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SPC BENCHMARK 1™ EXECUTIVE SUMMARY

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

SPC-1 V1.7

Submitted for Review: July 14, 2003

Submission Identifier: A00014

Accepted: September 12, 2003

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EXECUTIVE SUMMARY**Test Sponsor and Contact Information**

Test Sponsor and Contact Information	
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Revision Information and Key Dates

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SPC-1 Specification revision number	V1.7
SPC-1 Workload Generator revision number	V2.1
Date Results were first used publicly	July 14, 2003
Date FDR was submitted to the SPC	July 14, 2003
Date revised FDR was submitted to the SPC Pricing and Price/Performance revised.	August 9, 2004
Revision History: March 4, 2004: Company name change Email addresses changed resultant from above. Pricing and Price/Performance revised.	
Date the TSC is/was available for shipment to customers	July 31, 2003
Date the TSC completed audit certification	July 14, 2003

Summary of Results

SPC-1 Results	
Tested Storage Configuration (TSC) Name: Fujitsu Storage Systems ETERNUS3000 Model 600	
Metric	Reported Result
SPC-1 IOPS™	33,496.57
SPC-1 Price-Performance	\$14.65/SPC-1 IOPS™
Total ASU Capacity	7,804.500 GB
Data Protection Level	Mirroring
SPC-1 LRT™	2.26 ms
Total TSC Price (including three-year maintenance)	\$490,750

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 7,849.648 GB. The Total ASU Capacity utilized 99.42% of the Addressable Storage Capacity. The actual Configured Storage Capacity was 16,294.049 GB, which included the multiple copies of user data required by a Data Protection Level of Mirroring. The Configured Storage Capacity utilized 93.23% of the priced Physical Storage Capacity of 17,475.433 GB.

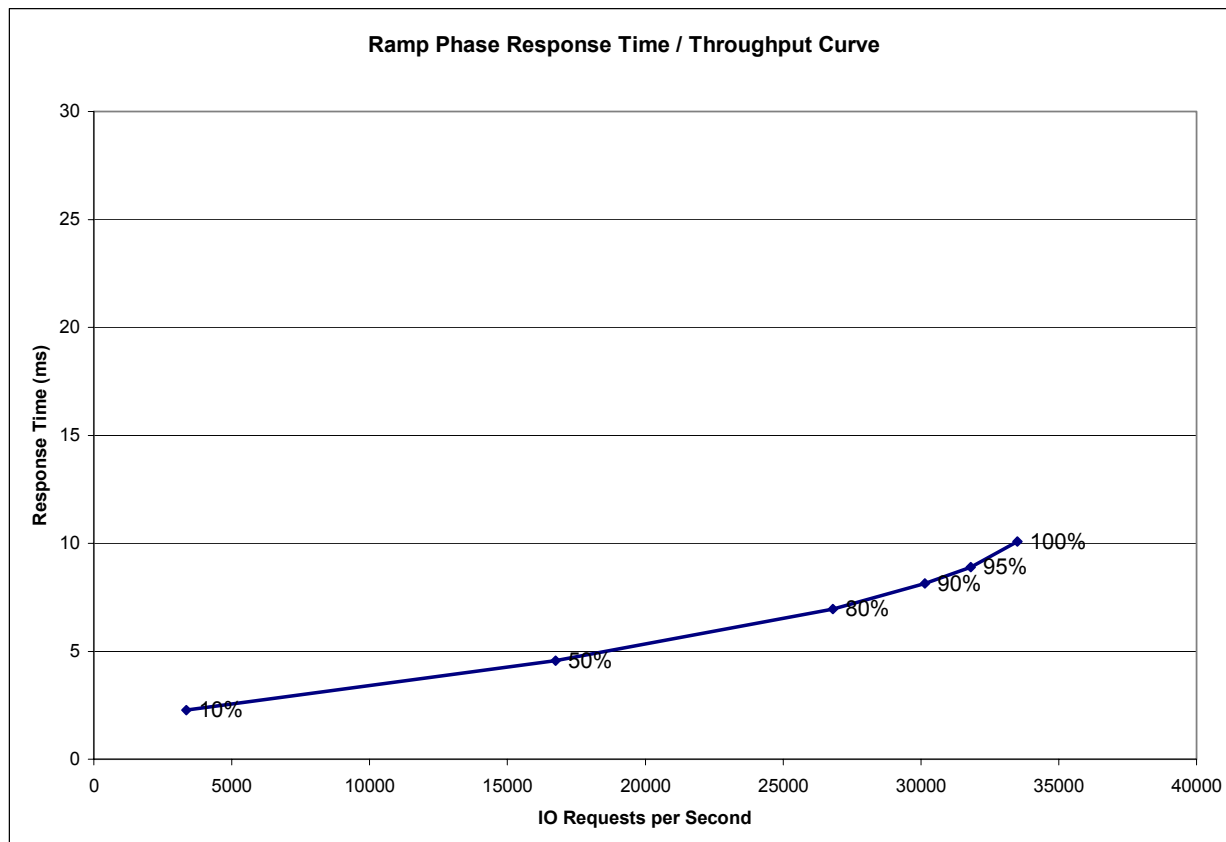
A **Data Protection Level** of Mirroring configures two or more identical copies of user data, maintained on separate disks.

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.



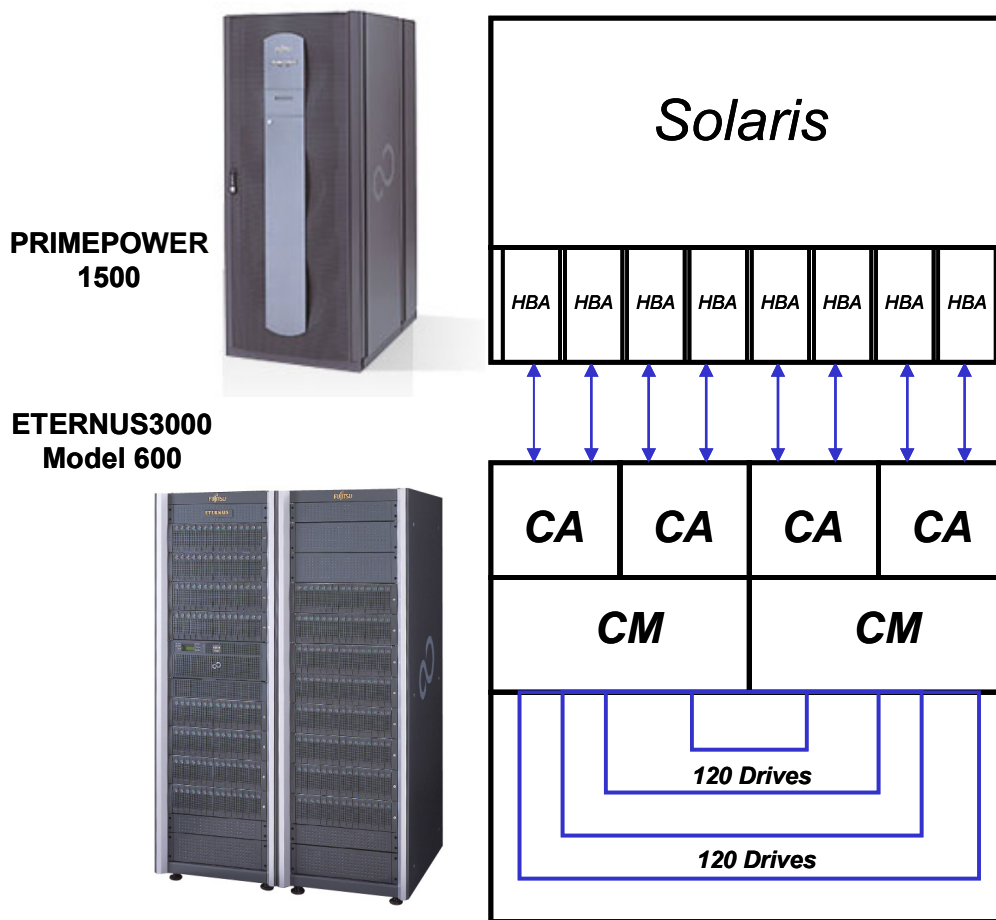
Response Time – Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
I/O Request Throughput	3,348.87	16,748.05	26,802.92	30,147.87	31,805.13	33,496.57
Average Response Time (ms):						
All ASUs	2.26	4.57	6.96	8.13	8.90	10.09
ASU-1	2.77	5.45	8.31	9.73	10.66	12.06
ASU-2	2.96	6.18	9.49	11.22	12.39	14.15
ASU-3	0.88	2.00	2.99	3.38	3.63	4.14
Reads	4.53	8.75	13.40	15.83	17.44	19.80
Writes	0.79	1.85	2.76	3.11	3.33	3.77

Tested Storage Configuration Pricing

Item	Product Id	Description	Qty	Unit \$	Extd \$
1	E360S20AU	ETERNUS3000 Model 600 without Door including Controller Enclosure, 2x Controllers, each Controller with dual ports & 2GB Cache dual power supplies, dual battery units 2x drive enclosures, 2x 146GB disk drives 1800mm (36U) rack, 2x power distribution (200VAC) 4x FC cables (5m), 2x LAN cables (5m) rack mount kit, ETERNUSmgr & drivers slots for up to 30 disk drives	1	\$560,000	\$560,000
2	E340SR3	ETERNUS3000 Expansion rack without Door including Expansion 1800mm (36U) rack 2x drive enclosures, 2x 146GB disk drives 2x power distribution (200 VAC) slots for up to 30 disk drives	1		
3	E300CE2	Drive Enclosure pair - (rack mount 2x 3U) with slots for up to 30 disk drives	6		
4	E360CM4	Additional cache memory (2x 2GB)	1		
5	E300CHF4	Additional host interface (2x dual ports)	1		
6	E300CD7H	73GB/15krpm Disk Drives	236		
7	CBL-MLLB15	Fibre Channel Cable	8	\$250	\$2,000
8	LP9002L	Emulex LP9002 HBA	8	\$2,795	\$22,360
9	A08974-J00000	Veritas Volume Manager	1	\$28,295	\$28,295
10		Maintenance VxVM - 3 years 24x7	1	\$15,279	\$15,279
11		Enhanced Plus Model 600 - Phone 24x7, On-site 24x7, with 4 hour response - 3 year Warranty Uplift Base w/ 2 DEs	1	\$14,256	\$14,256
12		Enhanced Plus Model 600 - Phone 24x7, On-site 24x7, with 4 hour response - 3 year Warranty Uplift per DE pair	7	\$13,464	\$94,248
Total Product List Price					\$612,655
				Product Discount	30%
Net Product Price					\$428,859
Total Service List Price					\$123,783
				Service Discount	50%
Net Service Price					\$61,892
Total Sell Price, including 3 years Service					\$490,750

Benchmark Configuration/Tested Storage Configuration Diagram



Host System:	Storage System:
Fujitsu PRIMEPOWER 1500	Fujitsu ETERNUS3000 Model 600
UID=HS-1	UID=SC-1
32 SPARC64GP-V 1.35 GHz CPUs each with 128KB L1 Instruction Cache, 128KB L1 Data Cache, 2 MB L2 Cache	Dual Control Modules, each with: 2.8 GHz Xeon CPU 4 GB Cache 2 dual channel FC Host interfaces
64 GB Main Memory	8 – Front side Fibre Channels (2 Gbit each)
Solaris 8	4 – Drive side Fibre Channel Loops (2 Gbit each)
8 – Emulex LP9002L Fibre Channel Host Bus Adapters (2 Gbit)	16 Drive Enclosure Modules, each with dual FC-AL interfaces 15 Hot Swap drive slots
Veritas Volume Manager 3.5	236 – 73GB disks, 4 – 146GB disks
WG	