

# Indian Institute of Technology Delhi

## Department of Chemical Engineering

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Date: 11 August 2014

Ref: IITD/VVB/2014-15/Cluster

Department of Chemical Engineering invites quotations for a **Rack mountable storage server, Monitor and Up-gradation of the existing high performance computer cluster** with the following specifications:

### 1. Rack mountable storage server (Qty: 1)

#### 1.1 Processor:

**INTEL XEON Processor** must be of latest generation (at least 2.4GHz, 6-core, 15 MB cache)  
The server should be able to run 32/64 bit Linux and 64 bit Windows Operating System.

#### 1.2 Memory:

Minimum of 16 GB (2x8GB) DDR3 memory expandable to 32 GB.

#### 1.3 Storage:

Minimum of 8 TB usable PFS (Parallel File System) storage with RAID 5/6 control (hardware based) with provision for future expansion. Appropriate form factor. Hot pluggable. Storage It should be scalable to 16 TB storage. The number of hard-disk bays that will get used up for 8 TB of storage and the number of slots that will remain free for future expansion should be clearly mentioned. SATA/NL-SAS/SAS disk type (7.2 k rpm with appropriate form factor) should be quoted.

1.4 **Interface ports/connectivity to cluster:** Dual Ethernet ports of 1 GB/s should be provided.

1.5 **Infiniband card and cable:** IB HCA 40Gbps 1 port QDR enhanced card with IB cable to connect the storage server with existing cluster through the existing IB switch (the card should be compatible to the existing IB switch). The details of the IB switch are given in Annexure I. The vendor will have to ensure the compatibility issues.

1.6 Rack mounts/accessories.

1.7 **Management software:** Web based management software to monitor status and health of the storage system like performance, throughput, network connection and controller health and other parameters.

1.8 **Operating system:** Systems to be supplied with 64 bit **Red Hat Linux**.

1.9 **Warranty:** 3 years comprehensive onsite warranty (inclusive of parts and labor costs).

### 2. IB cards and cables (Qty: 3 units)

- HBA (40Gbps) cards (the card should be compatible of the existing SUN X2200 server and IB switch). The details of the SUN X2200 server and IB switch are given in Annexure I. The vendor will have to ensure the compatibility issues.
- Suitable IB cables.

### 3. Monitor (Qty: 1)

- **Size:** 101.6 cm (40") diagonal size
- **Panel type:** Anti glare with hard coat 3H
- **Optimal resolution:** 1920 X 1080 (minimum)
- **Backlight technology:** LED
- **Viewing angle:** 178<sup>0</sup> vertical and 178<sup>0</sup> horizontal
- **Display type:** Widescreen flat panel display
- **Input:** VGA, DVI-D (Dual link), HDMI, Stereo mini jack, USB port facility
- **Wall mount interface:** 200 x 200 mm

- **Support:** Quick set-up guide, warranty card, application CD, D-sub cable, power-cord, remote controller, batteries
- **Integrated tuner:** Required
- **Warranty:** 3 year comprehensive onsite warranty (inclusive of parts and labor costs)

#### 4. Integration of the storage server and configuration of existing high-performance compute cluster (HPC)

- The supplier will have to install and configure the storage server mentioned in (1) and integrate it with existing HPC cluster (key details of the existing cluster are provided in Annexure I).
- The supplier shall responsible for installing the OS (RHEL 5.3) on the storage server (mentioned in (1) above), the existing master and client nodes and configure the entire cluster for job submission only through master node to the client nodes using machine file or SSH and via Job scheduler.
- An open source job scheduler must be installed and configured. It should able to submit job on both Linux and Windows node and should be compatible with softwares mentioned in Table 1. The vendor should be responsible for job submission scripts files that are required for the software mentioned in Table 1. The scheduler should be configured such that multiple users are able to submit multiple jobs. The vendor shall be responsible for integrating all user applications to the web portal for ease of job submission and monitoring.
- The supplier also needs to install the softwares mentioned in Table 1 and configure and test those for parallel computations. Compiler compatibilities, OS requirements and additional specific requirements with respect to different software are provided in Table 1. The supplier shall be responsible for installation of required compilers and specific add-ons, as required.
- Intel MPI tool-kit must also be installed in addition to the open MPI.
- Latest version of open fabric for Infiniband must be installed/configured.
- The supplier will be responsible to maintaining the storage server and the entire HPC cluster for a period of 1 year from the installation of storage server and initial configuration of the HPC cluster. This will involve installation of software updates/compilers/additional third softwares/new softwares etc.
- Two days training should be arranged onsite on usage of the cluster.

Table 1				
	Simulation software	Linux enterprises version compatibility	Compiler compatibilities	Additional requirements
1	OpenFoam-2.2.2	RHEL 5.3	GCC 4.5 Openmpi-1.6.5	ParaView 4.0
2	Ansys Fluent 14.0	RHEL 5.3	Platform Mpi – 8.1.2 Intel Mpi -4.0.2 (by default In Linux installation)	Intel 11.1.069 (Fortran, C, C++)
3	Star CCM++ v8.06	RHEL 5.3	Gnu 4.6/ Platform Mpi – 8.3.0.2	Java 1.6.0 _45 Platform MPI - 8.3.0.2
4	CFX 14	RHEL 5.3	Platform Mpi – 8.1.2 Intel Mpi -4.0.2 (by default in Linux installation)	PGI Fortran 10.3 HP-MPI is recommended for high speed interconnects.

#### Terms and conditions

- The OEM must have at least 5 HPC installations listed in the recent list (June 2014) of top 500 HPC installations available at [www.top500.org](http://www.top500.org).
- The supplier must have experience of
  - (a) Installing and configuring the storage server with the HPC cluster,

- (b) Configuring and managing the HPC cluster (with at least 12 nodes with infiniband interconnects and 16 TB storage) as mentioned in (4) above,
- (c) Installing and configuring aforementioned softwares and configuring them for parallel computations,
- (d) Configuring job scheduler, parallel file system, and other cluster management utilities.

The prospective bidders should include the copies of purchase orders/certificates demonstrating the experience in installation and management of HPC clusters (with at least 12 nodes with infiniband interconnects and 16 TB storage). The bids received without this information will be rejected.

- The supplier must be an authorized dealer/distributor of the principal/manufacture and should furnish the authorization certificate from the principal/manufacture. Quotations without authorization certificate will be rejected.
- The technical and commercial bids must be submitted in separate sealed envelopes subscribed with "**Technical Bid**" or "**Commercial Bid**" as appropriate. Both the technical and the commercial bids should be enclosed in an envelope subscribed "**Quotation for Storage Server and Monitor**" and should be submitted to the undersigned.
- For rack mountable storage server (Item 1), the price should be quoted in the OEM's currency. For items (2), (3) & (4), the price should be quoted in Indian rupees. For items to be imported (in OEM's currency), the price should be on FOB basis. For items quoted in INR, it should be inclusive of all applicable taxes, freight charges, etc.
- For items to be imported (item 1 & 2), the delivery period will be 4 weeks. The supply of monitor and configuration of the HPC cluster should be completed within a week's time.
- Quotations must be valid for at least three months from the date of NIQ.
- A special discount/rebate wherever admissible keeping in view that supplies are being made for educational purpose in respect of public institution of national importance may please be indicated.
- The institute reserves right to accept or reject any or all quotations without stating the reasons thereof.

The quotations should reach to the following by ~~26.08.2014, 1700 hrs.~~ **Revised submission date: 12.09.2014**



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## Annexure I

### Hardware details of the existing cluster:

**SUN X2200 server (Qty: 03)** 2 x Dual core AMD (3.0 GHz), 1 MB cache per core, 8 GB (4x2GB) (8 slots, up to 64 GB), Graphics: On board, Storage: 1 x 500 GB HS SATA II, Interface ports: 4x 1 Gigabit Ethernet, 6 XUSB, 1 serial CD-RW, DVD+/- RW

**SUNFIRE X2200 M2 server (Qty: 06)** with two quad core AMD Opteron 2.7 GHz processor (No. 2384), 8 GB DDR 667 RAM (expandable to 64 GB), 500 GB SATA HDD (7200 RPM), with 4 x 10/100/1000 Mbps Ethernet ports, 4 USB ports, DVD+/-RW and CD RW, with 1U/2U chassis and rack mounting kit

**Infiniband switch 24 port 4X DDR (Flextronics make, Model-F-X430044)**