

Business situation:

Engineering of 400 kV Sub-station using Kalkitech SCL Manager Software

Benefits:

- Lower Integration Costs.
- Lower Maintenance Costs.
- Implement New Capabilities
- 3rd Party Vendor Independent Tool
- Help specification and design preparation

Introduction

The current trend in sub-station automation is highly focused on migrating the existing communication and configuration systems into the Ethernet Network based on IEC 61850 standards. The major driver for this shift is the availability of high bandwidth and low communication latency in Ethernet networks, zero packet loss Ethernet switches and topologies, optical technologies that allow high EMI/EMC tolerance as well as the work in standardization of sub-station equipments and their interactions between different vendors, and reducing the complexity and maintainability of sub-stations. IEC 61850 has evolved from the need faced by both Vendors and Utilities with respect to these issues.

The conventional substation automation standards which use proprietary systems and protocols have a very serious impact on the automation industries as far as operating costs and inter-operability and future integration requirements. The IEC 60870-5 Series of standards introduced a first step in standardizing the tele-control landscape. IEC 61850 further enhances and expands the same and defines an object oriented methodology for representing sub-station devices.

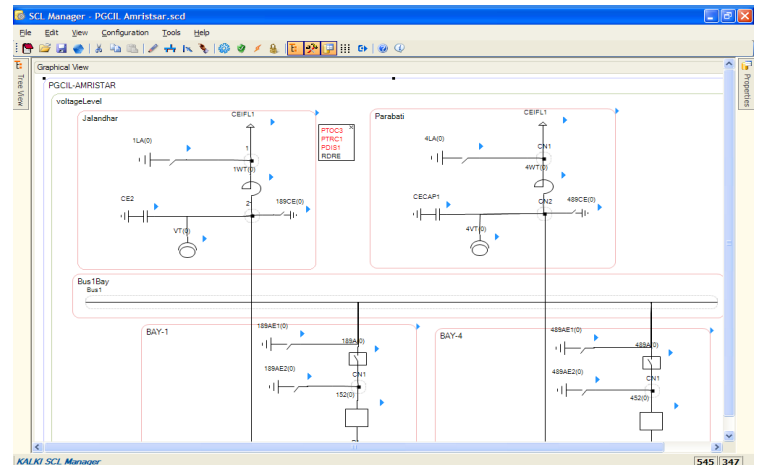
Kalkitech SCL Manager software is an engineering software for IEC 61850 based substation automation. It enables the configuration of a device, and its role in the substation architecture to be precisely defined using XML files. Kalkitech SCL Manager can be used to configure ICD files for devices, create and manage SCD and SSD (Substation Configuration Definition and Substation Specification Definition) files, as well as for creating SLD's.

This paper gives emphasis on engineering for a typical 400/220 kV substation using SCL Manager.

Typical substation

The typical 400/220kV substation has been taken as an study specimen for a conventional substation which we will migrate to an IEC 61850 substation.

The typical substation is in one and half circuit breaker scheme. A 400Kv Incomer is supplying the two buses. Feeders are provided from the 400KV buses and step down to 220kv for supplying to the local electrical distribution company. Provision are provided for extending the substation and add more feeders to the 400Kv bus. IEC 61850 IED's from one Vendor for distance protection, transformer differential and over current protection IED's are used in Main 1. Another OEM IEC 61850 IED's are used as the Main 2 protection. Future extension of the substation will be costly if we are using the conventional automation scheme. However extension cost can be drastically reduced if we are migrating the current automation scheme to IEC61850 standard. Now we can have a look at how we can migrate to an IEC6180 substation.



Engineering Using Kalkitech SCL Manager

Kalkitech SCL Manager is an engineering tool for IEC 61850 based sub-station automation. The following steps are required to engineer the IEC 61850 Substation.

- Import ICD files of IED's being used in the project
- Create SLD of the substation.
- Add Logical Nodes to Substation elements
- Link IED to SLD
- Create the SCD and SSD file

Kalkitech SCL Manager helps in all the above stages to create the complete Engineering of the IEC 61850 Substation. The SCD and SSD files are made available

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to the SCADA team to integrate into the SCADA/HMI, and CID files created from SCD are used by the OEM IED tools to download to the IED's. Once these processes are complete the engineering is complete.

The configured SCD file can be used by any client application for understanding each device model as well as for making out the HMI screen. Kalkitech SCL Manager enables the sharing of IED configuration among users and suppliers to reduce or eliminate inconsistencies and misunderstandings in system configuration and system requirements.

There are also various other functionalities in the Kalkitech SCL manager that include validation of the output SCD file and validation of ICD file. The software also has an option to generate MMS tags of the data instances in the IED. These tags are important for easy data engineering in the SCADA. The private logical nodes enable OEM specific objects to be created and managed using Kalkitech SCL Manager.

Application Note – IEC 61850 SCL based S/S Engineering

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