ANNEXURE-I

Software requirement specifications for Supply of Source code libraries of IEC61850 Client and its Implementation for SCADA

1.0 Introduction:

This document describes the specification to supply of source code libraries and implementation of IEC61850 client in BHEL SCADA software for establishing communication with field level IEDs. The application shall use the Source code libraries based on latest IEC61850 standard and the application runtime environment shall be Windows Operating System over x86 hardware platform.

2.0 Scope:

The scope of the work includes:

2.1 Submitting the detailed design document in line with the requirement specifications.

2.2 Developing the software as per the approved design document.

2.3 Demonstration of the software features at vendor premises

2.4 A. Supply of latest MMS stack Source Code Libraries along with user's manual and documentation.

B. Design, development of IEC61850 Client Runtime driver and integration with BHEL application.

C. Building of IEC61850 client for transmit/receive of user data as per configuration file.

D. Testing of IEC61850 client driver along with the BHEL software at BHEL R&D in their hardware.

E. Preparation and submission of documentation including data diagrams, flow charts, user's manuals etc.

2.5 Training at BHEL R&D, Hyderabad on the development and configuration of the software.

2.6 Support during the testing of implemented software using third party test tool.

2.7 Maintenance and Warranty for a period minimum of one year after successful installation and training.

3.0 Deliverables:

The deliverables will include:

3.1 Source Code Library of MMS Stack for IEC61850 protocol, IEC61850 Client Run time Driver and IEC61850 Client configuration interface.

3.2 Integration of IEC 61850 Client run time driver, MMS protocols and Configuration interface with BHEL SCADA application software in Windows Platform as per mutually agreed terms.

3.3 Design documentation and user manual of both Source Code Libraries and implementation softwares.

3.4 Training on Source Code Libraries and implementation of softwares.

4.0 Detailed functional requirements of the software (Scope as defined in IEC61850 standard)

The vendor shall integrate IEC 61850 Client with BHEL SCADA application on Windows platform.

- The software developed should be able to communicate with multiple IEDs (Approx. 100 IEDs) on IEC 61850 over the TCP/IP network.

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- Browse the data model (Logical Devices, Logical Nodes, Data Objects and Data Attributes)
- Read and write of Data values
- Read and write of Data Set values
- Control Model (all models as mentioned in the supported ACSI services)
- Reporting (Buffered and Un-buffered)
- File transfer
- Time Synchronization
- Service Tracking
- The developed client driver should provide inter-operability support for the Ed.1.0, Ed. 2.0 and Ed.2.1 devices.
- The vendor shall provide the "client.icd" file with matching Client Services.
- Support for GOOSE Subscription and Sampled values shall not be required at this stage, however the Source Code should have ability to expand and include GOOSE Subscription and Sampled value subscription
- The developed client driver should store the data obtained from servers in a database.
- It shall be possible to archive the historical data in open database format like SQL/RDBMS etc.
- It should provide IEC61850 client driver redundancy to ensure the field device data availability in the database server and also ensure that there are no events or data loss during switchover from primary to secondary IEC 61850 client.

4.1 MMS Stack (EC 61850-7-2 and IEC 61850-8-1): The MMS stack should support the following ACSI services for IEC61850-8-1 Client system:

Sl No.	Conformance Block	Mandatory	Optional
1	Basic Exchange	Associate Abort and/or Release	GetAllDataValues SetDataValues GetServerDirectory GetLogicalDeviceDirectory(LD) GetLogicalNodeDirectory(DATA) GetDataDirectory GetDataDefinition GetDataValues
2	Data Set	CreateDataSet DeleteDataSet	GetDataSetValues SetDataSetValues GetLogicalNodeDirectory(DATA-SET) GetDataSetDirectory
3	Substitution	SetDataValues	GetLogicalNodeDirectory(SGCB)
4	Setting Group Selection	SelectActiveSG SelectEditSG, SetEditSGValue ConfirmEditSGValues	GetSGCBValues GetEditSGValue
5	Unbuffered Reporting	Receive Report GetURCBValues SetURCBValues	GetLogicalNodeDirectory(URCB)

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6	Buffered Reporting	Receive Report GetBRCBValues SetBRCBValues	GetLogicalNodeDirectory(BRCB)
7	Logging	GetLCBValues QueryLogByTime and/or QueryLogAfter GetLogStatusValues	GetLogicalNodeDirectory(LCB) GetLogicalNodeDirectory (LOG) SetLCBValues
8	GOOSE Control Block		GetLogicalNodeDirectory(GOCB) GetGoCBValues SetGoCBValues
9	Direct Control	Operate	TimeActivatedOperate
10	SBO Control	Select, Operate	Cancel, TimeActivatedOperate
11	Enhanced Direct Control	Operate Receive CommandTermination	TimeActivatedOperate
12	Enhanced SBO Control	SelectWithValue, Operate Receive CommandTermination	Cancel, TimeActivatedOperate
13	Time Sync	TimeSynchronization	
14	File Transfer	GetServerDirectory(FILE) GetFile	
15	Service Tracking	Receive Report	

5.0 General

5.1 The application shall be developed using source code libraries based on the latest IEC61850 standard.

5.2 The vendor should have the development environment and all the software and hardware components to carry out the development. The vendor should substantiate the same in the offer.

5.3 A. The offer should contain the technical documentation of Source Code Libraries for technical evaluation.

B. The offer should specify the development environment and the same has to be included in the Technical Proposal.

5.4 The successful bidder shall submit a design document within 2 weeks' time from the date of Purchase Order.

1. After the design is approved by BHEL R&D, vendor shall take up the implementation.
2. BHEL R&D shall review the work at suitable stages of the development.
3. The functioning of the software shall be inspected periodically.
4. Vendor shall install the software at BHEL R&D, on the target hardware platform provided by BHEL.
5. Testing shall be conducted as per mutually agreed Acceptance criteria. This shall include modifications on the source code, compiling in the development environment and porting on to the runtime platform at BHEL R&D.

5.5 The source code is deliverable to BHEL; the source code should be compiled and executed in the presence of BHEL in their in-house development environment for demonstration.

5.6 The application and configuration software modules are the sole property of BHEL R&D and should not be used for any other purpose by the vendor.

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