RAD’s Solutions for Power Utility Communications

Service Assured Networking
For more than 30 years, RAD has worked closely with its worldwide energy utility customers to provide field-proven communications solutions that address the automation, Teleprotection and core operational network needs of their transmission and distribution (T&D) grids.

RAD's Service Assured Networking solutions offer a wealth of tools that meet the key requirements of power utility communications networks: mission-critical reliability, smooth migration to packet-based networks and high security.
Mission-Critical Reliability
- Fail-safe operations and resiliency over IP/MPLS, TDM and Carrier Ethernet cores
- Differential and distance protection communications

Smooth Migration
- Legacy TDM and new Ethernet services
- IEC 61850-3 SCADA connectivity
- Smart Grid backhaul

Security
- Robust protection from internal and external cyber attacks
- Real-time video transmission on the move for perimeter security
RAD Solutions for Power Utility Communications

Control Room
- Data Center
- RADview
- SCADA Server
- Megaplex

Fiber Optic

SDH/SONET

Carrier-Grade Ethernet

Substation
- RTU
- IED
- ETX

Fiber Optic
Substation

- RTU
- ETH
- Teleprotection
- Voice

Fiber Optic

Megaplex

- Megaplex-4
  - Next-Generation Multiservice Access Nodes

ETX-5
- Ethernet Service Aggregation Platform

SecFlow-1
- Ruggedized SCADA-Aware Gateway

SecFlow-2
- Ruggedized SCADA-Aware Ethernet Switch/Router

SecFlow-4
- Modular Ruggedized SCADA-Aware Ethernet Switch/Router

Airmux-5000
- Point-to-Multipoint Ethernet Radio

RADview
- Carrier-Class Network Management System

LV Transformer

- RTU
- Meter Concentrator
- Camera

Wireless

Airmux

Fiber Optic
1. Hybrid TDM/PSN Design for a Smooth Migration to IP

- Powerful cross-generation TDM and carrier-grade Ethernet capabilities, including TDM DS0 cross-connect and SDH/SONET, Gigabit Carrier Ethernet and OAM, TDM pseudowire over Ethernet/IP, and Ethernet over NG-PDH/SDH/SONET
- Easily configurable connectivity of all serial automation and Teleprotection devices to either the existing SDH/SONET network, new SDH/SONET rings or to a new PSN
- Serial and C37.94 Teleprotection interfaces for differential and distance relays
- Supports analog and digital data and voice devices, as well as Ethernet IEDs with versatile rates from RS-232 low speed traffic up to STM-4/OC-12 or GbE
- Guaranteed smooth migration to PSNs by supporting legacy devices; optional traffic duplication over both SDH/SONET and Ethernet networks for reduced latency, better resiliency and gradual migration to PSN
- Future-ready with virtualization capabilities, for adding new applications (security, router, SCADA) to the communications features using RAD’s innovative x86 D-NFV module
2. Packet-Based Operational Network Using Carrier-Grade Ethernet

- Carrier-grade Ethernet is ideal for replacing SDH/SONET for operational applications and to enable Service Assured Networking
- Simplified architecture and management
- Increased security (802.1X, MACsec)

- Lower latency
- Assured QoS using Carrier Ethernet OAM and PM tools
- Ongoing performance monitoring
Single product supports both distance trip command relays and differential Teleprotection delivery over TDM or IP networks

Wide range of Teleprotection interfaces — Serial, G.703 Codirectional, E&M, C37.94 — to extend differential Teleprotection relay over TDM and Ethernet networks

Reduces CapEx and OpEx by using a single-box solution for all substation communications services, including voice, data, automation and Teleprotection signals

Redundancy hierarchy from the Teleprotection interface up to the communication link ensures 0 msec (zero) hardware protection

Sub-3 msec end-to-end delay over PSN

Tested interoperability with most Teleprotection contact relays from leading vendors (Alstom, ABB, Siemens, SEL, Schneider)
Secure IEC 61850-3 Substation Network

- Supports Ethernet-based IEC 61850-3 substation communications for mission-critical automation traffic within the substation and between SCADA control centers
- Enables co-existence of serial RTUs and Ethernet IEDs with full redundancy over various topologies using fiber optic rings, 2G/3G cellular modems and external radio systems
- Complies with IEC 61850-3 and IEEE 1613 environmental standards

- Built-in router enables seamless communication of IP SCADA to both old and new RTUs by converting IEC-101 and IEC-104, Modbus serial and IP, DNP3 and others
- Enables secure, dedicated networks over fiber and/or radio links using IPsec encryption and distributed security SCADA firewall suite
A comprehensive solution addressing communications to secondary substations, metering and automation network integration and cyber security

- Complies with IEC 61850-3 and IEEE 1613 environmental standards for outdoor installations
- Seamless communication of SCADA traffic over fiber optics, radio links, 2G/3G/LTE cellular links and leased lines from a telecom service provider

- Integrated firewall with distributed SCADA security suite
- Point-to-multipoint radio connectivity supports high capacity mission-critical traffic over licensed and unlicensed sub-6 GHz bands, with dedicated bandwidth allocation and service level agreement (SLA) per subscriber
D-NFV for Mission-Critical Communications

- Reduces the number of physical network devices for better reliability and simpler operation, with software-based functions running on an x86 D-NFV server module integrated within RAD’s Megaplex-4
- Integrates higher-level applications (routing, firewall, encryption, SCADA, and more) with communications platform in a single device
- Future-ready and flexible solution to meet new applications needs
- Terminal server allows transmission of any serial protocol over IP
- Supports tailor-made as well as third-party applications, tested and certified by RAD
- Smaller footprint
The Power of RAD

RAD is the preferred communications vendor for many energy utilities and system integrators around the world.

Selected Customers

www.rad.com