



**SPC BENCHMARK 1™**  
**EXECUTIVE SUMMARY**

**NETWORK APPLIANCE, INC. *(TEST SPONSOR)***  
**EMC CLARION CX3 MODEL 40**  
*(SNAPVIEW™ ENABLED)*

**SPC-1 V1.10.1**

**Submitted for Review: January 29, 2008**  
**Submission Identifier: A00060**

## **EXECUTIVE SUMMARY**

### **Test Sponsor and Contact Information**

<b>Test Sponsor and Contact Information</b>	
<b>Test Sponsor Primary Contact</b>	Network Appliance, Inc. – <a href="http://www.netapp.com/">http://www.netapp.com/</a> Steve Daniel – <a href="mailto:daniel@netapp.com">daniel@netapp.com</a> 7301 Kit Creek Road Building 1 Research Triangle Park, NC 27709 Phone: (919) 476-5726 FAX: (919) 476-4272
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<b>Auditor</b>	Storage Performance Council – <a href="http://www.storageperformance.org">http://www.storageperformance.org</a> Walter E. Baker – <a href="mailto:AuditService@StoragePerformance.org">AuditService@StoragePerformance.org</a> 643 Bair Island Road, Suite 103 Redwood City, CA 94063 Phone: (650) 556-9384 FAX: (650) 556-9385

### **Revision Information and Key Dates**

<b>Revision Information and Key Dates</b>	
<b>SPC-1 Specification revision number</b>	V1.10.1
<b>SPC-1 Workload Generator revision number</b>	V2.00.04a
<b>Date Results were first used publicly</b>	January 29, 2008
<b>Date the FDR was submitted to the SPC</b>	January 29, 2008
<b>Date the TSC is available for shipment to customers</b>	currently available
<b>Date the TSC completed audit certification</b>	January 29, 2008

### **Tested Storage Product (TSP) Description**

The CX3-40 is the performance workhorse of EMC's CLARiiON CX3 UltraScale series. Featuring quad Xeon processors, 8 GB memory, quad 4 Gb/s back-end loops, and support for up to 240 drives, the CX3-40 appeals to commercial and enterprise customers with OLTP and messaging (e.g., Microsoft Exchange) workloads, and with larger requirements for array-based replication. Enterprise-class business continuance features include hot-pluggable redundant hardware, hot spare disk drives, multi-path failover, snapshots, cloning, local/remote mirroring, and non-disruptive firmware upgrades.

## Summary of Results

SPC-1 Results	
Tested Storage Configuration (TSC) Name: EMC CLARiiON CX3 Model 40	
Metric	Reported Result
SPC-1 IOPS™	8,997.17
SPC-1 Price-Performance	\$59.49/SPC-1 IOPS™
Total ASU Capacity	7,054.148GB
Data Protection Level	Mirroring
Total TSC Price (including three-year maintenance)	\$535,251

**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.

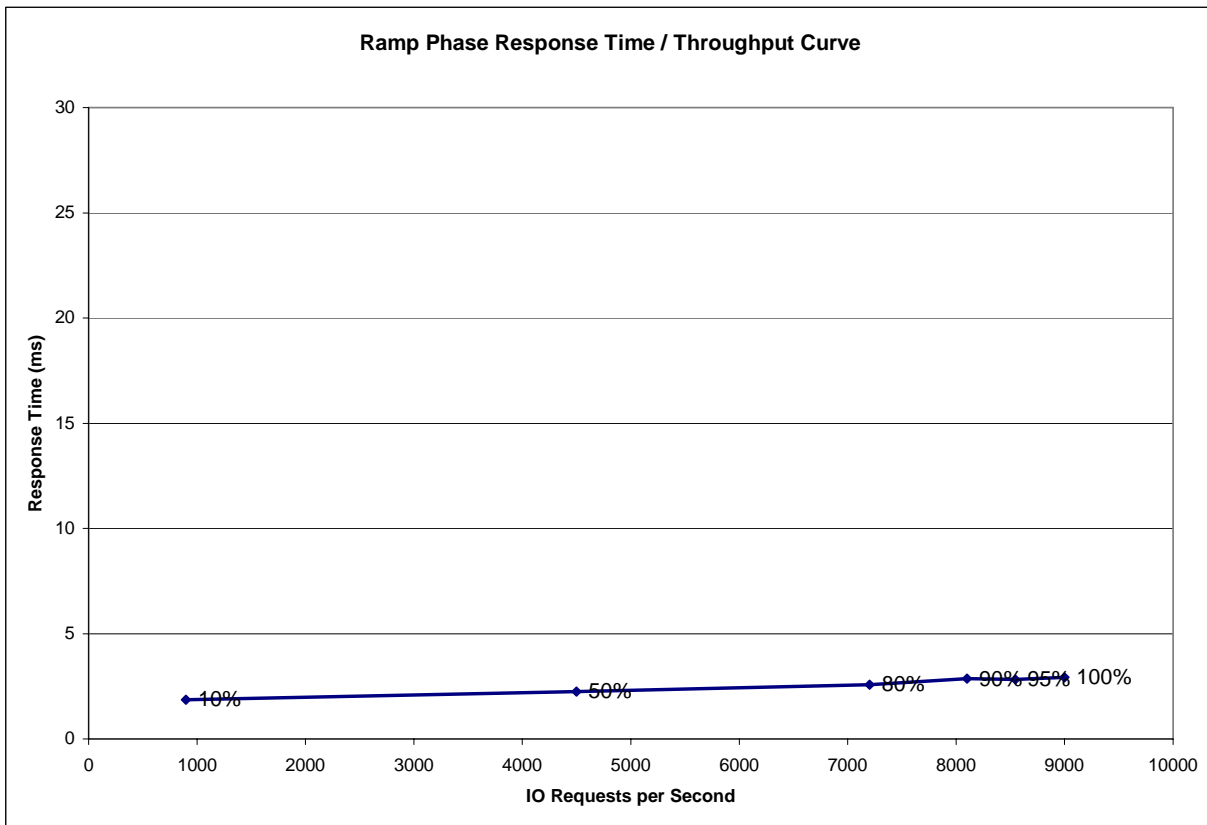
### Storage Capacities and Relationships

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
<b>I/O Request Throughput</b>	898.75	4,499.35	7,200.94	8,100.50	8,545.80	8,997.17
<b>Average Response Time (ms):</b>						
All ASUs	1.86	2.25	2.57	2.85	2.83	2.92
ASU-1	2.47	2.90	3.24	3.54	3.52	3.61
ASU-2	1.58	1.93	2.30	2.58	2.56	2.65
ASU-3	0.67	1.02	1.26	1.53	1.49	1.56
Reads	3.90	4.40	4.88	5.20	5.20	5.32
Writes	0.53	0.85	1.07	1.32	1.28	1.35

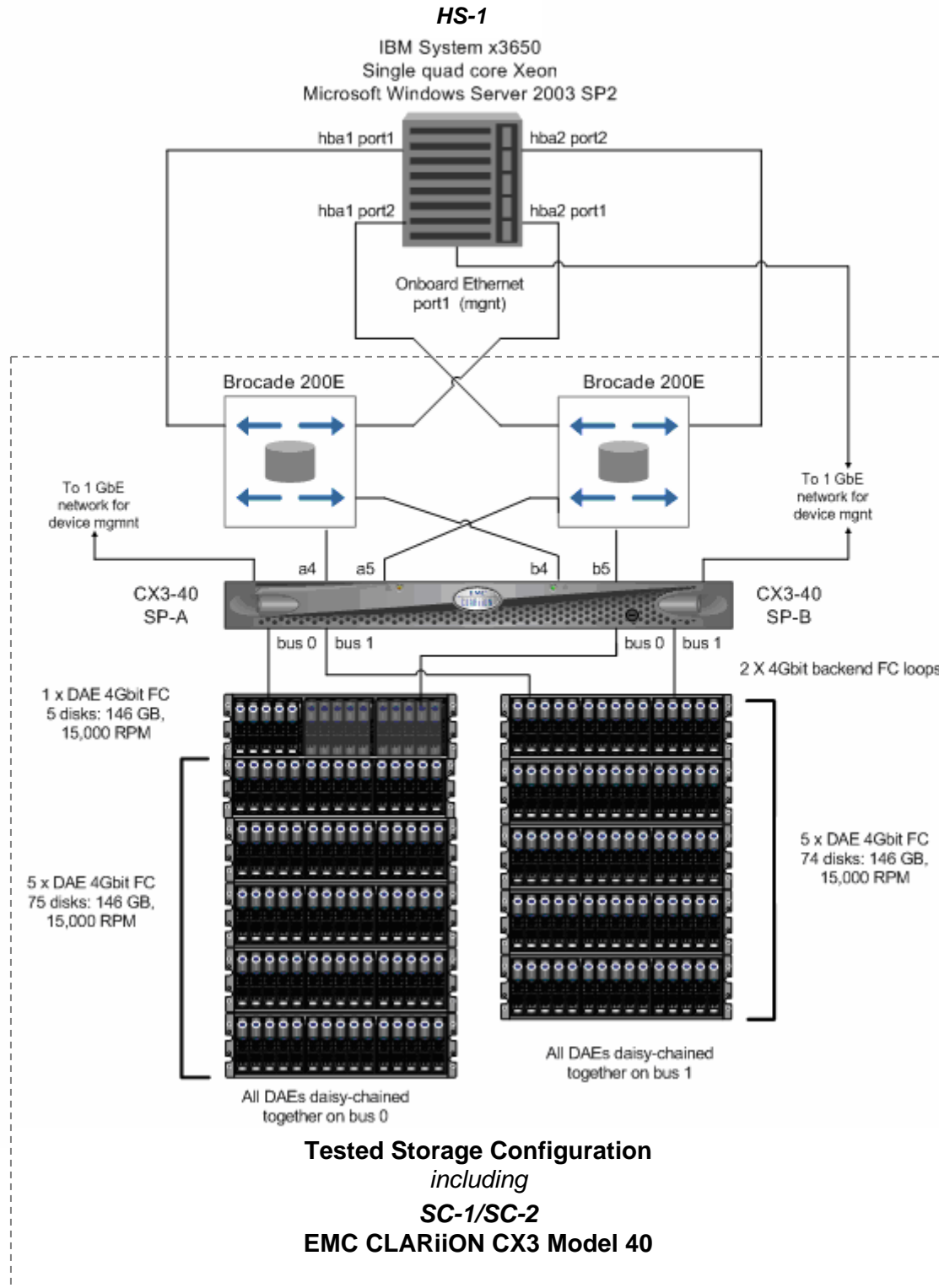
## Tested Storage Configuration Pricing (*Priced Storage Configuration*)

Qty	Product	U/M	Unit List	Discount	Total	Vendor
1	CX3-40C-FD - SPE-FIELD INSTALL	EA	\$42,300	0%	\$42,300	see attached third party quotation
11	CX-4PDAE-FD - 4G DAE FIELD INSTALL	EA	\$5,900	0%	\$64,900	see attached third party quotation
150	CX-4G15-146 - 146GB 15K 4GB FC	EA	\$1,645	0%	\$246,750	see attached third party quotation
1	V-CX4014615K - VAULT PACK CX3-40 146GB 15K 4GB DRIVES QTY 5	EA	\$8,225	0%	\$8,225	see attached third party quotation
4	FC2-HSSDC-8M - 8M HSSDC2 to HSSDC2 bus cbl	EA	\$600	0%	\$2,400	see attached third party quotation
1	PP-WN-KIT - POWERPATH WINDOWS KIT	EA	\$0	0%	\$0	see attached third party quotation
1	NAV-ENKIT - NAVI ENTERPRISE MEDIA	EA	\$0	0%	\$0	see attached third party quotation
8	NAVAGT-WINKIT - NAVI AGENT WINDOWS MEDIA	EA	\$0	0%	\$0	see attached third party quotation
1	SV3-KIT - SNAPVIEW MEDIA CX3-XX SER	EA	\$0	0%	\$0	see attached third party quotation
8	UTIL-WIN - Windows Software Utilities	EA	\$40	0%	\$320	see attached third party quotation
1	CX34C-KIT - CS3-40C DOCS AND RTU KIT	EA	\$0	0%	\$0	see attached third party quotation
1	C-MODEM-US - CLARIIION SERVICE MODEM-US	EA	\$0	0%	\$0	see attached third party quotation
1	NAV34-EN - NAVI MGR CX3-40 ENTPR LIC	EA	\$58,000	0%	\$58,000	see attached third party quotation
1	SV34 - SNAPVIEW CX3-40	EA	\$17,400	0%	\$17,400	see attached third party quotation
1	PP-WN-WG - PPATH WINDOWS WGR	EA	\$1,440	0%	\$1,440	see attached third party quotation
1	PS-BAS-PP1 - POWERPATH 1HOST QS	EA	\$1,330	0%	\$1,330	see attached third party quotation
1	PS-BAS-PMBLK - POWERPATH 1HOST QS	EA	\$1,970	0%	\$1,970	see attached third party quotation
1	M-PRESW-001- premium software support	EA	\$33,929	0%	\$33,929	see attached third party quotation
1	M-PRESW-004 - premium software support - open SW	EA	\$777	0%	\$777	see attached third party quotation
1	WU-PREHW-001- premium hardware support	EA	\$31,317	0%	\$31,317	see attached third party quotation
2	QLA2462-E-SP - 2 PORT 4GB PCI-X	EA	\$1,700	0%	\$3,400	see attached third party quotation
2	Brocade 16-Port 200e FC Full Fab Switch,-C,R5	EA	\$8,700	0%	\$17,400	Network Appliance, Inc.
2	BSWITCH-16PORT-R5 HW Support,Premium,4hr,y	EA	\$1,697	0%	\$3,393	Network Appliance, Inc.
2	BSWITCH-16PORT-R5 SW Subs,Premium,4hr,y	EA	\$0	0%	\$0	Network Appliance, Inc.
Hardware Total					\$385,375	
Software Total					\$77,160	
Services Total					\$3,300	
prepaid software maintenance (3YR-4HOUR)					\$34,706	
hardware warranty upgrade summary (3YR 4HOUR)					\$34,710	
<b>Total Price</b>					<b>\$535,251</b>	

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

The Tested Storage Configuration contained 154 disk drives and the Priced Storage Configuration contained 155 disk drives.

### Benchmark Configuration/Tested Storage Configuration Diagram



**Benchmark Configuration/Tested Storage Configuration Components**

<b>Host System:</b>	<b>Tested Storage Configuration (TSC):</b>
<b>HS-1: IBM System x3650</b>	2 – Qlogic QLA2462-E, 2-Port, 4Gb, PCI-X HBAs
Single quad core Xeon processor	2 – Brocade 16-Port 200e FC switches
3 GHz CPUs, 8 MB cache per CPU	<b>SC-1/SC-2: EMC CLARiiON CX3 Model 40</b> <b>2 – storage controllers each with:</b> 2 – Intel Xeon 2.8 GHz processors FLARE 03.26.040.5.005 4 GB main memory and cache 2 – 4Gb/s front-end ports 2 – 4Gb/s backend ports
18 GB main memory	
Windows Server 2003 with SP2	
Priced Host System Software: Navisphere Powerpath Windows Kit 5.0	
PCI-X	154 – 146 GB 15K RPM disk drives
WG	