MOLECULAR BIOPHYSICS UNIT
UGC Centre for Advanced Study

INDIAN INSTITUTE OF SCIENCE
BANGALORE: 560 012, INDIA

Date: 17/08/2016

Dear Sir/Madam,

Subject: <u>Request for quotation for a high performance cluster</u>

I would like to purchase a high-performance computational cluster having a peak performance of **1.2 teraflops** per node or above. The CPU proposed should support 16 Double precision floating-point operations per second. In the evaluation, preference will be given to system with higher extensibility (ease of adding new nodes to cluster in future). Server chassis/ enclosure based solutions, with redundant power supplies and configured with redundant fans, and capable of getting mounted on standard 42U (19") rack is desirable. Also, each of the server nodes should be individually serviceable without shutting down the other server nodes. Proposed servers should be preferably managed by single network cable at 1 Gbps or higher speed.

Following are item wise specification. Only core components are cited below and the bidders are expected to also quote for and supply the necessary unlisted accessories (e.g. LAN, Rail, Software etc) that will be required for setting up the complete solution.

1) **Compute Nodes** with following specifications. Provide three separate quotes for 8 nodes as essential specification. Optional specification of 10 nodes and 12 nodes tender should also be submitted separately.

   a. Broadwell family of processors with dual socket E5 2680 v4 series or higher. 14 cores or higher. 2.4 GHz clock speed or higher (Haswell processor family not allowed)

   b. 128 GB DDR4 memory configured in each compute node (2400 MHz)

   c. SAS/SATA hard disk @ 7200 rpm or higher, minimum 2 TB capacity per node. *Expandable up to 4 disk drives as an optional specification.*

   d. Interconnect: Please quote for both FDR and Omnipath architecture with option of 56 Gbps and 100 Gbps speed.

2) **Master Node:** A separate master node with the same configuration as the compute nodes but with following additional requirement

   a. 2 x 4 TB SATA/SAS HDD
   b. DVD-RW drive
   c. SAS controller card for external storage connectivity
   d. No external storage currently but the system should have provision to allow for addition of external storage with RAID 6 in future.

3) **Network/Interconnect:**

   a. Separate quotes for Infiniband switch with minimum of 36 ports switch. Option should be provided to choose between 56 Gbps or 100 Gbps speed. Also, both FDR and Omnibus architecture must be quoted.

   b. A separate 1G network should be provided for management and administration of the cluster.

   c. Also, all network cables and drives should be listed and supplied.

4) **Software:** Installation costs should be quoted separately.

   a. Cluster Management Software: Following criteria should be considered while quoting for cluster management software

      i. GUI (Web) Cluster Management (Add, Modify, Delete Nodes)
      ii. Profile based compute node, storage node provisioning
      iii. Fully automated system image and scheduler
      iv. Managed Services from cluster tool (DNS, DHCP etc.)
      v. GUI (Web) Cluster Monitoring (CPU, Memory, Network & Disks)
      vi. Cluster Manager must support Linux OS Red Hat/Cent OS/Suse
      vii. Power Management support and Parallel command execution

   b. Job Submission Portal

      i. Submission of jobs from any location using web Browser should be allowed
      ii. E-mail notifications, Flexible Authentication
      iii. Real time Resource monitoring of cluster.
      iv. Capable of generating reports on Cluster usage, node usage, job, individual user, Department etc. for specified period

---

5. General Specification:

a. The components of the server/chassis and management/monitoring software must be from OEM and it is preferred that they are from same OEM.

b. All the equipment must be compatible with Indian electrical standards/codes

c. The bidder must carry out installation, commissioning and cabling of all supplied hardware components and software.

d. The HPC cluster solution must be housed in suitable chassis. Dense computing platform with extensibility option is preferred.

e. The bidder must provider three years 24x7 comprehensive onsite warranty for the supplied hardware and also three years onsite warranty for maintenance of software and cluster management. This should be provided separately and should be considered as optional specification.

f. The bidder should provide manufacturing authorization form (certificate from OEM for quoting the requirement)

g. Also, bidder must provide at least three references where they have carried out the installations. The purchase committee will independently obtain inputs from referees before making the final decision on the bid.

h. The lowest commercial bid and/or the most agreeable technical bid should have the option for further negotiations.

Eligibility Criteria:

The OEM should be listed in the website www.top500.org for India

The bidder/OEM should have set up at least 3 or more HPCs in the last 3 years with at least one cluster with 256 cores. Purchase order copies of previous installations are required.

OEM should have installation/service center base in the Bangalore for such units and fully equipped service center. Pls. give details of Karnataka Registration and Office Address.

Bidder/OEM has to quote exactly as per mentioned specifications for entire solution, partial offers will not be accepted.

Server OEM should run the benchmarks in their Cluster. OEM is not allowed to run the benchmark at Customer premises or CPU manufacturer. OEM/ Bidder needs to give undertaking for this.

The quotation should be in two parts:

Part I (Technical bid) and Part II (Commercial bid)

Part I should be put in a sealed cover and superscripted "Technical Bid". Part II should be put in a separate sealed cover and superscripted "Commercial Bid". Technical bid should be exactly same as commercial bid except that prices are not shown in technical bid. Technical bid should have item wise compliance report of all specifications. The above covers should be put in another cover. This cover should be sealed and subscripted "Bid for High –Performance Computational cluster for Dr. Anand Srivastava (Molecular Biophysics Unit)".

The vendor can give multiple configurations (as noted above). The Technical bid should not have any details about pricing. **The commercial bid should have pricing for each of the configuration quoted in the technical bid.** The last day for submitting the bid is 5th September 2016. The offer should be valid for a period of at least 60 days from the last date for submission of quotes. Prices quoted should be inclusive of all taxes / duties. The prices quoted should be inclusive of delivery of the items to the site and installation at site and should include both rupee and US dollar quotes. Both technical and commercial bid will be negotiable for the lowest costing commercial bid and most desirable technical bid. While evaluating the technical bid, weightage will be given for extendibility (25%), performance and adherence to specifications (50%) and references from past customers (25%).

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.

Thanking You,
Yours sincerely,

Important Dates:
Date of release of the enquiry :   18th August, 2016
Pre-bid clarification   :   30th August, 2016
Date of submission of Quote :   15st September, 2016

Best regards,
Anand Srivastava
Assistant Professor, Molecular Biophysics Unit
Indian Institute of Science-Bangalore
Bangalore 560012