Substation Communications
Agenda

• Introduction
• State of Communications
• Business Drivers for Substation Communication
• Protocols – Current and Future
• Security
• Closing
Communication Layers

Application and Data Exchange Format

Core network
Moving towards IP and specifically IPv6

Gateway
Connects Access Network and Backhaul with Core Networks
Aggregation and Address Translation

Access Networks
Wired: Fiber, SONET/SDH, cable/DSL
Wireless “macro”: GPRS, EDGE, 3G, WiMAX, LTE
Wireless “capillary”: 802.11, Zigbee, IEEE 802.15.4x, HAN: HomePlug Green PHY, IEEE1901
Access Layer

- Frame Relay – Leased Lines
- Private Radio Networks
- DSL, Cable Modems, Cellular Services
- Metro Ethernet, MPLS
- ...or Nothing
Business Drivers

- Individual Application Communications Requirements
- Convergence and Automation of Electro-Mechanical Controls
- Simplicity
- Physical Interfaces
Protocols

- DNP3
- Future - 61850, Modbus-TCP, other
- Enabler – TCP/IP Packaging
Security

- NERC CIP
- Requirements
  - Separation of SCADA, DA, AMI and Corporate Networks
- Strong Encryption will be Required
Distribution Automation Network

IntelliRupter
Repeater
IntelliRupter (Normal Open)
IntelliRupter

Wired or Wireless Network for Backhaul (AMI, SCADA, or DA)

Substation 1 Cabinet
- RTAC
- SEL-351
- Layer 3 Switch
- IntelliNode
- Ethernet
- RS232/Ethernet

Substation 2 Cabinet
- RTAC
- SEL-351
- IntelliNode
- Ethernet
- RS232/Ethernet
- Radio

RS232
Closing – A Moment to Ponder

- Decisions are Pending
- Network Management of Communication Networks
- Support of Communication Networks