

Case Study

**TUNNEL MANAGEMENT****SOLVING HIGH BANDWIDTH & POWER ISSUES WITH IP CAMERAS**

Tunnels are one of the most dangerous traffic environments. A tunnel accident can quickly escalate into a tragedy. But tunnel management, monitoring and incident management systems are only as good as the network infrastructure being used to collect and send critically important data.

The eWorx SE500 Series of managed switches from B+B SmartWorx powered by Advantech provided a leading Norwegian tunnel constructor with a reliable, safe and robust network — and solved previous application challenges. Tunnel monitoring data can now be passed to control rooms and emergency services with confidence and reliability.

THE CHALLENGE

Prior to the new tunnel's opening in Norway, all of the necessary safety measures and equipment checks needed to be completed. It was required that the traffic management engineers could monitor the status of the tunnel's traffic in real-time via the Internet. Since the total distance of the network is greater than 100 KM and a high amount of data with reliable transfer accuracy was needed, an issue of bandwidth had to be solved.

Due to the use of high-definition PTZ cameras, the application required power up to 25W per camera for video surveillance. In addition to a high-bandwidth need, engineers also had to consider the likely possibility of future growth — devices that would grow with the application. The non-stop tunnel surveillance, in combination with the harsh operating environment within the tunnel, demanded a **high-tech, innovative and intelligent system of Ethernet devices**.

Another necessary requirement of the Norwegian engineers was a reliable network with redundancy and fast recovery function in case of node failure. They needed to be able to monitor all fiber connection statuses in real-time, including transmission power, voltage, temperature, etc. Due to the large number of modules equipped in the system, such as speed detectors, smoke detectors, temperature detectors, PIS LED information board, PoE (Power over Ethernet) IP cameras, voice broadcasting, PoE IP phones, license plate recognition system and traffic light controls, a reliable and fast redundancy network was essential.

The system was expected to support wide industrial-grade temperatures since the equipment would be installed outdoors. The entire mechanism had to be able to withstand harsh environmental conditions. Because of the size of the network, engineers also had to jump the hurdle of mass deployment in the field. Deployment and multiple manual configurations of devices would be a hassle and risk the possibility of human error.

THE SOLUTION

To meet the many challenges of the application, the system integrator in Norway chose B+B SmartWorx eWorx SECP510-2SFP-T industrial switches from the SE500 Managed Switch Series. The series' interface includes eight 10/100 RJ-45 and supports IEEE 802.3 af/at PoE ports and two Gigabit Copper/SFP (Small Form Pluggable) fiber combo ports. The industrial-grade switches are fully-managed, have a wide operating temperature from -40 to +75°C and support 802.1x authentication processes.

With Gigabit bandwidth, the SE500 Series has the built-in intelligence to transform with the network. The series utilizes compact sizes, the ability to connect multiple network layers and unique port combination options, such as up to 28 ports for Gigabit in 19-inch rackmount and a 20-port Gigabit in DIN-Rail option.

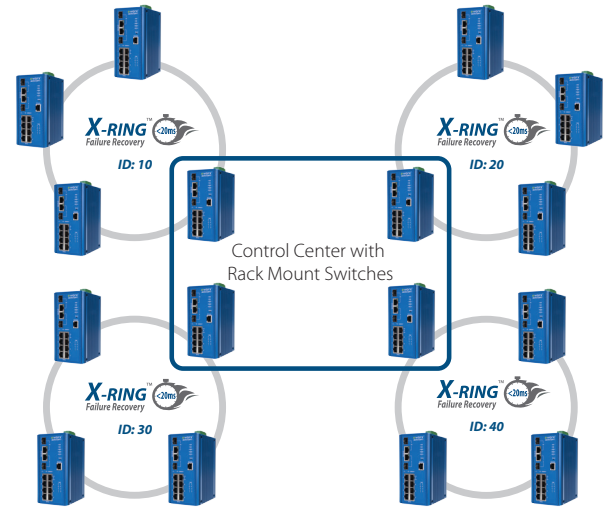
Each of the Ethernet ports (ports1~8) provides up to 30W power to connected devices with PoE/PoE+ port monitoring and configuration. This eliminated the need to run dedicated power lines to the camera locations. Administrators and operators can monitor power consumption, voltage and temperature from the managed switch interface.

To solve mass deployment issues and concerns, the SE500 Series uses IXM Intelligent Provisioning Technology. With IXM, administrators can upgrade firmware and deploy and restore configurations to groups of switches quickly and efficiently. IXM offers auto synchronization of firmware updates and push configuration settings for individual or groups of switches via an easy-to-navigate Web GUI.



With comprehensive diagnostic tools, such as Digital Diagnostic Monitoring (DDM) for fiber status monitoring and IPv4/IPv6 Ping Test tools to verify first-line connections, remote monitoring and prevention of network issues keeps engineers informed to avoid downtime and keep motorists safe. The DDM monitors fiber status through a system log and aids in identifying required service levels.

The flexible network topology (right) supports multiple dual-ring networks from the control center. Each ring's ID supports one tunnel and is flexible enough to be extended in the future. The SFP fiber ports support dual mode 100 Mbps or 1000 Mbps SFP auto detection, future-proofing the entire installation.



THE BENEFITS

Limited lifetime warranty

B+B SmartWorx guarantees that all eWorx switches—managed, monitored or unmanaged—are free from defects in material and workmanship for its lifetime.

PoE/PoE+ technology

PoE/PoE+ features meet IEEE 802.3af /at standards for running electrical DC power over existing Category5 (or higher) copper cabling, while concurrently supporting the Ethernet data stream. To prevent damage to connected equipment, the detected circuit will only provide as much power as the equipment actually draws.

Ethernet Green®, IEEE802.3az energy-efficient Ethernet

All eWorx Ethernet switches cut power usage by up to 60%, reducing total cost of ownership.

- Automatically powers down ports that have no link
- Budgets power output for different Ethernet cable lengths

Cost-effective solutions, reduced TCO

- IEEE802.3az energy-efficient Ethernet cuts power usage
- B+B's IXM minimizes deployment and firmware configuration time
- No need to pay a software license fee for B+B's IXM intelligent provisioning
- Avoid costly expansions with future-proof Gigabit
- Avoid downtime and easily troubleshoot issues with DDM SFP, IPv4/IPv6 Ping Test tool, cable diagnostics and more

Designed and built for harsh environments

- Certifications for NEMA TS2 in Traffic Management, UL508 in Control Panel and EN50121-4 in Wayside Traffic Control
- Wide temperature range, -40 to 75°C
- Radiated/conducted noise protection, EMC Level 3
- Overload current protection and power-fail relay
- MTBF: 858,835 hours

L2 advanced management suite

Managed switches give you better control over LAN traffic and offer additional advanced features to control traffic and data with segmentation, troubleshooting, security access and more. The five previously discussed key features help round out the full advanced management suite for the SE500 Series.

- Network management/troubleshooting
- Network security access
- Network redundancy and resilience
- Network segmentation with multiple groups
- Network traffic optimization and prioritization



eWORX | SE500 Series

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