

# TECHNICAL SPECIFICATIONS

## 1. Enterprise Storage Array Specifications

### 1. Storage Array Must support the following Functionality

- Self optimized to dynamically balance workloads across all resources
- Resource optimization tools that deliver the required levels of performance to meet specific application service levels (Quality of service, Dynamic Cache Partitioning, Priority Controls)
- Non-disruptively migrates data between tiers, changing drive and RAID types for volumes
- Virtual thick and Thin provisioning
- Fully automated storage tiering which uses sub-LUN-level performance metrics therefore automatically optimizes performance by dynamically allocating and relocating application workloads based on service level requirements.
- Provide multi-site recovery and restart to prevent site and/or regional outages.
- Ability to use virtual provisioning
- Ability to reclaim "no longer used" space

### 2. Storage Capacity:

Storage system should be scalable to at least 2000 disk drives on the same system, and must be configured with a total usable capacity of 30TB based on the following tiers and capacities

- 2TB Usable of FC SSD Drives configured with RAID5
- 10TB Usable of Fiber Channel drives configured with RAID1
- 18TB Usable of Fiber Channel Drives configured with RAID5

### 3. Controller:

- Fault tolerant, based on multiple independent controller architecture with support for up to 8 controllers-non-disruptively linear scale-out of array resources, where each controller will comprise the front-end, cache and backend. The architecture should allow the controllers to share resources.

### 4. Cache:

- Minimum of 64GB of cache and should support a maximum scalable size of 1TB.
- Global cache design (cache centric) that can be wholly accessed by any controller in the storage system.
- In the event of site power total failure (short or prolonged) Vendor shall mention how the storage system protects data in cache memory by indicating the actions the storage system will take upon power failure and actions taken upon return of power to site and power on.

### 5. Supported disk types shall include:

- FC 146GB, 15K RPM
- FC 300GB, 10K & 15K RPM
- FC 450GB, 10K & 15K RPM
- FC 600GB, 10K & 15K RPM

- SAS 300GB, 10K RPM (Gen 2)
- SAS 450GB, 10K RPM (Gen 2)
- SAS 600GB, 10K RPM (Gen 2)
- SATA 1TB, 7.2K RPM
- SATA 2TB, 7.2K RPM
- SSD 200GB (Flash disk)
- SSD 400GB (Flash disk)

## 6. RAID Level Supported

- RAID 0
- RAID 1
- RAID 1+0
- RAID 5
- RAID 6

## 7. Hot Spare Support

- Online global hot-spare disks. Must have the optimum quantity of hot spare disks as recommended by the manufacturer. Must explain the process of how the hot-spare drive replaces a defective drive.

## 8. Connectivity

- Proposed system must be provided with a minimum of 16 X 8Gb/s Fiber Channel ports for front end connectivity.
- Proposed systems should be able to support the following protocols:
  - 8 Gb/s Fibre Channel Host/SAN Ports
  - 8 Gb/s Fibre Channel Remote Replication Ports
  - 8 Gb/s FICON Host Ports
  - 4 Gb/s Fibre Channel Host/SAN Ports
  - 4 Gb/s Fibre Channel Remote Replication Ports
  - 10 Gb/s 10 GigE Remote Replication Ports
  - 10 Gb/s FCoE Host Ports
  - 10 Gb/s iSCSI Host Ports
  - 1 Gb/s GigE Remote Replication Ports
  - 1 Gb/s iSCSI Ports

## 9. Redundancy

- 100% redundancy with **No Single Point Of Failure**
  - Redundant power supplies
  - Redundant disk arrays
  - Redundant I/O
  - Redundant cooling system

## 10. Availability

- Must have 99.999% availability at any given time and situation.
  - No disruption during microcode updating

- No disruption on hardware maintenance such as replacement of defective hard disk, power supply, controller etc.
- No disruption on hardware upgrading such as hard disk additions.
- No disruption on volume size configuration changes
- No disruption on location configuration changes

## **11. Management**

- Solution should offer a comprehensive consolidated tool for resource management overlooking:
  - Planning
  - Provisioning
  - Monitoring
  - Reporting
- Proposed tool should be able to:
  - View the end-to-end topologies and relationships from file systems to hosts, thin devices, or thin pools. This information can be used to troubleshoot availability or performance issues
  - Monitor thin devices and pools, and view properties such as “capacity allocated and consumed” to get a quick status of the state of your virtual and physical objects within your environment
  - Track thin device and thin pool capacity consumption, forecasting “time until full” conditions to properly manage growth and demand, and to avoid running out of capacity
  - Develop chargeback reports for virtually provisioned capacity to help business units realize the savings from Virtual Provisioning
  - Track detailed performance metrics for the different components of hosts, SAN switches and storage arrays.
  - Should be easy to schedule and distribute custom reports. It should enable scheduling custom queries and write them to a file or distribute them through e-mail.

## **12. Virtual Environment Support**

- Optimized for virtual environment. Must be certified compatible to VMware and HyperV features.
- Coordination with virtualization management
- Optimizes provisioning for VMware and Hyper-V virtual machines by automating and accelerating the most common, repetitive, and error-prone tasks
- The proposed storage management console must provide visibility into the virtual hypervisor and virtual machines
- Support of vStorage APIs for Array Integration (VAAI) with virtualization management
- Support of vStorage APIs for Storage Awareness (VASA) with virtualization management

### **13. Security**

- Support Encryption for data transit to prevent unauthorized service actions with Support for secure shredding of data from disk drives.
- Support Data at rest encryption which eliminates security risks when drives are removed from the array.
- Support for Data at Rest Encryption with built-in, hardware- based data encryption. Data needs to be encrypted when written to drives and decrypted when read from the drives with no impact on performance or local and remote replication.
- The solution shall include an Audit Service where audit log ensures that service and host-initiated actions on the array are recorded in a secure log to assist with compliance efforts.

### **14. Required Business continuity and data replication**

- Full volume point-in-time replicas of the production data. Must have the following feature stated below:
  - Ability for incremental restore with instant access
  - Ability for cascaded cloning for thick and thin volumes
  - Ability to restore to other location other than the original production volume
  - Ability to integrate with database engines to create a restartable point-in-time copy of the database. Must indicate which type of databases is supported.
  - Ability to simultaneously create consistent point-in-time copies across multiple production volumes
- Supports remote replication to a similar storage system from the same family with synchronous and asynchronous replication capability. It should have the capability to do 3 site replications with capability of zero data loss over extended distances.

### **15. Load Balancing and Multipathing**

- Software necessary for the Load Balancing and Multipathing must be provided to ensure path redundancy to avoid any single point of failure for the physical server environment. As well as load balancing and automatic path failover for virtual servers and should be fully integrated with the *Host* capability of Oracle, Exchange and SQL servers.

## **2. CCTV and File System SAN Storage Specifications:**

### **1. Storage Capacity**

- Vendor should provide one unified storage array in the primary site with a total usable capacity of 50TB based on the following tiers and capacities:
  - 10TB usable capacity using 15K 600GB SAS drives (after RAID 5).
  - 90TB usable capacity using 7.2K 2TB NL-SAS drive (after RAID 5)
- Array must have the optimum quantity of global hot spare disks as recommended by the manufacturer (in addition to the usable capacity)

### **2. Controllers**

- The proposed array should provide a unified architecture that should natively support Fibre Channel, iSCSI, FCoE, CIFS, NFS, pNFS, FTP, HTTP in the same array without using Gateways or software emulation.
- Storage array must deliver consistent predictable steady state performance by using dedicated controllers for RAID activities and separate controllers for NAS resources

### **3. Cache**

- Array should include a minimum of 48GB of cache for the controllers within the Array and should be scalable.
- Array must be able to absorb spikes in both read and write workloads by providing an extended cache style solution using SSD Flash drives.
- Array must keep write cache persistent during fault conditions to prevent data loss.

### **4. Storage**

- The array must support 2nd generation SAS 6Gb/s drive connectivity and must be able to support SSD, SAS, NL-SAS data storage tiers in order to maximize both system performance and capacity scalability.
- Array should be scalable to at least 700TB of RAW capacity.
- Array must be able to support intermixing of SSD drives, SAS drives and NL-SAS drives in the same disk enclosure.
- Array should support both 10K and 15K SAS disk drives as well 7.2K NL-SAS drives
- Array should support the Raid levels: 0, 1,3, 1+0, 5 and 6.
- Array must support thin provisioning to allow physical allocation of just the storage that is needed within a defined virtual file system or LUN.
- Thin provisioning should be licensed per full capacity of the array.
- Array should have the ability to automatically optimize data placement across all tiers of data storage (SSD, SAS, NL-SAS). Data movement between the tiers should be done at the sub-LUN level.
- The array must support file level Deduplication and compression as well as Block Data compression

- Array should support Quality of Service functionality to prioritize storage system resources for applications based on defined policies to achieve application performance objectives

## **5. Connectivity**

- Array should be provided with a minimum of 16 X 8GB FC ports and 8 X 1Gb iSCSI ports for SAN connectivity.
- Array should be provided with a minimum of 8 X 1Gb Ethernet ports for NAS connectivity.
- Array must be able to provide additional connectivity to meet existing or future needs for front end port counts and future technologies such as 10Gb/s iSCSI and FCoE.

## **6. Local and Remote Replication**

- Array should offer both "Pointer-Based Snapshot" and "Full-Volumes" copies (clones) of the production data. This should include support for the following features:
  - Ability for incremental restore with instant access
  - Ability to restore to other location other than the original production volume
  - Ability to integrate with database engines to create a restartable point-in-time copy of the database. Must indicate which type of databases is supported.
  - Ability to simultaneously create consistent point-in-time copies across multiple production volumes
  - Licenses for local snapshots and clones should be per full capacity of the array
- The array should be capable of supporting bi-directional Synchronous and Asynchronous remote replication to remote sites over WAN or FC connections.
- The array should support continuous data protection both locally and remotely with any point in time recovery.

## **7. Redundancy**

- Array should provide fully redundant architecture with No Single Point Of Failure, including:
  - Redundant power supplies
  - Redundant disk arrays
  - Redundant I/O
  - Redundant controllers
  - Redundant backend host connectivity
  - Redundant cooling system

## **8. Availability**

- Array must provide 99.999% availability at any given time, including:
  - No disruption during microcode updating
  - No disruption on hardware maintenance such as replacement of defective hard disk, power supply, controller etc.
  - No disruption on hardware upgrades such as hard disk or IO modules additions

## **9. Management**

- Array must provide single management Graphical User Interface to manage both SAN and NAS configurations
- Array must provide management control of SNMP, email and phone home notification
- Array must provide automatic monitoring of disk drive health and initiate a proactive background drive rebuild on failing drives
- Must support performance monitoring and analysis software functionality.
- Must provide multiple levels of access control including role-based security and auditing capability.

## **10. Virtual Environment Support**

- Array must be optimized for virtual environments including VMware and HyperV.
- Storage array should support VMWare Vstorage APIs for Array Integration (VAAI)
- Array must be certified and compatible to VMWare features such as:
  - Distributed Resource Scheduler (DRS)
  - High Availability (HA)
  - Site Recovery Manager (SRM) to automate failover and failback
  - Vmotion

## **11. Interoperability**

- Storage array should support all major operating systems including Solaris, AIX, Linux and Microsoft Windows. It should also include support for VMWare and Hyper-V virtualization solutions.

### **3. SAN Fabric Specifications:**

#### **1. SAN Cabling**

- All the Needed LC-LC fiber cables must be provided to implement the full solution

#### **2. SAN Switch (Qty 2)**

- **Fibre channels** - 48 ports active and with full license. Universal (E, F, M, EX, FL) ports, wwith 8GB SFP.
- **Performance** – Auto sensing 2GB/sec, 4GB/sec and 8GB port speeds
- **Media type** - Small Form-factor Pluggable (SFP) laser, Short-wave up to 500 meters Long-wave up to 30 kilometers (2 long wave SFPs per switch)
- **Management Access** – 10/100 Ethernet (RJ-45), in-band over Fibre Channel; serial port (RJ-45); USB; call-home integration enabled

### **4. Deployment and Setup**

The deployment should be carried out by the professional service resources of the original manufacturer (the “vendor”), A Project Manager should be allocated by the vendor to manage the project.

A solution Engineer should be allocated by the vendor to ensure maximizing the performance of each application, The CV of the above resources should be provided by the vendor (failure to do so would result in disqualifying the offer). Bidder must provide certificate from vendor that the deployment services shall be provided by the vendor (Manufacturer or International Partner).

Full solution should be deployed, tested and accepted with in 6 month from the signing date of the contract award, and providing the project plan to be approved by TCIL.

### **5. Training**

Training should be done as per following requirements:

- 1- Training for the proposed Enterprise Storage System (operation & administration) and for the Security Storage System.
- 2- The training will be for a total of 4 persons, at the certified training center residing at the vendor’s country of origin.
- 3- The vendor will be responsible for all expenses.

### **6. Resident Engineer:**

The bidder shall provide one resident engineer for a period of one year. The resident engineers should have the following qualifications:

- 1- Specialized engineer in Storage Solutions
  - Engineering Degree (Bachelors or higher)
  - 7 years experience in datacenter support and maintenance
  - Certified in high-end datacenter solution
  - Fluent in Arabic and English languages reading & writing

- The CV should be included with the proposal meeting all the above criteria.

#### **SAN Storage Resident Engineer Responsibilities:**

- Manage and Operate the installed SAN storage infrastructure
  - Doing the storage administration Daily tasks as requested by the client.
  - Application of vendor's best practices to current architecture after obtaining the customer agreement.
  - Involvement with Incident and Problem Management activities.
  - Participate in any necessary Root Cause Analysis reviews.
  - Participate in the planning, approval, and implementation of the related activities
- Monitor Installed Storage Infrastructure
  - Review the SAN and storage Logs periodically
  - Monitoring of SAN and storage performance data for the optimization of the environment
  - Monitor the storage utilization and assignment
- Documentation and Knowledge Transfer
  - Maintain installed infrastructure documentation
  - Reviewing the SAN configuration and provide TCIL with a detailed SAN layout
  - Provide SAN and storage management experience to augment current SAN and storage management staff
- Provide the necessary Proactive Support
  - Generate regular operational performance reports using vendor's tools
  - Generate reports using available SAN management tools onsite
  - Compare the current SAN layout with vendor best practices and suggest for the required modifications to match the vendor best practices.
  - Conduct review meeting with TCIL team and IT management to review reports and documentation

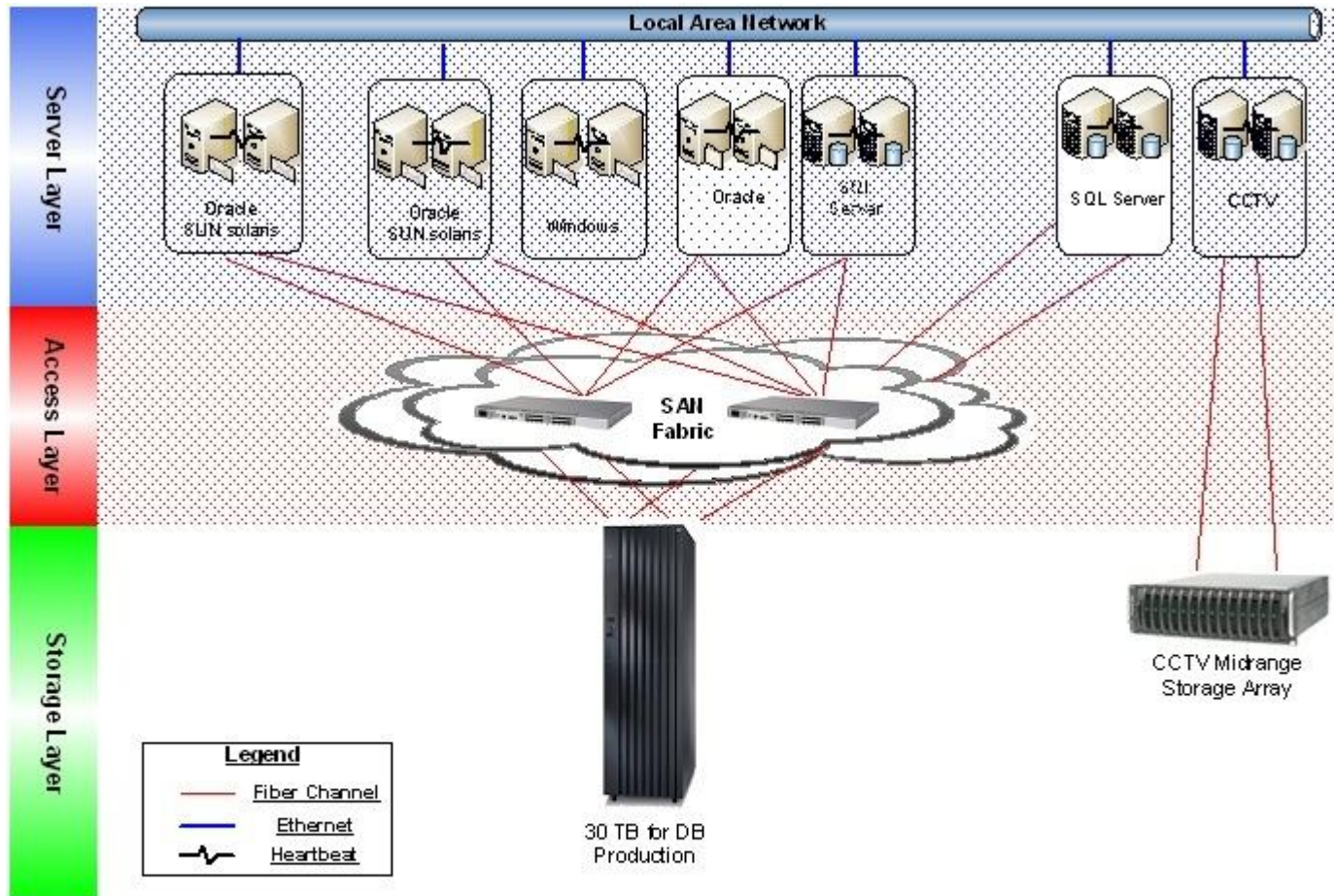
#### **7. Warranty**

**The warranty should cover all the labor charges and parts within the scope of the tender for the total solution covered by a 24X7 SLA (4 hours mission critical) on site support for the duration of the maintenance period of 36 Months (includes the deployment phase) .**

**The warranty shall also cover the currently installed base of security systems for 36 Months which covers the following equipment:**

- **MOBOTIX Camera Model M22M with adaptor - 125 units**
- **Network equipment related to the IP-CCTV solution**

## Draft Diagram for the Requested Storages Solution



# Pricing & Costs

(To be filled by the bidder)

Item No.	Product Details	Unit Price (INR)	QTY	Total Value (INR)
1	Enterprise Storage System		1	
2	CCTV Storage System		1	
3	SAN Fabric		2	
4	Professional services & deployment		L/S	
5	Training		4	
6	Resident engineer for one year		1	
7	36 Month Warranty for the solution & Mobotix CCTV		3	
<b>Grand TOTAL</b>				

- Tender can't be itemized and must be awarded in full for a single system integrator
- TCIL has the right to increase or decrease requested BOM by 25%.