SPC BENCHMARK 1™

EXECUTIVE SUMMARY

DATACORE SOFTWARE CORPORATION

DATACORE PARALLEL SERVER

(DUAL NODE, FIBRE CHANNEL SAN)

SPC-1 V1.14

Submitted for Review: June 15, 2016
Submission Identifier: A00179
Revised: June 17, 2016

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
Test Sponsor Primary Contact	DataCore Software Corporation – http://www.datacore.com Ben Treiber – ben.treiber@datacore.com Worldwide Headquarters Corporate Park 6300 NW 5th Way Ft. Lauderdale, FL 33309 Phone: (954) 377-6000 FAX: (954) 938-7953
Test Sponsor Alternate Contact	DataCore Software Corporation – http://www.datacore.com Roni Putra – roni.putra@datacore.com Worldwide Headquarters Corporate Park 6300 NW 5th Way Ft. Lauderdale, FL 33309 Phone: (954) 377-6000 FAX: (954) 938-7953
Auditor	Storage Performance Council – http://www.storageperformance.org Walter E. Baker – AuditService@StoragePerformance.org 643 Bair Island Road, Suite 103 Redwood City, CA 94063 Phone: (650) 556-9384 FAX: (650) 556-9385

Revision Information and Key Dates

Revision Information and Key Dates	
SPC-1 Specification revision number	V1.14
SPC-1 Workload Generator revision number	V2.3.0
Date Results were first used publicly	June 15, 2016
Date the FDR was submitted to the SPC	June 15, 2016
Date the revised FDR was submitted to the SPC Revised configuration diagrams*(page (10)* to more clearly illustrate the various components	June 17, 2016
Date the Priced Storage Configuration is available for shipment to customers	September 6, 2016
Date the TSC completed audit certification	June 15, 2016

Tested Storage Product (TSP) Description

DataCore Parallel Server provides a flexible platform for enterprise environments. Because it is designed from the outset as parallel storage software, it is uniquely able to scale to its underlying hardware environment and to do so in both conventional storage topologies and in more recent converged environments.

This SPC-1 Result, which used the Lenovo x3650-M5 as storage servers, demonstrates, by employing parallel processing, the software balances load and better utilizes memory, compute and storage resources to accelerate the I/O between the external workload and the storage subsystem. This parallel I/O architecture further enhances the system's ability to process intensive and mixed workloads typical of database and other transactional oriented applications.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: DataCore Parallel Server *(Dual Node, Fibre Channel SAN)*	
Metric	**Reported Result**
SPC-1 IOPS™	5,120,098.98
SPC-1 Price-Performance™	$0.10/SPC-1 IOPS™
Total ASU Capacity	11,880.000 GB
Data Protection Level	Protected 1 *(Mirroring)*
Total Price	$506,525.24
Currency Used	U.S. Dollars
Target Country for availability, sales and support	USA

SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

SPC-1 Price-Performance™ is the ratio of **Total Price** to **SPC-1 IOPS™**.

Total ASU (Application Storage Unit) **Capacity** represents the total storage capacity available to be read and written in the course of executing the SPC-1 benchmark.

A **Data Protection Level** of **Protected 1** using ***Mirroring*** configures two or more identical copies of user data.

> ***Protected 1:*** *The single point of failure of any* ***storage device*** *in the configuration will not result in permanent loss of access to or integrity of the SPC-1 Data Repository.*

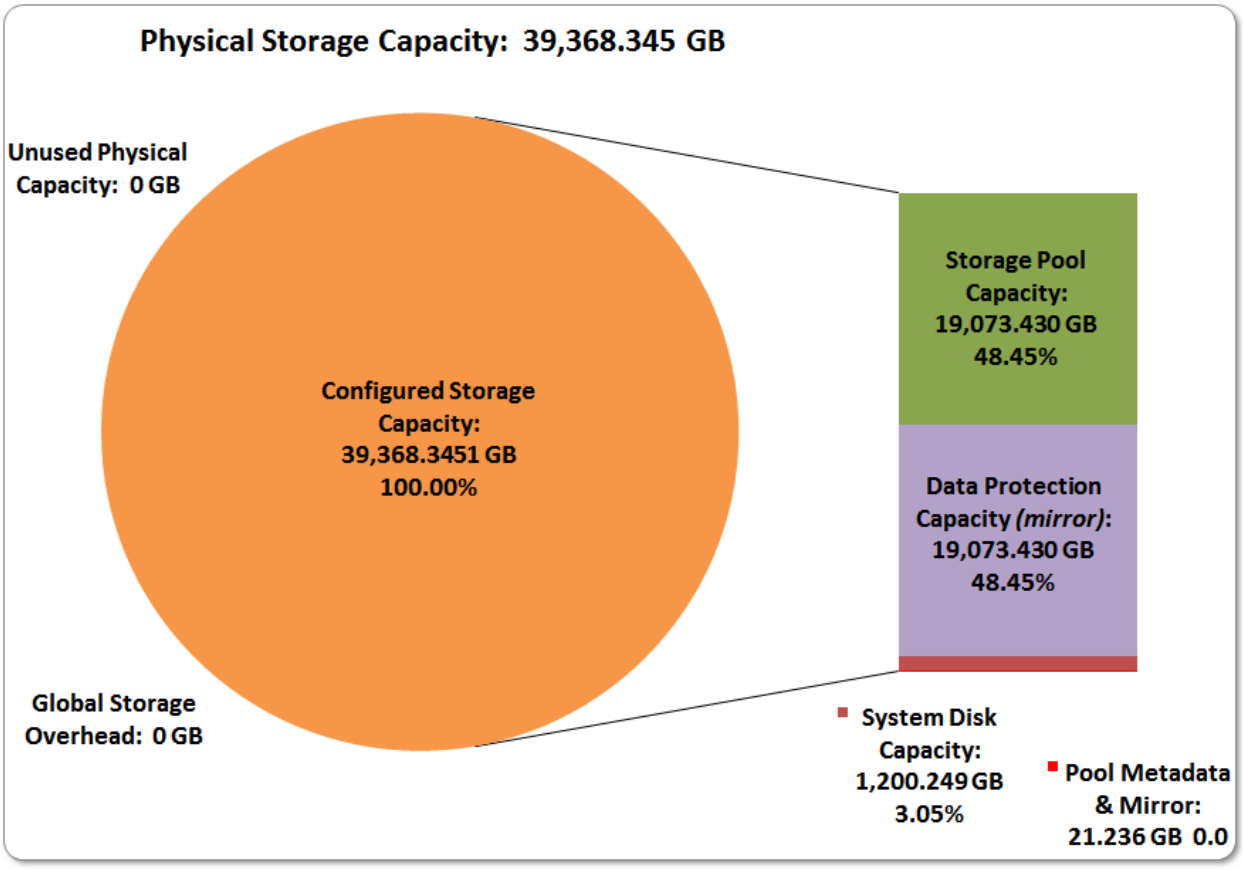
Total Price includes the cost of the Priced Storage Configuration plus three years of hardware maintenance and software support as detailed on page 9.

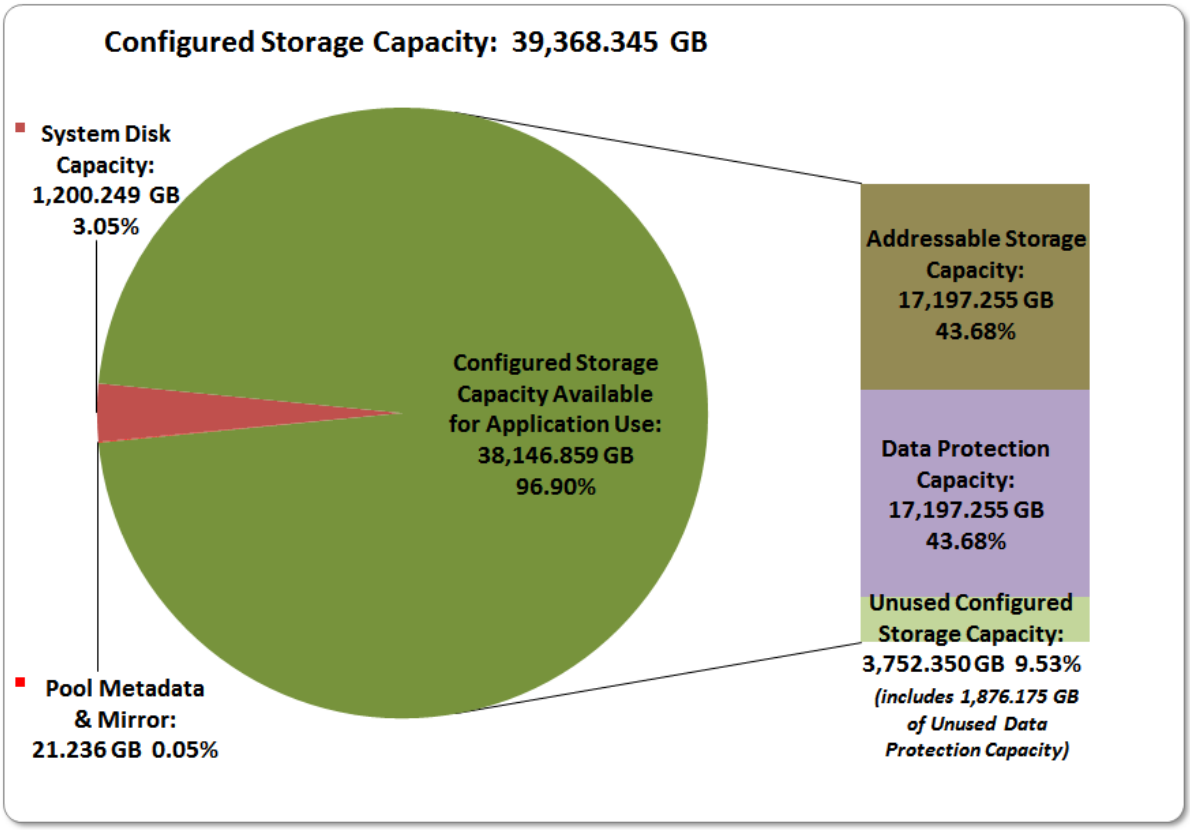
Currency Used is formal name for the currency used in calculating the **Total Price** and **SPC-1 Price-Performance™**. That currency may be the local currency of the **Target Country** or the currency of a difference country *(non-local currency)*.

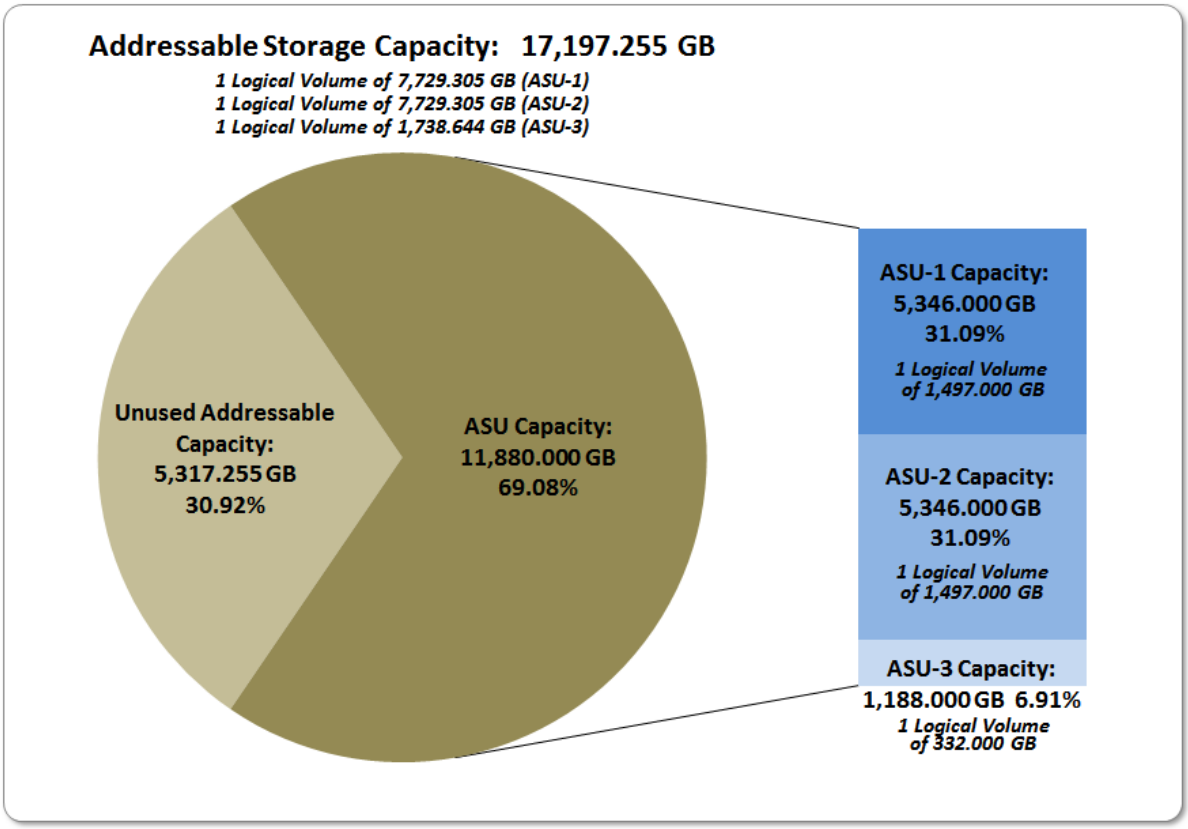
The **Target Country** is the country in which the Priced Storage Configuration is available for sale and in which the required hardware maintenance and software support is provided either directly from the Test Sponsor or indirectly via a third-party supplier.

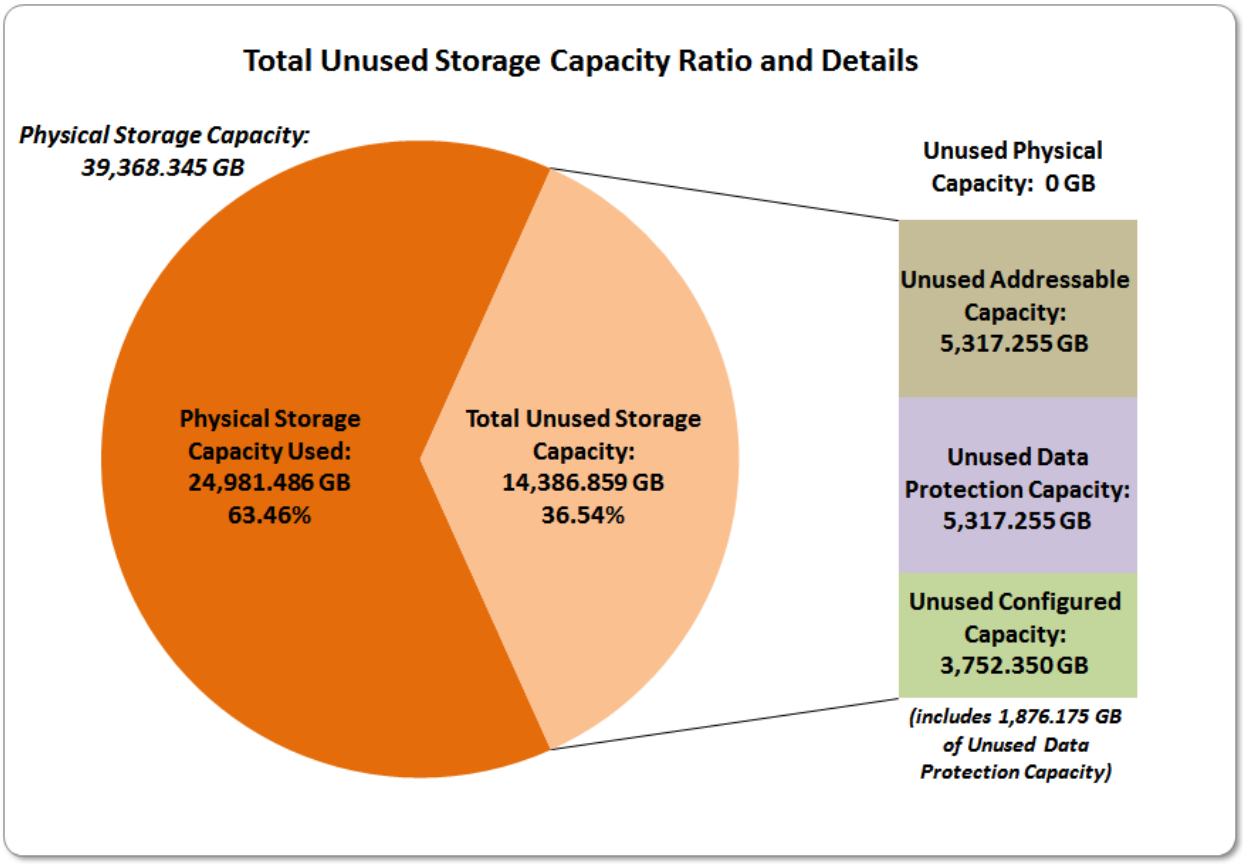
Storage Capacities, Relationships, and Utilization

The following four charts and table document the various storage capacities, used in this benchmark, and their relationships, as well as the storage utilization values required to be reported.




Configured Storage Capacity: 39,368.345 GB
System Disk Capacity: 1,200.249 GB 3.05%
Pool Metadata & Mirror: 21.236 GB 0.05%
Configured Storage Capacity Available for Application Use: 38,146.859 GB 96.90%
Addressable Storage Capacity: 17,197.255 GB 43.68%
Data Protection Capacity: 17,197.255 GB 43.68%
Unused Configured Storage Capacity: 3,752.350 GB 9.53%
(includes 1,876.175 GB of Unused Data Protection Capacity)


Addressable Storage Capacity: 17,197.255 GB
1 Logical Volume of 7,729.305 GB (ASU-1)
1 Logical Volume of 7,729.305 GB (ASU-2)
1 Logical Volume of 1,738.644 GB (ASU-3)
Unused Addressable Capacity: 5,317.255 GB 30.92%
ASU Capacity: 11,880.000 GB 69.08%
ASU-1 Capacity: 5,346.000 GB 31.09%
1 Logical Volume of 1,497.000 GB
ASU-2 Capacity: 5,346.000 GB 31.09%
1 Logical Volume of 1,497.000 GB
ASU-3 Capacity: 1,188.000 GB 6.91%
1 Logical Volume of 332.000 GB



SPC-1 Storage Capacity Utilization	
Application Utilization	30.18%
Protected Application Utilization	60.35%
Unused Storage Ratio	36,54%

Application Utilization: Total ASU Capacity *(11,880.000 GB)* divided by Physical Storage Capacity *(39,368.345 GB)*.

Protected Application Utilization: (Total ASU Capacity *(11,880.000 GB)* plus total Data Protection Capacity *(19,073.430 GB)* minus unused Data Protection Capacity *(7,193.430GB)*) divided by Physical Storage Capacity *(39,368.345 GB)*.

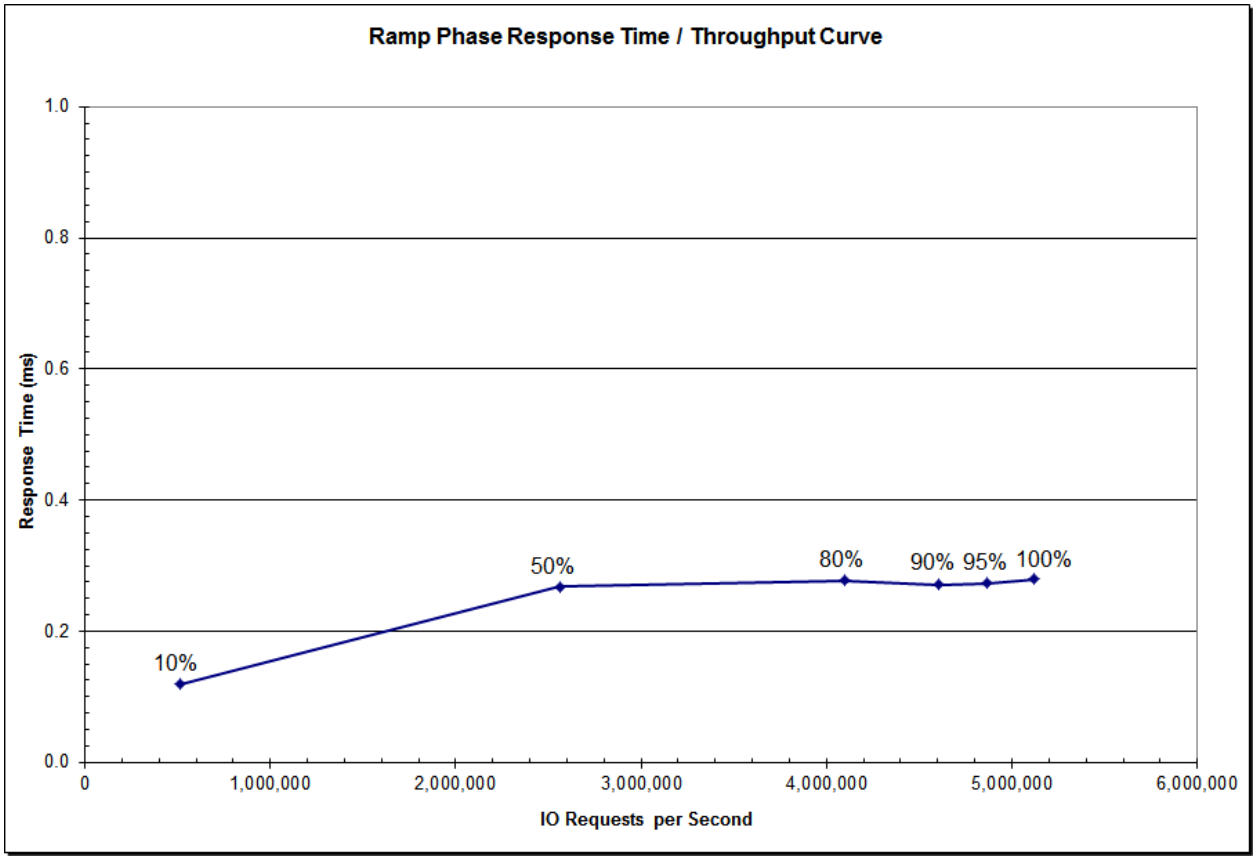
Unused Storage Ratio: Total Unused Capacity *(14,386.859 GB)* divided by Physical Storage Capacity *(39,368.345 GB)* and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 25-26 in the Full Disclosure Report.

Response Time – Throughput Curve

The Response Time-Throughput Curve illustrates the Average Response Time (milliseconds) and I/O Request Throughput at 100%, 95%, 90%, 80%, 50%, and 10% of the workload level used to generate the SPC-1 IOPS™ metric.

The Average Response Time measured at the any of the above load points cannot exceed 30 milliseconds or the benchmark measurement is invalid.



Response Time – Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
I/O Request Throughput	512,050.42	2,560,046.41	4,095,932.88	4,608,044.73	4,863,951.58	5,120,098.98
Average Response Time (ms):						
All ASUs	0.12	0.27	0.28	0.27	0.27	0.28
ASU-1	0.11	0.26	0.27	0.26	0.26	0.27
ASU-2	0.15	0.32	0.33	0.32	0.32	0.33
ASU-3	0.12	0.26	0.27	0.27	0.27	0.28
Reads	0.13	0.30	0.30	0.29	0.29	0.30
Writes	0.11	0.25	0.26	0.26	0.26	0.27

Priced Storage Configuration Pricing

The Priced Storage Configuration pricing information is not embedded in this document due it size and format. The pricing information is available via the following hyperlink:

Priced Storage Configuration Pricing

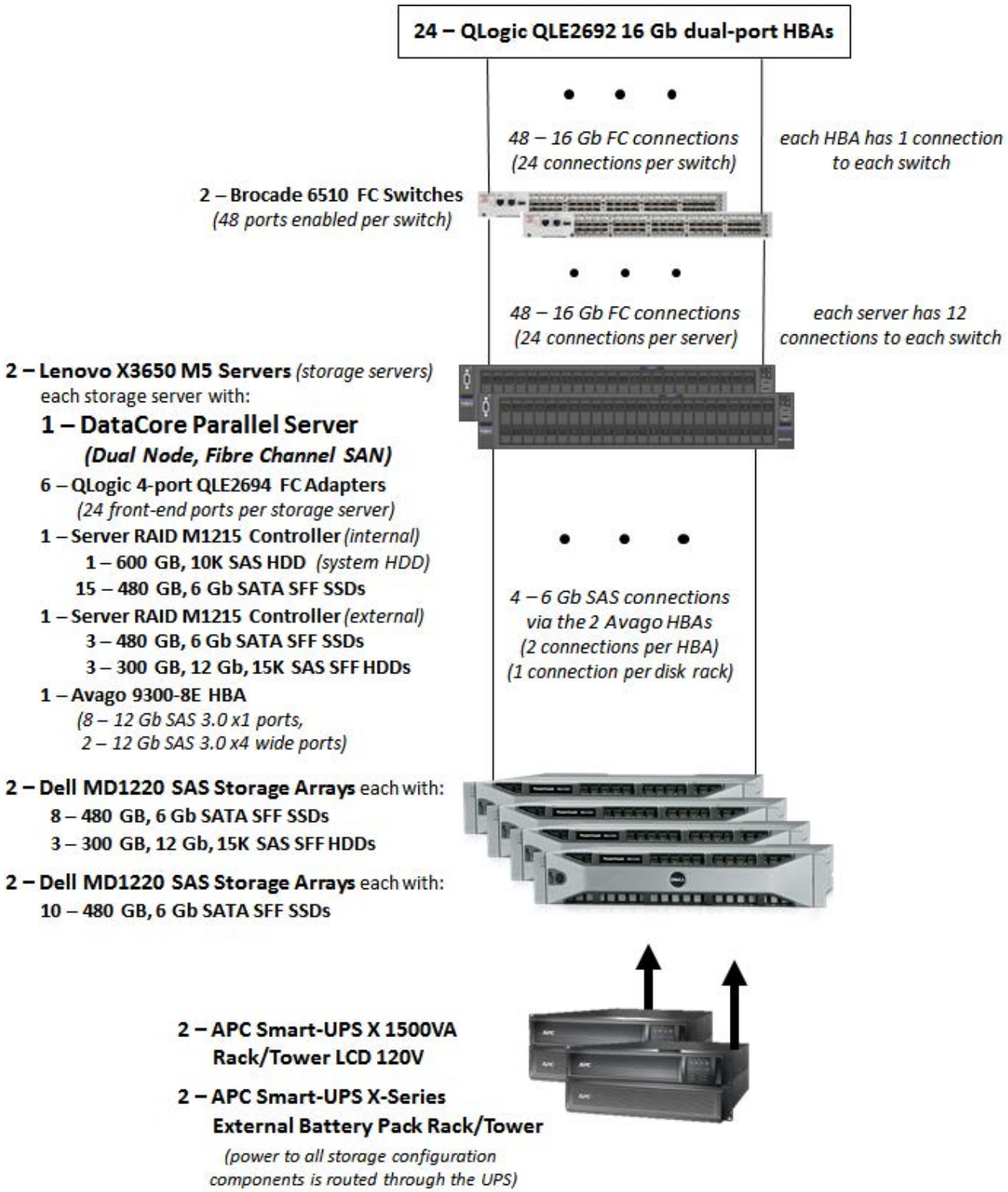
The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- Acknowledgement of new and existing problems within four (4) hours.
- Onsite presence of a qualified maintenance engineer or provision of a customer replaceable part within four (4) hours of the above acknowledgement for any hardware failure that results in an inoperative Priced Storage Configuration that can be remedied by the repair or replacement of a Priced Storage Configuration component.

Differences between the Tested Storage Configuration (TSC) and Priced Storage Configuration

There were no differences between the Tested Storage Configuration and the Priced Storage Configuration.

Priced Storage Configuration Diagram



Priced Storage Configuration Components

Priced Storage Configuration
24 – QLogic QLE2692 16 Gb dual-port HBAs
2 – Brocade 6510 Fibre Channel Switches *(48 ports enabled on each switch)*
DataCore Parallel Server ***(Dual Node, Fibre Channel SAN)*** *(2 copies of the product, one on each storage server)*
1 – Lenovo X3650 M5 Server (storage servers), each with: 2 – Intel® Xeon® 2.30 GHz E5-2696 V3 processors each with 18 cores, 45 MB Intel Smart Cache 1,536 GB main memory *(1.25 TB configured for DataCore Parallel Server)* Windows 2012 R2 Standard Edition PCIe 6 – 4-port QLE2694 16Gb HBAs *(24 – 16Gb ports total and used)* 1 – Server RAID M1215 SAS/SATA Controller *(internal)* 1 – Server RAID M1215 SAS/SATA Controllers *(external)* 1 – Avago 9300-8E HBA *(8 – 12 Gb SAS 3.0 x1 ports total,* *2 – 12 GB SAS 3.0 x4 wide ports total and used)* 1 – System Disk (*connected to the internal controller)* Seagate Savvio 10K.4 600 GB HDD 15 – 480 GB, 6 Gb SATA SFF SSDs *(Samsung SM863 MZ-7KM480E)* *(connected to the internal controller)* 3 – 480 GB, 6 Gb SATA SFF SSDs *(Samsung SM863 MZ-7KM480E)* *(connected to the external controller)* 4 – 300 GB, 12 Gb, 15K SAS SFF HDDs *(HGST Ultrastar C15K600)* *(connected to the external controller)*
2 – Dell PowerVault MD1220 SAS Storage Array, each with 8 – 480 GB, 6 Gb SATA SFF SSDs *(Samsung SM863 MZ-7KM480E)* 3 – 300 GB, 12 Gb, 15K SAS SFF HDDs *(HGST Ultrastar C15K600)*
2 – Dell PowerVault MD1220 SAS Storage Array, each with 10 – 480 GB, 6 Gb SATA SFF SSDs *(Samsung SM863 MZ-7KM480E)*
2 – APC Smart UPS X 1500VA Rack/Tower 120V – SMX1500RM2UAPC 2 – APC Smart-UPS X-Series 48V External Battery Pack Rack/Tower
1 – 24U Rack Enclosure Cabinet wi/doors & sides 1 – PDU1215: Tripp Lite Basic PDU 120V 15A 5-15 outlet