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# **SPC BENCHMARK 1™ EXECUTIVE SUMMARY**

**FUJITSU LIMITED  
FUJITSU STORAGE SYSTEMS  
ETERNUS6000 MODEL 1100**

**SPC-1 V1.8**

**Submitted for Review: October 20, 2004**

**Submission Identifier: A00035**

**Accepted: December 19, 2004**



**EXECUTIVE SUMMARY****Test Sponsor and Contact Information**

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**Revision Information and Key Dates**

<b>Revision Information and Key Dates</b>	
<b>SPC-1 Specification revision number</b>	V1.8
<b>SPC-1 Workload Generator revision number</b>	V2.00.04a
<b>Date Results were first used publicly</b>	October 20, 2004
<b>Date FDR was submitted to the SPC</b>	October 20, 2004
<b>Date the TSC will be available for shipment to customers</b>	December 28, 2004
<b>Date the TSC completed audit certification</b>	October 20, 2004

## Summary of Results

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

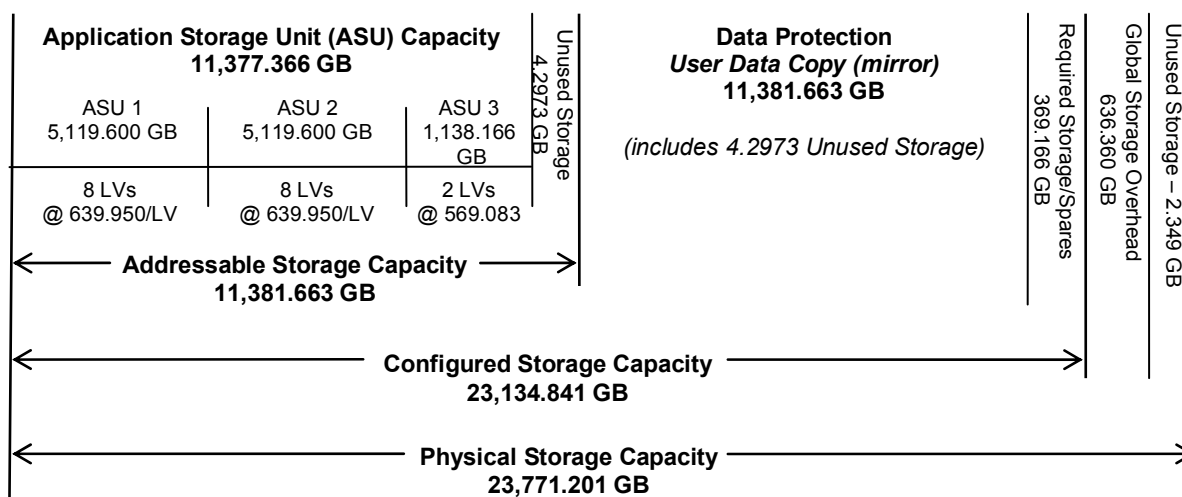
**Total ASU (Application Storage Unit) Capacity** represents the total storage capacity read and written in the course of executing the SPC-1 benchmark.

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

SPC-1 Results	
Tested Storage Configuration (TSC) Name: Fujitsu Storage Systems ETERNUS6000 Model 1100	
Metric	Reported Result
SPC-1 IOPS™	100,242.23
SPC-1 Price-Performance	\$13.39/SPC-1 IOPS™
Total ASU Capacity	11,377.366 GB
Data Protection Level	Mirroring
Total TSC Price (including three-year maintenance)	\$1,342,738

## Storage Capacities and Relationships

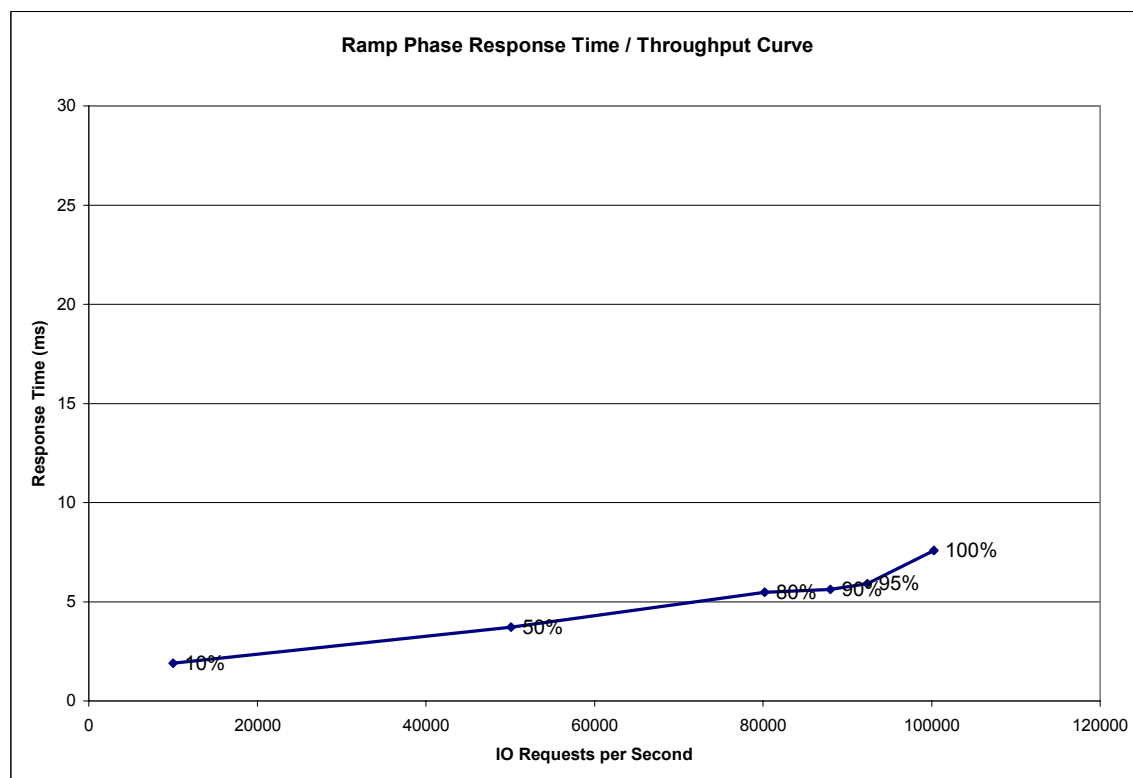
The following diagram documents the various storage capacities, used in this benchmark, and their relationships.



## 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 100% load point 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
<b>I/O Request Throughput</b>	9,998.70	50,098.95	80,196.03	87,989.60	92,386.76	100,242.23
<b>Average Response Time (ms):</b>						
All ASUs	1.90	3.72	5.49	5.62	5.90	7.59
ASU-1	2.40	4.36	6.30	6.55	6.87	8.58
ASU-2	1.85	3.62	5.58	5.82	6.16	7.96
ASU-3	0.86	2.40	3.73	3.59	3.73	5.33
Reads	3.59	5.86	8.32	8.91	9.40	11.30
Writes	0.79	2.33	3.64	3.49	3.63	5.17

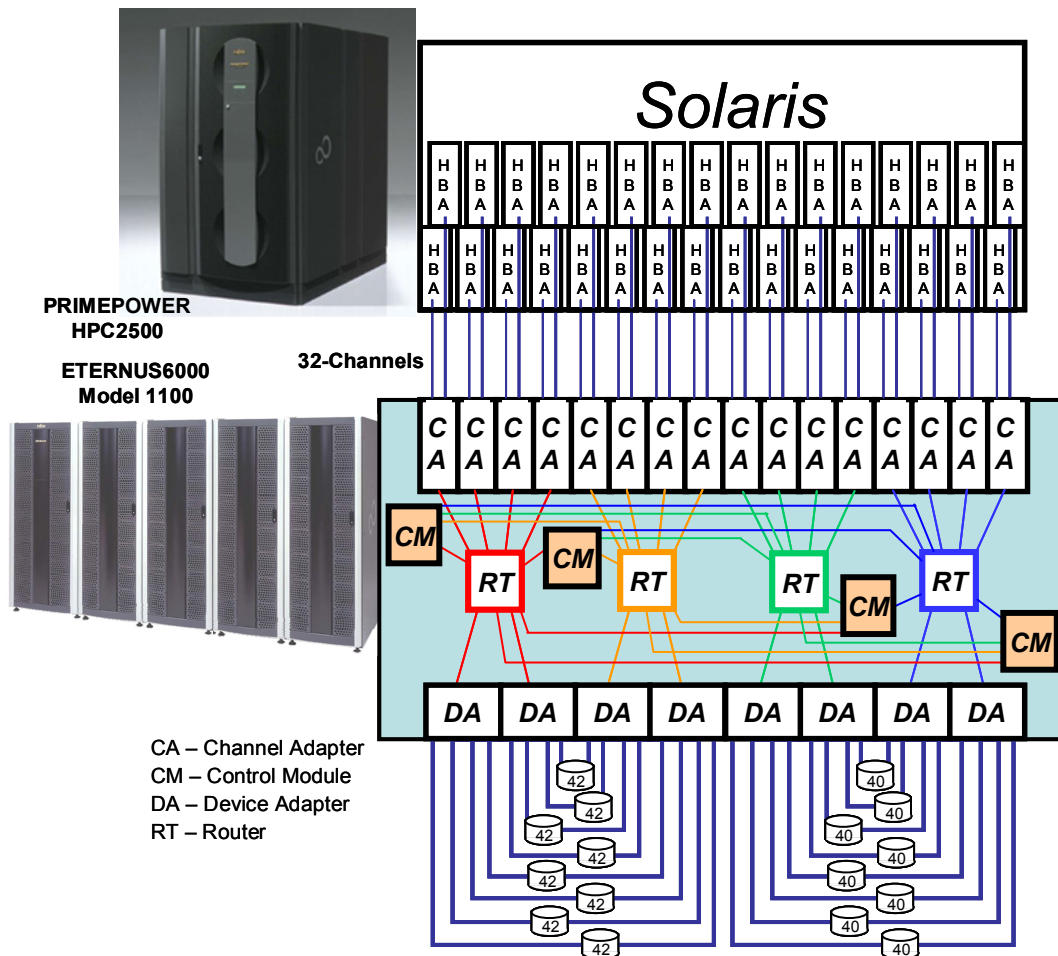
**Tested Storage Configuration Pricing (*Priced Storage Configuration*)**

Item	Product Id	Description	Qty	Unit \$	Extd \$
1	E6B0S01AU	ETERNUS6000 Model 1100 Base Unit (with door) including Controller Enclosure, 4x Controllers (CM), 4x Interface Units (RT), 8x Drive Interface (DA), 4x power supplie units, 6x battery units, 24x drive enclosures (DE), 8x 36GB System disk drives, 1x Base 1800mm (36U) rack, 2x Expansion 1800mm (36U) rack, 8x power distribution (200VAC), rack mount kit, ETERNUSmgr & drivers slots for up to 360 disk drives	1	\$341,149	\$341,149
2	E600CR3U	ETERNUS6000 Expansion Rack (with door) including Expansion 1800mm (36U) rack 2x power distribution (200 VAC)	2	\$7,450	\$14,900
3	E600CE21U	Drive Enclosure (4x DE) with slots for up to 60 disk drives	6	\$37,944	\$227,664
4	E600CM45	Additional cache memory (4x 8GB)	1	\$123,520	\$123,520
5	E600CM47	Additional cache memory (4x 16GB)	1	\$247,040	\$247,040
6	E600CH14	Fibre Channel Host Interface (dual port) x2	8	\$7,180	\$57,440
7	E600CC2L	36GB/15krpm Disk Drives RAID(4+4)	80	\$7,782	\$622,560
8	E600CA2L	36GB/15krpm Disk Drive (Hot Spare)	8	\$973	\$7,782
9	CBL-MLLB15	Fibre Channel Cable	32	\$290	\$9,280
10	LP9002L	Emulex LP9802 HBA	32	\$1,862	\$59,584
11		Enhanced Plus ETERNUS6000 Model 1100 Base Unit Phone 24x7, On-site 24x7, maintenance service with 4 hour response - 3 year Warranty Uplift w/ 24 DEs	1	\$128,621	\$128,621
12		Enhanced Plus ETERNUS6000 Model 1100 additional DE Set Phone 24x7, On-site 24x7, maintenance service with 4 hour response - 3 year Warranty Uplift per DE set	6	\$26,928	\$161,568
<b>Total Product List Price</b>					<b>\$1,710,919</b>
				<b>Product Discount</b>	<b>30%</b>
<b>Net Product Price</b>					<b>\$1,197,643</b>
<b>Total Service List Price</b>					<b>\$290,189</b>
				<b>Service Discount</b>	<b>50%</b>
<b>Net Service Price</b>					<b>\$145,094</b>
<b>Total Sell Price, including 3 years Service</b>					<b>\$1,342,738</b>

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

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

### Benchmark Configuration/Tested Storage Configuration Diagram



Host Systems:	Tested Storage Configuration (TSC):
<b>UID=HS-1</b>	32 – Emulex LP9802 FC HBAs (2 Gbit)
Fujitsu PRIMEPOWER 2500	<b>UID=SC-1:</b>
128 - SPARC64 V (1.3 GHz) CPUs, each with: 128 KB L1 instruction cache, 128 KB L1 data cache, and 2 MB L2 cache	Fujitsu ETERNUS6000 Model 1100
512 GB main memory	4 – Controller Modules (CM), each with 24 GB cache
Solaris 9	16 – Channel Adapter Modules
PCI	8 – Device Adapter Modules
WG	4 – Router Modules
	32 – Front side fibre channels – 2 Gbit each
	32 – Drive side fibre channel switched FC-AL loops – 2 Gbit each
	656 – 36 GB 15K RPM disk drives
	48 – Drive enclosure modules, each with dual FC-AL interfaces
	15 – hot swap drive slots