SECURE WIRELESS SOLUTION

Mobile Wireless Broadband Connectivity for Italian Railways

Challenge

Guaranteed bandwidth requirements across the whole link.

Solution Technology

Use of Fixed broadband wireless access (FBWA) to provide broadband interconnection of railway stations & train carriages. Run communication, security and safety services. Replace existing leased line network.

Equipment

Network:

- InfiNet Wireless R5000-O single-radio 36 mbps, 5.4 GHz
- InfiNet Wireless R5000-O dual-radio 36 mbps, 5.4 GHz
- Stella Doradus parabolic and panel antennas

Introduction

Headquartered in Puglia, Italy, Ferrotramviaria manages North Bari's railroad and bus public transit services over a 1,400 km area with approximately 700,000 residents. As the third-largest Italian railway company, Ferrotramviaria SpA operates the 70 km line connecting the Southern cities of Bari and Barletta, which links Bari to other main towns in the North Bari area, including Bitonto, Terlizzi, Ruvo, Corato, Andria and Barletta.

After installing a video surveillance system using leased lines, Ferrotramviaria SpA decided to implement a more advanced solution. Ferrotramviaria wanted to provide broadband interconnection among all its railway stations and to replace the existing leased line network. They wanted to run communication, security and safety applications while reducing operational costs. I-TEC Srl and partner Teckne Srl were chosen to design this new network infrastructure.

Key business problems

Ferrotramviaria was looking to find the most efficient, cost-effective way to improve the performance of its network, and become the technological leader among Italian railways. The company was looking to expand its network in the following key areas:

Station-to-Station Communication and Administration

Interconnectivity and open communication between stations is the most important issue for a railway company, particularly for the successful implementation of a video surveillance system. The original network used VPN tunnels over ADSL connections and suffered from network bottlenecks. It also had No back-up network or remote administration capability.

Fixed-Mobile Communication

The availability of a communication channel between station and train is also important, to enable the driver-control room communication in real-time.

Train Communication

There is a need for train-to-station & carriage-to-carriage communication to provide various media, communication & security services. These must connect various devices such as video cameras next to sliding doors, screens and speakers for audio-visual messages, etc.

Project details

As already mentioned Ferrotramviaria required a cost effective and modern broadband network to support many different services, i.e. video, voice, data. They also needed to enable fixed-mobile communications between the stations and trains. This would allow the driver to see video images of passengers loading and manage train carriage communications for service, location and emergency messages.

The main challenge was bandwidth management and Quality of Service (QoS) across the whole network. To accomplish this, Teckne Srl asked I-TEC Srl to provide a FBWA solution to replace the existing leased lines. After an initial feasibility study carried out by Teckne, a four phase project was developed.

1st phase – July 2006
First eight stations (Bari Centrale Ruvo di Puglia) interconnection (completed).

2nd phase – July 2007
Interconnection of the other five stations (from Ruvo di Puglia to Barletta). Pilot test of fixed-mobile communication between the station and the train.

3rd phase – First half 2008
Implementation of fixed-mobile train-to-station communications. In-carriage & carriage-to-carriage pilot project.

4th phase –First half of 2009
Implementation of in-carriage & carriage-to-carriage network.

The feasibility study effectively proved that a broadband wireless link among the stations could achieve a bandwidth of at least 10 mbps, more than enough for carrying the current video surveillance information and planned upgrades.

Solution

The Ferrotramviaria network topology comprises two networks – radio and SHDSL – providing interconnection between all the railway stations. Separate interface. The following outlines how the network was designed:

Primary Backhaul Wireless Network

The main backbone uses InfiNet Wireless radios. Two R5000-O radio types were used: 36 Mbps 5.4 GHz single & dual radios coupled with Stella Doradus parabolic and panel antennas. The average throughput achieved is 9 Mbps.

SHDSL Back-up Network & OSPF Routing

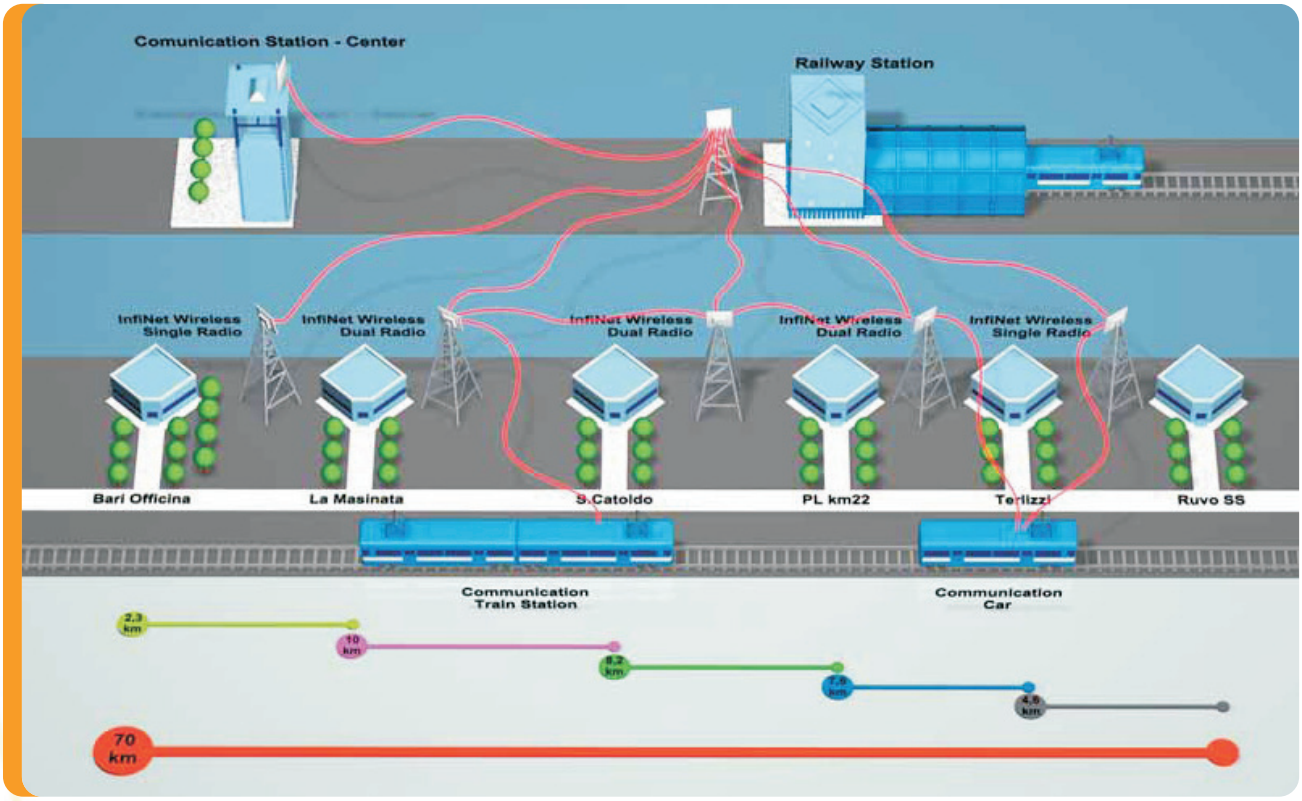
In order to achieve automatic failover between the radio & SDSL networks, OSPF routing is used. This guarantees that if a link goes down, all traffic is automatically routed through an alternative link.

To implement this resiliency, two types of routers were implemented:

- Tahoe 682 and 684 SHDSL routers;
- I-TEC X3ME station routers.

UMTS & ADSL Remote Administration

To provide remote monitoring and assistance of the system, I-TEC and Teckne deployed a VPN over UMTS tunnel. System & network management can be performed from Teckne's or I-TEC's offices in Milan or Ferrotramviaria office in Bari.



Summary

Ferrotramviaria SpA wanted an advanced network to provide broadband connectivity between stations & trains along 70 kms of railway line between Bari to Barletta. The network had to provide communication, security and safety applications. It also had to replace the existing leased line network.

I-TEC Srl and partner Teckne Srl designed a new broadband communications network based on InfiNet Wireless radios. Not only did it provide CCTV surveillance from a central location, it also allowed Ferrotramviaria to implement a fixedmobile network between the railway stations and the trains. This network transports voice, data & video for incarriage services such as announcement and emergency messages.

The four phase project began in July of 2006 and will be completed in the first half of 2009.

About InfiNet Wireless

Established in 1993, InfiNet Wireless is one of the largest privately owned Fixed Broadband Wireless Access (FBWA) development and manufacturing companies in the world. With more than 17 years of intense customer based research and product development, InfiNet's range of wireless connectivity solutions are the preferred choice of global communication corporations and governments who require uncompromising connectivity. To date, InfiNet Wireless has forged a solid foundation in fixed wireless installations, and currently has thousands of deployments successfully deployed in over 50 countries. Its philosophy of providing the most flexible, reliable, cost-attractive and innovative solutions in the industry has helped it to reach the market leader position for Wireless solutions in Russia and Central & Northern Asia, and is the benchmark of carrier grade multiservice broadband wireless access systems.

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