



THE POSSIBILITIES ARE INFINITE

**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**FUJITSU LIMITED
FUJITSU STORAGE SYSTEMS ETERNUS DX200 S3**

SPC-1 V1.14

Submitted for Review: December 30, 2013

Submission Identifier: A00139

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
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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	December 30, 2013
Date the FDR was submitted to the SPC	December 30, 2013
Date the Priced Storage Configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	December 20, 2013

Tested Storage Product (TSP) Description

The scalable and unified Fujitsu Storage ETERNUS DX200 S3 delivers enterprise-class functionality to small and medium-sized companies and subsidiaries with an excellent price/performance ratio. It is the perfect solution when consolidating data for server virtualization, e-mail, databases and business applications as well as centralized file services. Simple, intuitive system management, highly flexible network connectivity and the option of field upgrades to higher system classes significantly reduce operational and migration costs. The ETERNUS DX family architecture lets customers benefit from software options, such as thin provisioning, automatic storage tiering and quality of service management even as early as the entry-level class. This all contributes to better business support.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: Fujitsu Storage Systems ETERNUS DX200 S3	
Metric	Reported Result
SPC-1 IOPS™	200,500.95
SPC-1 Price-Performance™	\$0.77/SPC-1 IOPS™
Total ASU Capacity	3,280.000 GB
Data Protection Level	Protected 2 (<i>Mirroring</i>)
Total Price	\$154,005.32
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 2** using **Mirroring** configures two or more identical copies of user data.

***Protected 2:** The single point of failure of any **component** 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.

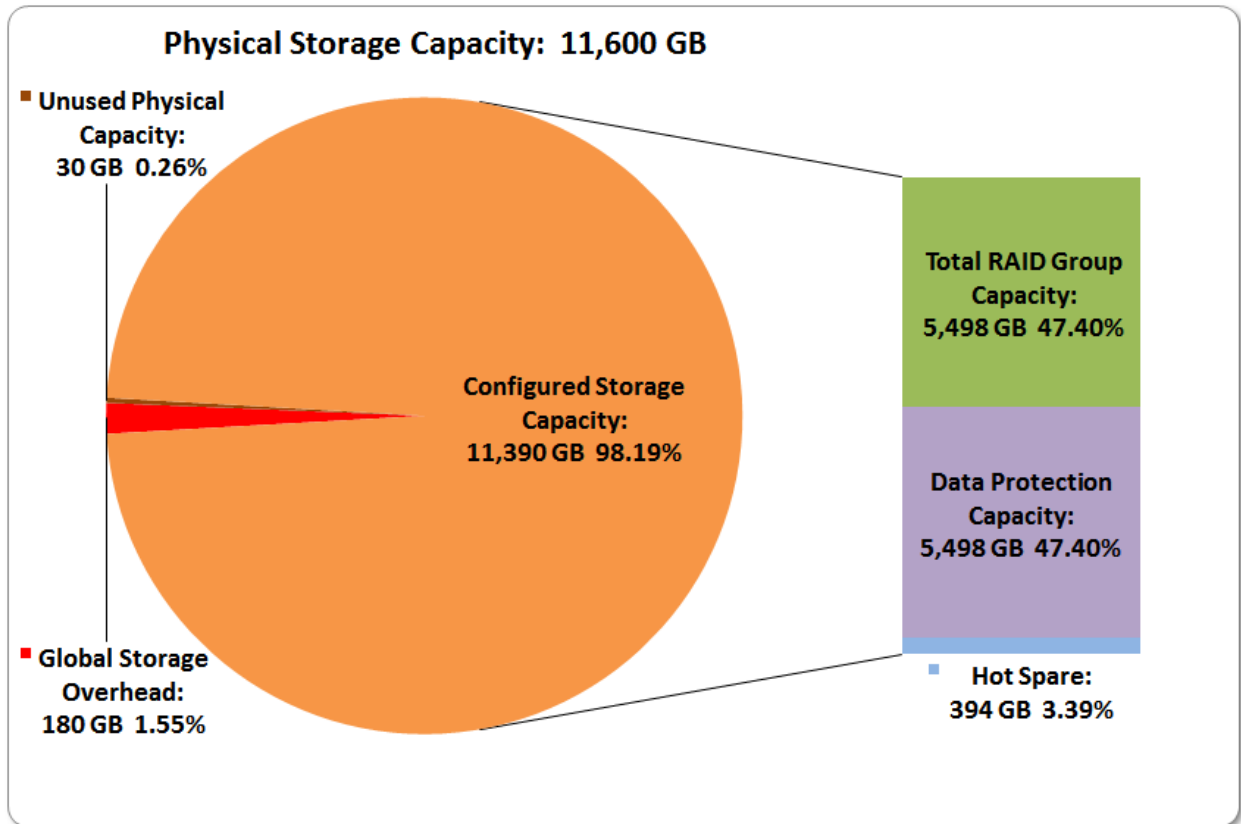
Currency Used is formal name for the currency used in calculating the **Total Price** and **SPC-1 Price-Performance™**. That currency may be the local currency of the **Target Country** or the currency of a difference country (*non-local currency*).

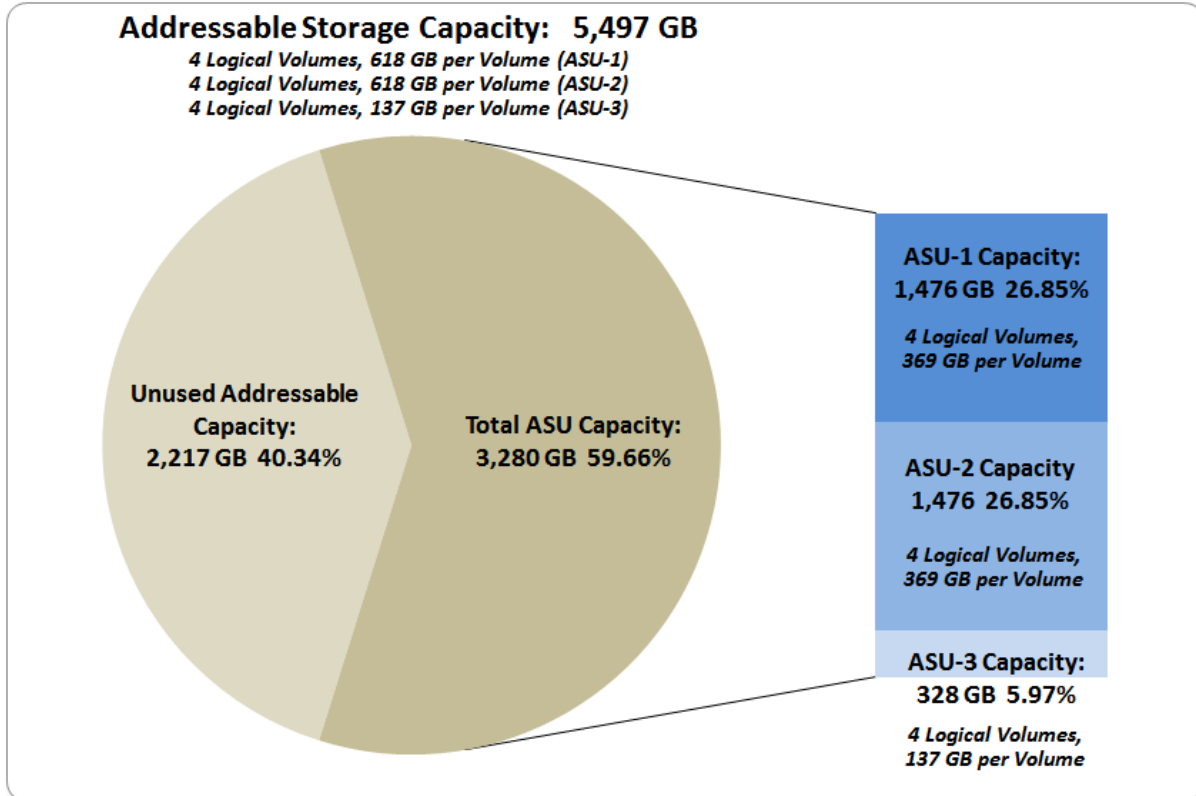
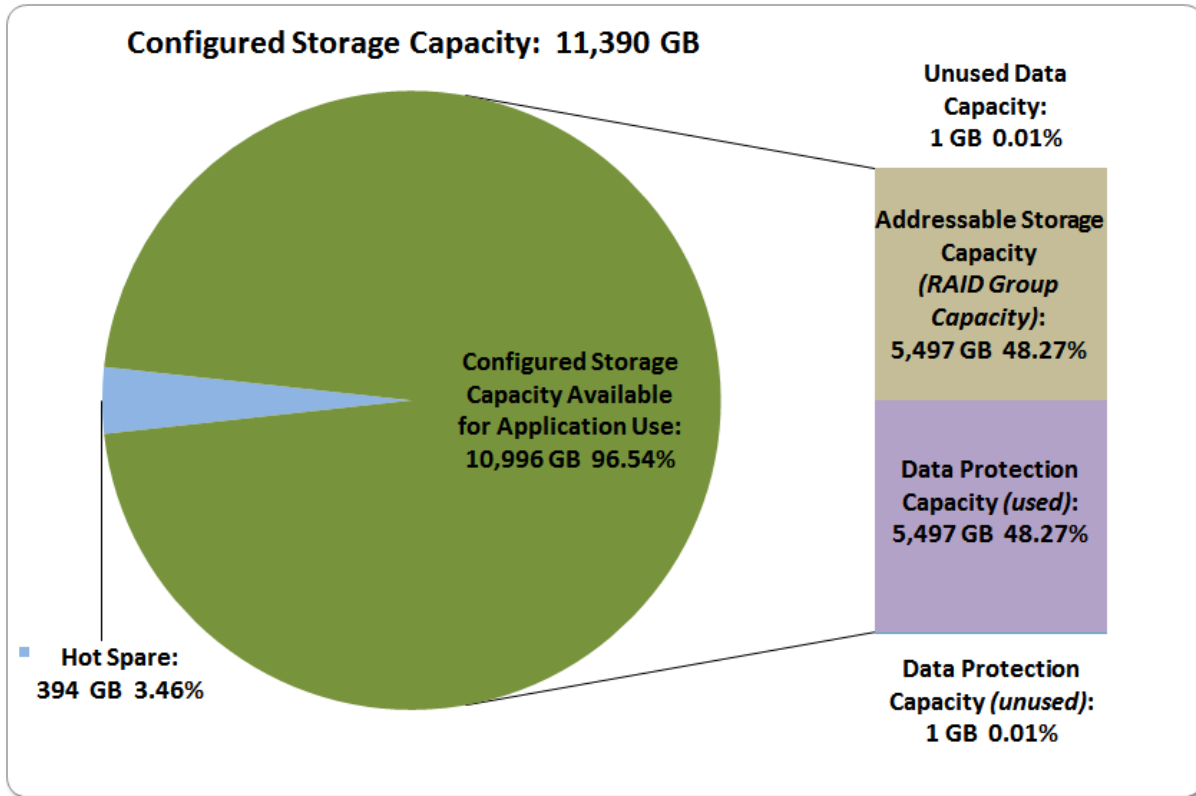
The **Target Country** is the country in which the Priced Storage Configuration is available for sale and in which the required hardware maintenance and software support is provided either directly from the Test Sponsor or indirectly via a third-party supplier.

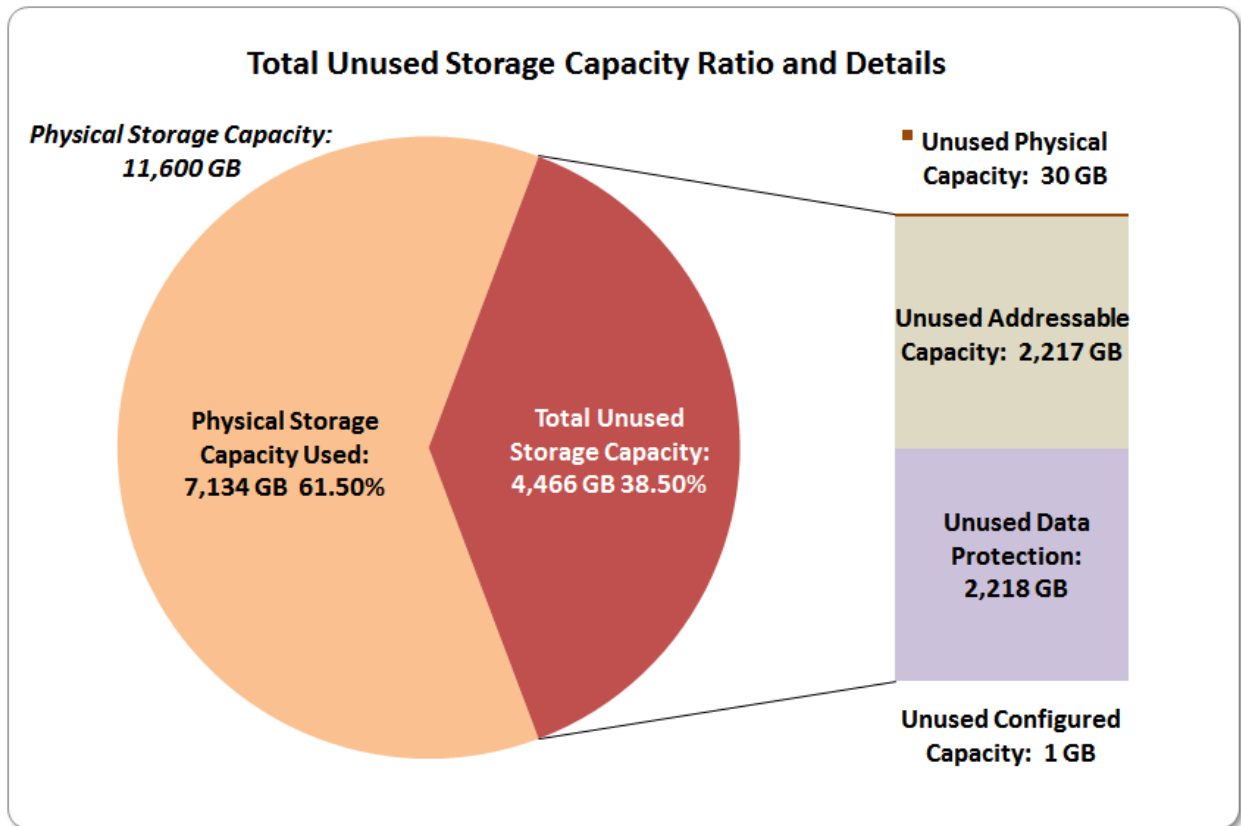
Storage Capacities, Relationships, and Utilization

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.

The capacity values in each of the following four charts are listed as integer values, for readability, rather than the decimal values listed elsewhere in this document.







SPC-1 Storage Capacity Utilization	
Application Utilization	28.28%
Protected Application Utilization	56.55%
Unused Storage Ratio	38.50%

Application Utilization: Total ASU Capacity (3,280.000 GB) divided by Physical Storage Capacity (11,600.000 GB).

Protected Application Utilization: Total ASU Capacity (3,280.000 GB) plus total Data Protection Capacity (5,498.095 GB) minus unused Data Protection Capacity (2,218,095 GB) divided by Physical Storage Capacity (11,600.000 GB).

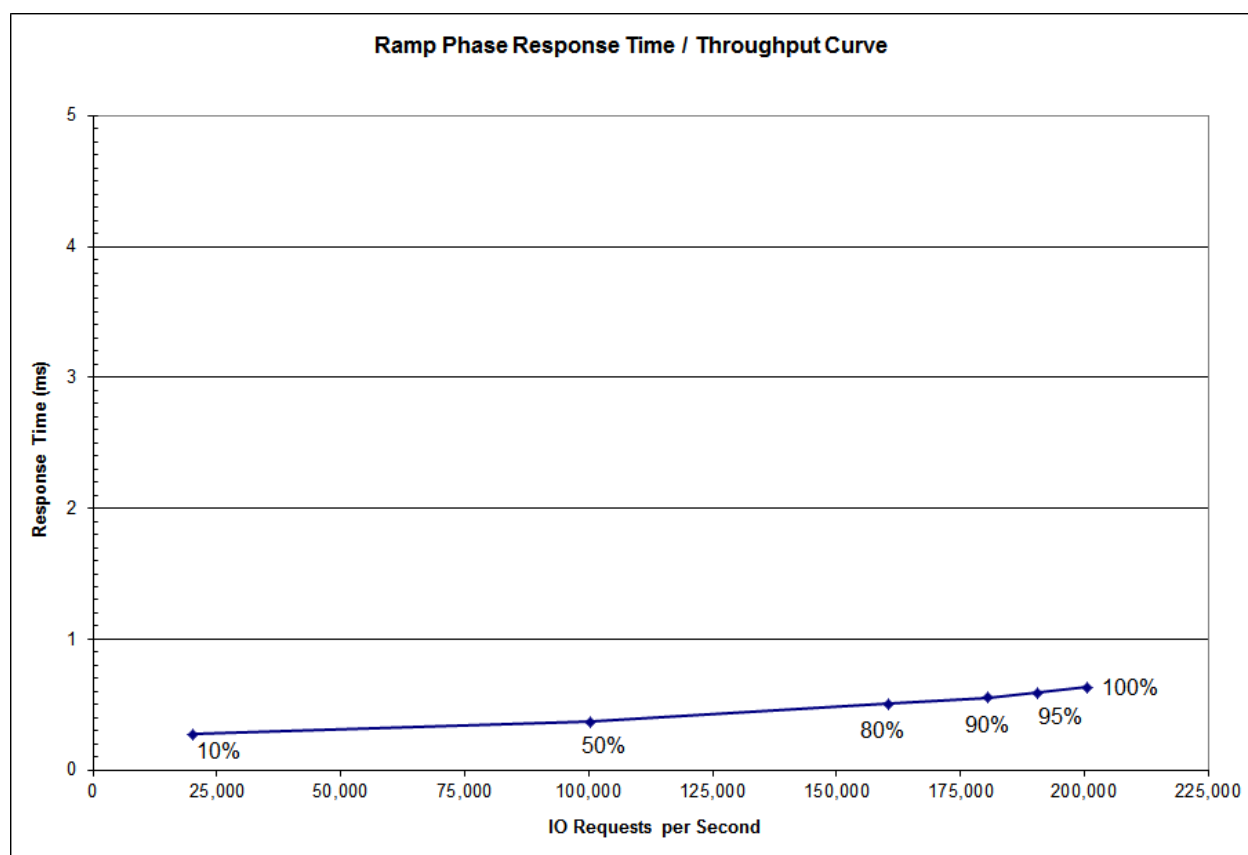
Unused Storage Ratio: Total Unused Capacity (4,466.255 GB) divided by Physical Storage Capacity (11,600.000 GB) and may not exceed 45%.

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	20,053.34	100,240.80	160,412.21	180,467.93	190,491.94	200,453.37
Average Response Time (ms):						
All ASUs	0.27	0.37	0.50	0.55	0.59	0.63
ASU-1	0.29	0.42	0.59	0.65	0.69	0.74
ASU-2	0.29	0.41	0.55	0.59	0.65	0.67
ASU-3	0.23	0.24	0.30	0.33	0.36	0.40
Reads	0.36	0.59	0.83	0.91	0.95	1.02
Writes	0.21	0.23	0.29	0.32	0.36	0.38

Priced Storage Configuration Pricing

Product ID	Product Name	Qty	Unit List Price	Extended LP	Discount %	Discounted Price
ET203AU	DX200 S3 Base System Rackmount (AC200V, 2RU) (2.5" type)	1	\$3,579.00	\$3,579.00	30%	\$2,505.30
ETFEADU	Drive Enclosure - DX100/200 Rackmount (AC200V, 2RU) (2.5" HDD, Dual IOM type)	1	\$4,275.00	\$4,275.00	30%	\$2,992.50
ETFM42U	Cache Memory - DX200 S3 8GB per CM	2	\$1,000.00	\$2,000.00	30%	\$1,400.00
ETFCH2F	FC Host Interface, 2 ports DX200 S3 CM & CA#0 (4/8/16Gbps, Host/Remote Connect)	2	\$8,806.00	\$17,612.00	30%	\$12,328.40
ETFHH2	FC Host Interface, 2 ports - CA#1 (4/8/16Gbps, Host/Remote Connect)	2	\$2,000.00	\$4,000.00	30%	\$2,800.00
ETFSA4	MLC-SSD 400GB 2.5" Drive x1 SAS for DX100/200 S3	29	\$4,422.00	\$128,238.00	30%	\$89,766.60
QLE2562	QLogic 8Gbps Dual Port Fibre Channel Host Bus Adapter	8	\$2,597.85	\$20,782.80	10%	\$18,704.52
ETFKC05U	AC Power Cords (125V - IEC320-C14, 0.5m)	2	\$80.00	\$160.00	30%	\$112.00
61-343827-003	Fibre Channel Host IF Cable LC/LC - 3m	8	\$132.00	\$1,056.00	30%	\$739.20
	(Provide 24 hour per day / 7days per week 4 hour response maintenance for 36 months)					
ETD200-W025360-ADE	Warranty Service, 36 months Standard, 9x5 phone, NBD response	1	\$0.00	\$0.00		\$0.00
ETD200-U004361-ADE	Warranty Uplift, 36 months Enhanced plus, 24x7 4hr Onsite	1	\$28,321.00	\$28,321.00	20%	\$22,656.80

SFPs are included.

Total:	\$154,005.32
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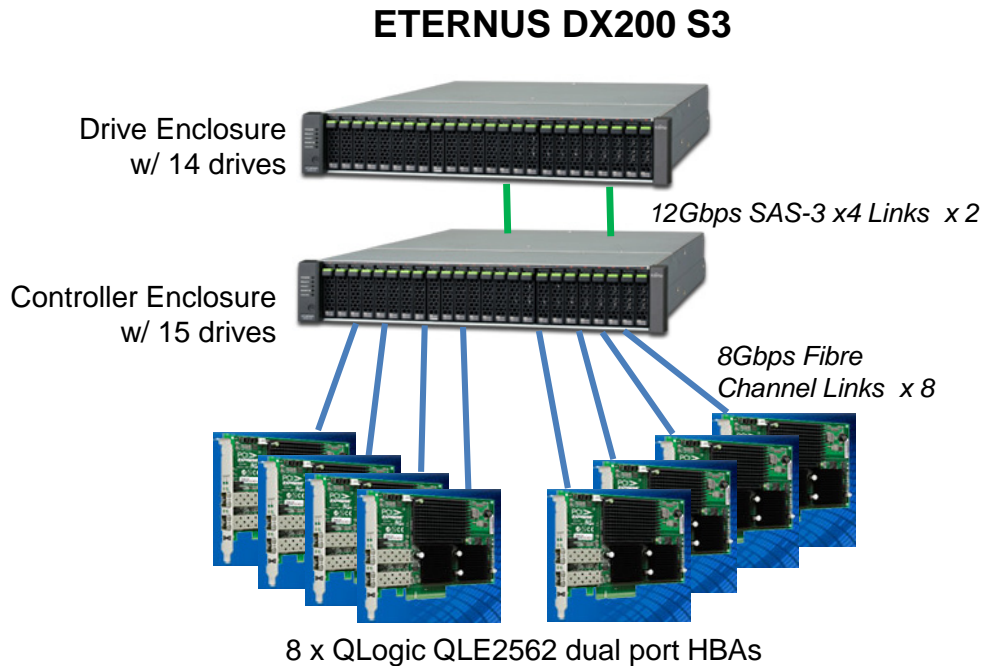
The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- Acknowledgement of new and existing problems with 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 TSC and the Priced Storage Configuration.

Priced Storage Configuration Diagram



Priced Storage Configuration Components

Priced Storage Configuration
8 – QLogic QLE2562 dual-port HBAs
Fujitsu Storage Systems ETERNUS DX200 S3
1 – Controller Enclosure Module with 2 – Control Modules (CM) each with 8 GB cache (16 GB total) 2 – Channel Adapters (CA) each with 2 – 16 Gbps FC host ports <i>(4 ports per CA, 8 ports total and used)</i> 1 – SAS Expander Drive Interface with QSFP 12 Gbps SAS-3 <i>(2 – SAS-3 x4 links total and used)</i> 24 – Hot Swap drive slots 15 – 400 GB MLC SSD storage devices
1 – Drive Enclosure Module with 24 – Hot Swap drive slots 14 – 400 GB MLC SSD storage devices 2 – SAS Interface/Expander Modules with QSFP 12 Gbps SAS-3