The connected train

Secure, consistent, fast Wi-Fi for train passengers

THE CHALLENGE

The lack of high-speed connectivity on trains is a well-known problem in the United Kingdom. Wherever they are, whether they're waiting for the train or on it, passengers expect fast Internet connectivity for business and leisure.

In response to this, the U.K. Government has committed to improving mobile connectivity for rail, which is reflected in the KPIs for upcoming franchises. Until now, the only practical way to provide backhaul for in-train Wi-Fi services has been utilising 3G/4G services from mobile network operators, but both poor 4G availability in the UK and the difficult terrain on the railway provide significant challenges.

> "The current model of delivery through existing mobile networks of towers set some distance from railway lines is enabling some of the most immediate challenges to be addressed but it is unlikely to be a cost effective means for achieving high capacity continuous connectivity to trains in the long term, and will become increasingly substandard as passenger data requirements increase."[1]
>
> — National Infrastructure Commission (NIC)

THE SOLUTION

Cisco's new approach, providing high-speed, in-train connectivity using trackside infrastructure, will help train operating companies not just achieve, but exceed, these KPIs. In addition, they will be able to turn passenger frustration into delight and realise significant operational benefits.

Cisco have enhanced their Connected Rail solution to create a fully integrated, end-to-end architecture for delivering high-speed wireless to trains. This architecture is being proven in the United Kingdom as part of the Project SWIFT pilot, jointly funded by Innovate UK, the RSSB, and Cisco. This will deliver up to 500 Mbps to the train from trackside infrastructure.

Crucially, as part of Project SWIFT, Cisco have worked in partnership with Network Rail Telecom (NRT) to utilise their existing fibre and mast assets wherever possible with the relevant product and safety approvals for trackside deployment.

Building on this experience of testing and proving their Connected Rail solution in the United Kingdom, Cisco can now deliver high-speed wireless to trains as a fixed price for the full contract term. This is coupled with trackside CCTV and acoustic sensing to achieve additional service, safety, and operational efficiency benefits.

HOW IT'S PROVEN

A live prototype has been built at the Quinton Rail Technology Centre, allowing Cisco to integrate and test together all the components required for delivering a consistent and high-bandwidth wireless service to the passenger. From this, Cisco have built a proven, tested end-to-end architecture blueprint from trackside fibre right through to the passenger device on the train.

Later this year, as the final part of Project SWIFT, a live production trial will be available between Edinburgh and Glasgow.

Cisco's newly enhanced Connected Rail architecture is now available as a managed service that provides:

- Secure, ubiquitous, wireless connectivity up to 500 Mbps, averaging 300 Mbps

- An upgrade path to double speeds with a single radio for up to 1 Gbps

- Use of NRT masts and fibre

- A full trackside corridor of CCTV and acoustic sensing to quickly detect and react to trackside incidents, such as intrusion or rock falls

- Delivery "as a service" with proactive security and availability monitoring

- Service billed as a single predictable cost per year, with no data charges

THE BENEFITS

Cisco® Connected Rail architecture provides significant benefits to train operating companies in terms of passenger satisfaction, safety, operational efficiency, and commercialisation opportunities.

These create new revenue streams, increase ridership, and show the innovation to achieve, and exceed, franchise KPIs—not to mention the opportunity to surprise and delight passengers.

23%

"Strong and continuous connection makes travel time less onerous by up to 23%."[2]

— *Passenger Demand Forecasting Council*
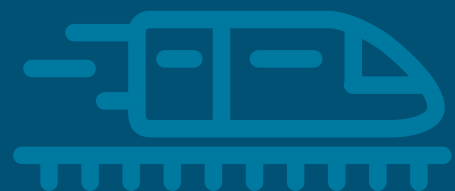
Sources:
1. *Connected Future*, National Infrastructure Commission, Dec. 2016.
2. *Valuations of Rolling Stock Improvements*, Passenger Demand Forecasting Council, 2016.