

Ref. No.: SSCU/AN/HPC-Tender/2019-52

July 2, 2019

Subject: Request for proposal for a high-performance computing cluster

Dear Madam/Sir,

We wish to purchase a new high performance computing (HPC) cluster comprising of master and compute nodes. The detailed specifications are provided below. Vendors are requested to kindly provide a proposal for this requirement. The final choice will be awarded on the basis of lowest price, provided all the specifications are met. The last date for submission of bids is 17/07/2019. All the quoted prices should be valid for a period of at least 90 days from the last date.

The bids should be addressed to:

The Chairman,
Solid State and Structural Chemistry Unit,
Indian Institute of Science (IISc),
Bengaluru, India - 560012.

The sealed envelopes should be sent to:

Dr. Awadhesh Narayan
Solid State and Structural Chemistry Unit,
Indian Institute of Science (IISc),
Bengaluru, India – 560012.
Email: awadhesh@iisc.ac.in

Important Dates:

Date of release of inquiry: 02/07/2019

Pre-bid enquiries up to: 10/07/2019

Last date of submissions: 17/07/2019, 5 PM

Master node with the following specification: Please provide quote for the master node with the following specifications.

Specifications for the master node:

1	Processor	Intel Cascade Lake Silver 4210 processor
2	Motherboard	Uni-socket type; the model should be specified in the bid
3	RAM	64 GB (4 nos. of 16 GB) DDR4 2666 MHz modules.
4	Form factor	2U in standard 19” server racks
5	14 or more hard drive bays	(A) 12 of the bays will be populated with a 4 TB enterprise class drives. Total storage will be 12 nos. of 4 TB= 48 TB. Please mention the information about the hard drives that you will provide. (B) 2 bays will be populated to at least 250 GB enterprise class solid state drives for the operating system and other software. Total space 2 nos. of 250 GB = 500 GB SSD storage space.
6	Networking	Intel Omni Path (OPA) host fabric adapters and cables, which are compatible with Intel Omni Path switch supporting 100 Gbit/s, should be provided.
7	RAID controller	High quality raid controller with at least 2 GB cache with a battery backup. Please specify the make and model.
8	Redundant power supply	At least Platinum (94%) level.

Compute nodes with the following specification: Please provide quotes for **8 nodes** as essential specification. Optional specification of **4 nodes** tender should also be submitted separately.

Specifications for each of the compute nodes:

1a	Processors	Intel Xeon Gold 6226 processor operating at 2.7 GHz
1b	Motherboard	Dual-socket type; the model should be specified in the bid
1c	Core count per node	12 cores per processor * 2 processors per node = 24 cores per node
2	RAM per node	128 GB per node All populated DIMMs should be 16 GB or 32 GB DDR4 2933 MHz chips
3	HDD	Single 1 TB Enterprise hard disk per node; 7.2K RPM.

Other specifications for the cluster:

4	Misc	Standard IPMI with both web and command line (CLI) interface is required.
5	Form factor	The combined rack height of all the chassis provided should be 20U or lower in standard 19" server racks. If the power plugs are NOT the standard 15 Amps round pin plugs, the vendor must provide a power strip with industrial input plugs fixed in the rack.
6	Cooling	All the proposed nodes should be efficiently cooled by a double 2 ton split A/C located within a few feet of the nodes. The quote should contain the BTUs produced per hour, both per node and in total by all nodes, alongside the typical cooling rate for a 2 ton A/C in the same units.
7	Network switch	Minimum 24 Port Intel Omnipath (OPA) switch with 100 Gbit/s Required number of OPA host fabric adapters and OPA cables should be provided.
8	Cluster management software	Open source cluster management and monitoring software Rocks and Ganglia should be installed.

Mode of utilization of the HPC cluster:

1. The proposed system will comprise of the proposed master node and the proposed compute nodes. All machines will be connected with the Intel Omni Path 100 Gbit/s network switch.
2. The SSDs will be configured under RAID 1, while the 4 TB hard disk drives will be configured under RAID 5 with one or more hot spares as specified on site at the time of installation.
3. On all the nodes (master + compute nodes), the vendor will install the latest stable version of CentOS. The compute nodes should be rebuildable through network install with a kickstart file from the master node. Unified installation of the compute nodes through an open source cluster management system like Rocks along with monitoring software like Ganglia is acceptable.
4. The operating system, job scheduling software and other software (see point 6 below) will be installed in the RAID 1 partition. The RAID 5 partition would be used for /home alone. The software and home partitions of the master node would be NFS mounted on the compute nodes.
5. Job queues on a Slurm scheduling system will be used to submit jobs to the compute nodes. The vendor will install the latest version of this software.
6. The source code of standard density functional simulation packages such as Quantum Espresso must be compiled using Intel C/C++ or GCC compilers and the performance of the benchmark calculations should be on par with the recent standard published benchmarks.
7. The vendors must **explicitly include statements in the bids** that they agree to the above mode of use of the machines and that such a utilization will have no adverse effect on the warranty of the new machines. The absence of clear statements to this effect will lead to disqualification.

General Specifications for the purchased master and compute nodes:

1. The hardware components should be from an original equipment manufacturer (OEM) and it is preferable that they should be from the same OEM.
2. All the components that go in the server (RAM, HDD, etc.) must be tested and validated by the mother board manufacturer.
3. The entire solution should have redundant power supplies at least platinum level (94%).
4. The entire solution must be factory integrated. No on-site integration is allowed.
5. All equipment must be compatible with Indian Electrical Standards/Codes.
6. The vendor must carry out the installation, commissioning and cabling of all the hardware as well as software components.
7. The vendor must provide a minimum of three-year 24x7 comprehensive on-site warranty of all the installed hardware as well as a comprehensive on-site warranty for maintenance of software and cluster management. The warranty period will commence from the date of acceptance of the equipment.
8. Non-disclosure of various technical specifications listed above may lead to disqualification.
9. The bids should be valid for at least 90 days from the last date of submission of the quotation.
10. The price should be quoted in either rupee or US dollar, including CIF, and other taxes and duties. Please note that IISC, being an academic institution with University status is eligible for customs duty exemption.
11. A Technical & Purchase Committee shall deliberate on the bids shortly after the submission. The date of this meeting shall be made known to the bidders in sufficient advance. The decision of the Committee will be deemed final.
12. The competent authority reserves the right to reject the tender without assigning any reasons thereof.
13. If a bidder wins the order, the payment for the product shall be made to the winning bidder after delivery, set-up, and satisfactory verification of the product components. Any component errors detected at the time of the OS installation should be promptly rectified, and the warranty period should be correspondingly extended.
14. During the warranty period, vendor will have to undertake comprehensive maintenance of the entire hardware, hardware components, equipment, software support and accessories supplied by the vendor at the place of installation of the equipment. The defects, if any, during the guarantee/warranty period are to be rectified free of charge by arranging free replacement wherever necessary. It should be completed within 2 working days for individual server and next working day for central components like power supply, networking and storage after the intimation of fault.

15. A letter of commitment for three years with respect to hardware support from the OEM and software support from the OEM should be enclosed in the cover for Technical bid. Offers will be rejected if they are not accompanied by the letter from OEM.

16. Additionally, the vendor must provide three references where they have carried out installations of above 20 TFlops in the past 3 years. The Purchase Committee shall independently obtain inputs from the provided referees before arriving at a final decision.

17. The bids should have the option for further negotiations.

18. IISc will have the right to impose a penalty of 1% of PO value per week for delay under any of the following conditions:

- Delay in delivery of hardware beyond scheduled delivery period.
- Delay in successful installations/commissioning of system beyond scheduled period
- Any delay in node warranty servicing beyond 2 days will incur a penalty of 0.5% of the total cost per day of delay.
- The maximum penalty for non-performance will be 5% of the total cost. On reaching this limit in any year, the bidder will be considered in breach of the contract. The penalty will not apply if the delay is caused by IISc.

Eligibility Criteria:

1. The bidding vendor (bidder) should be registered with the IISc vendor list.

2. The bidder should have set up at least 3 or more HPCs above 20 TFlops in the last 3 years. Reference and purchase order copies of previous installations are required.

3. The bidder should have installation/service center base in Bangalore for such units and a fully equipped service center. Please provide details of Karnataka Registration and Office Address.

4. The bidder has to quote exactly as per mentioned specifications for entire solution, partial offers will not be accepted.

Tender Specifications:

The proposal should comprise of two parts: A Technical Bid (Part I) and a Commercial Bid (Part II). Both parts should be identical in every respect, except that the Technical Bid (Part I) will not contain information about the price. **The Technical Bid should also include an item-wise compliance report of all the specifications.** The Commercial Bid must have itemized pricing information for each component in the Technical Bid. The two parts should be sealed in separate envelopes and marked "Technical Bid" and "Commercial Bid" respectively. Both bids should be finally put into one envelope, which should be marked "Bid for High Performance Computational Cluster for Dr. Awadhesh Narayan (Solid State and Structural Chemistry Unit)". This final envelope is the one that should be submitted to the institute.

The prices quoted should include either rupee or US dollar quotes and should be inclusive of all taxes/duties. They should also be inclusive of the delivery of the items to the site as well as the installation at the site. RBI price of US dollar on the last date for submitting of tender will be considered for all calculations.

Please note that IISc, being an academic institution with University status, is eligible for customs duty exemption. Rupee price should be specified with applicable TAX separately.

IISc may decide to increase/decrease node count at the time of negotiation based on budget availability. In this event, the metric to award the final choice shall be per node price specification.

Payment will be made after satisfactory supply and installation. The system supplied may be tested/certified by us through an identified person/committee. Three year on-site warranty should be provided for the hardware. The warranty period will commence from the date of acceptance of the equipment.

Last date for submission of bids: July 17, 2019, 5 PM

With regards,



Dr. Awadhesh Narayan
Solid State and Structural Chemistry Unit,
Indian Institute of Science (IISc),
Bengaluru, India – 560012.