ANNEXURE I

Technical Specifications for Software Requirement Development of IEC 61850 Sampled Measured Values, GOOSE Publish and Subscription

1.0 Introduction

This document describes the software requirements specification for the development of server software to implement the IEC 61850 protocol for sampled measured values, GOOSE publish and subscription application. The application shall be based on the MMS-EASELite Source code libraries of SISCO. The application runtime environment will be Linux/RTLinux (from Fsmlabs).

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 Supply of the software – source code of application and executables, along with the software documentation including data diagrams, flow charts, user's manuals etc.
2.5 Installing the software at BHEL R&D in their hardware and testing
2.6 Training on the development and configuration of the software
2.7 Support during / for the successful third party test certification at a reputed test lab.
2.8 Maintenance and Warranty for a period of one year after successful installation / third party test certification (whichever is later).

3.0 Deliverables

The deliverables will include:

3.1 IEC 61850-9-2 server software integrated with BHEL software code.
3.2 Design documentation and user manual.
3.3 Training on implementation / software.

4.0 Detailed functional requirements of the software

4.1 The server driver should support options for adding logical devices, logical nodes, Data, data attributes, Datasets, GOOSE Control Blocks, Sampled Measured Values. The server software shall support configuration options to add the following as defined in IEC 61850.

1. Logical devices, logical nodes
2. Data, data attributes, Datasets
3. GOOSE control blocks
4. Sampled Measured Values

4.2 The server software shall provide for the following as defined in IEC 61850-7-2:

1. GOOSE model
2. Sampled Measured Values model

4.3 Software development module as per IEC 61850:9-2 : Accept multiple digitized CT / CVT signals and convert it to multiple time synchronized Sampled Measured values (IEC 61850:9-2) for multicast over Ethernet port. The digitized samples are generated at a frequency of 4 kHz (with a sampling interval of 250 us) for protection and 12.8 kHz (with a sampling interval of 78.125 us) for power quality measurement. These samples have to be time stamped with a synchronized precision time clock, before being multicast. Making available the synchronized precision time clock for this time stamping, does not fall in the scope of the activity. The scope includes building 61850-9-2 server for multicast of sampled values as per configuration file. It can be assumed that the instantaneous data of the CT/CVT signals is transferred via IPC (Interprocess communication) from the BHEL's software.

4.4 Software development module as per IEC 61850:8-1 Subscribe and Publish GOOSE messages to control and access the field switches (IEC61850:8-1) over Ethernet port. Scope includes building 61850-8-1 server with Server, LD, LN and Data including GoCBs as a separate task and a Goose publish/subscribe task. It can be assumed that data will be provided locally in the board via IPC from the BHEL's software.

5.0 General

5.1 The application shall be developed based on the latest SISCO's MMS-EASELite source code libraries.

5.2 As and when the edition 2 of the IEC 61850 standards is released before the completion of the warranty period, the vendor is expected to make the software compliant with this update.

5.3 The vendor has to substantiate his competence in executing the job. A client reference list indicating similar jobs undertaken for the implementation of IEC61850 standards in IEDs should be enclosed with the Technical proposal. Technical offers of competent vendors, with proven client list, only shall be considered.

5.4 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.

5.5 The offer should specify the development environment and the entire development environment has to be supplied and the same has to be included in the Technical Proposal

5.6 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 then 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 a 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

5.7 The source code in deliverable to BHEL, The source code should be compiled and executed in the presence of BHEL in the inhouse development environment. The executable module generated by the compilation should be delivered.

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

For any Technical Clarifications please contact –
Mrs V Shyamala, DGM(TPS) e-mail ID : shyamala@bhelrnd.co.in

The following ACSI conformance features given in the Basic conformance statement, Model conformance statement and service conformance statement should be supported.

ACSI Basic conformance Statement

	Description	**Client / Subscriber**	**Server / Publisher**	**Value / Comments**
Client-Server roles				
B11	Server side (of TWO-PARTY APPLICATION-ASSOCIATION)	--	N	
B12	Client side (PARTY APPLICATION-ASSOCIATION)	N	--	
SCSM supported				
B21	SCSM : IEC 61850-8-1 used	--	Y	GOOSE only
B22	SCSM : IEC 61850-9-1 used	--	N	
B23	SCSM : IEC 61850-9-2 used		Y	
B24	SCSM Other		N	
Generic Substation Event Mode (GSE)				
B31	Publisher side	--	Y	GOOSE
B32	Subscriber side	Y	--	GOOSE
Transmission of Sampled Value Model (SVC)				
B41	Publisher side	--	Y	
B42	Subscriber side	N	--	

ACSI Models Conformance Statement

		Client / Subscriber	**Server/ Publisher**	**Value / Comments**
If Server side (B11) supported				
M1	Logical Device	-	N	
M2	Logical Node	-	N	
M3	Data	-	N	
M4	Data Set	-	N	
M5	Substitution	-	N	
M6	Setting group control	-	N	
Reporting				
M7	**Buffered report control**		N	
M7-1	Sequence – number	-	N	
M7-2	Report-time-stamp	-	N	
M7-3	Reason-for-inclusion	-	N	
M7-4	Data-set-name	-	N	

M7-5	Data-reference	-	N	
M7-6	Buffer-overflow	-	N	
M7-7	Entry id	-	N	
M7-8	Buf Tm	-	N	
M7-9	IntgPd	-	N	
M7-10	GI	-	N	
M7-11	Conf-revision	-	N	
M8	Unbuffered report control			
M8-1	Sequence – number	-	N	
M8-2	Report-time-stamp	-	N	
M8-3	Reason-for-inclusion	-	N	
M8-4	Data-set-name	-	N	
M8-5	Data-reference	-	N	
M8-6	BuffTm	-	N	
M8-7	IntgPd	-	N	
M8-8	GI	-	N	
M8-9	Conf-revision	-	N	
Logging				
M9	Log control	-	N	
M9-1	IntgPd	-	N	
M10	Log	-	N	
M11	Control	-	N	
If GSE (B31/B32) is supported				
M12	GOOSE	Y	Y	
M13	GSSE	N	N	
If SVC (B41/B42) is supported				
M14	Multicast SVC	N	Y	
M15	Unicast SVC	N	N	
If server or client side (B11/B12) supported				
M16	Time	-	N	
M17	File Transfer	-	N	