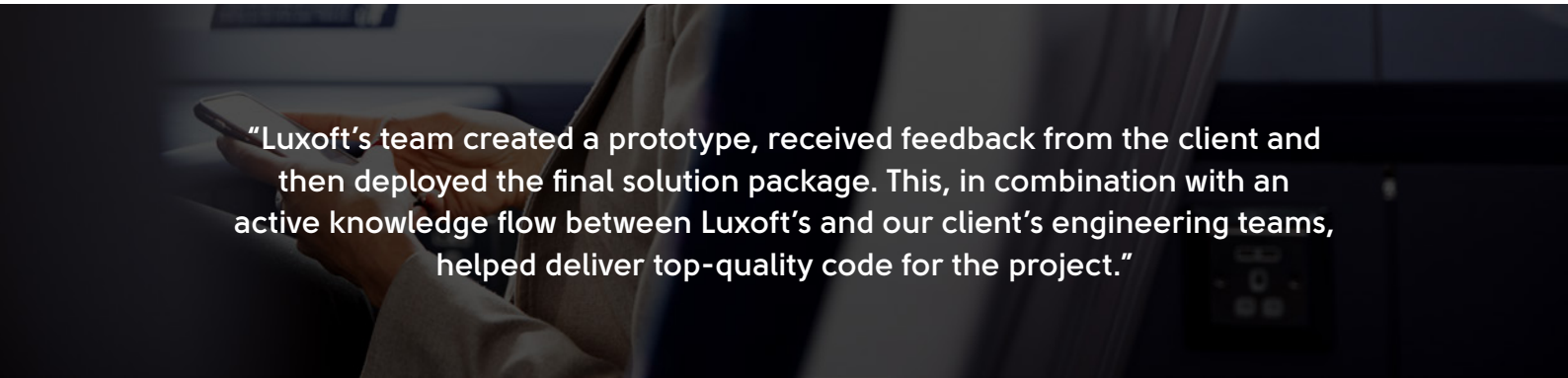
Solution

An optimized communications solution

Fintego proposed creating a Multiple Spanning Tree Protocol (MSTP)-based solution tailored to the project's specific needs. It needed to have the capabilities for coupling MSTP with other redundancy protocols, such as Device Level Ring (DLR) or Multimedia Redundancy Protocol (MRP).

The solution was developed around two protocols:

• **Multiple Spanning Tree Protocol:** Equipped with MSTP's fast recovery times tuned for the train industry, it provides optimized code that achieves switchover times in under 3 seconds. In the event of a root failure, it only needs 50 seconds maximum to re-establish connectivity.

• **Redundant Coupling Protocol:** This proprietary protocol uses a coupling mechanism that allows two redundancy protocols (e.g., MSTP and DLR) to run in parallel in an onboard train topology, ensuring connectivity between wagons.

This networking solution offered multimedia streaming divided between separate MSTP instances inside one train wagon. Using a coupling mechanism allows the LAN network to couple with networks from other wagons.

> "Luxoft's team created a prototype, received feedback from the client and then deployed the final solution package. This, in combination with an active knowledge flow between Luxoft's and our client's engineering teams, helped deliver top-quality code for the project."

Result

Cutting costs, improving efficiency and decreasing downtime

• **Saves significant costs and improves efficiency:** Our secure communication solution allows our client's customers to share resources for various components of the main train topology system.

• **Fast topology recovery and flexibility:** Our networking solution enables switchover times of **under 3 seconds** and recovery times from root failure of **50 seconds maximum** (and the solution passed all of our client's acceptance tests, including wagons reordering).

• **Enables predictive maintenance to minimize costly downtime:** This modern data communication solution provides a continuous dialogue between trains and their service facility, allowing potential technical faults to be rectified before they actually occur.

• **A smart rail solution:** Our communication software includes a CCTV and passenger information system, train communications network and passenger WiFi.

• **Innovative communication design:** With its enhanced digital connectivity capabilities, this new software package is setting a new standard in availability and passenger comfort.

Looking for a system upgrade?

Contact Us

fintego