Robust Project Planning & Documentation in Large-scale deployment of IEC 61850

IEC 61850 Europe 2014

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Confidentiality - None (C1)
Content

• Background

• Driving forces for standardization

• IEC 61850 process based on a pilot concept

• Robust project planning and documentation with third party tool

• Large scale deployment of IEC 61850
Background

- Rapidly aging substation automation systems (SAS)
- Limited life time of modern DSAS devices
- Unique solutions because of functional purchase
- Need a new standardized concept to efficiently replace SAS
- Strategic direction within Vattenfall Distribution to standardize DSAS by implementing IEC 61850
Driving forces for standardization

- Future-proof investments
- Sustainable asset management
- Uniform structure
Pilot SS Upplands Väsby

• New technology and new concept
  - Test new equipment for process bus IEC 61850-9-2 to collect sampled values
  - Developing and testing Vattenfall standard Service PC solution, including a Remote Access solution
  - Critical substation functions as blockings, interlockings, bfp, collection and triggering of disturbance files and information from/to IEDs to gateway is done via the station bus

• Develop work processes for IEC 61850
  - Test a new model for project execution (based on SCL files) for IEC 61850 SAS that covers the whole life cycle of the substation
  - Specification with top-down architecture by using 3rd party software

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• Vattenfall is an organization which purchase new substations based on functional requirements, ie we do not decide the construction

• All design and construction is done by external contractors

• The Vattenfall IEC 61850 process developed is therefore focused on the activities:
  - Specification
  - Acceptance of delivery
  - Final documentation for O&M activities
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Use of three different signal naming principles in third-party tool

- Apart from the IEC 61850 product and functional names VF also uses a third naming based on classical company names for functions and signals. This to minimize the knowledge gap.
Function Library

- Reflecting Vattenfall standards
- Combines IEC 61850 elements with no IEC 61850 elements
- Creation of substation specific signal list from the library
- Library exchange as ZIP-file between users
Design review

- Comparision of specified signals with the implemented signals

- IED by IED review to get an overview of the quality of delivery

- Following statuses are added for every signal:
  Specified, Implemented as specified, Implemented differently and Implemented
Visualization of GOOSE exchange at the functional level

- The aim is to visualize GOOSE functions in the third-party tool from a functional perspective instead of a communication view.
Advantages for Vattenfall with the new IEC 61850 process

- Minimize errors caused by humans
- Standardized and scalable solutions
- Increased efficiency
- Clear and coherent utility/contractor relationship
- Larger volumes of standardized solutions
- Increased future possibilities
- Uniform structure
- Sustainable substation management

- Future proof investments
Future proof our assets

MISSION

OBJECTIVES

OTHER OBJECTIVES

New business opportunities

Improve quality of documentation

Future proof our assets

Modern way of work

Sustainable asset management

Vendor independence

Uniform structure

Follow the market of technical progress

Attractive employer

Cost effectiveness

Avoid proprietary solutions

CRITICAL SUCCESS FACTORS

Develop inhouse knowledge

Implement new process

IT infrastructure in place

Fast experience feedback

Management commitment & support

Strong connection to ordinary business

RESOURCES

• Protection & Automation Engineers
• Project managers
• Communication Specialists
• Process development team
• Management
• IT-department
• Change Management
• Purchase department
• Maintenance department

STEPS /ACTIVITIES

Prepare large-scale deployment

• BAU in process-organisationen
• IEC61850-knowledge relevant at recruitment
• Measure & Follow up
• Incentive for increased development of DSAS
• Develop SW and file mgmt solutions
• Communicate internally & externally

Impl large-scale deployment

• DEMT decision
• Software and file management solutions in place
• Valid for all substation projects
• New procurement strategy
• New maintenance strategy

Develop concept

• Pilot substation
• Develop concept
• Develop process
• Test tools (Third-party tool & ServicePC)
• Evaluate overall
• Risk Analysis

Refine the concept

• Complete and refine process
• Improve tools
• Acceptance Test
• Business Case
• Clarify decision making and strategic direction

Impl new process

• Update the governing doc
• Coord technical guidelines & tool library
• Education & training
• Inform Entrepreneurs
• Plan for multiple substations
• Pre-studies for software and file management
• Communicate

Implement a tool utility package

Develop concept

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