



Why your communications network holds the key to better safety and customer service

There's no doubt about it – communication technology is business-critical to rail travel today in many ways: making sure the right travel information is always clearly displayed; monitoring staff and passenger safety; ensuring trains are signalled at the correct time. For all of these activities and more, technology plays a fundamental role

On the grounds of data security, network separation and cost, however, it's not unusual for operators to choose to manage a number of separate networks – TDM, ATM, SDH and frame relay – for each activity they need to undertake.

This is becoming counter-productive.

For one thing, each network needs to be managed separately, which can be labour-intensive and costly. More importantly, these are legacy technologies which do not have the bandwidth or scalability to support the needs of the rail industry into the longer term.

For precisely the reasons outlined above, it makes real business sense to move to a single, converged network – one that is robust, secure and simple to manage. Choose a converged IP/MPLS network, and you have the bandwidth and responsiveness to manage all of your current traffic and to adopt a number of new applications, being sure that industry levels of resilience are met, thanks to a rigorous network engineering and design methodology.

This can help you to enhance passenger

safety and satisfaction in ways that you may not have thought possible.

The benefits of convergence

Signalling

Naturally, signalling is mission-critical for the safety of day-to-day railway operations. Monitoring the state of the rail line, controlling traffic flow and generating alarms – all of this depends on the availability of the network, which is why to date many operators have preferred to rely on a separate, dedicated network for this purpose.

If it is to be carried over the same network as other traffic, signalling traffic must be treated as a mission-critical priority – and this is exactly what IP/MPLS can do. IP/MPLS enables a 'service-aware' infrastructure thanks to a built-in mechanism called traffic engineering, which enables operators to prioritise traffic across a network according to its importance.

What's more, an IP/MPLS network can restore traffic within 50 milliseconds in the event of an outage, making the network highly resilient and restoring connectivity before any

"By choosing a converged IP/MPLS network, you have the reliability and flexibility to support existing and new applications, helping you to enhance passenger safety and satisfaction in ways that you may not have thought possible."

interruption of service.

Staff and passenger communications

To provide an efficient work environment, high quality voice and data communications are fundamental for all members of staff. By choosing IP/MPLS, rail operators can not only establish robust fixed internet and intranet connectivity; they also have the flexibility to deploy mobile connectivity to suit a variety of new applications.

A wireless LAN, for example, can be particularly helpful for mobile staff, allowing them to access maintenance manuals and work orders easily while on the move. Data for passenger information displays at station terminals can also be transported over this network, generated at central or regional centres and broadcast simultaneously to as many stations as required.

Passengers can also be offered wireless internet access in stations and on the train, improving customer service.

"By moving CCTV traffic from a dedicated network and deploying it over a converged MPLS-based network, service can be greatly improved."

Video surveillance

Video surveillance via closed-circuit television (CCTV) has become paramount for rail operators to monitor critical assets and ensure the safety of personnel and passengers. But by migrating from a dedicated network and deploying it over a MPLS-based converged network, service can be greatly improved.

At each station, for instance, high quality CCTV camera traffic can be delivered to multiple operations centres at once, in real time. This allows improved image quality, while enabling multiple parties to access the images at any time for better responsiveness in the event of an incident.

If wireless access points are installed along the tracks, the same can be done on the trains themselves to improve passenger safety. The MPLS network can act as a high-speed link, broadcasting camera data back to the control centre.

In fact, IPCCTV can even be used by the driver in order to make train dispatch more efficient. Video images from cameras on the platform can be transferred over the MPLS network straight to a monitor in the operator's cab, reducing the amount of staff needed on the platform and helping to make dispatch both faster and safer.

Cargo tracking

An IP/MPLS network can also be used to support rail operators in their efforts to track cargo. Coupled with a reliable IP/MPLS network, a tracking system (such as one using new radio frequency identification (RFID) technology) can be used to track cargo throughout the rail network, enhancing the efficiency of shipping and boosting customer satisfaction.

A low-risk move to cutting-edge communications

It's important to state that moving to a converged network need not be high risk.

A new IP/MPLS network can be implemented over a range of physical media including copper, fibre and microwave technologies – and it can support existing TDM, frame relay and ATM traffic. This means rail operators can maintain their legacy infrastructure investment and support new IP applications at the same time, lowering cost and risk significantly by allowing them to decide when (and if) to move to IP fully.

What's more, the high performance and reliability of the technology has been extensively field-tested, and officially tested and approved by industry compliance bodies including Iometrix – one of the networking industry's pre-eminent testing authorities.

For all of these reasons and more, IP/MPLS provides the ideal infrastructure for more secure, flexible, cost-effective and advanced rail operations – the ingredients for a better passenger experience and a more successful rail business into the long term.

Alcatel-Lucent's IP/MPLS products have been independently tested to show the highest reliability, which has been proven repeatedly with more than 370 customers worldwide. Offering the widest range of products from any telecoms vendor and with a full complement of engineering, installation and maintenance services, Alcatel-Lucent can help you migrate your network to support all of your current and future communications needs.

IP/MPLS: industry-approved technology

"This series of tests assesses the ability of packet-based networks to support accurate and stable frequency distribution. The results provide conclusive evidence that Ethernet and IP/MPLS networks can distribute synchronization of the same quality as SONET and SDH networks in environmentally challenging multi-hop configurations.

"To the best of our knowledge this series of tests is the first and most comprehensive publicly available examination of Sync-E timing distribution."

Bob Mandeville, CEO, Iometrix

The experience of Banverket

● Rail Authority Banverket has exclusive responsibility for the rail transportation systems in Sweden. This includes all conventional rail, underground and light rail systems countrywide used for freight and passengers and spans almost 12,000 kilometres.

In 2007, Banverket selected Alcatel-Lucent to lead the transformation of its communications infrastructure. By deploying the Alcatel-Lucent solution, Banverket is now managing critical data and services communications with high availability and security over a single, converged next-generation IP network.

Banverket's IP/MPLS based network will carry traffic for GSM-R, operational telephony, passenger information displays in the stations and on-board trains, signalling and track-side emergency phones, video surveillance, station and platform clocks, commercial vendor communications, corporate voice, video and data traffic and more.

"The ability to progressively and efficiently migrate all traffic from several legacy data and voice networks to a single, more efficient network will help us offer the citizens of Sweden an even more efficient and safe railroad network," said Bengt Vidin, deputy head of operations for Banverket. "The performance of the Alcatel-Lucent Service Aggregation Router exceeded our expectations for robust and accurate Ethernet synchronisation, which is essential for all of our safety-critical network communications."

To find out more about our technology and experience in this field, please contact:

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