MOLECULAR BIOPHYSICS UNIT
UGC Centre for Advanced Study

INDIAN INSTITUTE OF SCIENCE
BANGALORE: 560 012, INDIA

Anand Srivastava   Date: 31/10/2016

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 **1.0 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.

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

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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.

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

g. Also, bidder/OEM 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.

Submission of Proposal

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.

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.

Prices should NOT be given anywhere in the technical bid. Mention of prices in technical bid may result in disqualification. A copy of the Price bid with prices masked but giving all other details should be enclosed along with the technical bid.

The prices can be quoted either in foreign denominations or in INR. Provide itemized pricing for each item. Please specify the statutory taxes and duties, if any. Please note that IISC, being an academic institution with University status is eligible for customs duty exemption. INR price to be specified with applicable TAX separately.

Wherever multiple options have been offered mention details for each option.

IISc may decide to increase/decrease node count at the time of negotiation based on budget availability. SBI price of dollar on the last date for submitting of tender will be considered for all calculation.

Likely Timeline

Last date for receiving queries: Nov 10, 2016. Please email anand@mbu.iisc.ernet.in

Last date for submission of bids: Nov 15, 2016. 5 PM

Bid Evaluation :-

The Evaluation process to identify the successful bidder is based on the combined techno-commercial evaluation. The Technical Committee constituted by the Institute will evaluate the bids received from the bidders. The decision of the technical committee is final and binding on all bidders.

The technical bids are evaluated first. The mandatory conditions mentioned elsewhere must be adhered to and *failure of the same will result in disqualification of the bid.*

Each bidder has to obtain the minimum score under each category of the Technical Evaluation to qualify for opening of the commercial tender.

Sl. No.	Description	Max. Score	Min. Score (to qualify)
	Technical bid Evaluation:		
1.	Operational Cost	30 marks	10 marks
2.	Solution Superiority (Stress on extensibility of the solution, i.e: Ease of adding new nodes to cluster in future)	30 marks	10 marks
3.	Benchmark Performance	25 marks	8 marks
4.	Clarity and quality of RFP response document and presentation	15 marks	5 marks

The top three qualified bids will be considered. They will be marked as T1, T2 and T3.

Sl. No.	**Commercial bid Evaluation:**	Max. Score	
5.	Price Evaluation	100 marks	

Marks are computed based on the total cost of ownership (TCO). This is the sum of the cost of the proposed solution which includes HPC cluster, storage, interconnect, software, etc In addition to these, cost of service level agreement (SLA) is added.

The marks for this is computed from $m = 100 - [TCO(bidder) - TCO(lowest)]/2$ where, TCO is in lakhs and TCO (bidder) is TCO of the bidder and TCO(lowest) is the lowest TCO of all the bidders.

The final score will be an average of L and T scores of an individual bidder. This means that it is possible that bidder who is L2 or L3 may win the final bid based on better technical scores. IISc will be allowed to negotiate with the final bidder. If the winner of the bid is unwilling to negotiate, the bidder with the next highest joint score will be considered.

Technical Bid Evaluation:

1. Operational Cost:- Lower operating cost will attract higher marks. This is evaluated using the sum of rated IT and cooling load of the proposed HPC solution by the bidder. The bidder with the lowest requirement of IT+cooling load will receive full marks.

$$m = 50 - (x - x_{min})*0.8 \text{ where,}$$
x = kw of power consumed by given bidder
x_{min} = the lowest quoted value in kw among all bidders
m = marks obtained for the operation cost by the specific bidder

2. Solution Superiority:- Solutions meeting the technical requirement of the tender will be given 10 marks. 10 marks are allocated for ease of extendibility (how much time, effort and installation costs will be required to add new nodes to the cluster). Additional 10 marks are given if the proposed solution has advantages of superior interconnect, higher reliability of product such as redundant power supplies, hot swappable fans, hot swappable power supplies, hot swappable compute blades etc. Kindly state clearly the superiority of your bid separately in the bid.

3. Benchmark performance:- Benchmark data should be provided with standard LAPACK subroutines. Also, it is desirable to provide benchmark with softwares such as LAMMPS, NAMD and GROMOCS. Upon final selection, rigorous benchmarking with respect to above soft wares will be sought.

4.   Clarity and quality of the RFP response document and presentation:- Large difficult-to-read documents where the important information is hidden deep within will attract less marks. Clear, concise document with all details of important information will obtain more marks. Information should not be scattered but should all be at one place for a particular item.

Thanking You,
Yours sincerely,

Best regards,
Anand Srivastava
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