

CENTRAL UNIVERSITY OF RAJASTHAN



राजस्थान केन्द्रीय विश्वविद्यालय
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CURAJ/Purchase/Tender/2022-23/4476

Date : 10-02-2023

CORRIGENDUM

This has reference to the tenders vide Tender No. CURAJ/Purchase/Tender/2022-23/4023 dated 12.01.2023 for the supply & installation of High Performance Computing (HPC) Cluster equipment under HEFA Grant at Central University of Rajasthan.

Delivery period and **Mode of EMD** have been amended as follows:

Delivery period: The equipment including indigenous items should be delivered to the University within 6 months from the date of LC opening.

Mode of EMD: Bidders should send separate Account Payee Demand Draft/ Fixed deposit receipt/ Banker's Cheque /Bank Guarantee from any of the Commercial Banks/ payment online in an acceptable form/ Bid security declaration for EMD (Refundable without any Interest) in favor of "Registrar, Central University of Rajasthan" payable at Kishangarh/ Bandarsindri.

Technical specifications have also been amended for the High Performance Computing (HPC) Cluster as **Annexure -I**

All other terms and conditions will remain same.

Registrar

Technical Specifications for High Performance Computing (HPC) Cluster

1. Master cum Storage Node

	Quantity	1 unit
Sr. No.	Specification	Description
1.	Processor	2 x CPU or more (x86 Architecture based) each with minimum 16 Cores and minimum frequency of 2.9GHz and 135MB L3 cache or higher, <=185W power. Specrate2017_fp_base benchmark score >80 must be listed in www.spec.org by server OEM with either the same system model or with a model from similar series with dual processor CPU configuration. CPU model used must be the same as offered by the OEM in the bid.
2.	Memory	RAM: 128GB or more ECC DDR4-3200 Mhz or better RAM using 32GB DIMMs. At least 24 DIMM slots available in total.
3.	Security Features	<ul style="list-style-type: none"> - Security of the system based on the protection and secrecy of the cryptographic info, especially against reading out or manipulation of the key material. - Tick counter with tamper detection - Protection from Dictionary Attack - Must support RSA Secure ID - Encrypted File System - RSA Compliant security embedded software - Root of Trust Management
4.	Hard Disk Drives & SSDs	2TB SATA×2 Numbers 2TB SSD x2 Numbers
5.	HDD bays	HDD bays- supporting 8 or more SAS/SATA Hard drives and Solid State Drives. On board NVMe controller and at least 2 dedicated NVMe slot or more available to populate NVMe drive.
6.	Free I/O slots (Peripheral Component Interconnect Express,PCIe)	Minimum 4 × PCIe4.0(x16) slot and 1 x PCIe4.0(x8) slots must be vacant after populating all Add on controllers. (if some of the slots can only be operational once 2 nd CPU is populated – then that will be acceptable)
7.	RAID Level support	SAS 12Gbps controller with provision to support up to 40+ HDDs, and supports RAID 0, 1, 10, 5 ,50 ,60 & 6 with dedicated cache memory. RAID card must support all HDD bays w/o any additional item to be added. with supported backplane for drive bays and JBOD. System must provide array configuration and management utilities, Independent of port auto-negotiation, optional battery back up unit for future upgrade. Must Support SSP, SMP, STP protocols or more
8.	Graphics controller	Integrated Graphics with on board controller.
9.	Network interface	2 x 10G (SFP+) / BASE-T
10.	Ethernet ports with PXE	❖ 1 × 1 Gbps Ethernet port with Preboot Execution Environment (PXE) boot capability (including CAT6 cable for connecting to switch). If this port is common with ports offered against Network interface (parameter 9 then the same is acceptable)
11.	Ports	Minimum 2 USB 3.0 or higher, 1 VGA, 1 graphics port, 2 x Disk on module Ports,

12	Chipset	Applicable / Compatible CHIPSET
13.	Server management (Intelligent Platform Management, Interface, IPMI or equivalent)	<p>IPMI 2.0 or equivalent Support with KVM and Media over LAN features. Must include any licenses, if required for using these features.</p> <p>It should be able to automate mgmt. tasks and automated firmware updates.</p> <p>❖ Out of band Management Capabilities, Stack with a full IPMI implementation, Hardware Health monitor , Remote power control, Console Redirection with multi language support HTML web Console Redirection. Serial Over LAN, Media Redirection , CD/ DVD redirection , USB 2.0 or 3.0 -based drive redirection with support for USB Key , VLAN functionality supports Reading Log Events, SMTP Support, Sensor read methodology, Email Alerting methodology, User management functionality with SSL based security , Multi User Permission Levels, Multi User Profiles, LDAP Support, Windows Active Directory and Open LDAP support, Common Information Methodology with class handling , Core Support with creation of class , instances and workability with instances. WSMAN Support with common information model support. Provision for Getting , discovering, enumeration and subscribing features. Product datasheet must confirm the compliance.</p>
14	Power supplies	Redundant (N+1) 80 Plus Certified efficient power supplies.
15.	Cooling	Optimum no. of Cooling fans.
16	Operating System	Should support latest version of 64-bit CentOS. And Certified for commercial Linux flavour (RHEL and SUSE. Certificate must be submitted)
17.	Warranty	❖ 3 years onsite warranty by OEM and Bidder.
18	Software Suites	Open source & commercial research codes/ software suites to be loaded as part of installation process by HPC experts of bidder or OEM.
19	Form Factor	Rack Mount <= 2U per node

2. Compute Node-

Quantity		20-25 units
Sr. No.	Specification	Description
1.	Processor	2 x CPU (x86 Architecture based –processor) with minimum 32 Cores and minimum frequency of 2.8GHz And 48MB L3 cache or higher ., And HPL Peak Perf @1.40TF/socket. CPU Performance benchmark - Spec_fp_2017_rate_base- score must be >=190 , Spec_int_2017_rate_base- score must be >=200. Spec Benchmark must be listed at www.spec.org by the OEM for the offered system model with same CPU configuration as quoted in bid.
2.	Memory	RAM: 512GB for 10 nodes and remaining with 256GB, ECC DDR4-3200 Mhz or better RAM using 32GB DIMMs. At least 24 DIMM slots available in total.
3.	Security Features	<ul style="list-style-type: none"> - Security of the system based on the protection and secrecy of the cryptographic info, especially against reading out or manipulation of the key material. - Tick counter with tamper detection - Protection from Dictionary Attack - Must support RSA Secure ID

		<ul style="list-style-type: none"> - Encrypted File System - RSA Compliant embedded software - Root of Trust Management
4.	Hard Disk Drives & SSDs	1 x 2TB SSD
5.	HDD bays	HDD bays- supporting 8 or more SAS/SATA Hard drives and Solid State Drives. On board NVMe controller and at least 2 dedicated NVMe slot or more available to populate NVMe drive.
6.	Free I/O slots (Peripheral Component Interconnect Express, PCIe)	Minimum 4 × PCIe4.0(x16) slot and 1 x PCIe4.0(x8) slots must be vacant after populating all Add on controllers.
7.	RAID Level support	RAID Controller with RAID 0,1,10 levels from day one
8.	Graphics controller	Integrated Graphics with on board controller.
9.	Network interface	2 x 10G (SFP+) / BASE-T
10.	Ethernet ports with PXE	❖ 1 × 1 Gbps Ethernet port with Preboot Execution Environment (PXE) boot capability (including CAT6 cable for connecting to switch) . If this port is common with ports offered against Network interface (parameter 9 then the same is acceptable)
11.	Ports	Minimum 2 USB 3.0 or higher , 1 VGA, 1 graphics port, 2 x Disk on module Ports,
12.	Chipset	Applicable / Compatible CHIPSET
13	Server management (Intelligent Platform Management, Interface, IPMI or equivalent)	<p>IPMI 2.0 or equivalent Support with KVM and Media over LAN features. Must include any licenses, if required for using these features.</p> <p>It should be able to automate mgmt. tasks and automated firmware updates.</p> <p>❖ Out of band Management Capabilities, Stack with a full IPMI implementation , Hardware Health monitor , Remote power control, Console Redirection with multi language support HTML web Console Redirection. Serial Over LAN, Media Redirection , CD/ DVD redirection , USB 2.0 or 3.0 -based drive redirection with support for USB Key , VLAN functionality supports Reading Log Events, SMTP Support, Sensor read methodology, Email Alerting methodology, User management functionality with SSL based security , Multi User Permission Levels, Multi User Profiles, LDAP Support, Windows Active Directory and Open LDAP support, Common Information Methodology with class handling , Core Support with creation of class , instances and workability with instances. WSMAN Support with common information model support. Provision for Getting , discovering, enumeration and subscribing features. Product datasheet must confirm the compliance.</p>
14	Power supplies	Redundant (N+1) 80 Plus Certified efficient power supplies.
15	Cooling	Optimum no. of Cooling fans.
16	Operating System	Should support latest version of 64-bit CentOS. And Certified for commercial Linux flavour (RHEL and SUSE. Certificate must be submitted)
17	Warranty	❖ 3 years onsite warranty by OEM and Bidder.
18	Software Suites	Open source & commercial research codes/ software suites to be loaded as part of installation process by HPC experts of bidder or OEM.
19	Form Factor	Rack Mount <=2U per node

3. Accelerator Node

Quantity		1 unit
Sr. No.	Specification	Description
1.	Processor	2x CPU (x86 Architecture based –processor) with minimum 64 Cores and minimum frequency of 2.25GHz and Turbo Frequency 3.4GHz And 256MB L3 cache or higher
2.	Memory	RAM: 2TB, ECC DDR4-3200 Mhz or better RAM using 32GB DIMMs. At least 24 DIMM slots available in total.
3.	GPU	8x80 GB Tensor core GPUs GPU memory- 640 GB Performance- 5 petaflops AI, 10 peta OPS INT 8
4.	Hard Disk Drives & SSDs	1 x 2TB SSD
5.	HDD bays	HDD bays- supporting 8 or more SAS/SATA Hard drives and Solid State Drives. On board NVMe controller and at least 2 dedicated NVMe slot or more available to populate NVMe drive.
6.	Free I/O slots (Peripheral Component Interconnect Express, PCIe)	Minimum 4 × PCIe4.0(x16) slot and 1 x PCIe4.0(x8) slots must be vacant after populating all Add on controllers.
7.	RAID Level support	RAID Controller with RAID 0,1,10 levels from day one
8.	Graphics controller	Integrated Graphics with on board controller.
9.	Network interface	2 x 10G (SFP+) / BASE-T
10.	Ethernet ports with PXE	❖ 1 × 1 Gbps Ethernet port with Preboot Execution Environment (PXE) boot capability (including CAT6 cable for connecting to switch) . If this port is common with ports offered against Network interface (parameter 9 then the same is acceptable)
11.	Ports	Minimum 2 USB 3.0 or higher , 1 VGA, 1 graphics port, 2 x Disk on module Ports,
13.	Chipset	Applicable / Compatible CHIPSET
14.	Server management (Intelligent Platform Management, Interface, IPMI or equivalent)	IPMI 2.0 or equivalent Support with KVM and Media over LAN features. Must include any licenses, if required for using these features. It should be able to automate mgmt. tasks and automated firmware updates. ❖ Out of band Management Capabilities, Stack with a full IPMI implementation , Hardware Health monitor , Remote power control, Console Redirection with multi language support HTML web Console Redirection. Serial Over LAN, Media Redirection , CD/ DVD redirection , USB 2.0 or 3.0 -based drive redirection with support for USB Key , VLAN functionality supports Reading Log Events, SMTP Support, Sensor read methodology, Email Alerting methodology, User management functionality with SSL based security , Multi User Permission Levels, Multi User Profiles, LDAP Support, Windows Active Directory and Open LDAP support, Common Information Methodology with class handling , Core Support with creation of class , instances and workability with instances. WSMAN Support with common information model support. Provision for Getting , discovering, enumeration and subscribing features. Product datasheet

		must confirm the compliance.
15.	Power supplies	Redundant (N+1) 80 Plus Certified efficient power supplies.
16.	Cooling	Optimum no. of Cooling fans.
17.	Operating System	Should support latest version of 64-bit CentOS. And Certified for commercial Linux flavour (RHEL and SUSE. Certificate must be submitted)
18.	Warranty	❖ 3 years onsite warranty by OEM and Bidder.
19.	Software Suites	Open source & commercial research codes/ software suites to be loaded as part of installation process by HPC experts of bidder or OEM.
20.	Form Factor	Rack Mount <=2U per node

4. Cluster Management and other S/W Stack

i). WORKLOAD MANAGER with Below Features

S.No	Description
1	Commercial Support backed license for all nodes with warranty upgrade. Fully featured version with no limitation to no of jobs and scalability of nodes
2	Integrated advanced scheduling features including cross-system scheduling, peer to peer scheduling with advanced fair share & hierarchical fair share reservations, preemption, access control lists (ACLs), Role based access control and backfilling scheduling, multi-cluster scheduling, Meta-scheduling for job scheduling and management across distinct clusters (earlier supplied by clusters are also to be covered)
3	Power aware job scheduling to support auto shutdown and auto boot of nodes as per the workload to be supported.
4	Topology-aware scheduling (both inter- and intra-node) to ensure maximum application performance while minimizing cross-job network contention;
5	Preemption and checkpointing (suspend/checkpoint/requeue) allow users to immediately run high-priority work
6	Plugin framework for custom health checking, mitigation, and notification capabilities including off-lining flaky nodes, restarting scheduling cycles and requeuing jobs
7	The Management Suite must offer Web/CLI based Job submission, monitoring, management and 3D remote visualization capability with secure access control which can be integrated with LDAP.
9	The Cluster Management Suite must Web based tool for administration of HPC including real time monitoring, historical repository based on jobs, users, application etc.
10	S/W offered must be licensed support backed , bidder or the ISV(back end arrangement with bidder) must provide end to end support for the same. Datasheet / Product Manual must be submitted with the bid, failure to which may lead to non compliance.

ii) Operating System	CentOS
iii) HPC Operating System Support	REQUIRED
iv) Resource Management/Job Scheduling Support	REQUIRED
v) Commercially backed Licensed Cluster Management S/W (License issued in the name of CENTRAL UNIVERSITY OF RAJASTHAN)	Unified system management, monitoring toolset for configuration, diagnosis and management of the system, Cluster manager with provisioning, monitoring and reporting capabilities. Support Package and Image based

	provisioning. Support Diskfull and diskless cluster deployment. Intuitive web interface to manage and customize the cluster Customizing networks and compute node profiles through GUI. Customizing compute nodes (upto changing kernel parameter). Able to Push configuration changes and updates to the compute nodes without reinstalling and rebooting. Datasheet / Product Manual must be submitted with the bid, failure to which may lead to non compliance.
vi) Software Support for both Serial and Parallel Environment	YES

5. Switches:

- Primary Interconnect (IB-EDR 100Gbps Infiniband): - Description: 36-Ports Externally Managed IB-EDR 100 Gbps Switch
- Secondary Interconnect (Gigabit Ethernet) (Quantity required: 2): - Description: 48-Ports Gigabit Ethernet Switch using Dlink DGS-1210-52

6. UPS

- Please quote for UPS and batteries pack necessary for 60-minute backup at full load. Please specify calculations of power consumption.
- Please ensure that it can back up of 1 master + 20 compute nodes + 1 Accelerator node for 60 minutes at full load

7. Air Conditioner- 6x 2 ton or as per load at the time of installation

8. Server Rack with PDU- 90U Server Rack (800x1000 mm) with 2 PDU's each with sufficient Ports, Key Board tray, cable manager, cable route, any other required accessories as per requirement of the above mentioned configuration of master , compute node, switches is the responsibility of bidder

9. Warranty & AMC: On-site comprehensive warranty of 3 years must be provided for all components.

Annual maintenance contract (AMC) for additional 2 years subsequent to the warranty period should be quoted. Bidder should also include full description of services to be provided during the AMC period.

If during the period of warranty any component or spare part is needed to be imported, all associated cost for replacement shall be borne by the supplier including the cost of customs duty, customs clearance charges etc.

10. Manpower: 2 technical manpower for 3 years for all technical and maintenance support

11. Training: Training for user at Central University of Rajasthan at company cost