# CONDIS®

> Substation Design

# Use of IEC 61850 for communication between substations and control centre according to TR90-2 and TS80-6
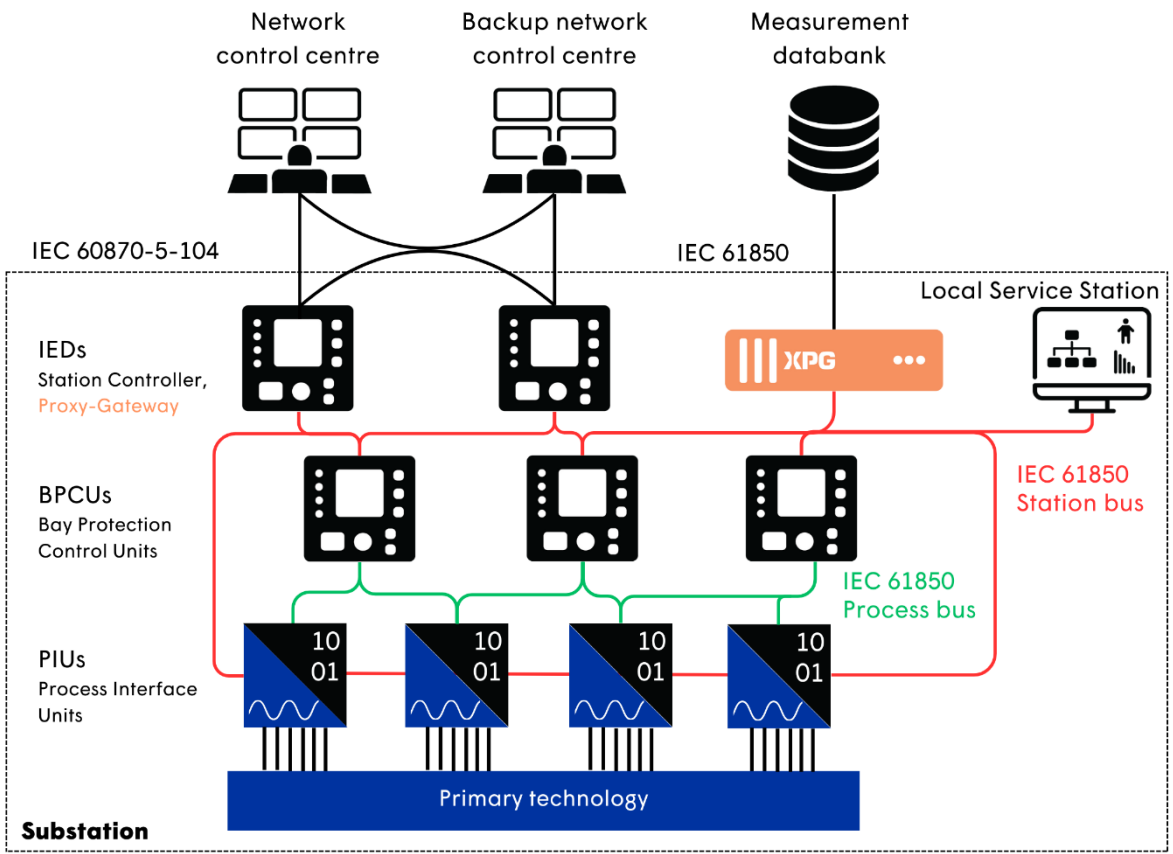
POSTER IN COLLABORATION WITH *STROMNETZ HAMBURG GMBH* AND *SIEMENS AG*

## MOTIVATION & OBJECTIVES

→ Concept development for the realisation of substations at Stromnetz Hamburg GmbH according to requirements in 2030

→ Pilot project with real reconstruction of a substation

→ 2 110 kV switchgears, 2 110/10 kV transformers, 4 10 kV busbars with approx. 60 10 kV feeders

→ Introduction of an IEC 61850 process and station bus

→ Modelling in the data model down to internal requirements level

→ IEC 61850 top-down data modelling with Helinks STS-SD

→ Development and testing of automatic test concepts

→ CAPEX and OPEX reduction

→ Extended sensor technology installation for event-orientated maintenance
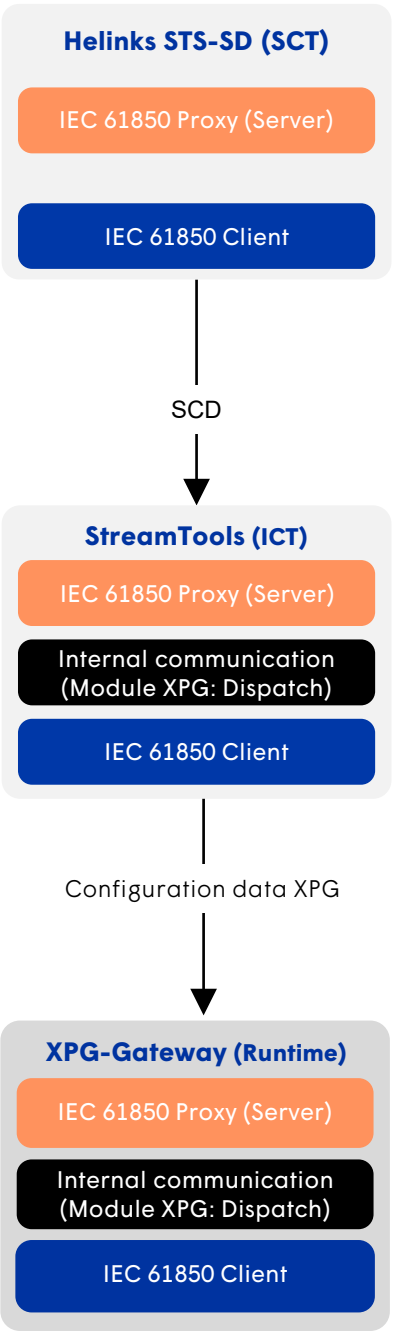
## SCHEMATIC COMMUNICATION STRUCTURE IN UW2030

• IEC 61850 process bus up to 10 kV level, PRP, RSTPIEC

• 61850 station bus, RSTPTime synchronisation on process bus in accordance with IEC 61850-9-3 (PTP profile)

• Redundant station controller SICAM A8000 from Siemens AG with redundant connection to the grid control centre

• Conversion from IEC 61850 station level to IEC 60870-5-104 grid control level in accordance with TS 61850-80-1

• Communication with Stromnetz Hamburg GmbH's own measurement database based on TR 61850-90-2 and the future TS 61850-80-6 via IEC 61850 Proxy-Gateway XPG from Condis SA. IEC 61850 is used instead of IEC 60870-5-104 to transfer an object-orientated database.



Network control centre · Backup network control centre · Measurement databank

IEC 60870-5-104 · IEC 61850 · Local Service Station

IEDs — Station Controller, Proxy-Gateway

BPCUs — Bay Protection Control Units

PIUs — Process Interface Units

IEC 61850 Station bus

IEC 61850 Process bus

Primary technology

Substation

## IEC 61850 PROXY-GATEWAY ACCORDING TO TR90-2 AND TS80-6

### General function

The IEC 61850 proxy gateway records data in the substation, such as measured values, position and hazard messages and network information, and forwards these to a higher-level measurement database.

The gateway is simultaneously an IEC 61850 client to record the data from various devices (IEDs, BPCUs, PIUs) and an IEC 61850 server to publish the data for a higher-level system in accordance with TR 61850-90-2 and the future TS 61850-80-6.

### Helinks STS-SD (SCT)
IEC 61850 Proxy (Server)
IEC 61850 Client

SCD

### StreamTools (ICT)
IEC 61850 Proxy (Server)
Internal communication (Module XPG: Dispatch)
IEC 61850 Client

Configuration data XPG

### XPG-Gateway (Runtime)
IEC 61850 Proxy (Server)
Internal communication (Module XPG: Dispatch)
IEC 61850 Client

## IEC 61850 System Engineering Tool SCT - Helinks STS-SD

• Creation of the entire IEC 61850 data model and all communication with gateway client

• The IEC 61850 proxy (server) data model can then be created on the gateway in the SCT

• All logical nodes on the client side of the gateway are also published in a logical node provided for this purpose on the server side

• SCD export with IEC61850 client and server (proxy) part of the gateway

## IEC 61850 IED Configuration

• Import of the SCD into the ICT of the gateway

• Creation of IEC 61850 client, IEC 61850 server and dispatch module

• Dispatch module responsible for the logical connection of the data points between client and server

• Sum totals or other logics can also be created in the gateways protocol dispatch module

• Export of the configuration file for the gateway

## XPG Gateway (Runtime)

• The configuration file exported from the ICT can be loaded onto the gateway

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