



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai - 400076

PR No. 1000034742

Rfx No. 6100001483

Technical Specification

Add-on Components for Up-gradation of Existing HPC Cluster System

A. HPC Compute Nodes with Infiniband Cards and Cables

| HPC Compute Nodes | | | |
|-------------------|----------------------------|--|-----|
| S.N. | Components/ Part Number | Product Description | QTY |
| 1 | 7D2VCTOLWW | SR665 Compute Server : ThinkSystem SR665-3yr Warranty - HPC&AI | 4 |
| 2 | B8LZ | ThinkSystem 2U 2.5" Chassis with 8, 16 or 24 Bays | 4 |
| 3 | BF7C | ThinkSystem AMD EPYC 7713 64C 225W 2.0GHz Processor | 8 |
| 4 | B5XD | ThinkSystem 16GB TruDDR4 3200MHz (2Rx8 1.2V) RDIMM-A | 64 |
| 5 | AUNG | ThinkSystem RAID 530-8i PCIe 12Gb Adapter | 4 |
| 6 | B8J6 | ThinkSystem 2.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD | 4 |
| 7 | B8LU | ThinkSystem 2U 8x2.5" SAS/SATA Backplane | 4 |
| 8 | B5T1 | ThinkSystem Broadcom 5719 1GbE RJ45 4-port OCP Ethernet Adapter | 4 |
| 9 | NA | ThinkSystem 10GbE SFP+ Ports | 4 |
| 10 | B4R9 | ThinkSystem Mellanox ConnectX-6 HDR100/100GbE QSFP56 1-port PCIe VPI Adapter | 4 |
| 11 | BQZT | ThinkSystem NVIDIA A2 16GB PCIe Gen4 Passive GPU w/o CEC | 4 |
| 12 | B8LJ | ThinkSystem 2U PCIe Gen4 x16/x8/x8 Riser 1 or 2 | 4 |
| 13 | B8LJ | ThinkSystem 2U PCIe Gen4 x16/x8/x8 Riser 1 or 2 | 4 |
| 14 | BHWK | ThinkSystem 2U x16/x16 PCIe Riser3 Kit v2 | 4 |
| 15 | BMUF | ThinkSystem 1800W 230V Platinum Hot-Swap Gen2 Power Supply | 8 |



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| 16 | 6400 | 2.8m, 13A/100-250V, C13 to C14 Jumper Cord | 8 |
| 17 | AUPW | ThinkSystem XClarity Controller Standard to Enterprise Upgrade | 4 |
| 18 | B8LY | ThinkSystem SR665 Performance Fan Option Kit | 24 |
| 19 | B8LA | ThinkSystem Toolless Slide Rail Kit v2 | 4 |
| 20 | BMJ9 | ThinkSystem 2U EIA Latch w/ VGA and External Diagnostics Port Upgrade Kit v2 | 4 |
| 21 | B0MK | Enable TPM 2.0 | 4 |
| 22 | B7Y0 | Enable IPMI-over-LAN | 4 |
| 23 | BF6Z | ThinkSystem SR665 MB for 7003, TPM 2.0 | 4 |
| 24 | 5PS7A78552 | Premier Essential - 3Yr 24x7 4Hr Resp + YDYD SR665 | 4 |
| 25 | 5AS7A02327 | Hardware Installation Standard Server (Business Hours) | 4 |

B. HPC Storage Solution

| <p align="center">HPC Storage Server</p> <p align="center">100TB Usable Dual Ctrl True Unified Storage with 10G</p> | | | |
|---|---|--|-----|
| S.N. | Component/Part Number | Technical Description | QTY |
| 1 | GS2024RTC0F0H-0032 | EonStor GS2000 4U/24bay,high IOPS solution,cloud-integrated unified storage,support NAS,SAN,object protocol and cloud gateway,dual redundant controller subsystem including 2x12GB/s SAS EXP.ports, 8x1G iSCSI ports+4x host board slots(s), 4x16Gb,2x(PSU+FAN module), 2x(SuperCap+Flash module),24 drive trays and 1 rackmount kit | 1 |
| 2 | RES10G1HIO2-0010-CTL MOD and other FRUs | EonStor GS2000 4U/24bay,high IOPS solution,cloud-integrated unified storage,support NAS,SAN,object protocol and cloud gateway,dual redundant controller subsystem including 2x12GB/s SAS EXP.ports, 8x1G iSCSI ports+4x host board slots(s), 4x16Gb,2x(PSU+FAN module), 2x(SuperCap+Flash module),24 drive trays and 1 rackmount kit | 2 |
| 3 | HELT72S3600-00301-6TB SAS HDD | Enterprise 3.5" SAS 12Gb/s HDD, 6TB, 7200RPM, 1 in 1 Packing. | 24 |



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| 4 | 9370CSFP10G-0010- SFP Module | 10G BASE-SR SFP+ Transceiver, LC, multi-mode | 4 |
| 5 | 9270CFCCAB05-0010- Cables | Optical CFC cable,LC-LC,MM-50/125,Duplex,LSZH,O.D.-1.8mm*2.5 meters | 4 |

C. Interconnect- 10G Switch and Cables

| Interconnect | | | |
|---------------------|----------------------------------|--|-----|
| S.N. | Components/Part Number | Technical Description | QTY |
| 1 | 10G Switch- EdgeCore ECS5520-18X | 16 x 10G SFP+ +2x40G QSFP+ Uplinks Ports | 1 |
| 2 | Cables | Required cables must be considered | |
| 3 | Warranty | 3 Years onsite warranty and support | |

D. Softwares

| Software - 1 Set. | | |
|--|------------------------------|--|
| Commercial Software with direct support from it's OEM's | | |
| 1 | Cluster Management Software: | <p>Proposed cluster management tool to be fully supported by it's OEM. An authorisation letter must be produced during technical bid submission for back to back support.</p> <p>Proposed cluster management tool should have web based graphical remote access interface.</p> <p>Should be compatible to work on RHEL 5.x / RHEL 6.x / CentOS 5.x/ CentOS 6.x/ Fedora</p> <p>Should be able to provision above operating systems to compute nodes. Should be able to auto-provision applications to compute nodes</p> <p>Should allow HPC management console to be accessible from any system in the network.</p> <p>Should support role based access to the HPC system.</p> <p>Every role should be able to be remotely managed using the Graphic User Interface.</p> <p>Should provide profile-based and fully automated provisioning features.</p> |



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| | | Proposed cluster management tool should have a graphic user interface. |
| | | Should support Add/Modify/Delete compute nodes from GUI window. |
| | | GUI (Web) based monitoring feature to be part of proposed solution. |
| | | Should support major power management modules like bullpap, wti, apc_snmp, ether_wake, ipmilan, drac, ipmitool, ilo, rsa, lpar, bladecente as per the hardware proposed. |
| 2 | Job scheduler: | Bidder should propose a job scheduler which is fully supported by them. Job Scheduler proposed should only be OGE / Torque / Open PBS or Licensed and supported version of PBS Pro. No other scheduler to be proposed. |
| 3 | Libraries, MPI and Compilers | Bidder should propose GNU Compilers & Intel Cluster Studio single user floating license for 3 years. |
| | | Bidder should implement Open MP and MPI network. |
| | | Bidder should set up the Cluster for MPI Communication over IB/GigE |
| | | Vendor specific InfiniBand stack on Linux OS, if available, should be supplied. |
| | | Vendor specific MPI implementation on Linux OS should be supplied. |
| | | Open source software/platforms like Python, Perl, etc. should be integrated with the cluster. Integration of NAMD will be a major plus. |
| | | IIT Bombay Mumbai also has licenses from Matlab, AMBER, Charmm, Gold etc. These also to be integrated with the cluster. |
| 4 | Jobs Submission Portal: | Bidder should propose for ISV supported GUI Based Job submission portal. |
| | | Proposed GUI Based job submission portal should be in production mode with at least 3 organizations in India of which 2 have to be Govt/research organization. At least 1 location from the same to be in production mode for last 3 years. |
| | | Proposed portal should be integrated with existing LDAP or NIS authentication. Integration of NAMD into the cluster will be a major plus. |
| | | Proposed job submission Portal should be fully integrated with proposed Cluster management tool and Scheduler. |
| 5 | Operating System for Server Node | Opensource Linux cluster OS for proposed Server as well as other existing head and compute nodes. |



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E. Scope Of Work

| SCOPE OF WORK | |
|----------------------|--|
| 1 | Rack Mounting & Cabling for HPC Server Nodes and all other hardware components. |
| 2 | Integrating hardware with existing HPC Cluster setup. Compute Nodes Installation and Configuration |
| 3 | Operating System Installation and Configuration. |
| 4 | Installation of all the middleware software along with the user sought applications. Cluster Tool Kit installation and Configuration, Scheduler Installation and Configuration, Job Submission Portal Installation and configuration, Application installation and configuration as per the requirement. |
| 5 | Benchmarking: Application benchmarking. Storage Benchmarking |
| 6 | Acceptance Test and fine tuning the performance as per expectation. |
| 7 | Training on cluster usage to admin. |
| 8 | 3 Years of onsite comprehensive warranty and support. |

F. General Compliance –Terms & Conditions

| GENERAL COMPLIANCE - TERMS & CONDITIONS | | Compliance |
|--|--|-------------------|
| 1 | Bidder to provide complete details about Schematic Diagram, Rack layout, Power & Cooling requirement, Electrical infrastructure requirement and anything else required at IIT Bombay. Special instructions for site preparation if any should be clearly mentioned in the technical bid. | |
| 2 | All products quoted should be with 3 years of warranty and support. Any new version available of the software proposed in the respective domain should be provided and implemented at no extra cost for entire contract period. | |
| 3 | Compute Hardware OEM should have direct local sales & support office in Mumbai. The OEM should have direct presence in India. i.e. OEM office & spare depots should be present in India. A letter confirming same from OEM is to be submitted. | |
| 4 | The bidder must submit the product catalogues, literature of the proposed product in solution. | |
| 5 | Manufacturing Authorization Form (MAF) is compulsory. | |
| 6 | Point by point compliance to all the above mentioned features should be provided by the firm. There should not be any deviation and if any, should be stated clearly. | |
| 7 | Full Server configuration as listed above should be tested and integrated at OEM manufacturing plant which includes all major components, power supply, cooling fan cabinet etc. No local site integration of the server components will be allowed. No rebranded product /OEM would be considered. The OEM must be actually manufacturing the products. The same might be asked to prove. | |
| 8 | The firm must be authorized by the manufacturer to supply, install and maintain the system. The specific authorization by the manufacturer for participating in this tender should be enclosed, otherwise quotation may be rejected. | |



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| 9 | The bidder must agree to install and configure the user sought operating systems, mostly open source Linux versions, MPI libraries, Job schedulers plus cluster management tools, and demonstrate its running in parallel as part of the system acceptance. Installation and maintenance during warranty period should be mentioned separately along with training on cluster usage to it's users. | |
| 10 | Vendor must provide the Bill of Material with manufacturer's part numbers for the items proposed to meet the complete solution. Vendor should verify and certify that the items proposed are sufficient to integrate the proposed solution into a production mode. | |
| 11 | The Supply, installation, and commissioning of the system should be completed within 16 weeks from the date of purchase order. The project/activity must be completed by, integrating the hardware, system software, and application software by a single vendor/system integrator. | |
| 12 | Warranty: The vendor should provide a minimum of Three years' comprehensive On-site support warranty for all the deliverables, Hardware, and software at no additional charges. | |
| 13 | No End of Life/End of Support/Sell product should be quoted and the same should be stated on the OEM letterhead that EOL/EOS would not be there for quoted products for at least 3 years. | |
| 14 | Price should be quoted on the basis of 24x7 response against call log by IITB to the Bidder/OEM. | |
| 15 | The support must be maintained for new setup without any issue as the existing setup is already in warranty and support with a vendor. There must not be any issue in integration because of which the existing cluster must not face any issue. | |
| 16 | Bidders must mention GST and HSN/SAC codes of all the items quoted. | |