OPEN TENDER

Request for Quotation

Open Circuit Wind Tunnel (OCWT)

Department of Aerospace Engineering

Indian Institute of Science

Bangalore 560012

Last date for submitting the quotes: 5PM 16th September 2025

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1. Lowest quotations for compute servers and accessories to be installed in the above lab, at least subscribing to the following baseline specifications are sought from Registered Indian OEMs or their authorized Indian distributors:

1.A HPC Cluster Master Node

Sr. No	Parameter	Technical Specification
1	Node	Two processors per node with each socket having the following specifications: (1) Processor has to be at least PCIe generation 5.0 compliant (2) At least 128 Physical Cores per processor with 256 Threads and with at least 2MB Cache per core (3) At least 2.1 GHz base frequency per core (4) TDP per socket must be within 400 W. Or Node equivalent to the above specifications.
2	Memory	(1) Minimum RAM per core: 4GB/core supporting DDR5 Server Memory with system running frequency of 4800 Mhz or higher (2) Every memory channel from the processor(s) should be populated in a balanced configuration. (3) All memory slots should be populated to achieve maximum memory bandwidth
3	Storage	(1) Each node should have 8 (eight), 2.5"/3.5" SAS/SATA Hotswap bays (2) Hotswap bays to be populated with 4 Nos. of 7.68 TB (or more) capacity Enterprise SSD hot swapable drive with MTBF of 2 million hours. (3) All the capacity Drives should be interfaced to Hardware RAID Controller with minimum cache of 2GB (4) Integrated three Nos. of M.2 NVMe slots populated with one M.2 NVMe Enterprise drive having 480 GB/960 GB capacity for OS installation. (Remaining two M.2 NVMe slots should be available for future expansion of internal storage)
4	Network	4 Nos. PXE and iSCSI boot compliant on-board 10-Gigabit or higher

		(2 nos. should be RJ45 ports & 2 Nos. should be short range fiber port with multimode fiber modules)
5	Patch Cords	2 Nos. Multimode Fiber Patch Cords compatible with the modules. 1 no. of 7ft RJ45 patch cord , (factory crimped)
6	PCI expansion slot	Minimum 4 Nos. Low Profile standard native Pcie X16 Slots (These slots should be kept free for future expansion)
7	External Ports	Following minimum number of external ports should be available in the system 1 x VGA ports 4 x USB 3.2 ports 1 x dedicated 1GbE RJ45 port for IPMI
8	Chassis	Appropriate Chassis (Maximum 2U) with rail-kit. The USB ports have to be on the front and rear side. Supplied chassis has to be approved by the system board OEM. Chassis should be populated with a maximum number of redundant cooling fans that can be accommodated in the chassis and the cumulative air flow should be sufficient to take away the heat generated at peak load with fully populated hardware.
9	Server Management	Dedicated IPMI 2.0 compliant management 1 Gbps ethernet port having support for 1. System health monitoring 2. PMBus and SMBus monitoring for redundant power supply and storage backplane 3. Event log accounting and monitoring changes in the server hardware and system configuration 4. Virtual media over network and Virtual KVM (KVM over IP). 5. Agentless management using the out - of - band remote management port 6. At least 128 bit SSL encryption and secure shell Version 2 support. 7. Should provide support for AES and 3DES on browsers. 8. Should provide remote firmware update functionality. 9. Should provide support for Java free graphical remote console. 10. IPMI must have graphical interfaces accessible to qualified users only and through browsers and give access to all of the above. 11. All required licenses (if any) to use IPMI features
10	Power Supplies	80+ Platinum Certified Redundant Power Supply. Power supplies should be only of the make/model approved for the motherboard. Power supply has to be configured in N+1 redundancy The system should sustain in case of failure of one power supply. Power Management Bus (PMBus) support should be provided and status information must be available via IPMI
11	Certification	The server and all its components should be verified and recommended by the system manufacturer by means of compatibility list and documentary Proof of the same should be provided by the bidder.

12	Power Cord and other cables	Power cable should have IEC 320 (male-female) connectors matching the peak-load rating of the power supplies. All the network cables required are to be supplied in appropriate numbers and of appropriate specification.
13	OS Support	The node should support the following minimum operating systems without any deviations: (1) Red Hat Enterprise Linux server 8.6 + (2) Rocky Linux 9.0+ OS device drivers should be compatible with the hardware.
14	Additional Requirements	(1)The main-board of the system should be preferably of the same brand as the entire system. (2) The main-board PCB should be permanently printed with the system brand markings but not through pasted stickers or removable markings. Evidence towards the same needs to be submitted along with the bid.
15	Warranty	3 years comprehensive on-site advance replacement warranty with in person support. The warranty should be trackable online on the OEM website through system serial number providing detailed system hardware configuration report.
16	MII (Make in India)	It is mandatory to submit declaration of breakup of MII (Make in India) content with proof
17	MAC Address	The MAC address OUI (Organizationally Unique Identifier) of the servers, and any other hardware required to make the system complete must be registered in the name of quoted OEM of the product. Self-declaration by OEM on their letter head signed by the authorized signatory. This should be verifiable on: https://regauth.standards.ieee.org/standards-raweb/pub/view.html#registries
18	HPC Tool Kit	HPC tool kit should be provided with the HPC solution.
19	Job Scheduler	Job Scheduler utility should be provided by the OEM with all the features along with a writeup about its features
20	MAF & BOM	The Vendor must provide Manufacturer Authorization Form (MAF) & technical Bill Of Material (BOM) with the quote

1.B HPC Cluster Compute Node

Sr. No	**Parameter**	**Technical Specification**
1	Node	Two processors per node with each socket having the following specifications: (1) Processor has to be at least PCIe generation 5.0 compliant (2) At least 128 Physical Cores per processor with 256 Threads and with at least 2MB Cache per core (3) At least 2.1 GHz base frequency per core (4) TDP per socket must be within 400 W.

		Or Node equivalent to the above specifications.
2	Memory	(1) Minimum RAM per core: 4GB/core supporting DDR5 Server Memory with system running frequency of 4800 Mhz or higher (2) Every memory channel from the processor(s) should be populated in a balanced configuration. (3) All memory slots should be populated to achieve maximum memory bandwidth
3	Storage	(1) Each node should have 8(eight), 2.5"/3.5" SAS/SATA Hotswap bays (2) Hardware RAID Controller with minimum cache of 2GB should be available for future storage expansion (3) Integrated three Nos. of M.2 NVMe slots populated with one M.2 NVMe Enterprise drive having 480 GB/960 GB capacity for OS installation. (Remaining two M.2 NVMe slots should be available for future expansion of internal storage)
4	Network	4 Nos. PXE and iSCSI boot compliant on-board 10-Gigabit or higher (2 nos. should be RJ45 ports & 2 Nos. should be short range fiber port with multimode fiber modules)
5	Patch Cords	2 Nos. Multimode Fiber Patch Cords compatible with the modules. 1 no. of 7ft RJ45 patch cord , (factory crimped)
6	PCI expansion Free	Minimum 4 Nos. Low Profile standard native Pcie X16 Slots (These slots should be kept free for future expansion)
7	External Ports	Following minimum number of external ports should be available in the system 1 x VGA ports 4 x USB 3.2 ports 1 x dedicated 1GbE RJ45 port for IPMI
8	Chassis	Appropriate Chassis (Maximum 2U) with rail-kit. The USB ports have to be on the front and rear side. Supplied chassis has to be approved by the system board OEM. Chassis should be populated with a maximum number of redundant cooling fans that can be accommodated in the chassis and the cumulative air flow should be sufficient to take away the heat generated at peak load with fully populated hardware.
9	Server Management	Dedicated IPMI 2.0 compliant management 1 Gbps ethernet port having support for 1. System health monitoring 2. PMBus and SMBus monitoring for redundant power supply and storage backplane 3. Event log accounting and monitoring changes in the server hardware and system configuration 4. Virtual media over network and Virtual KVM (KVM over IP). 5. Agentless management using the out - of - band remote management port

		6. At least 128 bit SSL encryption and secure shell Version 2 support. 7. Should provide support for AES and 3DES on browsers. 8. Should provide remote firmware update functionality. 9. Should provide support for Java free graphical remote console. 10. IPMI must have graphical interfaces accessible to qualified users only and through browsers and give access to all of the above. 11. All required licenses (if any) to use IPMI features
10	Power Supplies	80+ Platinum Certified Redundant Power Supply. Power supplies should be only of the make/model approved for the motherboard. Power supply has to be configured in N+1 redundancy The system should sustain in the occasion of failure of one power supply. Power Management Bus (PMBus) support should be provided and status information must be available via IPMI
11	Certificati on	The server and all its components should be verified and recommended by the system manufacturer by means of compatibility list and documentary Proof of the same should be provided by the bidder.
12	Power Cord and other cables	Power cable should have IEC 320 (male-female) connectors matching the peak-load rating of the power supplies. All the network cables required are to be supplied in appropriate numbers and of appropriate specification.
13	OS Support	The node should support the following minimum operating systems without any deviations: (1) Red Hat Enterprise Linux server 8.6 + (2) Rocky Linux 9.0+ OS device drivers should be compatible with hardware.
14	Additional Requirem ent	(1)The main-board of the system should be preferably of the same brand as the entire system. (2) The main-board PCB should be permanently printed with the system brand markings but not through pasted stickers or removable markings. Evidence towards the same needs to be submitted along with the bid.
15	Warranty	3 years comprehensive on-site advance replacement warranty with in person support. The warranty should be trackable online on the OEM website through system serial number providing detailed system hardware configuration report.
16	MII (Make in India)	It is mandatory to submit declaration of breakup of MII(Make in India) content with proof
17	MAC Address	The MAC address OUI (Organizationally Unique Identifier) of the servers, and any other hardware required to make the system complete must be registered in the name of quoted OEM of the product. Self-declaration by OEM on their letter head signed by the authorized signatory. This should be verifiable on: https://regauth.standards.ieee.org/standards-raweb/pub/view.html#registries
18	HPC Tool	HPC tool kit should be provided with the HPC solution.

	Kit	
19	Job Scheduler	Job Scheduler utility should be provided by the OEM with all the features along with a writeup about its features
20	MAF & BOM	The Vendor must provide Manufacturer Authorization Form (MAF) & technical Bill Of Material (BOM) with the quote

1.C Network Switch-1:

Sr. No	**Parameter**	**Technical Specification**
1	Formfactor	Rackmount
2	Size	1RU
3	Speed	10/100/1000
4	Interface	24 Nos. RJ45
5	No. of Ports	Minimum 24 Port
6	Power Supply	Single Power Supply should support 200~240V AC Input
7	Warranty	3 Years Onsite on Software , OS & Hardware

1.D Network Switch-2:

Sr. No	**Parameter**	**Technical Specification**
1	Formfactor	Rackmount
2	Size	1RU
3	Speed	28 Nos. 1/10G
4	Interface	SFP+ Direct Attached
5	No. of Ports	Minimum 28 Port
6	Uplink Ports	2 Nos. of 100G port should be available for uplink on QSFP28 Interface
7	Power Supply	1+1 Redundant Power Supply should support 200~240V AC Input
8	Optic Fiber Modules	Minimum 24 nos. of short range 10G SFP+ multimode fibre optic modules should be included with the network switch.
9	Warranty	3 Years Onsite on Software , OS & Hardware

1.E 42U Rack for housing the server (dimensions H2000mm * W1000mm * D1200mm) with Redundant power supplies / power strips and cable managers

2. The vendor should agree to install the OS on the master node, configure diskless/network booting on other nodes with the help of master node and configure the network on both switches for communication/maintenance. Testing of the cluster should be demonstrated using any standard MPI based parallel software package/HiFUN (see item 4) towards commisioning of the system. Any additional cost towards this should be clearly indicated in the price bid.

3. Bidders should quote for all the items (Power cables, network cables, cable manager etc.) required for placing these in the rack. Partial offers are liable to be rejected.

4. The CFD solver HiFUN (www.sandi.co.in) forms the major intended application to be ported on the compute servers to be procured. The above minimum baseline specifications have been worked out based on the performance of HiFUN solver on similar X86_64 architecture based platforms wherein performance optimization of the solver has been carried out.

5. The quotations should be submitted in two bid format, namely technical bid and price bid in separate envelops. The price bid of only those vendors with a qualified technical bid will be considered for further processing.

6. A vendor is allowed to make only one technical bid (and the corresponding price bid). It is expected that the vendor offers the configuration that best meets the above technical specifications which is also costwise most competitive.

7. In the technical bid vendor should include a compliance statement for each of the 5 items (1.A to 1.E) as presented above in item 1. Compliance statement should be strictly in the form of a table with the all details indicated in item 1 (see Appendix). Compliance or non-compliance should be clearly indicated against each of the features described in item 1. In case of non-compliance, the vendor should also include the reasons for the deviation or non-compliance. The purchase committee reserves the right to accept or reject the deviations in the specifications of the configurations listed in item 1 as presented by the vendor in the compliance sheet.

8. Price bid should be in sufficient details, with an appropriate cost breakup. Vendor should take note that unit price of 5 items (1.A to 1.E) as listed above should be clearly mentioned in the price bid. Any additional charges (for example, OS installation) should also be clearly mentioned in the price bid. Taxes as applicable and the warranty clause should also be included in the price bid.

9. Based on the unit price of the compute node (1.B), number of such units for placement of the final purchase order will be decided taking into account the budgeted cost for this procurement. The technical committee evaluating the technical bid reserves the right to place order for increased or decreased quantity of compute nodes.

10. The price bid should be on FOR-FSID, IISc Bangalore basis in INR only. The vendors should agree for 100% payment against delivery, installation and certification of the

servers. The certification process involves installation of an appropriate linux OS, executing HiFUN solver using an appropriate workload for performance evaluation and demonstration of applications such as HPC tool kit and job scheduler. Details of parallel performance of the HiFUN solver on CPU clusters may be had from:

CPU server: http://dx.doi.org/10.13140/RG.2.2.15096.78082

11. Considering the urgency associated with the project, the vendor is expected to deliver the clusters within 10 weeks after the placement of purchase order. Ability of the vendor to supply the clusters in a period less than 10 weeks will be considered as an added qualification. The delivery period should be clearly indicated in the technical bid itself. In addition, the vendors also should indicate in the technical bid, the maximum number of compute server units (1.B) they can supply, particularly taking into account the 10 weeks delivery period.

12. All requirements indicated above should be clearly mentioned in the technical and price bids. Failing to do so will disqualify the bid.

13. The bidders must enclose a client list, contact details and compliance certificate (as in Appendix) with the technical bid. In case the bidder has supplied HPC systems to any of the labs in the institute in the past 3 years, the relevant POs should be attached along with the contact details.

14. Technical bid and price bid in two separate sealed envelops should be submitted to the office of the undersigned in the address mentioned below before **5PM, 16th September 2025.**

15. The bidder is deemed to have understood that by submitting the technical and price bids, failure to meet the delivery schedule and the warranty clause will result in the bidder being blacklisted by the institute for any future transactions.

16. **Indemnity:** The vendor selected is responsible for his/her own acts and/or omissions and those of his/her officers/employees/agents during the execution of this tendering process. The selected vendor shall fully indemnify and hold IISc-FSID harmless against all claims arising out of the tasks executed by the vendor under this tendering process.

N. Balakrishnan

Professor

CAd Lab (AE224) , Dept. of Aerospace Engineering, IISc

Bangalore

Contact person: Ms. Vijaya, Secretary, CAd Lab, AE, IISc (080-2293 3029)

Appendix

Compliance sheet 1 for Technical Bid:

1.A HPC Cluster Master Node

Sr. No	Parameter	Yes/ No	Remark
1	Node		
2	Memory		
3	Storage		
4	Network		
5	Patch cords		
6	PCI expansion Free		
7	External Ports		

8	Chassis		
9	Server Management		
10	Power Supplies		
11	Certification		
12	Power Cord and other cables		
13	OS Support		
14	Additional Requirment		
15	Warranty		
16	MII (Make in India)		
17	MAC Address		
18	HPC Tool Kit		
19	Job		

	Scheduler		
20	MAF & BOM		

1.B HPC Cluster Compute Node

Sr. No	Parameter	Yes/ No	Remark
1	Processor		
2	Memory		
3	Storage		
4	Network		
5	Patch cord		
6	PCI expansion Free		
7	External Ports		
8	Chassis		

9	Server Management		
10	Power Supplies		
11	Certification		
12	Power Cord and other cables		
13	OS Support		
14	Additional Requirement		
15	Warranty		
16	MII (Make in India)		
17	MAC Address		
18	HPC Tool Kit		
19	Job Scheduler		
20	MAF & BOM		

Network Switch-1 :

Sr. No	Parameter	Yes/ No	Remark
1	Formfactor		
2	Size		
3	Speed		
4	Interface		
5	No. of Ports		
6	Power Supply		
7	Warranty		

Network Switch-2 :

Sr. No	Parameter	Yes /No	Remark
1	Formfactor		
2	Size		
3	Speed		
4	Interface		
5	No. of Ports		
6	Uplink Ports		
7	Power Supply		
8	Optic Fiber Modules		
9	Warranty		

Compliance sheet 2 (to be included in the Technical bid):

Sr. No	Technical Specification	Yes/ No	Remark
1	Price of all items 1.A to 1.E included		
2	Prices are quoted in INR		
3	Agreed to Payment Terms		
4	Price for Interconnect cables, Power Cables required to build HPC Cluster included (if No, indicate it separately in the price bid)		
5	Prices offered in the price bid includes all the delivery charges, Taxes, Installation & 3 Years warranty support		
6	Number of compute nodes as per the specification listed under item 1.B the vendor can supply in the specified	XXXXXX	

	period		
7	Client list as per item 10 above is included		