

Study Committee B3

Substations & Electrical Installations

Paper PS3_10917_2022

Application of IEC61850 – a DNO approach

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How can we industrialize the engineering process of a SAS system

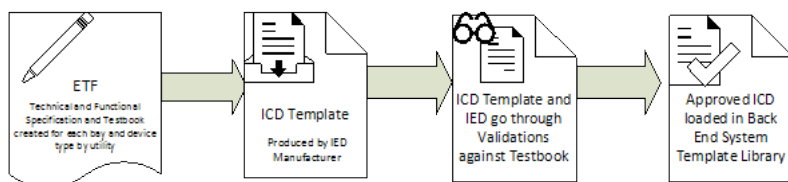
- Standardise Input data
- Optimised Production Tools
- An Error Control System
- Minimal human intervention – “one click configuration”

The Standardised Input Data: Pre-Engineering Work

ICD template contains info. per manufacturer IED and bay type. It needs a definition of:

- Standard primary equipment and busbar topologies
- Protection and control criteria
- Substation and HMI criteria

Functional specification and testbook per IED and bay type



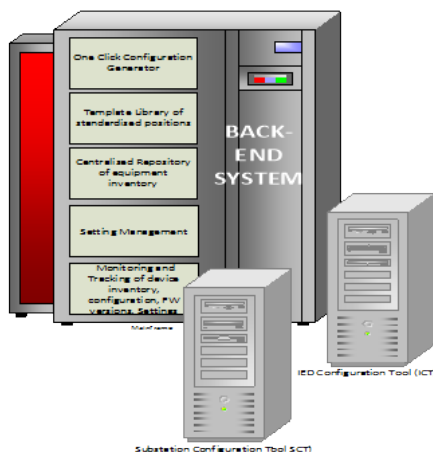
Optimized Production Tools: The Back End System

The back-end system produces the Project Information File (CNF) as input for the SCT. It needs:

- The standardised bay types and single diagram (SSD)
- Server section: ICDs to be imported and IED names
- Networking section: comm. parameters (MMS/IP and Goose interfaces)
- Goose matrix section
- Report Control Block section

The back-end receives the initial scope of the project and coordinates the communication with other systems

Only one data source guarantees consistency and no errors



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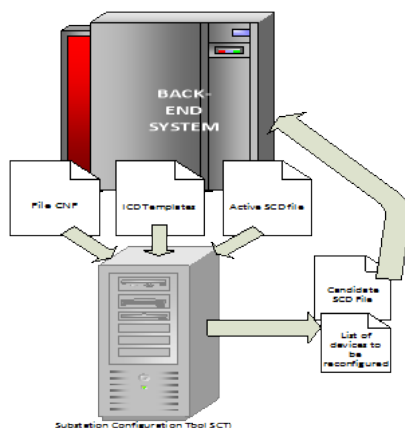
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Optimized Production Tools: Creation of a SCD file

The SCT receives a command line call to produce the SCD without any human intervention:

- Reads and checks the CNF file
- Imports and validates the ICDs
- Instantiates the IEDs, assigns IED names and sets the comm. parameters
- Assigns the RCB to clients
- Subscribes Goose messages according to the matrixes

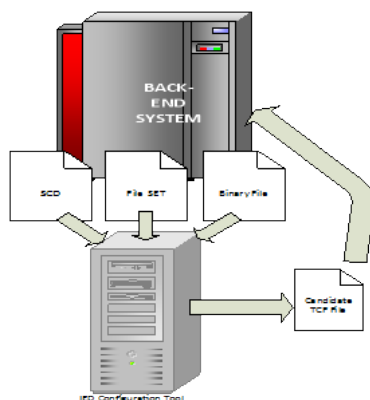


Optimized Production Tools: Creation of Automated IED Configuration

The IED Configuration Tool (ICT) creates the Total Configuration File (TCF):

- Imports the SCD file and extracts the CID for the device
- Imports the particular Setting File (settings can be 61850 modelled or not)
- Imports a specific Binary File (optional template)

The ICT connects to IED in order to load the TCF, upgrade the firmware and check inventory info. and versioning



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Error control systems

SCT

- Comparison with active SCD
- Validates ICD templates and Input File CNF

ICT

- Validates Settings File
- Validates SCD from SCT

Factory Acceptance test

- Definite Device Configuration
- IP address comparison

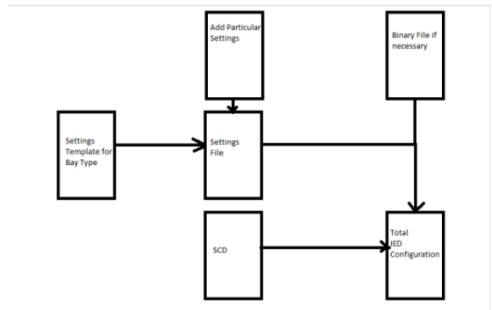
Back-end System Database

- Track and Trace
- Configuration Hash
- Timestamps
- Configuration Comparison

Minimal human intervention

Settings Process

- Separate particular Settings File
- XML
- Editable from our Back End System
- Templates created for Manufacturer, IED and Bay Type with 90% settings pre-defined
- Back End System tracks the Who and When of settings changes
- SCD does not become obsolete after setting change



Results

- Automated Engineering for the configuration of the IED, GTW and HMI
- SCD in minutes not hours!
- 50% reduction in engineering costs and testing time with a high quality
- Standardised configuration process, 61850 file types (SCL) and a standard bay type engineering make it possible
- Remote automated process. E. g., Firmware upgrades can be remotely batch processed
- Utility has taken control of the engineering process. No longer dependent on manufacturers for re-engineering of Gateway or HMI
- Efficiencies also achieved for the complete lifecycle of the SAS (operation, maintenance, retrofit,...)