



**Supply, Installation and Maintenance of Hardware, Operating Systems and Database Licenses for various Projects/Applications**

**RFP Ref. No DIT/BPR & BTD/OA/1835/2020-21 Date-06/10/2020**

**Amendments, Addendums and Corrigendums**

	<b>Original Clause</b>	<b>Revised Clause</b>
Annexure VI Point No.1 Storage System (Rack Mountable Storage System	Fiber Channel External Storage System with two RAID Controllers.Each Raid array controller should support Raid levels 0, 1, 5 and 1+0 implementations. Storage should have high availability feature with no single point of failure. Storage should have minimum 60 Gbps front end throughput and minimum 8 no. of FC front end ports. Storage should be supplied with all required licenses to connect at least 10 no: of servers as well OS such as Red Hat Enterprise Linux 6.x or higher, Windows server 2012 (both standard and datacenter editions) or higher. The usable capacity of SAN. Storage-1:Usable storage space of 45 TB having Raid 1+0 To be Placed at BDC. Storage-2.Usable Space of 55 TB having Raid 1+0 to be place at KDC.	Fiber Channel External Storage System with two RAID Controllers. Each Raid array controller should support Raid levels 0/1/5/6 or their combinations. Storage should have high availability feature with no single point of failure. Storage should have minimum 60 Gbps front end throughput and minimum 8 no. of FC front end ports. Storage should be supplied with all required licenses to connect at least 10 no: of servers as well OS such as Red Hat Enterprise Linux 6.x or higher, Windows server 2012 (both standard and datacenter editions) or higher. The usable capacity of SAN. Storage-1: Usable storage space of 45 TB all SSD having above raid option to be Placed at BDC. Storage-2.Usable Space of 55 TB all SSD having above raid option to be place at KDC.
Annexure VI Point No.2 Raid Support	Offered Storage Subsystem shall support Raid 0, 1, 1+0, 5 and Raid 6. Must support inter-mixing different RAID groups with one storage system. Different type of RAID levels should co-exist within the same array simultaneously to match different protection requirements of Data.	Offered Storage Subsystem shall support Raid 0/1/5/6 or their combinations. Must support inter-mixing different RAID groups with one storage system. Different type of RAID levels should co-exist within the same array simultaneously to match different protection requirements of Data.
Data in-Place upgrade Migration	The proposed storage must support seamless data-in-place upgrade of existing storage controllers without having to change the disk subsystem.	The proposed storage must support data migration of existing storage controllers without having to change the disk subsystem.

## Specification for SAN (Storage Area Network)

Sl. No.	Item	Specifications	Offered Specification	Complied (Y)
1	Storage System (Rack mountable storage system)	<p>Fiber Channel External Storage System with two RAID Controllers. Each Raid array controller should support Raid levels 0/1/5/6 or their combinations. Storage should have high availability feature with no single point of failure. Storage should have minimum 60 Gbps front end throughput and minimum 8 no. of FC front end ports. Storage should be supplied with all required licenses to connect at least 10 no: of servers as well OS such as Red Hat Enterprise Linux 6.x or higher, Windows server 2012 (both standard and datacenter editions) or higher. The usable capacity of SAN.</p> <p>Storage-1:Usable storage space of 45 TB all SSD having above raid option to be Placed at BDC.</p> <p>Storage-2:Usable Space of 55 TB all SSD having above raid option to be place at KDC.</p>		
2	Raid Support	Offered Storage Subsystem shall support Raid 1+0/5/6. Must support inter-mixing different RAID groups with one storage system. Different type of RAID levels should co-exist within the same array simultaneously to match different protection requirements of Data.		
3	Cache Memory	<ol style="list-style-type: none"> <li>Offered Storage Array shall be given with <b>Minimum of 128GB</b> usable cache <b>across dual controller</b>.</li> <li>Shall have dynamic management of Cache block size. Cache should be mirrored between the Active-Active controllers (load balancing). The paths should be redundant (at least 2 paths) to prevent disruption if one path fails. Must support either Cache battery backup for a minimum of 72 hours or fully automatic de-stage of cache to disks or it should be non-volatile DIMM (NVDIMM) during power failure to prevent possible data loss.</li> <li>Cache shall not have any overhead for the operating system.</li> </ol>		

4	Bays	Offered storage should support SSD hot swappable hard disk bays to accommodate above no. of hard disks and upgradable to 100 HDDs supporting 1 TB or higher hot swappable hard disk drives. Offered storage shall have minimum of 8 host ports for connectivity to servers.		
5	Hard disk drives	The storage array shall be offered with 1 TB or higher hot swappable hard disk drives, the Storage should support SSD Drive, mix and match of different type of spindles should be supported behind the same pair of controllers. The Storage shall be scalable to minimum 100 TB.		
6	Power supply	n +1 redundant hot swap power supply units		
7	Fans	n +1 redundant hot swap fans		
8	Management Software	Storage Array Configuration management and Performance Management Software should be provided. <b>(Storage Management Solution should also provide Historic Reports.)</b>		
9	Operating System (supporting)	1.The SAN should be accessible from servers having Windows Server 2012 or higher Edition, both 64 bit & 32 bit, Linux, RHEL, Cent OS, Unix etc. 2. Offered Storage Shall support all above operating systems in Clustering.		
10	No Single Point of Failure	Offered Storage Array shall be configurable in a No Single Point of failure configuration including Array Controller card, Cache memory, FAN, Power supply etc.		
11	Data Protection	1. In case of Power failure, Storage array shall be able to hold data in the cache for at-least 72 hours of time or shall support de-staging to disk drives. Bidder shall ensure that in case of de-staging, dual redundant Standby power supplies are configured.		
		2.For optimal data protection, storage shall support distribution of metadata on more than one drive shelf. (i.e., For optimal data protection, storage should have full protection of metadata.)		
		<b>3.Storage should have Thin provisioning, snapshots, clone &amp; Replication.</b>		
12	Maintenance	Offered storage shall support online non-disruptive firmware upgrade for both Controller and disk drives		

13	<b>Fiber Channel Switches with necessary cables (4 numbers)</b>	Minimum of 8 x 8-Gbit ports per trunk, Minimum 32 ports scalable up to 48 ports. Each port should be minimum 8 Gbps with auto sensing support for minimum 4 Gbps. must have in-built diagnostics, power on self-test, command level diagnostics, online and offline diagnostics capabilities, support online-firmware upgrades, must have redundant Control Units, Power supply, Fan Assembly and all the components shall be Hot Swappable, etc.		
14	<b>On-line RAID Group Expansion</b>	The storage array must support RAID 1+0 /5/6, levels with online expansion of RAID Group/Disk Group. Must support online expansion of volumes. Must be able to add additional disks on the fly to expand the RAID group capacity.		
15	Snapshot and Full Copy/Clone Functionality	The array should support controller-based functionality for pointer based snap copies as well as full physical copies.		
16	Mirroring / Replication	i) The storage array should support both Sync and <b>Async mode</b> data replication at the storage controller level.		
		ii) The storage array must have the capability to do array based remote replication using FCIP or IP technology.		
17	<b>Data Migration</b>	The proposed storage must support data migration of existing storage controllers without having to change the disk subsystem.		
18	Storage Management	Storage Management Software should be provided with simple to use Browser based interface and CLI		
19	Data Compression	Storage array should support both <b>Compression and de-duplication for SAN Data.</b> <b>The Storage specifications will be limited up to SAN only.</b>		
20	Software / Firmware	Should Support online firmware upgrade of firmware, etc. without a need for downtime.		
21	Online LUN migration flexibility for redeployment	The array should support online LUN migration (transparent movement of volumes within the array). The functionality should allow cross RAID migration and cross spindle migration (e.g. 600GB SAS to NL-SAS etc.)		
22	Warranty	<b>3 years</b> comprehensive warranty with 24x7 Support		
23	Virtualization Integration	i)The Storage should be fully certified for all supported protocols to virtualized application environments. ii)The storage solution should be capable of providing multi-pathing software with failover and load-balancing functionality for the virtualised OS.		

**\* Any line item given above, if not complied, will entail rejection of the bid.**