ALL-IP communications architecture for Smartgrid/AMS applications

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Utility communications today

- Mostly SCADA only
- Emerging applications
  - Measurement, AMR
  - Maintenance & SW upgrades
  - Security & Access Control

Primary Substations

Secondary Substations

Switching / stations
Issues with today’s Utility Networks

- Single application networks
- Mostly only SCADA
- Limited capacity
- Parallel networks, “silos”
- Obsolete technology

Control Centre

- Telephone networks
- Serial communications servers
- Serial traffic, kbit/s

Primary Substations
- Secondary Substations
- Switching Stations

NETCONTROL Energy Network Automation
Challenge: How to handle the growing data transfer needs?
Solution: ALL-IP network

**Before: Vertical model**
Applicatio nspecific networks
- Expensive operations
- Limited bandwidth
- Limited scalability

**Now: Horizontal model ALL-IP**
All application in the same network
- Better Manageability
- Better Scalability
- Fault tolerance - redundancy

IP= Internet protocol

Broadband networks:
copper, fiber, wireless
ALL-IP ARCHITECTURE FOR ELECTRICITY UTILITIES
ALL-IP key components

Control Centers

SCADA

Central Gateway

Other applications

Internet

Office

IP traffic
Over-any-broadband- IP/Ethernet media
- Fiber, wireless, copper...

Remote Gateway RTU

Remote Gateway RTU

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ALL-IP multiple applications

- SCADA
- Advanced metering (AMS)
- Substation Security
- Demand Management
- Outage Management
- Power Quality Monitoring
- Mobile Workforce

Remote Gateway/RTUs

IP traffic
- Over-any-broadband- IP/ Ethernet media
  - Fiber
  - Wireless
  - Copper...

Central Gateways
Gateway functionalities

![Diagram showing gateway functionalities]

- New IP/Ethernet applications
- Old serial applications by protocol conversions

IP traffic
Over-any-broadband- IP/ Ethernet media
Fiber, wireless, copper...

Ethernet
Remote Gateway/RTUs
Remote Gateway/RTUs
Protocol Conversion
Protocol Conversion

Serial
Ethernet
Central Gateway
Central Gateway

- SCADA
- Advanced metering (AMS)
- Substation Security
- Demand Management
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- Power Quality Monitoring
- Mobile Workforce
- SCADA
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Build-in Cyber Security

- Build-in firewalls
- All traffic in encrypted into VPN tunnels
- User Authentication
- Traffic Prioritization
ALL-IP Architecture summary

- Multi-application capability
  - Traditional SCADA
  - Smartgrid application traffic
- Build-in cyber security
- Graceful migration from serial to IP environment - preserves legacy investments
- Operates over any broadband media
- Scalability
Netcontrol & ALL IP networks

- We have operations all Nordic countries
- Several ALL-IP deliveries
- We have the
  - People
  - Knowledge
  - Products
- Further info
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