ANNEXURE-II

Software requirement specifications for Supply of Source code libraries of OPC UA server and its Implementation for SCADA

1.0 Introduction:

This document describes the specification to supply of source code libraries and implementation of OPC UA Server in BHEL SCADA software for establishing communication with OPC UA Client. The application shall use the Source code libraries based on latest OPC UA standard. 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 A. Supply of OPC UA stack Source Code Libraries along with user's manual and documentation.

B. Design, development of OPC UA Server driver and integration with BHEL application.

C. Building of OPC UA Server for transmit of user data as per configuration file

C. Testing of OPC UA Server driver along with the BHEL software at BHEL R&D in their hardware.

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

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

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

2.6 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 OPC UA Stack.

3.2 Integration of OPC UA Server run time driver 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 OPC UA standard)

The vendor shall integrate OPC UA Server with BHEL SCADA application on Windows platform.

a) The OPC Unified Architecture server (OPC UA server) should exchange data with OPC UA clients and also provision should be provided to exchange data with OPC Classic client via wrappers/ UA Tunneller.

b) Server and client should communicate through sessions.

c) The monitored items of data (also referred to as node attributes) to be shared by the OPC UA server to be selected from a list of the variables available in common database of BHEL application.

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d) OPC UA uses a subscription model; client subscribes to the address space of server. The OPC UA server reads the values of node attributes from the database at a fixed sampling rate, places the data in a queue, then sends them to clients as notifications at a regular publishing interval.

4.1 OPC UA Services:

As part of the standard (OPC UA Part 7), the following OPC UA Server features are to be implemented:

Service Set	Service	Implementation Required
Discovery	Find Servers	M
	Find Servers On Network	O
	GetEndpoints	M
	Register Server	O
	Register Server 2	O
Session	Create Session	M
	Activate Session	M
	Close Session	M
	Cancel	O
Node Management	Add nodes	O
	Add references	O
	Delete nodes	O
	Delete references	O
View	Browse	M
	Browse next	M
	TranslateBrowsePathsToNodeIds	M
	Register Nodes	M
	Unregister Nodes	M
Query	Query First	O
	Query Next	O
Attribute	Read	M
	History Read	M
	Write	M
	History Update	M
Method	Call	M
Monitored Item	Create	M
	Modify	M
	Set Monitoring Mode	M
	Set Triggering	M
	Delete Monitored Items	M
Subscription	Create	M
	Modify	M
	Set Publishing Mode	M
	Publish	M
	Republish	M
	Transfer Subscriptions	O
	Delete Subscriptions	M

M – Mandatory; O- Optional

4.2 OPC UA Server Configuration Description:

The following OPC UA Server Configuration parameters should be supported:

Parameter	Value	Default value
OPC UA Server Enabled	Enabled/ Disabled	Enabled
Disable anonymous login	Enabled/ Disabled	Disabled
Security Policy	None Basic128Rsa15 Basic256 Basic256Sha256 Aes128-Sha256-RsaOaep Aes256-Sha256-RsaPss	None
Message Security	None Sign SignAndEncrypt	None
Server port	0...65535	4840
Max. subscriptions per session	1...100	20
Min. publishing interval	200...5000	1000
Max. monitored items per subscription	1...1000	100
Min. KeepAlive interval	500...5000	500
Max. number of sessions	1...4	2
Identifier type	Numeric String	Numeric
Enable trace	Enabled/disabled	Enabled
Sampling rates (ms)	200...5000	500 1000 2000

5.0 General

5.1 The application shall be developed using source code libraries based on the latest OPC UA 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 for server are the sole property of BHEL R&D and should not be used for any other purpose by the vendor.