Service Assured Networking Solutions for Power Utility Communications

Legacy Equipment Replacement in T&D Grids

Power utilities employ an array of legacy communications equipment and infrastructure to transport voice and sensitive data, including SCADA and Teleprotection, from their substations. These devices – such as RTUs, FXS/FXOs and n x 64 lines – have been in use for decades and power utility networks rely on their proper functioning for mission-critical operations.

Many prominent vendors, however, have declared their legacy TDM multiplexers as "end of life" products and ceased to manufacture and support them. These devices include, among others, the Adtran TA-1500, Alcatel (Newbridge) 3600 Mainstreet and 163x DACS, Alcatel Lucent DMXtend and 1850TSS5, Carrier Access Adit-600, Coastcom D/I Mux III (also sold under the name Bayly), D4 Channel Bank, Ericsson XMP, GE JungleMux, Keymile XMP1, Mainsail DACS 8000, Nokia Dynanet, and Tellabs 53x DACS. As they disappear from the market, so do the spare parts required to keep existing deployed inventories functioning. More and more power utilities, therefore, are now replacing them, as it is more cost effective than paying exorbitant prices for spare parts in low supply.

But to slash CapEx further down the line, replacement multiplexers should not only support existing legacy devices but be future-proof as well. In that way, they can continue to be used when the utility decides to begin its gradual migration to intelligent packet switched networks (PSNs) and applications.

In planning and implementing a seamless migration of legacy T&D grids to PSNs, power utilities will first have to be certain that their new infrastructure can efficiently and reliably handle massive amounts of bi-directional or even multi-directional data communications between various devices and locations.

Flexibility in Meeting Specific Needs

RAD's modular Megaplex-4 next generation multiservice access node, part of its cyber-secure Service Assured Networking (SAN) solutions, does just that. Easily configurable to either an SDH/SONET or a packet network, the Megaplex's TDM and PSN backplanes ensure both maximum reliability and smooth migration. As a result, it is able to support analog and digital data and voice devices, as well as Ethernet IEDs, at versatile rates ranging from RS-232 up to STM-4/OC-12 and GbE. The fully redundant Megaplex provides high reliability while lowering OpEx.

Typical Application
- Power utility communications

Typical Users
- Electric power utilities

Megaplex-4
Next-Generation Multiservice Access Node

RAD

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RAD can also tailor the Megaplex to meet whatever the customer's unique requirements might be, ensuring that it is fully interoperable with all proprietary interfaces in the outmoded devices that it is replacing. Moreover, an optional x86 server blade can be added for hosting virtual functions to accommodate future enhancements, such as protocol conversion, VoIP and security applications.

When deployed at a central site, traffic from remote sites is aggregated by a VS multiservice module, increasing port density to either 6 or 12 per card.

RAD's SAN portfolio is managed by the RADview management and orchestration system, which combines an intuitive user interface, service provisioning and performance monitoring. Powerful yet easy-to-use, RADview enables immediate fault detection so that remedial actions can be taken quickly to restore performance levels.

The Megaplex also features a complete cyber-attack prevention suite, including encryption, authentication, authorization, and auditing, to provide the highest possible multi-tier security over both TDM and packet-switched networks. It fully supports the IEC 61850-3 standard for Ethernet-based communications over electrical substation automation systems, and enables power utilities to comply with new requirements issued by the North American Electric Reliability Council (NERC) for Critical Infrastructure Protection (CIP). In addition to these attributes, the Megaplex can be ordered with an optional end-to-end cyber security solution, jointly developed by RAD and Check Point Software Technologies, which protects utility operational technology networks by eliminating RTU and SCADA equipment vulnerabilities while defending against cyber-attacks on the network's control and data planes.
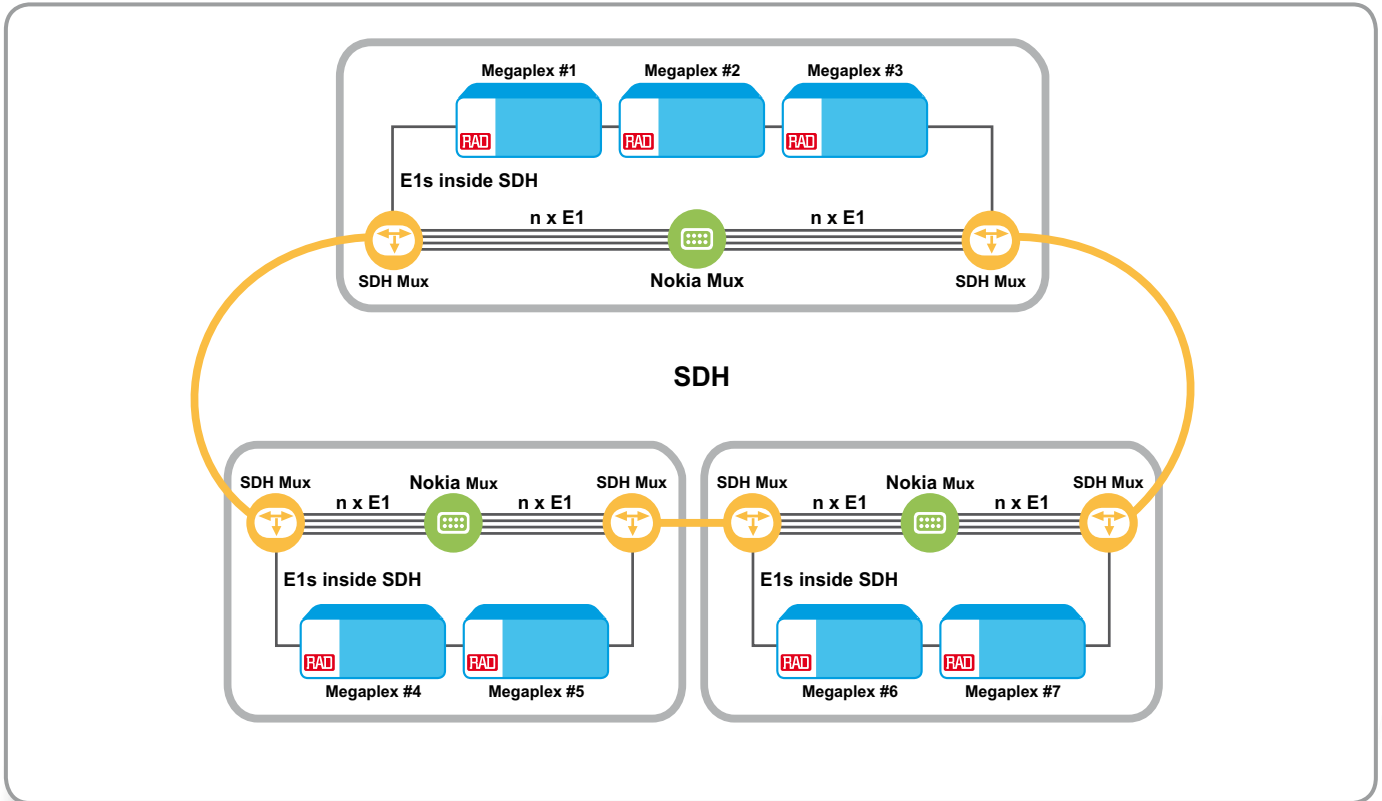
Megaplex is a recipient of the Fierce Energy Innovation Award for Cybersecurity.

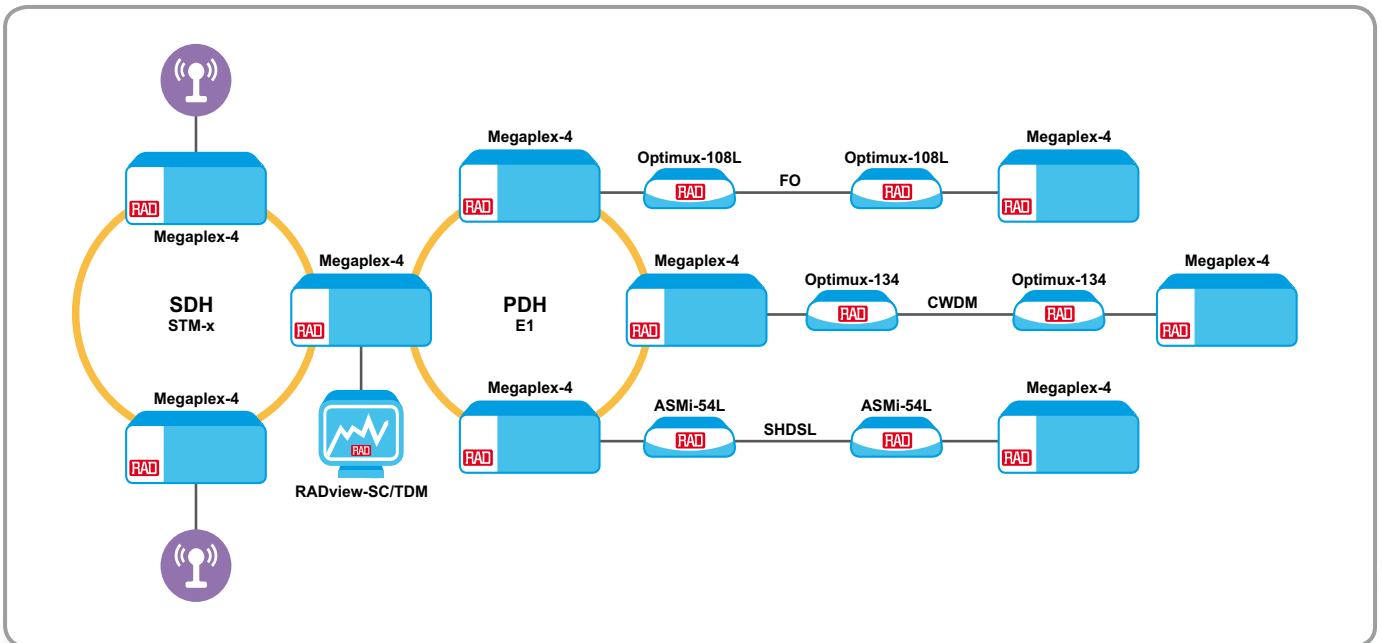## Legacy Equipment Replacement Deployments
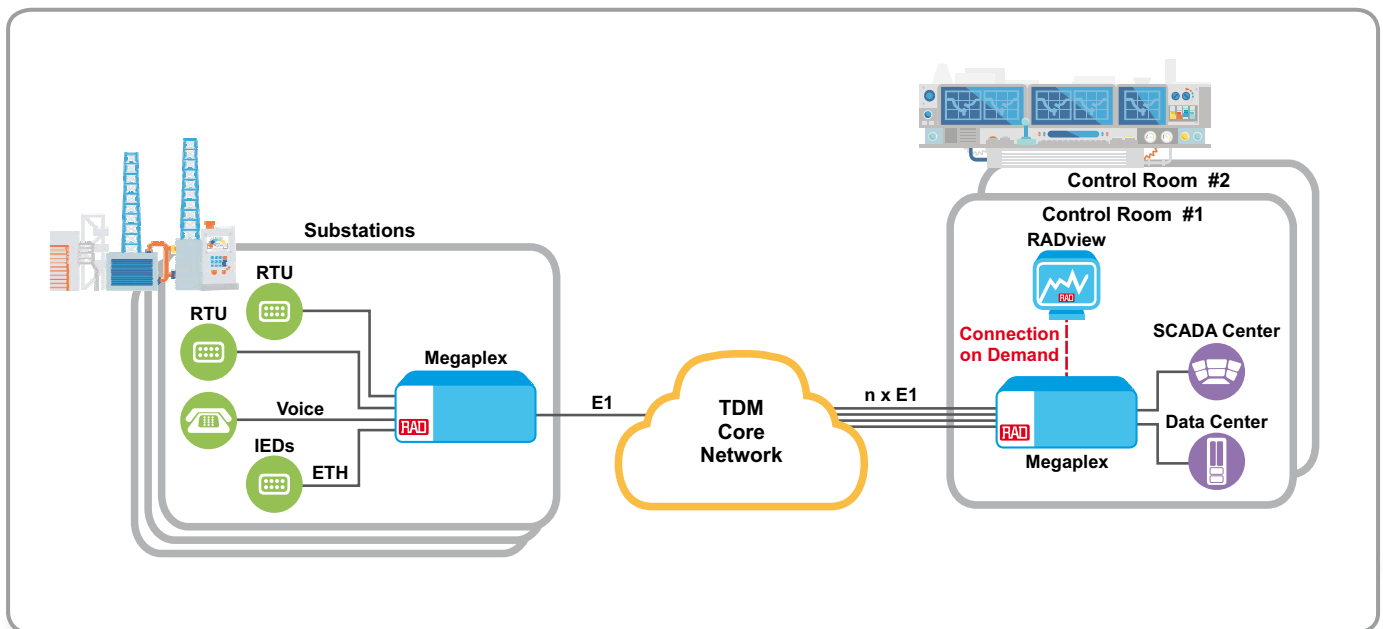
Deployment #1 – Asia
Nationwide replacement of obsolete Ericsson XMP equipment in substations

Deployment #2 – Europe
Replacement of Nokia Dynanet, interoperability with clock Nokia distribution, n x64 path

Deployment #3 – Europe
Replacement of Newbridge legacy muxes, full interoperability for supporting E&M, C37.94, FXO, and Ethernet services

Features	Benefits
Powerful TDM and Ethernet hybrid backplane design	Guaranteed smooth migration to PSNs with reduced latency and better resiliency
Supports analog and digital data and voice devices, as well as Ethernet IEDs	Provides versatile rates from RS-232 up to STM-4/OC-12 or GbE
Full redundancy	Increases reliability and lowers OpEx
Connects all serial automation and Teleprotection devices to SDH/SONET or packet networks	Simple to deploy and future-ready for new applications
Optional x86 server blade	Accommodates future enhancements
VS card for central site deployment	Significantly increases port density
IEC 61850-3 compliant	Guarantees Ethernet-based communications over electrical substation automation systems
Encryption, authentication, authorization, and auditing	Robust cyber security
NERC CIP compliant	Meets all the requirements for operation in North America's bulk electric system

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