EVIDEN

CFL: The first European railway infrastructure manager to deploy Mission-Critical Push-to-Talk (MCX) for commercial operations by 2027

Paving the way for a seamless transition from GSM-R to FRMCS

"This project will enable us to take a new step forward by becoming one of the leading European railway companies to deploy a next-generation critical communication system (MCX). Our goal is to implement these solutions across our entire national railway network by 2027, in line with constantly evolving industry standards. "

Mathieu Perrus,
Infrastructure Engineering Department,
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Société Nationale des Chemins
de Fer Luxembourgeois

All European railway infrastructure managers are expected to adopt the Future Railway Mobile Communication System (FRMCS) standard in the coming years due to the programmed end of life of GSM-R within 2035-2040 timeframe.

CFL decided in 2024 to proactively begin the phased transition to FRMCS earlier than other European infrastructure managers. This initiative will lead to the first commercial deployment of MCX in operational service in Europe by 2027, marking a significant milestone in the transition from GSM-R to FRMCS and setting a precedent for future railway communication systems across the continent.

This innovative approach has the immediate benefit to address important use cases like shunting (that are not addressed by GSM-R in Luxembourg), to start the renewal of one specific layer of their existing network with the replacement of aging GSM-R components and to get their operational and maintenance staff already trained on the next-generation technologies.

CFL's critical migration from GSM-R to FRMCS is being carried out gradually. From 2024 to 2027, Eviden is modernizing the FRMCS Service Stratum through two PoCs leading up to the live deployment. After 2027, the FRMCS Transport Stratum will be updated by another telecom provider based on private 5G infrastructure. The complete GSM-R network will then be switched off after a period of coexistence with FRMCS.

FRMCS System

Railway Application Stratum

Service Stratum

Transport Stratum

—— Media

······· Signaling
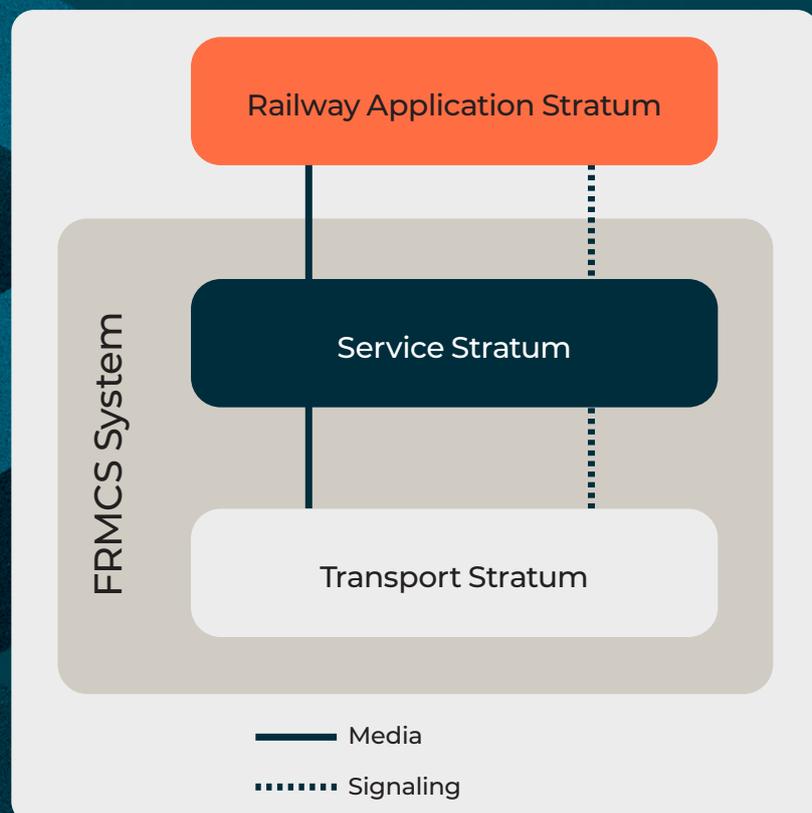
Delivering the components of the FRMCS Service Stratum to CFL

CFL selected Eviden to supply and integrate all necessary FRMCS Service components into its existing railway environment:

- Lifelink MCx Connect – Eviden's mission-critical communication platform delivering robust, secure, and scalable services including Mission-Critical Push-To-Talk (MCPTT), Mission-Critical Video (MCVideo), and Mission-Critical Data (MCData), fully aligned with 3GPP standards. It is the core component of the Eviden solution

- Lifelink MCx Dispatcher – A web-based dispatcher application, offering operators an interface for railway dispatching

- Lifelink MCx Recorder – A centralized solution for voice recording, storage, and playback, supporting operational traceability and compliance requirements

- Lifelink MCx IWF – The interworking function that enables hybrid operational scenarios with smooth interoperability between Lifelink MCx Connect, CFL's PBX system and the existing GSM-R infrastructure

- Lifelink MCx CMS – A centralized management system for configuration, fault and performance management
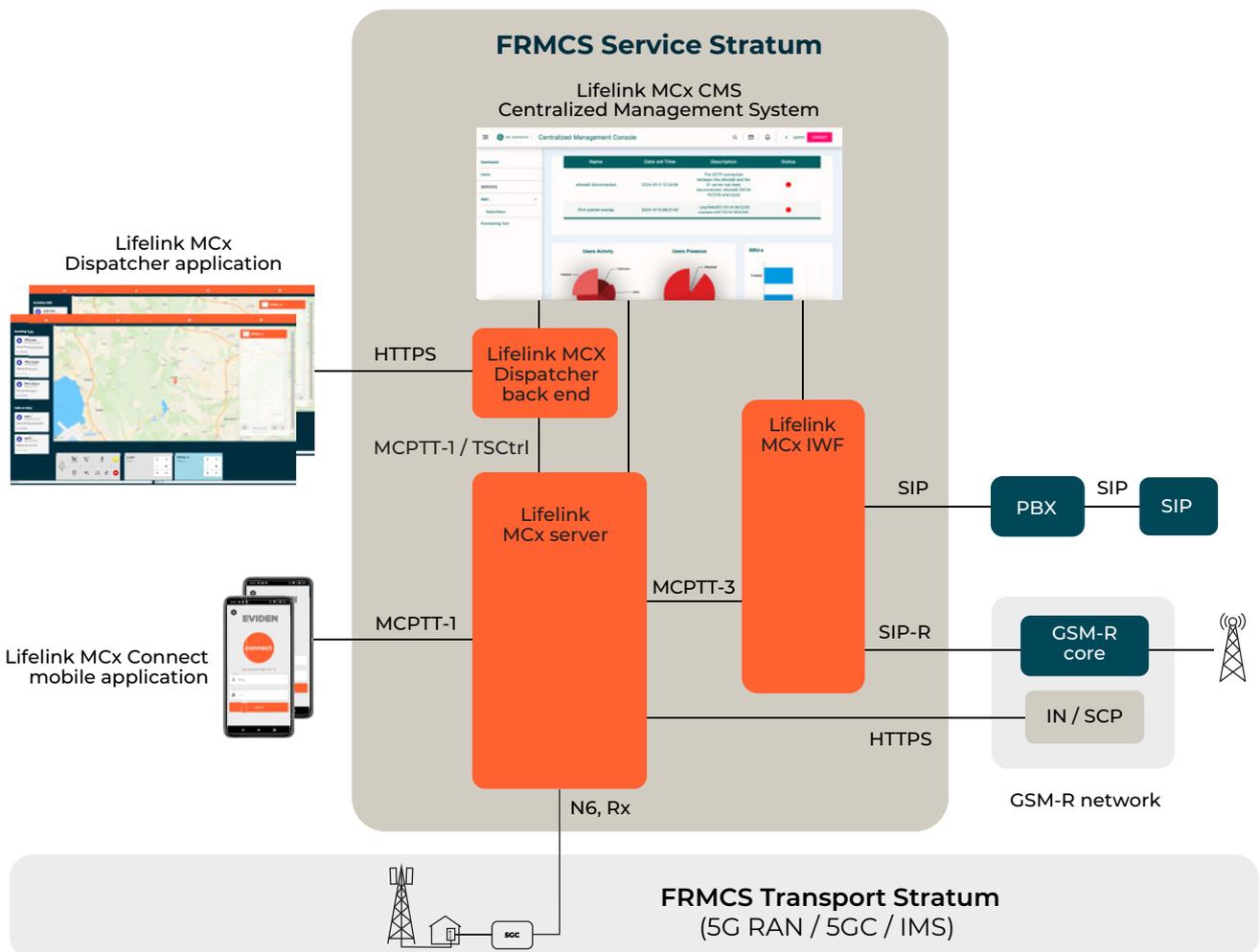
A phased transition to full FRMCS compliance

The CFL project is organized into four phases:

Phase 1: First proof of concept - Interoperability of the MCX system with public 4G/5G and PABX

At this stage, the Eviden system comprises the following components:

- Lifelink MCx Connect – the core mission-critical communication platform

- Lifelink MCx Dispatcher – the web-based dispatcher client

- Lifelink MCx Recorder – the centralized recording and playback system

- Lifelink MCx IWF – enabling seamless integration with existing systems

- Lifelink MCx CMS – the management system

These components are deployed in a virtualized, redundant environment at the CFL's Network Operation Center (NOC), ensuring high availability and resilience in line with mission-critical requirements from CFL.

The system has been tested across various railway operational areas in Luxembourg, leveraging public 4G/5G radio coverage in an Over-the-Top (OTT) architecture. It is also fully integrated with key CFL systems, including the PBX, the public announcement system and the real-time customer information system. Additionally, comprehensive penetration tests have been conducted to validate the cybersecurity resilience of the system, ensuring robust protection against potential threats.

The solution supports a wide range of advanced mission-critical communication features, such as:

- Ad-hoc and predefined group calls with role-based priority and pre-emption

- Geolocation services for real-time personnel tracking and emergency response coordination

- Support for operational scenarios such as shunting

- Seamless interoperability with PBX systems via SIP, enabling integration with station public announcement systems

- Centralized system management, including configuration, monitoring, and role-based user administration

- End-to-end secure communication with VPN encryption and firewall protection

These capabilities will contribute significantly to operational efficiency, safety, and coordination of CFL personnel in day-to-day and emergency situations.

The proof of concept was successfully completed in September 2025, validating the integration of the Eviden system within the existing CFL infrastructure. It demonstrates the technical maturity, scalability and future-readiness of the Eviden platform. This successful first phase provides a robust foundation for the remaining phases of migration to FRMCS-compliant railway communications.

Phase 2: Second proof of concept - Interoperability of the MCX system with CFL's GSM-R system

The second proof of concept is scheduled to begin at the end of 2025 and to last for one year. This phase will focus on validating interoperability between Eviden's MCX solution and CFL's existing GSM-R system.

The solution will leverage the Lifelink MCx Interworking Function (IWF) to enable seamless communication between GSM-R and MCX users. The objective is to demonstrate real interoperability scenarios, ensuring that critical communication services are maintained on both legacy and next-generation platforms.

As a concrete example, the Eviden system will maintain seamless communication between the FRMCS-compliant dispatch console connected to Eviden's Lifelink MCx system and a train driver using a GSM-R cab radio, despite the use of different communication technologies

Lifelink MCx IWF for GSM-R Interworking will bring several key benefits to CFL:

· Coexistence between legacy GSM-R and FRMCS system

· Uninterrupted communication services with hybrid network operations during the FRMCS migration period

· Reduced infrastructure costs by avoiding immediate replacement of GSM-R equipment

· Support of a phased, low-risk deployment strategy toward full FRMCS adoption

In addition, this phase will include interoperability testing between the MCX system and the CFL Wi-Fi network, with use cases planned in CFL maintenance workshops.

Phase 3: National deployment

The systems validated during phases 1 and 2 will be progressively rolled out in 2027 nationwide across the entire CFL network. This live deployment will include the installation of main MCX servers in a high-availability configuration with geo-redundancy, ensuring maximum resilience and service continuity.

In parallel, additional dispatch consoles, rugged 4G/5G smartphones, PCs and tablets will be deployed. These will be made available to CFL operational, maintenance, and safety personnel, enabling secure and scalable access to mission-critical communication services.

Phase 4: Adaptation to the latest FRMCS and CCS TSI specifications

This phase will start by the end of 2027 and will bring the following:

· Adaptation to the latest FRMCS specifications (namely FRMCS 1st Edition), which is the first complete set of FRMCS specifications that will be operational, deployable and commercially available for railway networks

· Adaptation to the latest CCS TSI specifications from the European Union Agency for Railways (ERA)

· Connection and validation of all MCX functions with a new private 5G FRMCS network from a telecom vendor

At this stage, CFL will be fully compliant with the first authorized FRMCS specifications and latest European directives.

Eviden, a key player in FRMCS

Eviden delivers a full-featured FRMCS Service Layer solution, supported by a long-term road-map and service commitment, designed to seamlessly integrate and complement the FRMCS Transport Layer solutions provided by leading 5G telecom vendors.

- **FRMCS Service Layer**
  - o MCX server
  - o MCX client
  - o MCX client SDK for embedded 3rd party onboard unit integration
  - o IMS/SIP Core
  - o Interworking function (IWF)
  - o Dispatching system and consoles
  - o Voice recording system and playback
  - o Trackside gateway

- **FRMCS TOBA / Cab Radio**
  - o Onboard gateway
  - o Embedded MCX client

- **Cybersecurity**
  - o Design, integration, consulting, maintenance services, pentests
  - o Compliance with new policies (NIS2 directive, CRA regulation and national security rules)

- **Services**
  - o System integration
  - o Project management
  - o Multi-vendor care services
  - o Long-term maintenance
  - o Consulting services

Eviden is an active member of UNIFE and contributes to two key working groups:

- UNITEL, focused on the development and implementation of FRMCS

- The Cybersecurity Working Group, addressing security challenges across the rail sector

Eviden fully recognizes the critical importance of interoperability within the FRMCS ecosystem. To this end, it engages in comprehensive interoperability testing with major FRMCS stakeholders to ensure compatibility, reliability, and alignment with evolving standards.

Eviden has also achieved ETSI recognition through its successful participation in industry testing events, including:

- The 9th MCX Plugtests (2025)

- The 5th FRMCS Plugtests (2025)

In addition, Eviden is an active member of the European FP2-MORANE-2 consortium. Through this initiative, Eviden delivers key components of the FRMCS Service Layer, such as MCX, IWF and dispatchers, and actively supports the testing and validation of FRMCS specifications in real operational environments.

About Eviden

Eviden is a next-generation technology leader specializing in reliable, sustainable, and data-driven digital transformation, with a strong portfolio of patented technologies. Its global leadership in advanced computing, security, AI, cloud, and digital platforms enables it to provide in-depth expertise across all industries in more than 47 countries. By bringing together 47,000 world-class talents, Eviden is expanding the possibilities offered by data and technology across the digital continuum, today and for generations to come. Eviden is an Atos company with annual revenue of approximately €5 billion.

About CFL

The Société Nationale des Chemins de Fer Luxembourgeois (CFL) is Luxembourg's national railway company. In 2023, CFL transported approximately 28.7 million passengers and in 2024, handled 2.3 billion ton-km of freight. With over 5,000 employees, it is one of the country's largest employers. CFL plays a key role in both national mobility and cross-border rail transport.

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