Opportunities for Digitalization in Power Sector

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The need for faster decisions and increased business agility requires greater visibility of the entire business.

Digitalization is key for the necessary agility and speed of decision-making.
New challenges for utilities and suppliers

Substation automation challenges

- Increasing demand on refurbishment of substations
- Project execution under increasing cost and time pressure
- Better utilization of existing assets
- Increased expectations on transmission system availability
- Safeguard investment over the entire life cycle

Digital substation respond to today’s utility challenges
Digital substation
Basic concepts-Overview

MPLS-TP Network
Remote connectivity.

Transformer with
Electronic Control
Monitoring and
diagnostics.

Control Room
Including automation,
Protection and
Control IEDs, and IEC
61850 station bus.

Integrated Non
conventional Instrument
Transformers. Increasing
safety and reducing the
substation footprint.

Transformer

Process Bus. Connecting
the switchyard to the
protection and
control system.

Merging Units &
Process I/O.
Bridging the gap
between
analogue and
digital world.
Compliant to IEC
61850.
Digital substation
Fiber optic substitutes copper signaling wires

Conventional Substation

Digital Substation
Benefits of Digital substation

Overview

Main benefits

- Safety
- Reduced substation footprint
- Interoperability
- Reduces copper cabling
- Ease of configuration
- Maximum reliability and availability
- Real-time performance
- Smart Grid communications capabilities
- Reduces cost of ownership

Digital substations are safer to operate, future proof and require less space
Digital Substation - Migration strategies
Life enhancement through retrofit

Benefits

- 40% shorter installation time of P&C system
- Up to 80% copper cable reduction
- 40% outage time reduction during P&C retrofit

Existing IEDs with support for only station bus

Factory tested solution

Existing bay marshalling box

Hardwire

Bay

Up to 80% copper cable reduction

40% shorter installation time of P&C system

40% outage time reduction during P&C retrofit
Digital solutions
Communication Networks

Wireless solutions for distribution networks and other applications: TropOS, ArcheOS, TeleOS

Power line carrier

“Narrowband” (some 10 … 100 kbit/s)

“Broadband” (some 100 … 10‘000 Mbit/s)
Digital solutions
Highly available and reliable utility communication

Technology shifts in utility communication

IEC 61850 instead of copper wires for truly digital integration of utility communication equipment
Using the benefits of IEC 61850 to communicate across substations
Move from TDM to packet-switched communication for operational, maintenance and protection data

Utility-grade equipment to ensure the reliable operation of the power grid is required
Asset Performance Management
Why Do Utilities Need Asset Performance Management

Assets

Asset Management Drivers

Aging Workforce
- Digital workforce less attracted to Asset Intensive Industries
- Younger Workforce have different expectations and a lower threshold

Aging Assets
- Regulatory pressures to improve environmental, reliability and safety standards

Cost Pressures
- Need to do more with less
- Improve return on assets without impacting production/service delivery

Asset Management Challenges

Increased number of assets with fixed operation & maintenance budget
Asset Performance Management
Power Transformer

Risk of failure (RoF) of Transformer