



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**DATA CORE SOFTWARE CORPORATION
DATA CORE SANMELODY™ DISK SERVER**

SPC-1 V1.8

Submitted for Review: April 12, 2004

Submission Identifier: A00029

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EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
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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

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SPC-1 Specification revision number	V1.8
SPC-1 Workload Generator revision number	V2.00.04a
Date Results were first used publicly	April 12, 2004
Date FDR was submitted to the SPC	April 12, 2004
Date the TSC is/was available for shipment to customers	March 8, 2004
Date the TSC completed audit certification	April 9, 2004

Summary of Results

SPC-1 Results	
Tested Storage Configuration (TSC) Name: DataCore SANmelody™ Disk Server	
Metric	Reported Result
SPC-1 IOPS™	19,949.73
SPC-1 Price-Performance	\$4.06/SPC-1 IOPS™
Total ASU Capacity	407.018 GB
Data Protection Level	Mirroring
Total TSC Price (including three-year maintenance)	\$80,897.00

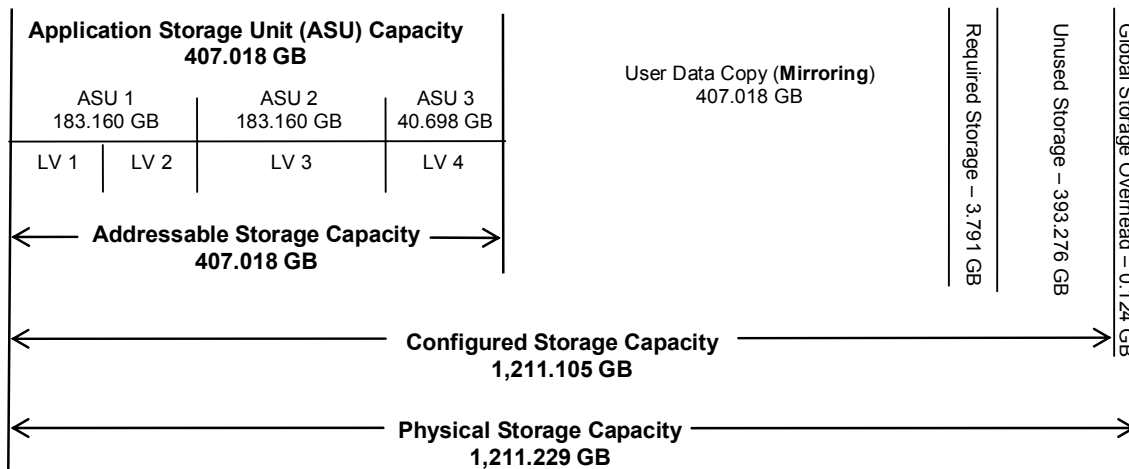
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

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. Mirroring for this SPC-1 result was implemented by Host System software (Microsoft Windows) and as a result the two Host Systems were included as components in the Tested Storage Configuration (TSC) as well as the Priced Storage Configuration.

Storage Capacities and Relationships

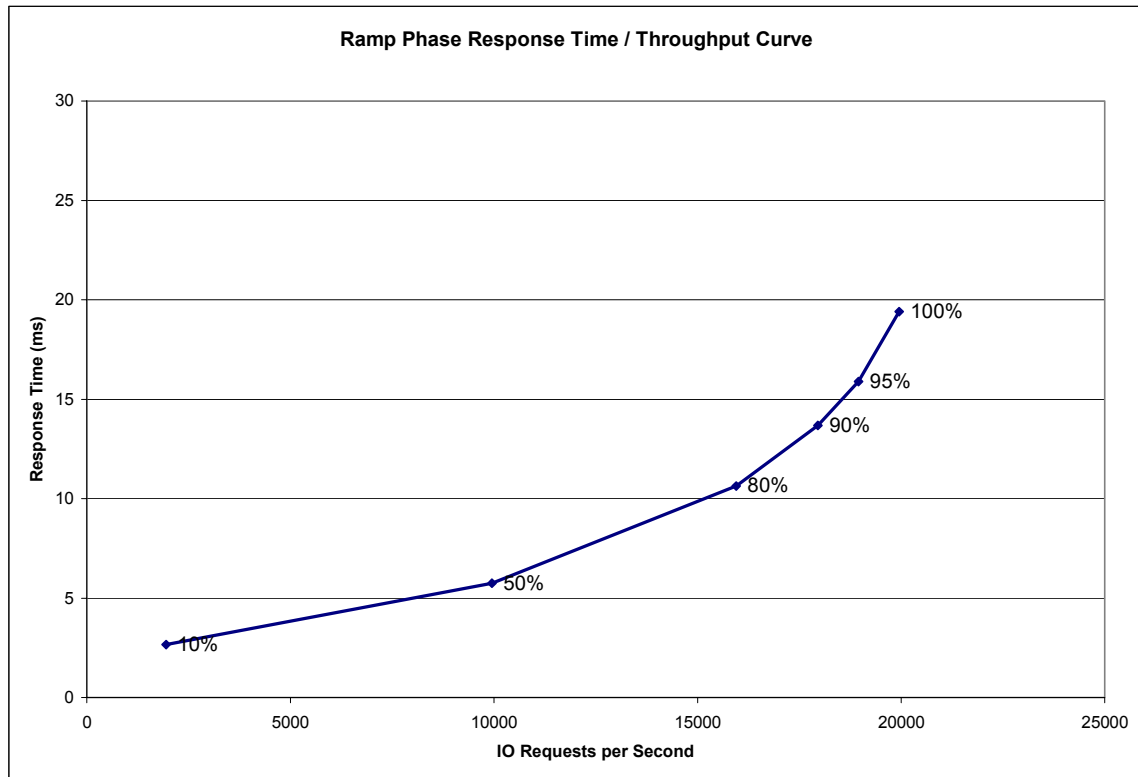
The following diagram documents the various storage capacities, used in this benchmark, and their relationships.



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 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	1,950.26	9,951.10	15,950.63	17,950.99	18,951.79	19,949.73
Average Response Time (ms):						
All ASUs	2.65	5.75	10.63	13.69	15.90	19.40
ASU-1	3.63	7.85	15.23	19.61	22.35	27.21
ASU-2	2.83	7.12	10.20	13.12	15.65	18.55
ASU-3	0.50	0.72	1.06	1.37	2.32	3.21
Reads	6.08	13.69	25.63	33.03	37.82	45.72
Writes	0.42	0.59	0.86	1.09	1.61	2.26

Tested Storage Configuration Pricing (*Priced Storage Configuration*)

ITEM	SOFTWARE	Qty	Unit		Discount	Net Price
			Price	Extended Price		
MDB-EWR-140-BSV	DataCore SANmelody™ Category D - Base Software	1	\$7,857	\$7,857	0%	\$7,857
MDP-EWR-140-FSV	DataCore SANmelody Auto Provisioning Option for Category D	1	\$3,928	\$3,928	0%	\$3,928
Software Subtotal						\$ 11,785
SERVERS (see 3rd party quotes)						
		Qty	Unit Price	Extended Price	Discount	Net Price
PowerEdge 2600	Dell PowerEdge 2600 Server, Dual Xeon 3.06GHZ CPU, 2GB DDR SDRAM (2x1GB) memory w/ Windows Server 2003 & 3 year Silver Support 4Hr Onsite [Disk Server]	1	\$ 5,374	\$ 5,374	7%	\$ 4,974
PowerEdge 2600	Dell PowerEdge 2600 Server, Dual Xeon 3.06GHZ CPU, 1GB DDR SDRAM (2x512MB) memory w/ Windows Server 2003 & 3 year Silver Support 4Hr Onsite [Host Systems]	2	\$ 4,824	\$ 9,648	8%	\$ 8,848
CHANNELS, DISKS & ENCLOSURES (see 3rd party quotes)						
QLA2344-CK	Qlogic Fibre Channel Quad, 4 SFF LC Multimode Optic	5	\$ 3,249	\$ 16,245	9%	\$ 14,795
QLA2342-CK	Qlogic Fibre Channel dual port HBA	1	\$ 1,575	\$ 1,575	5%	\$ 1,500
QLA2340-CK	Qlogic Fibre Channel single port HBA	1	\$ 925	\$ 925	0%	\$ 925
FR10-F22-2S	JMR JBOD 10 Bay, Fibre Channel, black Fortra Rackmountable	6	\$ 2,210	\$ 13,260	3%	\$ 12,810
ST318453FC	18.4GB Seagate Fibre Channel Disk, 15k rpm	46	\$ 210	\$ 9,660	10%	\$ 8,694
ST336753FCO	36GB Seagate Fibre Channel Disk, 15k rpm	10	\$ 255	\$ 2,550	0%	\$ 2,550
MDB-9-6-1	Fiber Media Interface Adaptor DB-9/SC (MIA Copper to Fiber)	7	\$ 230	\$ 1,610	0%	\$ 1,610
GCFAZLL	LC:LC Fibre Multimode Duplex Fiber Optic Patch Cables, 5 meters, 62.5uM	8	\$ 51	\$ 408	20%	\$ 326
GCFAZCL	SC:LC Fibre Multimode Duplex Fiber Optic Patch Cables, 5 meters, 62.5uM	7	\$ 40	\$ 283	20%	\$ 226
Servers, Channels, Disks & Enclosures Subtotal				\$ 61,538	7%	\$ 57,259
SM1-EWV-PLT-PY3	3- year S/W + H/W Maintenance (7x24x365 with 4hr response)					\$ 11,853
Total TSC Price (Including 3-year maintenance):						\$ 80,897

The following TSC components were priced using third-party price quotations:

- PowerEdge 2600 – SANmelody™ Disk Server system
- PowerEdge 2600 – SPC-1 Host Systems
- QLogic HBAs
- JMR JBOD 10 Bay Fibre Channel Chassis
- Disk drives
- Fibre Media Interface Adapters
- Cables

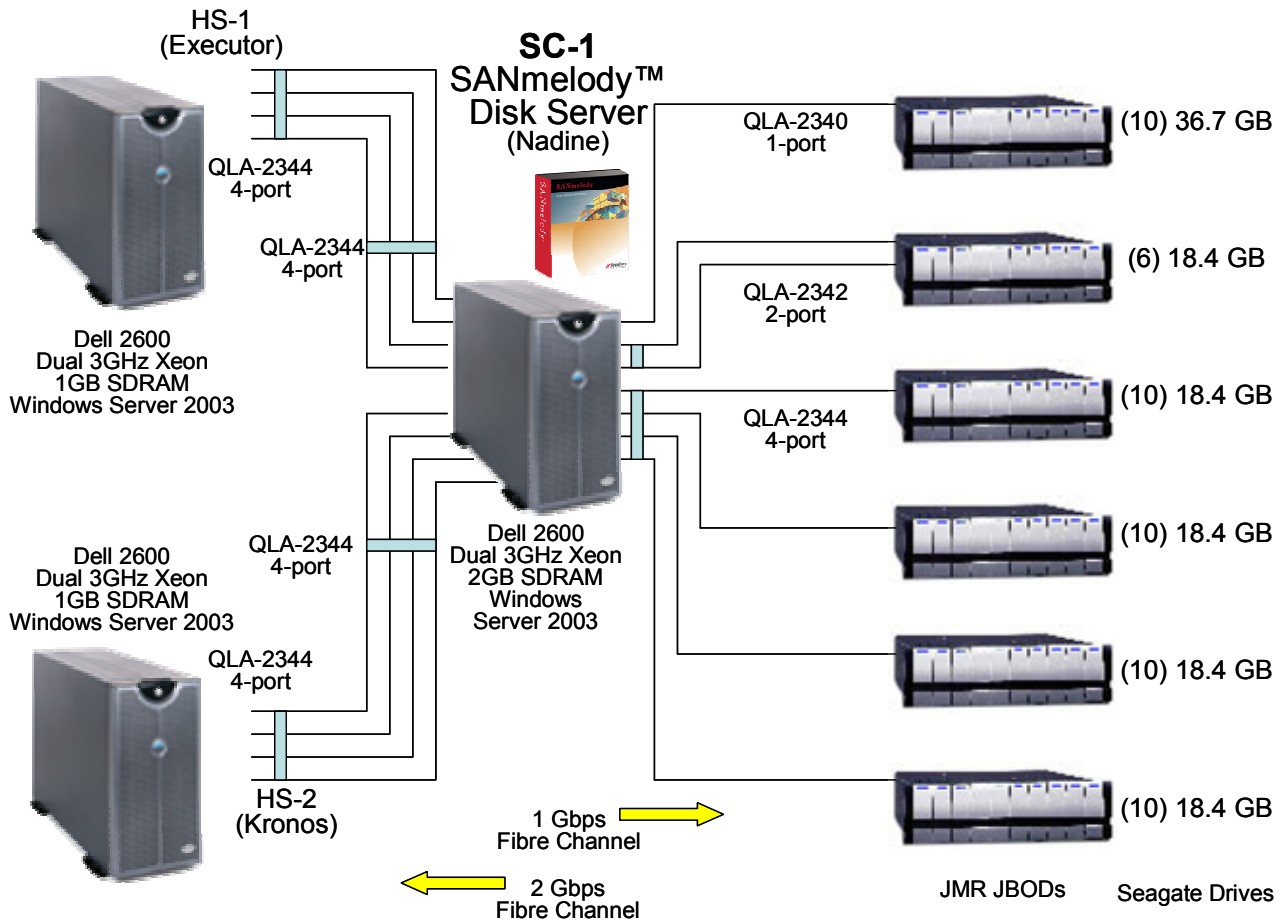
The third-party price quotations may be found in “Appendix D: Third-Party Quotations” on page 58 of the SPC-1 Full Disclosure Report.

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.

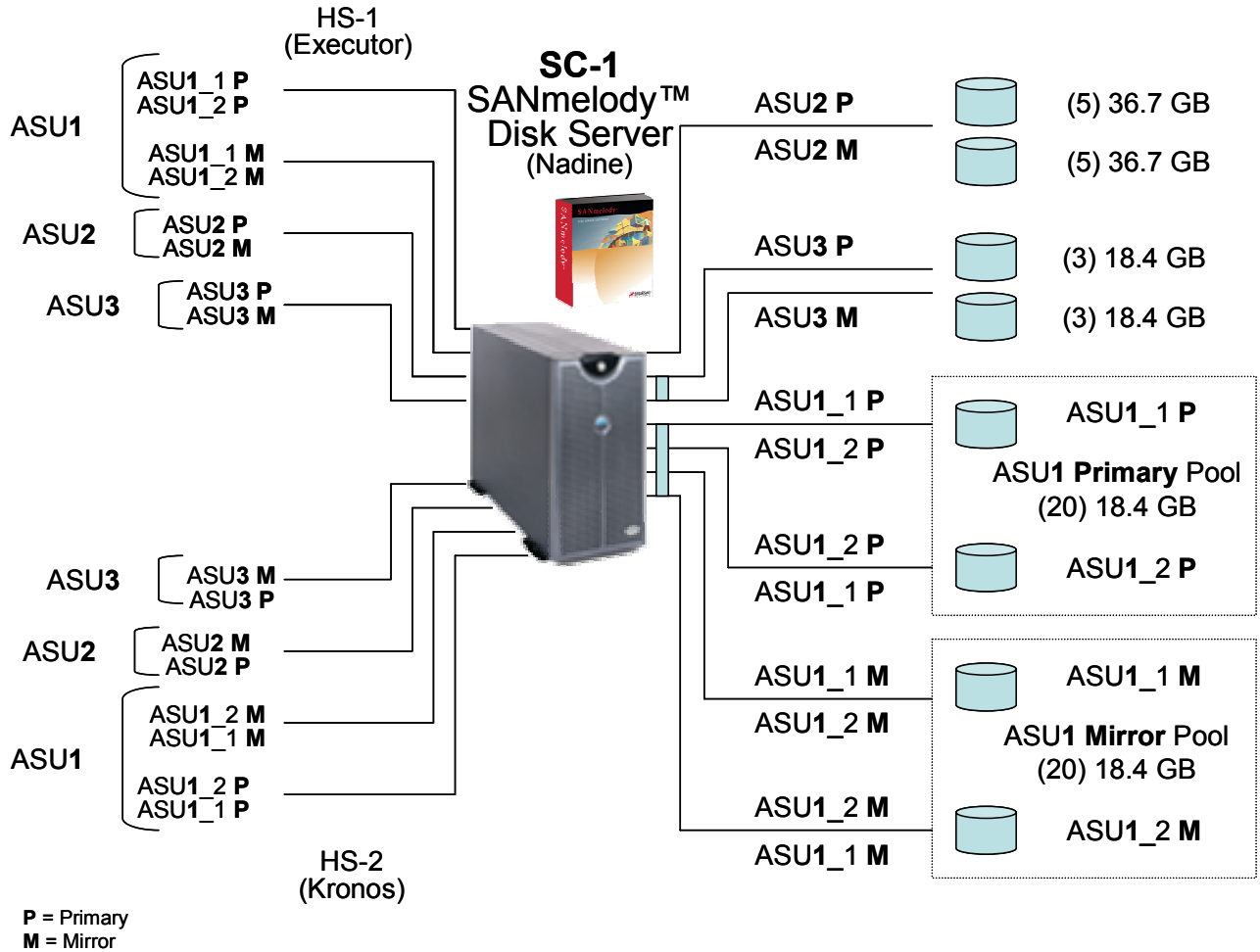
Benchmark Configuration/Tested Storage Configuration Diagram1

The first Benchmark Configuration (BC)/Tested Storage Configuration (TSC) diagram illustrates the complete configuration.



Benchmark Configuration/Tested Storage Configuration Diagram2

The second Benchmark Configuration (BC)/Tested Storage Configuration (TSC) diagram illustrates the relationships between the ASUs, Host Systems, storage pools/disk drives, and data paths.



Benchmark Configuration/Tested Storage Configuration Details

Host Systems:	Tested Storage Configuration (TSC):
HS-1: Dell 2600	HS-1: Dell 2600
2 – Intel 3.0 GHz Xeon CPUs	HS-2: Dell 2600
512 KB L2 cache per CPU	SC-1: DataCore SANmelody™ Disk Server
1 GB main memory	Dell 2600 Server with:
1 – QLogic QLA-2344 4-port HBA	2 – Intel 3.0 GHz Xeon CPUs
Microsoft Windows Server™ 2003, Standard Edition	512 KB L2 cache per CPU
WG	2 GB main memory
HS-2: Dell 2600	3 – QLogic QLA-2344 4-port HBAs
2 – Intel 3.0 GHz Xeon CPUs	1 – QLogic QLA-2342 2-port HBA
512 KB L2 cache per CPU	1 – QLogic QLA-2340 1-port HBA
1 GB main memory	Microsoft Windows Server™ 2003, Standard Edition
1 – Qlogic QLA-2344 4-port HBA	8 – 2 Gbps FC front-end ports
Microsoft Windows Server™ 2003, Standard Edition	7 – 1 Gbps FC backend ports
WG	6 – JMR JBOD 10 Bay Enclosures
	46 – 18.4 GB, 15k rpm Seagate disk drives
	10 – 36.7 GB, 15k rpm Seagate disk drives