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Question 3.04 What are other experiences to improve the specification, engineering, testing and maintenance to address the challenges in our industry?

Process improvement examples

The contribution focuses on two examples to address industry challenges that affect customers and system integrators alike and therefore improves interoperability and quality of IEC 61850 protection, automation, and control systems.

Harmonization of models using Flexible Product Naming

For customers, seeking to be involved in depth in the IEC61850 definitions for their substations, flexible product naming allows to apply a customer-defined IEC 61850 data model to a vendors IED data model, with the target to have the same information modelled in the same way by different IEDs of different vendors.

The customer motivations to request harmonized data models can be different from customer to customer:

- Ease of understanding applications
- Ease of exchanging IEDs from different vendors
- Simplify/automate system engineering for customers that do the IEC 61850 system integration by themselves
- Reduce integration and maintenance efforts
- Shifting complexity from system to IED engineering

During the specification phase of the data model, customers usually work with an enriched signal list, that includes IEC 61850 Logical Node, Data Object and often also Data Attribute definitions. To enable smooth execution this data model is then documented by the customer in an SSD file.

To ensure that the model can be implemented by the IED suppliers (at least two), it is recommended and common practice to involve the suppliers in the data model definition process before the bidding phase.

Ones the specification phase is completed, the data model is rolled out:

- Freeze data model, and test implementations
- Deploy for site installations
- Own and maintain

As the definition and implementation of the customer data model is a time-consuming exercise, it is not done for individual projects, but for frame contracts involving multiple substations and/or running for several years.

Improved interoperability with IEC 61850 Edition 2, Amendment 1

Until the introduction of IEC 61850 Edition 2.1, mixing of IEDs of IEC 61850 Edition 1 and of Edition 2 in one substation automation system, was only possible to a limited extent. Having IEDs of both editions in one system, meant that the IEDs could not talk to each other, also the IEC 61850 client(s) had to provide access points of both editions, to integrate the different devices. Even if only one System Configuration Tool (SCT) was used, the result was two independent SCD files for Edition 1 and Edition 2.
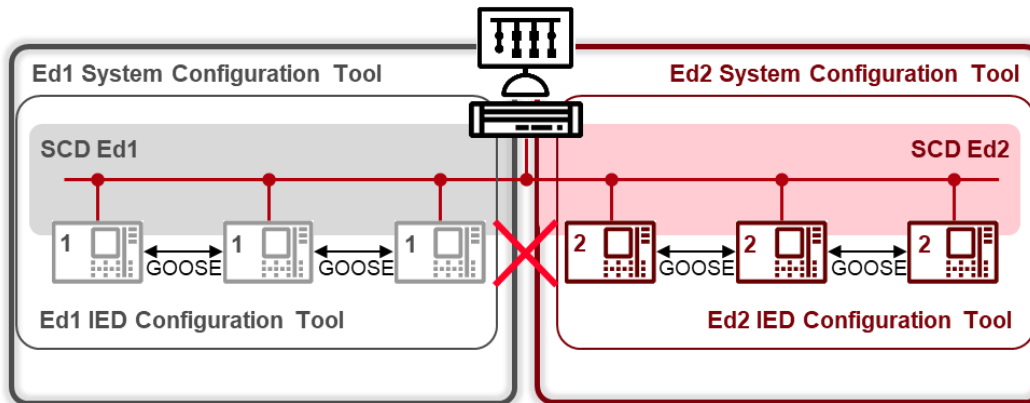
With Edition 2.1, rules have been defined how system and IED configuration tools shall handle differences, with the result that, in the interoperable area, IEDs of different editions can exchange data between each other. This not only simplifies extensions of existing substations, but it also gives more freedom in the selection of products to be implemented, as now devices of different IEC 61850 editions can be integrated in the same IEC 61850 project.
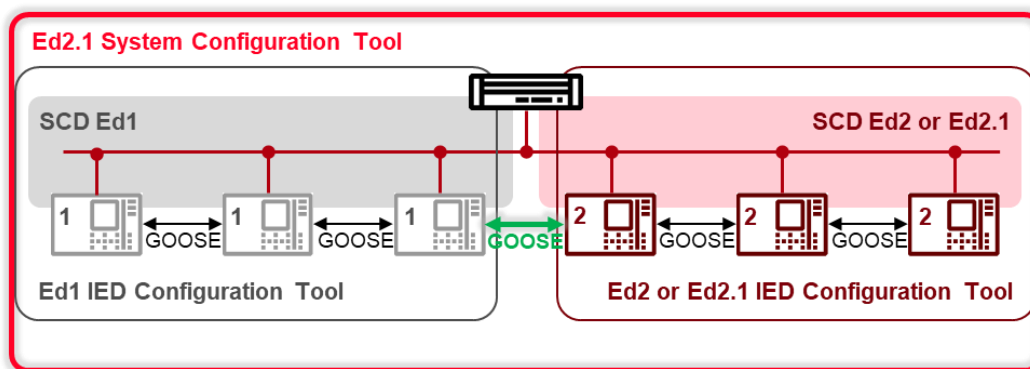
This increases the flexibility in device selection and enables new approaches for system extensions where existing edition 1 systems need to be extended with IEDs of edition 2 or 2.1.