

**MINUTES OF THE PRE-BID MEETING FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING
OF HIGH – PERFORMANCE COMPUTING CLUSTER**

[Tender Notification No.1/1/2022-PROC/HPLC]

Members Present:

1. Dr.Subbareddy Bonthu, Sci-C (Through Skype)
2. Mr.E.Subramanian
3. Mr.Alokranjan Samal

Representative of Participating firm

1. Mr.Prem Selvam A, USAM
2. Mr.B.Vijayakumar, USAM
3. Mr.G.John Selvn, USAM
4. Mr.Ananatha Padmanabhan, Locuz
5. Mr.Kandasamy, Locuz
6. Mr.Palanivel R, Netweb Technologies
7. Mr.Senthilkumar, Feix Infotech
8. Mr.V.Kumar, PC Net

As scheduled, the pre-bid meeting for Supply, installation, testing & commissioning of High – Performance Computing cluster was held on 08-01-2023 at 11.00 Hrs and participant was welcomed to the meeting.

The participants were invited to discuss about his doubts/ queries on the bid document for Supply, installation, testing & commissioning of High – Performance Computing cluster. The responses to the queries raised by the prospective bidder and received through the e-mail along with the modification in the relevant provisions of the bid document are appended here with. The prospective bidder was requested to participate in the bidding process after careful reading and understanding of the provisions of the bid document published and possible amendment/s subsequent to the present pre-bid meeting.

QUERIES/ SUGGESTIONS AND RESPONSE THEREON

| Sl. No. | Clause Reference | Queries/ Suggestions raised by the prospective bidders | Response to the Queries/ Suggestions |
|---------|--|--|--|
| 1. | 4.0 Eligibility to Participate (NIT clause 3 and ITB clause 3.2) | Classes of Local suppliers eligible to participate ITB clause 4.1.4 (make India Policy) As mentioned Only Class-I and Class – II Local suppliers eligible (Domestic tenders) (or) All classes of contractors (Class-I, Class-II and Non-Local) eligible – Global tenders | Class I and Class II Local suppliers eligible. And the following clause to be removed (or) All classes of contractors (Class-I, Class-II and Non-Local) eligible – Global tenders |
| 2. | Delivery Period | The bidders are requested to deliver the Servers within 16 to 24 Weeks whereas For Mellanox Parts delivery will be 56 to 60 Weeks from the respected OEM. So, requesting you to kindly increase the Delivery time frame accordingly | Delivery period is revised as 120 to 180 days |
| 3. | EMD | The bidders are requested Clarify whether MSME Bidders are exempted from EMD or not. | EMD / Bid Security amount is Rs.3,00,000/- MSME bidders are exempted from submitting Bid Security and should submit MSME certificate Form - 7 of the tender document is applicable |

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| 4. | Section VI: Schedule of Requirements | Price bid | The separate price bid has to provide for the Option – 1 & Option – 2. Bidders may submit for their offer(s) any one or both the options. Evaluation will be done for each option separately. |
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amendment mentioned above is to be treated as amendment to the terms and conditions of the RFQ. All other terms & conditions of the published RFQ shall remain the same.

The bidders have to submit a copy of this Minutes along with the amendment and RFQ. Each page of the RFQ as well as this Minutes along with the amendment are to be signed by the authorized Signatories of the bidders.

Sd/-
Director

Technical Specifications of HPC

Option 1 - HPC with CPU Node

| Master Node: 1 No. | | |
|---------------------------|---|---|
| Processor | Dual Processor with minimum 16C, 2.90GHz or Higher | Dual processor with 16 core, 2.90 GHz of 3 rd generation or higher |
| Support | X86_64 Processor must have AVX – 512 native supports | No Change |
| Chipset | Compatible chipset | No Change |
| RAM | 256GB ECC DDR4 3200 MHz RAM or higher to be configured in a balanced Memory Configuration for Optimum Performance | Required 16 DIMM |
| Controller | 2GB SAS Controller Supports RAID 0, 1, 5, 6 , 10, 50 & 60 | No Change |
| HDD(s) | 10 x 16TB Enterprise SAS 7.2K RPM 3.5" Hot Swap HDD | No Change |
| SSD | 2 x 960GB Enterprise SATA 2.5" Hot Swap 3DWPD SSD | No Change |
| HPC Network | 1 x 100Gbps high speed and low latency Port with cable of 2M length | No Change |
| Network | Dual Gigabit LAN Ports with 2 x 2M Gigabit Ethernet Patch Cable | No Change |
| Management | IPMI 2.0 with compliant Dedicated Port | No Change |
| Exp. Slot | 2 PCI-E Slots (in x16 / x8) | No Change |
| Ports | At least 2 x USB 3.0 ports | No Change |
| Chassis | 2U Rack mountable Using Rail Kit | No Change |
| Power Supply | 1600W Redundant Power Supply With 80Plus | Power supply: Minimum 1000watts or higher redundant supply |
| OS | Open-Source Linux | |
| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |

| Compute Node: 8 Nos. | | |
|-----------------------------|--|-----------|
| Processor | Dual Processor with minimum 24C, 2.80GHz or Higher | No Change |
| Support | X86_64 Processor must have AVX – 512 native supports | No Change |
| Chipset | Compatible chipset | No Change |
| RAM | 512GB ECC DDR4 3200 MHz RAM or higher to be configured in a | No Change |
| | balanced Memory Configuration for Optimum Performance | No Change |
| Controller | Using On board Controller | No Change |
| SSD | 2 x 480GB Enterprise SATA 2.5" Hot Swap SSD with 3 DWPD | No Change |
| | 2 x 960GB Enterprise SATA 2.5" Hot Swap SSD with 3 DWPD (For Scratch Data) | No Change |
| HDD/SSD Bays | At least 12 Nos | No Change |
| HPC Network | 1 x 100Gbps high speed and low latency Port with cable of 2M length | No Change |
| Network | Dual Gigabit LAN Ports with 2 x 2M Gigabit Ethernet Patch Cable | No Change |
| Management | IPMI 2.0 compliant with Dedicated Port | No Change |
| Exp. Slot | 2 PCI-E Slots (in x16 / x8) | No Change |
| Ports | At least 2 x USB 3.0 ports | No Change |
| Chassis | 2U Rack mountable Using Rail Kit | No Change |
| Power Supply | 1600W Redundant Power Supply With 80Plus | No Change |
| OS | Open-Source Linux | No Change |

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| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |
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| Primary Communication Switch: 1 No. | | No Change |
| Switch-IB 2 based EDR 1U switch, 36 QSFP28 ports, 2 Power Supplies (AC), unmanaged, standard depth, P2C* airflow, Rail Kit | | All IB should be based on HDR |
| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |

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| Secondary Communication Switch: 1 No. | | No Change |
| 24 x 10/100/1000BASE-T ports, 2 x 10GBASE-T and 4 x 10G SFP+, L3 Stackable Managed Switch With Redundant Power Supply DPS-500A | | No Change |
| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |

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| Server Rack: 1 No. | | No Change |
| 42U Server Rack with 800MM x 1200MM with 2 Nos 32Amps C13 - C14 PDUs with necessary accessories | | No Change |
| Peripherals | | No Change |
| 1 x 24" LED Monitor (1920X1080) Resolutions & 1 x USB Keyboard & Mouse | | No Change |
| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |

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| Storage Solution using PFS : 1 No. | | |
| Capacity: 200TiB usable capacity (or more), implemented in hardware only RAID6 (8D+2P), with at least 2% disks as hot-spare. Metadata storage: 2% of usable storage (or above) storage space to be configured in RAID 1/1E/10 using SSDs with endurance rating of 3DWPd or higher. Controller: Offered Storage shall have Active-Active controller with minimum 8GB cache per controller. GUI: Storage system should provide GUI based management and administration. Hard Drives: Support for SSD, SAS, NL-SAS. Required capacity and performance to be configured with NL-SAS HDDs Ports: Storage solution should effectively connect to multiple compute nodes by 100 Gbps InfiniBand File system: Storage should allow creating single global namespace parallel file system of at least 200 TiB usable size. The storage should support parallel file system deployment such as Lustre / BeeGFS or equivalent and entire PFS to be configured with no single point failure architecture. Performance: The overall storage system should be able to deliver at least 4GB/s of sustained read/write throughput (1MB block size) or better across the usable 200 TiB. To be demonstrated and submit output during implementation. Entire PFS solution must be configured in a no single point failure architecture The storage should be provided with Rack Mount (Max 12U), redundant Power Supply, redundant Fans (wherever applicable). The Solution offered must be complete PFS solution and any required component that is not mentioned above should be added by vendor. | | Option such as separate I/O nodes to be decided by the bidder. NCSCM shall technically evaluate |

| Installation & Commissioning | | |
|---|---|-----------|
| Parameters | Description | |
| Operating System | 64-bit Linux (Open-Source Linux) | No Change |
| Resource Manager | Job monitoring and management | No Change |
| | Workload cum resource manager with policy-aware, resource-aware and topology-aware scheduling | No Change |
| | Advance reservation support | No Change |

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| & Scheduler (Job Scheduler with following features) | Heterogeneous cluster support | No Change |
| | Multi-cluster support | No Change |
| | Pre-emptive and backfill scheduling support | No Change |
| | Application integration support | No Change |
| | Live reconfiguration capability | |
| Compilers/Libraries | Latest versions of GCC and LLVM and Intel® oneAPI Base & HPC Toolkit (Multi-Node) for 2 Concurrent User and Max 10 Developers to be Supported for 3years. | No Change |
| HPC Management (Commercially License in the name of Purchaser with 3 Years Support) | 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 Disk full 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. Note: Offered Stack must have been deployed by OEM / Bidder earlier as well as part of HPC Solution – documentary evidence must be provided NOTE: In case bidder wish to offer open source-based software utility, Then the same must be validated by the OEM. The bidder can enclose a declaration copy for the same from the respective Server OEM. | No Change |
| Application Suites | WRF, MOM, MPAS, NEMO to be installed by the bidder and has to show benchmark performance between 92 to 98 percent with reputed government institutions. Bidder should run and demonstrate WRF Model with input dataset provided by NCSCM NOTE: Bidder should enclose recommendation letter from any renowned past user, where they have executed and installed the similar applications. | No Change |
| User Manual | Bidder should provide user manual of installed compilers, libraries and applications | No Change |
| Training | Bidder should provide the training to NCSCM system administrator and users regarding the usage and administration of the administration of installed HPC cluster | No Change |
| Support | Bidder should provide remote and on-site support related to the cluster administration and issues for one year | No Change |
| Warranty | 5 years comprehensive warranty for Hardware & softwares. | 5 years from the successful date of installation for Hardware & softwares. |

OPTION – 2 HPC with CPU and GPU node

| Master Node: 1 No. | | |
|---------------------------|---|---|
| Processor | Dual Processor with minimum 16C, 2.90GHz or Higher | Dual processor with 16 core, 2.90 GHz of 3 rd generation or higher |
| Support | X86_64 Processor must have AVX – 512 native supports | No Change |
| Chipset | Compatible chipset | No Change |
| RAM | 256GB ECC DDR4 3200 MHz RAM or higher to be configured in a balanced Memory Configuration for Optimum Performance | Required 16 DIMM |
| Controller | 2GB SAS Controller Supports RAID 0, 1, 5, 6, 10, 50 & 60 | No Change |
| HDD(s) | 10 x 16TB Enterprise SAS 7.2K RPM 3.5" Hot Swap HDD | No Change |
| SSD | 2 x 960GB Enterprise SATA 2.5" Hot Swap 3DWPD SSD | No Change |
| HPC Network | 1 x 100Gbps high speed and low latency Port with cable of 2M length | No Change |
| Network | Dual Gigabit LAN Ports with 2 x 2M Gigabit Ethernet Patch Cable | No Change |
| Management | IPMI 2.0 with compliant Dedicated Port | No Change |
| Exp. Slot | 2 PCI-E Slots (in x16 / x8) | No Change |
| Ports | At least 2 x USB 3.0 ports | No Change |
| Chassis | 2U Rack mountable Using Rail Kit | No Change |
| Power Supply | 1600W Redundant Power Supply With 80Plus | No Change |
| OS | Open-Source Linux | No Change |
| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |

| Compute Node: 4 Nos. | | |
|-----------------------------|--|--|
| Processor | Dual Processor with minimum 24C, 2.80GHz or Higher | No Change |
| Support | X86_64 Processor must have AVX – 512 native supports | No Change |
| Chipset | Compatible chipset | No Change |
| RAM | 512GB ECC DDR4 3200 MHz RAM or higher to be configured in a | No Change |
| | balanced Memory Configuration for Optimum Performance | No Change |
| Controller | Using On board Controller | No Change |
| SSD | 2 x 480GB Enterprise SATA 2.5" Hot Swap SSD with 3 DWPD | No Change |
| | 2 x 960GB Enterprise SATA 2.5" Hot Swap SSD with 3 DWPD (For Scratch Data) | No Change |
| HDD/SSD Bays | At least 12 Nos | No Change |
| HPC Network | 1 x 100Gbps high speed and low latency Port with cable of 2M length | No Change |
| Network | Dual Gigabit LAN Ports with 2 x 2M Gigabit Ethernet Patch Cable | No Change |
| Management | IPMI 2.0 compliant with Dedicated Port | No Change |
| Exp. Slot | 2 PCI-E Slots (in x16 / x8) | No Change |
| Ports | At least 2 x USB 3.0 ports | No Change |
| Chassis | 2U Rack mountable Using Rail Kit | No Change |
| Power Supply | 1400W Redundant Power Supply With 80Plus or higher | No Change |
| OS | Open-Source Linux | No Change |
| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |

| Compute Node (GPU): 1 No | | |
|---------------------------------|--|--|
| Form Factor | Max. 2U Rack Mount Server/workstation | No Change |
| Configured CPU | 64Core 2.25-3.4 Ghz or higher latest gen processor | No Change |
| GPU | 4x NVIDIA cudacore (5000 or higher), Tensorcore (400 or higher) 80GB GPUs with NVLink | The GPU specifications have been changed with latest updates and provided the specifications separately. |
| Memory | 512GB DDR4 RAM | |
| Memory Slots | Min 32 DIMMs or more | |
| RAID Controller | 12Gbps PCIe 3.0 SAS RAID controller supporting for RAID 0,1 support | |
| Internal Storage | 7.68 TB U.2NVME drive. OS1.92TB NVME drive | |
| Network Ports | 2 x 10GbE and 1x 1GbE management port | |
| IB Adapter | 1 no. single port 100Gbps HDR Infiniband adapter with cable | |
| PCIe Slots | 6x PCIe Gen4 slots with min 4 PCIe x16 slots. | |
| Cooling system | Workstation should be liquid cooled or better | |
| | All vendor/partners bidding for this tender should submit Authorisation certificate directly obtained from GPU Vendor for GPU Node | |

| Compute Node (GPU): 1 No | | |
|---------------------------------|---|--|
| Configured CPU | Dual AMD Rome,7742, 128 cores, 2.25Ghz or higher latest gen processor | |
| GPU | 8x NVIDIA A100 80GB GPUs with NVLink | |
| Memory | 2TB DDR4 RAM with DIMM slots supporting 3200 MT/s or higher in a fully balanced configuration | |
| Memory Slots | Min 32 DIMMs or more | |
| RAID Controller | 12Gbps PCIe 3.0 SAS RAID controller supporting for RAID 0,1 support or with better options | |
| Internal Storage | 2 x 1.92TB hot-plug SSDs in RAID 1 | |
| Network Ports | 1x 1GbE dedicated remote management port | |
| IB Adapter | 8 no. single port 200Gbps HDR Infiniband adapter with cable | |
| PCIe Slots | 6x PCIe Gen4 slots with min 4 PCIe x16 slots. | |
| Power Supply | 80 Plus Platinum Redundant Power Supply/better | |

| Primary Communication Switch: 1 No. | | |
|--|--|--|
| | Switch-IB 2 based EDR 1U switch, 36 QSFP28 ports, 2 Power Supplies (AC), unmanaged, standard depth, P2C* airflow, Rail Kit or Mellanox quantum HDR infinityband switch, 40 QSFP56 ports, | All IB should be based on HDR |
| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |

| Secondary Communication Switch: 1 No. | | |
|--|--|--|
| | 24 x 10/100/1000BASE-T ports, 2 x 10GBASE-T and 4 x 10G SFP+, L3 Stackable Managed Switch With Redundant Power Supply DPS-500A | No Change |
| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |

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|---|---------------------------------------|--|
| Server Rack: 1 No. | | |
| 42U Server Rack with 800MM x 1200MM with 2 Nos 32Amps C13 -C14 PDUs with necessary accessories | | No Change |
| Peripherals | | No Change |
| 1 x 24" LED Monitor (1920X1080) Resolutions & 1 x USB Keyboard & Mouse | | No Change |
| Warranty | 3 years Comprehensive onsite Warranty | 5 years from the successful date of installation over the onsite |

| | | |
|--|---|--|
| Storage Solution using PFS : 1 No. | | |
| Capacity: 200TiB usable capacity (or more), implemented in hardware only RAID6 (8D+2P), with at least 2% disks as hot-spare. Metadata storage: 2% of usable storage (or above) storage space to be configured in RAID 1/1E/10 using SSDs with endurance rating of 3DWPD or higher. Controller: Offered Storage shall have Active-Active controller with minimum 8GB cache per controller. GUI: Storage system should provide GUI based management and administration. Hard Drives: Support for SSD, SAS, NL-SAS. Required capacity and performance to be configured with NL-SAS HDDs. Ports: Storage solution should effectively connect to multiple compute nodes by 100 Gbps InfiniBand. File system: Storage should allow creating single global namespace parallel file system of at least 200 TiB usable size. The storage should support parallel file system deployment such as Lustre / BeeGFS or equivalent and entire PFS to be configured with no single point failure architecture. Performance: The overall storage system should be able to deliver at least 4GB/s of sustained read/write throughput (1MB block size) or better across the usable 200 TiB. To be demonstrated and submit output during implementation. Entire PFS solution must be configured in a no single point failure architecture. The storage should be provided with Rack Mount (Max 12U), redundant Power Supply, redundant Fans (wherever applicable). The Solution offered must be complete PFS solution and any required component that is not mentioned above should be added by vendor. | Option to be decided by the bidder. NCSCM shall technically evaluate. | |

| Installation & Commissioning | | |
|--|--|---|
| Parameters | Description | |
| Operating System | 64-bit Linux (Open-Source Linux) | The bidders proposed for open source solution |
| Resource Manager & Scheduler (Job Scheduler with following features) | Job monitoring and management | |
| | Workload cum resource manager with policy-aware, resource-aware and topology- aware scheduling | |
| | Advance reservation support | |
| | Heterogeneous cluster support | |
| | Multi-cluster support | |
| | Pre-emptive and backfill scheduling support | |
| | Application integration support | |
| | Live reconfiguration capability | |
| Compilers/Libraries | Latest versions of GCC and LLVM and Intel® oneAPI Base & HPC Toolkit (Multi-Node) for 2 Concurrent User and Max 10 | No Change |

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|---|---|--|
| | Developers to be Supported for 3years. | |
| HPC Management (Commercially License in the name of Purchaser with 3 Years Support) | 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 Disk full 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. Note: Offered Stack must have been deployed by OEM / Bidder earlier as well as part of HPC Solution – documentary evidence must be provided NOTE: In case bidder wish to offer open source-based software utility, Then the same must be validated by the OEM. The bidder can enclose a declaration copy for the same from the respective Server OEM. | No Change |
| Application Suites | WRF, MOM, MPAS, NEMO to be installed by the bidder and has to show benchmark performance between 92 to 98 percent with reputed government institutions. Bidder should run and demonstrate WRF Model with input dataset provided by NCSCM NOTE: Bidder should enclose recommendation letter from any renowned past user, where they have executed and installed the similar applications. | No Change |
| User Manual | Bidder should provide user manual of installed compilers, libraries and applications | No Change |
| Training | Bidder should provide the training to NCSCM system administrator and users regarding the usage and administration of the administration of installed HPC cluster | With free of cost |
| Support | Bidder should provide remote and on-site support related to the cluster administration and issues for one year | With free of cost |
| Warranty | 5 years comprehensive warranty for Hardware & softwares. | 5 years from the successful date of installation for Hardware & softwares. |