

भारतीय प्रौद्योगिकी संस्थान ततरुपतत Indian Institute of Technology Tirupati Settipalli, Renigunta Road Tirupati 517506	दूरभाषसंख्या Phone no: 0877 – 2500335 ईमेल Email : govindak@iittp.ac.in
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Prof. T.S. Natarajan
Registrar i/c

Date: 19.03.2018

Public Tender No: IITT/Comp/09/2017-18/08 **Due Date: 25.04.2018 at 3.30PM**

Dear Sir/Madam,

On behalf of the **Indian Institute of Technology TIRUPATI**, sealed quotations are invited in two part bid system for supply of **High Performance Computing Facility (Cluster)** as detailed in the tender document at IIT Campus, Renigunta Road, Settipalli Post, Tirupati, Chittoor District, Andhra Pradesh.

Specifications and compliance statement:

The detailed specifications of the equipment are given in the Annexure "A" and the same should be complied with. If any deviations, it should be clearly stated in the technical bid. Technical literature/leaflet showing the compliance of the specification may also be attached with the quotation.

Please ensure that the specifications are basic essence of the product. It must be ensured that the offers must be strictly as per our specifications. At the same time it must be kept in mind that mere copying of our specifications in the quotation shall not make the parties eligible for consideration of the quotation. A quotation has to be supported with original catalogue (not of photo copy) of the quoted model duly signed by the principals and the same must be sent along with the technical bid. The quoted model should not become obsolete for a minimum period of 5 years (This is for the availability of spares). Therefore the model quoted should invariably be highlighted in the leaflet/literature enclosed with the quotation. Non-compliance of the above shall be treated as incomplete/ambiguous and the offer can be ignored without giving an opportunity for clarification/negotiation etc. to the bidder.

The technical bid shall be evaluated for acceptability by the technical committee and may call the tenderers for discussion. If necessary, the committee may modify the technical specification to suit the requirement of IIT Tirupati. In such case the opportunity shall be given to all the participating bidders for submitting the revised bid as per modified specifications, if any.

Any item not specifically mentioned in the tender document but in the opinion of the bidder the same is essentially required for successful implementation of HPC solution, the fact should be brought to the notice of the Institute well in advance and on clearance from our side, the same may be quoted with price. However the decision as to whether to consider or not of such items rests with the Institute.

The bidder shall ensure that the bid submitted by him includes all equipment, hard ware and software for full execution of contract to be awarded and cannot charge extra for additional hardware and software items required to meet the operational requirement at the installation and commissioning stage.

The eligibility criteria for participation in bid are mentioned below:

1. The Bidder must be an Original Equipment Manufacturer (OEM) or his Authorized Dealer/ Channel Partner having a Direct Purchase and Support agreement with the OEM. In case, the Bidder is a Dealer, a valid LETTER OF AUTHORIZATION from Original Equipment Manufacturer should be produced along the bid.
2. The bidder / OEM should have successfully executed at least three such High Performance Computing Cluster (HPCC) projects in the last five financial years preferably by supplying to the Central/State Govt./ PSUs/Universities/IITs/Autonomous bodies/any firm and proof of supply and its working condition is a mandatory and must be produced along with the bid document. In addition to this, the bidder/OEM should satisfy any one of the following conditions mentioned below:

Bidder should have executed:

1. At least one Order of 80% of quoted value
 2. At least two Orders each of 50% of quoted value
 3. At least three Orders each of 40% of quoted value
3. The bidder should be willing to arrange for a demonstration of the equipment offered at free of charge on mutually agreeable place and date prior to opening of price bids to ascertain their conformity with tendered specifications.
 4. The bidder should be registered under the Companies Act 1956 or a registered firm. Registration certificate to this effect must be produced. The bidder /OEM must have registered office either in Karnataka, Tamilnadu, Telangana or Andhra Pradesh with well established Service Centre.
 5. In case the bidder is a System Integration Partner of the OEM, a certificate from the OEM clearly stating the relationship and level of partnership with the Partner and authorisation to the Partner to quote for this specific tender enquiry is to be furnished. One OEM can authorise one partner only and one partner can represent only one OEM.
 6. The bidder should have average annual sales turnover of Rs.5 Crores or more during the last three financial years ending 31 st March 2017. Attach firm's last 3 years audited profit and loss Account balance sheet duly audited by C.A.
 7. The bidder should produce documentary evidence of having supplied and installed an Intel Lustre based parallel file system of at least 50TB (in a single order) to higher educational institutions like IIT, IISER, TIFR etc.) and satisfactory performance of the installed parallel file system.
 8. Bidder must be in existence in the HPC business for at least in the last ten years. Documentary evidence to this effect must be produced along with technical bid.
 9. The bidder should ensure that:(i) Access to 24 x 7 online support for 5 years from Technical Assistance Center of OEM/bidder for resolution of problems with the help of online tools and technical assistance . (ii) Defective part replacement during warranty period (3 years) within a period of two working days with Advance Replacement Policy. (iii) Onsite spares for mother boards, hard disk, power supply for compute nodes and memory amounting to at least 2% of installed capacity need to be provided.
 10. Bidder should specify the theoretical computing power in TFLOP for the proposed solution.

Bidder should also specify the expected peak TFLOP based on previous experience with similar sized clusters.

11. The OEM/Bidder must have an India based support infrastructure by maintaining a local spares depot in the country. This is to ensure immediate delivery of spare parts from OEM to its channel partner/system integrator.
12. Bidder should be in a position to provide case logging procedure for both hardware and software failure.
13. Please specify the heat dissipation (in BTU) and max power consumption of each component when configured with the above configuration. The bidder has to visit the installation site and provide the plan, cluster rack arrangement and cooling requirements for hosting the HPCC in the given place.
14. Bidder should provide complete documentation about the Rack layout, power, cooling and electrical infrastructure required at IIT Tirupati along with the technical bid.
15. One Resident Engineer has to be deployed at least for a period of 6 months from the date of acceptance and installation of HPC at IIT Tirupati site. Engineer should have experience of HPC environment and able to solve first level of all types of call/Queries related to HPC. He should be stationed at IIT Tirupati on all working days between 9.30Am to 5.00P.M on 6 days a week basis for 6 months as mentioned above. A detailed resume of the Engineer to be provided along with Technical Bid.
16. Bidder has to deploy NAS storage in other building in the same campus with same network as of HPC. The data of PFS should be automatically backed up on this storage system.
17. Vendor shall possess ISO 9000 certification for Quality System implementation. Required evidence shall be provided along with offer.
19. Bidder should be registered under **GST** Act with concerned State Sales Tax Authorities. The bidder should furnish along with the bid document, the relevant **GST** Registration Document and PAN / TAN copies.
20. List of Present Clientele to whom identical or similar equipment supplied in the preceding three years must be produced with contact addresses & telephone numbers.

The supplier should quote commercially proven model of equipment or control system. Prototypes are not acceptable.

The above mentioned basic eligibility conditions are broad guidelines for pre-qualification and the Director/Registrar, in-charge, IIT Tirupati hereby reserves the right to relax / alter / modify / add any or all the conditions.

The interested bidders are advised to go through the conditions envisaged for eligible criteria for participation in the bidding.

Instructions to the Bidder

- (i) **Preparation of Bids:** The bidders must ensure that bids are submitted in **two part bid system (i.e.) Technical bid and Financial bid in separate envelopes.**
- (ii) **Techno-commercial bid:** The technical bid should consist of all technical details/brochures along with commercial terms and conditions super-scribed as TECHNICAL BID with Tender No. and date and time of closing and the bidder's name and address. No prices should be included in technical bid.
- (iii) **Financial (Price) Bid** should indicate item-wise prices for the items with firm and fixed figures and words super-scribed with the Tender No. and date of closing of the Tender with name of supply/work and the bidder's Name and address. The price bid should not contain any conditional clauses. No price escalation for any reasons whatsoever is allowed. All prices should be given in Indian Rupees or USD or Euros only. The Indian bidders shall quote firm price fully in Indian currency only.
- (iv) The techno-commercial and the financial bids duly signed by the bidders or their authorised signatories with name and seal should be put in separate cover and sealed. Both sealed covers should be put into a bigger cover duly super-scribed with PT No. and due date/time with name of supply /work. **Technical bids must either be spiral bound / stapled together. No loose sheets will be accepted. All pages must be numbered.**
- (v) **Submission of the tender:** The complete sealed bids in all respects shall be sent to the following address well in advance either by post or by courier or by hand so as to reach this office on or before the due date and time specified in the Schedule. The bids received after closing date and time shall not be considered.

The Registrar I/C,
Indian Institute of Technology Tirupati,
Renigunta Road,
Settipalli Post,
Tirupati-517 506, Andhra Pradesh

While submitting the bids, the bidders must sign all the tender documents as a token of accepting of tender documents as well as terms and conditions stipulated therein. Tender documents without signature of bidders or their authorised signatories will be treated as invalid bids.

No conditional offer or terms and conditions will be entertained by the institute and such bids will be treated as invalid.

- (vi) The tender documents can be down loaded from IIT Tirupati web site:<http://iittp.ac.in/tenders> on or after 26.03.2018

(vii) Bid Security (EMD): EMD either in the form of Bank Guarantee or Demand draft at 2% of the quoted value initially valid up-to 90 days drawn in favour of Indian Institute of Technology Tirupati payable at Tirupati must be sent along-with the technical bid only. The technical bid without EMD would be considered as UNSOLICITED and will be REJECTED. Photo/FAX copies of the Demand Draft/Banker's pay orders will not be accepted. No interest will be paid for the EMD and the EMD (Bid Security) will be refunded to the successful bidder on receipt of Performance Security (Security Deposit) and in case of unsuccessful bidders, the EMD will be refunded on finalisation of tender.

(viii) Bid security be forfeited without any intimation in such cases as below:-

- a) If a bidder withdraws its bid during the period of bid validity
- b) If a successful bidder fails to execute the awarded contract
- c) If a successful bidder fails to provide performance guarantee

ix) Micro and Small Enterprises (MSEs) registered with National Small Industries Corporation are exempted from payment of Earnest Money Deposit. However, vendors covered under this category have to submit copy of registration certificate along with technical bid. Failing which, the bid will be disqualified.

(x) Details of our Banker

Name of bank	State Bank of India
Address of bank branch	Settipalli Branch Renigunta Road, Tirupati
Bank Branch code	006677
IFS Code	SBIN0006677
Bank Account Number	35523338208

Modifications to bid:

(xi) The bidder shall make no modifications to the bids after the closing date unless specifically requested by IIT Tirupati. In case certain clarifications are sought by Institute after the opening of bid, then the reply of bidder should be restricted to the clarifications sought. Any bidder who modifies his bid having effect of altering the value of his offer after the closing date without specific reference by IIT Tirupati shall make him-self liable to be debarred from this tender and forfeit the bid security amount.

xii) Modifications of specification:

The supply to be made by the Supplier under this Purchase order can be modified or changed by the request from the IIT Tirupati provided that for such modifications or changes the parties shall first agree to possible addition or reduction in cost, the delivery date and such other terms and conditions occasioned by or resulting from such modification or change. Such agreement shall be effected either by way of exchange of letters duly signed by authorised representatives of the parties or by signed change order form or by minutes of meeting signed by authorised representatives of the parties, which

shall constitute the necessary amendments to the contract. Possible increase or decrease in the contact price shall be calculated in accordance with unit prices. The cost of such additional jobs should be reasonably fixed with reference to the quoted price for such or similar items.

(xiii) Opening of the tender: The Technical Bids will be opened by the tender committee duly constituted in the presence of bidders or their authorised representatives on **25.04.2018 at 16.00** hours. Then the bids will be evaluated by the Technical Evaluation Committee which will decide the suitability of the technical bids as per our requirement and terms and conditions. Once the technical evaluation is completed, the price Bids of only those bidders who are found technically acceptable will be opened in the presence of Authorized Representatives of such bidder(s), if any on a date and at a venue to be intimated by IIT Tirupati to the short listed bidders.

(xiv) The bidder shall note that any unsolicited post-tender reduction by them would disqualify them from participating from the bidding and forfeit the security bid.

(xv) Incomplete bids are liable for rejection.

(xvi) Prices: The price should be quoted on FOR: IIT, Tirupati. The bid should consist of basic price, P&F charges, freight, unloading charges, Installation and commissioning charges and applicable taxes.

The Contract will be awarded to single suitable party who quote for all items and meet all our specifications and stands as Lowest bidder.

The total landed cost will be calculated from the information provided by the bidder in their price bids. The bid conforming to the lowest cost would then be considered for award of contract.

The custom duty if any applicable must be shown separately. It may be noted that IIT Tirupati is exempted from payment of custom duty and duty at concessional rate against duty exemption will be paid.

In case of import supply, the price should be quoted on EX-WORKS/FOB/CIP basis indicating the mode of shipment.

Offer validity: The offer must be valid for 90 days from the closing date in the case of indigenous supply and 120 days for overseas supply. If the validity of offers for acceptance is less than 90 days/120 days, the same will not be considered.

IIT Tirupati reserves the full right to accept / reject any tender or all tenderers at any stage without assigning any reason.

Yours sincerely,

Registrar, IIT Tirupati

Important Commercial terms and conditions:

- a) The due date for the submission of the tender is **25.04.2018 at 15.30 hours.**
- b) **Late offer:** The offers received after the due date and time of closing will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.
- c) **Payment terms:** No Advance payment will be made for Indigenous purchase. Our normal payment terms are 100% within 30 days after receipt of complete supply at our site and acceptance. However in case of high value Purchase Orders, as a special case, payment of 90% of Order value will be made based on pre-inspection of material at supplier's site and also on receipt of goods at our site and clearance by inspection team. Balance 10% of PO value after completion of all inspection and acceptance formalities. For making payment original tax invoice in triplicate, Delivery Challan's, material test certificate, pre-inspection of material at factory, guarantee/warranty certificates must be sent along with material.

In case of import supplies, our normal terms of payment are by Sight Draft. However, other terms of payment such as Letter of Credit also considered as agreed upon by opening LC for 100% in which case 90% payment will be released against proof of shipping documents and balance 10% after successful installation wherever the installation is involved/on receipt and acceptance of material at our site.

- d) **Advance Payment:** No advance payment to indigenous supplies will be made. However in case of import goods, specific percentage of advance payment will be agreed upon for which, the Foreign Vendor has to submit a Bank Guarantee equal to the amount of advance payment and it should be routed through the Beneficiary Bank to the end user Bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee through a Nationalized Bank of India.

If an Indian agent is involved, the following documents must be enclosed:

Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.

Copy of the agency agreement concluded with the foreign principal and the precise relationship between them and their mutual interest in the business.

Enlistment with DGS&D as Indian Agent of Foreign principals under the Compulsory Enlistment Scheme of Ministry of Finance.

- e) **Agency Commission:** Agency commission, if any, will be paid to the Indian agents in Rupees on receipt of the equipment and after satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender even in the case of 'Nil' commission. The tenderer should indicate the percentage of

agency commission to be paid to the Indian agent. The foreign Principal should indicate about the percentage of payment and it should be included in the originally quoted basic price, if any.

- f) **Inspection Clause:** All major equipment will be inspected by a team of IIT Tirupati at Supplier's premises and after clearance in the form of report, the items shall be despatched to IIT Tirupati. Readiness of equipment shall need to be intimated well in advance for our inspection formalities.
- g) The bidder alongwith technical bid shall submit detailed plan of installation of equipment and site arrangement which include rack layout, power, cooling and electrical infrastructure required at Insitute.
- h) **Delivery Schedule:** Please note that delivery is the essence of the contract. In case there is any deviation in the delivery schedule, liquidated damages clause will be levied for the delayed period of supply. Therefore, it should be ensured that all the ordered items should be supplied within 4 months from the date of receipt of Purchase Order on door delivery basis at our Institute as per Purchase order terms with securely and sufficiently packed by following standard packing procedure to withstand transit damages. In case of import supply, the item should be delivered at the cost of supplier to our institution. The installation and commissioning should be completed as specified in our important terms and conditions.
- i) **Extension of time:** If the completion of stores is delayed due to reason of force majeure such as acts of God, acts of public enemy, acts of Government, fires, floods, epidemics, quarantine restriction, strikes etc., the contractor shall give notice within 15 days to Institute in writing of his claim for an extension of time. The Institute on receipt of such notice after verification, if necessary, may agree to extend the Contract delivery date as may be reasonable but without prejudice to other terms and conditions of the contract.
- j) **On-site erection and commissioning:** It is the responsibility of the Contractor to install and commission the equipment or machinery supplied by them within two months from the date of receipt of the item at the site of IIT Tirupati and demonstrate the performance of the system to the satisfaction of the users/concerned faculty members/committee in-charge at IIT Tirupati. In case the Contractor fails to carry out the erection as and when called upon to do so within the specified period by the Institute, the Institute shall have the right to get the erection work done through any source of his choice. In such an event, the Contractor shall be liable to bear any additional expenditure that the Institute is liable to incur towards erection.
- k) **Training of End user:** The successful bidder shall provide comprehensive training at IIT Tirupati to IIT personnel on operation, programming, and maintenance at free of cost on all the items installed to the satisfaction of the IIT personnel. The expenses related to travel (to and fro) including local travel, stay, food and per diem and training have to be completely borne by the vendor.
- l) **Liquidated damages:** If the Contractor fails to deliver the material within the time specified in the Contract or any extension thereof, the Institute shall recover from the Contractor as Liquidated Damages a sum of one-half of one per cent (0.5 per cent) of the Contract Price of the undelivered material for each calendar week of delay. The total liquidated damages shall

not exceed ten per cent (10%) of the Contract price of the unit or units so delayed. Stores will be deemed to have been delivered only when all their component parts are also delivered.

- m) **Performance Bank Guarantee:** Performance Bank guarantee for 5% of Purchase order value should be produced in the form of B.G from the nationalised /scheduled Bank valid till the completion of warranty / guarantee period plus sixty days as claim period. Where-ever installation/commissioning is involved, the guarantee/warranty period shall be reckoned from the date of completion of installation/commission. Failure to render contracted service during the warranty/guarantee period by the contractor, the performance bank guarantee will be forfeited. No interest is payable on the performance Bank guarantee amount.
- n) **Guarantee/Warranty:** The Contractor shall guarantee that the material supplied shall comply fully with the specifications laid down, for material, workmanship and performance after acceptance of the material **for a period of three years.** The tenderer should clearly mention in the bid the period of guarantee/warranty offered by him. If any defects are discovered therein or any defects therein found to have developed under proper use arising from faulty stores design or workmanship, the Contractor shall remedy / replace such defective items at his own cost.
- o) **Comprehensive Annual Maintenance contract:** CAMC charges for a period of 2 years after expiry of warranty period should be quoted separately for the equipment where-ever applicable which come into force after expiry of warranty/guarantee periods. The quote should contain details about free replacement of spares/accessories/software during the currency of CAMC and number of break down calls shall be attended and duration of time required for attending to emergent calls and details of essential spares which are to be supplied on chargeable basis also need to be mentioned in the quote. IIT Tirupati reserves the right to conclude AMC at appropriate time after expiry of warranty period depending upon the requirement.

The Bidder should clearly categorize the Basic/Standard features as well as optional features of the system in order to have a clear cost comparison. Essential spares if any for maintenance to be quoted separately. The bidder should ensure continued supply of spares throughout the useful life of the equipment.

- p) **Insurance:** IIT Tirupati being a Central autonomous body under Ministry of HRD, Government of India, we will not insure our goods. However, to safe guard the ordered material from probable transit damage while in transportation the contractor may insure the goods at his risk and cost.
- q) **Do not quote the optional items or additional items unless otherwise mentioned in the tender documents / specifications.**

ARBITRATION CLAUSE: Arbitration in the event of any dispute or difference arising under these terms & conditions or any Condition contained in the Purchase Order or in connection with this contract (except as to any matter the decision of which is specially provided for by these conditions), the same shall be referred to the sole arbitration of the Registrar, IIT, Tirupati or of some other person appointed by him and the dispute further processed in terms of the Arbitration & Conciliation Act ,1996. There will be no objection that the arbitrator is a Government Servant that he deal with matter which the Contract relates to or that in the course of his duties as Government Servant has expressed views on all or any of the matters in dispute or difference .The award of the arbitrator shall be final and binding on the parties of this Contract.

If the arbitrator is the Registrar, IIT, Tirupati

- i. In the event of his being transferred or vacating his office by resignation or otherwise , it shall be lawful for his successor in office either to proceed with the reference himself for to appoint another person as arbitrator, or
- ii. In the event of his being unwilling or unable to act for any reason, it shall be lawful for the Registrar, IIT, Tirupati to appoint another person as arbitrator.

If the arbitrator is a person appointed by the Registrar, IIT, Tirupati – In the event of his denying or neglecting or refusing to act, or resigning or being unable to act, for any reason, shall be lawful for the Registrar, IIT, Tirupati to proceed with the reference himself or to appoint another person as arbitrator in place of the outgoing arbitrator subject, as aforesaid , to the Arbitration & Conciliation Act ,1996, and the rules there-under and any statutory modifications thereof for the time being in force shall be deemed to apply to the arbitration proceeding under the clause. The Arbitrator shall have the power to extend with the consent of the purchaser and the contractor the time for making and publishing the award. The venue of Arbitration shall be the place as the purchaser in his absolute discretion may determine work under the Contract shall, if reasonably possible, continue during Arbitration Proceedings.

All amendments, time extension, clarifications etc., if any will be uploaded in the website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.

- r) **Acknowledgement:** It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

**SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE
COMPANY WITH DATE**

Specifications

ANNEXURE-A

Sl.No.	Description	Qty.	Compliance Yes/No	Remarks
1	Master Node	2Nos		
	2 x Intel® Xeon Skylake processors 6126 (12-Core, 2.6GHz or more)			
	96GB DDR4-2666 ECC RDIMM (Max 1TB, at least 16 DIMMs)			
	SAS RAID controller with 2GB Cache supports RAID 0, 1, 5,6,10,50 & 60 levels			
	2 x 400GB, Enterprise Class NVMe SSDs (endurance >17DWPD)			
	4 x 600GB, 10KRPM Enterprise SAS hot-plug HDDs			
	at least 10 HDD drive bays (with at least 8 hot swap bays or more)			
	2 x Gigabit(10/100/1000Mbps) Ethernet ports on-board			
	Single 100Gbps or better Interconnect Mellanox IB or OPA port, with cable			
	Graphics using on board graphics controller			
	On-board IPMI 2.0 with dedicated LAN and KVM over LAN support			
	At least 4 PCI-E 3.0 expansion slots or higher/better			
	1 Serial, 2 USB, 2 x Network, 1 x Management, 1 x Interconnect, 1 x Video			
	1U/2U or better rack-mountable with sliding rails			
	(1+1) Redundant, hot-plug power supplies (80PLUS Platinum Certified)			
	18.5" TFT Color Monitor, Keyboard & Optical Mouse			

Sl.No.	Description	Qty.	Compliance Yes/No	Remarks
2	Compute Node	24 Nos		
	2 x Intel® Xeon Skylake processors 6126 (12-Core, 2.6GHz or more)			
	96GB DDR4-2666 ECC RDIMM (Max 1TB, at least 16 DIMMs)			
	1 x 480 GB, SATA 6Gbp/s Data Centre Class SSD (Min 3 HDD Bays)			
	2 x Gigabit(10/100/1000Mbps) Ethernet ports on-board			
	Single 100Gbps or better Interconnect Mellanox IB or OPA port, with cable			
	Graphics using on board graphics controller			
	On-board IPMI 2.0 with dedicated LAN and KVM over LAN support			
	with required license for activation			
	at least 2x PCI-Express 3.0 x16 slot in which at least 1 slot to be free			
	2 USB, 2 x Network, 1 x Management, 1 x Interconnect(100Gbps), 1 x Video			
	1U/2U or better rack-mountable with sliding rails			
	Redundant, hot-plug power supplies (80PLUS Certified)			

Sl.No	Description	Qty.	Compliance Yes/No	Remarks
3	Accelerator Nodes	2Nos		
	2 x Intel® Xeon Skylake processors 6126 (12-Core, 2.6GHz or more)			
	2 x Nvidia Tesla P100 16 GB Accelerator Card			
	with support for at least 3 GPGPU Cards			
	96GB DDR4-2666 ECC RDIMM (Max 1TB, at least 12 DIMMs)			
	SATA RAID controller with support for RAID 0, 1,& 10			
	1 x 480 GB, SATA 6Gbp/s Data Centre Class SSD .			
	2 x Gigabit(10/100/1000Mbps) Ethernet ports on-board			
	Single 100Gbps or better Interconnect Mellanox IB or OPA port, with cable			
	Graphics using on board graphics controller			
	On-board IPMI 2.0 with dedicated LAN and KVM over LAN support			
	with required license for activation			
	At least 4 PCI-E 3.0 x16 expansion slots or higher/better			
	1 Serial, 2 USB, 2 x Network, 1 x Management, 1 x Interconnect, 1 x Video			
	1U/2U or better rack-mountable with sliding rails			
	(1+1) Redundant, hot-plug power supplies (80PLUS Certified)			

Sl.No	Description	Qty.	Compliance	Remarks
			Yes/No	
4	Parallel File System	1No.		
	General Specification			
	Lustre based PFS with following specification :-			
	Metadata Storage: >2TB (using 900GB SAS 10K PM SAS HDDs configured as RAID10 or Similar with one hot-spare.			
	Usable Storage : > 100TB usable with RAID6 or similar (using up to 2TB, 7.2K RPM SAS HDDs			
	Configured as RAID6 volumes with two Global hot-spare disks. Each individual volume to be ≤ 22TiB			
	Throughput : > sustained 3GB/s read/write (50:50) performance			
	100TiB (usable in RAID6 configuration or similar) Parallel File System based Storage with 3GBps throughput with 1MB block size for the PFS. At least 2 I/O Nodes in fail over configuration to be quoted each node with minimum :			
	2 x Intel Xeon 12 Core processors 6126 Model with 2.6 Ghz and 19.25 MB Cache			
	Redundant Power Supply with at least 80 Plus Platinum efficiency			
	128GB DDR4 2666Mhz memory with ECC			
	At least 2 no. of PCI-E x16 expansion slots			
	2 x 240GB Data centre grade SSD in RAID1 (for OS)			
	With Hi Speed Interconnect ports – minimum 100Gbps			
	<p>The solution must be capable of handling the loss of the following without interruption.</p> <ul style="list-style-type: none"> - One Power Supply - One Fan - One HDD for MDT or Two HDDs for MDS - One I/O Server <p>The I/O server must have redundant paths to the storage.</p> <p>Vendor/bidder must have installed PFS of at least half the size (50TB) in the past in an HPC environment</p>			

Sl.No.	Description	Qty.	Compliance Yes/No	Remarks
5	Benchmark report and Performance demonstration for PFS Throughput			
	Open-source IOR/IO Zone benchmarks running on compute nodes with 1MB block size.			
	Storage Performance to be measured from compute node using IOR benchmark for 3GBps throughput			
	Benchmark result to be submitted along with bid and performance to be demonstrated by IOR/IOZONE. The hard disk capacity to be maximum 4TB/drive used for benchmark running and for the solution proposed			

Sl.No	Description	Qty.	Compliance Yes/No	Remarks
6	Unified Network Storage System	1No.		
	Must be 100 TB useable space in a single box by using not more than 4TB 7.2K RPM NL – SAS or SAS Drives			
	With not more than 11 HDDs in a RAID group configured with RAID 5 (10D+1P			
	Support for Management Web based GUI for management			
	Support for Hardware monitoring			
	SNMP support			
	File System with Journaling support			
	Support for ADS & NIS			
	Support for Volume Replication			
	2 x Intel® Xeon® Processor with at least 8C/2.1GHz/20M			
	32 GB memory ECC Reg Expandable Up to 1TB using LR DIMMS Minimum 8 DIMM Slots			
	Linux based OS to be provided			
	Unlimited User license, Unlimited Storage Size License			
	Maximum 4U rack-mountable			
	Redundant Power supply			
	Host Interface: 8 x Gigabit Ethernet with load-balancing & 2 x 10G RJ45 Ports			
	System should have provision to use in future Host Interface with InfiniBand & FC within the same proposed storage box.			
	SAS controller 12 Gbps with support for Hardware RAID 0, 1, 10, 5 & 6, 2GB battery backed cache			
	Both File & Block Storage functionality			
	Supports NFS, CIFS/SMB & FTP, Supports iSCSI target,			
	Must have provision to Supports SRP target/ FC Target while using InfiniBand/ FC Interface			

SI No.	Description	Qty.	Compliance Yes/No	Remarks
7	Primary Communication Network	1		
	Min 100 Gbps Mellanox-InfiniBand/Intel OPA interconnect switch (minimum 36 ports) (Hi Speed Interconnect) interconnect in fully non-blocking, configuration. Model /Make, Number and types of switches, adapters etc. To be mentioned			
	The interconnect must support RDMA at the specified speed. Inter-node latency should be less than 2 microseconds.			
	Should be compatible with OpenMPI, GPU Direct. Should provide full quoted Performance on open source software (Linux-OFED-OpenMPI)			
	Interconnect Fabric must have at least 48 Ports in total or higher			
	Switch should have provision to upgrade in future to at least 64 Ports or more by using the existing switch.			

SI.No	Description	Qty.	Compliance Yes/No	Remarks
8	Secondary Communication Network	1		
	52-port, Layer-2 Managed, Gigabit Ethernet switch			
	With required cables. 1U rack-mountable			
	Required no. Of patch cords to be supplied along with switch with adequate length.			

Sl.No.	Description	Qty.	Compliance Yes/No	Remarks
9	KVM Switch & Console	1		
	2 x 16-port KVM Switches with required cables, 1U rack-mountable and 1U Rack Console			

S.No.	Description	Qty.	Compliance Yes/No	Remarks
10	42U Rack	1		
	Standard 42U Server Rack with 600MM x 1000MM Depth with Front & Rear Perforated Door Should be supplied with standard accessories and minimum 2 PDUs of 32AMPS each.			

S.No.	Description	Qty	Compliance Yes/No	Remarks
11	Software & Installation	1		
	Components include			
	OS: Redhat Enterprise Linux with support.			
	Intel parallel studio XE latest cluster version-Academic perpetual floating license with 5 years support			
	Job Schedulers			
	GUI based Job monitoring and management			
	GUI based reporting,			
	Workload cum resource manager with policy-aware, resource-aware and topology-aware scheduling			
	Advance reservation support			
	Support of job submission through CLI, Web-services and APIs			
	Heterogeneous cluster support			
	Multi-cluster support			
	Pre-emptive and backfill scheduling support			
	Application integration support			
	Live reconfiguration capability			
	SLA/Equivalent			
	GPU Aware scheduling Intuitive web nterface to submit and monitor jobs			
	MPI:OpenMPI, MVAPICH			
	Libraries : Open Source Libraries for C, C++ & FORTRAN, MPI, MKL, Blas 1,2,3, Lapack, Scalapack etc.			
	RHEL latest to be provided for Master Node,Compute Node,Accelerator Node & PFS.			
	The vendor has to install open-source CUDA compiler and associated SDK. In addition, other freeware tools such as Tensor flow, Theano and other open source softwares/tools (if required) need to be installed.			

S.No.	Description	Qty.	Compliance Yes/No	Remarks
12	Licensed Cluster Management S/W :The cluster management stack with a GUI based cluster monitoring for all the cluster nodes.	1		
	Cluster monitoring and management software with the following features			
	Cluster manager with provisioning, monitoring and reporting capabilities			
	Support Package and Image based provisioning			
	Support Disk and disk less cluster deployment			
	Intuitive web interface to manage and customize the cluster			
	Customizing networks and compute node profiles through GUI			
	Customizing compute nodes to max, Upto changing kernel parameter			
	Able to Push configuration changes and updates to the compute nodes without re installing and rebooting			