SPC BENCHMARK 1™

EXECUTIVE SUMMARY

3PAR INC.

3PAR INSERV® T800 STORAGE SERVER

SPC-1 V1.10.1

Submitted for Review: September 2, 2008
Submission Identifier: A00069

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
Test Sponsor Primary Contact	3PAR Inc. – http://www.3par.com Bill McCormack – bill.mccormack@3par.com 4609 Technology Drive Fremont, CA 94538 Phone: (510) 897-2784 FAX: (510) 413-5998
Test Sponsor Alternate Contact	3PAR Inc. – http://www.3par.com John Cooper – john.cooper@3par.com 4609 Technology Drive Fremont, CA 94538 Phone: (510) 668-9310 FAX: (510) 413-5998
Test Sponsor Alternate Contact	3PAR Inc. – http://www.3par.com Geoff Hough – geoff.hough@3par.com 4609 Technology Drive Fremont, CA 94538 Phone: (510) 668-9213 FAX: (510) 413-5699
Auditor	Storage Performance Council – http://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	V1.10.1
SPC-1 Workload Generator revision number	V2.00.04a
Date Results were first used publicly	September 2, 2008
Date the FDR was submitted to the SPC	September 2, 2008
Date the TSC is available for shipment to customers	September 2, 2008
Date the TSC completed audit certification	August 29, 2008

Tested Storage Product (TSP) Description

3PAR® designed the 3PAR InServ® T800 Storage Server to deliver high levels of performance and consolidation simply and affordably, so that customers don't have to overprovision capacity or resort to overly complex administration to increase performance and improve capacity utilization.

3PAR's unique and tightly-clustered InSpire® Architecture was designed to ensure high and predictable levels of performance for all workloads, as well as high utilization rates for purchased resources. Central to the InSpire design is a high-bandwidth, low-latency backplane that unifies cost-effective, modular, and scalable components into a highly available and autonomically load-balanced cluster. The 3PAR Gen3 ASIC featured by 3PAR's T-Class storage arrays was also designed to alleviate performance concerns and cut traditional array costs by allowing the InServ to deliver mixed workload support, whereby transaction- and throughput-intensive workloads run without contention on the same storage resources.

Summary of Results

| SPC-1 Results	
Tested Storage Configuration (TSC) Name: 3PAR InServ® T800 Storage Server	
Metric	**Reported Result**
SPC-1 IOPS™	224,989.65
SPC-1 Price-Performance	$9.30/SPC-1 IOPS™
Total ASU Capacity	77,824.000 GB
Data Protection Level	Mirroring
Total TSC Price (including three-year maintenance)	$2,091,667

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.
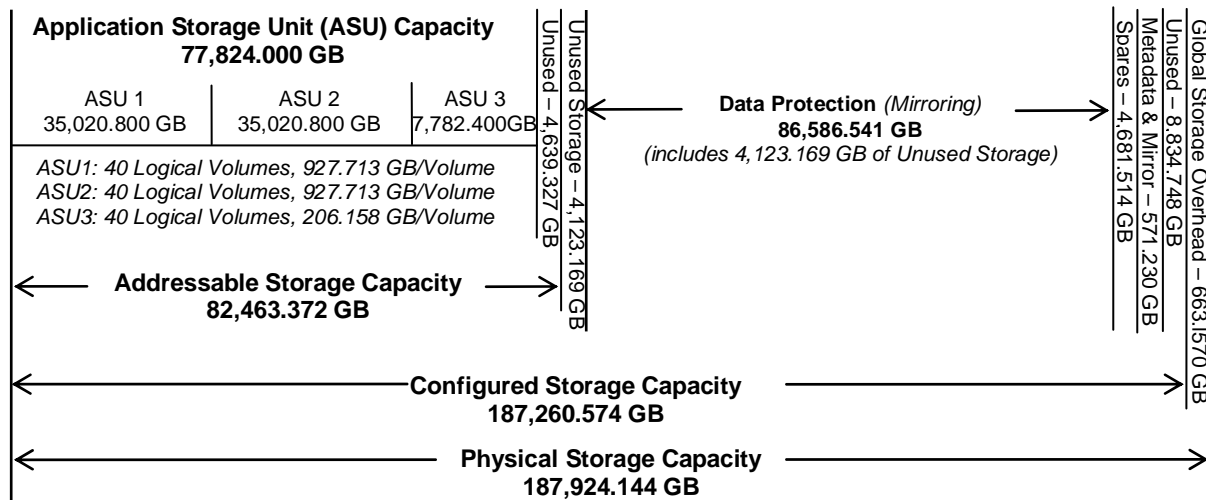
Response Time – Throughput Curve

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.
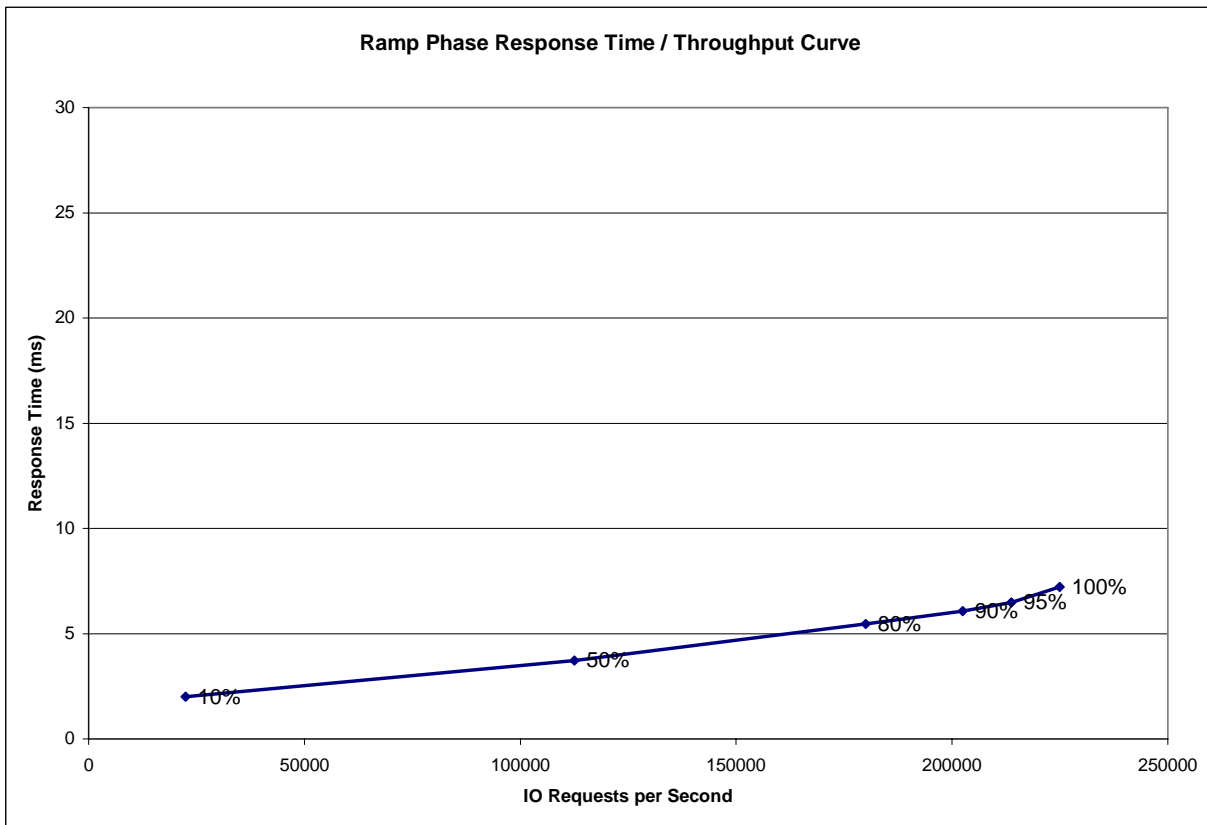
Response Time – Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
I/O Request Throughput	22,500.27	112,523.81	180,038.31	202,489.84	213,739.77	224,989.65
Average Response Time (ms):						
All ASUs	1.99	3.72	5.47	6.08	6.49	7.22
ASU-1	2.73	4.78	6.69	7.31	7.72	8.40
ASU-2	2.04	5.03	7.70	8.61	9.13	9.94
ASU-3	0.42	0.88	1.90	2.36	2.74	3.54
Reads	4.51	8.26	11.38	12.34	12.89	13.72
Writes	0.36	0.76	1.62	2.00	2.32	3.00

Tested Storage Configuration Pricing *(Priced Storage Configuration)*

Item	Description	Qty	Price
980-200008	2.33GHZ T-SERIES CONTROLLER NODE	6	
980-200009	4GB CONTROL CACHE (2 x 2GB DIMMS)	8	
980-200010	6GB DATA CACHE (3 x 2GB DIMMS)	16	
980-0037	4-PORT FIBRE CHANNEL ADAPTER (4 GBIT)	24	
980-200007	INSERV T800 BASE CONFIGURATION	1	
981-200004	DRIVE CHASSIS (40-DISK, 4 GBIT/S)	32	
981-200005	4 x 146GB DRIVE MAGAZINE (15K RPM, 4 GBIT/S)	320	
982-200000	2M FIBER CABLE 50/125 (LC-LC)	8	
982-0021	10M FIBER CABLE 50/125 (LC-LC)	56	
982-0023	50M FIBER CABLE 50/125 (LC-LC)	16	
982-0008	2M CABINET KIT (WITH REDUNDANT PDU PAIR)	4	
982-0014	REGIONAL KIT, NORTH AMERICA	5	
985-0001	SERVICE PROCESSOR	1	
987-200096	INFORM SUITE (T800) - 4 x 146GB 15K RPM MAGAZINE LTU	320	
987-0122	3PAR MPIO FOR IBM AIX MEDIA KIT	1	
985-200031	INSTALLATION AND SET-UP 8 NODES T-SERIES	1	
985-200052	HW MAINT 24X7 4HR RESP, PRICE PER NODE FOR 4, 6, AND 8 NODES T-SERIES	8	
985-200061	INFORM SUITE SW MAINT, PRICE PER NODE FOR 4, 6, 8 NODES T-SERIES	8	
985-200127	3PAR MPIO FOR IBM AIX SW MAINT (1-10 HOSTS) T-SERIES	1	
	3PAR InServ T800 Storage Server Package	1	$2,082,867
	--Includes 3-years Service (24x7 4 hour response)		
3rd Party:	IBM 5759 4 GB Dual-Port Fibre Channel Adapter	8	$8,800
	Total		**$2,091,667**

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

There were no differences between the Tested Storage Configuration and the Priced Storage Configuration.

Benchmark Configuration/Tested Storage Configuration Diagram
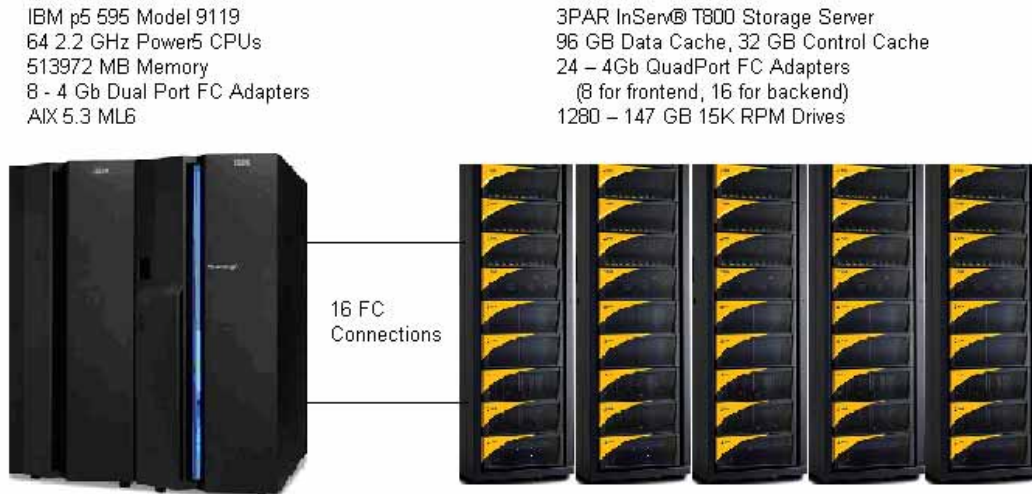
Benchmark Configuration/Tested Storage Configuration Components

Host Systems:	Tested Storage Configuration (TSC):
UID=HS-1	8 – IBM 4Gb Dual Port PCI-X HBAs *(9119-5759)*
IBM P5 595 Model 9119	*UID=SC-1:* 3PAR InServ® T800 Storage Server

64 – 2.2 GHz CPUs – 2 CPUs/POWER5 chip
        32 KB L1 cache, 960 KB L2 cache,
        and 18 MB L3 cache per CPU
	8 – T-Series Controller Nodes
	96 GB data cache
	32 GB control cache

513972 MB main memory	8 – 4Gb QuadPort FC Adapters *(2 ports/adapter used for front-end)*
3PAR® Multipath I/O 2.2 for IBM AIX	16 – 4Gb QuadPort FC Adapters *(4 ports/adapter used for backend)*
AIX 5.3 ML6	
PCI-X	5 – 2M Cabinet Kits
WG	1280 – 146 GB, 15K RPM disk drives