

Industrial Ethernet Backbone for Railway in Norway



⇒ Project Intro

A globally operating company focussing on service market segments, light express railway service, streetcars and rack railway vehicles offers their customers complete vehicle concepts. Their customised solutions have been used by one of Norway's most important transport companies whose main activities are passenger transport by train and bus and rail freight operations. The company needed to establish reliable, redundant train backbones to connect all associated devices inside the cars. The network also needed to be able to integrate legacy devices and build an easy to install, control and maintain solution.

Company: **A globally operating transportation solution provider**

Location: **Norway**

System Requirements

- Products for a fast establishing network, with little boot up time: The train network must be ready before the embedded computers in the train are booted
- Reliable, feature-rich and train application certified switched for flexible solutions
- Sufficient numbers of ports to connect all devices to the network
- Comprehensive service and support, and value for money products

Moxa Solution

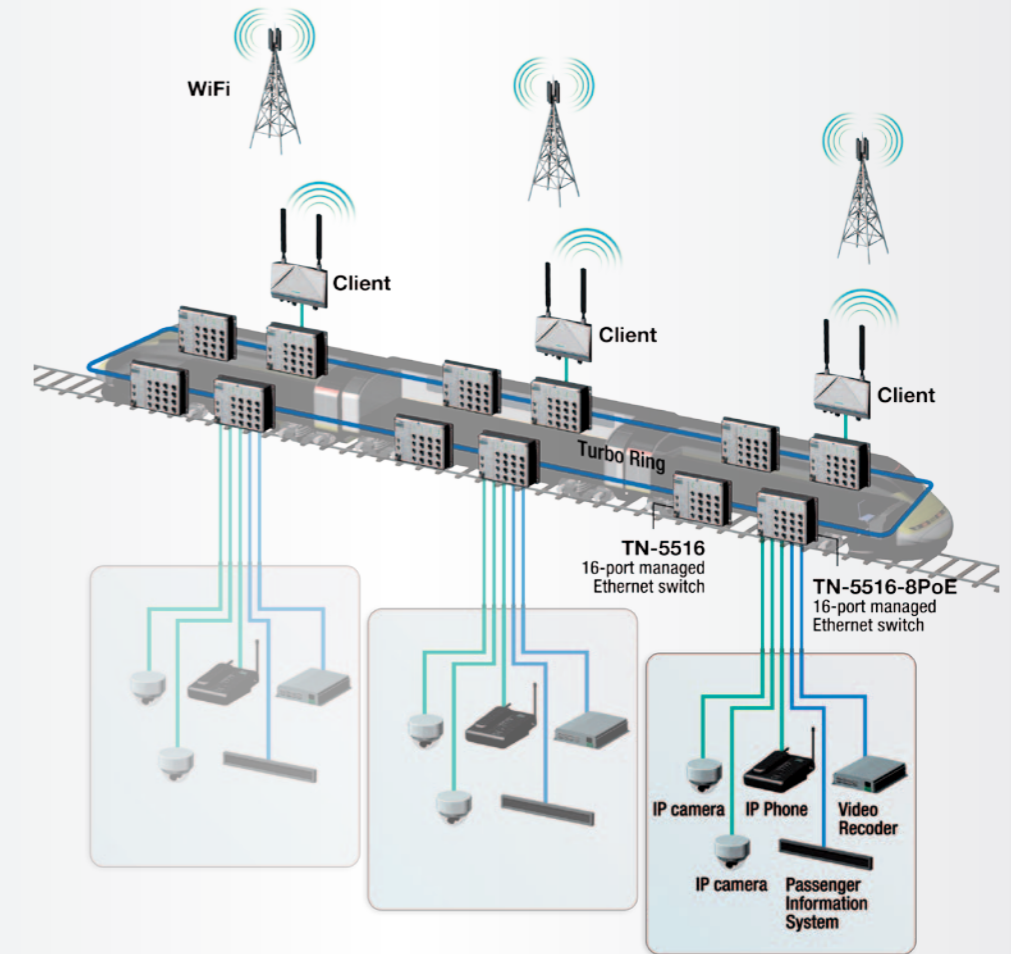
The manufacturer of railway vehicles was looking for reliable industrial Ethernet switches to establish the network infrastructure on-board fifty of their trains, and to connect all the associated devices, i.e. IP cameras, IP phones, video recorders, a passenger information system, a passenger counting system and a WiFi system to this network.

Their major requirement was to set the switches up in one ring topology per consist. This could easily be realized with Moxa's Turbo Ring technology. A consist is composed of a locomotive and five cars. In each car, four TN-5516 EN50155 16-port managed Ethernet switches are installed. The PoE versions of the TN switches connect to IP cameras for video surveillance and IP phones for a security line. The regular switches connect to an embedded computer functioning as video data recorder that stores the video data from the cameras, and to a passenger information system with displays to inform the passengers while travelling. Moreover, there is the connection to a passenger counting system that delivers data on how many people actually travel with the train. The network also connects to several access points/clients that ensure wireless connection to outside antenna towers to provide passengers with WiFi services. The WiFi system also connects to a central control station for monitoring, control and maintenance.

With the redundant, reliable ring backbone, the railway company is able to offer their passengers a maximum of state-of-the-art information and entertainment services, plus security functions such as video surveillance.

System Diagram

- Twisted Pair Cable
- PoE Connections



Why Moxa?

- Moxa's switches take only 5 to 6 seconds to boot, beating other manufacturer's products
- TN-5516 has a built-in DC/DC converter. This saves the customer the installation of an additional converter – and with this space, time and money
- Sophisticated products that cover the different power inputs on-board a train: 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC dual, isolated redundant power supply increases the reliability of the communications
- Moxa's service package and the value for money of the offered solution convinced the customers

⇒ Product



TN-5516 and TN-5516 PoE – EN50155 16-port Managed Ethernet Switches

- IPv6 Ready
- PoE (Power over Ethernet) functionality
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring, Turbo Chain, and RSTP/STP (IEEE802.1w/D) for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization

And many more features. For details please refer to www.moxa.com