

**INTER-UNIVERSITY ACCELERATOR CENTRE**  
**(An Autonomous Centre of UGC)**  
**Aruna Asaf Ali Marg, New Delhi-110 067**

**NOTICE INVITING E-TENDER**

**Tender No: IUAC/NIT/42/SMO/2018-19**

**Dated: 01/03/2019**

**Instructions for Online Bid Submission:**

Inter-University Accelerator Centre (IUAC), invites online bids through e-Procurement Portal under two bid system, viz., Technical and Financial bids, from eligible and experienced parties for the work/supply of **"Supply and installation of HPC cluster at IUAC"**.

Tender Documents may be downloaded from Central Public Procurement Portal <http://eprocure.gov.in/eprocure/app> and [www.iuac.res.in](http://www.iuac.res.in)

Aspiring Bidders who have not enrolled/registered in e-Procurement Portal should enroll/ register before participating through the website <http://eprocure.gov.in/eprocure/app>.

Bids shall be submitted online only at CPPP website: <http://eprocure.gov.in/eprocure/app>. Tenderers/Contractors are advised to follow the instructions provided in the e-procurement portal. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.

IUAC reserves the right to accept / reject any/all tenders in part/full without assigning any reasons thereof.

Bidder has to select the payment option as "offline" to pay the tender fee/EMD as applicable. The Earnest Money Deposit shall be in the form of demand draft issued in favour of "Inter-University Accelerator Centre, New Delhi" and it should be deposited in IUAC before the bid opening. Bidders registered with MSME/NSIC are exempted from payments of EMD & tender fee. Copy of valid registration certificate should be uploaded.

Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BOQ format with the tender document, then the same is to be downloaded and to be filled and submit it online without modifying the format. If the BoQ file is found to be modified by the bidder, the bid will be rejected.

Any Corrigendum/Amendments in respect of above tender shall be issued on IUAC website [www.iuac.res.in](http://www.iuac.res.in) and website [https://eprocure.gov.in](http://eprocure.gov.in) only. Bidders should take into account any corrigendum published on the tender document before submitting their bids.

## E-TENDER DOCUMENT

Name of Work	<b>Supply and installation of HPC cluster at IUAC</b>
Tender No.	<b>IUAC/NIT/42/SMO/2018-19</b>
Tender Value/Estimate	Rs. 26210000 (Two crore sixty two lakhs ten thousand)
Earnest Money Deposit	Rs 5,25,000 /-(Rupees five lakhs twenty five thousand only) in the form of D.D.
Tender Cost	Rs. 500/-
Bid Submission End Date	22/03/2019 at 3.00 p.m.
Technical Bid Opening Date	25/03/2019 at 3.30 p.m.
Price Bid Opening Date	To be intimated later.
Contact Person	M. B. Joseph, Administrative Officer (S&P) e-mail: <a href="mailto:joseph@iuac.res.in">joseph@iuac.res.in</a> Phone: 011-24126018 & 24126022

### SCOPE OF WORK

Scope of work will include the supply and installation of High Performance Compute cluster at IUAC, with all hardware, software, accessories and services as detailed in the technical specifications.

### GENERAL TERMS & CONDITIONS

**1. Submission of Tender:** Bids may be submitted by manufacturers with at least five systems listed in each of the Top500 list of supercomputers ([www.top500.org](http://www.top500.org)) in the last three years (June 2016 to November 2018) or their authorized representatives / partners. Tenders should be uploaded in two Parts i.e. "Technical bid" (Part-A) and "Price bid" (Part-B). No other mode of submission will be accepted.

**2. Technical Bid (Part-A) :** In this bid, the bidder shall upload the scan copies of the following:

- a) Covering letter on Company's Letter Head
- b) Biodata of company (Company profile, organizational setup, credentials, list of plant, machinery & tools in his possession).
- c) Copies of PAN no., GST Reg. no.
- d) Copies of work orders and completion certificates of similar type of equipment executed

successfully during the last 7 yrs. in Govt., Public sector, Autonomous body or reputed Public Ltd. Company, with at least one work of value not less than Rs. 2.1 crores or two similar works, each of value not less than Rs. 1.32 crores or three similar works, each of value not less than Rs. 1.05 crores. Work order must be in favour of bidder, or, in case of order being issued in foreign currency to logistic partner of bidder based outside of India, the order should have clear mention of bidder and the price bid reference submitted by bidder. Full details of responsible contact person at site where order was executed shall also be provided.

- e) Detailed documents to prove compliance with every condition and technical specification laid out in the tender document, including technical data sheets and performance results, lists of systems of OEM in Top500 in last three years, and any other documents required to assess compliance.
- f) Authorization letter from manufacturer of computer systems, if bid is being submitted by authorized representative/partner. Authorization letter issued by manufacturers to representatives/partners should be specific to this tender.
- g) Undertaking by OEM that comprehensive on-site warranty support would be provided by OEM for five years.
- h) Entire NIT (except Price bid) duly signed & stamped by the bidder as acceptance of all terms & condition of tender.

**3. Price Bid (Part-B):** In this bid, the bidder is required to quote his item rates in the BOQ formed in accordance with the scope of work, terms & conditions & technical specifications enclosed. Unit prices should be quoted by bidder for all items; quantities finally ordered may vary from quantities specified in this tender document, at the discretion of IUAC. The rates/price quoted by contractor should be all inclusive i.e. should include all material cost, services, freight, insurance, customs duty and all applicable Govt. Duties, levies & taxes, transport/cartage of materials/labour and all other expenses not specifically mentioned but reasonably implied. Nothing over and above these rates shall be payable to contractor. Further , nothing extra in rates will be considered for any variations in tender quantities or due to any site difficulties. It is mandatory for bidder to quote all items rate as asked for in the BOQ/ PRICE schedule. Failure in not filling some item rates will lead to rejection of tender. The bidders should quote unconditional rates. The BOQ provides brief description of items to be quoted, while this document provides detailed technical specifications. In case of any ambiguity, the detailed specifications in this document are to be considered final and binding. IUAC is partially exempted from payment of Customs Duty (We will provide Custom Duty Exemption Certificate, CD applicable is 5.5%).

**4. Earnest Money:** An earnest money deposit (EMD) of Rs 5,25,000 /= (Rupees five lakhs twenty five thousand only) has to be submitted before opening of the technical bid (Part-A). The EMD shall be only in the form of Bank Draft / Banker's cheque in favour of "Inter-University Accelerator Centre", payable at New Delhi. No Cheque / Cash shall be accepted as EMD. The refund of EMD to the technically disqualified & lowest 4th bidders onwards shall be made within 15 days from the date of opening of price bid. The refund of EMD of the 2<sup>nd</sup> & 3<sup>rd</sup> lowest bidders shall be made after award of work and site mobilization

by the successful bidder. The EMD of the successful lowest bidder (L1) shall be adjusted against Security deposit.

- 5. Validity of Tender:** Tender shall be valid for our acceptance without any change in rates and NIT conditions for a period of 90 days from the date of opening of Technical bid.
- 6. Escalation:** No escalation over and above items rates quoted by the bidder shall be paid during the execution of contract.
- 7. Completion time:** The time shall be the essence of this contract and entire work as titled above is to be completed in all respects within a period of eight weeks from the date of issue of LOI / Purchase order by the Centre. Any delay in completing the work for reasons attributable to the Contractor is liable for liquidated damages as per clause 15 of NIT. Under the force-majeure conditions or delay due to reasons beyond control of the contractor, IUAC may grant suitable time extension without penalty for which the contractor has to request along with the justification/ reasons well in advance to IUAC for approval without any prejudice to price escalation. No time extension request shall be considered after the expiry of completion period/contract. The decision of the Director, IUAC regarding Time extension will be final and binding on the contractor.
- 8. Deviations:** No deviation from the stipulated terms and conditions will be allowed. Tender will be unconditional.
- 9. Correspondence:** All the correspondence in respect of tender/award of work shall be made to A.O.(S&P), IUAC, Aruna Asaf Ali Marg, New Delhi-110067.
- 10. Terms of Payment: For Import:-** Letter of Credit will be opened for 100% FOB value after receipt of acceptance of order from successful bidder. 100% payment will be made through Letter of Credit against complete shipping of materials/goods followed by submission of complete shipping documents. **For Indigenous Supply:** 100% payment after the delivery at IUAC and its certification.
- 11. Liquidated damages:** In case the work is delayed beyond the specified completion period for reasons attributable to the contractor, deductions on account of Liquidated damages @1% of the contract value per week will be deducted subject to a maximum of 10 % of the contract value. However, during the delayed period, IUAC also reserves the right to get balance portion of work done by any other contractor at the risk and cost of the existing contractor and amount to that effect along with 10% overhead charges will be deductible from his bills/dues.
- 12. Warranty period:** Warranty period shall be **five years from the date of completion of work.**
- 13.** Selected supplier must agree to supply all the technical details, service and user manuals to IUAC free of cost.

**14. Security Deposit :** A security deposit equal to 10 % of the value of work will be deducted from Contractor's bills and shall be refunded after the completion of warranty period after ensuring successful performance of the system executed by the contractor.

**15.** Tender once submitted will remain with the Centre and will not be returned to the bidders.

**16. Termination of Contract:-** The Director, IUAC reserve the right to terminate the contract on account of poor workmanship, failure to mobilize site within eight weeks, non-compliance of specifications for the works, abnormal delay in progress of work, violation of any contract provisions by the contractor. In such case, contractor's EMD and security deposit deducted so far will be forfeited. The contract can also be terminated on the request of contractor. In such cases the contractor is liable to pay Liquidated damages @ 5% of tendered value besides forfeiture of EMD & security deposit recovered so far.

**17. Any dispute arising out of this contract will be subjected to jurisdiction of New Delhi/Delhi.**

**18.** Tenders not complying with any of the provisions stated in this tender document are liable to be rejected. **Director, IUAC also reserves the right to accept or reject any or all the tenders without assigning any reason and does not bind him to accept the lowest tender.**

**Accepted**  
(Signature of bidder)

**Note:** - Entire NIT (except price bid) is to be uploaded with 'Technical bid (Part-A)' duly signed & stamped by the bidder

## **TECHNICAL SPECIFICATIONS, SCOPE OF WORK & SPECIAL CONDITIONS**

The Inter University Accelerator Centre proposes to augment its high performance computing (HPC) facility to support the computing requirements of its users, and of research groups in universities and academic institutions across the country. The facility will include a cluster of servers with a high speed interconnect to support parallel programs using distributed memory within the MPI framework; a storage solution for the cluster; and associated networking components and peripherals.

### **1. Supply and installation of cluster of nodes with Infiniband interconnect for MPI applications:**

System should be configured with 30 compute nodes, 1 head (master) node, and 100 Gbps EDR Infiniband / OPA interconnect. All chassis shall be mountable in standard 19" rack. It should be ensured that the total power per rack for occupancy of 40 server nodes in a standard 19" 42U rack does not exceed 20 kW at full CPU load for the head and compute node configuration laid down below. It should also be ensured that the system supplied, including chassis, power cords and rail kits, are fully compatible with IUAC's existing 19" data centre rack and cooling infrastructure. Details of IUAC's rack, electrical and cooling configuration may be obtained from the contact persons listed at the end of this document.

All relevant information about mechanical and electrical properties of each node and switch should be provided with the technical bid, especially including the weight, dimensions, power consumption at full CPU load for the configurations specified below, and minimum and maximum air flow through the servers and compute nodes.

All supplied hardware should be compatible with open source Linux OS (in particular RHEL, CentOS or Scientific Linux), OFED (OpenFabric Infiniband stack), OpenSM, OpenMPI, and other OS/MPI/compiler/math library options as laid down in the specifications below. The vendor shall ensure that all firmware / drivers required for operation with open source Linux OS are available. In addition, the vendor should ensure compatibility with other software listed in the requirements below.

All server and network equipment should carry a comprehensive on-site 5 years warranty directly from respective OEM.

#### **Head nodes: 1 no.**

Dual socket x86\_64 based server with 2 nos. Intel Xeon Gold 6126 CPU 12C

128 GB ECC RAM. RAM should be provided in balanced configuration to optimize memory bandwidth.

At least 3 nos. hot plug Enterprise SAS, total raw capacity at least 3 TB, with RAID5 controller

BIOS with capability to boot from LAN (PXE boot) and USB

2 x 1GbE network ports with PXE boot capability

1 x EDR Infiniband / OPA HCA card 100 Gbps

At least 2 PCI-e Gen 3.0 slots, including at least 1 free PCI-e Gen 3.0 x16 slot

At least 4 USB ports

Redundant and hot-swap power supply and fan units.

Power supply unit and cooling fans shall be adequate for given configuration at full CPU load. Details to be clearly mentioned in technical bid.

Chassis, preferably 1U, rack mountable in standard 19" rack with sliding rail kits and all accessories for rack mounting. Chassis, power cords and rail kits supplied should be fully compatible with existing 19" data centre rack and cooling infrastructure.

Front to back air flow. Air flow capacity in cfm to be clearly mentioned in technical bid.

IPMI 2.0 compliant BMC with remote console redirection

**Compute nodes (CPU only): 30 no.**

Dual socket x86\_64 based server with 2 nos. Intel Xeon Gold 6126 CPU 12C

96 GB ECC RAM. RAM should be provided in balanced configuration to optimize memory bandwidth.

1 x 240 GB SSD HDD

BIOS with capability to boot from LAN (PXE boot) and USB

2 x 1GbE network ports with PXE boot capability

1 x EDR Infiniband / OPA HCA card 100 Gbps

At least 2 PCI-e Gen 3.0 slots, including at least 1 free PCI-e Gen 3.0 x16 slot

At least 3 USB ports

Redundant and hot-swap power supply and fan units.

Power supply unit and cooling fans shall be adequate for given configuration at full CPU load. Details to be clearly mentioned in technical bid.

Chassis, preferably 1U or 0.5U, rack mountable in standard 19" rack with sliding rail kits and all accessories for rack mounting. Chassis, power cords and rail kits supplied should be fully compatible with existing 19" data centre rack and cooling infrastructure.

Servers must be individually serviceable.

Front to back air flow. Air flow capacity in cfm to be clearly mentioned in technical bid.

**Compute nodes (CPU + GPU): 4 nos.**

Dual socket x86\_64 based server with 2 nos. Intel Xeon Gold 6126 CPU 12C

1 no. Nvidia Tesla V100 32 GB GPU

96 GB ECC RAM. RAM should be provided in balanced configuration to optimize memory bandwidth.

1 x 240 GB SSD HDD

BIOS with capability to boot from LAN (PXE boot) and USB

2 x 1GbE network ports with PXE boot capability

1 x EDR Infiniband / OPA HCA card 100 Gbps

At least 2 PCI-e Gen 3.0 slots, including at least 1 free PCI-e Gen 3.0 x16 slot

At least 3 USB ports

Redundant and hot-swap power supply and fan units.

Power supply unit and cooling fans shall be adequate for given configuration at full CPU load. Details to be clearly mentioned in technical bid.

Chassis, preferably 2U, rack mountable in standard 19" rack with sliding rail kits and all accessories for rack mounting. Chassis, power cords and rail kits supplied should be fully compatible with existing 19" data centre rack and cooling infrastructure.

Servers must be individually serviceable.

Front to back air flow. Air flow capacity in cfm to be clearly mentioned in technical bid.

IPMI 2.0 compliant BMC with remote console redirection.



**High speed cluster interconnect: 1 no.**

Dual socket x86\_64 based server with 2 nos. Intel Xeon Gold 6126 CPU 12C

100 Gbps EDR Infiniband / OPA switch configured to support at least 48 ports in 100% non-blocking mode.

Compatibility with OFED (OpenFabric Infiniband stack), OpenSM and OpenMPI; should provide full quoted performance on open source software (Linux-OFED-OpenMPI)

Vendor specific Infiniband stack and fabric manager, if available, shall be supplied.

Management software should include all tools for installation, configuration and monitoring. All software/firmware/drivers should be supplied with no limits on number of users / processors / processes

Redundant power supply

Chassis mountable in standard 19" rack; rail kits for rack mounting to be provided.

Chassis, power cords and rail kits supplied should be fully compatible with existing 19" data centre rack and cooling infrastructure.

Complete technical details, including details of fabric manager included with switch, to be provided as part of the technical bid.

Details of possibility and mechanism of expansion to include more ports should be provided.

**Ethernet switch: 2 nos.**

48 port 10/100/1000 Mbps Ethernet switch with auto sensing of link speed on all ports

Mountable in at most 1U in standard 19" rack; rail kits for rack mounting to be provided

**Provision and installation of cables:**

Infiniband cables of appropriate length to connect all nodes listed above to Infiniband chassis. Details of make and type of cable should be provided in technical bid. Prices for different lengths of cable (3, 5, 7, 10 m) shall be quoted in price bid; payment will be made as per actual quantities used for each length. Only fibre cables are to be used.

Ethernet cables capable of supporting 1000 Mbps to connect Ethernet switches to head node, compute nodes, and storage. Prices for different lengths of cable shall be quoted in price bid; payment will be made as per actual quantities used for each length.

Power cables 1 ft length black, 18AWG or better with connectors IEC320 C13 to IEC320 C14, to connect head nodes, compute nodes, metadata and storage servers to rack PDU. Cables, connectors and contacts must be designed to withstand inrush current of 60 A peak for quarter cycle (5 ms). Cables should be compatible with IUAC's existing rack PDUs.

All cables to be routed through provided cable managers and cable trays as decided in consultation with IUAC.

### **Cluster software installation:**

Rocks/Linux based cluster should be installed by the bidder, with the following minimum software environment:

Latest version of Rocks cluster installation and management software.

Linux OS with all packages / software / drivers required for high performance parallel computing on Infiniband clusters, including but not limited to GNU C, C++, Fortran compilers, OpenMPI, GSL, Infiniband drivers and fabric and subnet managers, cluster monitoring tools like Ganglia.

Linux distribution installed on all nodes to be decided in consultation with IUAC.

Latest version of Intel Parallel Studio 2019 Cluster Edition academic license with a minimum of two floating users.

Open source resource manager (SGE / Slurm), to be decided in consultation with IUAC.

All vendor-specific server and Infiniband drivers and installation, monitoring and configuration tools, including all available vendor-specific tools for remote management and SNMP based monitoring and configuration, and remote console redirection.

### **2. Supply and Installation of parallel storage solution: 1 no.**

Storage solution of at least 80TB usable capacity.

4 GB/s I/O 50:50 r/w from each compute node simultaneously, with adequate numbers of controllers, management, metadata and object storage nodes to ensure required performance and NSPOF.

Complete details of solution, including details of MDS/OSS/OST/storage controllers/software as applicable, details of redundancy, reliability and resilience, and details of access method and performance from head / compute nodes, to be provided in technical bid.

### **3. Supply and Installation of software and drivers: 1 set**

Supply and installation of Intel Parallel Studio 2019 Cluster edition 2-user academic license

Rocks cluster management software with CentOS

Lustre / GPFS for storage ensuring user access from all nodes

All software and licenses required for baseboard management including remote console redirection

## Annexure – B

(Price should be quoted in the standard BOQ format of this tender)

### BOQ / PRICE BID

Tender Inviting Authority : INTER UNIVERSITY ACCELERATOR CENTRE

Name of Work/Supply : **Supply and installation of HPC cluster at IUAC**

Tender Number : IUAC/NIT/42/SMO/2018-19

Name of Bidder:- \_\_\_\_\_

Sl. No.	Item Description	Qty	Unit Rate	Currency [USD/ EURO/ INR]	Total Price
1	Supply and installation of 1 x master node with 2 x Intel Xeon Gold 6126 CPU 12C, 128 GB RAM, 3 x 1 TB HDD, 1 x EDR HCA / Intel OPA 100G, 3 x 1G Ethernet ports, Rocks-CentOS. Hot swap and redundant power supply and fan. IPMI 2.0 compliant BMC with remote console redirection. From reputed make; MAF required. 5 years warranty from OEM.	01			
2	Supply and installation of compute nodes with 2 x CPU Intel Xeon Gold 6126 12C, 96 GB RAM, 100G HCA EDR / Intel OPA, 3 x 1G Ethernet, 1 x 240G SSD HDD, hot swap and redundant power supply and fan, IPMI 2.0 compliant BMC with remote console redirection, Rocks-CentOS. From reputed make; MAF required. 5 years warranty from OEM.	30			
3	Supply and installation of compute nodes with 2 x CPU Intel Xeon Gold 6126 12C, 1 x Nvidia Tesla GPU 32 GB, 96 GB RAM, 100G HCA EDR / Intel OPA, 3 x 1G Ethernet, 1 x 240G SSD HDD, hot swap and redundant power supply and fan, IPMI 2.0 compliant BMC with remote console redirection, Rocks-CentOS.	04			

	From reputed make; MAF required. 5 years warranty from OEM.				
4	Supply and installation of 1 x parallel file system with 80 TB usable space, 4 GB/s I/O 50:50 r/w from each compute node simultaneously, with adequate numbers of controllers, management, metadata and object storage nodes to ensure required performance and NSPOF. From reputed make, MAF required. 5 years warranty.	01			
5	Supply and installation of EDR Infiniband / Intel Omnipath switch, at least 48 ports x 100G non-blocking. From reputed manufacturer, MAF required. 5 years warranty.	01			
6	Supply and installation of Ethernet switch 48 ports x 1G, from reputed make, MAF required, 5 years warranty	02			
7	Supply and installation of Intel Parallel Studio 2019 Cluster edition 2-user academic license, Rocks cluster management software with CentOS, Lustre / GPFS for storage ensuring user access from all nodes, all software and licenses required for baseboard management including remote console redirection, SGE / Slurm resource manager	01			
8	Supply and installation of all Infiniband fiber, Ethernet, power (C13-C14 connectors), and any other connectors and cables required for full operation of all cluster components. Supply and installation of rack mounting kits for all equipment, and installation of nodes, storage, Infiniband and Ethernet storage in standard 19" rack in IUAC's existing data center.	01			
9	Packing & Forwarding Charges (if any)				
10	FOB Charges (if any)				
11	Any other charges (if any)				
<b>TOTAL FOB PRICE</b>					

Name & Signature of  
Tenderer Company with Seal