RFP for supply, installation & maintenance of Flash Storage - NPCI/RFP/2017-18/IT/07 dated 24.11.2017							
Consolidated list of Replies to Pre-bid Queries							
S.No	Document Reference	Page No	Clause No	Description in RFP	Clarification Sought	Additional Remarks (if any)	NPCI Response
1	RFP for Flash Storage	**32**	**2 / Requirement**	Storage should be supplied @ two locations Chennai &Hyderabad. The proposed bidder should have implemented the proposed storage 2 Nos (1DC+1DR) Flash System successfully with replication capability between sites withRPO of lesser than 5 mins. The storage should have capability of 3way replication with zero data loss	We request NPCI to consider " Proposed bidder / OEM should have implemented the proposed storage 2 Nos (1DC+1DR) Flash System successfully with replication capability between sites withRPO of lesser than 5 mins."		Proposed bidder / OEM should have implemented the proposed storage 2 Nos (1DC+1DR) Flash System successfully with replication capability between sites withRPO of lesser than 5 mins.The storage should have capability of 3wayreplication with zero data loss if it is deployed with Near site arachitecture.
2	RFP for Flash Storage	32	3 / Architecture	Proposed storage must be a All Flash Array. Designed to take advantage of the Flash/SSD for high performance, reliability, energy efficiency and consistent performance. All the LUNs should have visibility through all controllers and data flow should be possible through them.	Based on earlier RFP response from NPCI, "Proposed bidder solution controller should support Active- Active, and both controllers should be able to serve the Data path for same LUN. All the LUNs should have visibility through all controllers and data flow should be possible through them." Request NPCI to clarify if the above is true for this RFP as well.		No change in RFP. (All the LUNs should have visibility through all controllers.)
3	RFP for Flash Storage	32	5 / Media	Offered storage shall support various SSD capacities drives	We understand from the earlier RFP response from NPCI that encryption should be hardware (SED /storage controller) based and not a software functionality. Request NPCI to clarify if SED based encryption is offered, will support be required for encrypted SSD drive capacities (960GB, 1.92TB, 3.84, 7.68 & 15TB).		The Maximum supported and available SSD disks can be supplied
4	RFP for Flash Storage	32	8/Encryption	The storage should have native encryption capabilities as per PCI DSS standards and encryption should not add any performance overheads	Request you to also clarify if the internal key management solution need to be offered along with storage offering.		Not required
5	RFP for Flash Storage	32	7 / RAID Support	Industry standard RAID array supporting 10, 0, 1, 5 and 6 or better levels. It should support a mix and match of RAID levels behind a pair of controllers. The storage array should allow online expansion of existing RAID Groups / Storage Disk Pools.	Enterprise All flash arrays do not support RAID0 as this does not offer any data protection. Hence request NPCI to remove the same in the clause.		Proposed bidder solution should support all the RAID Levels which offers data protection
6	RFP for Flash Storage	32	6 / Capacity	The proposed storage should provide 100 TB usable capacity post RAID 5/6 configuration and should be expandable up to 1 PB + and should be capable of delivering sustained 1000000 IOPS (Read Write Ratio of 60:40) with Microsecond response time @ fully populated capacity.	All Flash arrays typically support multiple RAID group sizer, however, having larger RAID group sizes expose the data stored on it if there are drive failures. As per best practices, for better performance and lesser impact of drive failure during rebuild, and faster rebuild, it is recommended to use not more than 8 drives, i.e., R5(7+1) and R6(14+2).		Proposed bidder solution should provide performance and availability of Data without any impact during the rebuild process
7	RFP for Flash Storage	32	6 / Capacity	The proposed storage should provide 100 TB usable capacity post RAID 5/6 configuration and should be expandable up to 1 PB + and should be capable of delivering sustained 1000000 IOPS (Read Write Ratio of 60:40) with Microsecond response time @ fully populated capacity.	Request NPCI to mention the IOPS requirement from Day 1 as storage should be able to deliver 1000000 IOPS when is it fully populated.		No change in RFP. The controllers should be able to deliver 1000000 IOPs is from day one
8	RFP for Flash Storage	32	10 / cache Mirroring	Fully populated cache not less than 4TB which should be mirrored between active-active controllers on a controller pair. The cache mirroring should happen over dedicated bus / path internal/external to array without using the host ports for the same.	Cache is used to provide faster response time & reduce latency while accessing data. To protect data written to cache, mirroring of the data is done across controllers (in same pair or across pair of controllers). Using low latency high bandwidth dedicated paths will be essential to ensure fast response time for the application/hosts. But incase cache mirroring is done at switch level the entire purpose is defeated as there will be high latency while accessing data. Hence request NPCI to mention cache mirroring to happen over dedicated bus/path internal to array without using the host ports. This will help NPCI to get maximum advantage from the available cache and avoid silos. please confirm whether 4TB cache should be available as a single unit and not as multiple islands of cache		Fully populated cache should not be less than 2TB on dual controllers from day one
9	RFP for Flash Storage	33	16 / Zero Data Loss	Even in case of natural calamities Data loss in storage should be zero	It is technically not feasible to achieve zero data loss by implementing async replication with RPO of 5 mins. We could offer a Zero Data loss solution by implementing a Sync replication to a near site and async replication to far DR and establishing a 3 DC replication with delta resync technology (cascaded and concurrent STAR). Request NPCI to confirm if such a functionality is being looked at.		The storage should be capable of zero RPO if it is deployed with Near site architecture
10	RFP for Flash Storage	33	24 / Availability	The storage should be able to provide availability parameter of 99.9999 % from the date of acceptance of the SAN to be calculated on an annual basis.	RFP page 23 point 8.1 mentions SLA downtime will be calculated beyond 5.26 minutes which works out to be 5 9's availability. 6 9's availability warrants anything beyond 31.5 seconds should be counted as SLA breach. Request NPCI to clarify if this is indeed 99.9999% (6 9's) availability and it will be <32seconds		Requirement is of 99.9999 availability (6 9's)
11		**34**	2 / Requirement	Storage should be supplied @ two locations Chennai &Hyderabad. Minimum two set of Nodes should be supplied ateach site. The proposed bidder should have implemented theproposed storage 2 No"s (1DC+1DR) Flash System successfully with replication capability between sites with RPO of lesserthan 5 mins. The storage should have capability of 3wayreplication with zero data loss.	We request NPCI to consider " Proposed bidder / OEM should have implemented theproposed storage 2 No"s (1DC+1DR) Flash System successfully with replication capability between sites with RPO of lesserthan 5 mins".		Proposed bidder / OEM should have implemented the proposed storage 2 Nos (1DC+1DR) Flash System successfully with replication capability between sites withRPO of lesser than 5 mins.The storage should have capability of 3wayreplication with zero data loss if it is deployed with Near site arachitecture.
12	RFP for Flash Storage	34	5/ Media	Offered storage shall support various SSD capacities drives	Request NPCI to clarify whether support is required for encrypted SSD drive capacity from 2TB to 15TB.		All supplied disks should follow PCIDSS latest standards
13	RFP for Flash Storage	34	9/Protocol Support	The storage solution should support various versions of FC , FCoE, iSCSI, NFS, and CIFS storage protocols and should be licensed for overall capacity from Day one	FCoE is no more an adopted technology. Dell EMC used to support FCoE in 2 generation older products, but with no acceptance and no requirement from customers, this interface is not offered anymore. Request NPCI to remove this from the clause.		Proposed 250 TB storage should support at least FC,iSCSI, NFS and CIFS.
14	RFP for Flash Storage	34	9/Protocol Support	The storage solution should support various versions of FC , FCoE, iSCSI, NFS, and CIFS storage protocols and should be licensed for overall capacity from Day one	Also please clarify if the NFS, CIFS would be implemented, as we do not see any mention of the 1/10Gbe ports for file serving in the RFP.		Proposed storage solution should have ample ports to supports all the necessary requested protocols with redundancy .
15	RFP for Flash Storage	34	10 /Cache	The storage should have minimum of 2 TB cache and should be upgradable	Considering exponential data growth up to 3PB, the system should provide sustained performance and controller cache is a vital component to complement the performance. We recommend cache must be upgradeable to minimum 4TB as a single unit as this would make the solution give consistent performance with all the data services on.		No change in RFP
16	RFP for Flash Storage	36	24/Availability	The storage should be able to provide availability parameter of 99.9999 % from the date of acceptance of the SAN to be calculated on an annual basis.	RFP page 23 point 8.1 mentions SLA downtime will be calculated beyond 5.26 minutes which works out to be 5 9's availability. 6 9's availability warrants anything beyond 31.5 seconds should be counted as SLA breach.		Requirement is of 99.9999 availability (6 9's)
17	RFP for Flash Storage	36	25/Hot Swappable	All the components in the storage should have the capability to be replaced without disruption of services and should be Hot swappable	If for this requirement 2 controllers (1 node) are offered, would NPCI accept 1 controller (50% of resources) to be taken offline for maintenance like software and hardware upgrades? If the backplane (active or passive) needs replacement, both controllers will be down and services will be disrupted. Request NPCI to clarify.		No change in RFP
18	RFP for Flash Storage	34	6 / Capacity	The proposed storage should provide 250 TB usable capacity post RAID 5/6 configuration and should be expandable up to 3 PB + and should be capable of delivering sustained 800000 IOPS (Read Write Ratio of 70:30) with sub Millisecond response time @ fully populated capacity.	Request NPCI to mention the IOPS requirement for Day 1 as storage should be able to deliver 800000 IOPS when is it fully populated.		No change in RFP. The controllers should be able to deliver 800000 IOPs is from day one
19	RFP for Flash Storage	34	25/Hot Swappable	All the components in the storage should have the capability to be replaced without disruption of services and should be Hot swappable	If for this requirement 2 controllers (1 node) are offered, would NPCI accept 1 controller (50% of resources) to be taken offline for maintenance like software and hardware upgrades? If the backplane (active or passive) needs replacement, both controllers will be down and services will be disrupted. Request NPCI to clarify.		No change in RFP
20	RFP for Flash Storage	35	16/Zero Data Loss	Even in case of natural calamities Data loss in storage should be zero	NPCI intends to have a zero data loss solution which essentially requires that there should not be any limitation around the no. of LUNS being replicated. While the storage array capacity configured in 100TB today and scalable to 1000TB, asuming a 100GB LUNS configured. we require atleast 10K LUN to be simultaneously replicated at the same time. Request NPCI to include teh clause that the storage array should be able to replicate atleast 10K LUNS simulaneously both Syncronously as well as asyncronously without any limitation		No change in RFP