Intro to IEC 61850

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Implementada por giz
Con Punche Perú
BICENTENARIO DEL PERÚ 2021 - 2024

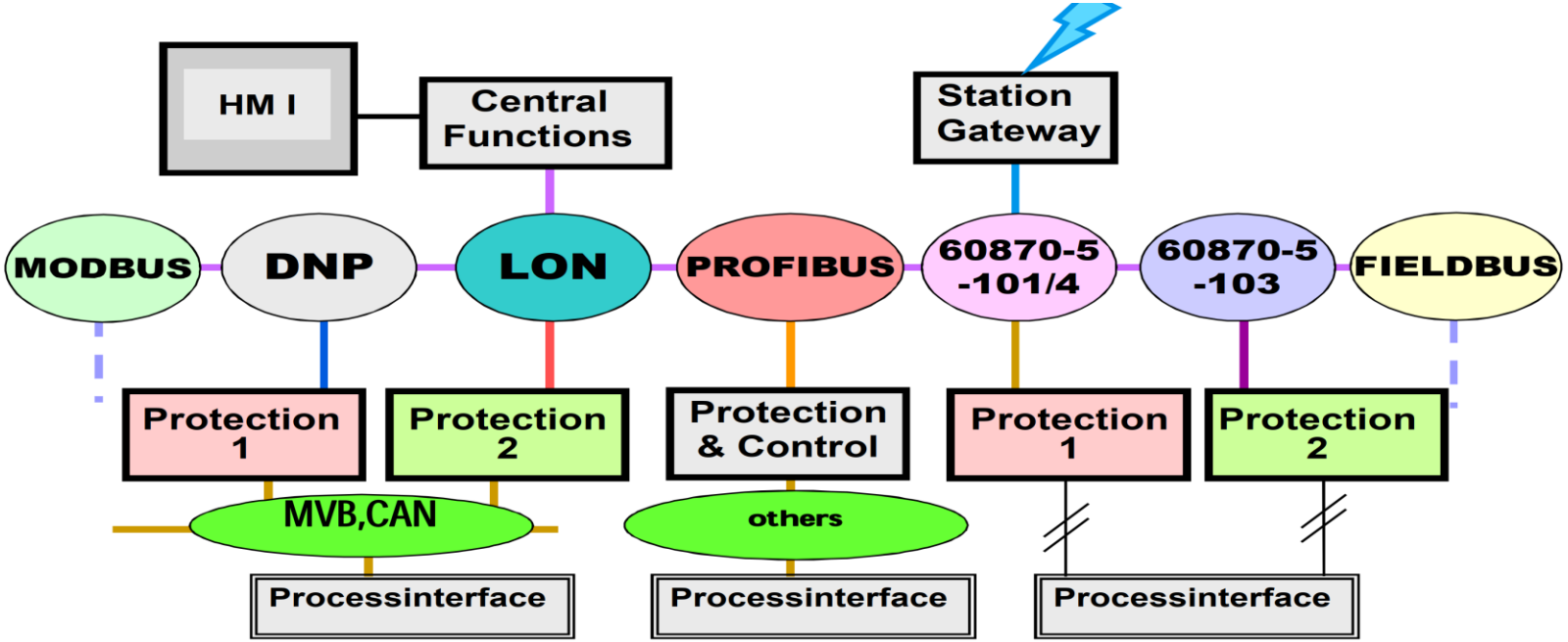
In view words=> What is IEC61850?

IEC 61850 is much more than a new protocol. The standard describes an engineering process and architecture with many new advantages that will influence design, specification, engineering, operation, and maintenance. It can be said to be both the language and the infrastructure for the power system.

IEC 61850 was developed by the International Electrotechnical Commission, Geneva by a group of manufacturers (ABB, Alstom, Schneider, SEL, Siemens, Toshiba,..) and electrical utilities (Electricité de France, Iberdrola, Hydro-Quebec,…)

State before IEC 61850

Substation Automation Systems with IED's (intelligent electronic devices) incl. a serial communication well accepted on the worldwide market



Why IEC61850

The global market

- needs a global standard
- A standard supporting all design & operation philosophies

Mixing IED’s from different Vendor

- Interoperability between Vendor
- For need of equipment exchange , through end of availability

Cost reduction

- By competition for investments
- By engineering and commissioning
- For operation and maintenance

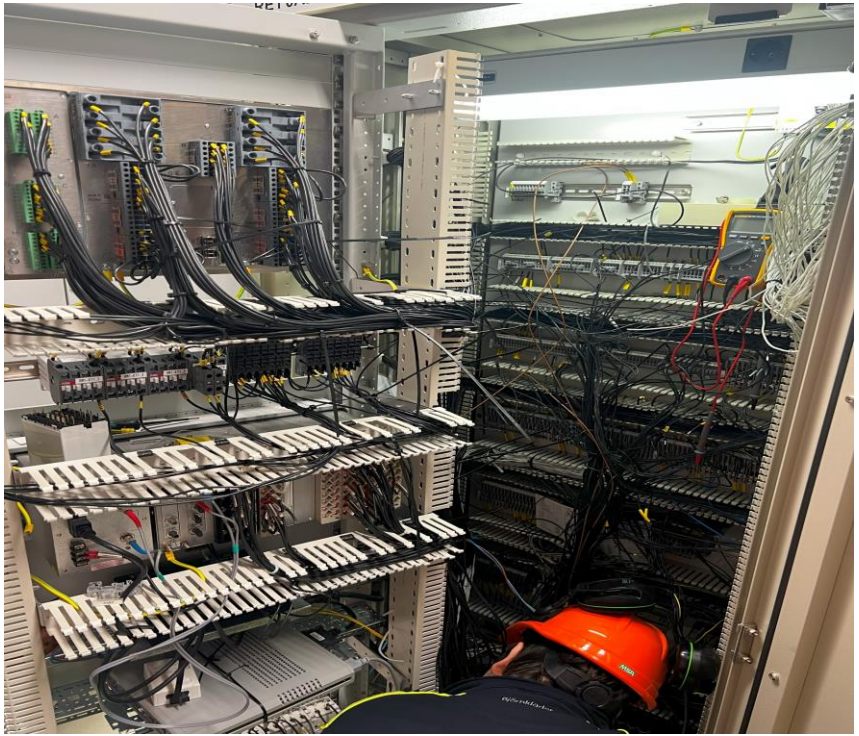
A Open and future-proof standard

- For staying up to date with cyber security standards
- For future extensions by bays or functions
- Long term stability (the standard allows to follow the progress in communication technology as well as evolving system requirements

Avoid massive cable pulling

Non-Digital Substation

Conventional 132kV Control & Protection incl. Metering for 3 Bays



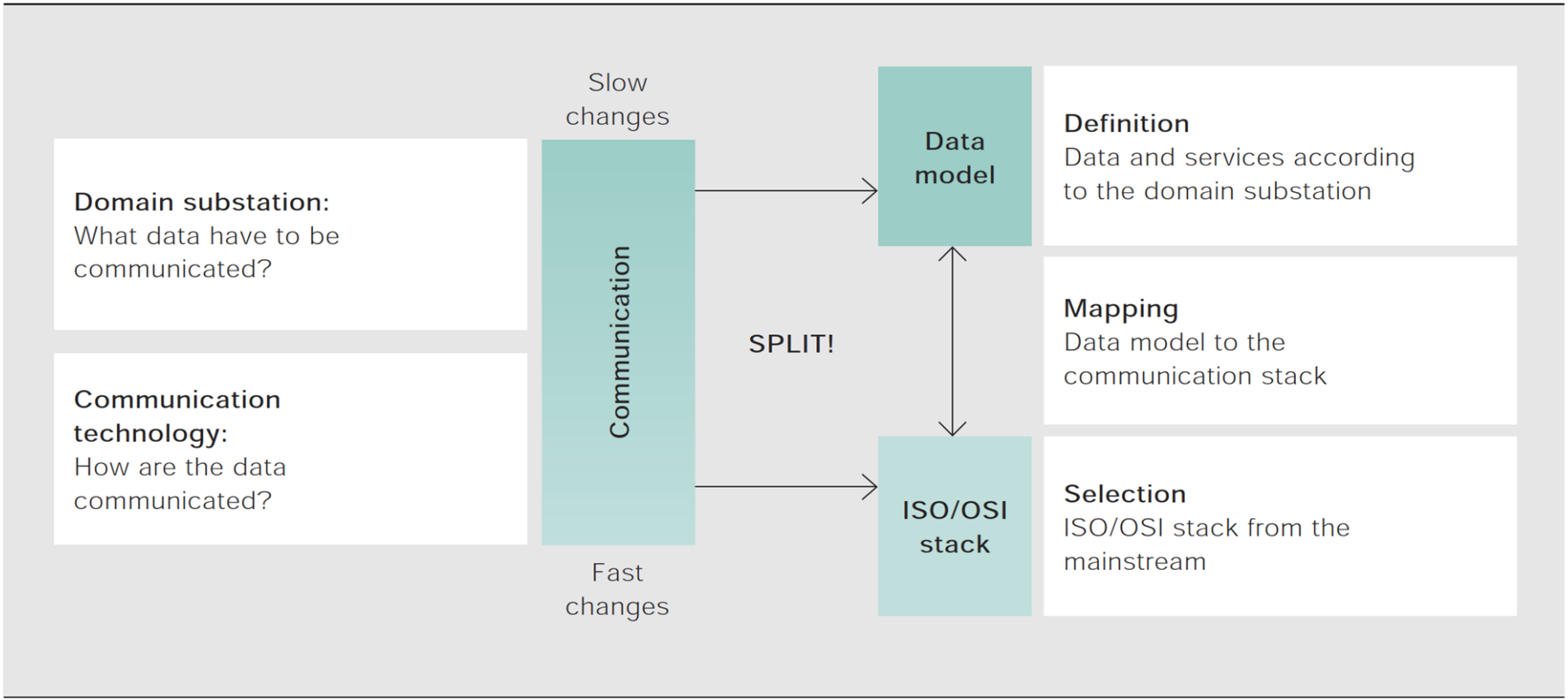
Conventional Control & Protection Cubicle

Digital Substation

Frontview 132kV Control & Protection incl. Metering for 3 Bays

Backview 132kV Control & Protection incl. Metering for 3 Bays

Long term stability (future proof)



Overview of the standard

IEC 61850

Communication Networks and Systems for Power Utility Automation

	System-Aspekte
1	Introduction and Overview
2	Glossary
3	General Requirements
4	System and Project Management
5	Communication Requirements for Functions and Device Models
	Konfiguration
6	Configuration Language for electrical substation IEDs (SCL)
	Datenmodelle
7-4	Compatible Logical Node Classes and Data Classes
7-3	Common Data Classes
	Abstrakte Kommunikationsdienste (ACSI)
7-2	Abstract Communication Services
7-1	Principles and Models
7-500	Basic information and communication structure – Use of logical nodes for modeling application functions and related concepts and guidelines for substations
	Mapping der Kommunikation (SCSM)
8-1	Mapping to MMS and ISO/IEC 8802-03
9-2	Sampled Values over ISO/IEC 8802-3
	Testen
10	Conformance Testing

IEC 61850-6 = SCL Example

```
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```
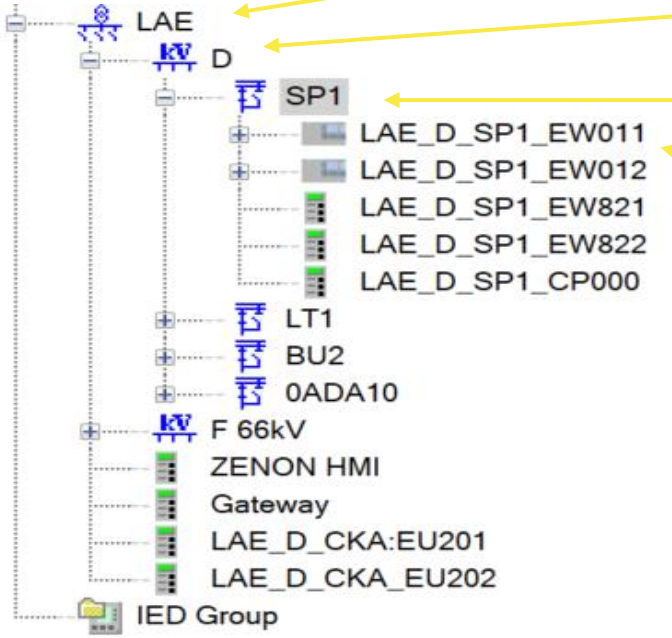

Substation Structure (IED Naming)



SUBSTATION Naming => LAE (e.g. ABCXYZ)

Voltage Level => D for 220kV (F for 66kV)

BAY Naming => SP1 (e.g. QC1)

IED Naming => EW011 (e.g. BCU)

!!!All Equipment needs to be unique naming in the entire system!!!

IED Data model Overview

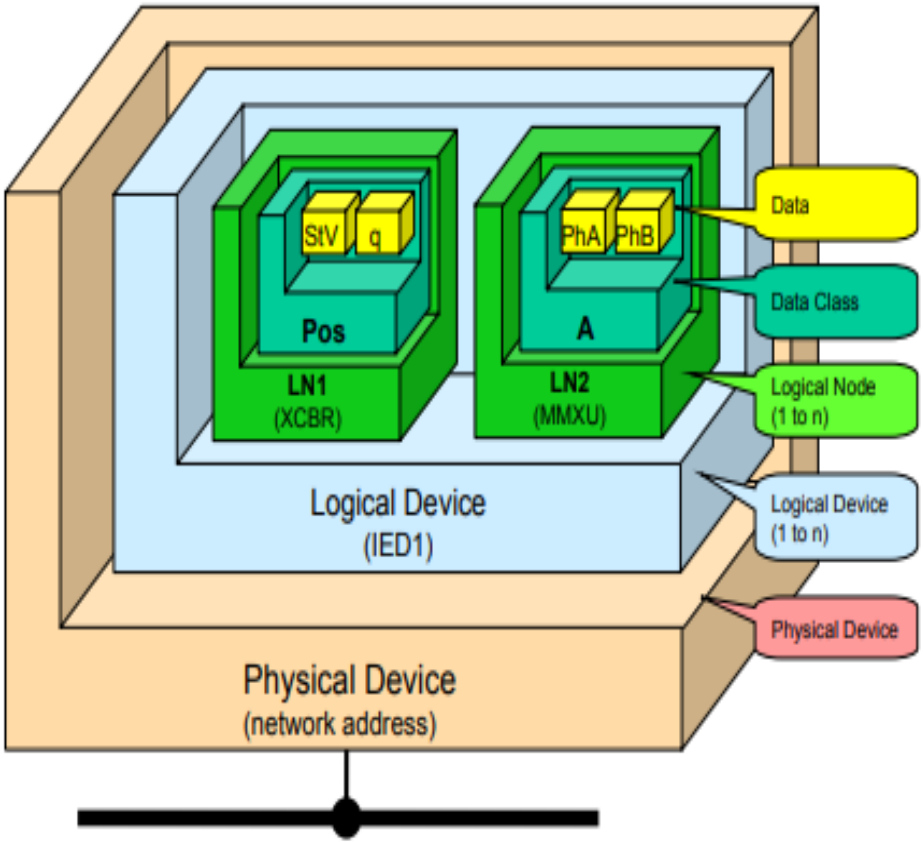
Physical Device (max.64 digits, start with a letter)
IED mit Netzwerkschnittstelle (IP)
e.g. BCU , BPU , MU,…

Logical Device *LD*
Functional Group within a Phy. IED (max. 64 digits)
e.g. PROT, CTRL, LD0,…
1xPhy. Device can contain multiple Logical Devices

Logical Note *LN* (max.4 digits)
Logical function within a Logical Device
e.g. DIFF, PTOC, PTRC, XCBR, CSWI,…
For more detailed it can modified with
Praefix and Instance Nomber
e.g. PTRDIFF1 (Powertransformer Diff.1)

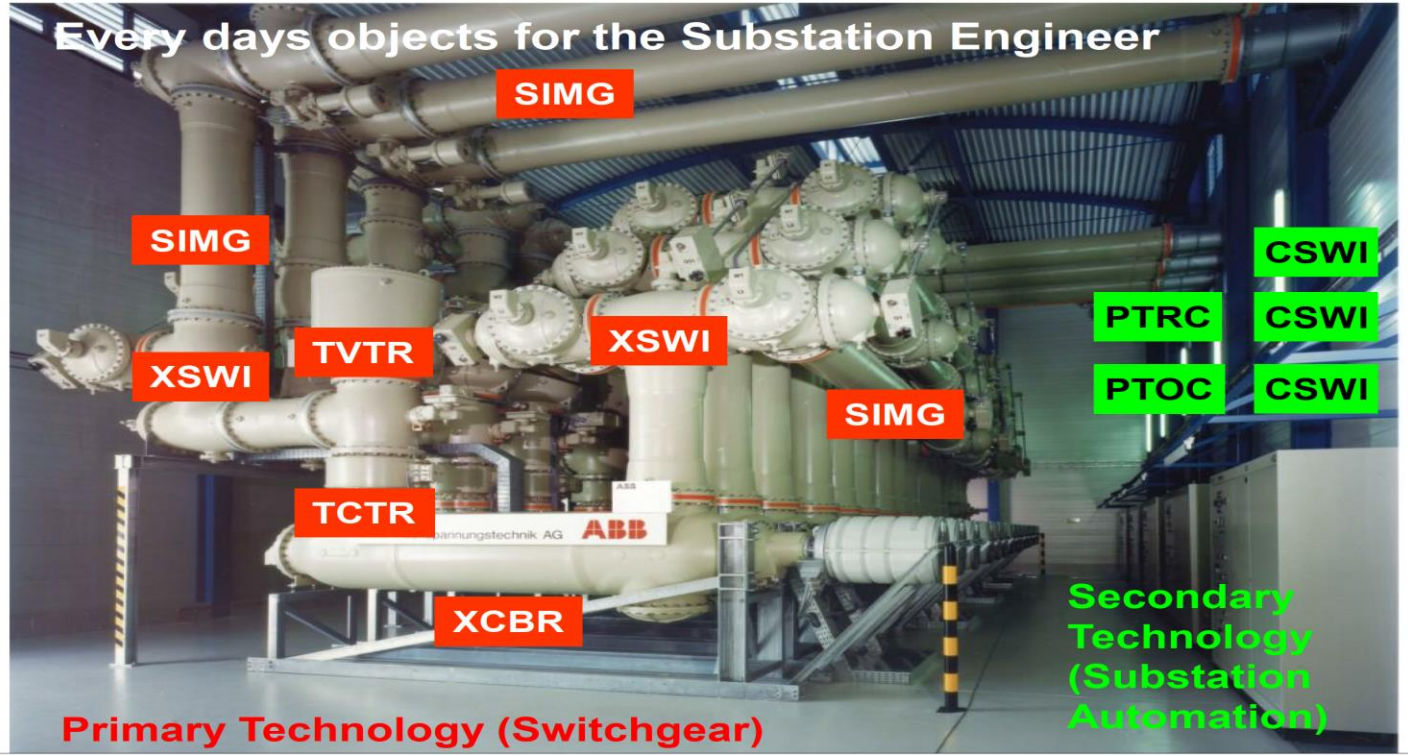
Data Object *DO*
Detailed Information Class within a Logical Note
e.g. Pos, A, Op, St,

Data Attribute *DA*
e.g. StVal, q, CtVal, instmag



IED Data model Overview

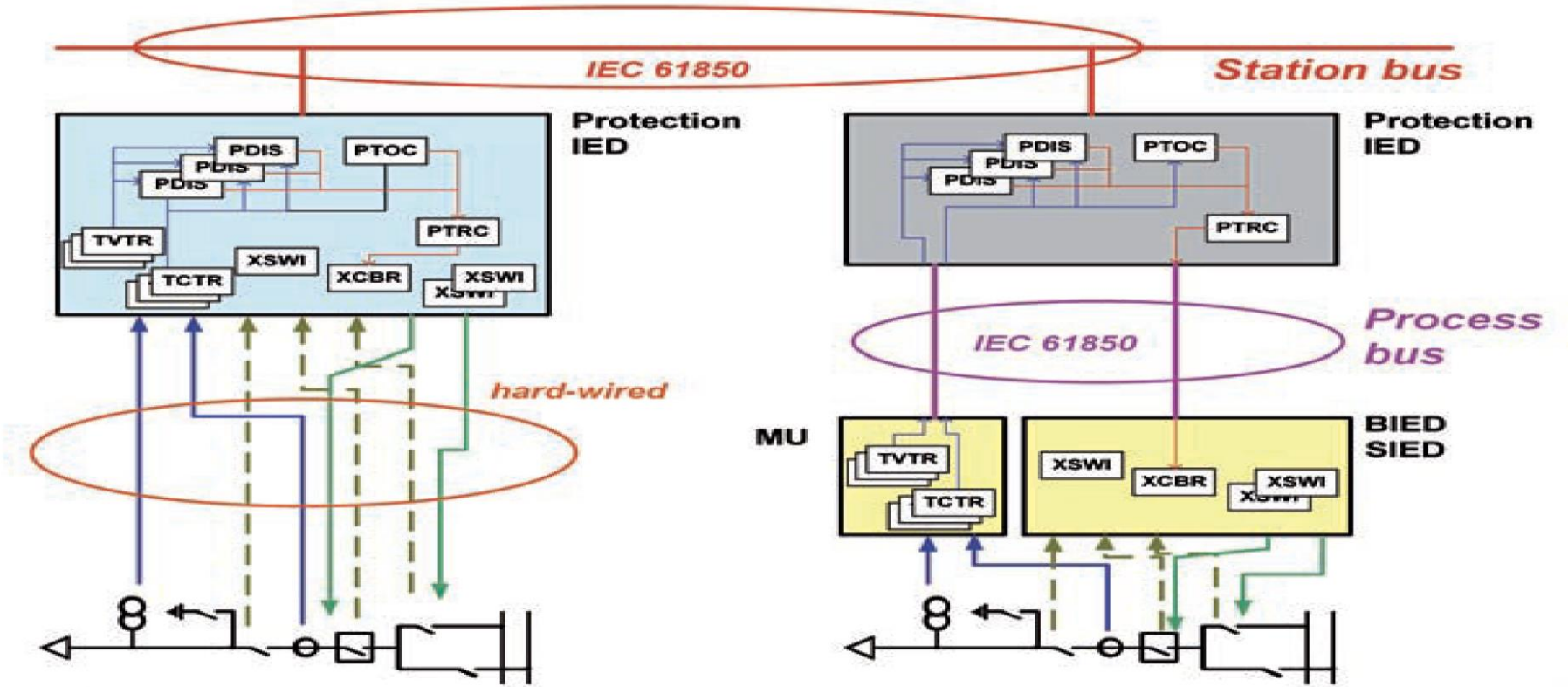
User-near object oriented Data model



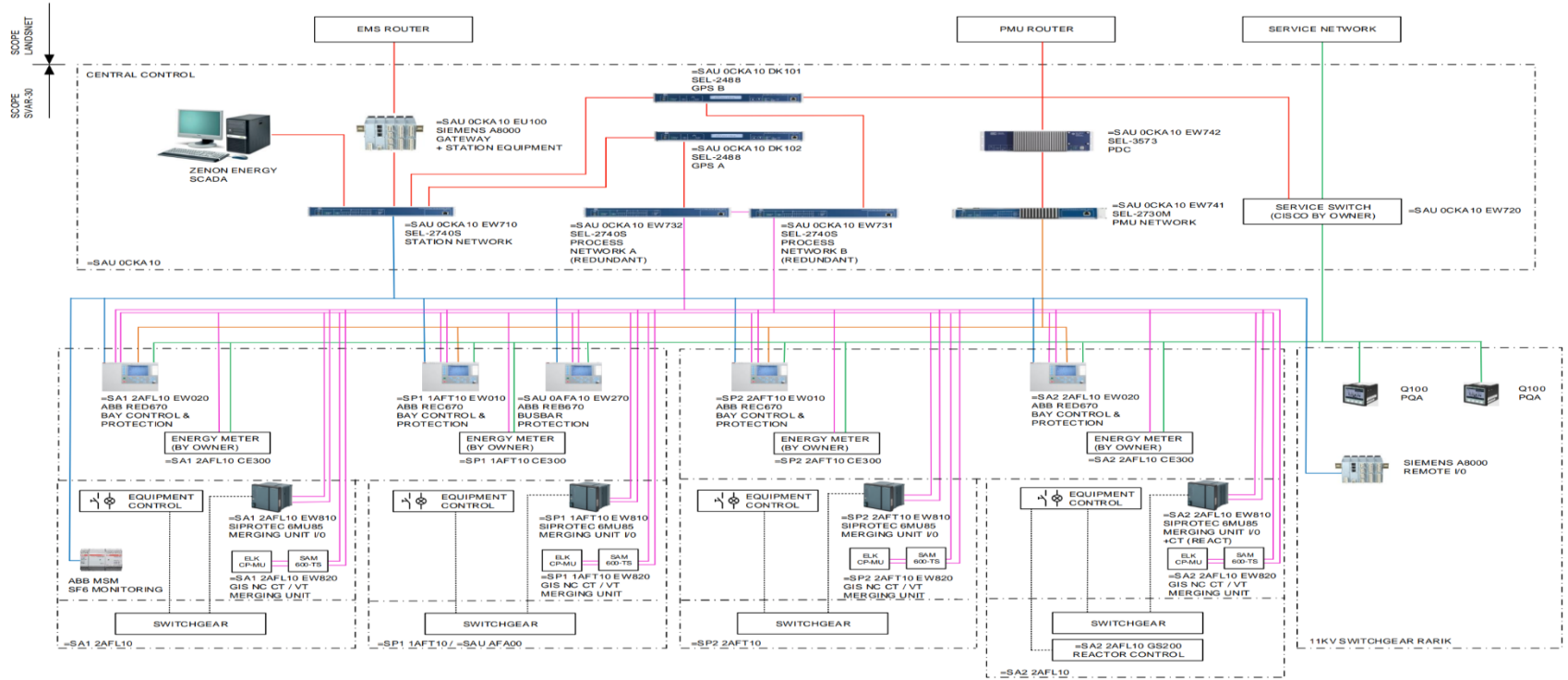
Example :
Object Circuit Breaker
XCBR
What data belong to this object ?

These Objects are called *Logical Nodes*

61850 Station With and without Process-bus



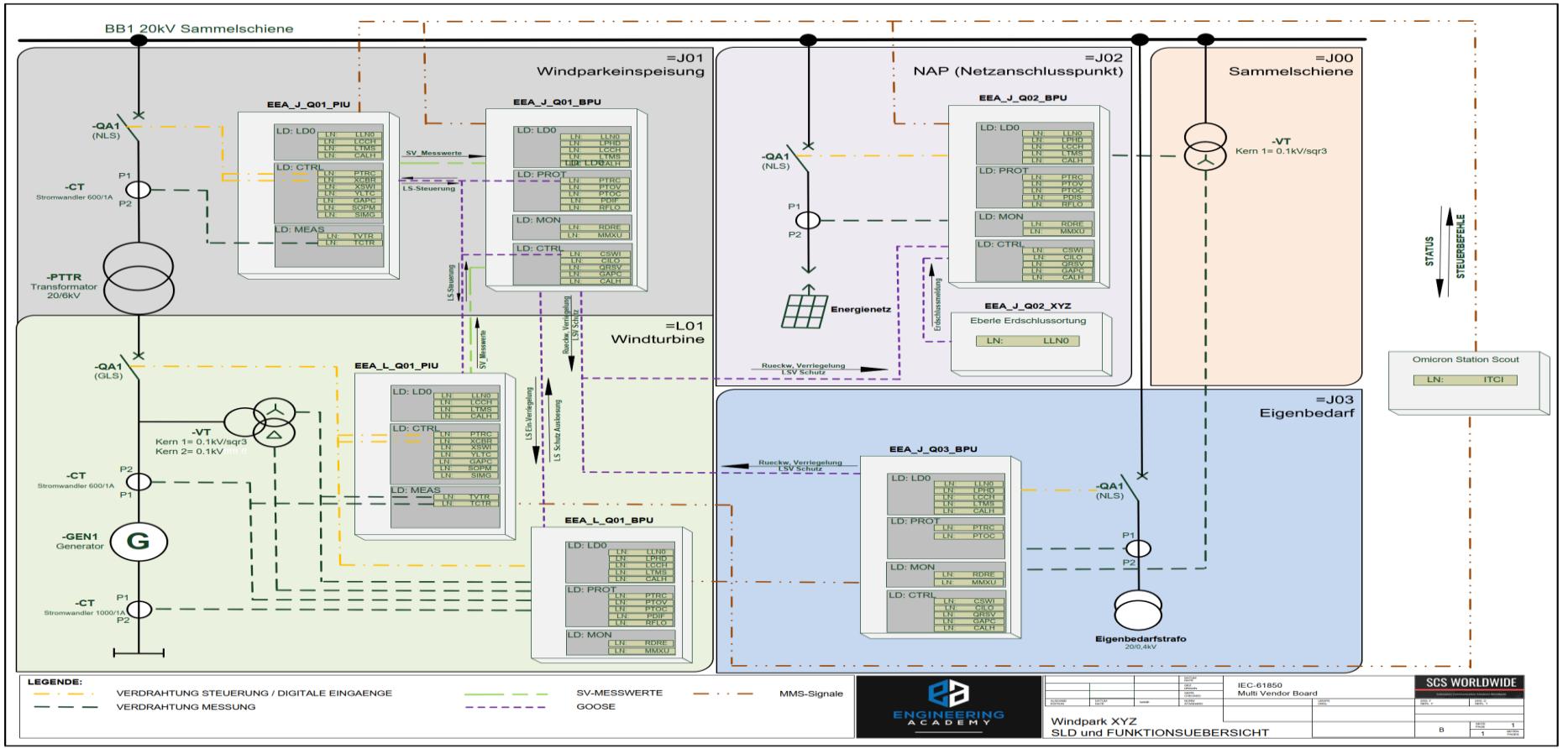
61850 Station Overview Exampe Iceland



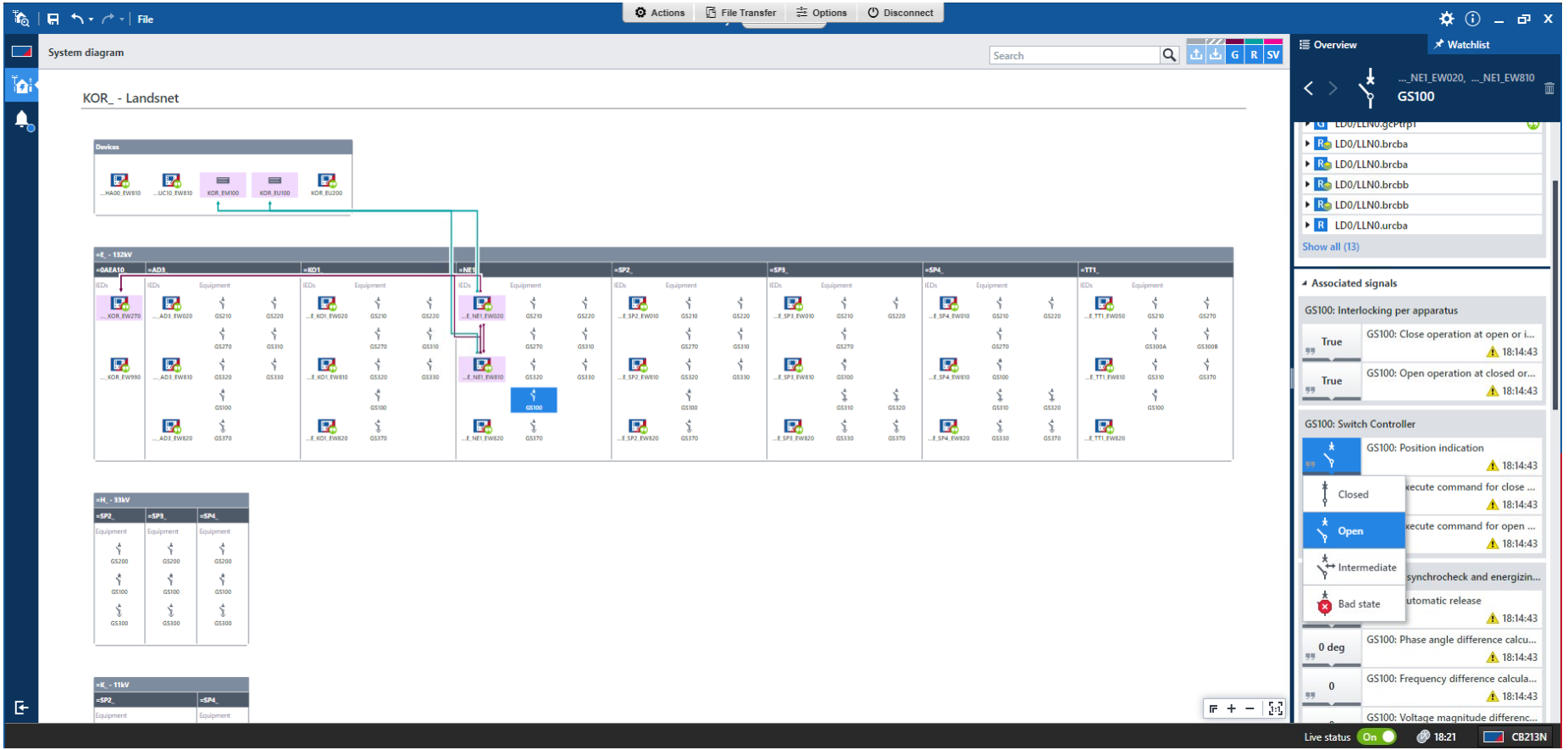
LEGEND:
ETHERNET RJ45 (Cu)
STATION NETWORK (FO)

A	24.01.20	KNIS		04.12.2015	LANDSNET SAUDARKROKUR CONTRACT SVAR-30	LANDSNET
B	18.02.20	KNIS		C. VON KÄNEL		
C	16.03.20	VKCH		M. KNOBEL		
66KV S/S SAUDARKROKUR CONTROL & PROTECTION SYSTEM CONFIGURATION					19651PL030001	B

61850 Station Overview Function Config.



Test Overview SCL via Station Scout



Digital Substation FAT for 220kV Station

Factory acceptance test in Iceland /Landsnet

Digital Substation FAT for 220kV Station

Retrofit geothermal power plant

Site Acceptance Test with Omicron Station Scout

Gracias por su atención

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