Department of Mechanical Engineering
Indian Institute of Technology Madras
Chennai - 600 036

Coordinator: Head of the Department, Department of Mechanical Engineering
Phone: 044 2257 4650; Fax: 044 2257 4652

Tender date: 19-08-2016 **Due date: 09-09-2016**

Reference: MECH/CLUSTER/2016/ENQ1

Dear Sir,

1. Quotations are invited in duplicate for the various items shown in Annexure-I.
2. The quotations are to be in two parts as technical offer and as commercial offer.
3. The two parts of the offer are to be clearly marked on the envelopes. The two parts of the offer in separate envelopes must be enclosed in the one bigger envelope duly sealed and super scribed with reference number and due date and must be addressed to the undersigned so as to reach him on or before the due date stipulated above.
4. Fax and Email quotation are not acceptable.
5. Quotations should be valid for 60 days from the due date and period of delivery required, warranty terms etc. should also be clearly indicated.
6. Imported supplies should be quoted for CIF Madras.
7. Local firms to quote for free delivery to this Institute. If quoted for Ex-Godown delivery charges should be indicated separately.
8. Firms outside Chennai: Quotations should be for F.O.R Chennai. If F.O.R consignor station, freight charge by passenger train/lorry transport must be indicated. If Ex-Godown packing, forwarding and freight charge must be indicated.
9. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable. Samples / machine/ equipment if called for should be submitted / demonstrated at free of charges, and collected back at the supplier's expenses. Compliancy certificate is to be provided indicating conformity to the technical specifications.
10. Sales Tax/General Taxes/ED if applicable and such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. If this is not indicated no such claim will be admitted at any stage. The taxes leviable should take into consideration that we are entitled to have concessional Sales Tax applicable to Non-Government Educational Institutions run with no profit motive for which a

concession is given. Sales Tax Certificate will be issued at the time of final settlement of the bill.

11. Goods should be supplied carriage paid and insured.
12. Goods shall not be supplied without an official supply order.
13. If the item is under DGS&D Rate contract No. and the price must be mentioned. It may also please be indicated whether the supply can be made direct to us at the Rate contract price (Please note that we are not Direct Demanding Officers). If so please send copy of the RC.
14. The Guarantee period of the item may be indicated clearly.
15. In case of LC Payment, 90% of the payment will be made after completion of the supply. The balance 10% of the payment will be made after satisfactory installation of the equipment.
16. Every attempt will be made to make payment within 30 days from the date of receipt, bill/acceptance of goods whichever is later.
17. IIT Madras is exempt from payment of Excise Duty and is eligible for concessional rate of custom duty. Necessary certificate will be issued on demand. IIT Madras will make necessary arrangements for the clearance of imported goods at the Airport/Seaport. Hence the price should not include the above charges.
18. **Acceptance and Rejection**: I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

Yours faithfully,
sd/-
Head of the Department,
Department of Mechanical Engineering

Annexure-I

Specifications for the High Performance Computing Cluster

Master Node: Quantity 1

S. No.	Parameters	Values/Notes
1	Processor	Dual Intel Xeon E5-2640 V4 (10 Core, 2.4 GHz, 25 MB)
2	Memory	80 GB (5 x 16GB) DDR4-2400 R ECC memory, with necessary free slots and provision to add at least 80 GB in future.
3	Internal Storage	HD NL-SAS 6G 2 no's of 2 TB 7.2K RPM hot-plug HDD scalable up to 8 drives
4	RAID Card	1x 8-Port RAID Card supporting RAID 0, 1, 5 & 6
5	I/O Ports	1x Single-Port QDR 40 GB/s Infiniband Adapter, 1x 2M QDR QSFP Infiniband Cable, 2x Gigabit Ethernet Port, 1x Dedicated LAN for system management
6	DVD Writer	Internal DVD Writer
7	Power supply	Redundant Platinum Level (94%) Power Supplies
8	Mount type	Rack mount rail kit
9	Warranty	4 years on-site comprehensive warranty

Compute Nodes: Quantity 5

10	Processor	Dual Intel Xeon E5-2640 V4 (10 Core, 2.4 GHz, 25 MB)
11	Memory	320 GB (10 x 32 GB) DDR4-2400 R ECC memory, with necessary free slots and provision to add at least 160 GB in future.
12	Internal Storage	HD NL-SAS 6G single 2TB 7.2K RPM hot-plug HDD
13	I/O Ports	1x Single-Port QDR 40 GB/s Infiniband Adapter, 1x 2M QDR QSFP Infiniband Cable, 2x Gigabit Ethernet Port, 1x Dedicated LAN for system management

14	Power supply	Redundant Platinum Level (94%) Power Supplies
15	Mount type	Rack mount rail kit
16	Warranty	4 years on-site comprehensive warranty

Primary Interconnect: Infiniband switch

17	Infiniband switch	1x18 port 40GB/s QDR Infiniband Switch unmanaged with 4 years onsite comprehensive warranty

Secondary Interconnect: Gigabit Ethernet switch

18	Gigabit Ethernet Switch	1x24 port L2 web managed gigabit ethernet switch with required number of ethernet cables to connect all nodes with 4 years onsite comprehensive warranty

Rack

19	Rack unit	42U Standard OEM racks to be supplied OR branded racks like APW/APC/Rittal/Netrack should be supplied with Perforated front and back doors. The rack unit should be of size 800 WX1200D There should be proper design, with the self-cooling(fans) Mechanism for the Master/Compute/ Computational nodes in the racks. Suitable capacity of redundant PDUs, circuit breakers for single phase OR 3 phase UPS power inlets should be provided. 4 years onsite comprehensive warranty

Storage (Optional but mandatory to quote)

20	Storage Server	● Single Intel Xeon E5-2620 V4 (8 Core, 2.1 GHz, 20 MB) ● 32 GB (2 x 16GB) DDR4-2400 R ECC memory, with necessary free slots and provision to add at least 32 GB in future. ● HD NL-SAS 6G 6 no's of 4 TB or lower capacity with 7.2K RPM hot-plug HDD for data storage ● HD NL-SAS 6G 2 no's of 500 GB 7.2K RPM hot-plug

		HDD for OS ● 1x 8-Port RAID Card supporting RAID 0, 1, 5 & 6 ● 1x Single-Port QDR 40 GB/s Infiniband Adapter, ● 1x 2M QDR QSFP Infiniband Cable, ● 4x Gigabit Ethernet Port with teaming support ● 1x Dedicated LAN for system management ● The storage should be configured based on open source Linux and should support NFS, CIFS and SMB ● The bidder should integrate the storage system with the cluster. Storage should be connected to the master node and compute nodes through the Infiniband (IB) switch. The proposed server should have necessary redundant power supply and fans. ● The storage server should have 4 years on-site comprehensive warranty.

Other specifications

21	Supplier capability	A. OEM (Manufactures) should have at least 5 HPC installations in latest listing of Top 500 supercomputer list. B. The bidder (system integrator) should have installed and implemented 5 HPC clusters within the last 3 years with a minimum size of 5 nodes each along with infiniband. The PO's and installation reports of those installations should be furnished. C. The bidder (System Integrator) should submit the authorization letter from the OEM's. OEM should authorize only one bidder & the bidder also bid only one OEM product. D. The bidder (System Integrator) should have technical expertise in implementing cluster, which includes installation configuration, maintenance and customization as per requirement. The details of the engineers should be furnished together with the technical bid.
22	Other conditions	A. The server and all its components should be verified and recommended by the motherboard manufacturer by means of compatibility list. B. The part number/model numbers of the memory and HDD should be provided. C. The compute nodes should be dense rack form factor designed for cluster solution and should be in the lowest footprint and the lowest power consumption
23	Installation,	A. The bidder should build the cluster based on open source

	warranty and training	HPC management software with 64 bit open source Linux operating system (preferably CentOS LTS). Open source CMS like ROCKS may be considered for the HPC system. Open source solutions like Torque and Maui or equivalent for the scheduler with full customization as required by IITM may be considered for the HPC system. B. The bidder shall install and configure all the required hardware and software as required by IITM including but not limited to racking and stacking, cluster networking, configuring all nodes, installation of open source compilers and applications, configuration of environment variables and license utility configuration. C. The bidder to ensure that the hardware and software components are compatible with each other, and provide necessary cables/wires and any other accessories necessary for connecting the supplied components. Bidder must install the complete system interconnecting all the components above. D. The bidder should integrate the following list of applications (but not limited to) with the system a. Open source compilers (gcc, g++, gfortran, python) b. Intel Compilers for C++ and Fortran c. Open source software i. LAMMPS, OpenFoam, LIGGGHTS, CFD-DEM, ParaView, VIsIt, GVim, EMacs, Octave, Scilab, MPI, OpenMP, Gnuplot, Gaussian d. Commercial Software (the required licenses will be provided by IITM) i. Ansys ii. Abaqus iii. Matlab iv. Comsol v. VASP vi. Mathematica E. A one day admin and user training on the cluster usage and administration must be provided. F. The bidder should provide a rough estimate of the project plan in the form of a GANTT chart. G. The bidder should provide 4 years onsite support for hardware and proposed open source cluster software.
24	Compliance statement	A. Compliance statement needs to be provided by bidders clearly specifying COMPLY/NON COMPLY with remarks of all of the points mentioned above

Note: It will be sole discretion of IITM to choose one or more technically qualified bidders. Compliance to this point is mandatory.

The sealed quotations (technical and commercial separately) to be sent to the following address:

Head of the Department,
Department of Mechanical Engineering,
IIT Madras, Chennai - 600 036
Tamil Nadu, India
Email: mehead@iitm.ac.in

Any queries related to technical specifications of the cluster can be addressed to the following:

Dr. Kameswararao Anupindi
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