

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B, Raja S.C. Mullick Road, Jadavpur, Kolkata-700032

NIT No. :IACS/CSS/CMCD/2017-2018/125

Date: 22-03-2018

Sealed tender in two bids system (technical bid and price bid) is invited from bonafide, resourceful and eligible manufacturer/exclusive distributor/vendors for purchase of **IACS Cray Facility Extension 2018 with CPU/GPU hybrid architecture, parallel filesystem and high-speed interconnect.**

Part-I (Technical Bid) of the tender should contain technical specifications in detail as well as commercial terms and conditions. Part-II (Price Bid) should clearly indicate group-wise price, if needed, as mentioned in the technical bid. The Technical Bid and Price Bid are to be submitted in separately sealed envelopes, distinctly marked accordingly and both to be put inside another envelope, that should be sealed and superscribed with tender notice no. and due date. The bidders may submit bids duly signed in their own letterheads.

Completed tender bids should reach the office of the **Registrar, Indian Association for the Cultivation of Science (IACS), 2A & 2B Raja S. C. Mullick Road, Jadavpur, Kolkata-700032** on or before the scheduled date and time specified below:

Tender Notice No.	NIT No. IACS/CSS/CMCD/2017-18/125, Date: 22-03-2018
Last date and time of submitting tender	12.04.2018 before 17:00 hrs Indian Standard Time
Pre-bid meeting(date, time & place) to discuss technical specification	28.03.2018 at 16:00 hrs at J.C.Bose meeting room
Date and time of opening tender (Technical Bids)	12.04.2018 at 18:00 hrs Indian Standard Time
Place of opening tender	Would be declared later
Date and time of opening of Price Bid	The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.
Contact	Email: rcap@iacs.res.in , ssprp@iacs.res.in Tel: +91 33 2473 4971 (ext 1779 and ext 1310)

The technical bids will be opened first to judge/evaluate the technical specifications of the said instrument and thereafter the price bids of only technically qualified bidders will be opened.

Technical Bid Evaluation: The Technical Bids will be evaluated in the presence of the representatives of intending bidders who will be able to clarify technical aspects of their bids, if any, required by the Technical Evaluation Team.

Opening of price-bid: The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.

Please note that IACS will not provide any accommodation or reimburse any expenses to any of the bidders for attending opening of technical bid.

Quotations received incomplete or beyond the stipulated time will be summarily rejected.

Bidders should submit their past experience for supplying and successful installation of similar units to other research Institutes/Universities/other organizations in India and abroad. Please provide documentary proofs of such successful installation and supportive documents that the instruments are running successfully.

1. TECHNICAL BID

The technical bid should contain technical specifications and should be kept in a separate sealed envelope duly superscribed as 'TECHNICAL BID' on the outer cover of the envelope as already detailed above. **It should be clearly mentioned on the envelope as "Technical Specification for IACS Cray Facility Extension 2018 with CPU/GPU hybrid architecture, parallel filesystem and high-speed interconnect".**

1.1 Technical Specifications

i) Overall specification

1	System architecture	Tightly integrated cluster with minimum 100Gbps EDR Infiniband in 100% non-blocking architecture or 5D-Torus or Aries interconnect or similar. Both blade and rack based architectures are acceptable.
2	Compute power	The proposed base system should have a minimum compute capability of 80 TFLOPS of peak theoretical performance - CPU+GPU (Rpeak) with minimum 60 TFLOPS from CPU nodes and 20 TFLOPS from CPU+GPU nodes. The cost of all necessary hardware, licenses and software components should be included and additionally, the incremental cost for enhancing the system in a step size of 12 TFLOPS should be mentioned. This should be valid up to 200 TFLOPS total system size.
3	Compute nodes	Compute nodes must be Diskless. The compute nodes should be either blade based with blade enclosure or chassis based with chassis enclosure designed for HPC solution.
4	Number of CPU nodes	Minimum of 20 CPU only nodes.
5	Number of CPU-GPU nodes	Minimum of 4 CPU-GPU nodes.
6	System Interconnect	Interconnect should be constructed without any external switches. Interconnect should provide direct hardware support for one-sided remote memory operations such as put and get.
7	Storage capacity	1. Minimum of 90 TB of usable storage in RAID 5 or RAID 6. 2. Redundant power supplies and fans. 3. No single point of failure in the entire storage solution. 4. Storage should be scalable.
8	Parallel filesystem	Lustre based (1.8.6 or newer) stable parallel file system with direct support from the OEM.
9	Operating system	Commercially licensed Enterprise Linux based 64-bit operating system with full support.
10	Compilers	Commercially licensed compilers such as Cray, PGI, Intel, or similar compiler consisting of C, C++ (support for C++11 standard), FORTRAN 77, FORTRAN 90, FORTRAN 95 with 4 user licenses and full support.
11	Software tools	Software tools namely MPI OpenMP, SHMEM and other libraries/development kit and vendor specific / supported versions like MPICH2/MVAPICH/OpenMPI with non-mpd based installation required to run jobs, should be included

		with minimum of 4 user licenses, wherever applicable. Python version 2.7, 3.0, 3.5, 3.6 should be installed. Latest stable releases of Python packages NumPy, SciPy, mpi4py should be installed.
12	Management software	Commercially licensed Management software stack consisting of cluster management/ system management etc. should be included. All software must be supported by OEM/ISV.
13	Job scheduler	Commercially Licensed job scheduler as a separate line item with appropriate no of tokens/licenses for the entire system with OEM / ISV support. Preferred scheduler: PBS Pro.
14	Login nodes	Two dedicated login nodes
15	Management nodes	Dedicated management nodes for managing the entire setup.
16	Input/Output nodes	As required to fulfil the storage solution requirement.

ii) CPU nodes:minimum quantity should be 20

1	Processor	Two Intel processors with x86_64 architecture with clock speed of at least 2.4 GHz , with 32 or more instructions per core per cycle and 20 or more cores per socket.
2	Memory	At least 40% of the CPU Compute nodes should have minimum of 192 GB of memory per node. Remaining 60% of the CPU Compute nodes should have minimum of 96 GB of memory per node.

iii) CPU-GPU nodes:minimum quantity should be 4

1	Processor	One Intel processor with x86_64 architecture with clock speed of at least 2.1 GHz , with 16 or more instructions per core per cycle and 18 or more cores per socket.
2	GPU accelerator	One or more NVIDIA® Tesla® P100 GPU accelerator(s) per node.
3	Memory	Minimum of 3 GB per core or 64 GB, whichever is higher.

iv) Application Benchmarking

The vendors should run the following application benchmarks.

1. VASP
2. NAMD
3. HOOMD-Blue
4. NWChem

Benchmarking should be carried out based on the input and instructions provided by the IACS team on a system of size at least 90% (ninety percent) of the proposed (80 TFLOPS) system (i.e. same CPU/GPU and memory per node and on at least as many nodes proposed). This defines the “Benchmark System”. The vendor should provide benchmark output as described in the benchmarking instructions given below:

1. We will supply detailed instructions for compilation of each code. The vendor should strictly conform to the supplied instructions.
2. Detailed specifications of the compiler and compiler options/flags that conform to the prescribed instructions should be mentioned for each code.
3. Each benchmarking study should have at least **4 data points**, highest node count being as close as possible to the maximum nodes that are available in the benchmark system.
4. Vendor should submit binary output files (whenever possible) and log files generated by the application.
5. Benchmarking should also provide the heating and power rating, plotted as a function of TFLOPS.
6. All the application benchmarks in this tender must be run in the factory to reproduce committed performance or better. Performance must be reproduced onsite too, within 15 days from the date of delivery.

Of the proposals that meet specifications mentioned in items i), ii) and iii) above, benchmark performance (execution time) should be within 10% variance of the best performance of all the proposals. If it falls below 10% variance it would lead to technical disqualification of those proposals. Issues of power consumption and site requirements will also be taken under consideration to decide on the technical competence of a submitted bid.

1.2 Site requirements

1. Detailed site preparation document should be given.
2. Details of power consumption, heat dissipation and cooling requirements should be specified.
3. Space requirement should be specified.
4. Details of noise generation by the system should be given.
5. Weight, footprint and Point Load should be mentioned. Uniform load of the system should preferably be within 130 KG/m².

1.3 Warranty and Support

Warranty	3 years of comprehensive on-site warranty and support for all Hardware, Operating System and all Software, Middleware, etc.
Training	Two weeks of on-site training on system administration, storage management and usage of the HPC server must be provided to the IACS team.

1.4 Vendor Eligibility

1. The participating vendors must be OEMs or OEM supported single vendors only with original authorization certificates from the OEMs. The service provider should be OEM or OEM authorized agency. In case of authorized agency, the experience certificate in handling **200 TFLOPS** or higher HPC machine should be provided.
2. Vendors should have proven experience in setting up a minimum of three HPC with **at least one at 200 TFLOPS (Rmax / HPL sustained) in India**. The system should be listed in “Top Supercomputers in India” list. A proof for such experience (copies of orders/installation certificate) should be provided.
3. The participating vendors should have proven experience in **deploying parallel filesystem in an HPC system with peak performance of 80 TFLOPS or higher**. A proof for such experience (copies of orders/installation certificate) and recommendations should be provided.
4. Sub-leasing of service/technical support by OEMs or OEM supported vendors is not admissible.

5. The technical committee's decision regarding the suitability of the technical specification will be judged on the basis of benchmarking, compute power, power efficiency.

1.5 Installation and Commissioning

Installation should be done free of cost at IACS, Kolkata. The vendor will be required to install and optimize libraries and scientific software mentioned in the following list: FFTW, LAPACK, BLAS, ScaLAPACK, NAMD, LAMMPS, HOOMD-Blue, GROMACS, AMBER, CHARMM, VASP, Quantum Espresso, CPMD, ABINIT, OCTOPUS, GAUSSIAN, NWChem. The scientific packages will be provided by us.

1.6 Compliance List

The vendor must submit a table indicating the compliance of the features of the model of the components being quoted with those given in the indent. In case of non-compliance against a particular item, the vendor should justify that.

Servicing facility within India is a must while service engineer stationed at Kolkata will be preferred.

A list of other places where the instrument has been installed should also be provided.

A compliance table (see below) must be prepared and submitted along with the technical bid.

Sr. No	Tender specification	Your offered instrument specification	Extent of compliance

Tender will not be accepted if the technical compliance chart is NOT provided following the above format.

1.7 Post-sale service

The vendor must submit the names of the service engineers employed by them who are competent to serve the HPCC installation along with their contact details in India.

****Please Note: The decision of the Technical Committee on technical competence and eligibility of any technical bid submitted by any vendor would be final and cannot be contested.**

2. PRICE BID

The financial bid indicating (item-wise) price for the item(s) mentioned in the technical bid should be kept in a separate sealed envelope duly super scribed as 'PRICE BID' on the outer cover of the envelop as already detailed above. Price bids of only technically qualified bidders will be opened, and they will be intimated the date and time of the opening of price bid at their e-mail ids. Rest of the bidders will stand rejected.

PRICE: The final quoted price should be the Delivery at Place (DAP) price.

3. BID SECURITY

- a. An Account Payee Demand Draft/Pay Order of any Commercial Bank for Rs. 8,00,000 (only) drawn in favour of “Indian Association for the Cultivation of Science (State Bank of India, Jadavpur University Branch, A/C No. 11079699211, IFSC: SBIN000093, MICR Code: 700002048)” is to be furnished by the bidders along with Technical Bid except those who are registered with the Central Purchase Organizations, National Small Industries Corporation or the concerned Ministry or Department, as Bid Security money or Earnest Money Deposit (EMD). Alternatively, the Bidder shall have the option to furnish the EMD in the format of Bank Guarantee (BG).
- b. The Demand Draft for the Bid-Security should have at least about 90 (ninety) days validity period of opening of the bids.
- c. In case of non-award of the work the Bid Security money would be returned to the unsuccessful Bidders.
- d. The EMD amount would be returned to the winning bidder after submission of performance security.

4. PERFORMANCE SECURITY

Performance security to the tune of 10% of the order value in the name of “Indian Association for the Cultivation of Science” is to be furnished by the successful bidder as Performance security. Performance security money should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. Bid security money or EMD will be refunded to successful bidder on receipt of the Performance security money. Performance Security may be furnished in the form of an Account Payee Demand Draft, Fixed Deposit Receipt from a Commercial bank, Bank Guarantee from a Commercial bank or online payment in an acceptable form safeguarding the purchaser’s interest in all respects.

5. TERMS OF PAYMENT

Payment will be made through irrevocable Letter of Credit in two installments. 90% of the money will be released on submission of shipping documents. Remaining 10% will be released after successful installation of the instrument.

6. GENERAL INSTRUCTIONS

1. The Entire Solution (including storage, software) must be factory Integrated. All the application benchmarks in this tender must be run in the factory to reproduce committed performance or better. Performance must be reproduced onsite too, within 15 days from the date of delivery.
2. Details on how vendor / proposed system meets the technical specifications have to be provided. Simply ‘complied’ or ‘yes’ responses without adequate justification / clarification shall lead to disqualification.
3. Any new document or details provided post proposal submission due date shall not be considered in evaluation of the proposal.
4. The offers shall remain valid at least for a period of 90 days. The period starts from the date of closing of tender submission.

5. Validity of tender: Tender submitted should remain valid for at least six months from the date of opening the tender. Validity beyond six months from the date of opening of the tender shall be lapsed by mutual consent.
6. The tender should accompany a compliance chart.
7. Incomplete and conditional tenders as well as tenders received after the due date will be summarily rejected without assigning any reasons thereof.
8. At any time prior to the bid due date, IACS may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder during pre-bid meeting, modify the bidding documents. The amendment(s) will be notified on the institute website. **Prospective bidders are advised to occasionally visit the website (www.iacs.res.in/tender) for any amendment.**
9. Installation/Demonstration/Application training at site: Installation & user training at IACS, free of cost by the supplier.
10. Service facility: In India, preferably Kolkata, supplier should mention their details of service setup and man powers who are responsible for after sales support. Response time should be within 24 hrs.
11. The model number, make and a printed literature of the product should be submitted positively.
12. Proposed delivery schedule should be mentioned clearly.
13. Manufacturers / exclusive distributors / vendors should have history of supplying this type of instruments to this or other scientific organizations. Availability of a list in this regard would be preferred.
14. Authorized dealership certificate should be provided in case of principal manufacturing company is not quoting directly.
15. Guarantee certificate, user manuals etc. are to be handed over to the user after successful commissioning of the system.
16. In the event of date being declared a closed holiday for purchaser's office, the due date for submission of bids and opening of the technical bids will be the following working day at the appointed time.
17. In case of any dispute, the decision of IACS authority shall be final and binding on the bidders.
18. For any clarification regarding technical specifications, information etc., please send your queries to **Prof. Ankan Paul (rcap@iacs.res.in) and Prof. Raja Paul (ssprp@iacs.res.in)**.
19. The authority of IACS reserves the right to reject any or all of the tenders received without assigning any reason thereof.

Acting Registrar