भारतीय प्रौद्योगिकी संस्थान मद्रास चेन्नै 600 036
INDIAN INSTITUTE OF TECHNOLOGY MADRAS Chennai 600 036
भंडार एवं क्रय अनुभाग
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G. Chitrapavai
Deputy Registrar (Stores & Purchase)

Dated : 24.12.2018

Tender No. IITM/SPS /CC/HPCE Cluster/008/2018-19

Dear Sirs,

On behalf of the Indian Institute of Technology Madras, Tenders are invited for the supply and installation of

"HPCE Cluster "

confirming to the specifications enclosed.

Tender Documents may be downloaded from Central Public Procurement Portal **https://etenders.gov.in/eprocure/app**Aspiring Bidders who have not enrolled / registered in eprocurement should enroll / register before participating through the website https://etenders.gov.in/eprocure/app. The portal enrolment is free of cost. Bidders are advised to go through instructions provided at "Help for contractors". [Special Instructions to the Contractors/Bidders for the e-submission of the bids online through this eProcurement Portal"].

Tenderers can access tender documents on the website (For searching in the NIC site, kindly go to Tender Search option and type 'IIT'. Thereafter, Click on "GO" button to view all IIT Madras tenders). Select the appropriate tender and fill them with all relevant information and submit the completed tender document online on the website https://etenders.gov.in/eprocure/app as per the schedule attached.

No manual bids will be accepted. All quotation both Technical bid and Financial bid should be submitted in the E-procurement portal.

1	**LAST DATE for receipt of Tender**	**:**	**14.01.2019 before 02.00 p.m.**
	Date & Time of opening of Tender	**:**	**16.01.2019 at 03.00 p.m.**
	Pre bid meeting :	**:**	**02.01.2019 @ 03.00 pm** **Venue : Conference Room, 2nd floor, Admin Building** **If you need more clarification on this tender documents or specifications of the equipment, you are invited to attend the pre bid meeting.**
			As per the directives of Department of Expenditure, this tender document has been published on the Central Public Procurement Portal URL: https://etenders.gov.in/eprocure/app

A	**Submission of Tender**	**÷**	The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal. More information useful for submitting online bids on the CPP Portal may be obtained at: https://etenders.gov.in/eprocure/app Both Technical Bid & Price Bid should be submitted separately in online CPP portal as per the specified format only. Right is reserved to ignore any tender which fails to comply with the above instructions. **No manual bid submission is entertained.**
B	**Instructions for online bid submission**	**:**	**REGISTRATION** i. Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal URL:https://etenders.gov.in/eprocure/appby clicking on "Online Bidder Enrollment". Enrolment on the CPP Portal is free of charge. ii. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts. iii. Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal. iv. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.) v. https://etenders.gov.in/eprocure/app?component=%24DirectLink&page=DSCInfo&service=direct&session=Twith their profile. vi. Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse. vii. Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / eToken.
Guidelines, Terms and Conditions of Tender			
			i. There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID,

C	**Searching for tender documents**	**:**		organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender published on the CPP Portal. ii. Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective **"My Tender"** folder. This would enable the CPP Portal to intimate the bidders through SMS / email in case there is any corrigendum issued to the tender document. iii. The bidder should make a note of the **unique Tender ID** assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.
D	**Preparation of bids**	**:**		i. Bidder should take into account any corrigendum published on the tender document before submitting their bids. ii. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid. iii. Bidder, in advance, should prepare the bid documents to be submitted as indicated in the tender document / schedule and generally shall be in PDF / XLS formats as the case may be. Bid documents may be scanned with 100 dpi with black and white option. iv. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, GSTIN Details, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use **"My Documents"** area available to them to upload such documents. These documents may be directly submitted from the "My Documents" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process. **v. All the technical related documents need to be uploaded in Technical bids for evaluation purpose.**
E	**Submission of bids**	**:**		i. Bidder should log into the site well in advance for bid submission so that he/she upload the bid in time i.e. on or before the bid submission date and time. Bidder will be responsible for any delay due to other issues. ii. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender

			document. iii. Bidder has to select the payment option as "Off-line" to pay the EMD as applicable. The original EMD DD has to reach IIT Madras on or before the closure date and time of the tender. If the DD is not received before the closure date and time the tender will be summarily rejected. **The EMD document submitted physically to IIT Madras and the scanned copies furnished at the time of bid submission online should be the same otherwise the tender will be summarily rejected.** iv. A standard BOQ format has been provided with the tender document to be filled by all the bidders. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. Bidders are required to download the BOQ file, open it and complete the detail with their respective financial quotes and other details (such as name of the bidder).If the BOQ file is found to be modified by the bidder, the bid will be rejected. v. The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission. vi. The **Tender Inviting Authority (TIA)** will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders due to local issues. vii. The uploaded tender documents become readable only after the tender opening by the authorized bid openers. viii. Upon the successful and timely submission of bids, the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details. ix. Kindly add scanned PDF of all relevant documents in a single PDF file of compliance sheet.
F	**Assistance to bidders**	**:**	i. Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender. ii. Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk. The contact number for the helpdesk is [0120-4200462, 0120-4001002, 0120-4001005]

G	**General Instructions to the Bidders**	**:**	i. The tenders will be received online through portal https://etenders.gov.in/eprocure/app. In the Technical Bids, the bidders are required to upload all the documents in pdf format. ii. Possession of a Valid Class II/III Digital Signature Certificate (DSC) in the form of smart card/e-token in the company's name is a prerequisite for registration and participating in the bid submission activities throughhttps://etenders.gov.in/eprocure/app iii. Digital Signature Certificates can be obtained from the authorized certifying agencies, details of which are available in the web sitehttps://etenders.gov.in/eprocure/appunder the "Information about DSC".
H	**Opening of the tender**	**:**	The online bid will be opened by a committee duly constituted for this purpose. Online bids (complete in all respect) received along with scanned copy of EMD (if any) will be opened as mentioned at "Annexure: Schedule". Bid received without EMD (if present) will be rejected straight way. The technical bid will be opened online first and it will be examined by a technical committee (as per the eligibility criteria, specification and requirement). The financial offer/bid will be opened only for the offer/bid which technically meets all requirements as per the specification.
I	**Earnest Money Deposit (EMD)**	**:**	i. **EMD for Rs.50,00,000 /-has to be paid by means of DD only. The scanned copy of DD to be uploaded in the online portal and the original DD should reach us on or before the due date and time**. ii. **The original EMD DD should be sent either by REGISTERED POST ACKNOWLEDGEMENT DUE OR THROUGH MESSENGER**. If the original EMD DD is sent through Messenger, the same has to be dropped in the **TENDER BOX marked Stores & Purchase** kept for this purpose in the **REGISTRAR'S OFFICE (1st Floor of Administrative Building) on or before due date 14.01.2019 before 02.00 p.m.** iii. If it is by post (Registered Post or Speed post only) the same should reach **on or before due date 14.01.2019 before 02.00 p.m.** otherwise it will be summarily rejected even if the scanned copy of the DD is enclosed in e-bid. iv. Demand Draft may be drawn in favour of "**The Registrar, IIT Madras**" payable at Chennai. The original EMD should be sent to: **The Registrar** **INDIAN INSTITUTE OF TECHNOLOGY MADRAS** **CHENNAI-600 036** v. **5% Performance Guarantee** of the order value has to be submitted by way of DD/Bank Guarantee by the successful bidder only.

			vi. **Non submission of original EMD DD on or before the due date and time will result in rejection of the e-bid even if the proof of the DD attached in the e-bids submitted by the vendor.** vii. The EMD will be returned to all tenderer only after the tenders are finalized. In case of successful tenderer, Performance Guarantee will be retained till the installation and completion of warranty period.
J	**Marking on Technical Bid**	**:**	i. The technical specification and special condition for this tender is given in **Annexure A** under. The tenderer shall go through the specification and special conditions and submit the technical bid. ii. The Technical bid should be submitted in the proforma given as per **<u>Annexure B</u> in pdf format only through online (e-tender). No manual submission of bid is entertained. The tenderer should quote for all the 4 options.** iii. All technical bid should have the page-wise **heading as "Technical Bid" and page no.** in all pages with seal and signature of authorized signatory. The total no. of pages should be mentioned at the last page of the documents. iv. The technical bid should consist of all technical details along with catalogue/brochureand other technical, commercial terms and conditions.
K	**Marking on Price Bid**	**:**	**i.** Price bid should be submitted in the prescribed proforma **Annexure – C as per BOQ in PDF** format through e-tender only. **No manual submission of bid is entertained.** ii. Price bid should indicate item-wise price <u>for all the items</u> mentioned in the price bid. iii. Total value in the price bid should be indicated in figures & words clearly.
2	**Preparation of Tender:** a) You should quote your product as per our specification requirements by mentioning our requirements and your offer side by side and the rate should be in total as per our requirements. We will not make any calculation if you have mentioned the rates of items separately. b) The offer/bids should be submitted through online only in two bid system i.e. Technical Bid and Price Bid separately. c) The online technical bid will be first opened and evaluated. In the screening, the Vendor Eligibility Criteria and technical evaluations as per ANNEXURE – A and B will be evaluated. The Price bid of only those bidders whosevendor eligibility criteria and technical compliance are found to be adequate by the Committee will be opened.		
3	**Signing of Tender:** The Tender is liable to be rejected if complete information is not given therein or if the particulars and date (if any) asked for in the schedule to the Tender are not fully filled in or not duly signed/authenticated. Specific attention is drawn to the delivery dates and terms and conditions enclosed herewith. **Each page of the technical bid required to be signed and bears the official seal of the tenderers.**		

	If the application is made by a firm in partnership, it shall be signed (with seal)by all the partners of the firm above their full typewritten names and current addresses or alternatively by a partner holding power of attorney for the firm in which case a certified copy of the power of attorney shall accompany the application. A certified copy of the partnership deed along with current addresses of all the partners of the firm shall also accompany the application. If a limited company or a corporation makes the application, it shall be signed by a duly authorized person holding power of attorney for signing the application, in which case a certified copy of the power of attorney shall accompany the application. Such limited company or corporation may be required to furnish satisfactory evidence of its existence. The applicant shall also furnish a copy of the Memorandum of Articles of association duly attested by a Public notary.
4	**Period for which the offer will remain open:** i. Firms tendering should note the period for which it is desired that their offers should remain open for acceptance. If the firms are unable to keep their offers open for the specified period they shouldspecifically state the period for which their offers are being provided, however, the day up to which theoffer is to remain open being declared closed holiday for the Indian Institute of Technology Madras, theoffer shall remain open for acceptance till the next working day. ii. Quotations qualified by such vague and indefinite expressions such as 'subject to immediate acceptance', 'subject to prior sale' will not be considered. iii. The Tender shall remain open for acceptance/validity till:**120 days from the date of opening of the tender**
5	**Prices:** i. The prices quoted must be nett. per unit as per the technical specification mentioned in **Annexure B** and must include all Shipping, Handling, etc.. **The prices quoted by the Tenderer should be inclusive of GST and other statutory levies** (and should be clearly stated to be so) which will be paid by the Purchaser/if legally leviable at the rate ruling on the date of supply as specified in the Acceptance of Tender. **The percentage of tax etc. included in the price should be indicated in clear terms**. **If the inclusive price is not given, we will treat your offered rate as inclusive rate and comparison be made with others.** If at the time of comparison of your offer without taxes etc. is happen to be lowest, you are bound to supply as per the offered rate, i.e. without taxes etc. ii. **Concessional GST :**IIT Madras is eligible for concessional GST @ 5% on IGST and @ 2.5% for CGST and SGST as per Notification No. 45/2017 – Central Tax (Rate) Dated 14th November 2017 & Notification No.47/2017 – Integrated Tax (Rate) Dated 14th November 2017, for procurement of Equipments and Consumables for research purpose. At the time of Invoicing, please state the concessional GST accordingly. During the supply of item, a certificate to this effect will be issued to your firm. iii. **"In case of CIF/CIP shipments, kindly provide the shipment information at least 2 days in advance before landing the shipment along with the documents i.e. invoice, packing list, forwarder Name, address, contact No. in India to save penalty/demurrage charges (imposed by Indian Customs) . Otherwise these charges will be recovered from the supplier/Indian Agent."** iv. **The price should be without customs duty since IIT Madras is eligible for payment of concessional customs duty against submission of Essentiality Certificate. The customs duty will be payable / reimbursable by us at the time of clearance on production of necessary proof. Hence these duties need not be included in the price while quoting**.

	v. Discount, if any, should be indicated prominently.
6	**Agency Commission:** Agency commission if any will be paid to the Indian agent in Rupees on receipt of the equipment and after satisfactory installation and commissioning. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender even incase of Nil commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. Percentage of agency commission should be clearly mentioned in the price bid.
7	**Payment: No Advance Payment will be made for Indigenous purchase.** Payment will be made only after supply and satisfactory installation and also technical clearance from Computer Centre, IITM.The vendor must supply soft copy & Hardcopy of wiring diagram after completion of the work. **Import Payment:** Normally for more than USD 2001, payment will be made by Letter of Credit only. 90% payment will be made initially by Letter of Credit and balance 10% will be paid only after satisfactory installation and commissioning on the same LC. **Demurrage charges (if any) will be deducted from the balance 10%**. Initial opening of Letter of Credit charges will be borne by us. If any amendment is requested for, the charges for the amendment will be borne by the supplier only. Hence, care should be taken in all respects before opening of Letter of Credit.
8	**Terms and conditions :** Failure to comply with any of the instructions stated in this document or offering unsatisfactory explanations for non compliance will likely to lead to rejection of offers.
9	**Right of Acceptance:** IIT MADRAS reserves the right to reject the whole or any part of the Tender without assigning any reason or to accept them in part or full.The institute reserves the right to choose any one of the options from the specifications given.
10	**Communication of Acceptance:** Acceptance by the Purchaser will be communicated by Post, if required, and the Company's acceptance communicated to us formally in writing.
11	**Warranty : Entire HPC solution including each software, firmware and hardware component should have atleast 5 years warranty from the HPC solution provider from the date of acceptance.**
12	Delivery period will be as per the clause 5 of special condition given in Annexure A. **Non delivery of items** will lead to cancellation of Purchase Order without any notice. In addition, action may be taken for removing them from our mailing list.
13	In terms of Rule 173 (iv) of General Financial Rules, 2017 the bidder shall be at liberty to question the bidding conditions, bidding process and/or rejection of its bid.
14	**Conditions of contract and Deviations:** Tenderer should quote as per the terms and conditions referred to in the tender documents. In case these terms and conditions are not acceptable to the tenderer, he should specifically state the deviation(s) as a separate document.
15	**Transit Insurance:** The Purchaser will not pay separately for Transit Insurance.
16	**Tenderer shall submit along with his Tender:** Name and full address of the Banker and their swift code and PAN No. and GSTIN number.
17	**Guarantee:** The tenderer has to declare that the goods sold to the buyer under this contract shall be of the best quality and workmanship and shall be strictly in accordance with the specifications. Tenderer should indicate the period for which the said goods/articles would continue to confirm to the specifications.
18	**Jurisdiction:** All questions, disputes, or differences arising under, out of or in connection with the contract, if concluded, shall be subject to the exclusive jurisdiction at the place from which the acceptance of

	Tender is issued.
19	**Force Majeure:** The Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure. • For purposes of this Clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not limited to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes. • If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by theForce Majeure event.
20	**Risk Purchase Clause:** In event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from the other source on the total risk of the supplier under risk purchase clause
21	**<u>For Technical Related Queries Contact :</u>** **Ms.P. Gayathri** **HPCE Service** **Computer Centre** **IIT Madras** **Chennai - 600 036.** **Phone No: 044- 2257 5983**

Yours Faithfully
-sd/-
Deputy Registrar
(Stores & Purchase Section)

ACKNOWLEDGEMENT

It is hereby acknowledged that I/We have gone through all the points listed under "Specification, Guidelines, Terms and Conditions" of tender document. I/We totally understand the terms and conditions and agree to abide by the same.

SIGNATURE OF TENDERER ALONG WITH SEAL OF THE COMPANY WITH DATE

DECLARATION

I/We/ M/s. _____ hereby declare that we have the required Certificate issued by OEM and I/We/M/s. _____ _____ have office at Chennai with experts / specialists to handle Installation, Configuration and solving all types of issues in time.

SIGNATURE OF TENDERER ALONG WITH
SEAL OF THE COMPANY WITH DATE

ANNEXURE - A

TECHNICAL SPECIFICATION - HPCE CLUSTER

I.VENDOR ELIGIBILITY CRITERIA:

Vendors should have significant experience in building large clusters measured by:

1. Vendor must have presence in Top 500 supercomputers listed at top500.org. (necessary proof of document to be enclosed with tender)
2. Vendors must have presence for at least 10 years in this business. (proof of selling high performance computing facilities for past 10 years should be attached)
3. Vendor must have installed at least 5 X 200 TF system (CPU only) in India with at least 200 TB of parallel file system. Order copy and work completion certificate from the client should be attached.
4. Only OEMs should quote. If an OEM aligns with a business partner, then it should be one business partner per OEM (Authorisation letter from OEM should be submitted in this regard)

II. Technical Requirement/Specification:

For the HPC facility at IIT Madras, this section lists the system configuration and the technical specifications. CPU performance is 500 / 600 / 700 / 800 TF and GPU performance is fixed at 200 TF. Vendors will quote for them using a two bid format to verify meeting of technical specifications.

Comparing Technical Bid :

The total performance of the CPU cluster is measured based on the application performance using linpack and gromacs.

Table 1: Application Performance

Application	Performance metric	Dataset	Contribution to Performance
Linpack	TFlops (double-precision)	Standard	70%
Gromacs	ns/day (treated as 1 TFlop for each ns/day)	Testcase B at www.prace-ri.eu/ueabs/#GROMACS	30%

The application performance $\mathbf{P_{app}}$ (in TFlops or ns/day) is as specified in Table 1. Performance comparison formula: $\mathbf{P_{CPU} = 0.7*P_{linpack} + 0.3*P_{gromacs}}$

$\mathbf{P_{CPU}}$ is the total performance of the cluster. Note that this performance is only for the CPU cluster, and not of the CPU-GPU cluster (mentioned below). However, the cost must include all the components of the whole system. Each vendor should specify the details of the configuration using the table below.

Table 2: Bidding Summary

$P_{linpack}$	$P_{gromacs}$	P_{CPU}	P_{GPU}	#CPUnodes	# Racks	Power consumed at 100% load
		500TF	**200TF**	**...**	**...**	**...**
		600TF	**200TF**	**...**	**...**	**...**
		700TF	**200TF**	**...**	**...**	**...**
		800TF	**200TF**	**...**	**...**	**...**

The system quoted for must include all items required in the specifications of the tender. These include, but are not limited to:

a. AC Chilling system with capacity to cool the system upto 125% of its nominal sizing. The Total Electricity power consumed should be computed for 100% load (not 125%).
b. Racks with forced cooling from the AC system
c. 500 / 600 / 700 / 800 TF (defined by $\mathbf{P_{CPU}}$ above) of CPU nodes as specified in the technical specification Table 3 to meet the performance specifications.
d. 200 TF of GPU nodes as specified in Table 3 (vendor should quote for PCI-e and optionally can quote for NVLink)
e. 1 petabyte of storage as specified in Table 3.
f. Racks to host the system with sufficient space to host upto 25% additional CPU.
g. 4 lines of electricity with redundant 200 KVA (160 KVA usable) is supplied by IITM to the server room. If extra power is required for the solution, then the additional cost of 25 Lakhs for additional UPS (200 KVA) will be added by IITM to the system cost.
h. The AC Chilling unit has to be wired and the complete setup has to be taken care of by the tenderer. The overall system cost must specify USD and INR components (e.g., equipment versus installation costs). List those separately for each option (each row in Table 2 as shown).
    i. 2. The cost must include installation of AC chiller and pipes to the racks as well
    ii. AC capacity should be 125% of the calculated load.
    iii. The final cost should include any and all additional items required to make the system functional, pass the tests and function normally. IIT Madras will not pay any additional amount to the vendor for the supply and installation of this system.

Table 3

S. No.	Item	Technical Specification
1	CPU-only compute nodes	- 500/600/700/800 TFlops of compute power in double precision - clock at least 32 instructions per core per cycle - at least 16 cores per socket with 2.4GHz or more - At least 192 GB DDR4 RAM for main memory in a balanced configuration per node with 2666 MHz - At least two processors per node - At least 2 TB 15K RPM SAS Hard disk per node - One free PCI-e slot for future expansion - Rack mountable with suitable mounting kit - Redundant power supplies for all nodes - Service level: Next business day
2	CPU-GPU compute nodes	- 200 TFlops of compute power in double precision; Two GPUs per node - NVIDIA Tesla V100 32 GB cards with at least 16 GB main memory - CPU: x86-64 architecture, at least 2.4 GHz clock - at least 32 instructions per core per cycle, at least 16 cores per socket - At least 192 GB main memory in a balanced configuration per node with 2666 MHz or more. - At least 2 TB SAS 15K RPM Hard disk per node - Redundant power supplies - Rack mountable with suitable mounting kit - Service level: Next business day - Vendor should quote for PCI-e and NVLink separately, if applicable
3	Total compute power	- $\mathbf{P_{CPU}}$+200 TFlops of GPU installation; **- The overall system must support expansion to 25% more CPU compute power.** - For additional expansion in future, the vendor must offer at the bid price or below
4	Service nodes (Master, login, I/O, etc.)	- x86-64 architecture, at least 2.4 GHz At least 192 GB main memory in a balanced configuration - At least 2 TB SAS 15K RPM Hard disk per node - Number of nodes required for the optimal parallel file system with redundancy - Rack mountable with suitable mounting kit - Service level: 24x7

5	Storage	- Total at least 1 PB (licensed storage) of usable file system - At least RAID 6 across 1 PB - It would be split as 60% of scratch area using parallel file system and 40% of home storage using parallel file system, both available in all nodes with an I/O bandwidth of 25 GBPS - The PFS throughput must be demonstrated with the help of IOR tool at the time of technical evaluation, with 1 MB I/O block size - Backup up of 40% of home with a NAS Storage of 200TB; with Necessary auto backup/restore control - PFS Proposed should be completely supported software by the vendor, with upgrades and training whenever needed.
6	Interconnect	- At least 100 Gbps per port bandwidth. Adequate redundancy to avoid single-point failure in the interconnect should be provided. All switches should have redundant power supplies
7	Power	As required for the solution above, the vendor is expected to visit the site to understand the existing infrastructure.
8	Cooling	As required for the solution above using chilled water or air;The cooling should be for 125% of the calculated load; The vendor is expected to visit the site to understand the existing infrastructure
9	Operating system/ Cluster Manage-ment	Licensed OS(64-bit Linux or Unix variant) and licensed cluster management/monitoring software should be fully supported (by the OEM), with updates during warranty period. Cluster management software should be licensed without the limits on the number of nodes.
10	Compilers, libraries and tools	Support for the complete software suite including all the software currently supported on the Virgo cluster at IITM (Abaqus, Comsol, Mathematica, Gaussian, Nastran, Dytran, Marc, Ansys/fluent, Namd, Lammps, Gromacs, Amber, Accelerys, Matlab.) along with various compilers (such as GNU GCC collection, intel, java compiler ..). Vendor must supply 10 Licenses of Intel Parallel Cluster Studio which should be valid for the entire warranty period (5 years).
11	System administration	All HPC components should be administered from a single management console. There should be a redundant console and if one fails the other should come up automatically.
12	Software reliability	Software failover for critical system services including system database, system logger and batch file systems, parallel file systems;

13	Hardware reliability	- Redundant paths for all system RAID - Redundant power supplies and voltage regulator modules
14	Job management	- Licensed and commercial-grade or open-source HPC workload and resource management with support for the entire lifetime of the cluster. - Accounting capability to summarize the total CPU usage of a user in a specific period.
15	Safety level	International standard safety level

III. SPECIAL TERMS AND CONDITION:

1. Options:

i. Options are listed with variation in performance numbers.

ii. All vendors are required to bid for all the options failing which the bids submitted will be totally rejected.

iii. IITM reserves all rights to choose any one of the options from the specifications given above (700TF /800TF / 900TF / 1PF).

iv. The orders will be placed only for one option and decision on the option to be picked up will be made during the final comparison of financial bids.

Option	CPU Performance	GPU Performance	Total Performance
A	500 TF	200 TF	700 TF
B	600 TF	200 TF	800 TF
C	700 TF	200 TF	900 TF
D	800 TF	200 TF	1000 TF

2. **Price:**

i. Separate quotations should be provided for each of the cluster configurations options specified above. Each configuration option quoted must meet all the specifications given for that configuration.

ii. The L1 will be the sum of Total Electricity cost for 5 years and the Total system cost. The total system cost should be quoted by subtracting the buy-back value of the Virgo cluster. The detail of existing virgo cluster is given **Annexure – D.**

iii. The power consumed at full load must agree with the number quoted in the Table 2 mentioned in the technical bid. If the power exceeds the quoted value, the excess power for five years will be a penalty imposed on the tenderer.

iv. Current computing infrastructure has a fixed space and the new system that you bid for must fit into the available space. The total cost to IIT Madras to increase power and cooling will be taken into account when comparing bids as described above.

v. The prices quoted must be nett that should include all shipping, handling etc. The prices quoted by the tenderer should be inclusive of GST and other staturory levies etc (and should be clearly stated to be so). The percentage of tax etc included in the price should be indicated in clear terms. If the inclusive price is not given, we will treat your offered rate as inclusive rate and comparison be made with others. USD-to-INR exchange rate would be used as the one on the opening date of the financial bid. The cost must include installation of AC chiller and pipes to the racks as well.

vi. Total electricity cost must include the power consumption due to AC also.

vii. The total cost to IIT Madras to provide power and cooling for five years will be taken into account when comparing bids. The quote must mention the electricity bill for the whole system running at 100% load for five years according to Tamil Nadu Electricity Board (INR 6.35 per unit).

3. Software reliability: Software failover for critical system services including system database, system logger and batch file systems, parallel file systems

4. Safety level: International standard safety level

5. Delivery, Installation and Acceptance.

i. Delivery time for the cluster from the date of issue of the LC should be indicated by the vendor.

ii. All racks should be 42U or smaller. It is the responsibility of the vendor to unload the machine and position the machine in the data center.

iii. The cluster must be factory integrated and brought to IIT Madras.

iv. Installation of the factory-integrated hardware, OS, software components must be done by trained engineers from the solution provider. The solution should be validated and certified by the provider.

v. All the existing software in Virgo cluster should be successfully migrated to the new cluster.

vi. After deployment, the same codes must be run on the new cluster in the presence of IIT Madras representatives and the benchmark data must meet or exceed the expectations as projected in the technical bid. If the performance is not met, the vendor must add more compute nodes to achieve the specified performance without any extra cost to IIT Madras. After installation and the above tests, end users from IIT Madras will check the software which they use, within a period of 14 working days. The power consumed at full load must

agree with the quoted in the Table 2 mentioned in the technical specification. If the power exceeds the quoted value, the excess power for five years will be an imposed as penalty on the tenderer.

vii. All these software must be demonstrated as working on the new cluster.

viii. Training for general system administration with adequate documentation should be provided by the system provider.

ix. Upto 30days non-stop acceptance test with availability equal or greater than 99% has to be achieved on the delivered system. If the availability drops below 99% during the acceptance, supplier will have to submit an official report and rectify the fault. After the fault-rectification, the system would be accepted only after 30 more days of acceptance test as above. An engineer should be available "onsite basis" the first six months of installation at IIT Madras on all the working days. The entire system must be installed within 90 days of opening of LC. This includes the preparation of the site and the cooling system. IIT will be responsible to remove all existing systems from the room, except for the Virgo cluster, which will be required to transfer existing data to the new system. Acceptance must happen within 40 days of installation. Any delay beyond this will result in a penalty equal to 1% of the total purchase cost per month upto a maximum of 5%.

x. The OEM should install the entire system (Hardware, Software and the firmware) and **maintain** the entire system.

Timeline for Delivery, Installation and Acceptance

Day	Progress
0	IIT Madras opens LC
30	System shipped to IIT Madras
90	Cluster is installed in the HPCE area of the Computer Center of IIT Madras; benchmarking checks begin; end-user checks begin
104	Benchmarking approved; end-user acceptance test passed; non-stop acceptance test begins
134	Non-stop acceptance test passed; warranty period begins

6.**Reliability and server health care :**Compute nodes should be hot swappable or have built-in standby nodes of the same configuration; tools to monitor the physical state (such as power and temperature) of each node, allowing each node to be turned on and off remotely, monitor and administer file system, simultaneously install a software package on all the nodes.

7.Warranty:

Entire HPC solution including each software, firmware and hardware component should have atleast 5 years warranty from the HPC solution provider, from the date of acceptance.

During warranty period the vendors will attend to any complaint such that the cluster is restored to operational condition within 24 hours and the full performance is restored within 72 hours.

If the cluster fail for longer than the allowed time, **the warranty period will be extended** by such excess time without any additional financial burden to IIT Madras.

The vendor will maintain the infrastructure facility for the 5 years of warranty period (24x7 on call support from maintenance personnel to be provided)

8.Support: Submit the specifics of your 24x7 support in terms of response and resolution time for various types of problems in the HPC cluster.

9.**Documentation :** User creation, deletion, modification; user usage accounting: storage and compute; Scheduling and load balancing Switching on, starting up and shutting down the cluster; Disk, health status monitoring of Master / IO nodes and storage; Basic troubleshooting for storage and job scheduler; Step-by-step installation guide for node configuration; any other document / manual for daily administration should be provided

10.Total power consumption, electrical requirements and air conditioning requirement of the cluster should be specified by the tenderer.

11. The space currently available should be utilized for the erection of the HPCE and we will not provide additional space for the installation of this new equipment which is proposed to be purchased.

12. Site inspection for the tenderer is scheduled on **31.12.2018 and 01.01.2019**. It is compulsory for the tenderer to visit the site to understand the available resources and requirements.

13.**Buyback:**The detail of existing virgo cluster is given **Annexure – D**. The vendors must subtract the price for the buyback of the existing HPC cluster at IIT Madras while quoting in the price bid. The cluster is to be removed from IIT Madras after commissioning of the new cluster and it is vendor responsibility to disconnect and move the machine from the data center as well as from the IIT Madras.

ANNEXURE –B

TECHNICAL BID SUBMISSION FORMAT

TECHNICAL BID COMPLIANCE STATEMENT – VENDOR ELIGIBILITY CRITERIA				
S. No.	**Description**	**Comply Yes/ No.**	**Page No. of the document**	**Remarks**
1	Vendor must have presence in Top 500 supercomputers listed at top500.org. (necessary proof of document to be enclosed with tender)			
2	Vendors must have presence for at least 10 years in this business. (proof of selling high performance computing facilities for past 10 years should be attached)			
3	Vendor must have installed at least 5 X 200 TF system (CPU only) in India with at least 200 TB of parallel file system. Order copy and work completion certificate from the client should be attached.			
4	Only OEMs should quote. If an OEM aligns with a business partner, then it should be one business partner per OEM (Authorisation letter from OEM should be submitted in this regard)			

OPTION 1: 700 TFlops

S. No	Item	Specification	Comply (Yes/ No)	Pg No of the Proof of Document
1	CPU-only compute nodes	- 500 TFlops of compute power in double precision - clock at least 32 instructions per core per cycle - at least 16 cores per socket with 2.4GHz or more - At least 192 GB DDR4 RAM for main memory in a balanced configuration per node with 2666 MHz - At least two processors per node - At least 2 TB 15K RPM SAS Hard disk per node - One free PCI-e slot for future expansion - Rack mountable with suitable mounting kit - Redundant power supplies for all nodes - Service level: Next business day		
2	CPU-GPU compute nodes	- 200 TFlops of compute power in double precision; Two GPUs per node - NVIDIA Tesla V100 32 GB cards with at least 16 GB main memory - CPU: x86-64 architecture, at least 2.4 GHz clock - at least 32 instructions per core per cycle, at least 16 cores per socket - At least 192 GB main memory in a balanced configuration per node with 2666 MHz or more. - At least 2 TB SAS 15K RPM Hard disk per node - Redundant power supplies - Rack mountable with suitable mounting kit - Service level: Next business day - Vendor should quote for PCI-e and NVLink separately, if applicable		
3	Total compute power	- $\mathbf{P_{CPU}}$+200 TFlops of GPU installation; **- The overall system must support expansion to 25% more CPU compute power.** - For additional expansion in future, the vendor must offer at the bid price or below		
4	Service nodes (Master, login, I/O, etc.)	- x86-64 architecture, at least 2.4 GHz At least 192 GB main memory in a balanced configuration - At least 2 TB SAS 15K RPM Hard disk per node - Number of nodes required for the optimal parallel file system with redundancy - Rack mountable with suitable mounting kit - Service level: 24x7		

5	Storage	- Total at least 1 PB (licensed storage) of usable file system - At least RAID 6 across 1 PB - It would be split as 60% of scratch area using parallel file system and 40% of home storage using parallel file system, both available in all nodes with an I/O bandwidth of 25 GBPS - The PFS throughput must be demonstrated with the help of IOR tool at the time of technical evaluation, with 1 MB I/O block size - Backup up of 40% of home with a NAS Storage of 200TB; with Necessary auto backup/restore control - PFS Proposed should be completely supported software by the vendor, with upgrades and training whenever needed.		
6	Interconnect	- At least 100 Gbps per port bandwidth. Adequate redundancy to avoid single-point failure in the interconnect should be provided. All switches should have redundant power supplies		
7	Power	As required for the solution above, the vendor is expected to visit the site to understand the existing infrastructure.		
8	Cooling	As required for the solution above using chilled water or air;The cooling should be for 125% of the calculated load; The vendor is expected to visit the site to understand the existing infrastructure		
9	Operating system/ Cluster Manage-ment	Licensed OS(64-bit Linux or Unix variant) and licensed cluster management/monitoring software should be fully supported (by the OEM), with updates during warranty period.Cluster management software should be licensed without the limits on the number of nodes.		
10	Compilers, libraries and tools	Complete software suite including all the software currently supported on the Virgo cluster at IITM (Abaqus, Comsol, Mathematica, Gaussian, Nastran, Dytran, Marc, Ansys/fluent, Namd, Lammps, Gromacs, Amber, Accelerys, Matlab.) along with various compilers (such as GNU GCC collection, intel, java compiler ..). 10 Licenses of Intel Parallel Cluster Studio should be valid for the entire warranty period (5 years).		
11	System administration	All HPC components should be administered from a single management console. There should be a redundant console and if one fails the other should come up automatically.		
12	Software reliability	Software failover for critical system services including system database, system logger and batch file systems, parallel file systems;		
13	Hardware reliability	- Redundant paths for all system RAID - Redundant power supplies and voltage regulator modules		

14	Job management	- Licensed and commercial-grade or open-source HPC workload and resource management with support for the entire lifetime of the cluster. - Accounting capability to summarize the total CPU usage of a user in a specific period.		
15	Safety level	International standard safety level		

OPTION 2: 800 TFlops

S. No	Item	Specification	Comply (Yes/ No)	Pg No of the Proof of Document
1	CPU-only compute nodes	- 600 TFlops of compute power in double precision - clock at least 32 instructions per core per cycle - at least 16 cores per socket with 2.4GHz or more - At least 192 GB DDR4 RAM for main memory in a balanced configuration per node with 2666 MHz - At least two processors per node - At least 2 TB 15K RPM SAS Hard disk per node - One free PCI-e slot for future expansion - Rack mountable with suitable mounting kit - Redundant power supplies for all nodes - Service level: Next business day		
2	CPU-GPU compute nodes	- 200 TFlops of compute power in double precision; Two GPUs per node - NVIDIA Tesla V100 32 GB cards with at least 16 GB main memory - CPU: x86-64 architecture, at least 2.4 GHz clock - at least 32 instructions per core per cycle, at least 16 cores per socket - At least 192 GB main memory in a balanced configuration per node with 2666 MHz or more. - At least 2 TB SAS 15K RPM Hard disk per node - Redundant power supplies - Rack mountable with suitable mounting kit - Service level: Next business day - Vendor should quote for PCI-e and NVLink separately, if applicable		
3	Total compute power	- $\mathbf{P_{CPU}}$+200 TFlops of GPU installation; **- The overall system must support expansion to 25% more CPU compute power.** - For additional expansion in future, the vendor must offer at the bid price or below		

4	Service nodes (Master, login, I/O, etc.)	- x86-64 architecture, at least 2.4 GHz At least 192 GB main memory in a balanced configuration - At least 2 TB SAS 15K RPM Hard disk per node - Number of nodes required for the optimal parallel file system with redundancy - Rack mountable with suitable mounting kit - Service level: 24x7		
5	Storage	- Total at least 1 PB (licensed storage) of usable file system - At least RAID 6 across 1 PB - It would be split as 60% of scratch area using parallel file system and 40% of home storage using parallel file system, both available in all nodes with an I/O bandwidth of 25 GBPS - The PFS throughput must be demonstrated with the help of IOR tool at the time of technical evaluation, with 1 MB I/O block size - Backup up of 40% of home with a NAS Storage of 200TB; with Necessary auto backup/restore control - PFS Proposed should be completely supported software by the vendor, with upgrades and training whenever needed.		
6	Interconnect	- At least 100 Gbps per port bandwidth. Adequate redundancy to avoid single-point failure in the interconnect should be provided. All switches should have redundant power supplies		
7	Power	As required for the solution above, the vendor is expected to visit the site to understand the existing infrastructure.		
8	Cooling	As required for the solution above using chilled water or air;The cooling should be for 125% of the calculated load; The vendor is expected to visit the site to understand the existing infrastructure		
9	Operating system/ Cluster Manage-ment	Licensed OS(64-bit Linux or Unix variant) and licensed cluster management/monitoring software should be fully supported (by the OEM), with updates during warranty period.Cluster management software should be licensed without the limits on the number of nodes.		
10	Compilers, libraries and tools	Complete software suite including all the software currently supported on the Virgo cluster at IITM (Abaqus, Comsol, Mathematica, Gaussian, Nastran, Dytran, Marc, Ansys/fluent, Namd, Lammps, Gromacs, Amber, Accelerys, Matlab.) along with various compilers (such as GNU GCC collection, intel, java compiler ..). 10 Licenses of Intel Parallel Cluster Studio should be valid for the entire warranty period (5 years).		
11	System administration	All HPC components should be administered from a single management console. There should be a redundant console and if one fails the other should come up automatically.		

12	Software reliability	Software failover for critical system services including system database, system logger and batch file systems, parallel file systems;		
13	Hardware reliability	- Redundant paths for all system RAID - Redundant power supplies and voltage regulator modules		
14	Job management	- Licensed and commercial-grade or open-source HPC workload and resource management with support for the entire lifetime of the cluster. - Accounting capability to summarize the total CPU usage of a user in a specific period.		
15	Safety level	International standard safety level		

OPTION 3: 900 TFlops

S. No	Item	Specification	Comply (Yes/ No)	Pg No of the Proof of Document
1	CPU-only compute nodes	- 700 TFlops of compute power in double precision - clock at least 32 instructions per core per cycle - at least 16 cores per socket with 2.4GHz or more - At least 192 GB DDR4 RAM for main memory in a balanced configuration per node with 2666 MHz - At least two processors per node - At least 2 TB 15K RPM SAS Hard disk per node - One free PCI-e slot for future expansion - Rack mountable with suitable mounting kit - Redundant power supplies for all nodes - Service level: Next business day		
2	CPU-GPU compute nodes	- 200 TFlops of compute power in double precision; Two GPUs per node - NVIDIA Tesla V100 32 GB cards with at least 16 GB main memory - CPU: x86-64 architecture, at least 2.4 GHz clock - at least 32 instructions per core per cycle, at least 16 cores per socket - At least 192 GB main memory in a balanced configuration per node with 2666 MHz or more. - At least 2 TB SAS 15K RPM Hard disk per node - Redundant power supplies - Rack mountable with suitable mounting kit - Service level: Next business day - Vendor should quote for PCI-e and NVLink separately, if applicable		

3	Total compute power	- P_{CPU}+200 TFlops of GPU installation; **- The overall system must support expansion to 25% more CPU compute power.** - For additional expansion in future, the vendor must offer at the bid price or below		
4	Service nodes (Master, login, I/O, etc.)	- x86-64 architecture, at least 2.4 GHz At least 192 GB main memory in a balanced configuration - At least 2 TB SAS 15K RPM Hard disk per node - Number of nodes required for the optimal parallel file system with redundancy - Rack mountable with suitable mounting kit - Service level: 24x7		
5	Storage	- Total at least 1 PB (licensed storage) of usable file system - At least RAID 6 across 1 PB - It would be split as 60% of scratch area using parallel file system and 40% of home storage using parallel file system, both available in all nodes with an I/O bandwidth of 25 GBPS - The PFS throughput must be demonstrated with the help of IOR tool at the time of technical evaluation, with 1 MB I/O block size - Backup up of 40% of home with a NAS Storage of 200TB; with Necessary auto backup/restore control - PFS Proposed should be completely supported software by the vendor, with upgrades and training whenever needed.		
6	Interconnect	- At least 100 Gbps per port bandwidth. Adequate redundancy to avoid single-point failure in the interconnect should be provided. All switches should have redundant power supplies		
7	Power	As required for the solution above, the vendor is expected to visit the site to understand the existing infrastructure.		
8	Cooling	As required for the solution above using chilled water or air;The cooling should be for 125% of the calculated load; The vendor is expected to visit the site to understand the existing infrastructure		
9	Operating system/ Cluster Manage-ment	Licensed OS(64-bit Linux or Unix variant) and licensed cluster management/monitoring software should be fully supported (by the OEM), with updates during warranty period.Cluster management software should be licensed without the limits on the number of nodes.		
10	Compilers, libraries and tools	Complete software suite including all the software currently supported on the Virgo cluster at IITM (Abaqus, Comsol, Mathematica, Gaussian, Nastran, Dytran, Marc, Ansys/fluent, Namd, Lammps, Gromacs, Amber, Accelerys, Matlab.) along with various compilers (such as GNU GCC collection, intel, java compiler ..). 10 Licenses of Intel Parallel Cluster Studio should be valid for the entire warranty period (5 years).		

11	System administration	All HPC components should be administered from a single management console. There should be a redundant console and if one fails the other should come up automatically.		
12	Software reliability	Software failover for critical system services including system database, system logger and batch file systems, parallel file systems;		
13	Hardware reliability	- Redundant paths for all system RAID - Redundant power supplies and voltage regulator modules		
14	Job management	- Licensed and commercial-grade or open-source HPC workload and resource management with support for the entire lifetime of the cluster. - Accounting capability to summarize the total CPU usage of a user in a specific period.		
15	Safety level	International standard safety level		

OPTION 4: 1000 TFlops

S. No	Item	Specification	Comply (Yes/ No)	Pg No of the Proof of Document
1	CPU-only compute nodes	- 800 TFlops of compute power in double precision - clock at least 32 instructions per core per cycle - at least 16 cores per socket with 2.4GHz or more - At least 192 GB DDR4 RAM for main memory in a balanced configuration per node with 2666 MHz - At least two processors per node - At least 2 TB 15K RPM SAS Hard disk per node - One free PCI-e slot for future expansion - Rack mountable with suitable mounting kit - Redundant power supplies for all nodes - Service level: Next business day		
2	CPU-GPU compute nodes	- 200 TFlops of compute power in double precision; Two GPUs per node - NVIDIA Tesla V100 32 GB cards with at least 16 GB main memory - CPU: x86-64 architecture, at least 2.4 GHz clock - at least 32 instructions per core per cycle, at least 16 cores per socket - At least 192 GB main memory in a balanced configuration per node with 2666 MHz or more. - At least 2 TB SAS 15K RPM Hard disk per node - Redundant power supplies - Rack mountable with suitable mounting kit - Service level: Next business day - Vendor should quote for PCI-e and NVLink separately, if applicable		

3	Total compute power	- P_{CPU}+200 TFlops of GPU installation; **- The overall system must support expansion to 25% more CPU compute power.** - For additional expansion in future, the vendor must offer at the bid price or below		
4	Service nodes (Master, login, I/O, etc.)	- x86-64 architecture, at least 2.4 GHz At least 192 GB main memory in a balanced configuration - At least 2 TB SAS 15K RPM Hard disk per node - Number of nodes required for the optimal parallel file system with redundancy - Rack mountable with suitable mounting kit - Service level: 24x7		
5	Storage	- Total at least 1 PB (licensed storage) of usable file system - At least RAID 6 across 1 PB - It would be split as 60% of scratch area using parallel file system and 40% of home storage using parallel file system, both available in all nodes with an I/O bandwidth of 25 GBPS - The PFS throughput must be demonstrated with the help of IOR tool at the time of technical evaluation, with 1 MB I/O block size - Backup up of 40% of home with a NAS Storage of 200TB; with Necessary auto backup/restore control - PFS Proposed should be completely supported software by the vendor, with upgrades and training whenever needed.		
6	Interconnect	- At least 100 Gbps per port bandwidth. Adequate redundancy to avoid single-point failure in the interconnect should be provided. All switches should have redundant power supplies		
7	Power	As required for the solution above, the vendor is expected to visit the site to understand the existing infrastructure.		
8	Cooling	As required for the solution above using chilled water or air;The cooling should be for 125% of the calculated load; The vendor is expected to visit the site to understand the existing infrastructure		
9	Operating system/ Cluster Manage-ment	Licensed OS(64-bit Linux or Unix variant) and licensed cluster management/monitoring software should be fully supported (by the OEM), with updates during warranty period.Cluster management software should be licensed without the limits on the number of nodes.		
10	Compilers, libraries and tools	Complete software suite including all the software currently supported on the Virgo cluster at IITM (Abaqus, Comsol, Mathematica, Gaussian, Nastran, Dytran, Marc, Ansys/fluent, Namd, Lammps, Gromacs, Amber, Accelerys, Matlab.) along with various compilers (such as GNU GCC collection, intel, java compiler ..). 10 Licenses of Intel Parallel Cluster Studio should be valid for the entire warranty period (5 years).		

11	System administration	All HPC components should be administered from a single management console. There should be a redundant console and if one fails the other should come up automatically.		
12	Software reliability	Software failover for critical system services including system database, system logger and batch file systems, parallel file systems;		
13	Hardware reliability	- Redundant paths for all system RAID - Redundant power supplies and voltage regulator modules		
14	Job management	- Licensed and commercial-grade or open-source HPC workload and resource management with support for the entire lifetime of the cluster. - Accounting capability to summarize the total CPU usage of a user in a specific period.		
15	Safety level	International standard safety level		

SIGNATURE OF TENDERER ALONG WITH
SEAL OF THE COMPANY WITH DATE

ANNEXURE –C

BOQ -PRICE BID FORMAT

Tender No.	**IITM/SPS /CC/HPCE Cluster/008/2018-19**
Name of the item	**HPCE Cluster**
Name of the Bidder	

S. No.	Description	Technical Description	Qty In Nos.	USD	INR
1	Compute nodes with CPU				
2	Compute nodes with CPU and GPU				
3	NVIDIA Teslav100 32GB cards with 16GB Main Memory				
4	Master nodes				
5	Login Node				
6	Storage nodes				
7	1PB usable parallel file system				
8	200 TB NAS Storage				
9	Switches				
10	Rack				
11	Cooling – Tower Cooling System				
12	All the necessary software (including licensed Linux OS, scheduler, Cluster Management Software) PFS Software				
13	Intel Parallel Cluster Studio License 10 Nos				
14	Implementation/ Installation Charges for the above cluster solution				
15	Power Consumption at 100 % load				
16	Additional Item (if needed)				
17	Buy Back Rate				
		Total Amount			
Total in words :					
Incoterms:					
Percentage of Agency Commission if any to be specifically stated:					

Note :

i. Any items other than specifically mentioned above that are required to make the cluster fully functional are to be mentioned in the bid and the total price must include the same.

ii. IIT Madras will not pay any additional amount under any condition.

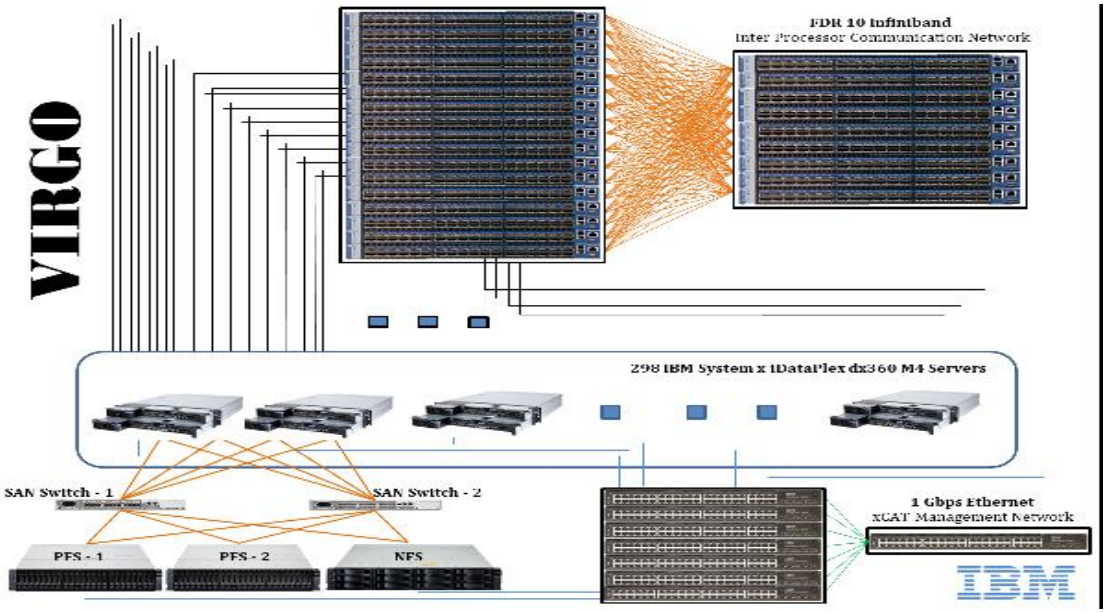
SIGNATURE OF TENDERER ALONG WITHSEAL OF THE COMPANY WITH DATE

ANNEXURE D

BUY BACK DETAILS

EXISTING CLUSTER'S SPECIFICATIONS:

The configuration of the existing HPC clusters at IIT Madras is given below. For more details about this configuration visit P. G. Senapathy center for computing resources at IIT Madras. Venders must mention the buyback price for this configuration and also guarantee that the clusters will be removed out of IIT Madras on successful installation of the new one.



System Configuration

- 292 Compute Nodes
- 2 Master Nodes
- 4 Storage Nodes
- Total Compute Power 97 TFlops
- IBM System x iDataPlex dx360 M4 Highly Optimized Servers for HPC
- Populated with 2 X Intel E5-2670 8 C 2.6 GHz Processor
- 64 GB RAM per node with 8X8 GB 1600 MHz DIMM connected in a fully balanced mode.
- Low powered Mezzanine Adapter for FDR10 Infiniband based Inter processor communication.

Storage Configuration

- 2 Storage Subsystem for PFS and 1 Storage Subsystem for NAS.
- Fine Tuned Redundant SAN Switch
- IBM DS3500 Series of Storage System
- Total PFS Capacity 160 TB
- Total NFS Capacity 50 TB

SCHEDULE

Name of Organization	Indian Institute of Technology Madras
Tender Type (Open/Limited/EOI/Auction/Single)	OPEN
Tender Category (Services/Goods/works)	Goods/Services
Type/Form of Contract (Work/Supply/ Auction/ Service/ Buy/ Empanelment/ Sell)	Supply
Product Category (Civil Works/Electrical Works/Fleet Management/ Computer Systems)	**HPCE Cluster**
Source of Fund (Institute/Project)	IIT Madras
Is Multi Currency Allowed	No
Date of Issue/Publishing	24.12.2018
Pre- bid Meeting Date and time	02.01.2019 @ 03.00 pm
Document Download/Sale Start Date	24.12.2018
Document Download/Sale End Date	14.01.2019
Last Date and Time for Uploading of Bids	14.01.2019 before 02.00 p.m.
Date and Time of Opening of Technical Bid	16.01.2019 at 03.00 p.m.
EMD	Rs.50,00,000/-
No. of Covers (1/2/3/4)	2
Bid Validity days (180/120/90/60/30)	120 Days
Address for Communication	**The Deputy Registrar** **Stores & Purchase Section** **IIT Madras** **Chennai 600 036**
Contact No.	**Technical Related Queries:** **Ms. P.Gayathri** **HPCE Service** **Computer Centre** **IIT Madras** **Chennai - 600 036.** **Phone No: 044- 22575983** **E-mail id : gayathri@iitm.ac.in**
Email Address	adstores@iitm.ac.in