SCOPE OF WORK

1. Scope of work

- The Bidder's scope of work as per the conditions of contract and technical specifications includes assembly, quality check, packing, supply, transportation, transit insurance, local delivery, receipt, unloading, handling, storage at site, conducting, cabling, installation, testing and commissioning of the requisite hardware infrastructure alongwith its associated peripherals and also include documentation, warranty and Facility Management Services for the said System.
- Only such bidders who have quoted their prices for the complete scope in all respect shall be considered.
- Any additional items/ components as required to make the project completely operational may be assessed by the bidder and the same may be incorporated in the offer. The BOQ as assessed by the party as above should be clearly indicated in the offer. Even at the time of execution, if any additional items/ components are required to complete the system integration, notwithstanding the BOQ as identified by the party as above, the same shall be provided free of cost by the firm.
- Documentation for the complete system including:
    a. Factory / Site test certificates of various equipments supplied.
    b. Original Manufacturers manuals and warranty cards.
    c. Installation certificates of all equipments, description of configuration profile as executed for different equipment.
    d. Troubleshooting chart for all equipment.
    e. Standard OEM checklists for installation, maintenance etc. if any.
    f. Training documents.
- Training of Owner technical team.

2. Compliance to Specification

- All the hardware specifications mentioned in the RFP are the required minimum, higher or better specifications would be acceptable.
- Component furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such component's and/or needed for erection, completion and safe operation of the component's as required by applicable codes though they may not have been specifically detailed in the technical specification, unless included in the list of exclusions. All similar standard components / parts of similar standard components provided shall be inter-changeable with one another.
- The selected bidder shall be responsible for providing all materials, components, and services, specified or otherwise, which are required to fulfill the intent of ensuring operability, maintainability, and reliability of the complete component covered under this specification within his quoted price. This work shall be in compliance with all applicable standards, statutory regulations and safety requirements in force of the date of award of this contract.
- The selected bidder shall also be responsible for deputing qualified personnel for installation, testing, commissioning and other services under his scope of work / service as per this specification. All required tools for completing the scope of work as per the specification is also the responsibility of the selected bidder.
- The selected bidder shall perform the services and carry out its obligations with all due diligence, efficiency and economy in accordance with generally accepted professional

techniques and practices and shall observe sound management practices and employ appropriate advance technology and safe methods. The selected bidder shall always act in respect of any matter relating to this contract or to the services as faithful advisers to the Owner.

- All interconnecting cables required to connect the communication component shall be furnished. All cables shall be fully assembled connector pre-terminated and factory tested as part of overall system checkout. Cables shall be neatly & properly tied up and dressed using appropriate cable hangers and Velcro bands. All the cables, connectors, sockets, panel's etc. shall be labeled for identification purpose.
- All the cabling should adhere to the TIA-942 Data Center Standard.
- All component, accessories and cables supplied under this contract shall be in accordance with the latest applicable recommendations, regulations and standards of:
    a) CCITT/ITU
    b) ANSI
    c) IEC 60364
    d) IEEE Standard 1100
    e) IETF
    f) IPSec
    g) OPSec
    h) ICSA
    i) TIA 942
    j) EIA/TIA 568 Standards
    k) International Electro-technical Commission (IEC)
    l) Cable (Cat 6A) and cable accessories (Cat6A) UL Listed and verified
- For parameters not covered under the above codes, internationally acceptable standards shall be accepted. The selected bidder shall furnish a complete list of all standards and codes under which his component is designed, manufactured and assembled along with the bids.
- Functionality / accessibility of each component of the system and the system as a whole should be demonstrated to the satisfaction of Owner.
- Reliable over voltage and over current protection circuits shall be provided in the component power supply units. The component power supply units shall be self-protecting and also protect connected component's against interference, noise, voltage dips and surges & impulses that may be present in the mains power supply sources. Component shall be guaranteed for operation over the following AC power range to be made available by Owner: 240 V AC +/-10%, 50 Hz +/- 5%.

3. Bidder’s Responsibility

- Only such bidders who have quoted their prices for the complete scope in all respect shall be considered.
- The complete System including all the hardware, software and other necessary items will be warranted for 05 years from the date of successful completion & taking over of the system and must operate at or above the guaranteed values with regard to availability.
- Any software update/enhancement released till the completion of warranty period shall be supplied free of cost and installed and commissioned free of cost as per instructions from engineer in charge.
- The system spare parts, as and when required, shall be guaranteed for a period not less than 5 years from the date of successful handing over of the system to Owner.
- The bidder shall arrange for all tools, tackles, testing instruments etc. as required during all operations such as transportations, installation, testing and commissioning etc. for completing the scope of work as per this specification. These tools and tackles and testing instruments etc. shall be allowed to be taken back by the bidder. The bidder shall undertake

all testing and commissioning activities and shall provide assistance during inspection and acceptance testing by the Owner.

- Bidder shall provide all required equipment and services, whether explicitly mentioned in these specifications or not, to fulfill the intent of the specification and to ensure completeness, operability and maintainability of the system at no extra cost to the Owner.
- Bidder shall furnish the part No. / Product identification Number for all products as provided by the original manufacturer.
- Bidder shall provide a clear and explicit activity wise action plan and schedule of completion of the above work.
- Successful bidder upon placement of award for work should undertake a site survey for installation and commissioning.
- Printed Brochures/ Pamphlet/ Leaflet illustrating Technical details / specifications etc. for all the items/ materials quoted should be enclosed with bid.
- Bidder shall replace, free of cost, any damaged media for software or documentation as well as Hardware locks during the warranty period.
- The Bidder shall post his Service Engineers at Data Centre premises till the completion of Acceptance test.
- The Bidder must address all the above aspects in the same order and must indicate very specifically any deviation taken by him on account of make / configuration / technical and other particulars in a separate schedule included in the bid documents. Unless specifically brought out in the specific schedule as mentioned above, the bid shall be deemed to be in line with the technical and other particulars mentioned in the tender specifications.
- Any hardware or software upgrades / enhancement / engineering changes applicable to the hardware and software supplied shall be communicated to Owner by the bidder within a period of one month from the date of release during the entire life of the system. Owner shall have the option for purchasing the necessary hardware / software to incorporate the same in their hardware / software.

4. Owner's Responsibility

Owner shall provide the following:-

- Illumination and space required for installation
- Provide the power, cooling and other expansion at Data Centre which is based on bidder requirement.

5. General Requirements

- Any hardware or software quoted by the bidder is declared End of Sale by the OEM at / before the time of delivery will not be accepted by Owner.
- Bidder shall provide periodic preventive maintenance during the warranty period including cleaning or periodic inspection. The preventive maintenance schedule recommended should be furnished along with this offer. During warranty period, bidder shall schedule the preventive maintenance in consultation with the Owner.
- Bid proposals and other proposal shall be in English.
- Owner reserves the right to order any of the quantity either in full or in part to any of the bidder should the circumstances warrants so.
- Bidder should have given the Power and Cooling Requirement along with bid.

6. Technical Support

- The SI should provide comprehensive onsite support to Owner at the Data Center.

- The SI should ensure that the entire solution as a whole is operational and run according to stipulated performance standards.
- The SI should commit to provide all necessary resources and expertise to resolve any issues and carry out required changes, optimizations and modification so that complete system as a whole works according to the specified requirements and satisfaction of Owner.
- The SI should provide comprehensive technical support services for all the software proposed for the entire period of the contract. The technical support should include all the upgrades, updates and patches that are released by the respective OEMs during the period of contract.
- The total period of support and maintenance including the Warranty and AMC / ATS shall be five (5) years from the date of acceptance of the project.

7. Schedule of Implementation

The activities should be completed as per the following schedule:

Activity	Time Frame (D- Date of PO Release) – in Weeks
Recommendation for cabling and Connectivity at Data Center for supplied Servers, Storage etc.	D+1 wk
SUPPLY	D+5wk
Racking, Stacking, Deployment of Servers, O/S etc. as per plan	D+8 wk
Integrated Testing by SI	D+10 wk
Validation of Server, Storage Deployment by Project Team and Acceptance by Owner	D+ 13 wk
Audit & Validation	D+18 wk

8. Packaging

All the material and equipment's offered shall be suitably protected, coated, covered in water proof packing and crated to prevent damage or deterioration during transit, handling and storage at site till the time of installation. The SI shall be responsible for any loss or damage during transportation, handling and storage due to improper packaging.

9. Insurance

The successful Bidder shall arrange to take appropriate insurance in the name of Owner for full value of System to protect from all risks such as loss or damage in transit, storage, Installation, testing & commissioning, theft, pilferage, riot, civil commotion, weather conditions of all kinds, fire, etc. Any claim on loss or damage to the equipment and materials during handling, transportation, storage, installation or otherwise at any stage, till the System is `Taken Over' by the Owner, shall be the responsibility of the contracted Bidder. The successful Bidder shall be liable to replace the lost or damaged System/sub-system without any extra cost. Further the Contractor is to take all required insurance coverage in respect of all its personnel who shall be working on this engagement and for third party claims, if any.

10. Documentation

All the below mentioned documentation shall be provided in electronic media (two copy) print media (one copy). The Electronic documentation should be provided in standard format (Word, PDF etc.). In case documentation is provided in any other format, software for the same shall be provided at no cost to the Owner.

- HARDWARE – Necessary operating manuals and technical manuals including diagnostic and troubleshooting manuals for all the hardware systems / sub-systems in CD / print media. The extent of documentation to be furnished shall be to the Owner.
- SOFTWARE – User and reference manuals related to complete software in CD / print media. The documentation shall be to the satisfaction of the Owner. The documentation should include warranty and license document

- NETWORKING - The manuals for all networking products shall be provided wherever applicable.

11. Drawings and Diagrams

Bidder has to provide 'As built' drawings/diagrams for server system as may be required by Owner.

12. Inspection and Testing

- All materials furnished and all work performed under the contract shall be inspected and tested. The objective of testing is to ensure that all the hardware and the software supplied are as per the specifications and the requirement indicated in the technical specifications.
- Except where otherwise specified, the bidder shall furnish all labor and materials for test including test facilities, power and instrumentation and replacement of the damaged parts
- All tests shall be witnessed by Owner and / or its authorized representatives unless Owner authorize testing to proceed without witness.
- Should any inspection or test indicates that specific hardware, software, firmware or documentation does not meet specification requirements the appropriate items shall be replaced, added or upgraded free of cost by the bidder as necessary to correct the noted deficiencies. After correction of a deficiency, all necessary retest shall be performed to verify the effectiveness of the corrective action.
- Owner also reserves the right to require any retesting of previously approves tests at Owner expenses. However, if retest(s) reveals non-compliance to the specification, the bidder shall bear the expenses for retesting and remedial actions.

13. Test Plans and Procedures

Test shall include the following:-

- Testing at Data Centre (Site acceptance test)
- Availability test

13.1 Testing at Data Centre (Site Acceptance Test)

All the equipment shall be tested in the stand alone mode as well as integrated system.

- On completion of supply of the equipment by the bidder and before commissioning each item of the equipment shall be thoroughly inspected jointly by the Owner and the bidder.
- Site Acceptance Test shall also include all the relevant tests to ensure functionality in LAN / Integrated environment. The test report print shall be generated for all hardware tests and a comprehensive test report indicating test done for all products and the test performance in the integrated environment along with the test result shall be prepared by bidder and submitted to Owner on completion of the test.

13.2 Availability Test

- The bidder shall include a comprehensive write up to cover the "Availability Test" as it proposes to be conducted. The intent of availability test shall be to demonstrate that the hardware and software supplied and installed performs correctly and reliably.
- Bidder shall provide all the consumables required during testing, commissioning and availability test.
- The system shall be considered as "available", if all the processors, total installed memory; all hard discs (internal & external) etc. are in service with network and external storage and up and running.
- However, if the system does not meet the availability criteria laid down as above, the system shall be treated as rejected and it will be the responsibility of the bidder to remove the rejected system from the Data Centre and provide for its

replacement. However, the replacement system shall be subjected to test/inspection. The bidder shall replace the system or subsystem within 6 weeks of the direction to that effect from the Owner. However the rejected system shall be allowed to be removed only on receipt of replacement system.

14. Acceptance

System shall be accepted by the Owner after successful completion of Availability test.

15. Taking Over

The hardware and software shall be considered to be taken over by the Owner from the bidder after successful completion of the tests as indicated in INSPECTION AND TESTING section 12 of this document to meet the satisfaction of the Owner and on the basis of certification by Owner.

16. Warranty

- The Bidder shall provide warranty for trouble free operation for a minimum period of 5 (Five) years after Handing Over to the Owner. Further, during this period, it will be the responsibility of the Bidder to maintain and support the system fully and ensure that the level of availability is 97% (Quarterly) on individual servers and 99.5% (Quarterly) on High Availability clusters and SAN storage. The provision of all supplies spares and services necessary for the maintenance shall be the Bidder's responsibility. The Engineer-In-Charge's decision will be final and binding.
- The following services shall be provided during warranty period on a 24 hrs x 6 format.
    a. Fault reporting facility with the OEM. Unlimited on-site support in case of configuration/ OS related issues.
    b. Maximum Two (2) hours response time for any reported fault.
    c. Maximum Six (06) hours resolution time to all hardware and OS related issues on High Availability Clusters, SAN storage and Backup System.
    d. Maximum Twenty Four (24) hours resolution time to all hardware and OS related issues on all stand-alone systems.
- Routine checking: The system shall be checked regularly for any abnormalities and pre-failure warnings to take up predictive maintenance in a scheduled manner. A log book for these checks clearly indicating all details shall be maintained, and kept with the engineer in charge.
- Any Software updates/enhancements released during the warranty period of the system shall be offered for installation & commissioning free of cost by the Bidder along with corresponding documentation within a period of one month from the date of release. Installation & commissioning of the above shall be as per schedule given by engineer in charge.
- Support shall be provided during applications loading and tuning of the system. All support with respect to OS tuning, kernel parameter optimizing etc for smooth running of applications shall be provided during Warranty Period.
- The availability shall be monitored on a quarterly basis during the warranty period.
- **MEDIA WARRANTY: -** The Bidder shall warrant the tapes, Diskettes, CDs or the media to be free of defects in material and workmanship under normal case for 90 days from the `Taking Over' date. During this period, Owner may return defective media to the Bidder and it will be replaced free of cost. If any document/manual supplied by the Bidder is found to be inadequate / incomplete within the period of the contract, the Bidder shall replace/complete such document / manual at their cost within 15 days' time.
- **SERVICE WARRANTY: -** The bidder shall warrant that its technical and consulting services will be of professional quality confirming to generally accepted industry standards and practices.

- Support shall be provided during applications loading and tuning on the system. All support with respect to OS tuning kernel parameter optimizing etc for smooth running of applications shall be provided during warranty period.
- The warranty shall be at Bidder's cost.

17. Completeness of Scope

Only those bidders who have quoted for complete works as specified in SCOPE OF WORK section of this document shall be considered.

18. Training

- Bidder shall provide training (1 week) of installation, configuration, commissioning, monitoring and troubleshooting of various equipment like servers, storage, associated software etc to the Owner's nominated staff. The detailed contents, coverage, venue and methodology for training will be decided mutually by the bidder and Owner.
- The training shall cover the following aspects of the systems offered against the tender but not limited to:
  - Training on OS of Servers covering fundamentals, device configuration, performance tuning, backup & restore, network options and cluster fundamentals and configuration.
  - Training on SAN Storage, covering configuration, system architecture, trouble shooting and management.
  - The H/W training shall include Hardware components of the system, Architecture, Data Communication over LAN and WAN, Peripherals, etc.
  - The Software training shall include OS, System Administration, software.

  The Bidder shall submit detailed proposal for training. The detailed module contents and module duration shall be mutually decided.
- The training course shall be structured and supported by programmed illustrations, video, charts, etc. The training shall be imparted by experienced personnel only. The Bidder shall provide extensive lecture notes, handouts and other training documentations. The H/W and S/W training courses can be at Owner site or bidder's Authorized Training Centre. The training shall be conducted at mutually agreed site on dates to be mutually decided.

TECHNICAL SPECIFICATIONS

All the hardware items supplied should be of latest generation and should not be declared End-of-Life in next 5 years

1. Servers – 30 in DC

Component	Specifications
Processor	Rack servers with 2 processors having minimum 16 cores in each processor.
Memory	Min 512 GB DDR4 RAM expandable to 1 TB
HDD Controller	12Gbps SAS RAID Controller supporting RAID 0 ,1 & 5 with minimum 1 GB Cache
HDD	2*600 GB SAS Hot Swap HDD (10 K or higher RPM)
Video Controller	Integrated Graphics Controller
Network Controller	**Network Controller** : Minimum four Port - 2*10 Gbps with SFP (dual port each on separate controllers) & 2*1 Gbps
Fibre Channel HBA	Two HBA with minimum one FC Ports of16/ 32Gbps on each

	HBA and two number of 5m LC-LC Cable
Slots	Minimum two free PCI/PCI-x/PCI-Express
Ports	2*USB; 1* Keyboard Port & 1*Mouse Port (on board/dongle); One dedicated Ethernet Port for OS independent out-of-band hardware management
Bays	Minimum 5 Hot Swap drive bays
Optical Drive	DVD ROM (Internal / External)
System Chassis	2U Rack Mount server chassis, Redundant Hot Swappable Power Supply with platinum efficiency
OS Certification	Certification for latest Server version of Windows and minimum two Linux flavours
Driver / Software utilities	All required device drivers for OS installation, System Configuration and Server Management.
System Management	Remote Management of Server over LAN & WAN with SSL encryption, Virtual Media with required license, Remote KVM, Server Health logging, Out-of-band management
Other features	Should support industry standard virtualization Software
Warranty	Five years on-site comprehensive OEM Warranty Support

2. SAN storage – 250 TB in DC

Raw Capacity	Storage array should be supplied with 250TB RAW capacity (excluding spare drives), in a single rack unit
Drives	Storage array should have enterprise level SSD/FMD/ Flash hard drive with 1.2 TB or higher.Hard drives should have dual port hot pluggable drives and both ports must connect with different controllers
Scalability	Storage array should be scalable up to 1PB without any downtime
Cache Memory	Storage array should have minimum 500 GB cache memory across controllers.
	In the event of power failure, the cache data need to be vault to drives safely before shut down of the storage array
Controller	Storage array should support Active/Active Cluster for Array Controller and each controller should be capable of handling full capacity in case of a controller failure
	Each and every component of controller must be redundant
FE IO Ports FC	Storage Array Should have minimum 8 no of FE ports with 32/16 Gbps. And these ports must be scalable if required
FE Replication Ports Ethernet	Storage Array Should support remote replication and should have at least 4 no of Fiber/Cupper 10Gbps ports for replication.
Management Port	Storage Array should have minimum 2 Ethernet cupper ports with 1/10Gbps and management should also be redundant
Backend Ports Speed	Storage Array should have minimum 16 no. of backend link with 6Gbps or 8 no of backend link with 12 Gbps with full-duplex data transfer capability

Hot Spare Policy	System should have Global hot spares that can automatically be used to replace a failed drive anywhere in the system. The solution must provide automatic monitoring of the drive health and initiate proactive copy. There should be at least 1 no of hot spare on each 20 no of drives
Management and analytics software	Management software should be provided for configuration, administration and monitoring of the storage array of full capacity from day one. Software should be of Enterprise level and should manage all the array of same family. Management Software should have both GUI and CLI. Storage System should be supplied with performance and analytics software for complete capacity from day one
Data Protection and Reduction	Storage Array should support local copy and remote copy for data protection and compression/deduplication for data reduction
Licenses	The necessary license(s) required to support above features should be included.

3. Operating System

Specifications
RHEL Virtual Data Centre Premium (unlimited guest) 2 sockets license – 30 licenses (for DC for 30 servers with 2 Proc each) (in case of procurement of 4 proc servers licenses would have to be increased accordingly) RHN Satellite per site – 1 (for DC) RHEL Smart management solution (unlimited guest) per server license – 30 licenses (for DC)

4. Virtualization Software

Specifications
VMware vSphere 6 with Operations Management Enterprise Plus for 1 processor with 3 yrs production support – Qty - 60 license (for DC for 30 servers with 2 Proc each) (in case of procurement of 4 proc server licenses would have to be increased accordingly) VMware vCenter Server 6 Standard for vSphere 6 (Per Instance) with 3 yrs production support.-Qty – 1 (for DC) Windows server Std edition 2 core license – 4 licenses at DC (for setting up Windows AD for vCentre). It needs to be clarified from Vendors/Microsoft whether no of licenses are to be procured on physical server cores or on the VMs cores. Accordingly, the no. of licenses and the cost would vary. The above has been recommended for Two VMs of 4 cores each.