

Section A Introduction

The District of Columbia Government, Office of the Chief Technology Officer (OCTO) has the responsibility to operate and maintain an IT infrastructure for much of the District's 68 agencies. To complete this task, as well as facilitate the addition of other agencies onto a central storage infrastructure, OCTO is looking to consolidate its existing storage and network infrastructure, to modernize and unify its Storage Area Network (SAN) services and to implement disaster recovery capabilities.

OCTO has been taking steps toward putting this solution in place and with this new direction, additional resources are necessary for a successful implementation. The awarded vendor(s) will work within a long-term consolidation strategy to enhance the District's storage infrastructure.

This project and its related tasks include those to purchase, migrate and implement the necessary storage equipment and software to enable the DC government to meet its expectations of growth over the next 3 years. Currently, the District is supported by two datacenters, OCTO Datacenter 2 (ODC2) and OCTO Datacenter 1 (ODC1). While not technically the primary site (production is split between the two sites), ODC2 hosts the District's tier 1 applications and the data is replicated to ODC1. The proposed solution should provide for the ability to perform long distance data replication if the District of Columbia relocates either the ODC2 site or the ODC1 site or both. Replication should also be used for ongoing business continuity.

The scope of the consolidated storage initiative encompasses all supplies and services necessary to meet OCTO's solution strategy. Interested vendors must meet and describe their approach to all stated requirements in this document.

Section A Specifications / Work Statement

A.1 Scope

The District of Columbia Office of the Chief Technology Officer (OCTO) relies heavily on its technical infrastructure in meeting the functional goals of its agencies. It has been determined that changes are required to effectively position the storage environment for the future.

The current storage infrastructure has reached over 75% of its useable disk capacity. A majority of the hardware was purchased in the 1998-2002 timeframe, making its technology at least 5 years old. The age of the infrastructure limits the District's ability to meet the current and expected growth. To meet future storage demands, OCTO desires to re-architect its infrastructure to provide a more highly available and robust processing environment. The foundation for this new enhanced infrastructure is a new, consolidated tiered storage environment.

As part of this consolidated storage initiative, OCTO will pursue a storage utility model with defined service offerings. Each of these services has specific capacity and performance criteria associated with it from which customers would select according to their storage needs. These criteria include performance, capacity, response time, memory, availability, manageability and recoverability metrics that are most widely applicable to enterprise needs.

By defining a storage utility model and the associated services offering, OCTO would be able to offer agencies different tiers of storage services based on specific requirements. This will have the positive effect of reducing uncertainty, allowing applications to reach production status more quickly, increasing application availability, and standardizing the level of effort needed to manage the environment.

This Request for Task Order Proposals outlines the framework for a storage utility model that will be the foundation for all OCTO storage efforts moving forward. The information contained in the following sections states the requirements for the District's next generation storage infrastructure.

OCTO's overall goal is to obtain a solution that efficiently, effectively, and economically provides and maintains a highly available consolidated storage infrastructure. As such, the specific objectives are:

- a. Award a performance-based contract to an Offeror committed to delivering a highly reliable, user-friendly, timely, and secure storage solution that meets or exceeds customer requirements and expectations.

- b. Establish a partner-focused working relationship with the Offeror to provide high quality management and support of all storage-related operations.
- c. Purchase a solution that provides robust and user-friendly enterprise-class storage, enabling the integration of best of breed in workflow, collaboration suites, content management, data retrieval, and service classification.
- d. Purchase a solution that minimizes the Total Cost of Ownership (TCO) and enhances OCTO's Return on Investment (ROI) by leveraging economies of scale.
- e. Enable security compliance and information assurance.
- f. Ensure OCTO's storage infrastructure continues to operate at required levels during any software or hardware changes or upgrades to said infrastructure.
- g. Ensure new capabilities are adequately tested to prevent adverse impact to operations or user experience during modifications and upgrades.
- h. Positioning DC for a future adoption of storage virtualization technologies. Storage virtualization, while not explicitly required by this RFTOP, would allow for a single management interface for all open systems storage components as well as provide increased flexibility, reliability, availability, and scalability. A storage virtualization solution would be considered a valuable addition to this RFTOP.

A.2 Requirements

A.2.1 Technical Requirements

OCTO is looking to procure a new consolidated storage infrastructure that must be interoperable with the existing hardware and software environment. This new storage infrastructure will have to support OCTO's storage services as defined by service level tiers identified. These tier requirements are defined in more detail below.

A.2.1.1 Definition of Tier Requirements

As the foundation of the consolidated storage strategy, OCTO will implement a storage utility model with defined service offerings. Each of these services has specific objective criteria including performance, availability, and recoverability metrics that correspond with a specific service level tier. These tiers are:

Number	Requirements
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Number	Requirements
A.2.1.1.1	<p>Tier 1:</p> <p>Data that will reside on Tier 1 storage is considered mission critical data. Mission critical data is application data without which the DC government cannot function and meet its primary mission objectives. Data in this tier must be protected at all costs</p>
A.2.1.1.2	<p>Tier 2:</p> <p>Data that will reside on Tier 2 storage is considered mission dependent data. This tier refers to application data that, if unavailable, would cause severe degradation in the DC government's ability to meet secondary business functions.</p>
A.2.1.1.3	<p>Tier 3:</p> <p>Data that will reside on Tier 3 storage is considered general supporting data. While the DC government's existence or mission's objective is not at risk here, it is still important that this information be protected in the most appropriate and cost effective manner. It should be assumed that Tier 3 data will be hosted physically on the same hardware as Tier 2 data.</p>

A.2.1.2 Availability

Number	Requirements
A.2.1.2.1	<p><u>Local Availability</u></p> <p>All applications that will reside on the storage infrastructure must be highly available. The degree of availability will be dependent on the service level tier. This will require local redundancy from a component and application perspective. This must be achieved through the use of point-in-time copies, multi-pathing and application integration.</p>
A.2.1.2.2	<p><u>Remote Availability</u></p> <p>All applications that will reside on the storage infrastructure must also be highly available in the event of a disaster at either ODC2 or ODC1. This will require support for remote availability. The degree of remote availability will be dependent on the service level tier. This must be achieved through the use of remote copies, multi-pathing and application integration.</p>
A.2.1.2.3	<p><u>Point in Time Copy Capabilities</u></p> <p>All data will require the utilization of point-in-time copies. These will be taken at different intervals based on the business requirement of the</p>

Number	Requirements
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applications and will enable OCTO to meet the recovery time objectives (RTOs) and recovery point objectives (RPOs) as defined in Service Level Agreements (SLAs) with the end users.

Each tier level will have slightly different requirements for the number and types of copies that will be produced for local availability.

- Tier 1 storage must have the capability to produce a full volume point-in-time snapshot of the data that is an exact clone of the original volume.
- Tier 2 storage requires a snapshot capability for pointer-based recovery of local data.

A.2.1.2.4 Multi-path support

All connections to the SAN will be at least dual-pathed. The Offeror solution must have software to support load balancing across multiple paths and path failover capability for continuous access. Data must be made available from multiple paths.

A.2.1.2.5 Application Integration

Replication of data within the system is required without disrupting service or performance of business-critical applications. Operations and data integrity is of the utmost importance when using the tools available to create the localized copies. Offeror software modules must be integrated with OCTO applications to handle transactions and ensure the integrity of these copies. Local clustering may be implemented for applications that will reside on Tier 1 and Tier 2 storage devices; therefore, it must be supported by the end solution.

The replication of data across data centers must also occur without disrupting service or performance of business-critical applications at the ODC2 site. Operations and data integrity is of the utmost importance when using the tools available to create the remote copies. Offeror software modules must be integrated with OCTO applications to handle transactions and ensure the integrity of the copy at the remote site. Tier 1 remote replication utilities must also support global clustering which will be implemented for these mission-critical applications.

A.2.1.3 RTO and RPO (Per Tier)

Recovery Time Objective (RTO) is the period of time within which applications must be recovered after an outage. Recovery Point Objective (RPO) is the point in time to which data must be recovered after an outage. This matrix summarizes the availability tier definitions at OCTO.

	Tier 1	Tier 2	Tier 3
Availability	99.99%	99.9%	99.0%
Downtime per year	53 Min	526 Min	5256 Min
MTBF	120 Days	90 Days	60 Days
RTO	15 Min	4 Hour	24 Hour
RPO	30 Min	12 hour	Previous COB
Performance	15K RPM	10K RPM	Average

Number	Requirements
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A.2.1.3.1 Architect storage environment to achieve the stated RTO and RPO objectives for Tier 1, 2 and 3.

A.2.1.4 RAID Capabilities (Per Tier)

Refer to [“Appendix C: Technical Specifications and Requirements Matrix”](#) for specific storage capacity and RAID configuration line item requirements.

Number	Requirements
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A.2.1.4.1 **Tier 1**
Candidates for Tier 1 storage require the ability to utilize a RAID-1 (Mirrored), RAID-5 (parity striped) or RAID-10 (striped and mirrored) disk configuration for ultra availability, performance and reliability. The Offeror options should include pricing for 15K RPM drives to meet the desired capacity to accommodate the requirements for Tier 1 applications.

A.2.1.4.2 **Tier 2**
Candidates for Tier 2 storage require the ability to utilize either a RAID-1 (Mirrored), RAID-5 (parity striped) or RAID-10 (striped and mirrored) disk configuration for high availability, performance and reliability. The Offeror options should include pricing for 10K RPM drives to accommodate the requirements for Tier 2 applications. It is considered beneficial if Offerors are able to offer a reasonably priced 15K RPM drive option at this tier.

A.2.1.4.3 **Tier 3**
Candidates for Tier 3 storage require the ability to utilize a RAID-5

Number	Requirements
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(parity striped) disk configuration for high availability, performance and reliability. The Offeror options should include pricing for 10K RPM drives to accommodate the requirements for Tier 3 applications. It is considered beneficial if Offerors are able to offer a reasonably priced 15K RPM drive option at this tier.

A.2.1.5 Internal Redundancy / Fault Tolerance

In order to meet high availability requirements, the storage solution must offer continuous access to data so that any error and its resulting corrective action (in media, power, connections, disk, cache, back end controller, diagnostic routine) is totally transparent to applications, systems, and users attached to the storage unit. No operational intervention shall be necessary to trigger recovery actions for hardware failures. Tier 1 storage arrays and switches must not have a single point of failure and all components must be hot swappable. If any two components have a failure, operations must be able to continue without disruption to data or operations. Tier 2 storage arrays and switches must be able to continue operations in the event of bss of one component; however, redundancies must exist for power, cooling and cache.

The required internal redundancies are highlighted below:

	Tier 1	Tier 2 and 3
Power	N+2	N+1
Cooling	N+2	N+1
Cache	Protected against corruption, power loss, and module failure	Protected against corruption, power loss, and module failure
Service Processor	4-8	Minimum of 2
Front-End Adapters	2N (Multiple paths required)	2N (Multiple paths required)
Back-End Adapters	2N (Multiple paths required)	2N (Multiple paths required)

Number	Requirements
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A.2.1.5.1 The Offeror will architect the storage environment to achieve the stated internal redundancy objectives for Tier 1, 2 and 3.

A.2.1.6 General Performance

Number	Requirements
A.2.1.6.1	The Offeror will be responsible to ensure that the entire configuration (front end, back end, physical disk layout, LUN layout) conforms to industry ‘best practice’ and to explain how the solution meets ‘best practice’. The configuration must be structured to the highest possible performance standards for implementation in support of OCTO’s specific environment and server requirements.
A.2.1.6.2	The overall components of the SAN must support operations at 4GB for optimal performance. Both Tier 1 and Tier 2 fibre channel storage and switch devices must have the ability to operate at 4GB/sec speeds.

A.2.1.7 Performance - Drive Speed vs. Drive Size Options

It is important that drive size options correspond to the drive speed requirements for each tier without significant impact to application performance.

	Tier 1	Tier 2 and 3
Disk RPM		
15K	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ¹
10K		<input checked="" type="checkbox"/>

Number	Requirements
A.2.1.7.1	The Offeror will architect the storage environment to support the specified hard drive speeds for Tier 1, 2 and 3.

¹ 15K RPM disks are not mandatory for tier 2, but would be preferable if available.

A.2.1.8 RAID Options Effect on Performance

It is understood that the various RAID options will have different impacts on performance. Applications must perform as good as or better than they do today and that level of performance must be maintained for the next four years, including the provision for 50% more bandwidth utilization, I/O throughput, and I/O operations over that time period.

	Tier 1	Tier 2	Tier 3
RAID Level			
RAID-1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
RAID-5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RAID-10	<input checked="" type="checkbox"/>		

Number	Requirements
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A.2.1.8.1 The Offeror will architect the storage environment to support the specified RAID types for Tier 1, 2 and 3.

A.2.1.9 Storage Array Capacity

Number	Requirements
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A.2.1.9.1 An estimated 25TB of space will be required to accommodate the Tier 1 SAN environment and 50TB for the Tier 2 SAN environment per datacenter

A.2.1.9.2 The Tier 1 SAN data is expected to grow at approximately 25% a year. The proposed Tier 1 storage solution must have the ability to scale to meet this demand over a three year period without requiring complete replacement of arrays or switches.

A.2.1.9.3 The growth figures for the Tier 2 SAN data are estimated at 35% a year, therefore, the proposed Tier 2 storage solution must accommodate for this growth as well.

A.2.1.9.4 It is expected that 50% of the Tier 1 production data will be locally replicated through the use of full copy, or cloned, Point-in-Time (PIT) copies.

A.2.1.9.5 It is also expected that 25% of the Tier 2 production data will be replicated through the use of full copy, or cloned, PIT copies.

A.2.1.9.6 Offerors may also additionally provide options based on checkpoint, or

Number	Requirements
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changed data only, PIT copies if it is felt they provide a compelling option.

A.2.1.9.7 The proposed Tier 1 storage environment of ODC2 will be mirrored exactly at ODC1. The Tier 2 storage environment of ODC2 will not initially be mirrored to ODC1 but all components must be capable of replicating this storage if future requirements dictate.

Details of the proposed SAN space are listed in the charts below:

Tier 1

Use	Year 1		Year 2		Year 3	
	ODC1 Usable Space (TB)	ODC2 Usable Space (TB)	ODC1 Usable Space (TB)	ODC2 Usable Space (TB)	ODC1 Usable Space (TB)	ODC2 Usable Space (TB)
Mainframe Production	9	10	11.25	12.5	14.1	15.65
Mainframe Local Replication	4.5	5	5.6	6.25	7	7.85
Mainframe Remote Replication	10	9	12.5	11.25	15.65	14.1
Open Systems Production	N/A	15	N/A	18.75	N/A	23.5
Open Systems Local Replication	N/A	7.5	N/A	9.38	N/A	11.75
Open Systems Remote Replication	15	N/A	18.75	N/A	23.5	N/A
Sub Totals	38.5	46.5	48.1	58.13	60.25	72.85
Total	85		106.23		133.1	

Tier 2

Use	Year 1		Year 2		Year 3	
	ODC1 Usable Space (TB)	ODC2 Usable Space (TB)	ODC1 Usable Space (TB)	ODC2 Usable Space (TB)	ODC1 Usable Space (TB)	ODC2 Usable Space (TB)
Open Systems Production	N/A	50	N/A	67.5	N/A	91.25

Use	Year 1		Year 2		Year 3	
	ODC1 Usable Space (TB)	ODC2 Usable Space (TB)	ODC1 Usable Space (TB)	ODC2 Usable Space (TB)	ODC1 Usable Space (TB)	ODC2 Usable Space (TB)
Open Systems Local Replication	N/A	12.5	N/A	17	N/A	23
Open Systems Remote Replication	N/A	N/A	N/A	N/A	N/A	N/A
Sub Totals	N/A	62.5	N/A	84.5	N/A	113.25
Total	62.5		84.5		113.25	

A.2.1.10 *Hosts*

Number	Requirements
A.2.1.10.1	The proposed solution must support a minimum of 150 hosts per datacenter (ODC1 and ODC2) for the first year, detailed as 95 Windows, 15 Solaris, and 30 AIX servers.
A.2.1.10.2	Host count is expected to grow by 30 Windows, 5 Solaris, and 10 AIX hosts per datacenter each year. The proposed solution must take this growth into account. Refer to the chart, below, for an estimate of the number of hosts at each location over the next three years.
A.2.1.10.3	It is expected that the proposal must allow for an equal number of servers to be located at ODC 1 & 2 to allow for future site failover.
A.2.1.10.4	It is expected that the proposed solution will support Oracle RAC and Microsoft Cluster Services

Host counts are summarized in the chart below:

	Year 1		Year 2		Year 3	
	Hosts ODC2	Hosts ODC1	Hosts ODC2	Hosts ODC1	Hosts ODC2	Hosts ODC1
Windows	120	110	125	115	155	145
AIX	30	20	40	30	50	40

Hosts

	Year 1		Year 2		Year 3	
	Hosts ODC2	Hosts ODC1	Hosts ODC2	Hosts ODC1	Hosts ODC2	Hosts ODC1
Solaris	10	10	20	20	25	25
Total	160	140	185	165	230	220

A.2.1.11 Host Bus Adapters

Number	Requirements
A.2.1.11.1	The proposed solution should provide 600 single port HBAs, 300 per site.
A.2.1.11.2	To provide for growth, the Offeror should offer a bundled discount for HBAs in groups of 20.

A.2.1.12 Ports

Number	Requirements
A.2.1.12.1	The proposed solution must provide sufficient ports to accommodate all host and storage connections through the first year of implementation. It is estimated that a minimum of 150 hosts with dual connections will be attached to the fibre channel switches, a total of 300 host ports per datacenter. All storage components in the final Offeror recommendation will need to be factored into port count as well
A.2.1.12.2	The Offerors will determine the total number of switches required to achieve the stated port capacity requirements.
A.2.1.12.3	The proposed SAN solution will require Enterprise Director class switches at each site with support for: <ul style="list-style-type: none"> ▪ At minimum the transport protocols: Fibre Channel and FICON. ▪ At a minimum the following protocols for management purposes: SNMP, SMTP, RCP, RCP over HTTPS, LDAP, SSH, NTP ▪ 2Gb/s FC ports ▪ No single path attachments or fibre channel attached components ▪ Load balancing at switch level
A.2.1.12.4	The proposed switch solution should have the ability to support both FC and FICON port connections.

A.2.1.13 Data Migration

Number	Requirements
A.2.1.13.1	All data currently on the SAN will need to be migrated to the new consolidated storage infrastructure. The Offeror will detail what options are available to minimize disruptions to operations and how to handle specific challenges associated with migrating present SAN customers.

A.2.2 **Management Requirements**

It is required that the Offeror's solution include a management framework tool that will allow the OCTO staff to efficiently and effectively manage ALL components of the solution. The specific required abilities of this framework are outlined below.

A.2.2.1 Management Interface

Number	Requirements
A.2.2.1.1	<p>The management framework proposed by the Offeror should have multiple options for interfacing with it. Specifically it is required that the management framework can be accessed through the following means:</p> <ul style="list-style-type: none">• Graphical User Interface (GUI)• Command Line Interface (CLI)• Automated Task Processing or Scripting

A.2.2.2 Geographically Dispersed Management

Number	Requirements
A.2.2.2.1	The management framework proposed by the Offeror should provide for the ability to remotely manage other installations from a primary site. OCTO would prefer that this would be implemented via a single management interface; however, other solutions would be considered. Offerors should detail in their responses their recommended methods for managing dispersed sites.

A.2.2.3 Configuration Management

Number	Requirements
A.2.2.3.1	The management framework proposed by the Offeror should have the capability to keep configuration history and change management tracking information. Specific points of interest that should be tracked are:

- When did change occur?
- What changed?
- Who made the change?

A.2.2.4 Policy Based Management

Number	Requirements
A.2.2.4.1	The management framework proposed by the Offeror should include a policy-based engine for administration and rule enforcement. This would apply to event management, reporting, billing and provisioning.
A.2.2.4.2	The framework should provide for the ability to define rules or conditions for alerts, define service levels (tiers) for storage allocation and billing, and rules for storage provisioning.

A.2.2.5 Host Discovery

Number	Requirements
A.2.2.5.1	The management framework proposed by the Offeror should include host discovery for all host types described in Appendix B .
A.2.2.5.2	Hosts discovery should be able to discover internal and external storage attached to the host.
A.2.2.5.3	Host discovery should also capture information regarding the HBAs (firmware and drivers) installed in the hosts, as well as other descriptive data about the host (hostname, host model, OS levels).
A.2.2.5.4	If host agent software is required for host discovery, OCTO would prefer that it be installed via a push technology, as opposed to requiring interaction with each host individually for agent deployment.
A.2.2.5.5	Offeror should detail their mechanisms for host discovery and agent management.

A.2.2.6 Fabric Discovery

Number	Requirements
A.2.2.6.1	The management framework proposed by the Offeror should discover all SAN technologies noted in Appendix B and those proposed by the Offeror.
A.2.2.6.2	The software should be able to use in-band or out-of band discovery methods.
A.2.2.6.3	The software should be able to draw topology maps and relationship maps of all discovered objects.
A.2.2.6.4	The software should be able to maintain an inventory of the SAN elements and maintain a repository of discovered objects.

A.2.2.7 Event Alerting

Number	Requirements
A.2.2.7.1	The management framework proposed by the Offeror should have an event alerting capability for the storage and host technologies described in Appendix B , as well as the infrastructure components being recommended by the Offeror.

Number	Requirements
A.2.2.7.2	The software should have the ability to modify the alert conditions and disable the alert if desired.
A.2.2.7.3	The software should have the ability to send alerts to HP Openview. Ideally, the software would also be able to send emails and/or execute user-defined actions/scripts for one or more alerts.
A.2.2.7.4	<p>The events that should be tracked and alerted on are:</p> <ul style="list-style-type: none"> ▪ Component Failure at the following levels: <ul style="list-style-type: none"> ▪ Storage Array <ul style="list-style-type: none"> • Service Processor, Cache, Disk, Front End Adapter, Back End Adapter, Power, and Cooling • Fabric Switch • CPU, Power, Cooling, Cache, Blade, and Port • Host <ul style="list-style-type: none"> ▪ HBA ▪ Performance Degradation at the following levels: <ul style="list-style-type: none"> • Storage Array <ul style="list-style-type: none"> ▪ Server Processor, Cache, Disk, Front End Adapter, and Back End Adapter Throughput ▪ Fabric Switch ▪ CPU, Blade, Cache, and Port • Host <ul style="list-style-type: none"> ▪ HBA ▪ Capacity Utilization at Host Level ▪ Automated Task Failure ▪ Configuration, Provisioning, Local Replication, and Remote Replication

A.2.2.8 SAN Administration

The following sections outline OCTO's daily management requirements for their consolidated storage environment management framework. The inability of any recommended tool to meet the needs described below must be explicitly noted in the response and a recommended work around must be provided.

Number	Requirements
A.2.2.8.1	<p><u>LUN Management</u></p> <p>The management framework proposed by the Offeror should have the ability to provide volume or LUN management that allows arbitrary creation, deletion, and sizing of the LUNs. If there are any restrictions, special considerations or limitations, the Offeror should describe them in</p>

Number	Requirements
	detail.
A.2.2.8.2	<p data-bbox="435 327 621 359"><u>LUN Masking</u></p> <p data-bbox="435 380 1377 558">The management framework proposed by the Offeror should have the ability to manage LUN masking and/or LUN security of the storage devices described in Appendix A and those recommended by the Offeror. The software will be able to launch the native management tool for the storage device.</p>
A.2.2.8.3	<p data-bbox="435 600 691 632"><u>Fabric Management</u></p> <p data-bbox="435 653 1377 894">The management framework proposed by the Offeror should provide the ability to manage the switch components described in Appendix A and any additional devices recommended by the Offeror. The software should be able to manage zone configurations (active, most recent, etc.). Additionally, the software should be able to create zones (WWPN or Port Zoning) and apply zones to the active switch configuration. The software will be able to launch the native management tool for the fabric device</p>
A.2.2.8.4	<p data-bbox="435 936 711 968"><u>Point-in-Time Copies</u></p> <p data-bbox="435 989 1377 1167">The management framework proposed by the Offeror should provide the ability to manage the point-in-time copy capabilities of the proposed solution. It is considered beneficial if the proposed solution can manage the point-in-time copy capabilities of the existing components outlined in Appendix A.</p>
A.2.2.8.5	<p data-bbox="435 1209 789 1241"><u>Remote Copies/Replication</u></p> <p data-bbox="435 1262 1377 1440">The management framework proposed by the Offeror should provide the ability to manage the remote copy/replication capabilities of the proposed solution. It is considered beneficial if the proposed solution can manage the remote copy/replication capabilities of the existing components outlined in Appendix A</p>
A.2.2.8.6	<p data-bbox="435 1472 740 1503"><u>Application Integration</u></p> <p data-bbox="435 1524 1377 1745">The management framework proposed by the Offeror should provide application agents for applications described in Appendix A. Application agents would be able to discover configuration information about the applications, above and beyond what host agents can discover (i.e. - table structures within a database). OCTO would prefer the application agent software be installed via a push technology.</p>
A.2.2.8.7	<p data-bbox="435 1776 683 1808"><u>Backup Integration</u></p> <p data-bbox="435 1829 1320 1896">The management framework proposed by the Offeror should provide support for Symantec Netbackup and associated agents described in</p>

Number	Requirements
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Appendix A. Backup agents would be able to discover configuration information about that application above and beyond what a host agent can discover (such as backup success/failure and media usage). OCTO would prefer the application agent software be installed via a push technology.

A.2.2.8.8 Automation of Tasks

The management framework proposed by the Offeror should provide the ability to schedule and script regularly repeated tasks. This includes tasks such as initiation or splitting of point-in-time copies or remote replicas, storage provisioning, and report generation.

A.2.3 Reporting Requirements

OCTO strongly believes that a corner stone of effective storage management is having easy access to accurate and timely information regarding the status of the infrastructure. The following sections outline OCTO requirements for reports at the operational, trending, and executive levels.

Number	Requirements
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A.2.3.1 Operational

OCTO requires the ability to easily access information regarding how the consolidated storage infrastructure is functioning on a day-to-day basis to enable effective management. Examples of required operational reports are:

- Storage Utilization per Array
- Storage Performance per Array
- Storage Utilization per Host
- Storage Performance per Host
- Storage Allocation per Array
- Port Utilization per Switch
- Port Performance per Switch

A.2.3.2 Trending

OCTO requires the ability to capture trends in utilization growth of the various components. The proposed software should capture performance metrics across the SAN infrastructure (such as storage, switches and HBAs) as described in Appendix A and those recommended by the Offeror. The data should be captured and stored for historic analysis and reporting. Ideally, OCTO would like to see weekly, monthly and yearly summarization. Examples of required trending reports are:

Number	Requirements
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- Monthly, Quarterly, and Annual Storage Utilization Change per SAN Protocol
- Monthly, Quarterly, and Annual Storage Utilization Change per Array
- Monthly, Quarterly, and Annual Storage Performance Change per Array
- Monthly, Quarterly, and Annual Storage Utilization Change per Host
- Monthly, Quarterly, and Annual Storage Performance Change per Host
- Monthly, Quarterly, and Annual Port Utilization Change per Switch
- Monthly, Quarterly, and Annual Port Performance Change per Switch

A.2.3.3 Executive Oversight

OCTO requires the ability for its management staff to “peer into” the consolidated storage solution to ensure that it is being utilized in an efficient and cost effective manner while meeting the organization’s business goals. To this end, OCTO requires the ability to track resource utilization and correlate them in various ways to get a complete picture of how the storage solution is being used.

Examples of required executive oversight reports are:

- Monthly, Quarterly, and Annual Storage Utilization per Application Group
- Monthly, Quarterly, and Annual Storage Utilization per Data Center
- Configure chargeback analytics to final margin on services

A.2.3.4 OCTO would like to be able to consolidate reports across installations and roll-up the data into a district-wide or domestic report. The Offeror will describe the recommended solution.

A.2.4 Maintenance Requirements

A.2.4.1 Fabric Switch Upgrades

Number	Requirements
--------	--------------

A.2.4.1.1 Physical

Capacity upgrades to both Tier 1 and Tier 2 fabric switches must be minimally disruptive. This includes the addition of more blades, ports or cache. Proposed configurations shall allow capacity upgrades within initially installed cabinets, racks, and frames. It must also be field

Number	Requirements
--------	--------------

upgradeable without interruption to applications, systems, and users connected to the fabric switch.

A.2.4.1.2 Operating System / Firmware / Microcode

All software and microcode updates/upgrades must be non-disruptive for both Tier 1 and Tier 2 fabric devices. Preventive maintenance considered to be disruptive to the production environment must be pre-planned in accordance with OCTO's maintenance schedule, usually off-hours during weekends.

Equipment must be capable of contacting the appropriate support personnel via automatic 'dial-home' telecommunications capability, and must be capable of supporting remote diagnostics with security features. Offeror bids must include support for these features.

A.2.4.2 SAN Hardware Upgrades

Number	Requirements
--------	--------------

A.2.4.2.1 Physical

Capacity upgrades to both Tier 1 and Tier 2 storage units must be non-disruptive, including additions of physical disks, logical volumes, cache, or front-end connections. Proposed configurations shall allow capacity upgrades within initially installed cabinets, racks, and frames. It must also be field upgradeable and able to increase physical capacity and logical volume or LUN expansion in terms of adding physical disk drives, total disk space, physical cache and connections without interruption to applications, systems, and users connected to the storage unit.

A.2.4.2.2 Firmware / Microcode

All software and microcode updates/upgrades must be non-disruptive for Tier 1 and Tier 2 SAN devices. Preventive maintenance considered to be disruptive to the production environment, must be pre-planned in accordance with OCTO's maintenance schedule, usually off-hours during weekends.

Equipment must be capable of contacting the appropriate support personnel via automatic 'dial-home' telecommunications capability, and must be capable of supporting remote diagnostics with security features. Offeror bids must include support for these features.

A.2.4.3 Software Upgrades

Number	Requirements
--------	--------------

Number	Requirements
A.2.4.3.1	<p data-bbox="435 275 532 306"><u>Patches</u></p> <p data-bbox="435 327 1354 470">All software patch updates must be non-disruptive. Software updates considered to be disruptive to the production environment must be pre-planned in accordance with OCTO's maintenance schedule, usually off-hours during weekends.</p> <p data-bbox="435 491 1370 558">Offerors are expected to give guidelines as to which software updates are to be considered disruptive.</p>
A.2.4.3.2	<p data-bbox="435 594 646 625"><u>Major Revisions</u></p> <p data-bbox="435 646 1370 751">Major revisions to all software products are expected to be disruptive. As such, all such updates must be pre-planned in accordance with OCTO's maintenance schedule, usually off-hours during weekends.</p> <p data-bbox="435 772 1295 840">Offerors are asked to give guidance as to which software package's revisions may be upgraded without disruption.</p>

A.2.5 Technical Support Requirements – Escalation & Notification Processes

A.2.5.1 Fabric Switch Upgrades

Number	Requirements
A.2.5.1.1	<p data-bbox="435 1155 1370 1297">The Offerors are requested to define SLA policy and procedures with regards to issues. When issues arise with components in the consolidated storage infrastructure, OCTO must know how the Offeror will deal with them.</p> <p data-bbox="435 1318 1305 1461">Specifically, the Offeror must address how incidents will be handled specific to the proposed solution. Escalation procedures along with corresponding point-of-contacts should be clearly defined and made available to OCTO.</p> <p data-bbox="435 1482 1370 1549">Points of interest to be addressed in these policies and procedures include the following:</p> <ul data-bbox="483 1570 1354 1858" style="list-style-type: none"> <li data-bbox="483 1570 1078 1602">▪ What is the escalation/notification process? <li data-bbox="483 1602 1305 1669">▪ How quickly can the Offeror determine that the issue is not a break-fix? <li data-bbox="483 1669 1062 1701">▪ How much work does OCTO need to do? <li data-bbox="483 1701 1354 1768">▪ Who along the escalation/notification process will require access to the building and equipment? <li data-bbox="483 1768 1354 1858">▪ What is the change control process w/ the Offeror for changes to the configuration?

Section A Supplies or Services and Price

A.1 The Government of the District of Columbia, Office on Contracting and Procurement, on behalf of the Office of the Chief Technology Office (OCTO) is seeking a contractor to provide hardware, software, and implementation services for the Consolidated Storage Initiative.

A.2 The District anticipates award of a firm fixed price contract.

A.3 Price Schedule

Line Items	Description	Unit	Unit Cost	Total Cost
	Storage System			
CLIN 001	Useable Tier 1 Storage Capacity	25 TB each for ODC1 & ODC2.		
	Useable Tier 2 Storage Capacity	50 TB each for ODC1 & ODC2.		
	Useable Tier 3 Storage Capacity	50 TB each for ODC1 & ODC2.		
	Local Volume Replication – ODC2	Appropriate disk capacity, interfaces and licenses for local replication of 25 TB at ODC2.		
	Growth for Usable Storage Capacity – ODC2 Tier 1 – 17TB (by year 3) per site, per array	1 TB increments for storage upgrade.		
	Growth for Usable Storage Capacity – ODC2 Tier 2 – 32TB (by year 3) per site, per array	1 TB increments for storage upgrade		
	Growth for Usable Storage Capacity – ODC2 Tier 3 – 32TB (by year 3) per site, per array	1 TB increments for storage upgrade		
	Growth Usable Storage Capacity – ODC1 Tier 1 – 17TB (by year 3) per site, per array	1 TB increments for storage upgrade		
	Growth for Usable Storage Capacity – ODC1 Tier 2 – 32TB (by year 3) per site,	1 TB increments for storage upgrade		

Line Items	Description	Unit	Unit Cost	Total Cost
	per array			
	Growth for Usable Storage Capacity – ODC1 Tier 3 – 32TB (by year 3) per site, per array	1 TB increments for storage upgrade		
	Storage Processors required to support each array	Per Unit for each Tier		
	Disk Controllers required to support each array	Per Unit for each Tier		
	Cache Minimum of mirrored write cache ODC1 - Must be able to scale up to 380 GB ODC2 – Must be able to scale up to 380 GB	Per Vendor Recommended increment		
	Synchronous Remote Replication of Tier 1 volumes from ODC 2 to ODC1	25 TB		
	Host System Interfaces: 2 Host Bus Adapters (HBA) per host with multi-path software available to provide load balancing.	HBA and multi-pathing software for 300 Hosts		
	SAN Fabric Switches	Total number of switches required to meet requirements with feature licensing.		
	SAN Switch Upgrades for future growth	Upgrade of capacity in increments of 16 ports		
	Each interface must be 2GB capable as installed.	Sufficient SAN switch ports to support all required connections for 300 hosts.		
	Physical drives			
	Drive Size (i.e. 73GB, 146GB) Tier 1	Per drive for each drive type including required disk enclosures.		
	Drive Size (i.e. 73GB, 146GB) Tier 2	Per drive for each drive type including required disk enclosures.		
	Drive Size (i.e. 73GB, 146GB) Tier 3	Per drive for each drive type including required disk enclosures.		
	Drive Speeds for_Tier 1 – 15K	Per drive for each drive type including required		

Line Items	Description	Unit	Unit Cost	Total Cost
		disk enclosures.		
	Drive Speeds for_Tier 2 – 10K mandatory, 15K optional	Per drive for each drive type including required disk enclosures.		
	Drive Speeds for_Tier 3 - 10K	Per drive for each drive type including required disk enclosures.		
	<u>Hot Spare</u> Hot standby dynamic spare (minimum of two physical disk supported)	Per drive for recommended space drives for appropriate drive size and speed.		
Warranties and Maintenance				
	<u>Hardware Warranty and On-Site Maintenance</u> 3 years on-site service, 24x7, 4 hour on-site response, including call home feature, local parts supply, and remote diagnostics	Per year		
	<u>Software Warranty and Maintenance</u> 3 years service and full support 24x7; includes all new versions, releases, and patches during the warranty period	Per Year		
Fault Tolerant Features				
	<u>Power</u> Minimum of dual power cords and dual power supplies	Per power supply as required by Offeror design.		
	Mirrored write cache	GB per Offeror design.		
	<u>Cache Battery Backup</u> Minimum requirement for battery backed up cache	Appropriate battery backup components.		
	<u>Disks</u> Battery backed up disks for de-stage of data in the event of a power loss	Appropriate battery backup components.		
Software				
	All SAN Management software provided, including licenses	Licenses for each host and array connection including		

Line Items	Description	Unit	Unit Cost	Total Cost
	required by the storage array, fabric switches, and host based software. Additionally it is to include the cost for upgrading the capacity in the most appropriate increments for each of software packages.	replication and per GB charges.		
	All server-based agents required to run vendor' s SAN software.	License cost for SAN attachment agents for a maximum of 300 hosts.		
	Storage Resource Management application	Base licenses plus 300 host agents, application, backup and storage options		
Pricing & Discounts				
	<u>Bundled Discounts</u> The Offerors are invited to provide additional quotes that reflect discounts that are offered if OCTO purchases a combination of items from a single Offeror.	Detail of discounts provided		
Installation, Migration, Training				
	<u>Services</u> This cost is to include pricing for the services outlined to implement the recommended solution. Additionally it is to include the cost for any additional hours broken out per various resource levels.	Per Hour		
	<u>Installation</u> Vendor will be responsible for initial installation and configuration within 5 business days of equipment delivery. Entire configuration (front end, back end, physical disk layout, LUN layout) must conform to ' best practice' and must be structured to the highest possible performance standards for implementation in support of OCTO' s specific environment and server	Per Hour		

Line Items	Description	Unit	Unit Cost	Total Cost
	requirements.			
	<u>Migration</u> Vendor should provide migration strategy and pricing for migrating existing infrastructure to new consolidated storage environment.	Per Hour		
	<u>Maintenance Services</u> This cost is to include yearly pricing for regular maintenance of the recommended solution. This includes firmware, microcode, capacity, and software upgrades. Additionally it is to include the definition, and costs, of any additional maintenance services not included in the regular maintenance contract.	Yearly Contract		
	<u>Training</u> This cost is to include pricing for each training class that the Offeror recommends that OCTO staff attend so that they are able to effectively manage the environment. It is expected that these costs will be expressed as per student per class.	Per Training Class		

GOVERNMENT OF THE DISTRICT OF COLUMBIA
OFFICE OF THE CHIEF FINANCIAL OFFICER
OFFICE OF TAX AND REVENUE



TAX CERTIFICATION AFFIDAVIT

THIS AFFIDAVIT IS TO BE COMPLETED ONLY BY THOSE WHO ARE REGISTERED TO CONDUCT BUSINESS IN THE DISTRICT OF COLUMBIA.

Date: _____

Name of Organization/Entity: _____

Address: _____

Business Telephone No.: _____

Principal Officer:

Name: _____ Title: _____

Soc. Sec. No.: _____

Federal Identification No.: _____

Contract No.: _____

Unemployment Insurance Account No.: _____

I hereby certify that:

1. I have complied with the applicable tax filing and licensing requirements of the District of Columbia.
2. The following information is true and correct concerning tax compliance for the following taxes for the past five (5) years:

	Current	Not Current	Not Applicable
District: Sales and Use	()	()	()
Employer Withholding	()	()	()
Ball Park Fee	()	()	()
Corporation Franchise	()	()	()
Unincorporated Franchise	()	()	()
Personal Property	()	()	()
Real Property	()	()	()
Individual Income	()	()	()

The Office of Tax and Revenue is hereby authorized to verify the above information with the appropriate government authorities. The penalty for making false statements is a fine not to exceed \$5,000.00, imprisonment for not more than 180 days, or both, as prescribed by D.C. Official Code § 47-4106.

This affidavit must be notarized and becomes void if not submitted within 90 days of the date notarized.

Signature of Authorizing Agent

Title

Print Name

Notary: DISTRICT OF COLUMBIA, ss:

Subscribed and sworn before me this _____ day of _____ Month and Year

Notary Public: _____

My Commission Expires: _____

PAST PERFORMANCE QUESTIONNAIRE

Offeror's Name:	Reference Organization:
Contact Name:	Contact Telephone:
Contract No:	Contract Value:
Type of Contract: (FFP, CPFF, T&M, etc.)	Period of Performance:

Circle Appropriate Score**TECHNICAL PERFORMANCE (Quality of Product/Service)**

- (5) *Exceptional* (Met all performance requirements by 20% or more. Highly effective corrective actions.)
- (4) *Very Good* (Met all performance requirements by 5% or more. Effective corrective actions.)
- (3) *Satisfactory* (Met all performance requirements. Satisfactory corrective actions.)
- (2) *Marginal* (Did not meet Technical Requirements. Inadequate corrective action plans.)
- (1) *Unsatisfactory* (Most performance requirements not met. Recovery not likely.)

COST CONTROL

- (5) *Exceptional* (Significant reductions in cost while meeting all contract requirements.)
- (4) *Very Good* (Reduction in overall cost/price while meeting all contract objectives.)
- (3) *Satisfactory* (Met overall cost/price estimates and met all contract requirements)
- (2) *Marginal* (Did not meet cost/price estimates. Inadequate corrective action plans.)
- (1) *Unsatisfactory* (Significant cost overruns/no obvious cost control measures.)

SCHEDULE (Timeliness)

- (5) *Exceptional* (Significantly exceeded delivery requirements. Highly effective corrective actions.)
- (4) *Very Good* (On-time deliveries/some early deliveries. Quickly resolved delivery issues.)
- (3) *Satisfactory* (On-time deliveries. Minor problems that did not affect delivery schedule.)
- (2) *Marginal* (Some late deliveries. No corrective actions.)
- (1) *Unsatisfactory* (Many late deliveries / Negative cost impact. Not likely to recover.)

BUSINESS RELATIONS

- (5) *Exceptional* (Highly professional / Responsive / Proactive. Significantly exceeded expectations.)
- (4) *Very Good* (Professional / Responsive. Exceeded expectations. High User satisfaction.)
- (3) *Satisfactory* (Professional / Reasonably responsive. Met expectations. Adequate user satisfaction.)
- (2) *Marginal* (Less professionalism/responsiveness. Low user satisfaction and no attempts to improve.)
- (1) *Unsatisfactory* (Delinquent responses. No cooperative spirit. Unsatisfied user and unable to improve.)

TOTAL SCORE: _____

Initials of Evaluator: _____

: Background of Existing Systems and Operations

The District of Columbia OCTO currently has a heterogeneous data storage infrastructure based on the following vendor platforms: Hitachi Data Systems (HDS) 9900 series, EMC CLARiiON CX600, CX300 and Centera. Although the largest sub-system, the HDS 9900, is shared (between open systems and mainframe applications) the CLARiiON CX600 is used exclusively by the Citywide Messaging group and the CX300 is being utilized by the Server Operations group.

One HDS 9960 is in use at each of the two DC datacenters and utilizes synchronous replication on DWDM circuits connected through a CISCO ONS 15530 aggregator. Each of the two SAN environments provides volume space to a myriad of mainframe, UNIX and windows nodes with a variety of applications. The open systems servers attach via fibre channel SAN connections provided by (4) McData Intrepid 6064 directors. The mainframe attaches via 14 half-duplex ESCON links (17Mb/sec).

There are currently (2) McData Intrepid 6064 directors at each site but they are not configured as redundant fabrics. 99% of the host systems connected to this SAN are not dual attached which lessens their redundancy, ability to fail-over paths to the SAN or load balance I/O operations.

The second SAN system is used exclusively by the Citywide Messaging group. It consists of an EMC CLARiiON CX600 and a Centera in operation at each data center. The Citywide Messaging group utilizes a (1) GB link through the Brocade fibre channel switches for replication. There is a Centera in use at each of the two data centers and replication for these devices occurs via Ethernet link.

Although the HDS and EMC subsystems comprise a majority of the data storage infrastructure, there are groups such as Server Operations that handle critical applications through dedicated storage at each site. Outside of the (2) CLARiiON CX300s, which currently use 1.5 TB at ODC1 and 4.5 TB at ODC2, the Server Operations group manages and additional 21 TB of locally attached storage for various city agencies. The CX300s were acquired to handle the growing needs of individual entities not able to be met by the current HDS or EMC systems. The CX300s are not mirrored and are connected to Brocade 3800 switches (one per site) into a dedicated fabric.

There are several areas within the SAN infrastructure(s) that are candidates for modernization that would benefit from the advanced capabilities that new systems can offer. It is OCTO's desire to choose a vendor that proposes the best overall solution in the consolidation and migration of the present infrastructure.

Applications

The DC IT infrastructure is currently managed by five major groups: Server Operations, Storage and Backup Operations, Citywide Messaging, Web Applications, and Datacenter Operations. The majority of the applications that reside on the SAN are outlined by their associated groups below:

- ❖ Server Operations
 - Ariba
 - PeopleSoft
 - Seebeyond
 - Oracle RAC
 - MS Cluster Services
 - GIS
 - SQL
- ❖ Citywide Messaging
 - Microsoft Exchange 5.5 and 2003
 - ARCserve 5.5
 - Symantec NetBackup 5.1
- ❖ Storage/Backup Operations
 - Symantec NetBackup 5.1
 - Ariba
 - PeopleSoft
 - Seebeyond
 - Microsoft Exchange 5.5 and 2003
 - Oracle 8i, 9i , and 10g
- ❖ Datacenter Operations
 - Peoplesoft
 - Oracle 8i, 9i , and 10g

Current SAN Storage Devices

Currently OCTO operates several separate (stand-alone) storage devices throughout its networks. The majority of the storage devices has reached their end of life (EOL) and must be replaced, while some may be able to be utilized in future design or for non-critical purposes. Re-use of the current infrastructure should not be considered as part of this RFTOP. OCTO's current storage subsystems are listed in the following table:

Subsystem	ODC2	ODC1	Use	SAN Connected Storage Ports
Hitachi Lightning 9960	1	1	Shared between IBM z800 Series Mainframe and Open Systems (Windows, Unix)	8 ODC1 8 ODC2

Subsystem	ODC2	ODC1	Use	SAN Connected Storage Ports
EMC CLARiiON CX 600 series	1	1	Exchange email	5 ODC1 6 ODC2
EMC CLARiiON CX300 series	1	1	Database support	4
EMC Centera	1	1	Not yet in production	2

OCTO Utilized Storage

Storage allocation is high on the HDS arrays that are being managed by the OCTO storage operations group. In the ODC1 datacenter, there exists approximately 39TB of raw storage, with 30.8 TB of usable space. In the ODC2 datacenter there is approximately 39TB of raw storage and 30.3TB useable storage. Overall allocation between the two datacenters is over 75%. Two Centeras also exist within OCTO's citywide messaging organization, accounting for 4 additional terabytes of storage space but are not currently being utilized.

The chart below outlines the allocation for OCTO's storage by datacenter.

Hardware	Mainframe (TB)	Open Systems (TB)	Total Utilized (TB)	Total Raw (TB)	Utilized (%)
ODC2					
Hitachi - (1) 9900 series	8.9	9.4	18.3	23	80%
CLARiiON - (1) CX 600 series (Citywide Messaging)	N/A	8	8	10	80%
CLARiiON - (1) CX 300 series (Server Ops)	N/A	4.5	4.5	6	75%
ODC1 Total TB	8.9	21.9	30.8	39	78%
ODC1					
Hitachi - (1) 9900 series	8.9	9.4	18.3	23	80%
CLARiiON - (1) CX 600 series (Citywide Messaging)	N/A	8	8	10	80%
CLARiiON - (1) CX 300 (Server Ops)	N/A	4	4	6	66%
ODC1 Total TB	8.9	21.4	30.3	39	75%

Hardware	Mainframe (TB)	Open Systems (TB)	Total Utilized (TB)	Total Raw (TB)	Utilized (%)
Total OCTO TB Usage	17.1	43.3	61.1	78	75%
Centera		4 TB (currently not in use)			

Current SAN Switch Topology

The current SAN switch topology is primarily built around McDATA 6064 switches. An additional SAN is built around 2 Brocade 3800 switches which support the CLARiiON CX300s. The current fibre channel switches within the environment are at capacity and cannot be expanded. There are a total of 32 available ports between ODC1 and ODC2. Figure 1.1, shown below, is a diagram of the current OCTO enterprise storage infrastructure.

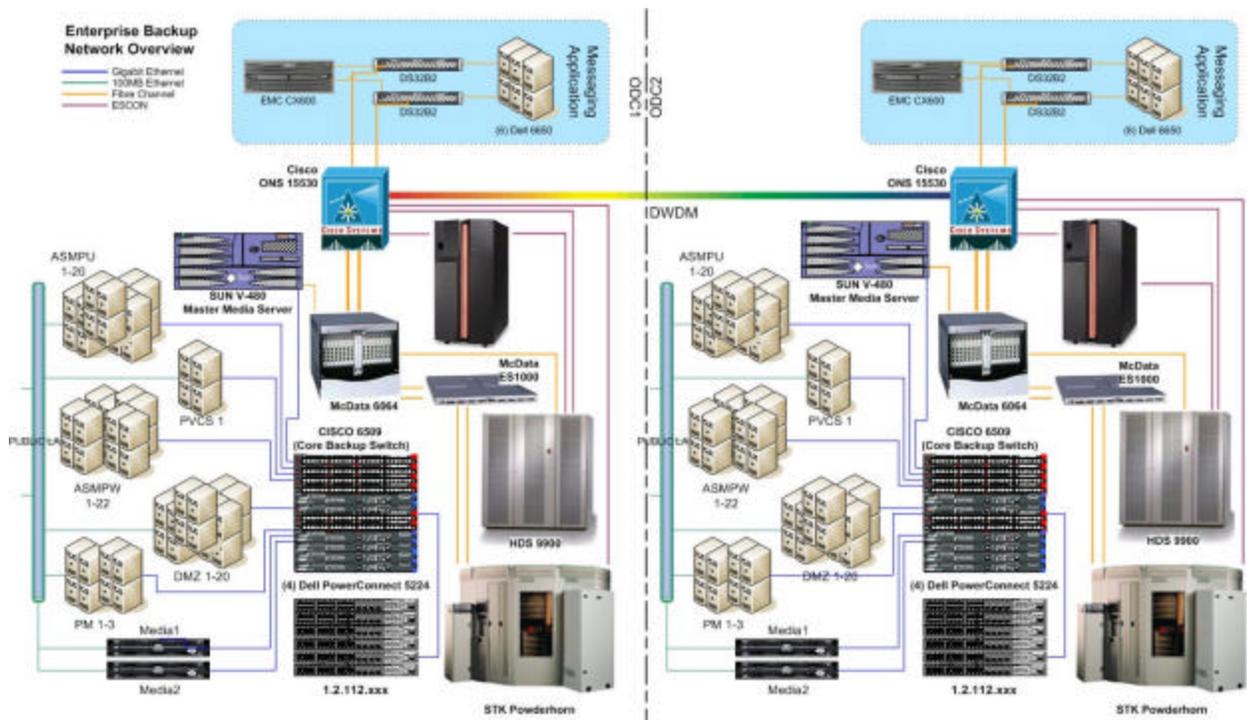


Figure 1: OCTO Enterprise Storage Infrastructure

Storage

Storage Identifier	ODC2	ODC1	ODC2	ODC1
Manufacturer	Hitachi	Hitachi	EMC	EMC
Make/model	9960	9960	CX600	CX300
Firmware version	1-19-91-00/00	1-19-91-00/00	2.07.600.5.016	
Single (S) or Dual (D) Attached Ports	D	D	D	D
# Ports required for single attached	0	0	0	0
# Ports required for dual attached	4	4	4	1
Interfaces				
SCSI (SC) or Fibre Channel (FC)	FC	FC	FC	FC
# Existing Fibre Channel interfaces	4	4	4	4
- make/model	Hitachi	Hitachi	EMC	EMC
Disk Breakdown				
# of 146GB	6	9	26	
# of 72GB	279	262	242	
# of 300GB	29	16	0	
Total Space				
Used Space (GB)	18,558TB	18,637TB		
Available Space (GB)	3.5TB	1.35TB		
Total Space (GB)	22,058TB	19,987TB		

Servers

Manufacturer	Make/Model	Quantity
Dell		
IBM		
SUN		

Operating Systems

Operating Systems	Quantity
Windows	130
Solaris	20
AIX	40

Host Bus Adapters

Host Bus Adapters	Quantity
Emulex	

Host Bus Adapters	Quantity
JNI	
QLogic	
Total HBAs	

Switches

Switch Identifier	Manufacturer	Make/Model	Firmware	Speed
ODC2/ODC1	McDATA	6064		2Gb
DWDM_switch	Cisco	15530		

Applications

Applications
Ariba
SeeBeyond
Exchange 5.5
Exchange 2003
Symantec Netbackup 5.1
PeopleSoft
Oracle 8i, 9i, 10g

: Technical Specifications and Requirements Matrix

Offerors are expected to provide detailed responses in the matrix below as to how they will meet the listed OCTO requirements (where applicable) and give any additional explanations regarding particular hardware or software included in the solution. The Offeror shall respond individually to each of the requirements using the following product rating codes:

- Y – The solution meets the requirements out of the box without customization
- P – The solution partially meets the requirement (explain in the Vendor Comments)
- C – The solution will meet the requirement with customization
- TP – The solution meets the requirement with a third-party product
- N – The solution does not meet the requirement

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
Storage Acquisition – Requirements List for Storage Systems		
Mandatory		
<u>Total Useable Storage Capacity</u> Tier 1 – 25 TB Tier 2 – 50 TB		
<u>Local Replication – ODC2</u> Tier 1 – 25 TB		
<u>Remote Replication – ODC 2 -> ODC1</u> Tier 1 (Synchronous) – 25 TB		
<u>Growth Usable Storage Capacity – ODC2</u> Tier 1 – 17TB (by year 3) per site, per array Tier 2 – 32TB (by year 3) per site, per array		
<u>Growth Usable Storage</u>		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<u>Capacity – ODC1</u> Tier 1 – 17TB (by year 3) per site, per array Tier 2 – 32TB (by year 3) per site, per array		
<u>Storage Processors</u>		
<u>Disk Controllers</u>		
<u>Cache</u> Minimum of mirrored write cache ODC1 - Must be able to scale up to 380 GB ODC2 – Must be able to scale up to 380 GB		
Optional		
<u>Connections</u> Connections for ODC1 must be 75% of ODC2		
Host Fibre Channel Connections for the Storage Solution		
Mandatory		
<u>Host System Interfaces</u> 2 HBAs per host with multi-path software available to provide load balancing.		
<u>Type</u> Fibre Channel (FC/SW) as installed.		
<u>Speed</u> Each interface must be 2GB capable as installed.		
<u>Support</u>		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
Each storage fibre adapter must be fully supported by McDATA manufactured switches (6064 Intrepid) and in publicly published support matrix.		
<u>Ports</u> 160 available storage ports in Enterprise Director #1 (ODC2) 128 available storage ports in Enterprise Director #2 (ODC1)		
Optional		
<u>Host System Interfaces</u> Specify maximum number of host interfaces supported.		
RAID and Striping Support		
Mandatory		
<u>Support</u> RAID levels supported – RAID 1, RAID 5 and RAID 10		
<u>Restrictions</u> Please describe any restrictions on use of mixing different RAID types within a single storage unit.		
<u>Rebuild</u> The proposed storage system should throttle down the rebuild to minimize the impact on existing applications.		
<u>Rebuild Process</u> Please describe the length (in time) and impact on applications software, general storage system operations, and performance during rebuilding		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
(after failure) for each of the proposed RAID sets or types (RAID-1, RAID-5and RAID-10.). Please include description and differentiate between rebuilding on the ‘hot spare’ and rebuilding on the replaced failed physical disk.		
<u>Automation</u> Please describe automated failover and failback process for invocation of ‘hot spares’ .		
Optional		
Physical drives		
<u>Drive Size</u> Please list drive sizes supported (i.e. 73GB, 146GB)		
<u>Drive Speed</u> Drives Supported as Installed Tier 1 – 15K Tier 2 – 10K mandatory, 15K optional		
<u>Interface</u> Drives supported as installed must have a fibre channel interface		
<u>Interface Speed</u> Drives supported as installed must have 2GB interface speed		
<u>Overhead</u> Please describe on a single physical disk how much space (in MB) is required for storage		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
system overhead		
Optional		
<u>Large Drive Support</u> Please specify size(s) above 146GB supported		
<u>Mixed Drive Configuration</u> Please specify drive types supported with mixed drive configurations (ATA/SATA/FATA) within a single frame		
Warranties and Maintenance		
Mandatory		
<u>Hardware Warranty and On-Site Maintenance</u> 3 years on-site service, 24x7, 4 hour on-site response, including call home feature, local parts supply, and remote diagnostics		
<u>Software Warranty and Maintenance</u> 3 years service and full support 24x7; includes all new versions, releases, and patches during the warranty period		
<u>Compliance</u> It is desirable for Offeror to provide maintenance in full compliance with Section 5.3. (If No, then fully explain all proposed differences)		
<u>Phone-Home</u> Phone Home Capability as installed		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<u>Remote Access</u> Remote Diagnostics Capability as installed		
<u>Updates</u> Non-disruptive firmware or microcode update capability		
<u>Availability</u> Please fully describe all maintenance, upgrade, service, hardware additions, layout and configuration changes that may require the entire storage system to become unavailable to all attached servers. For each item identified, specify the length in time of the outage.		
<u>Outages</u> Please describe in detail any hardware or software upgrade or changes that would disrupt operations or require a server reboot. Please specify for what period of time. Below is a sample (non-inclusive) list of activities for which operations should not be disrupted: <ul style="list-style-type: none"> • New physical disk, cache, front end connection, or power supply additions added or replaced • New configuration of disk, cache, and front end connections • New level of internal operating system or microcode and configuration • Code patches and fixes 		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<p>to existing internal operating system or microcode</p> <ul style="list-style-type: none"> • Vendor software agent update or new install of agent on connected host server • At installation formatting a new disk or RAID set or Mirrored pair • Creating new LUNs • Performing LUN masking operations 		
Optional		
Fault Tolerant Features Supported		
Mandatory		
<u>Redundancy</u> Redundant Hot Swappable Components as installed without storage system or server outages (power supplies; fans; front end and back end controllers; cache and disk drives)		
<u>Power</u> Minimum of dual power cords and dual power supplies		
<u>Cache</u> Minimum of mirrored write cache		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<u>Cache Backup</u> Minimum requirement for battery backed up cache		
<u>Hot Spare</u> Hot standby dynamic spare (minimum of two physical disk supported)		
<u>Disks</u> Battery backed up disks for destage of data in the event of a power loss		
High Availability Features		
Mandatory		
<u>Failover</u> Support for automatic failover (storage controller clustering)		
<u>Hot Spares</u> Hot Spares as installed will provide non-disruptive automatic failover		
<u>Pathing</u> Support for multi-pathing		
<u>Access</u> It is desirable for one LUN to be simultaneously accessible by two systems. Please describe any restrictions.		
Software		
Mandatory		
<u>Licenses</u> All software provided will include licenses required by the storage array, fabric switches, and host based software.		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<p>Additionally it is to include the cost for upgrading the capacity in the most appropriate increments for each of software packages.</p>		
<p><u>Modifications</u> Equipment and software provided must not require any modifications other than standard configuration practices to any operating systems or products such as performance tools, server diagnostic tools or programs, or any third party software package used by OCTO. See Appendix B for a complete list.</p>		
<p><u>Firmware/Microcode</u> Storage system firmware or microcode will be included.</p>		
<p><u>Agents Required</u> Please list all server-based agents required to run vendor's software. Include a full description of the functionality provided by the agent, which software features it supports, and what system or storage resources that are required for each agent.</p>		
<p><u>Agents Descriptions</u> Please describe for server based agents for all software offered by Offeror, including point-in-time copy software:</p> <ul style="list-style-type: none"> • Are agents or client software required on servers attached to the storage platform in order 		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<p>to support functionality? If so, please provide a list of agents and the functionality and the related software packages they support.</p> <ul style="list-style-type: none"> • Please explain agent architecture. • Please describe the practice for upgrading or modifying the software agents or clients listed in item a) above for all servers as a group attached to the proposed storage system. • Is a reboot required to pick up any new or upgraded agent or client, either during install or version, release, or patch upgrade? • Can agents or clients be remotely installed (pushed) and upgraded from a central location, or does it require logging onto each server? 		
<p><u>Cluster Support</u> Cluster support-capable for server clusters must allow simultaneous access for all servers in Appendix A.</p>		
<p>Optional</p>		
<p><u>LUN Expansion</u> Non disruptive logical volume (LUN) expansion</p>		
<p><u>LUN Reduction</u></p>		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
Non disruptive volume size (LUN) reduction		
Management Framework		
Mandatory		
<u>Management Interface</u> The management framework proposed by the Offeror should have multiple options for interfacing with it and making equal use of all of its capabilities. Specifically it is required that the management framework can be accessed through the following means: <ul style="list-style-type: none"> • Graphical User Interface (GUI) • Command Line Interface (CLI) • Automated Task Processing or Scripting 		
<u>Reporting</u> Performance collection tool with historical reporting will be included.		
<u>Geographically Dispersed Management</u> Should have the ability to remotely manage other installations from a primary site. Offerors should detail in their responses their recommended method for managing disparate sites.		
<u>Configuration Management</u> Should have the capability to keep configuration history and change management tracking information.		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<u>Policy Based Management</u> Should include a policy-based engine for administration and rule enforcement.		
<u>Host Discovery</u> Should include host agents for the hosts.		
<u>Fabric Discovery</u> Should discover all SAN technologies proposed by the Offeror via in-band or out-of band discovery methods.		
<u>Event Alerting</u> Should have event alerting capability for storage and host technologies.		
<u>LUN Management</u> Should have volume or LUN management that allows arbitrary creation, deletion, and sizing of the LUNs. If there are any restrictions, special considerations (ex. for striping LUNs), or limitations please describe.		
<u>LUN Masking</u> Should have the ability to manage LUN masking and/or LUN security of the storage devices		
<u>Fabric Management</u> Should provide the ability to manage the switch components		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<u>Point-in-Time Copies</u> Should provide the ability to manage the point in time copy capabilities of the proposed solution		
<u>Remote Copies/Replication</u> Should provide the ability to manage the remote copy/replication capabilities of the proposed solution		
<u>Application Integration</u> Should provide application agents for integration with critical applications hosted by OCTO		
<u>Backup Integration</u> Should provide backup agents for integration with Symantec NetBackup.		
<u>Automation of Tasks</u> Should provide the ability to schedule regularly repeating tasks		
Optional		
Replication Requirements		
Mandatory		
<u>Logical Point-in-Time Copy</u> Must have capability for logical (pointer-based) point-in-time copy		
<u>Full Point-in-Time Copy</u> Must have capability for full		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
(clone-based) point-in-time copy		
<u>Point-in-Time Copy Software</u> For both types of point-in-time copies, please describe: <ul style="list-style-type: none"> • Is there a command line interface? • Can the functionality be invoked within a script? • How much time does it take from invocation until the copy is available for use? • How much time does it take from invocation until a quiescent application can continue when taking a copy that will be considered consistent at a single point in time? 		
<u>Remote Copy</u> Must have capability for remote copy without server or host based software		
<u>Replication Support</u> Capability for Remote Copy – support for DWDM communication		
Optional		
Reporting		
Mandatory		
<u>Operational</u> OCTO requires the ability to		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
easily access information regarding how the consolidated storage infrastructure is functioning on a day-to-day basis to enable effective management.		
<u>Trending</u> OCTO requires the ability to capture trends in utilization growth of the various components.		
<u>Executive Oversight</u> OCTO requires the ability for its management staff to “peer into” the consolidated storage solution to ensure that it is being utilized in an efficient and cost effective manner while meeting the organization’s business goals.		
Optional		
Pricing & Discounts		
Mandatory		
<u>Bundled Discounts</u> The Offerors are invited to provide additional quotes that reflect discounts that are offered if OCTO purchases a combination of items from a single Offeror.		
<u>Storage Arrays</u> This cost is to include pricing for Tier 1 and Tier 2 storage capacities. It is to take into account the total amount of raw capacity that is needed to		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<p>achieve the protected capacities outlined. Additionally it is to include the cost for upgrading the capacity in increments of 1 TB of usable storage without any additional feature licensing.</p>		
<p><u>Fabric Switches</u> This cost is to include pricing for the total number of switches to achieve the port capacity requirements requested by OCTO. Additionally it is to include the cost for upgrading the capacity in increments of 16 ports without any additional feature licensing.</p>		
<p><u>Host Bus Adapters</u> This cost is to include pricing for the total number of host bus adapters required to connect all 300 hosts to the fabric switches. Additionally it is to include the cost for replacement of existing HBAs if necessary.</p>		
<p><u>Services</u> This cost is to include pricing for the services outlined to implement the recommended solution. Additionally it is to include the cost for any additional hours broken out per various resource levels.</p>		
<p><u>Maintenance Services</u> This cost is to include yearly pricing for regular maintenance of the recommended solution.</p>		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<p>This includes firmware, microcode, capacity, and software upgrades. Additionally it is to include the definition, and costs, of any additional maintenance services not included in the regular maintenance contract.</p>		
<p><u>Training</u> This cost is to include pricing for each training class that the Offeror recommends that OCTO staff attend so that they are able to effectively manage the environment. It is expected that these costs will be expressed as per student per class.</p>		
Optional		
Compatibility with existing environment		
Mandatory		
<p><u>Environment Support</u> It is desirable to have full support for OCTO's current environment (see Appendix A). Please describe any aspect of the current environment, which will not be fully supported, including but not limited to HBAs, server hardware, server software, applications software, and databases.</p>		
Optional		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
Existing Vendor Customer base		
Mandatory		
<u>Customer Base</u> Provide 3 references of similar solutions deployed by Offeror.		
Optional		
Installation and Migration		
Mandatory		
<u>Delivery</u> Delivery of all hardware and software must be within 4 weeks of award of the contract.		
<u>Facilities</u> Offeror must provide specifications for installation such as power requirements, whip and outlet specifications, special power connectors, floor weight when fully populated, floor space requirements, etc.		
<u>Installation</u> Vendor will be responsible for initial installation and configuration within 5 business days of equipment delivery. Entire configuration (front end, back end, physical disk layout, LUN layout) must conform to 'best practice' and must be structured to the highest possible performance standards for implementation in support of OCTO's specific environment and server requirements.		

Technical Specification and Requirement	Offeror Response (Y, P, C, TP, N)	Offeror Explanation
<u>Migration</u> Vendor should provide migration strategy and pricing for migrating existing infrastructure to new consolidated storage environment.		
Optional		