

# Paraguay Power Company Deploys JumboSwitch as Lower Cost Alternative to SONET/SDH System

## Case Study

South American Power Utilities have traditionally used SDH/SONET systems for their substation communications networks.

However, when the National Power Company of Paraguay (ANDE) received a budget-busting six-figure price quote for each SDH/SONET node for a proposed substation network expansion and upgrade, they immediately began researching lower cost Ethernet/IP alternatives.

ANDE's requirements for the new communications system were rigorous. It needed to support teleprotection relay circuit latency requirements of less than 12 msec. (round trip), provide E1 connectivity to PBXs located at two substations, and enable dedicated POTS service with PBX capability to all nodes.

The solution that fulfilled all of ANDE's requirements was the JumboSwitch Multi-service Ethernet Platform.

Costing less than a comparable SDH/SONET system, the JumboSwitch provided all of the required interfaces for ANDE's applications: Ethernet, Teleprotection (RS232), E1 over IP and VOIP with virtual PBX capability.

In addition, the JumboSwitch system offered a comprehensive network management system, "TCView," that helped technicians with minimal training to deploy, maintain and reconfigure a JumboSwitch network.

For example, configuring a point-to-point Teleprotection circuit with the JumboSwitch is a simple matter of programming the source IP address to the destination IP address. (Conversely, configuring this same circuit on a SDH/SONET system is more complicated and time consuming).

The installation went smoothly. ANDE deployed the JumboSwitch's E1 over IP card to link to its Remote Terminal Units (RTU); the "Turbo serial" RS232 low latency card for Teleprotection relays, and the VoIP card to enable voice communications between the substations and back to the central office. (See diagram below).

Hands-on training was conducted in both Spanish and English languages by a team of 4 JumboSwitch engineers, (including one fluent in Spanish), from TC Communications. The team traveled to ANDE headquarters in Asuncion, Paraguay and spent 5 days training and demonstrating all of the JumboSwitch features to about 15 of ANDE's technical employees.

It's interesting to note that before ANDE committed to buying JumboSwitches, it sent a special "substation project" team to Irvine, California to visit and inspect the TC Communication's headquarters and manufacturing facility. In addition, the team traveled to LeMars, Iowa to get an in-depth tour and review of an extensive 40-node JumboSwitch network currently being used by the Northwest Iowa Power Cooperative.

The JumboSwitch network connects five substations around the city of Asuncion, Paraguay back to the Central Office. The 250km self-healing ring network infrastructure is comprised of single mode fiber and one microwave link.

