Transforming Public Transit in Austria

LINZ AG TELEKOM connects people, trams, and data for higher efficiency, lower environmental impact, and an outstanding passenger experience.

Case study
LINZ AG

Size:
2,600 Employees

Location:
Linz, Austria

Industry:
Government

Challenges

- Enhance safety for trams and passengers
- Deliver an innovative passenger experience
- Improve operational efficiency with better insight

Solution

- Built on the existing Cisco network as its highavailability platform
- Deployed Wi-Fi and sensors on city trams connected to the network
- Used Cisco Industrial Ethernet to connect stations, ticketing machines, and digital displays

Results

- Increased tram efficiency and performance while reducing energy consumption by 10 percent
- Reduced carbon dioxide output by 85 tons in just 9 months
- Simplified maintenance on ticketing machines
- Enhanced capacity management

Linz, Austria lies at a strategic point on the Danube River where the river curves and changes direction. The city's beauty and rich history make it a popular tourist destination. LINZ AG is part of the technical-services arm of the City of Linz, Austria. It produces and distributes energy, power, and water; supports network services for the hospital and city government; operates public transportation in the city; and provides multiple additional communal services to the people of Linz and its surroundings. The leaders had an innovative vision for city transit, wanting to further digitize transit operations, rethink core processes, and embrace the Internet of Everything as it upgraded its tram system.

The enhanced tram system would enable 24-hour-per-day video security monitoring so that LINZ AG could monitor stations for safety and also improve coordination between trams. Equipment also had to be able to withstand harsh outdoor environments and constant use.

"LINZ AG has had a strategic relationship with Cisco for the past decade," says Georg Linhard, project manager for LINZ AG TELEKOM. "We decided to build on our existing Cisco® network and channel its agility and simplicity to incorporate new security, mobile, and analytics technologies that help us achieve our goals and gain greater business insight."

Trams support up to 500 simultaneous Wi-Fi users and generate more than 20 gigabytes of 3G wireless traffic per tram per month.

An application centric infrastructure

LINZ AG began the digital transformation by upgrading analog systems and serial connections to digital and fiber connectivity. Building on the existing Cisco network, LINZ AG added Ethernet video security monitoring, voice over IP (VoIP) capabilities, Cisco wireless network controllers and access points on trams and stations, and Cisco Industrial Ethernet switches.

Tram stations are connected to the network using Cisco Industrial Ethernet Switches, which are ruggedized for harsh environments. At stations where wired connectivity is not available or practical, Cisco mobile solutions (Cisco Integrated Services Routers [ISRs]) provide 3G wireless traffic backhaul. Tram stations and the tram garage are connected using video security monitoring, which runs on the network. The new video security solutions work intelligently with existing network and cybersecurity solutions to protect the network, devices, applications, users, and data. Cisco Industrial Ethernet Switches also power ticketing machines located around the city.

Smart connected trams

LINZ AG's 56 trams now provide free public Internet services, thanks to Cisco wireless controllers and access points. Some stations also offer guest Wi-Fi service. Today the trams support up to 500 simultaneous Wi-Fi users and generate more than 20 GB of 3G wireless traffic per tram per month. The same wireless controllers also transmit shift and drivers' schedule details to the main driver information system for optimizing scheduling.

“ People regard the Internet of Everything as a certainty and are excited about it. Our leaders are actively involved in seeking new insights and innovation for the city of Linz, and the Internet of Everything is integral to their vision. It will change society.”

Michael Langerreiter
Project Manager, LINZ AG TELEKOM

Self-diagnosing ticketing machines

New ticketing machines can support cash or credit card transactions while being monitored and managed from a central location. LINZ AG staff can update the user interface on any—or all—ticketing machines across the city when needed. Through Cisco Industrial Ethernet switches, the ticketing machines also notify LINZ AG staff if they are blocked or tampered with or malfunction. LINZ AG can dispatch a technician to the right location with the right part to get the machine back online as quickly as possible. With 400 ticketing machines around the city, automatic notification saves technicians hours of time and helps eliminate return trips for the right parts.

Dynamic displays improve transparency

Using real-time video displays at tram stations, LINZ AG now displays tram schedules and can announce events or incidents that might cause transportation delays so that passengers can take alternate routes. Data from connected trams and existing data sources can be analyzed in real time, which enables LINZ AG to optimize traffic flow and improve schedule accuracy. Now, passengers know when a tram is coming, and if not, why not. They can complete their trips faster, and the city has greater transparency with the public.

Analytics drive improvement

By connecting trams, data, and people, LINZ AG can gather, analyze, and apply data to improve processes and innovate further. Since the tram system was upgraded, LINZ AG can better predict passenger loads during city events. They increased tram efficiency and performance while reducing energy consumption by 10 percent, and carbon dioxide output dropped by 85 tons in just 9 months.

Sensor data optimizes maintenance

A unique machine-to-machine (M2M) solution developed and deployed by system integrator and Cisco Gold Certified Partner Kapsch was installed in the LINZ AG trams. These smart trams send sensor data over the wireless security system to the operation control center. Sensors measure attributes such as power (electricity) consumption, temperatures, braking distance, and weight. If the team identifies a potential problem, it can send the tram to the garage for maintenance. On-time maintenance helps assure long life for the tram while avoiding unnecessary procedures.

Passengers gain convenience

Mobile roaming charges in Europe are costly, and Linz welcomes a high volume of tourists each year. The city is committed to offering free public Wi-Fi access, and free Wi-Fi access on trams helps passengers reduce their mobile costs. The system receives 150,000 logins per month from passengers and carries over 100 million passengers per year. Linz also has deployed audio announcements and emergency call boxes at the stations and on trams using VoIP. With this capability, blind passengers can easily determine that they are on the correct tramline and going the direction that they wish to travel.

The new certainty

The Internet of Everything is expanding to incorporate the Linz bus system with the tram system. The same wireless, video security, and voice solutions could be deployed on the city's 180 buses. City leaders also envision smart parking, street lighting, and traffic management services.

"People regard the Internet of Everything as a certainty and are excited about it," says Langerreiter. "Our leaders are actively involved in seeking new insights and innovation for Linz, and the Internet of Everything is integral to their vision. It will change society."

For more information

To learn more about the Cisco IoT solutions, visit: www.cisco.com/go/iot

Products and services

Data center

- Cisco Nexus® 5000 and 7000 Series Switches
- Cisco Nexus 2000 Series Fabric Extender
- Cisco Catalyst® 6800 Series Switches
- Cisco Unified Computing System™ (Cisco UCS®) servers
- Cisco ACE Application Control Engine Module
- Cisco MDS 9148 Multilayer Fabric Switch

Routing and switching

- Cisco 819, 890, 1940, 2911, and 3945 Series Integrated Services Routers
- Cisco ASR 1000 Series Aggregation Services Routers
- Cisco Catalyst 2960, 3560, 3650, and 3750 Series Switches
- Cisco Industrial Ethernet Switches

Wireless

- Cisco Wireless Service Module 2
- Cisco 2504 Wireless Controller
- Cisco Aironet® wireless access points
- Cisco Aironet 1530 and 1550 Series Outdoor Access Points

Security

- Cisco ASA 5500-X Series Next-Generation Firewalls
- Cisco Identity Services Engine (ISE)
- Cisco Secure Access Control Server

Network management

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- Cisco Instant Connect
- Cisco Instant Connect Dispatch Console
- Cisco Unified Communications Manager
- Cisco Unified IP Phones 7965G