

November 18, 2019

Tender notification for the procurement of a “CPU+GPU+Storage HPC Cluster” (Last date: 7th December 2019 by 5:00 PM IST)

This is an open tender for the purchase of a HPC cluster consisting of:

1. **Item 1:** Seven nodes of multi-core CPUs with SSDs called **CPU-only** nodes.
2. **Item 2:** One of the seven CPU-only nodes in item 1 above is to be configured a master node attached to a 48 TB storage made available to all the nodes of the cluster.
3. **Item 3:** Additional one node with 2x NVIDIA V100 GPUs connected by NVLink.
4. **Item 4:** Additional one node with non-volatile memory.
5. **Item 5:** Eight Titan RTX GPUs. The nodes in item 1 above should be fitted with these GPUs.
6. **Item 6:** Peripherals
 - a. Cluster containing all the above nodes and components to be connected by 10 Gbps Ethernet primary interconnect with the corresponding switch and cables.
 - b. Rack for enclosing all the above components.
7. All node configurations and components should be Linux-OS compatible.

Details are as follows:

Item 1: Seven CPU-only nodes. Specification of each node as follows.

SNo.	Component	Specification
1	Processor	<ul style="list-style-type: none">• Latest server-model processors.• Two CPUs per node• Minimum Clock Speed 2.4 GHZ• Minimum 32 cores per node
2	Memory	Minimum 6 GB DDR4 per core (ECC reg. DRAM, minimum 2933 MHz). Each socket should have homogeneous balanced memory configuration (Each memory channel should have same amount of DRAM and the node should be populated with same capacity memory DIMMs.).
3	SSDs	NVMe M2 SSDs of at least 256GB
4	Storage	1 TB Enterprise SATA 3.5" @ 7200 RPM
5	NIC	2 x Intel® x550T2 or Intel x722 10 GbE controller or alternative 10Gb NIC that supports DPDK (userspace networking)
6	Power Supply	<ul style="list-style-type: none">• Redundant power supply of Titanium Level (96%)• The minimum PSU wattages should be suitable for the provided solution.

		<ul style="list-style-type: none"> • A supporting calculation of the power utilization of the solution and PSU efficiency must be provided.
7	Form factor	1U/2U Rack mountable Chassis
8	Management	Dedicated IPMI 2.0 LAN
8	Expansion slots	Minimum 2 PCI-3.0/4.0 x16 slots
9	USB ports	Minimum 2 USB 3.0 or better
10	Video o/p	One Onboard VGA port or better
11	Operating system	Ubuntu or CentOS
12	GPUs	Should accommodate at least two GPUs (V100 or Titan RTX) per node

Item 2: Master node: One of the above CPU-only nodes to be configured as a master node with the following additional requirements.

SNo.	Component	Specification
13	Additional Storage	<ul style="list-style-type: none"> • Minimum 48 TB 6Gbps Enterprise SATA HDD @7200 RPM attached to the master node. • High quality 1x RAID controller with battery backup – 8 internal SAS/SATA ports – RAID levels 0,1,5,6,10,50,60 with minimum 2GB cache. Specify the make and model.
14	Peripherals	21” monitor, mouse and keyboard

Item 3: One node with 2x NVIDIA V100s connected by NVLink

SNo.	Component	Specification
15	Processor	<ul style="list-style-type: none"> • Latest server-model processors. • Two CPUs per node • Minimum Clock Speed 2.4 GHZ • Minimum 32 cores
16	Memory	Minimum 6 GB DDR4 per core (ECC reg. DRAM, minimum 2933 MHz). Each socket should have homogeneous balanced memory configuration (Each memory channel should have same amount of DRAM and the node should be populated with same capacity memory DIMMs.).
17	GPUs	Two NVIDIA Tesla v100 SXM2 32 GB cards connected by NVLink
18	SSDs	NVMe M2 SSDs of at least 256GB

19	Storage	1 TB Enterprise SATA 3.5" @ 7200 RPM
20	NIC	2 x Intel® x550T2 or Intel x722 10 GbE controller or alternative 10Gb NIC that supports DPDK (userspace networking)
21	Power Supply	<ul style="list-style-type: none"> • Redundant power supply of Titanium Level (96%) • The minimum PSU wattages should be suitable for the provided solution. • A supporting calculation of the power utilization of the solution and PSU efficiency must be provided.
	Form factor	1U/2U Rack mountable Chassis
22	Management	Dedicated IPMI 2.0 LAN
23	Expansion slots	Minimum 2 PCI-3.0/4.0 x16 slots
24	USB ports	Minimum 2 USB 3.0 or better
25	Video o/p	One Onboard VGA port or better
26	Operating system	Ubuntu or CentOS

Item 4: One node with non-volatile memory.

SNo.	Component	Specification
27	Processor	<ul style="list-style-type: none"> • 2x Intel Intel® Xeon® 6242 (Cascade lake) • Minimum Clock Speed 2.4 GHZ • Minimum 32 cores
28	RAM	192 GB of DDR4 (ECC reg. DRAM, minimum 2933 MHz). Each socket should have homogeneous balanced memory configuration (Each memory channel should have same amount of DRAM and the node should be populated with same capacity memory DIMMs.).
29	Non-volatile memory	At least 2 x 128GB Intel Optane DC memory
30	SSDs	NVMe M2 SSDs of at least 256GB
31	Storage	1 TB Enterprise SATA 3.5" @ 7200 RPM
32	NIC	2 x Intel® x550T2 or Intel x722 10 GbE controller or alternative 10Gb NIC that supports DPDK (userspace networking)
33	Power Supply	<ul style="list-style-type: none"> • Redundant power supply of Titanium Level (96%) • The minimum PSU wattages should be suitable for the provided solution. • A supporting calculation of the power utilization of the solution and PSU efficiency must be provided.
	Form factor	1U/2U Rack mountable Chassis
34	Management	Dedicated IPMI 2.0 LAN

35	Expansion slots	Minimum 2 PCI-3.0/4.0 x16 slots
36	USB ports	Minimum 2 USB 3.0 or better
37	Video o/p	One Onboard VGA port or better
38	Operating system	Ubuntu or CentOS

Item 5: Titan RTX GPUs.

SNo.	Component	Specification
39	Titan RTX GPUs	8 Titan RTX GPUs. These GPUs to be installed in the CPU-only nodes given in item 1 above with up to two GPUs per node.

Item 6: Peripherals

SNo.	Component	Specification
40	Primary interconnect switch and cables	<ul style="list-style-type: none"> • 16-port 10 Gbps Ethernet switch with RJ45 copper. • Appropriate cables integrated with the rack
41	Rack/chassis	<ul style="list-style-type: none"> • Rack space for ten hot-pluggable systems (nodes) in a 2U form factor with the required power strip provided in the rack. • Modular power switches and interconnection cabling with interconnection switch ideally located at the top of the rack. • Material: 1 mm Mild Steel • Sides: Louvered ventilated side cover with locks • Front and Rear: Honeycomb perforated single door with lock and handle • Mobility: 4 Castor Wheel with two having breaking locks • 2 Levelling feet to adjust floor errors and station the rack in place
42	Cluster management software	Rocks with Ganglia

43	Job scheduling software	Open source software like SLURM or HTC condor
44	Management network	A16-port GigE switch with cables for IMPI interconnect.

Note on Possibility of Additional Procurements:

Based on the budget availability, the following items may be procured from the successful bidder in the given order of preference:

1. Additional CPU-only node given in item 1.
2. Additional storage of maximum 48 TB in the master node, i.e., in addition to the 48 TB requirement in item 2.
3. Up to two Titan RTX GPU cards given in item 5.

GENERAL TERMS & CONDITIONS

1. **Warranty:** Warranty services for the system should be valid for a period of 3 years from the date of installation of the equipment. The warranty on all components should be included in the quoted costs. During the warranty period, the bidder shall attend to all the hardware problems on site and shall replace the defective parts at no extra cost to the purchaser. During the warranty period, the bidder shall attend to all failures relating to software installation, configuration, management and performance. Periodic maintenance wrt software upgrades, updates and patches, as well as preventive maintenance, are the responsibilities of the bidder.
2. **Two-bid system** (separate technical and financial bids) in sealed tenders, covers containing the technical and commercial bids must be individually sealed, and superscribed respectively as “IoE HPCStack Cluster – Technical Bid” and “IoE HPCStack Cluster – Commercial Bid”. The two covers must be enclosed in a larger envelope, sealed, superscribed as “IoE HPCStack Cluster”.
3. IISc reserves the right to cancel the tender at any time without assigning any reason whatsoever.

TECHNICAL BID – TERMS & CONDITIONS

1. The technical bid must clearly specify the following:
 - a. Executive summary of the proposal.
 - b. Technical details of the system.
 - c. Technical compliance statement stating compliance against each item in the technical specifications given in the enquiry.
 - d. Terms and conditions of the offer.
 - e. Supporting technical materials, including brochures, highlighting unique characteristics.
 - f. A copy of the masked Commercial bid of the bill-of-materials.
2. Vendors who include price information in the technical bids will be automatically disqualified.

3. The vendor must provide three references where they have carried out supply, installation and support of above 20 TFlops systems in the past 3 years. IISc shall independently obtain inputs from the provided referees before arriving at a final decision.
4. Technical bids will be opened first. IISc may seek clarifications after opening of technical bids. Vendors may be required to give presentations.

COMMERCIAL TERMS & CONDITIONS

1. Price bids of only technically qualified vendors will be considered. Commercial bid shall be opened for the technically qualified bidders after the technical evaluation. The Institute will communicate by email provided in the technical bid the date and time of opening of the commercial bid to the qualified bidders. Commercial bids will be opened on the said date and time, irrespective of the presence of the bidders / authorized representatives.
2. **Costs of individual components:** The quotes should give the costs of the individual components including
 - a. the cost of each CPU-only node in Item 1,
 - b. the cost of the 48 TB storage in item 2,
 - c. the cost of the NVIDIA V100, and the cost of the NVLink in item 3,
 - d. the cost of the non-volatile memory node in item 4,
 - e. the cost of the Titan RTX GPUs in item 5 and
 - f. the cost of each peripheral components in item 6.
3. The commercial bid should contain among other things, payment terms, warranty, installation, commissioning etc. as per requirements of IISc mentioned in the tender document. All such conditions must be in line with the tender. In case of any deviation or conditional offer, the bid may be treated as non-responsive and hence will not be considered for evaluation.
4. IISc is registered with DSIR in order to get concession / exemption in Custom Duty / IGST (for import). Also only 5% GST (for indigenous items) is applicable for IISc purchases as per DSIR registration. IISc will provide necessary documents required for availing concession / exemption in Custom Duty / IGST for import or 5% GST for indigenous items. Bidders should consider these facts while offering their price bids for this tender.
5. Indigenous order should be with GST only and must be on FOR basis. In such cases, any kind of custom duty exemption certificate will not be provided. IISc will only provide relevant documents for availing concession / exemption in GST subject to submission of documents (viz. Proforma Invoice, acceptance of the order) required from vendor side.
6. In case of rupee offer, the component of tax, and any other statutory levies should be shown separately and not included in the total amount, to enable us to avail exemption.
7. In case of imports, the commercial bid should contain among other things, the name and address of the Indian agent, if any, and the agency commission payable to the agent (if any). Import order should be preferably in 'DDP - Delivered Duty Paid – IISc Bangalore' terms. However we can accept import bids, which is CIP-Bangalore basis also, but in this case, insurance should be on "Warehouse to Warehouse" basis and should not terminate at Bangalore airport. Bids on the FOB or Ex-work basis will not be accepted in case of import order.
8. For DDP, Bill of Entry must be in the name of IISc, Custom duty must be paid by the vendor only. Before release of final payment, all original documents with regard to import must be handed over to IISc, failing which final payment may not be released.

9. For CIP, IISc will arrange for custom clearance from Bangalor Airport, however it will be sole responsibility of the vendor to provide all documents (e.g. Airway Bill, Invoice, Packing List, Bill of Lading etc.) required for filing of Bill of Entry and custom clearance must be provided to IISc well in advance. In case of any penalty / fine / demurrage is imposed due to delayed submission of documents from the vendor, then such amount will be deducted from the bill of vendor while releasing the payment.
10. Proposals should contain the name and contact details, viz., phone, fax and email of the designated person to whom all future communication will be addressed.
11. Prices should be quoted in detail, for all the subsystems given in the Technical Specifications part of the tender. Further, bid and price validity should be for six months from the date of opening of the technical bids.
12. IISc will place the purchase order only on the successful bidder as per the decision of IISc. In this regard, decision of IISc will be final and binding.
13. **Resolving Price Conflicts:** In case of a price conflict, the vendor with the following components will be preferred in the following order of priority.
 - a. Total Peak CPU performance of all the nodes. Highest will be considered.
 - b. Total power that will be consumed. The lowest will be considered.
 - c. Higher memory at 2933 MHz.

PAYMENT TERMS

1. The total project cost will consist of Equipment supply and installation and warranty for three years from the acceptance and successful installation as per decided by IISc.
2. For Indigenous supplies, 100% payment shall be released by IISc against delivery, inspection, successful installation, commissioning and acceptance of the equipment at IISc Bangalore in good and functional condition and to the entire satisfaction of the Purchaser (IISc).
3. For orders placed in foreign currency (Import), payment terms should preferably 100% payment after delivery, inspection, successful installation, commissioning and acceptance of the equipment at IISc Bangalore in good condition and to the entire satisfaction of the Purchaser. However, IISc may consider payment of 80% of the total order value of equipment only after submission of all valid dispatch documents. Rest of the amount will be paid only after completion of installation, commissioning, inspection and satisfactory acceptance by the IISc Committee followed by submission of satisfactorily report regarding completion of the work by the Committee. Payments will be released through RTGS / LC at the discretion of IISc to be mentioned in the purchase order.
4. Payment will subject to deduction of TDS as per rules / laws and any other deduction as per PO terms.
5. The total solution as per the agreed bill of materials must be supplied within 4 – 6 weeks after receiving a firm PO from IISc. The installation and acceptance must be completed within 2-3 weeks after supply of the equipment.

Important Dates

1. Release of tender: November 18, 2019
2. Last date for sending queries: November 25, 2019. Queries may be sent to Dr Sathish Vadhiyar (vss@iisc.ac.in)

3. Pre-bid clarification meet: November 27, 2019, 2 PM in CDS 102. No queries will be entertained after pre-bid clarification meet.
4. Release of corrigendum to the tender based on the queries, if necessary: November 29, 2019.
5. Submission of the bid: December 7, 2019, 5 PM IST.

The bid should be addressed to:

The Chair
Department of Computational and Data Sciences (CDS)
Indian Institute of Science (IISc)
Bengaluru
India - 560012.