INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

Powai, Mumbai - 400076

PR No.1000022582 **RFx No. 6100000965**

Storage Technical Specifications

The following are the technical specifications for the storage infrastructure.

Quantity: 4 Storage boxes with 125TB per box usable in RAID6

1. Storage Architecture:

a. The proposed storage must be a true enterprise-class end-to-end NVMe All-Flash Array (AFA) with multi-controller architecture with No Single Point of Failure.
b. The Proposed AFA should be a total all-flash solution and not a hybrid storage array/system/solution. AFA must not be an existing HDD array technology fitted with solid-state drives (SSDs).
c. The storage should not be based on block emulation technology on files.
d. The storage offered should be of the current generation with the latest technology and a recent launch and should not reach End of Sale in next 3 years from the date of sale. The proposed equipment/components must not be declared "End of Life" or "End of Support" within the next 6 years from the date of purchase. In the event of the supplied equipment being declared End of Support/End of Life during the contract period of 5 years, the OEM has to replace the equipment with equivalent or higher configurations without any additional cost to the purchaser.

2. Controller Architecture & Processing Power:

a. Each proposed AFA must have a minimum 2 numbers of controllers per array in true symmetrical active-active mode with automatic failover to each other in case of failure and should be scalable to 4 controllers in a true symmetrical active-active mode without changing the existing controllers.
b. Each proposed AFA shall be based upon Intel CPUs and be shall be supplied with at least 40 or more numbers of CPU cores and shall be scalable to at least 80 or more numbers of CPU cores without replacing existing controllers. The CPU/Controller must not be declared as the manufacturer's end of life for the next 5 years from the date of purchase.
c. Overall uptime of 99.99% (Average Uptime on a yearly basis) is desirable.
d. In offered Storage Array all the controllers with or without scalability should be connected to a common back-plane and shall not use any loosely connected architecture like through SAN switch, Ethernet switch, Infiniband switches, etc.
e. The storage architecture must support the required performance and capacity scalability as a single enterprise storage system with the common backplane

and not a storage solution with multiple silo/groups of the dual controller storage in a clustered configuration proposed to meet the performance and scalability requirement.

f. The proposed AFA shall have dedicated, separated processing engines, apart from CPU cores, for effectively handling of NVMe parallelism (Command queue and no. of commands per queue), Raid-Rebuilding, and data striping, thin re-claim, etc.
g. The proposed AFA shall be supplied with at least 8 dedicated processing engines with ASICs. In case the OEM does not support ASIC then an additional 8 CPU Core needs to be provided.
h. The proposed AFA shall be scalable to at least 16 ASIC engines without replacing the existing controllers. In case the Vendor does not support ASIC then an additional 16 CPU Core needs to be provided without replacing existing controllers.

3. Operating System & Clustering Support:

The AFA should support industry-leading Operating System platforms, including Centos/RHEL 8.x, SuSe Enterprise Linux 15.x, Windows Server 2019, VMware 6.0, and higher versions (for all OS). The AFA must support third-party applications and APIs, along with multiple host operating systems. Any software and licenses required to connect to these OS should be supplied with the AFA. The proposed AFA should support all the above-operating systems in clustering.

4. Protocol Support:

The AFA should support the latest versions of block protocols like FC, iSCSI, etc. is must, and support of file protocols like CIFS, NFS, and SMB is preferred.

5. Storage Capacity and Disk Configuration:

Each AFA should be sized and configured with a total usable capacity of 125 TB NVMe with RAID 6 in the following manner:

a. Enterprise-class NVMe Drive only needs to be considered for Capacity and Performance requirements. Bidder/OEM should not use more than 10D+2P while sizing the array. 6D+2P or any combination with at least 2 parity disks less than or equal to 10D+2P is allowed.
b. 125 TB total usable capacities should be visible on the host, formatted, after RAID overheads, hot spares, vault/other system overheads, system reservations, journal volumes, etc.
c. Offered SSD's should withstand heavy writes without any limit. The vendor should replace failed SSD (physical failure, deteriorated performance due to SSD endurance, etc.) throughout the life of the array (under warranty and under AMC) without any additional cost to Computer Centre IIT Bombay. All SSD shall be provided with a minimum of 7 years' unconditional warranty.
d. Each proposed AFA should be further scalable just by adding disks and disk enclosures if required, without any additional controller (within the same storage subsystem).

6. Performance IOPS and Latency:

a. From the date of the installation itself, each AFA should serve a minimum of 1,00,000 sustained and consistent IOPS (60% Read,40% Write, 8k block size) with compression, replication, block, and file deduplication.
b. Each AFA should be scalable to more than 2,00,000 sustained and consistent IOPS (60% Read, 40% Write, 8k block size) without replacing existing controllers. The AFA should perform at sub-millisecond latency. (latency must not exceed 1 millisecond).

7. Base Cache Memory:

a. The system should be offered with a minimum of 512 GB DRAM cache memory for a single storage array and shall scale to 1TB without changing the existing controllers. Complete offered cache shall be both Global and coherent.
b. SSD/PCIe-based Flash as a cache will not be accepted. Bidder/OEM shall not offer any additional card/module/drive for write cache operations.
c. The cache management should be adaptive to the I/O workload. The storage should dynamically allocate Read Cache and Write cache from the available cache to accommodate the I/O workload.
d. The cache should be capable of mirroring all writes and keeping a single cached copy of read data, thereby eliminating cache wastage for mirrored reads and optimizing cache resources utilization. In case both read and write cache is mirrored by storage, the vendor has to provide a solution with at least 50% additional cache required for mirroring read data.

8. No Single point of failure:

a. Offered Storage Array has to be configured with "No Single Point of Failure" including Array Controller card, Cache memory, FAN, Power supply, etc.
b. All critical components should be hot-swappable.
c. Adequate technical details to be provided, as a part of a technical write-up in the technical bid, in support of the above.

9. Raid Support:

a. The proposed AFA should support industry-standard RAID 5/RAID 6/RAID 10/RAID 50/RAID 60.
b. Storage array should support online Volume / Pool / LUN Creation, Expansion. Necessary software & licenses have to be provided along with the storage offered.
c. Storage should support the online Migration of LUN from One RAID group to another.
d. Necessary software & licenses have to be provided for the full capacity along with the storage offered.

10. Data Protection and Encryption:

a. In case of the Power failure, the Storage array should be able to protect the DRAM cache data and should come with a de-stage module.
b. Bidders must ensure that in case of de-staging, dual redundant Standby power supplies or the batteries need to be configured in a way so that it can hold the data significantly and coherently during the process of cache de-staging to flash.
c. Vendor shall offer encryption capability with appropriate encryption licenses and shall meet FIPS 140-2 – Level 2 security requirements either by using encrypted disk drives or controller-based encryption, Vendor shall not offer any Software-based encryption.
d. Offered FIPS 140-2 shall support both KMIP 1.3 and KMIP1.4 for key management solutions. The bidder/OEM shall offer at least an internal Key manager engine for key management.

11. Host Ports:

a. Each proposed AFA shall be supplied with Min 4 x 25Gbps Ethernet ports and is scalable to at least 8 x 25Gbps Ethernet ports per controller.
b. The proposed AFA shall be supplied with two additional native 10Gbps IP ports for storage-based replication and shall be scalable to 4 Native 10Gbps IP ports without replacing existing controllers. All ports shall be provided with an SFP+ transceiver for fiber connectivity.
c. The complete solution should be IPv4 and IPv6 compliant and the management port should support dual-stack implementation.

12. Thin / Virtual Provisioning and Thin Reclamation:

a. The AFA should be configured with the capability of thin-provisioning. Any required licenses for the functioning of storage must be supplied for the fully populated storage capacity.
b. The AFA should have support for thin provisioning and Thin Reclaim to make the volume thin for an extended period of time.

13. Quality of Service:

a. Each AFA should support the quality of service for critical applications so that appropriate performance can be achieved. Any licenses (for fully populated storage capacity) required for this purpose should be included in the Proposed AFA.
b. Software if needed for QoS should be provided and should be perpetual in nature.

14. Proactive Hot sparing:

a. Must provide automatic monitoring of disk drive health and initiate a proactive background drive rebuild on unused/spare drives.
b. Offered Storage Array shall support distributed Global hot Spare for offered Disk drives.
c. Global Hot Sparing: Each AFA should support Global Hot Spare (HS) Disks. It should be configured as per the industry's best practices. For every 11 or less drives, one hot spare of the same type of disk must be included.

15.Load Balancing & Multi-path:

a. The proposed AFA should support dynamic load balancing across all active controllers in the system. Storage array should support multipathing across controllers. Any required licenses for availing of the above functionality must be mentioned and quoted.
b. Multi-path and load balancing software (along with the licenses) shall be provided if the vendor doesn't support MPIO functionality for the operating systems mentioned in point no. 3 of this document.
c. A single LUN/volume should be accessible parallelly from all the controllers.
d. All the LUN's should support automatic load balancing across all the storage controllers in the storage system. All LUNs must be accessible for Read & Write from all the hosts connected to the controllers.
e. Required license (if any) for connectivity to meet the above functionality should also be quoted.

16. Compression and Deduplication:

a. The proposed AFA shall mandatorily provide in-line data efficiency engines like compression and block-level deduplication without impacting any performance from the date of installation for the full storage capacity.
b. All licenses required for this purpose should be included in the Proposed AFA.

17. Snapshots / Full Copies:

a. Storage should be configured with the required license to support both, snapshot as well as restore file and block data. The license should be configured for the full capacity of the array from the date of installation.
b. The proposed AFA should have support for controller-based snapshots with at least 1024 copies for a given volume.
c. The snapshot copies to be independent of each other, restoring a snapshot to production file-system / LUN, should not invalidate the rest of the snaps for the same production file-system or LUN.
d. Snapshots should be taken without impacting the performance of the system.
e. If the vendor uses reservations and a dedicated pool of drives for the snapshot or full copy, then the same should be offered for 20% of the capacity using similar drives used for AFA's capacity.
f. Each proposed AFA should be able to recover data from any snapshot of any specific volume.

18. Software and Firmware Updates:

a. Each proposed AFA shall support online non-disruptive software and firmware upgrade for all controller & disk drives and should allow rollback without interrupting the services (In case of unsuccessful up-gradation).
b. Software and Firmware updates should not deteriorate more than 10% of the array's performance/throughput.

19. Repair Activities and Capacity upgrades:

a. Each AFA should support online maintenance and should be transparent to the connected application servers.
b. It should not deteriorate more than 10% of the array's performance/throughput during online maintenance/capacity up-gradation.
c. Each AFA should support Non-disruptive (with data in place) capacity and connection expansion, without any downtime.

20. Replication:

a. The storage array should support hardware-based data replication at the array controller level across all models of the offered family.

b. The proposed AFA should support both Synchronous and Asynchronous replication across 2 storage arrays natively without using any third-party or software-based solution. All licenses for replication are to be included from day 1.

c. The proposed AFA should support additional native IP ports for the storage-based replication. In case the vendor does not offer native replication ports, additional devices are required for replication like the FC-IP router has to be included in the proposed solution in a redundant fashion at each site.

d. The system should have the ability to withstand link failure for an extended period of time without having to restart replication from the beginning.

e. The proposed AFA should support 3 Datacenter solutions natively where the Primary site shall be able to replicate synchronously to nearby/Bunker location and at the same time shall be able to replicate to Far location asynchronously.

f. In case of Primary site failure – The far site shall have the capability to pull the incremental information from nearby/Bunker location natively without using any third party or software-based solution.

21. Virtualization Integration:

a. The proposed AFA should be fully compatible with all supported protocols for any virtualized application environment.
b. The proposed AFA should support and integrate with any virtualized OS for offloading storage-related functions from server to storage system.
c. The proposed AFA should provide multipathing software with failover and load balancing functionality provided by the virtualized OS.

22. Storage Array Configuration & Management Software:

a. The bidder/OEM shall provide centralized on-premises Storage Array Configuration and Management software/interface for all the Storage-related operations.
b. The proposed AFA must provide onsite easy to use, intuitive Secure GUI (web-based java free) and CLI enabled with single management/ administration interface for all storage configuration/management/operations.
c. The management software/tool should have complete remote management features.
d. The management software/tool should provide Change Management and Tracking.
e. The management software/tool should provide Event and Status Monitoring.
f. The management software/tool should measure and monitor storage services, including capacity, performance, encryption, replication, deduplication, etc.
g. Historical Reporting and Analytics: The storage management software should provide real-time and historical (at least 2 Years) performance monitoring, along with advanced reporting and analytics features. If any additional license is required, then the bidder must supply all the necessary licenses for the full capacity of the storage.
h. Tamper-proof audit logging of all administrative activities on the system should be supported for compliance reasons.
i. Storage management software must be able to perform and monitor local and remote replication operations.
j. Management software should also be capable of 1) Detailed data reporting 2) Simplified Provisioning Process 3) Policy-Based Operation 4) Role-Based Administration features 5) Log Maintenance 6) SNMP v2, v3 and traps 7) Automated Application-Aware Tuning 8) Monitoring by Mobile Device 9) Provision to send alerts via email/SMS 10) Ability to automate storage functions 11) Interface/wizards to perform configuration operations like create LUNs, map LUNs, set LUN attributes, etc.

Additional Terms and Conditions:

GENERAL TERMS AND CONDITIONS:

Bidders are advised to read all the clauses mentioned in the tender carefully. Submitting your solution implies that you agree to act as per the terms and conditions mentioned in the tender.

1. The bidder shall bear all the costs during the preparation and submission of the proposal, site visit (if required), etc.
2. The bidders may be requested to come to IIT Bombay and present the solutions proposed in their technical bids.
3. No new information will be accepted from the bidder after the submission of the bids. However, IIT Bombay may ask for clarifications, if required, on submitted information in order to evaluate the bid. The bidder should respond to such a clarification request within the specified time.
4. The bidder has to quote for all the items mentioned in the specification. On failing to do the same, IITB may invalidate the bid and disqualify the bidder.
5. The quoted product must be the most recent or currently supported models, and that they incorporate all recent improvements in design and materials. On failing to do the same, IITB may invalidate the bid and disqualify the bidder.
6. Due to a stringent deadline for incurring the expenditure, IIT Bombay has the right to **cancel the PO or charge the penalty** if the delivery, installation, and acceptance testing is not completed within the stipulated timeline. Specifically
    a. Delivery should be within **eight weeks** of issuing of PO.
    b. Installation, commissioning, and acceptance testing should complete within **two weeks of the delivery.**
7. The purchase committee will make the final decision on the quantity of purchase after evaluating the proposals. The actual quantity purchased could be lower or higher up to 20% of indicated quantity .
8. At the time of installation, if it is found that some additional hardware or software items are required to meet the operational requirement of the configuration but not included in the OEM's original list of deliverables, the OEM shall supply such items to ensure the completeness of the configuration at no extra cost.
9. Bidders should submit only the necessary documentation related to this tender with a proper index highlighting the required technical specs in the product documentation that matches the tender specs or asked by the purchaser with page numbers. Failure to do the same will invalidate the bid and result in disqualification.
10. Bidder is not allowed to outsource any work mentioned in the scope of work for this tender to a third party.
11. Along with the technical bid, the bidder has to submit the compliance sheet as per the given format in Annexure-V and complete bill of material (BoM). Failure to do the same will invalidate the bid and result in disqualification.
12. The bidder has to give an undertaking of acceptance of all terms & conditions along with the technical bid on the company's letterhead as per the format given in Annexure-III. Failure to do the same will invalidate the bid and result in disqualification.
13. The bidder has to give an undertaking of authenticity along with the technical bid on the company's letterhead as per the format mentioned in Annexure-I. Failure to do the same will invalidate the bid and result in disqualification.

14. IIT Bombay reserves the right to accept or reject, in full or in part, any or all the offers if a) seller fails to comply with any material term of the contract; b) seller fails to deliver the material(s) or any part thereof within the stipulated delivery period and /or fails to replace/ rectify any rejected or defective material(s) promptly; c) seller becomes bankrupt or goes into liquidation or the seller makes a general assignment for the benefit of the creditors or a receiver is appointed for any substantial property owned by the seller; d) seller has misrepresented to buyer.
15. IIT Bombay does not bind itself to accept the lowest bid or any other bid and reserves the right to reject all or any bid or cancel the Tender without giving any reason whatsoever.
16. IIT Bombay also reserves the right to re-issue the tender without any explanation. The bidders will not have any right to object to such re-issue of tender.
17. IIT Bombay reserves the right to terminate the order/tender/PO if the bidder/OEM violates any of the terms and conditions of the tender.

BIDDER ELIGIBILITY CRITERIA:

S. No	Qualifying Criteria	Mandatory Document proof to be furnished
1	The bidder should be an Indian Company registered under the Companies Act / Partnership / LLP at least from the last five years. in a similar line of business, i.e., Installation, configuration, and commissioning of Enterprise series IT equipment. In case the Bidding Company is the result of a merger/acquisition, at least one of the merging companies should have been in operation for at least three years as on the date of submission of the bid.	Copy of the Partnership deed/Bye Law/Certificate of Incorporation issued by Registrar of Companies and Memorandum & Articles of Association and full address of the registered office.
2	The bidder should have supplied at least three orders of Enterprise storage from a reputed OEM like HPE, DELL-EMC, Hitachi, Infortrend to State/Central Government/PSUs or any listed corporate company in the last three years.	Purchase order copies along with satisfactory work completion certificate/ Final Acceptance certificate issued by Client. Relevant Purchase Orders received in the last three years.
3	The bidder should have at least two qualified and experienced Storage Engineers/professionals on its payroll with a minimum experience of 5 years in handling storage devices from reputed brands.	Bio-data of the personnel proposed to be deployed for the project along with copies of the biodata, valid company ID, and salary sleep.
4	Bidder has to be an OEM or partner authorized by OEM for this tender.	Bidders should furnish a letter of authorization (MAF) from OEM for this tender as per the format

		given in Annexure - IV.
5	The Bidder should have an average annual turnover of ₹ 3 Crores and should be a positive net worth company for the last three financial years.	The Audited Financial Statements (Profit and loss statement, Balance sheet) for the last three years and CA certificate should be furnished/ uploaded.
		Solvency certificate for the value of ₹4 Crores issued by Scheduled Banks to be furnished.
6	The bidder should be an ISO 9001 certified company at least for the last three years.	The ISO certificate should be enclosed.
7	Bidders should have an office/branch in the MMR region.	Any government-approved proof should be provided.
8	The bidder is not blacklisted by any department of IIT Bombay, or by any other IIT, or by any state or central government body or organization, or by an autonomous body governed by state or central government during the past 3 years.	Self-declaration should be given on companies letterhead as per the format provided in the Annexure-II
9	The bidder can only go with a single OEM.	-NA-

OEM QUALIFICATION CRITERIA:

S. No	Qualifying Criteria	Mandatory Document proof to be furnished
1	The OEM should be in the Gartner leader's magic quadrant for all-flash storage, at least for the last three years.	URLs of OEM and Gartner website should be provided or The OEM should submit a self-declaration with all the details mentioned on his letterhead.
2	The OEM of quoted products should have its own corporate office or parts warehouse and service centre or RMA depot in the MMR region with fully qualified engineers.	Should submit any government authorized document which will prove this or should provide the OEM website URLs where this information is published.
3	The OEM should be well equipped and located to honor 4 hours of response time in case of failures.	The OEM should submit a self-declaration with all the details mentioned on his letterhead.
4	The OEM should be well established at least from the last 20 years in enterprise series of storage devices and should have a global footprint across a minimum of 5 continents.	Should submit any government authorized document which will prove the establishment of OEM/Brand and or copy of PO needs to be attached.

5	The OEM should have a direct presence in India at least from the last 10 years.	Should submit any government authorized document which will prove the establishment of OEM/Brand and or copy of PO needs to be attached.
6	The OEM should have at least 25 Crores average annual turnover from the last 3 consecutive years.	The Audited Financial Statements (Profit and loss statement, Balance sheet) for the last three years and CA certificate should be furnished/ uploaded. OR a duly signed and stamped self-declaration on companies letterhead.
7	The OEM should have their own 24x7 technical support center in India and the technical support resources should be on direct rolls with the OEM.	Should submit any government authorized document which will prove this or should provide the OEM website URLs where this information is published or The OEM should submit a self-declaration with all the details mentioned on his letterhead.
8	The OEM should not be from a country that shares a land border with India.	-NA-
9	The OEM should not be blacklisted by any department of IIT Bombay, or by any other IIT, or by any state or central government body or organization, or by an autonomous body governed by state or central government during the past 5 years.	Self-declaration should be given on companies letterhead as per the format provided in the Annexure-II
10	The OEM can only bid through a maximum of 3 bidder/channel partners.	-NA-

TENDER EVALUATION:

The competent authority will evaluate all the proposals to determine whether these are complete in all respects as specified in the tender document. Evaluation of the proposal shall be done in two stages as

(a) Stage - I (Technical Evaluation):

1. The competent authorities will evaluate the technical bid(s) to determine whether they are meeting the essential eligibility criteria, whether the tenderer has submitted the EMD undertaking, whether any computational errors have been made, whether all the documents have been appropriately signed & stamped, whether all the documents as mentioned / or required to be submitted with technical bid are submitted and whether a bid is complete and generally is in order. There will not be any further technical evaluation will be done in case of incomplete bid, and the bidder will be disqualified.

2. After evaluating the performance parameters offered, support structures, technical evaluation of proposed switches, and references, the competent authority will shortlist a group of bidders. Subsequent to this, the shortlisted bidders will be required to participate in the commercial bidding phase, and the disqualifications will be informed to the concerned bidders.

(b) Stage- II (Financial evaluation through Reverse Auction):

The financial bidding will be in the form of an electronic reverse auction. The details of the financial bidding phase will be announced to the short-listed bidder(s) at a later date.

Bidders should quote a single figure which includes all the cost of the project only in INR. The successful bidder will submit the item-wise bifurcation of the single figure quoted and an item-wise cost of a single box within 24 hours.

The bidders who have cleared /qualified for the technical evaluation are only allowed to participate in this stage.

Base price for Reverse auction will be determined from these price bids submitted in SRM Portal. The all technically qualified bidders will be allowed to participate in reverse auction.

EVALUATION MATRIX:

In Annexure-V, a set of attributes pertaining to the equipment have been given in the form of a compliance sheet. The purchase committee at IIT Bombay will check the quoted product is matching with the tender specifications. The evaluation will be done based on the documentation, details, and remarks given by the bidder and from the OEM website. The bidder/OEM will be disqualified if the quoted product is not complying with any of the tender specifications.

SCOPE OF WORK:

1. The selected Bidder has to supply the listed items within the stipulated time.
2. The selected Bidder has to deploy, install, configure and test the storage boxes as per specification mentioned in the tender at Computer Centre's Data Centre in accordance with the technical team of Computer Centre IITB. The scope of the work at this phase would include but not restricted to the following:
   A. Site Inspection and Bill of Material Verification.
   B. Rack Mounting and Stacking of the Storage devices.
   C. Structured cabling of OFC, CAT6a/CAT7 and power and any other required cabling and enclosing via flexible pipes wherever necessary with design approval from Technical staff assigned by Computer Centre IIT Bombay.
   D. Labelling for each and every cable and its diagram and documentation.
   E. Storage Power on Self/Burn-In/Stress Test activity –Minimum 48 Hours
   F. Replacement of hardware if any fault is observed.
   G. License installation.
   H. Firmware upgradation.
   I. Management IP and user configuration.
   J. Explanation of the configuration, and providing howtos and best practices on various configurations.
   J. Final acceptance from the technical team of the purchaser.

3. The Bidder has to ensure that the proposed equipment/components must not be declared "End of Life" or "End of Support" in the next 6 years from the date of purchase. Suppose the supplied equipment is declared End of Support/End of Life during the warranty period of 5 years. In that case, the bidder/OEM has to replace the equipment having equivalent or higher configurations without any additional cost to the purchaser.

4. The Bidder should have a back-to-back arrangement with the OEM so that the purchaser will be able to log a call with the OEM directly for the contract period of 84 months.

5. Single Point of Contact: The selected Bidder shall appoint a single point of contact, with whom IIT Bombay will deal with any activity pertaining to the requirements of this Tender. The Bidder has to award all the necessary authority to this person at its own expense.

WARRANTY & SLA:

1. Each and every component of the supplied equipment, security keys, accessories, and licenses should have an on-site comprehensive 24x7x365 days warranty for 60 months and AMC of 24 months with 4 hours of response time and would be in the name of Computer Centre IIT Bombay. No parts, accessories, licenses of the systems should be excluded from such warranty.
2. The said warranty will begin from the date of acceptance and sign-off from the technical team of Computer Centre IIT Bombay.
3. The bidder should also provide the cost of an annual maintenance contract (AMC) within the bifurcation document mentioned above which starts at the end of the warranty period with back-to-back, onsite support from the OEM. The price of the AMC will be valid for 24 months after the end of the warranty period. The payment of the AMC will be released on a quarterly basis based on the performance, and if there is any penalty, it will be deducted from the payment of the next quarter.
4. The bidder will be fully responsible for getting support from OEM in respect of each and every Hardware part, Software, Licenses, and technical support for the equipment mentioned in this tender. In case the bidder fails to provide the support, OEM has to provide technical support for the period mentioned in the contract. Bidder has to attach a confirmation letter from the OEM.
5. The said warranty and the AMC should not be considered violated if the IIT Bombay buys any other compatible supplemental hardware from a third party and installs it in the machines with an intimation to the Bidder. However, the warranty will not apply to such additional hardware items installed.
6. Mean time between failures (MTBF): If during the warranty period, any storage fails four or more occasions and caused downtime in a period of less than three months or six times in a period of less than twelve months, it shall be replaced by equivalent or better configured and robust new storage device by the Bidder/OEM at no cost to the IIT Bombay.

7. For any delay in delivery of replacement of faulty parts during the inspection, commissioning of the systems, or for acceptance tests/checks, the IIT Bombay reserves the right to charge a penalty.
8. The Bidder will depute an experienced engineer as and when required to visit the site and assist the staff during the initial configuration and/or during the failure and ensure the system's proper functioning.
9. The Root Cause Analysis (RCA) faced for any issues related to the system should be provided by the OEM within 3 Business Days.
10. If any component supplied by the Bidder/OEM is inoperative, which renders the entire system useless, then it will be treated as system downtime
11. The Uptime commitment of 99.6% monthly is a must on all the equipment, commencing from the date of the acceptance of the entire system (hardware/software). The uptime will be calculated as,

    Uptime (%) = ((Sum of total hours during the month - Sum of downtime hours during the month) X 100) / Sum of total hours during the month
    Total hours during the month = No. of working days x24 hours

12. Any hardware issues should be resolved/rectified within the 24 hours. It is the responsibility of Bidder to coordinate with the OEM to provide a replacement.
13. Along with the technical bid, the OEM should submit a letter of commitment for **84 months (60 months of warranty and 24 months of AMC)** from the installation date, with respect to Hardware, Software, and Firmware support, and uptime commitment. The bid will be rejected if they are not accompanied by the letter from the OEM.
14. In case of merger/sale of business by the OEM, the above-said warranty, AMC and SLA will be applicable to the new OEM. If the new OEM does not honor the said warranty, AMC, and SLA, the IIT Bombay reserves the right to blacklist both the OEM and reserve the right to take proper legal action. The OEM has to accept this clause in the commitment letter. Failure of the same may result in disqualification of the bid.

PENALTY:

1. Delivery of all equipment should be within 8 weeks from the date of Purchase Order. In the event of any or all equipment(s) not being delivered, installed, tested, and commissioned within a period of 10 weeks from the date of Purchase Order, a penalty of one percent of the total cost of equipments for each week or part thereof the delay will be charged to the bidder. This amount of penalty so calculated shall be deducted at the time of making final payment after successful installation and commissioning of hardware.

2. A penalty during the warranty period and AMC period:

Uptime Percentage	Penalty Details
During the warranty period	

Uptime is more than 99.6%	No Penalty
Uptime lesser than 99.6% but more than 99%	3% of the product cost
Uptime lesser than 99%	Penalty at an incremental rate of 2% (in addition to a base of 3%) of the product cost for every 0.5%lower than the stipulated uptime
During the AMC period	
Uptime is more than 99.6%	No Penalty
Uptime lesser than 99.6% but more than 99%	10% of the monthly product AMC cost
Uptime lesser than 99%	20% of the monthly product AMC cost

3. The penalty is to ensure that the OEM and vendor are putting their best efforts to honor SLAs committed. There will not be any upper limit on the penalty. If there is any penalty above the PBG, the bidder has to pay the penalty on demand raised by IIT Bombay. In case of failure to pay the penalty, the IIT Bombay reserves the right to take legal action and blacklist the bidder/OEM.
4. The IIT Bombay reserves the right to publish the information about the unsatisfactory service by the bidder/OEM and action taken by the institute on their website and in the national newspaper (s).

PREBID MEETING:11/01/2022 @ 11.00 AM
Link: https://kaksha.webex.com/kaksha/j.php?MTID=m424bb1683093142cab0adc36992ead58
Meeting number: 2514 961 4743
Password: h55cJM2H9kj

Annexure – I **Format for Undertaking of Authenticity**
(To be given on company's letterhead)

Date:

To,
The Head Computer Centre,
IIT Bombay,
Powai Mumbai – 400076.

Sub: Undertaking of Authenticity for Hardware and/or Software Supplies
Tender Reference No.: _____

Dear Sir,

With reference to the equipment being quoted to you vide our Quotation No:_____ dated _____, we hereby confirm that all the components, parts, assembly, software, etc. used in the equipment to be supplied shall be original new components/parts/assembly/software and of the most recent or current supported models, and that they incorporate all recent improvements in design and materials, only from respective OEMs of the products and that no refurbished / duplicate / second-hand components /parts/assembly/software shall be supplied or shall be used. We also undertake to produce a certificate from the Original Equipment Manufacturers (if required by you) to support the above statement at the time of delivery/installation.

2. We also confirm that in respect of licensed operating systems and other software utilities to be supplied, the same will be procured from authorized sources and provided with an Authorized License Certificate

3. In case of default and the purchaser finds that the above conditions are not complied with, we agree to take back the equipment supplied and return the money paid by you, in full within seven days of intimation of the same by the purchaser, without demur or any reference to a third party and without prejudice to any remedies the purchaser may deem fit.

4. In case of default and we are unable to comply with the above at the time of delivery or during installation, for the IT Hardware / Software already billed, we agree to take back the equipment without demur if already supplied and return the money if any paid to us by you in this regard.

5. We also take full responsibility for both parts & Service SLA as per the content even if there is any defect by our authorized Service Centre / Reseller / SI.

Dated this ..... day of ..... 202…

(Signature) (Name) (In the capacity of)

Duly authorised to sign Bid for and on behalf of _____

Annexure-II **Self declaration of blacklisting**

(To be given on company's letterhead)

Date:

To,
Head Computer Centre,
IIT Bombay,
Powai Mumbai – 76.

Sub: Declaration of Non-Blacklisting.
Tender Reference No.: _____

Dear Sir,

With reference to the equipment being quoted to you vide our Quotation No:_____ dated _____, we hereby declare that neither we nor our Start-up or a parent, subsidiary, or associate Company under direct or indirect common parent is/are presently not placed on any Blacklist or Holiday list by any department of IIT Bombay, or by any other IIT, or by any state or central government body or organization, or by any PSU's, or by an autonomous body governed by state or central government for any kind of fraudulent practice(s)/activity(s).

It is understood that, If this declaration is found to be incorrect, then without prejudice to any other action that may be taken, my/ our security may be forfeited in full, and the tender, if any to the extent accepted, may be canceled.

Dated this ..... day of ..... 202…

(Signature) (Name) (In the capacity of)

Duly authorised to sign Bid for and on behalf of _____

Annexure – III **TENDER / CONDITIONS ACCEPTANCE LETTER**

(To be given on company's letterhead)

Date:

To,
Head Computer Centre,
IIT Bombay,
Powai Mumbai – 76.

Sub: Acceptance of Terms & Conditions of Tender.
Tender Reference No.: _____

Dear Sir,

1. I/We have downloaded/obtained the tender document(s) for the above-mentioned 'Tender/Work.'
2. I/We hereby certify that I/We have read the entire terms and conditions of the tender documents (including all documents like annexure), schedule(s), etc.,) and I/We shall abide hereby the terms/conditions/clauses contained therein.
3. The corrigendum(s) issued from time to time by your department/organization has also been taken into consideration while submitting this acceptance letter.
4. I/We hereby unconditionally accept the tender conditions of the above-mentioned tender document(s)/corrigendum(s) in totality/entirely.
5. In case any provisions of this tender are found violated, your department/ organization shall be at liberty to reject this tender/bid, including the forfeiture of the full said earnest money deposit absolutely, and we shall not have any claim/ right against deptt in satisfaction of this condition.

Dated this ..... day of ..... 202…

(Signature) (Name) (In the capacity of)

Duly authorised to sign Bid for and on behalf of _____

Annexure – IV **Manufacturer's Authorization Form**

(To be given on OEM's letterhead)

Date:

To,
Head Computer Centre,
IIT Bombay,
Powai Mumbai – 76.

Sub: Authorization for participation in the Tender.
Tender Reference No.: _____

Dear Sir,

We, who are established and reputable manufacturers / producers of _____having factories / development facilities at (address of factory / facility) do hereby authorise M/s_____(Name and address of Agent) to submit a Bid, and sign the contract with you against the above Bid Invitation.

2. We hereby extend our full warranty for the above firm's Solution, Products, and services against this Bid Invitation for the mentioned period.

3. We duly authorize the said firm to act on our behalf in fulfilling all installations, Technical support, and maintenance obligations required.

Dated this ..... day of ..... 202…

(Signature) (Name) (In the capacity of)

Duly authorised to sign Bid for and on behalf of _____

Annexure - V **Format for the compliance sheet**

All the bidders are requested to mention the details/any deviations with respect to the specifications along with the exact reference page number from the documentation in the compliance sheet format given below.

Sr. No	Specifications	Bidder Compliance/Remark
1.	**Storage Architecture:** ● The proposed storage must be a true enterprise-class end-to-end NVMe All-Flash Array (AFA) with multi-controller architecture with No Single Point of Failure. ● The Proposed AFA should be a total all-flash solution and not a hybrid storage array/system/solution. AFA must not be an existing HDD array technology fitted with solid-state drives (SSDs). ● The storage should not be based on block emulation technology on files. ● The storage offered should be of the current generation with the latest technology and a recent launch and should not reach End of Sale in next 3 years from the date of sale. The proposed equipment/components must not be declared “End of Life” or “End of Support” within the next 6 years from the date of purchase. In the event of the supplied equipment being declared End of Support/End of Life during the contract period of 5 years, the OEM has to replace the equipment with equivalent or higher configurations without any additional cost to the purchaser.	
2.	**Controller Architecture & Processing Power:** ● Each proposed AFA must have a minimum 2 numbers of controllers per	

	array in true symmetrical active-active mode with automatic failover to each other in case of failure and should be scalable to 4 controllers in a true symmetrical active-active mode without changing the existing controllers. ● Each proposed AFA shall be based upon Intel CPUs and be shall be supplied with at least 40 or more numbers of CPU cores and shall be scalable to at least 80 or more numbers of CPU cores without replacing existing controllers. The CPU/Controller must not be declared as the manufacturer's end of life for the next 5 years from the date of purchase. ● Overall uptime of 99.99% (Average Uptime on a yearly basis) is desirable. ● In offered Storage Array all the controllers with or without scalability should be connected to a common back-plane and shall not use any loosely connected architecture like through SAN switch, Ethernet switch, Infiniband switches, etc. ● The storage architecture must support the required performance and capacity scalability as a single enterprise storage system with the common backplane and not a storage solution with multiple silo/groups of the dual controller storage in a clustered configuration proposed to meet the performance and scalability requirement. ● The proposed AFA shall have dedicated, separated processing engines, apart from CPU cores, for effectively handling of NVMe parallelism (Command queue and no. of commands per queue), Raid-Rebuilding, and data striping, thin re-claim, etc. ● The proposed AFA shall be supplied with at least 8 dedicated processing engines with ASICs. In case the OEM does not support ASIC then an additional 8 CPU Core needs to be provided. ● The proposed AFA shall be scalable to at least 16 ASIC engines without replacing the existing controllers. In case the Vendor does not support ASIC then an additional 16 CPU Core needs to be provided without replacing existing controllers.	

3.	**Operating System & Clustering Support:** ● The AFA should support industry-leading Operating System platforms, including Centos/RHEL 8.x, SuSe Enterprise Linux 15.x, Windows Server 2019, VMware 6.0, and higher versions (for all OS). The AFA must support third-party applications and APIs, along with multiple host operating systems. Any software and licenses required to connect to these OS should be supplied with the AFA. The proposed AFA should support all the above-operating systems in clustering.	
4.	**Protocol Support:** ● The AFA should support the latest versions of block protocols like FC, iSCSI, etc. is must, and support of file protocols like CIFS, NFS, and SMB is preferred.	
5.	**Storage Capacity and Disk Configuration:** Each AFA should be sized and configured with a total usable capacity of 125 TB NVMe with RAID 6 in the following manner: ● Enterprise-class NVMe Drive only needs to be considered for Capacity and Performance requirements. Bidder/OEM should not use more than 10D+2P while sizing the array. 6D+2P or any combination with at least 2 parity disks less than or equal to 10D+2P is allowed. ● 125 TB total usable capacity should be visible on the host, formatted, after RAID overheads, hot spares, vault/other system overheads, system reservations, journal volumes, etc. ● Offered SSD's should withstand heavy writes without any limit. The	

	vendor should replace failed SSD (physical failure, deteriorated performance due to SSD endurance, etc.) throughout the life of the array (under warranty and under AMC) without any additional cost to Computer Centre IIT Bombay. All SSD shall be provided with a minimum of 7 years' unconditional warranty. ● Each proposed AFA should be further scalable just by adding disks and disk enclosures if required, without any additional controller (within the same storage subsystem).	
6.	**Performance IOPS and Latency:** ● From the date of the installation itself, each AFA should serve a minimum of 1,00,000 sustained and consistent IOPS (60% Read,40% Write, 8k block size) with compression, replication, block, and file deduplication. ● Each AFA should be scalable to more than 2,00,000 sustained and consistent IOPS (60% Read, 40% Write, 8k block size) without replacing existing controllers. The AFA should perform at sub-millisecond latency. (latency must not exceed 1 millisecond).	
7.	**Base Cache Memory:** ● The system should be offered with a minimum of 512 GB DRAM cache memory for a single storage array and shall scale to 1TB without changing the existing controllers. Complete offered cache shall be both Global and coherent. ● SSD/PCIe-based Flash as a cache will not be accepted. Bidder/OEM shall not offer any additional card/module/drive for write cache operations.	

	● The cache management should be adaptive to the I/O workload. The storage should dynamically allocate Read Cache and Write cache from the available cache to accommodate the I/O workload. ● The cache should be capable of mirroring all writes and keeping a single cached copy of read data, thereby eliminating cache wastage for mirrored reads and optimizing cache resources utilization. In case both read and write cache is mirrored by storage, the vendor has to provide a solution with at least 50% additional cache required for mirroring read data.	
8.	**No Single point of failure:** ● Offered Storage Array has to be configured with "No Single Point of Failure" including Array Controller card, Cache memory, FAN, Power supply, etc. ● All critical components should be hot-swappable. ● Adequate technical details to be provided, as a part of a technical write-up in the technical bid, in support of the above.	
9.	**Raid Support:** ● The proposed AFA should support industry-standard RAID 5/RAID 6/RAID 10/RAID 50/RAID 60. ● Storage array should support online Volume / Pool / LUN Creation, Expansion. Necessary software & licenses have to be provided along with the storage offered. ● Storage should support the online Migration of LUN from One RAID group to another. ● Necessary software & licenses have to be provided for the full capacity	

	along with the storage offered.	
10.	**Data Protection and Encryption:** ● In case of the Power failure, the Storage array should be able to protect the DRAM cache data and should come with a de-stage module. ● Bidders must ensure that in case of de-staging, dual redundant Standby power supplies or the batteries need to be configured in a way so that it can hold the data significantly and coherently during the process of cache de-staging to Flash. ● Vendor shall offer encryption capability with appropriate encryption licenses and shall meet FIPS 140-2 – Level 2 security requirements either by using encrypted disk drives or controller-based encryption, Vendor shall not offer any Software-based encryption. ● Offered FIPS 140-2 shall support both KMIP 1.3 and KMIP1.4 for key management solutions. The bidder/OEM shall offer at least an internal Key manager engine for key management.	
11.	**Host Ports:** ● Each proposed AFA shall be supplied with Min 4 x 25Gbps Ethernet ports and is scalable to at least 8 x 25Gbps Ethernet ports per controller. ● The proposed AFA shall be supplied with two additional native 10Gbps IP ports for storage-based replication and shall be scalable to 4 Native 10Gbps IP ports without replacing existing controllers. All ports shall be provided with an SFP+ transceiver for fiber connectivity. ● The complete solution should be IPv4 and IPv6 compliant and the management port should support dual-stack implementation.	

12.	**Thin / Virtual Provisioning and Thin Reclamation:** ● The AFA should be configured with the capability of thin-provisioning. Any required licenses for the functioning of storage must be supplied for the fully populated storage capacity. ● The AFA should have support for Thin provisioning and Thin Reclaim to make the volume thin for an extended period of time.	
13.	**Quality of Service:** ● Each AFA should support the quality of service for critical applications so that appropriate performance can be achieved. Any licenses (for fully populated storage capacity) required for this purpose should be included in the Proposed AFA. ● Software If needed for QoS should be provided and should be perpetual in nature.	
14.	**Proactive Hot sparing:** ● Must provide automatic monitoring of disk drive health and initiate a proactive background drive rebuild on unused/spare drives. ● Offered Storage Array shall support distributed Global hot Spare for offered Disk drives. ● **Global Hot Sparing**: Each AFA should support Global Hot Spare (HS) Disks. It should be configured as per the industry's best practices. For every 11 or less drives, one hot spare of the same type of disk must be included.	

15.	**Load Balancing & Multi-path:** ● The proposed AFA should support dynamic load balancing across all active controllers in the system. Storage array should support multipathing across controllers. Any required licenses for availing of the above functionality must be mentioned and quoted. ● Multi-path and load balancing software (along with the licenses) shall be provided if the vendor doesn't support MPIO functionality for the operating systems mentioned in point no. 3 of this document. ● A single LUN/volume should be accessible parallelly from all the controllers. ● All the LUN's should support automatic load balancing across all the storage controllers in the storage system. All LUNs must be accessible for Read & Write from all the hosts connected to the controllers. ● Required license (if any) for connectivity to meet the above functionality should also be quoted.	
16.	**Compression and Deduplication:** ● The proposed AFA shall mandatorily provide in-line data efficiency engines like compression and block-level deduplication without impacting any performance from the date of installation for the full storage capacity. ● All licenses required for this purpose should be included in the Proposed AFA.	
17.	**Snapshots / Full Copies:**	

	● Storage should be configured with the required license to support both, snapshot as well as restore file and block data. The license should be configured for the full capacity of the array from the date of installation. ● The proposed AFA should have support for controller-based snapshots with at least 1024 copies for a given volume. ● The snapshot copies to be independent of each other, restoring a snapshot to production file-system / LUN, should not invalidate the rest of the snaps for the same production file-system or LUN. ● Snapshots should be taken without impacting the performance of the system. ● If the vendor uses reservations and a dedicated pool of drives for the snapshot or full copy, then the same should be offered for 20% of the capacity using similar drives used for AFA's capacity. ● Each proposed AFA should be able to recover data from any snapshot of any specific volume.	
18.	**Software and Firmware Updates:** ● Each proposed AFA shall support online non-disruptive software and firmware upgrade for all controller & disk drives and should allow rollback without interrupting the services (In case of unsuccessful up-gradation). ● Software and Firmware updates should not deteriorate more than 10% of the array's performance/throughput.	
19.	**Repair Activities and Capacity upgrades:** ● Each AFA should support online maintenance and should be transparent	

	to the connected application servers. ● It should not deteriorate more than 10% of the array's performance/throughput during online maintenance/capacity up-gradation. ● Each AFA should support Non-disruptive (with data in place) capacity and connection expansion, without any downtime.	
20.	**Replication:** ● The storage array should support hardware-based data replication at the array controller level across all models of the offered family. ● The proposed AFA should support both Synchronous and Asynchronous replication across 2 storage arrays natively without using any third-party or software-based solution. All licenses for replication are to be included from day 1. ● The proposed AFA should support additional native IP ports for the storage-based replication. In case the vendor does not offer native replication ports, additional devices are required for replication like the FC-IP router has to be included in the proposed solution in a redundant fashion at each site. ● The system should have the ability to withstand link failure for an extended period of time without having to restart replication from the beginning. ● The proposed AFA should support 3 Datacenter solutions natively where the Primary site shall be able to replicate synchronously to	

	nearby/Bunker location and at the same time shall be able to replicate to Far location asynchronously. ● In case of Primary site failure – The far site shall have the capability to pull the incremental information from nearby/Bunker location natively without using any third party or software-based solution.	
21.	**Virtualization Integration:** ● The proposed AFA should be fully compatible with all supported protocols for any virtualized application environment. ● The proposed AFA should support and integrate with any virtualized OS for offloading storage-related functions from server to storage system. ● The proposed AFA should provide multipathing software with failover and load balancing functionality provided by the virtualized OS.	
22.	**Storage Array Configuration & Management Software:** ● The bidder/OEM shall provide centralized on-premises Storage Array Configuration and Management software/interface for all the Storage-related operations. ● The proposed AFA must provide onsite easy to use, intuitive Secure GUI (web-based java free) and CLI enabled with single management/ administration interface for all storage configuration/management/operations. ● The management software/tool should have complete remote management features. ● The management software/tool should provide Change Management and Tracking.	

	● The management software/tool should provide Event and Status Monitoring. ● The management software/tool should measure and monitor storage services, including capacity, performance, encryption, replication, deduplication, etc. ● Historical Reporting and Analytics: The storage management software should provide real-time and historical (at least 2 Years) performance monitoring, along with advanced reporting and analytics features. If any additional license is required, then the bidder must supply all the necessary licenses for the full capacity of the storage. ● Tamper-proof audit logging of all administrative activities on the system should be supported for compliance reasons. ● Storage management software must be able to perform and monitor local and remote replication operations. ● Management software should also be capable of 1) Detailed data ~~reduction~~ reporting 2) Simplified Provisioning Process 3) Policy-Based Operation 4) Role-Based Administration features 5) Log Maintenance 6) SNMP v2, v3 and traps 7) Automated Application-Aware Tuning 8) Monitoring by Mobile Device 9) Provision to send alerts via email/SMS 10) Ability to automate storage functions 11) Interface/wizards to perform configuration operations like create LUNs, map LUNs, set LUN attributes, etc.	