

Technical Specifications for CPU multicores based HPC facility

1. Master/Login Node

(Quantity : 1)

Processor	Two physical processors with x86_64 architecture, each having 12-cores or higher, running @ 2.0GHz or higher base frequency. Must be capable of supporting memory running at 2666 MHz, base performance per physical processor should be 1.5 TF or higher
Memory	384GB (12 x 32 GB) DDR4-2666 MHz, ECC, populated in balanced performance with all channels populated and should have 12 free DIMM slots for future expansion
Disks	2 x 4 TB, 7200RPM SATA HDDs, Raid 0,1 supported
Graphics Support	Server based graphics controller on board
Interconnect	1 x 100Gbps (or higher) low-latency interconnect (Mellanox EDR InfiniBand or Intel® Omni-Path) connected to PCIe 3.0 x16
Management	Dedicated management port with KVM over LAN support enabled
Expansion	Minimum 3 PCIe 3.0 slots, with atleast 2 nos. of PCIe 3.0 x16 slots
Ports	2 USB, 1 VGA ports
Form Factor	SMART Rack-mountable with rail-kit, 1U form factor
Power Supply	hot-pluggable and N+N redundant 80PLUS Platinum or better
Warranty	3 years OEM comprehensive warranty, committed AMC for 4th and 5th year

2. Compute Node(s)

(Quantity : 30)

Processor	Two physical processors with x86_64 architecture, each having 12-cores or higher, running @ 2.0GHz or higher base frequency. Must be capable of supporting memory running at 2666 MHz, base performance per physical processor should be 1.5 TF or higher
Memory	192GB (12 x 16 GB) DDR4-2666 MHz, ECC, populated in balanced performance with all channels populated and should have 12 free DIMM slots for future expansion
Disks (Optional)	Diskless nodes, if bidder provides one disk per node, then include 1 x 240 GB Enterprise Grade SATA SSD
Interconnect	1 x 100Gbps (or higher) low-latency interconnect (Mellanox EDR InfiniBand or Intel® Omni-Path) connected to PCIe 3.0 x16
Management	Dedicated management port with KVM over LAN support enabled
Expansion	at least 1 no of free PCIe 3.0 x16 expansion slot
Ports	2 USB, 1 VGA ports
Form Factor	SMART Rack-mountable with rail-kit, 1U Form Factor
Power Supply	hot-pluggable and N+N redundant 80PLUS Platinum or better
Warranty	3 years OEM comprehensive warranty, committed AMC for 4th and 5th year

3. 100Gbps, Non-blocking, Switching Fabric

(Quantity : 1)

Mellanox EDR InfiniBand

OR Intel® Omni-Path

The InfiniBand/OPA interconnect with a minimum of 36 ports, EDR/OPA along with required cables, with rack-mounting kit.

Warranty: 3 years OEM comprehensive warranty, committed AMC for 4th and 5th year

4. 48-port, Layer-2 managed, Gigabit Ethernet Switch

(Quantity : 1)

with rack-mounting kit for HPC communication along with the required cables.

Warranty: 3 years OEM comprehensive warranty, committed AMC for 4th and 5th year

5. Storage: Parallel File System

(Quantity : 1)

- Lustre based Parallel File System (PFS) of minimum 100 TB usable capacity in hardware RAID 6 (8+2) or equivalent layout with a minimum of 2 GB/s demonstrable write performance on IOR and two global hot spare disks.

- Expandable to 200 TB usable capacity.
- The IOR benchmark should be run from the compute nodes and using 1 MB block size and the output file size used for IOR should be double than the I/O server memory and storage cache. IOR performance should be demonstrated on-site as part of the acceptance test.
- The I/O servers required for demonstrating the IOR performance should be part of the storage solution and the hardware and software on the I/O nodes should be configured appropriately to meet the performance.
- Components used for building the storage solution such as I/O nodes, controllers, etc. should rack mountable and mounted in a rack.
- The I/O nodes, if not embedded into the storage box, should run any popular version of LINUX.
- The storage solution should not have any single point of failure including the I/O servers, controllers, storage array, power supply, etc.
- Individual Hard Disk Drives used for the building the storage solution should be of at least 4 TB or higher capacity SATA/NL-SAS disks at 7200 RPM or higher.
- All components like cables, connectors, etc. for integration of the storage solution should be included in the quotation.
- Management Interface
 - Browser based management GUI.
 - Should have management tool to monitor status and health of the storage system, like Performance, throughput, Network Connection, controller health.
- Warranty: 3 years OEM comprehensive warranty, committed AMC for 4th and 5th year

6. Software:

- Cluster Manager: Open Source
- Job Scheduler : Open Source (preferably with GUI based job monitoring & management)
- OS : Open Source, Cent OS 7.x
- Compilers and Libraries: OpenMPI, MVAPICH, Intel MPI, Blas 1,2,3, LAPACK
 - Intel Parallel Studio-Cluster Academic version 2 seats floating with 3 years support

7. Smart-Rack and Power-Back-Up Solution:

- A Smart-Rack and Power-Back-Up solution (two-rack solution) should be a complete DC infrastructure (inbuilt Rack based cooling), offering smoke detection system with indicators, rodent control system, fire suppression system with necessary piping & detection sensors, alarm for any malfunctioning, toughened glass front panel all integrated together inside a rack. All monitored data and alarms to be sent via network for remote monitoring
- Possibility of enhancement of DC infrastructure as computing requirement increases in future
- N+N redundancy for power and cooling
- N+N built in redundancy based precision cooling unit (only inside rack), with in-built humidifier and dehumidifier to take care of minimum 20 kW operating power load at any time (24 x 7 operation)
- 42U, sturdy frame, corrosion resistance front glazed door and body of the rack
- Warranty for cooling solution: **3 year onsite** comprehensive support, committed AMC for 4th and 5th year
- 30 kVA, true online, 3 phase UPS with full (N+N) redundancy and 20 minutes of Run-Time (power backup) on each UPS under full load. UPS units to be external to the smart rack with independent battery banks, industry grade battery bank (dry and maintenance free), Sealed Maintenance Free (SMF)
- SNMP control, high power factor (0.9 or more), high efficiency (0.92 or more), sine wave output
- Only from reputed OEMs (APC, Delta, Vertiv, EATON, Socomec) with ISO certifications. CE compliant.
- Seamless integration of UPS and Smart Rack Solution to be done by the bidder.

8. Rack mount LCD monitor (foldable, at least 17") with KVM switch, keyboard and mouse.

The rates quoted by the supplier should, in addition to the cost of the items, include charges towards installation, relocation, spares, consumables, transportation, insurance, freight, loading, unloading, services of site engineer, taxes and duties etc. covering the free warranty period of three years and the extended comprehensive annual maintenance contract of additional two years (4th and 5th years).