



# Railway Transforms Transportation Environment

Executive Summary
<b>Customer Name</b> Netherlands Railways Utrecht, The Netherlands
<b>Industry</b> Transportation
<b>Business Challenge</b> <ul style="list-style-type: none"><li>• Improve passengers' experience of their end-to-end journeys</li><li>• Increase staff productivity, and reduce internal costs</li><li>• Create and develop new revenue streams</li></ul>
<b>Network Solution</b> A secure Unified Wireless Network based on the Cisco Service-Oriented Network Architecture (SONA), in conjunction with context-aware intelligence, is delivering mission-critical information and innovative services in stations and on trains. Cisco SONA Interactive Services included: <ul style="list-style-type: none"><li>• Infrastructure</li><li>• Identity</li><li>• Mobility</li><li>• Security</li></ul>
<b>Business Results</b> <ul style="list-style-type: none"><li>• Saved €8 million in operational costs</li><li>• Improved on-time performance and station security</li><li>• Opened door to new revenue-generating service opportunities through on-board delivery of information, news, and advertising content</li></ul>

**Netherlands Railways is using the Cisco Intelligent Public Transportation solution over a Service-Oriented Network Architecture to counter competition, improve customer service, increase operational efficiency, and generate additional revenues.**

## Business Challenge

Entering the new millennium, [Netherlands Railways](#) (Nederlandse Spoorwegen) decided to respond to competition from cars and planes by countering consumers' perception of rail travel as unpunctual, unsafe, and unpleasant.

The company manages the most concentrated train network in Europe, serving 400 stations throughout the country and carrying approximately one million passengers per day. Faced with the need to improve customer service, meet targets set by regulators, and generate additional revenues, Netherlands Railways started to explore the benefits to be gained from technology. Today, the adoption of intelligent mobility services is enabling the company to meet its objectives and driving the creation of a new collaborative business model.

"We needed to differentiate ourselves from other modes of transportation and make ourselves competitive in ways in which we were not before," says Philippe Smit, director of marketing and sales for Netherlands Railways.

## Network Solution

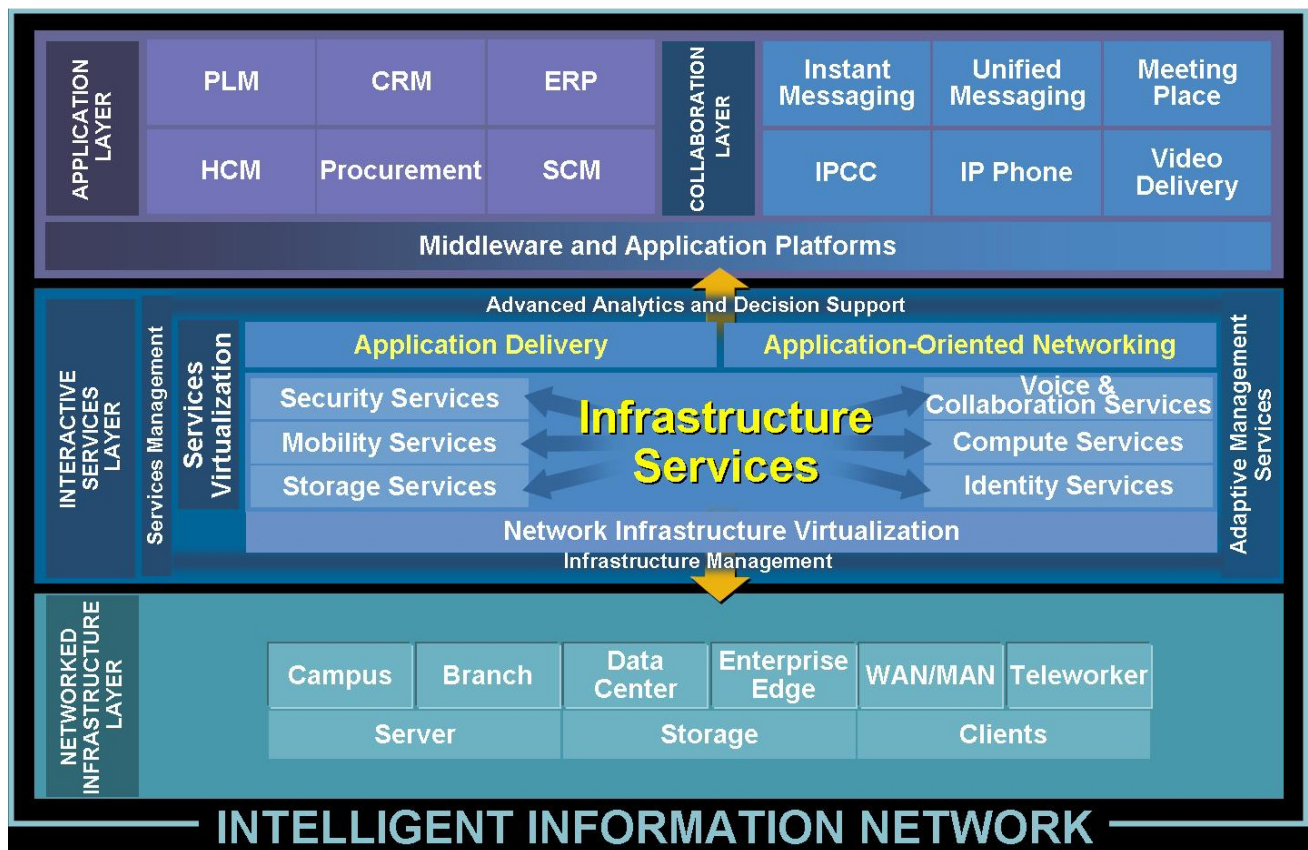
For help in meeting its aggressive objectives, Netherlands Railways deployed services and equipment of Cisco Systems®, [Capgemini](#), and [Appear Networks](#) – three companies that had worked with the Railways in the past and shared its vision for using communications technology to transform operations.

Capgemini has worked with Netherlands Railways for many years on reengineering processes and strategy. Pieter Zylstra, head of mobility for Europe and AsiaPac at Capgemini, says: "Mobile technologies are creating breakthrough business models and transforming the global public transport industry. Train companies are now able to bring new revenue-generating mobility services to their passengers, and to help ensure cost efficiencies at the operational level. Cisco® technology and vision of the intelligent information network show how a single infrastructure can not only serve both the business and its customers, but can also transform operations, removing areas where information is isolated by helping ensure that the right information is in the right place."

Together, the four organizations designed a new communications infrastructure called the [Mobility@NS](#) project. The network is based on the Cisco Service-Oriented Network Architecture (SONA). This architectural framework offers a path to migration. It allows the enterprise to pragmatically implement the intelligent information network vision to transform an existing infrastructure – with all its interconnected components – into a single, integrated system that unites disparate networks, applications, and databases.

By focusing on the network interactive services layer – the link between the networked infrastructure (of clients, servers, and storage) and the applications layer – Cisco SONA helps enable the infrastructure to enhance collaboration tools and business applications such as customer relationship management, enterprise resource planning, or human resource management.

**Figure 1**  
Cisco Service-Oriented Network Architecture (SONA) Framework



A Cisco Unified Wireless Network covers 49 rail stations throughout the Netherlands, providing not only public hotspots at each location, but also a secure, scalable solution with pervasive access to network resources and applications, regardless of location and client device.

In Europe’s largest deployment of its type, the Railways’ 10,000 frontline employees use Windows mobile-powered personal digital assistants (PDAs) for instant access to applications and information, which are made available by mobility services delivered through the Cisco SONA framework.

**Figure 2**  
Netherlands Railways PDA



Using a set of predetermined filters – including job responsibilities, physical location, time-of-day, and device type – Appear IQ, a “context aware” middleware from Appear Networks, identifies the mission-critical data and available applications that have value and relevance to each mobile employee and pushes them to the user’s handheld device. Railways customer service representatives, train conductors, platform staff, and operations teams have access to application services, regardless of where they are located. This rapid adaptation of resources improves employee efficiency, responsiveness, and overall productivity.

“We sought a single IT infrastructure that would solve the productivity challenges within the company, while at the same time, providing the means to offer new services to customers,” says Wim Liet, manager of business applications for Netherlands Railways. “The great thing was to find a solution that could be used for both these processes. This provided the foundation of our new business model.”

**“We moved to a service-oriented architecture that is actually the prime mover behind the entire new business model. It is not only supporting the business, it is driving the business.”**

– Kostas Gerogiannis, chief information officer, Netherlands Railways

## Business Results

“Previously, IT was focused on supporting operations, but we began to do much more,” says Kostas Gerogiannis, chief information officer for Netherlands Railways. “We moved to a service-oriented architecture that is actually the prime mover behind the entire new business model. It is not only supporting the business, it is driving the business.”

### **Unparalleled Mobility**

The system operates 365 days per year, 24 hours per day, and supports 10,000 users in 49 stations. On station platforms, train conductors and drivers, customer service representatives, and other staff wirelessly access business-critical data such as traffic information, schedules, shift rosters, maintenance information, and temporary speed limits. In the future, the network may be used for security applications, such as silent alerts and access to video surveillance feeds.

### **Improving Operational Efficiency**

With virtualized communication, users gain approximately 25 minutes each day that they previously spent downloading information to their PDAs and are able to resolve train delays faster. As a result, Netherlands Railways' punctuality rate has improved by four percent in a very short time. The company also saved almost €8 million in operating costs annually.

Overall, hundreds of employees have also been freed up for new assignments. New uses include maintenance personnel, with location and function-aware PDAs, being notified in real-time of problems requiring attention.

### **Increasing Public Safety**

Staff can respond to security incidents faster. Sound- and motion-detecting cameras are deployed in trains and stations and linked to the network, enabling the nearest security staff member to be alerted via a PDA when any abnormal behavior is observed. Over the past year, the number of such incidents has declined significantly, according to the Railways' transit police.

### **Improving Customer Satisfaction**

Schedule information is easily accessible online and on the trains, and passengers also can view daily national news. KPN's public wireless hotspots, available when the train stops at a station, are also popular with passengers, providing Internet access on a "pay-as-you-go" basis. The online information now available could aid in travel planning and saves time.

### **Generating New Revenue Streams and Business Opportunities**

The public Internet access service is provided and managed by KPN, the Dutch telecommunications service provider, with a joint KPN and Netherlands Railways branded portal providing access to travelers. KPN uses various technologies and companies to realize the network end-to-end. In future the Railways aims to generate new revenue streams. This could be realized a business model that shares advertising revenue from on-train advertising and news broadcast partners. Content is downloaded to onboard screens from wireless access points as the train passes through a station and updated as it reaches the next station.

### **Fighting Fare Fraud**

Wireless access to back-office data and applications is helping eliminate fare avoidance on trains. Customers without a ticket must provide personal information to conductors, who use their PDAs to check this information and, if necessary, to ask security personnel to intervene. Ticket checking will soon be made unnecessary, because customers will be able to load their mobile phones with paperless proof of payment. Conductors will check these tickets using their PDAs, accelerating the process for themselves and for customers.

"The Cisco end-to-end network enables us to save money on internal communications and allows us to make money in new value-added applications for customers," says Paul Diercks, manager of mobile services at Netherlands Railways. "We have many ideas for internal service improvements and for new services to customers. The Cisco network allows us to use a single technology to accomplish all of these objectives."

## Next Steps

Other initiatives are in the discussion stage. Netherlands Railways soon expects to offer MP3 downloads to customers' MP3 players, as well as television for mobile phones. Netherlands Railways is already working with Cisco to pilot worldwide interoperability for microwave access solutions for faster communications over a wider geographical range, which will enable more varied, media-rich content on trains.

## Technical Implementation

Wireless coverage at each station is typically achieved through 12 Cisco Aironet® 1231 Access Points using Power over Ethernet provided by a Cisco Catalyst® 3560 Series 24-port enterprise-class switch, which collapses the traffic and securely separates it into two streams. Operational traffic goes to a Cisco 3745 Router, which connects to Netherlands Railways' countrywide corporate network, a managed Virtual Private Network service over an end-to-end Cisco Multiprotocol Label Switching network.

Public wireless Internet hotspot traffic is switched to a KPN-managed server and a Cisco 837 Router, which provides secure connectivity to the Internet via an Asymmetric Digital Subscriber Line connection.

Access to the network from PDAs is achieved using 802.1x and EAP-PEAP authentication, with users entering a username and password. End-to-end network security is achieved through the SONA framework with a range of techniques, including firewalls and a three-tier zone approach.

The Appear Context Engine allows frontline employees to automatically receive context-specific information when entering a Wi-Fi-enabled station. Click-and-Run technology from Appear Networks automatically downloads, installs, and executes the chosen application directly on the user's device, while the Appear Synchronization Module automates the complex synchronization process between the user devices and the back office.

## For More Information

To learn more about Cisco Service-Oriented Architecture, visit: [www.cisco.com/go/sona](http://www.cisco.com/go/sona).

To learn more about Cisco Wireless solutions, visit: [www.cisco.com/go/wireless](http://www.cisco.com/go/wireless).

To learn more about Cisco switching solutions, visit: [www.cisco.com/go/switching](http://www.cisco.com/go/switching).

To learn more about Cisco routing solutions, visit: [www.cisco.com/go/routing](http://www.cisco.com/go/routing).

To learn more about Netherlands Railways, visit: [www.ns.nl](http://www.ns.nl).

This customer story is based on information provided by Netherlands Railways and describes how that particular organization benefits from the deployment of Cisco products. Many factors may have contributed to the results and benefits described; Cisco does not guarantee comparable results elsewhere.

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## Services

### Cisco SONA Interactive Services Implemented

- Infrastructure
- Identity
- Mobility
- Security

### Partners

- Appear Networks ([www.appearnetworks.com](http://www.appearnetworks.com))
- Capgemini ([www.capgemini.com](http://www.capgemini.com))

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