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Régie Autonome des Transports Parisiens (RATP)

RATP boosting communications with all-IP ultra-broadband network

Paris public transport provider, RATP, is radically upgrading its transmission infrastructure with a video system and the migration of its telecommunications services to an all-IP ultra-broadband network.

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, as part of the Réseau Express Régional (RER) network. With nearly 54,000 employees and 5.142 billion euros in revenues, RATP serves about 3 billion passengers per year. In early 2014, RATP announced a network renewal of its synchronous digital hierarchy (SDH)/asynchronous transfer mode (ATM) transmission and IP routing infrastructure. The project will migrate the telecommunications services for 360 of its stations (and a large number of other sites) to a converged all-IP ultra-broadband network that will support new-generation services, including an advanced video protection system for 15,000 cameras, with unlimited scalability for the foreseeable future.

Challenges

- Dealing with an explosion of data traffic generated by more than 15,000 CCTV cameras throughout RATP's transportation system
- Migrating from the existing obsolete SDH/ATM infrastructure in order to accommodate advanced IP-based services and applications, with readiness and scalability for the future
- Deploying the network in challenging environments, including busy railroad tunnels
- Ensuring smooth migration to IP of critical legacy applications, including TETRA, telephony and CCTV

Solutions

- A converged ultra-broadband IP/Multiprotocol Label Switching (MPLS) network with dense wavelength division multiplexing (DWDM) optical infrastructure made of:
  - Nokia 7705 Service Aggregation Routers (SARs) and 7750 Service Routers (SRs)
  - Nokia 1830 Photonic Service Switches (PSSs)
  - LAN switches
  - Nokia 5620 Service Aware Manager (SAM) for a unified management platform
- A single infrastructure that integrates all applications except signaling

Benefits

- A high-availability, resilient and scalable all-IP and ultra-broadband communications network
- Reduction of total cost of ownership (TCO) by replacing several legacy and aging networks with a converged IP infrastructure without changing any application
- A scalable solution capable of absorbing new-generation broadband services, such as the 30,000 HD video cameras planned for the future "Grand Paris" project
- A single and unified management platform, simplifying operations and improving operational efficiency and flexibility

“We have a challenging mission-critical situation, with more than 360 metro stations, the growing demand of new services to be deployed, and the imperative to migrate existing aging networks without stopping the passenger traffic. That’s why we have chosen an IP/MPLS network from Nokia.”

Patrick Goasdoué, Director, Telecommunications, RATP

The challenges

In recent years Paris public transportation provider RATP has faced an increasing number of challenges that would require upgrading its communication networks. 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 (HD) video protection, multimedia communications among its hundreds of stations, automated rail services, next-generation passenger applications and other systems that would to help ensure the safety and security of operations.

“We wanted to create a single IP-based infrastructure that would integrate all of our applications on a high-availability, redundant and secure communications network,” says Patrick Goasdoué, the agency’s Director of Telecommunications.

The network’s video component would need to support up to 15,000 HD cameras, with the capability to scale to 30,000 cameras as part of the future transportation component of the Grand Paris master plan for developing areas in the greater metropolitan region. In addition, it would need to be deployed in a difficult environment that includes underground stations and tunnels, with seamless migration of its critical and operational systems to the new, advanced network without disrupting operations.

Why Nokia?

RATP launched a request for quotes (RFQ) in February 2013, and ultimately awarded the project to Nokia in September 2014, based on its proposal for renewal of the full network and evolution of its CCTV infrastructure, including cameras, video management software and storage. Amid multiple bids, RATP chose Nokia for its capacity to understand the migration problem and its offering of innovative solutions to reduce operational risks and accelerate deployment. Another major factor was Nokia’s reputation as a trusted partner, due to its work with RATP for the past 10 years on other critical projects, including the implementation of a private TETRA mobile radio network and ground-to-train data transmission on Paris metro Line 1.

“We have a challenging mission-critical situation with more than 360 metro stations, a growing demand for new services to be deployed, and the imperative to migrate existing aging networks without stopping the passenger traffic,” explains Goasdoué, “That’s why we have chosen an IP/MPLS network from Nokia, which offers the technology, track record and reliability we can depend on.”

The solutions

Nokia will supply a high-availability, redundant, secure and flexible Ultra-Broadband IP network to transmit multiple communication services for RATP. The project is based on an IP/MPLS architecture and a fully passive WDM infrastructure, using products from Nokia's IP routing and transport divisions. For a given metro line, the stations are linked by passive DWDM optical chains, which can greatly enhance bandwidth capacity, delivering 4 x 1Gb/s per station today. Each station is connected at 1Gb/s to each end of the line. Each line is then connected to the core backbone (four nodes) through multiple 10Gb/s connections, transported over coarse wavelength division multiplexing (CWDM). The core network provides 99.999 percent redundancy along with 240Gb/s of available bandwidth. The respective applications (TETRA switches, CCTV data centers, application servers, ...), are also connected to the core with bandwidth ranging between 1Gb/s and 120Gb/s, depending upon requirements. With overall responsibility for the project, Nokia is working in partnership with Cofely-Ineo and Bull, which are responsible for video infrastructure and installation services.

End-to-end networking and service management across all the domains of the converged, all-IP network is accomplished with Nokia's 7705 SARs (providing integration of IP and TDM traffic for TETRA and telephony in stations and buildings), 7750 SRs (in aggregation, core and data center sites) and 5620 SAMs and the 5650 Control Plane Assurance Manager (CPAM). This helps RATP quickly maximize operational efficiencies through fast provisioning and troubleshooting, proactive assurance and a level of flexibility that eases integration of new services into the network. A scalable 1830 PSS will support next-generation WDM multiservice transport between data centers, with a flexible transport layer that offers managed agile photonics, multilayer switching and services, plus network intelligence.

"By converging our five separate legacy networks – CCTV, Telephony, IT, TETRA and passenger information – into one single IP/MPLS network, we will not only reduce our maintenance costs, but also improve our operations."

Patrick Goasdoué, Director, Telecommunications, RATP

The benefits

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 speed and high availability for RATP's voice transmissions, data and images, along with better supervision of the entire network, and enhanced control over performance and flexibility when deploying new services or upgrading existing ones.

The network's optical fiber infrastructure, along with the IP network, will provide the bandwidth capacity required to handle high video and data traffic, including support for RATP's 15,000-camera CCTV system with centralized access to CCTV images for public safety, and network partitioning for application security.

Benefitting from the flexibility, security and efficiency of IP/MPLS, RATP will be able to set parameters for each service according to operational requirements, with low jitter and few delays to handle all traffic in real time. Advanced traffic engineering will allow RATP to select the best path for each service, but also an alternative path to ensure that any service is quickly re-routed in case of a failure.

All of these enhancements will provide RATP with a single, future-ready network for all of its services, with unprecedented advantages in operational efficiency and reliability, simplified maintenance and scalability for future needs. These advantages will lower RATP's TCO while allowing the agency to better serve travelers.

"By converging our five separate legacy networks – CCTV, telephony, IT, TETRA and passenger information – into one single IP/MPLS network, we will not only reduce our maintenance costs, but also improve our operations," notes Goasdoué. "That is critical in today's economic climate."

Next steps

RATP and Nokia executed an agreement for the project in September 2014, and work has begun. The two partners expect to finalize the deployment of the entire solution during the course of 2015. Updating of the project's telephony services is planned to begin in 2016, and will be supported by up to 300 legacy PBX interfaces, eight aggregation sites and three transit PBXs, with full integration over the IP/MPLS network.

Summary

At the completion of this project, RATP will benefit from an advanced Ultra-Broadband IP/MPLS network that is fast, efficient, highly flexible, secure and scalable. The transport provider will be able to accommodate the latest services and applications for all back-office needs and rail operations, including support and scaling capability for extensive CCTV – all with centralized management. The result will be better services for passengers, enhanced operational efficiency for RATP, and a 21st century communications platform that is ready for future expansion and enhancement.

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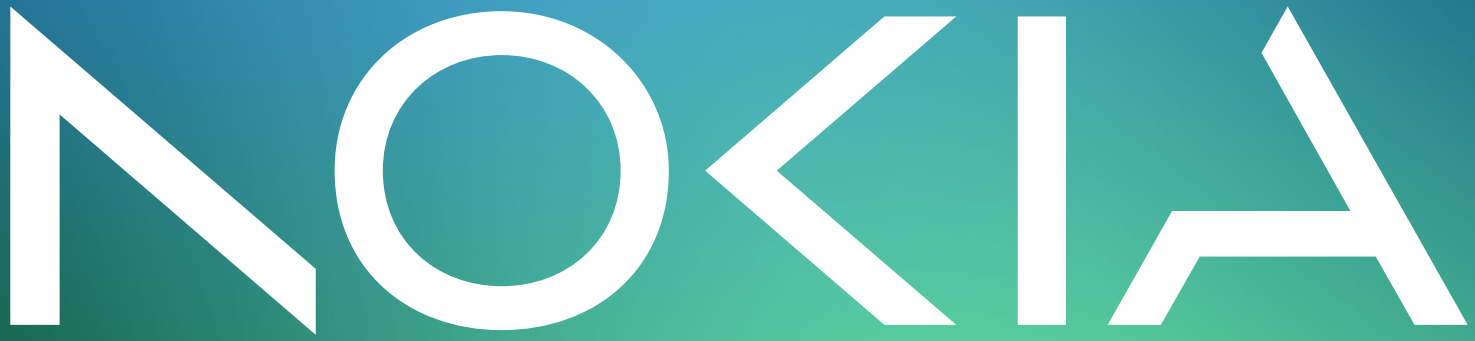

About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.