Metro-urban railway solutions

Innovative solutions for the digital transformation

Rail at the speed of life

Our subways, commuter railways and light rail systems are at the center of connecting communities with work and life experiences every day. Whether we are on our way to work, catching a game or out on the town, we rely on today's metro-urban railway systems to get us there.

Yet the world's metro-urban operators want to do even better. They want to connect passengers to the people, things and places they love more securely and efficiently, and with better experiences. As governments look to reduce urban congestion, lower carbon emissions and increase the numbers of passengers served, today's metro-urban railway operators are in the spotlight.

As the transportation backbone of modern, vibrant cities, metro-urban rail needs to provide passengers with a dependable and safe transport service, one that can keep them connected at all times. Nokia is offering innovative solutions for the digital transformation of railways — supporting new, smart railway applications without compromising current ones. Deliver more for your passengers and communities, keep up with the latest technologies and advance your business — ensure that your passengers travel at the speed of life with Nokia.

Nokia railway solutions

With more than 30 years' experience in the rail industry, Nokia has extensive expertise in working with rail operators to develop comprehensive solutions. We are working closely with the transportation industry to standardize advanced communications systems such as FRMCS, and our railway solutions reflect an insider's eye on your future needs.

Train-to-ground

The Nokia Train-to-Ground solution supports multi-path wireless concurrent access backhaul. It can be flexibly deployed over wireless networks such as private LTE/5G, existing Wi-Fi networks or a hybrid network setup. Powered by a unique multi-path switching algorithm developed by Nokia Bell Labs, the solution addresses the need for 100 percent network availability to reliably support highly automated rail operations. Along with end-to-end security, urban/metro rail customers benefit from seamless network coverage, assured bandwidth through capacity aggregation and guaranteed QoS using LTE/5G prioritization mechanisms.

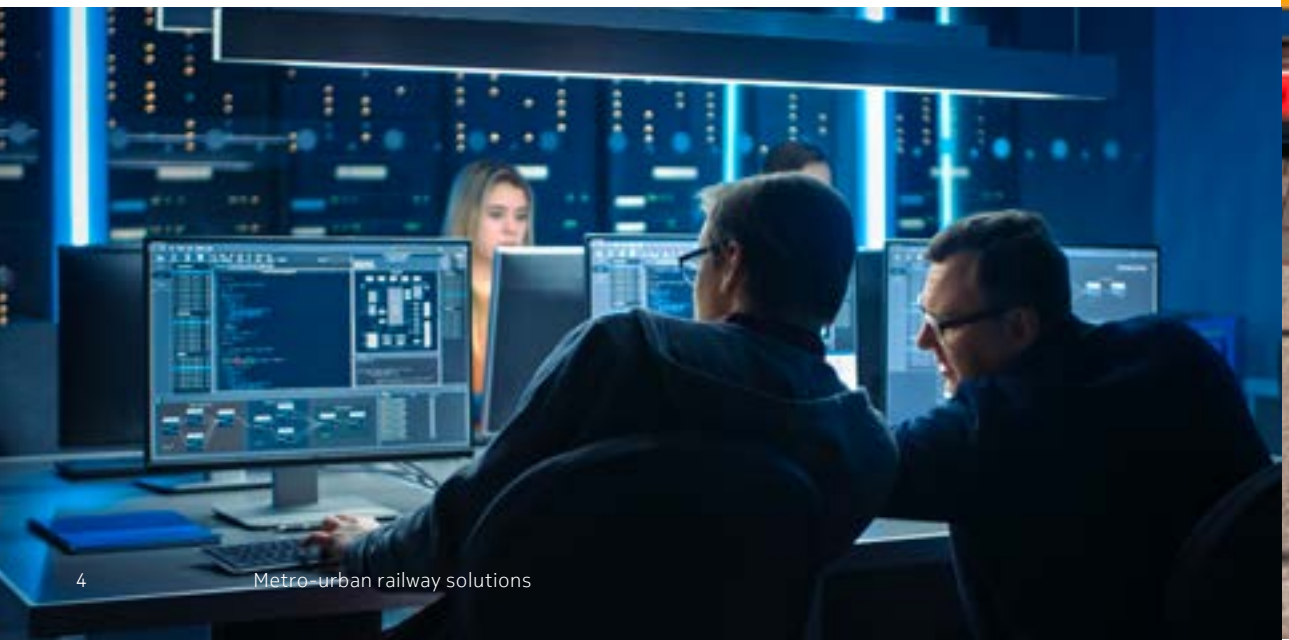
IP/MPLS backbone

The Nokia Mission-Critical IP/MPLS Network for Railways solution provides strong resiliency, assured QoS and robust security. As a converged backbone network, it can support all railway applications regardless of their criticality over a common network infrastructure, with no compromise in performance and security. The network's flexible IP/MPLS VPN service capability supports IP, Ethernet and TDM communications with proper network QoS policy. The Nokia IP/MPLS network can provide ultra-high network availability, which is imperative for railway operators to monitor track and rolling stock conditions even under extremely inclement weather. A Nokia IP/MPLS network is an integral part of an in-depth defense framework to protect railway infrastructure from both cyber threats and physical threats.

Nokia railway solutions

In-depth cybersecurity for railways

Railway operators face increasingly stringent legal, regulatory and compliance requirements, making them directly accountable for ensuring effective information security. We build cyber-defenses aligned with a network's operational objectives to achieve layered security across network, application, data, identity and access management, establishing a series of defenses that close off any attempts to exploit security gaps. Nokia security solutions encompass business processes, regulations and security policies to keep pace with the rapid rise in attacks. Effective cyber-security enables the safe adoption of new IP-based applications for train control, signal control, maintenance monitoring, video protection and passenger information systems.



Grand Paris Express Lines 15, 16 and 17

Grand Paris Express is the new automated metro of France's Capital Region, with 68 new stations and 200 kilometers of additional tracks. Its four new lines circle the capital and provide connections with Paris' three airports, business districts and research clusters. It will service 165,000 companies and daily transport 2 million commuters.

The Nokia LTE private wireless solution will provide indoor/outdoor connectivity across all Grand Paris Express stations, lines and depots.

These include voice, data (file transfer and multimedia support) and video services (transmission, on-board video surveillance) over a high availability private LTE network. Nokia will also supply mobile devices and on-board equipment. The solution will provide critical, high-speed wireless connectivity to meet all future Grand Paris Express operational and maintenance requirements, as well as emergency response and security services.

Bangkok Expressway

Nokia has collaborated with ST Engineering and First One Systems to deploy an IP/MPLS-based mission-critical Backbone Transmission Network (BTN) for the new Mass Rapid Transit (MRT) Orange Line of Bangkok Expressway and Metro Public Company Limited (BEM). The project is expected to be completed by 2030.

When deployed, Nokia's IP/MPLS solution will enable BEM to have a high-capacity, low-latency, reliable and secure transmission backbone to support both vital and non-vital railway applications, including CCTV surveillance, public announcements, passenger information displays, radio communication, and Supervisory Control and Data Acquisition (SCADA), among others.

The new 35.9 km Orange Line will connect the east and west sides of Bangkok, featuring both underground and elevated transit systems. Railway systems worldwide are undergoing digital transformation to enhance operational efficiency, reliability, and safety.

As part of the project, Nokia will develop two BTNs, 10G and 40G, each to support network speeds for voice, data and video transmission between stations and Operations Control Center (OCC). Nokia's solution includes Nokia 7250 Interconnect Router, Nokia 7210 Service Access System, Nokia Network Services Platform and professional services. The solution will help BEM to simplify operations and maintenance while providing real-time visibility into network performance.

London Underground

Hitachi Rail, in collaboration with its transmission network technology partner Nokia, has been awarded a contract by Transport for London (TfL) to deliver a comprehensive communications renewal to support the safe operations of the Tube network.

This renewal will ensure that TfL's multi-services network (MSN) operates at peak performance, minimising functional risks, journey disruptions and costs for TfL.

The MSN serves as the underlying infrastructure that supports Connect, Hitachi Rail's industry leading system responsible for the critical communications ecosystem that underpins the London Underground. This includes radio, transmission and operational CCTV technology used by TfL staff to maintain smooth operations, making the MSN vital to efficiency on the rail network and ensuring a safer and smoother passenger experience.

Legacy systems can slowly become unreliable and could disrupt services, leading to delays and an overall negative impact on passenger journeys. Ensuring a data-backed, integrated and timely update – such as this one spearheaded by Hitachi Rail and Nokia – proactively addresses these concerns, without hampering passenger mobility.

Nokia's mission-critical IP/MPLS network solution is the backbone and complements this system by providing secure, reliable, and scalable connectivity, ensuring that the foundation for this communications ecosystem is robust and sustainable.

Régie Autonome des Transports Parisiens (RATP)

The state-owned public transportation provider, Régie Autonome des Transports Parisiens (RATP), operates most of the public transport in Paris and its surrounding Île-de-France region, including 16 lines of the Paris metro, tram and bus services. RATP serves about three billion passengers per year.
In early 2014, RATP announced that it would renew its network. Its existing SDH and ATM infrastructure had become costly to manage and maintain. Additionally, the old infrastructure was ill-suited for supporting new IP-based and bandwidth-hungry services, such as high-definition video security and multimedia communications among its hundreds of stations. Automated rail services, next-generation passenger applications and other systems were to be supported by the new network to help ensure the safety and security of operations.

The project migrated the tele-communications services for 360 of its stations (and a large number of other sites) to a converged all-IP ultra-broadband network that supports new-generation services, including an advanced video protection system for 15,000 cameras, with unlimited scalability for the foreseeable future.

Based on an IP/MPLS architecture and a fully passive WDM infrastructure, RATP's new network will provide an efficient infrastructure that is robust, scalable and ready for new-generation services. The new infrastructure will support very high speeds and high availability for RATP's voice transmissions, data and images, along with better supervision of the entire network. By converging their five separate legacy networks – CCTV, telephony, IT, TETRA and passenger information – onto one single IP/MPLS network, RATP will reduce maintenance costs and improve operations – critical in today's economic climate.

Milan Metro

The expansion of Milan's metro and changing passenger habits was placing significant demand on the network infrastructure of its metro operator Azienda Trasporti Milanesi (ATM). They needed to extend the rail communication services so as to eliminate disruptions and provide high-bandwidth capacity to support critical security and safety services, all the while meeting passenger demand for access to new information services such as public Wi-Fi.

The Nokia solutions helped ATM enhance its passenger experience, improve operational efficiency and reduce costs by deploying a single, converged IP/MPLS network. It enabled ATM to revamp its teleoperation systems, including remote control of the signalling system and electrification plants using SCADA. It also helped them to realize a new radio system for train-to-wayside communications based on TETRA, and they extended the video surveillance and video recording systems using over 2,500 cameras transmitting IP video flows to a Unified Control Room.

Why Nokia railway solutions?

Nokia has been providing best-in-class railway solutions for 30+ years. We are the world leader in GSM-Railway, and at the forefront of FRMCS development. Overall, Nokia has provided networking, cybersecurity, IoT and analytics solutions to over 150 mainline and metro rail operators.

Our long history in communications innovation is reflected in the nine Nobel prizes won by our Bell Labs researchers. We have extensive experience in designing, deploying and operating mission-critical networks in a variety of industries, including railways.

Nokia OYJ
Karakaari 7
02610 Espoo
Finland

Tel. +358 (0) 10 44 88 000

CID:210626

nokia.com

About Nokia

Nokia is a global leader in connectivity for the AI era. With expertise across fixed, mobile, and transport networks, we're advancing connectivity to secure a brighter world.