



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**LSI LOGIC STORAGE SYSTEMS, INC.
LSI E4600 FIBRE CHANNEL STORAGE SYSTEM**

SPC-1 V1.4

Submitted for Review: 13 May 2002

Accepted: 19 July 2002



| Test Sponsor and Contact Information | |
|---|--|
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| Revision Information and Key Dates | |
| SPC-1 Specification revision number | V1.4 |
| SPC-1 Workload Generator revision number | V1.0 |
| Date Results were first used publicly | May 1, 2002 |
| Date FDR was submitted to the SPC | May 20, 2002 |
| Date the TSC is/was available for shipment to customers | October 1, 2001 |
| Date the TSC completed audit certification | May 1, 2002 |
| SPC-1 Results | |
| TSC Configuration Name: LSI E4600 Fibre Channel Storage System | |
| Metric | Reported Result |
| SPC-1 IOPS™ | 15,708 |
| SPC-1 Price-Performance | \$16.01/ SPC-1 IOPS™ |
| Total ASU Capacity | 400 GB |
| Data Protection Level | Mirroring |
| SPC-1 LRT™ | 1.64 ms |
| Price | \$251,434.15 |

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.

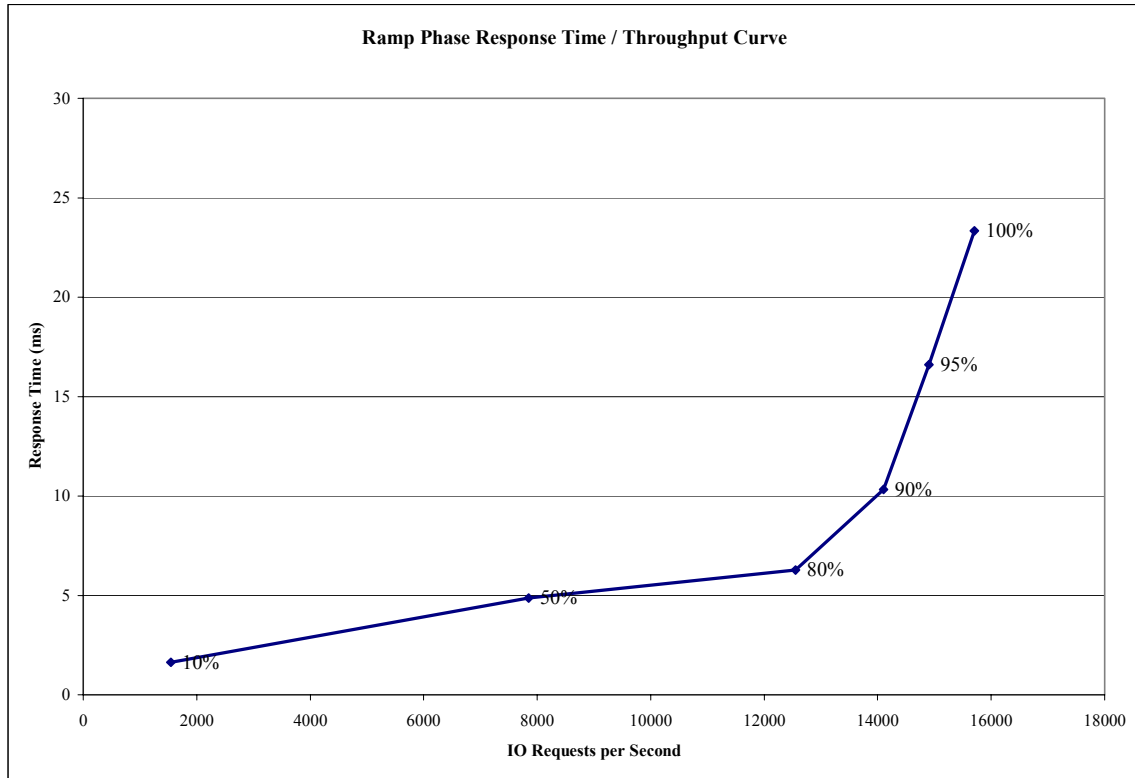
A **Data Protection Level** of Mirroring requires two or more identical copies of the Total ASU Capacity. As a result, Mirroring will utilize at least twice the storage designated as Total ASU Capacity.

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

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.



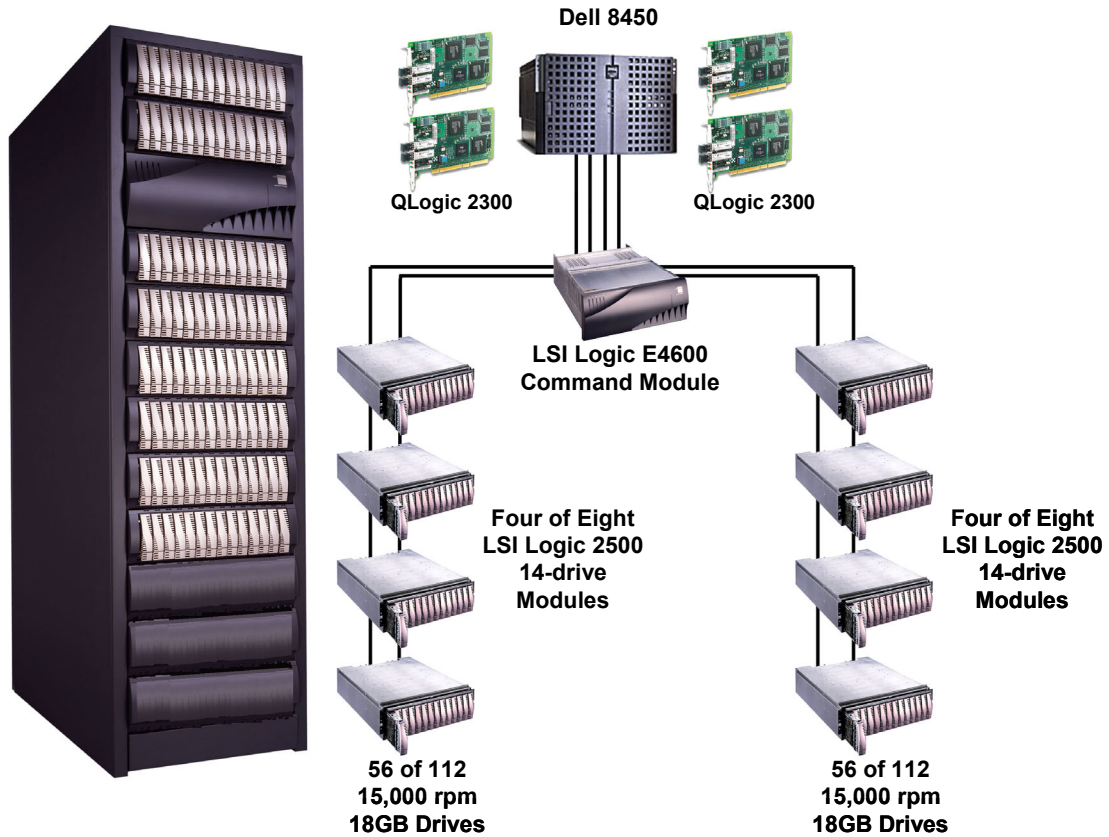
Response Time – Throughput Data

| | 10% Load | 50% Load | 80% Load | 90% Load | 95% Load | 100% Load |
|------------------------------------|----------|----------|----------|----------|----------|-----------|
| I/O Request Throughput | 1546.68 | 7846.48 | 12551.28 | 14101.18 | 14905.42 | 15708.85 |
| Average Response Time (ms): | | | | | | |
| All ASUs | 1.64 | 4.87 | 6.28 | 10.32 | 16.61 | 23.33 |
| ASU-1 | 2.16 | 6.18 | 8.23 | 13.61 | 22.33 | 27.97 |
| ASU-2 | 1.86 | 3.97 | 5.82 | 8.33 | 11.47 | 14.44 |
| ASU-3 | 0.43 | 2.50 | 2.37 | 4.20 | 6.72 | 17.39 |
| Reads | 3.59 | 9.57 | 13.17 | 21.47 | 34.71 | 41.16 |
| Writes | 0.36 | 1.81 | 1.80 | 3.06 | 4.82 | 11.73 |

Tested Storage Configuration Pricing

| Item | Description / Notes | Qty | List | Sell | Total |
|---|---|-----|---------------------|------------------|--------------|
| M100040 | E4600 Command Module, Rack Mount, Dual Controller (One per system, supports 8 FC hosts, 16 drive modules max (14 slot module) or 22 drives modules max (10 slot module). Must order SANtricity, at least one drive module and 5 drives min. Requires SANtricity 7.11 or higher) | 1 | 62,595.00 HWUNIT | 43,816.50 30% | \$43,816.50 |
| M100020 | System Color - Warm Gray (Default) | 1 | 0.00 HWOPT | 0.00 0% | \$0.00 |
| M100011 | E2400/4400/4600 Expansion Drive Module, 14 Slot, Rack Mount, Dual ESM (Requires dual controller command module, includes FC interconnect cable.) | 8 | 9,995.00 HWUNIT | 6,996.50 30% | \$55,972.00 |
| M100348 | SANtricity 7.11 for Windows 2000 Software Feature (Must pick one SANtricity per system) | 1 | 9,995.00 SW | 6,996.50 30% | \$6,996.50 |
| M100116 | SANtricity 7.11 for Windows 2000 Software Maintenance Subscription (Per annum) | 3 | 1,499.00 SVC | 1,274.15 15% | \$3,822.45 |
| 2500-F327M | 18GB FC 15K Drive Canister, 1.0" FF (For 14 slot Module. Order with system.) | 112 | 1,195.00 DSK | 836.50 30% | \$93,688.00 |
| QL-2300 | Qlogic 2300 HBA | 4 | 1,225.00 | 896.00 | \$3,584.00 |
| 006-1086726 | FC Optical Cable - 1GB/2Gb, 10.0m | 4 | 144.00 ACC | 100.80 30% | \$403.20 |
| M100017 | LSI 19" Equipment Rack Feature, 72"H x 22"W x 36"D w/ 220 Volt Power Dist. Unit, N. America | 1 | 4,595.00 HWUNIT | 3,216.50 30% | \$3,216.50 |
| M100019 | LSI Rack Mount Rails (Req'd with rack, 1 set per command/drive module, order with rack only) | 9 | 200.00 HWOPT | 140.00 30% | \$1,260.00 |
| M100246 | Onsite Service w/ Part Delivery, 4 Hour Response - E4400/E4600 Command Module - 3 Year Contract (Requires signed Service Agreement) | 1 | 11,000.00 SVC | 9,350.00 15% | \$9,350.00 |
| M100247 | Onsite Service w/ Part Delivery, 4 Hour Response - E4400/E4600 Drive Module - 3 Year Contract (Requires signed Service Agreement) | 8 | 3,750.00 SVC | 3,187.50 15% | \$25,500.00 |
| M100055 | On-site Installation Service, E4600 Command Module | 1 | 3,500.00 SVC | 2,975.00 15% | \$2,975.00 |
| M100057 | On-site Installation Service, 4 to 9 Drive Modules | 1 | 1,000.00 SVC | 850.00 15% | \$850.00 |
| Total End User Selling Price | | | | | \$251,434.15 |
| Total \$US list price of this configuration | | | | | \$348,258.00 |

Benchmark Configuration



| Host System: | Storage System: |
|--|---|
| Dell 8450 | LSI Logic E4600 Command Module |
| UID=HS-BM8450C | UID=SC-E4600-1 |
| 8 x 900MHz Pentium III Xeon with 2MB L2 Cache | 2 x 4884 Disk Array Controllers 128MB/1GB RAM Each |
| 4GB RAM | 4 x Fibre Channel Host Connect |
| Microsoft Win2K, Service Pack 2 | 4 x Fibre Channel Drive Connect |
| 4 QLogic 2300 Host Adapters | 8 x LSI Logic 2500 Drive Modules |
| 4 64-bit/66MHz PCI Slots Used | 112 x 18GB 15,000 RPM Drives |