Belden

Modernizing a utility network to serve a growing population and critical infrastructure

Belden helps a major African power utility company advance its infrastructure, increase bandwidth and ensure seamless, future-ready operations to support major global events.

Case Study

Customer

This power utility in Africa is responsible for continuously expanding its major infrastructure to meet the needs of a growing population.

With thousands of employees serving millions of customers, its electricity branch focuses on three areas: power production, transmission and distribution.

The electricity generated by the company and another producer is delivered to customers through an extensive grid managed by a transmission system operator (TSO) and distribution system operator (DSO). To support real-time grid monitoring and communications, the utility has equipped much of its network with aerial OPGW fiber optics. Its electricity network includes tens of thousands of kilometers of:

- Very-high-voltage and high-voltage lines
- Medium-voltage lines
- Low-voltage lines

Challenge

The utility's network infrastructure was built using equipment from a major global telecommunications equipment manufacturer. The system operated using SDH (synchronous digital hierarchy) technology to transmit digital signals over fiber. While highly effective during its peak years, SDH is decades old and on a fast path to obsolescence. Rapid advancements in networking standards and technologies have made it increasingly difficult for SDH systems to meet modern performance, scalability and integration requirements, so the utility needed to upgrade.

In addition, the company was having trouble getting support from the equipment manufacturer to address the frequent network issues caused by aging infrastructure. This left workers to manage issues on their own without sufficient resources or expertise to solve problems efficiently. It was difficult to maintain uptime and a high standard of operations, which negatively impacted service reliability.

To support decision-making, Belden's team provided extensive technical guidance throughout the process. They also conducted an in-depth proof of concept on the utility's live network, demonstrating the capabilities and user-friendliness of Belden's complete connection solutions.

To address these obstacles, the utility was ready to modernize, harden and secure its network, but it needed to do so while ensuring that critical applications, such as its protection systems, would continue to operate seamlessly. To support growing demand, the utility also wanted to increase bandwidth from 2.5 Gb/s to 10 Gb/s on the transport layer, and from 600 Mb/s to 1 Gb/s on the access layer. Because its needs would continue to evolve, the company also wanted a scalable platform that could support upgrades to 40 Gb/s and 100 Gb/s in the future with minimal investment and impact.

On top of that, the utility is preparing to address the demands of a major global sporting event being held within its service area in the future. For this reason, it's on a fast track to update its electrical grid, build new substations and ensure reliable power supply to accommodate an anticipated surge in demand.

Solution

Through close coordination and collaboration, Belden's XTran platform was deployed to modernize and streamline the utility's network.

As a modular, fully integrated solution, XTran enables the connection of any type of application at any rate. This allows the utility to run all its applications, including critical grid protection, SCADA, access control, enterprise telephony and LAN, on a single platform, eliminating the complexity and inefficiencies of managing multiple systems. Because network upgrades were made without replacing legacy systems, disruption and costs were minimal. The platform's scalability will support future upgrades to 40 Gb/s and 100 Gb/s and beyond, enabling the integration of applications like CCTV and advanced grid monitoring in line with the shift toward renewable energy as the country's population grows.

Because XTran leverages MPLS-TP technology, a protocol engineered for carrier-grade networks, it delivers deterministic performance for seamless, uninterrupted operation. Supporting advanced QoS (quality of service), bandwidth management and robust OAM (operations, administration and maintenance) features, XTran helps the utility prioritize and monitor traffic, troubleshoot quickly and maintain high service levels. This is critical for electricity transmission and distribution infrastructure, enabling reliability and real-time responsiveness for secure and consistent power delivery.

To strengthen the deployment, Belden also supplied fully assembled, IP54-rated cabinets that protect against dust, dirt and water. These cabinets house the XTran platform, along with dedicated connectivity and booster amplification capabilities, enabling network spans of more than 200 km without signal degradation.

Belden's advanced synchronization technologies ensure timing accuracy across the entire grid for seamless operation of protection and control systems.

TXCare, an intuitive and easy-to-use management system, makes it easier for the utility's team to efficiently oversee network operations: It's simple and straightforward for them to control, monitor and manage.

To make sure the network continues to perform optimally, Belden is providing ongoing services and support for long-term operation and reliability. This expertise ensures that the utility's workers have the support they need.

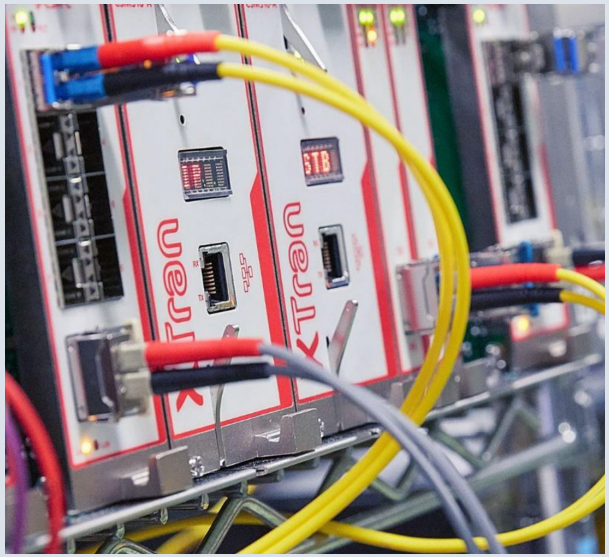
Results

Belden's XTran platform is set to transform this company's network operations, delivering measurable improvements across reliability, efficiency and future-readiness.

Its electricity transmission and distribution infrastructure operates with greater stability and resilience to reduce outages and support increased loads. Protection and control systems function with precise timing, further enhancing stability and reliability.

The complexity and inefficiencies associated with the disparate legacy systems used in the past have been replaced with a network that can be managed efficiently and with a single platform, reducing the workload for employees. Thanks to Belden's support, the utility no longer has to manage its network challenges alone.

The company is well-prepared to meet future growth and evolving demands, with a clear path to follow for expansion as the needs of the population change.



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