



THE POSSIBILITIES ARE INFINITE

SPC BENCHMARK 1™ EXECUTIVE SUMMARY

**FUJITSU LIMITED
FUJITSU STORAGE SYSTEMS
ETERNUS3000 MODEL 600M**

SPC-1 V1.7

Submitted for Review: August 11, 2003

Submission Identifier: A00016

Accepted: October 11, 2003

Revised: August 9, 2004



EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
Test Sponsor Primary Contact	Fujitsu Limited – http://www.fujitsu.com/services/computing/storage/ Fujitsu Computer Systems Corp. C.A. (Sandy) Wilson Sandy.Wilson@us.fujitsu.com 1250 East Arques Ave PO Box 3470 Sunnyvale, CA 94088-3470 Phone: (916) 434-8593
Test Sponsor Alternate Contact	Fujitsu Limited – http://www.fujitsu.com/services/computing/storage/ Fujitsu Computer Systems Corp. John Andoh John.Andoh@us.fujitsu.com Phone: (408) 746-6432 FAX: (408) 942-1725 Jim Repinski Jim.Repinski@us.fujitsu.com Phone: (408)992-2597 Noah Jergler Noah.Jergler@us.fujitsu.com Phone: (408)746-7690 Kun Katsumata Kun.Katsumata@us.fujitsu.com Phone (408) 746-6415 1250 East Arques Ave. PO Box 3470 Sunnyvale, CA 94088-3470
Test Sponsor Alternate Contact	Fujitsu Limited – http://www.fujitsu.com/services/computing/storage/ Norihiko Kondo kondo.n@jp.fujitsu.com Kanagawa-ken, Kanagawa-ken, Kawasaki-shi, Nakahara-ku, Kamikodanaka 4-1-1 Japan 211-8588 Phone: 044- 754-3605
Auditor	Storage Performance Council – 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	V1.7
SPC-1 Workload Generator revision number	V2.0.1
Date Results were first used publicly	August 11, 2003
Date FDR was submitted to the SPC	August 11, 2003
Date revised FDR was submitted to the SPC Pricing and Price/Performance revised. Revision History: March 4, 2004: Company name change Email addresses changed resultant from above. Pricing and Price/Performance revised.	August 9, 2004
Date the TSC is/was available for shipment to customers	July 31, 2003
Date the TSC completed audit certification	August 11, 2003

Summary of Results

SPC-1 Results	
Tested Storage Configuration (TSC) Name: Fujitsu Storage Systems ETERNUS3000 Model 600M	
Metric	Reported Result
SPC-1 IOPS™	64,249.77
SPC-1 Price-Performance	\$13.86/SPC-1 IOPS™
Total ASU Capacity	15,609.00 GB
Data Protection Level	Mirroring
SPC-1 LRT™	2.31 ms
Total TSC Price (including three-year maintenance)	\$890,497

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. The Addressable Storage Capacity, which contains the Total ASU Capacity, was 15,697.569 GB. The Total ASU Capacity of 15,609.000 GB utilized 99.44% of the Addressable Storage Capacity. The actual Configured Storage Capacity was 32,588.098 GB, which included the multiple copies of user data required by a Data Protection Level of Mirroring. The Configured Storage Capacity utilized 93.24% of the priced Physical Storage Capacity of 34,950.867 GB.

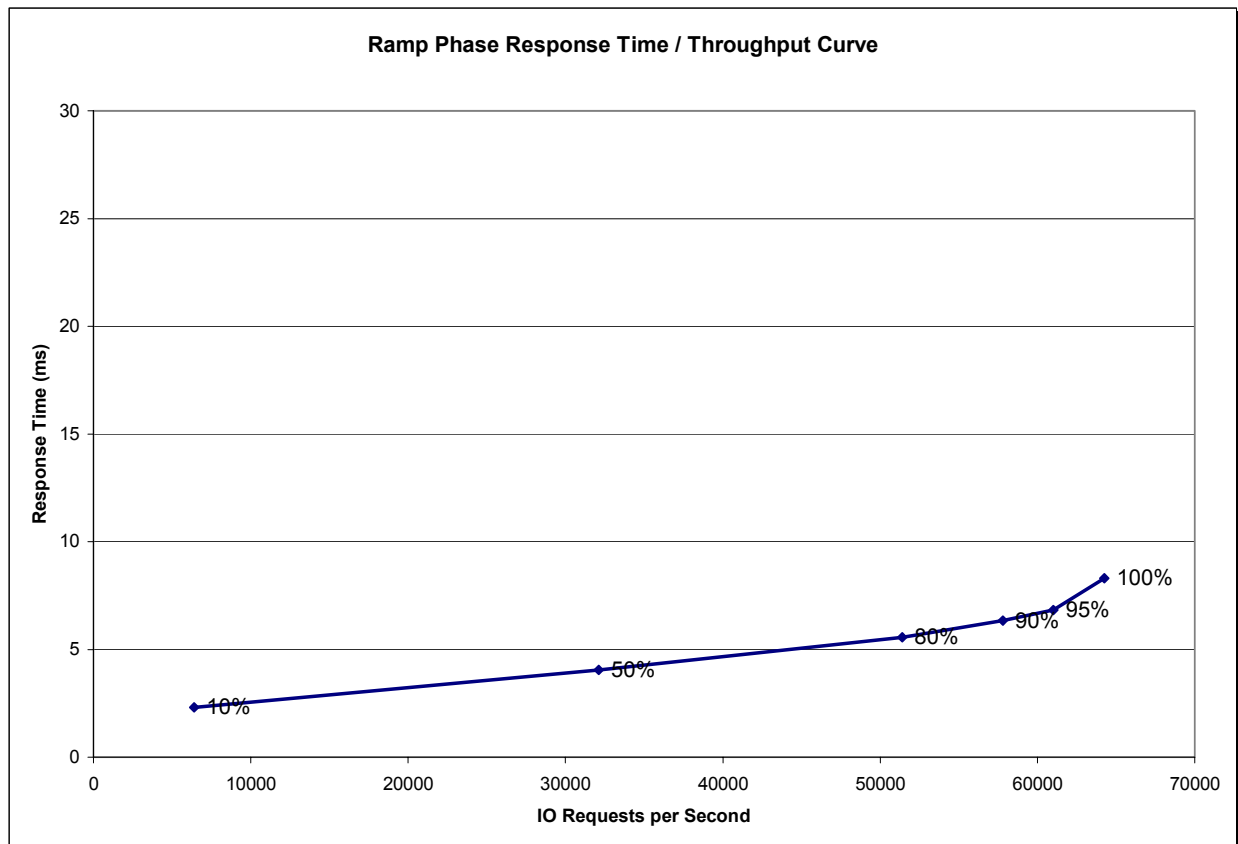
A **Data Protection Level** of Mirroring configures two or more identical copies of user data, maintained on separate disks.

The **SPC-1 LRT™** metric is the Average Response Time measured at the 10% load point, as illustrated on the next page. SPC-1 LRT™ represents the Average Response Time measured on a lightly loaded Tested Storage Configuration (TSC).

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.



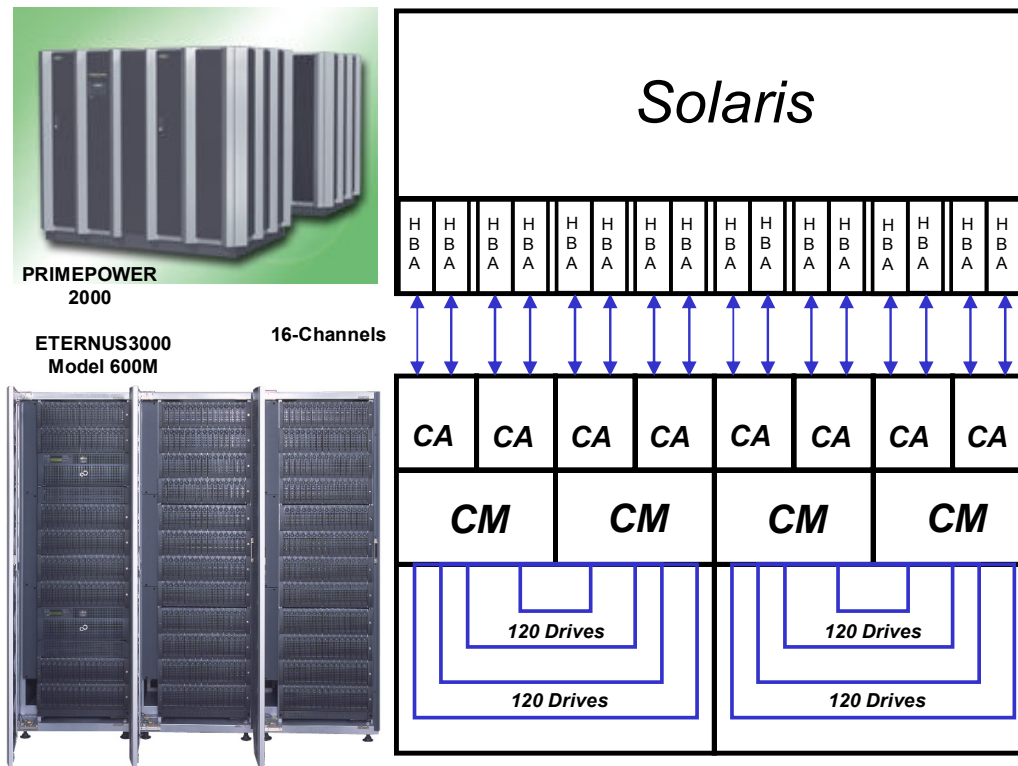
Response Time – Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
I/O Request Throughput	6,401.54	32,096.60	51,392.49	57,808.57	60,997.27	64,249.77
Average Response Time (ms):						
All ASUs	2.31	4.05	5.57	6.34	6.83	8.31
ASU-1	2.79	4.90	6.81	7.78	8.40	10.08
ASU-2	2.91	5.27	7.36	8.48	9.15	11.04
ASU-3	1.03	1.73	2.15	2.36	2.50	3.38
Reads	4.45	7.81	11.05	12.73	13.81	16.34
Writes	0.92	1.60	2.00	2.18	2.29	3.08

Tested Storage Configuration Pricing

Item	Product Id	Description	Qty	Unit \$	Extd \$
1	E360S21A	ETERNUS3000 Model 600M without Door including 2x Controller Enclosures, 4x Controllers, each Controller with dual ports & 2GB Cache dual power supplies, dual battery units 4x drive enclosures, 4x 146GB disk drives 1800mm (36U) rack, 2x power distribution (200VAC) 8x FC cables (5m), 4x LAN cables (5m) rack mount kit, ETERNUSmgr & drivers slots for up to 60 disk drives	1	\$985,000	\$985,000
2	E300MR4	ETERNUS3000 Expansion rack without Door including 2x Expansion 1800mm (36U) rack 4x drive enclosures, 4x 146GB disk drives 4x power distribution (200 VAC) slots for up to 60 disk drives	1		
3	E300ME2	Drive Enclosure set of 4 - (rack mount 4x 3U) with slots for up to 60 disk drives	6		
4	E360MM8	Additional cache memory (4x 2GB)	1		
5	E360MHP8	Additional host interface (4x dual ports)	1		
6	E300MA7H	2x 73GB/15krpm Disk Drives	236		
7	CBL-MLLB15	Fibre Channel Cable	16	\$250	\$4,000
8	LP9002L	Emulex LP9002 HBA	16	\$2,795	\$44,720
9	A08974-M00000	Veritas Volume Manager	1	\$60,195	\$60,195
10		Maintenance VxVM - 3 years 24x7	1	\$32,505	\$32,505
11		Enhanced Plus Model 600M - Phone 24x7, On-site 24x7, with 4 hour response - 3 year Warranty Uplift Base w/ 4 DEs	1	\$28,512	\$28,512
12		Enhanced Plus Model 600M - Phone 24x7, On-site 24x7, with 4 hour response - 3 year Warranty Uplift per DE set (4)	7	\$26,928	\$188,496
			Total Product List Price		\$1,093,915
			Product Discount		30%
			Net Product Price		\$765,741
			Total Service List Price		\$249,513
			Service Discount		50%
			Net Service Price		\$124,757
			Total Sell Price, including 3 years Service		\$890,497

Benchmark Configuration/Tested Storage Configuration Diagram



Host System:	Storage System:
Fujitsu PRIMEPOWER 2000	Fujitsu ETERNUS3000 Model 600M
UID=HS-1	UID=SC-1
64 SPARC64GP 675 MHz CPUs each with 128KB L1 Instruction Cache, 128KB L1 Data Cache, 8 MB L2 Cache	2 – Dual Control Modules, each with: 2.8 GHz Xeon CPU 4 GB Cache 2 dual channel FC Host interfaces
110 GB Main Memory	16 – Front side Fibre Channels (2 Gbit each)
Solaris 9	8 – Drive side Fibre Channel Loops (2 Gbit each)
16 - Emulex LP9002L Fibre Channel Host Bus Adapters (2 Gbit)	32 Drive Enclosure Modules, each with dual FC-AL interfaces 15 Hot Swap drive slots
Veritas Volume Manager 3.5	472 – 73GB disks, 8 – 146GB disks
WG	