Benefits

- **Cost-effective flexibility for grid modernization** Scalable high-density TDM services with circuit emulation technology over a protected MPLS backbone
- **Versatile multi-service performance** Rapid transition from legacy TDM and SONET/SDH to IP/MPLS communications
- **Reduce OPEX** Carrier-class design offers a much smaller footprint and higher capacity than legacy DCS/ADM network equipment
- **Easy to use network management** Evolved Programmable Network Manager (EPN-M) with Cisco Digital Network Architecture support for automating device operations, provisioning, and proactive assurance

Converged WAN Infrastructure for Mission-Critical Applications and Grid Modernization
Utilities have traditionally relied on time-division multiplexing (TDM)-based solutions such as SONET/SDH to control critical infrastructure. However, today utilities demand increasing grid reliability and operational efficiency. By migrating to a converged IP/MPLS network, utilities are able to cost-effectively support SCADA, Teleprotection, cyber security, and additional grid modernization programs.

Requirements for Improved Grid Reliability and Operational Efficiency

**Scalability**
- 10GE and 1GE interfaces across multiple topologies for access and aggregation
- Local and pass through capacity for both ring and linear nodes must be supported

**High Availability**
- Disaster recovery across redundant control centers
- Fast failover (<50ms) for node and link failures
- Power supply, forwarding plane, and control plane redundancy

**Intuitive, Easy to Use Network Management**
- Modern, graphical user interface
- Point and click, rapid provisioning of new services
- Performance/SLA monitoring for mission critical services including SCADA and Teleprotection
Why Cisco?

- Technology leadership
- Global ecosystem partnerships
- Future proof architecture

Cisco is the leader in end-to-end communications solutions and standards development, bringing more than 30 years of industrial networking experience to utilities. Cisco provides design expertise, industry partnerships, and a portfolio of best-in-class products and solutions to deploy MPLS within energy grid operations.

Scalable, secure implementations support both current and future applications, allowing operations managers to confidently plan for tomorrow’s capabilities while continuing to maximize existing technologies.

Cost-Effective Migration from Legacy SONET/SDH/TDM to a Converged IP/MPLS Multi-Service Communications Infrastructure

Addresses immediate utility customers needs for improved reliability and efficiency with the ASR 900 series in addition to reducing OPEX.

Common deployment scenarios include transitioning SCADA and Teleprotection applications from siloed legacy networks to a converged IP/MPLS WAN.

Key Capabilities

Performance

- The ASR 900 series uses custom ASICs offering industry leading throughput, low latency and jitter, path symmetry, and deterministic traffic flows

Flexible Transport Options

- MPLS-TE, MPLS-TP, and FlexLSP (RFC 7551)
- Optimized transport based on utility use cases and deployment scenarios

Multi-service

- Flexible VPNs – L2VPN, L3VPN, Pseudowire, and Raw Socket transport
- Point-to-multipoint and point-to-point services such as SCADA
- Wide set of network interfaces for existing and future end devices across multiple use cases
- Interface modules (IMs) shared across all three platforms (ASR 903, ASR 902, ASR 920)
- Hierarchical QoS, with hardware support for line rate performance
- Scalable multicast for video end points and PMUs
- Operations, Administration, and Maintenance (OAM) functions per service
- IEEE 1588 and SyncE timing, and Stratum-3E on-board clock to ensure precise network synchronization