SPECIFICATIONS FOR SCL(SUBSTATION CONFIGURATION LANGUAGE) MANAGER WITH HYDRO DATA MODELS

A. GENERAL SPECIFICATIONS

A.1 General Conformance:

The SCL (Substation Configuration Language) Manager configuration utility tool provided by the vender for configuring an IED(Intelligent Electronic Device) shall confirm to the IEC 61850 standard in terms of Data Models , Communication services, report control blocks and generic substation events. In general the data models supported by the SCL configuration utility shall confirm to the Common Data Classes , logical Nodes defined by the standard IEC 61850-7-3 and 61850-7-4. Further the configuration software tool shall provide additional data models with reference to hydro power plant as defined in the standard IEC 61850-7-410.

A.2 Schema Conformance:

The ICD(IED capability description) file , CID(Configured IED description) file and SCD(substation Configuration Description) files generated by the SCL manager configuration utility shall confirm with standard schema defined by the standard IEC 61850 schema format. The output files generated by the SCL manger software utility shall pass through standard XML schema parsers with out any errors while using the files in real time application with standard IEC 61850 client and server utilities.

A.3 Device Conformance:

The ICD, CID files generated by the SCL manager utility tool shall easily be ported on to the target and it shall be compatible and shall work with the IEC 61850 client and server applications realized with standard SISCO libraries**.**

A.4 Software deployability:

The SCL manager configuration Tool provided by the vender shall be deployable on any number of target machines without any additional Licenses or runtime time or reinstatement licenses by BHEL and the vendor shall support free upgrades or enhancements over specific period of time not less than two years. Further the software shall easily be deployable on a standard PC with Windows operating system.(Windows XP & Windows7)

A.5 Application utility:

The SCL manger configuration Tool with substation data models or substation and Hydro power plant data models shall be in commercial supply of the vender and vender shall provide a reference list where the tool has been commercially supplied .

A.6 Demo of software Tool:

The vender shall demonstrate at least one version of the SCL manger configuration Tool containing data models related to either substation or substation and hydro plant.

Incase the demo contains only substation models the vender shall specify the software design approach to accommodate additional logical nodes related to Hydro plant as per the standard IEC 61850-7-410

A.7 Data Model Upgrades:

The SCL Manager configuration Tool shall have the provision to include additional logical nodes defined by the standard IEC 61850-7-410 due to subsequent revisions. To that effect the current version of the SCL manager Configuration tool shall be upgraded by the vender .

A.8 Installation:

The SCL configuration tool shall provide a standard installation utility to install the software components easily by the user.

A.9 Software Maintenance:

The vender shall provide free support for fixing any software bucks encountered after the SCL configuration tool put to regular use at least for a period of two year from the date of delivery.

A.10 Installation & Training:

The vender shall provide free installation of the SCL manager Configuration Tool with Hydro data Models at BHEL ,R&D with complete media packs and supporting documents and shall provide two day onsite training for effective use of the SCL Configuration Tool.

B. FUNCTIONAL SPECIFICATIONS

B.1 Functional Requirement:

The SCL Manager configuration tool with hydro data models shall cater to the needs of implementation of complete configuration and engineering schemes as per IEC 61850 for substations and hydro power plant. It shall cover the functional components of System Configuration, IED Configuration and Engineering Workspace to a great extent.

SCL Manager shall also cater to creation of capability description files of any new IED which completely follow SCL as described in IEC 61850.

The tool shall provide various subsystems and components with suitable font end GUI to prepare system specifications, system configuration and IED configuration as per the IEC 61850 standard. The tool shall support the following minimum functional requirement
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B.2 Defining System specification:

The configuration Tool shall support defining of system specification as per IEC 61850 and it shall have definitions of complete electrical system interconnections (SLDs) required for a substation/hydro power plant and defining the functionality (Logical Nodes) that need to be performed by each element /subsystem or group of elements/subsystems together. The tool shall have capability to

1. Drawing complete Single Line Diagram(SLD) using the graphical user interface available in SCL Manager configuration tool. The process shall cover creation of substation and hydro plant elements and its interconnection using connectivity node (point or bus-bar).

2. The GUI and Configuration tool shall provide Page wise configuration of the SLDs also.

3. Selection of the functionality required on each element of substation and hydro power plant shall be possible by way of selection of suitable Logical Nodes (LNs) from the list of logical nodes master as specified in the IEC 61850 standard

4. The Configuration tool shall provide for exporting of system specification created by the tool as System Specification Description (.SSD) file.

B.3 Defining Substation / Hydroplant configuration

The SCL Configuration Tool shall support defining of substation/ Hydro power plant configuration by way of linking the functionality elements described in the system specification to the actual functional points (LNs under the IEDs) & description of complete communication schemes. The SCL configuration tool shall support

1. Importing of external file containing complete system specification (.SSD) into workspace or creation of new specification as per the steps given in system specification description.

2. Creation of IEDs which are needed for the specific substation/ Hydro plant or Importing of particular ICD files from external source in to the project and defining the communication services attributes for the specific IED.

3. Linking of the substation/ hydro power plant functionalities defined in the specification to the actual functional points by linking the LNs available in the substation/ hydro plant elements to the LNs of loaded IEDs.

B.4 Defining ICD (IED Capability Description):

The SCL Manager Configuration Tool shall mainly cater to the needs of Creation of ICD files for any new vender device as per the device requirements The configuration tool should have the capability to configure any new vendor device which does not have an ICD but will completely work depends on the configuration file created as per SCL standards . The Configuration Tool shall support the following functions

1. The SCL Manager configuration Tool shall support Defining of an IED (physical device) section with standard parameters as per the IEC 61850 standard.

2. The configuration tool shall support creation of separate logical divisions (LDs) within the physical device (IED)as required based on the application & add mandatory functions (LNs - LLN0 & LPHD) with required data & attributes under each logical divisions.

3. It shall also support addition of application specific logical nodes(user LNs) as per the functionality of the Logical Division related to particular IED. This shall include all logical nodes related to substation as per IEC 61850-7-3 &4 and all logical nodes related to hydro power plant as per the standard IEC 61850-7-410

4. The SCL Manager configuration tool shall support a template for each logical node and the GUI shall support for selection of particular logical node from the master list. Once the Logcal node is selected , it shall provide a template with all required data and attributes for the logical node including mandatory and optional attributes.

5. Provision shall be given in the configuration tool to check for a list of optional attributes that are required for specific application.

6. The SCL manager configuration tool shall support defining of control models for the logical nodes supporting control operation as the IEC 61850 control model definitions. To that effect the GUI shall support ticking / selecting of particular control model with required attributes.

7. The SCL manager Tool shall support assigning /changing of default values for various elements like control model by adding / editing data object instances under each logical nodes.

8. The SCL manager configuration tool shall support creation of required data sets as per the IEC 61850 definition under each logical device of a particular IED . the tool also shall support attachment of data form different logical nodes under the same logical device. Provision shall be made for creation of multiple data sets as per user requirement. The GUI shall support to create different data sets as per application requirement.

9. The SCL manager configuration tool shall support defining of required Report Control Blocks under each logical node and attach the relevant data set to the same as per the IEC 61850 standard. Further it shall support both buffered report control blocks and un buffered repot control blocks as per the user requirements.

10. The tool shall also support creation of multiple report control blocks with same or different data sets for using with different clients.

11. The SCL Manager configuration tools shall support for defining of required GSE/GOOSE functionality for inter IED communication , SMV for intelligent sensors and LOG control blocks for generating the reports of healthiness under LLN0 and associate the suitable dataset to the same.

12. After finalizing the IED configuration, the tool shall support generation of required ICD file in the form of standard XML as per the standard schema specified by the IEC 61850 standard. All necessary checks to validate the ICD file shall be carried out automatically and any errors shall be prompted to the user with required tips to correct the same.

13. The ICD file generated by SCL manager Configuration tool shall parse through any standard XML parser without errors.

B.5 IED Database

The SCL Configuration Tool shall support database to store commonly available IED configuration files. The database manager shall provided with the tool shall support the following capabilities

1. Adding an IED with its ICD file
2. Browsing functions of IED
3. Adding accessories and items list

B.6 Template creation

1. The SCL Manager Configuration Tool shall have the capability of storing SLD files in the form of Template, which can be used for generation of similar SLDs. Different templates can be generated for station, bay level , Hydro turbine , Generator , Transformer etc…

2. The SCL Manager Tool shall have tracking feature to trace the changes made in the SCL file and shall have a display showing differences.

B.7 External signal Mapping

The SCL Manager Configuration Tool shall support mapping of Generic Substation and Hydro plant Events and Report control blocks to the destination points of Logical nodes of different IEDs. The configuration tool shall support step by step procedure through the required GUI to configure source and destination points.

Minimum procedure shall include the follwing

1. Loading of the file containing complete substation configuration (.SCD) having multiple IED sections

2. Choosing of external signals mapping opttion.

3. Selection of Source -- Select the source IED, type of data transfer (GSE, RCB or Specific LN) & choose the data tag coming under GSE, RCB or LN.

4. Selection of Destination -- Map the specific tag to the destination logical node. Select destination IED, LN and choose automatic or manual entry for the destination identifier.

5. Saving of the complete mapping as part of .SCD file itself.

B.8 Acceptance Criteria

Data models related to two typical IED of a hydro power plant namely Electro Hydraulic Governor and Auto sequencer will be taken up for creating the ICD files of related IEDs and the SCL Manager Tool shall support creation of ICD and the same ICD shall work with the IEC client and server applications realized with standard SISCO libraries.

B.9 Warranty

Warranty shall be provided for Two years after the installation of the SCL manager configuration Tool.

For any Technical Clarifications please contact :

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