



ORACLE

**SPC BENCHMARK 1C™
EXECUTIVE SUMMARY**

**ORACLE CORPORATION
SUN FLASH ACCELERATOR F20 PCIe CARD**

SPC-1C™ V1.3

**Submitted for Review: September 17, 2010
Submission Identifier: C00011**

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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Revision Information and Key Dates

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SPC-1C Specification revision number	V1.3
SPC-1C Workload Generator revision number	V1.0
Date Results were first used publicly	September 17, 2010
Date the FDR was submitted to the SPC	September 17, 2010
Date the TSC is available for shipment to customers	currently available
Date the TSC completed audit certification	September 15, 2010

Tested Storage Product (TSP) Description

Oracle's Sun Flash Accelerator F20 PCIe Card is a high performance, high density, solid state flash PCIe card with 96 GB of capacity.

The F20 is designed to accelerate IO-intensive database applications.

It is based on enterprise-class SLC flash technology, with advanced wear-leveling, integrated power loss protection for write persistence, solid state robustness and 3M MTBF hour reliability.

Summary of Results

SPC-1C Results	
Tested Storage Product: Sun Flash Accelerator F20 PCIe Card	
Metric	Reported Result
SPC-1C IOPS™	72,521.11
Total ASU Capacity	147.413 GB
Data Protection Level	Unprotected
Total Price – Priced Storage Configuration	\$15,554

SPC-1C 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-1C benchmark.

A **Data Protection Level of *Unprotected*** provides no data protection in the event of a single point of failure.

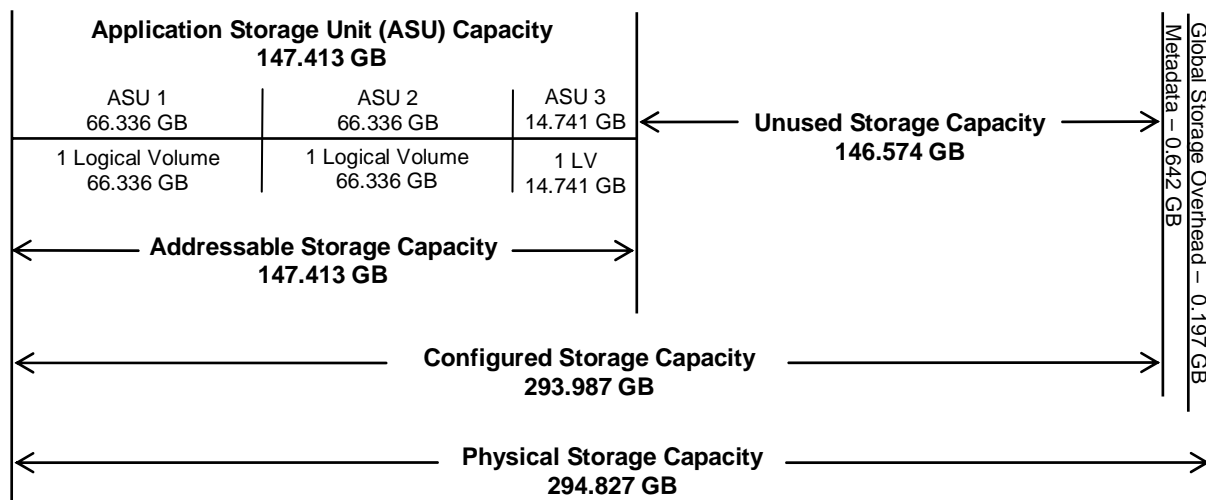
Storage Capacities and Relationships

The Tested Storage Configuration (TSC) must be configured so that there is either no Unused Storage or that the sum of Total ASU Capacity and storage required for data protection equals 50% (+-1 GiB) of the Physical Storage Capacity. This configuration meets the 50% requirement as documented below:

$$294.827 \text{ GB (Physical Storage Capacity)} * 0.5 = 147.413 \text{ GB}$$

$$147.413 \text{ GB (Total ASU Capacity)} + 0.000 \text{ GB (data protection)} = 147.413 \text{ GB}$$

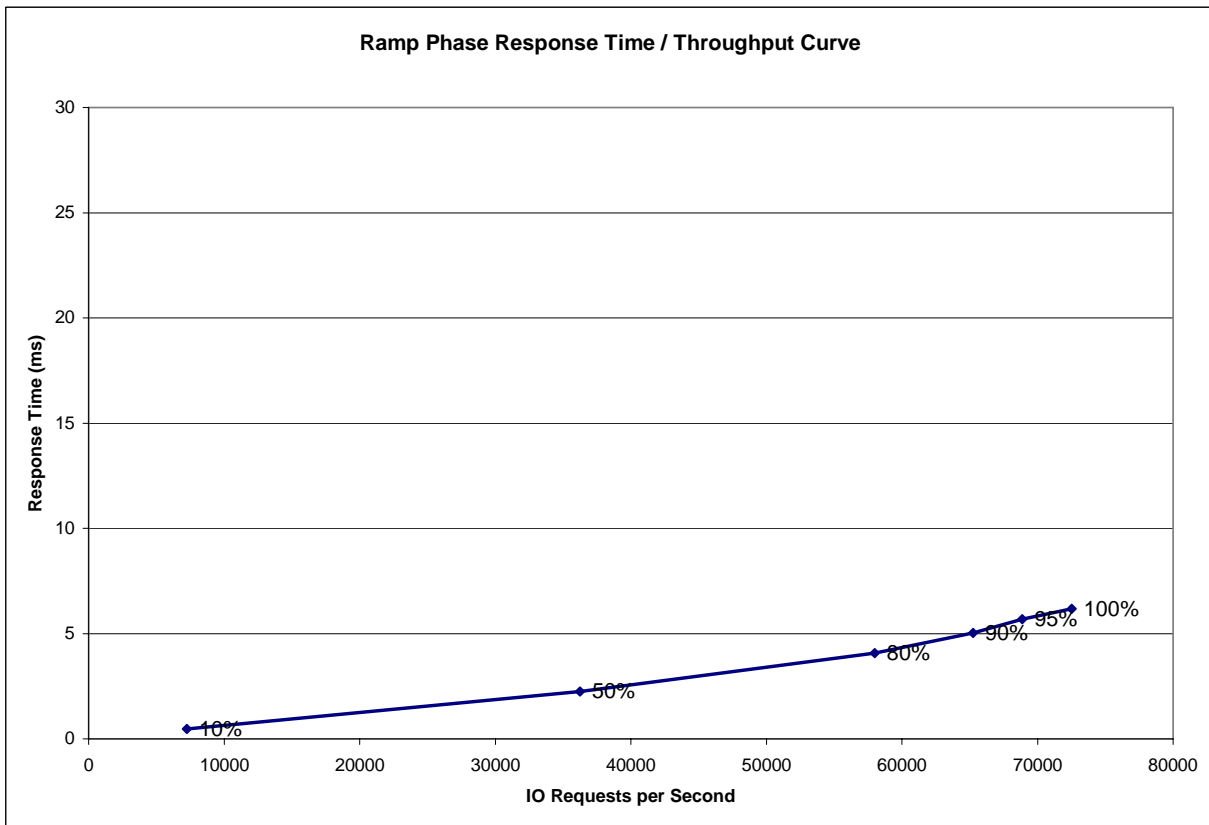
The following diagram documents the various storage capacities, used in this benchmark, and their relationships.



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	7,249.13	36,233.90	57,986.69	65,246.82	68,861.47	72,521.11
Average Response Time (ms):						
All ASUs	0.47	2.26	4.07	5.03	5.70	6.17
ASU-1	0.50	2.32	4.10	5.05	5.72	6.19
ASU-2	0.49	2.32	4.12	5.06	5.69	6.18
ASU-3	0.39	2.11	4.00	4.98	5.66	6.15
Reads	0.63	2.57	4.29	5.23	5.88	6.35
Writes	0.37	2.05	3.92	4.90	5.58	6.06

Tested Storage Configuration Pricing (Priced Storage Configuration)

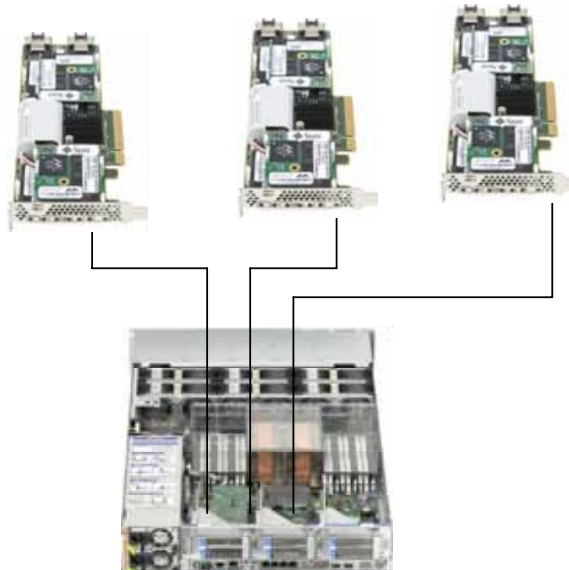
Part Number	Description	Quantity	US List	Total	discount	Ave. Price
TA-FAS-S3IE96GB-N	96GB solid state Flash Accelerator PCIe card with 2 x 4-wide SAS-1 ports for internal disk drives, 4 x 24GB enterprise-class SLC Flash modules, integrated super cap power backup, low-profile, ROHS-6 compliant	3	\$4,695.00	\$14,085	35%	\$9,155
X4270M2-H1-AA	Sun Fire X4270 M2 server: base chassis with twelve 3.5-inch drive bays (for factory installation)	1	\$3,499.00	\$3,499	20%	\$2,799
333A-25-15-NEMA 5933A	Power Cord Kit, North American/Asian, 2.5 Meter, NEMA 5-15P Plug, IEC60320-C13 Connector, 15A, 125VAC Sun Fire servers: 1200 W AC PSU (for factory installation)	1	\$10.00 \$349.00	\$10 \$349	20%	\$8 \$279
RA-SS1CR-1T7K	1 TB 7200 rpm 3.5-inch SAS HDD with bracket (for factory installation)	1	\$659.00	\$659	35%	\$428
5899A-N	CPU Heatsink for Sun Fire X4270 & X4275 Server. For Factory Integration Only. RoHS-6	1	\$0.00	\$0	20%	\$0
5896A-N	Processor Filler Panels for Sun Fire X4270 & X4275 Server. XATO. RoHS-6	1	\$0.00	\$0	20%	\$0
SG-SAS6-INT-Z	Sun Storage 6 Gb SAS PCIe HBA, Internal: 8 port (for factory installation)	1	\$419.00	\$419	35%	\$272
5897A-N	3.5-inch HDD Filler Panel for Sun Fire X4275 x64 servers. For Factory Integration Only. RoHS-6.	11	\$0.00	\$0	20%	\$0
4910A	4 GB (1 x 4 GB DIMMs) 1333 MHz DDR3 Low Voltage DIMM, for Sun Fire X4270 M2 Server and Sun Fire X4170 M2 Server, Factory Integration	3	\$255.00	\$765	20%	\$612
5879A-N	Sun Fire X4170, Sun Fire X4270, and Sun Netra X4270 servers, and Sun Blade X6275 and Sun Blade X6270 server modules: 1 memory filler panel (for factory installation)	15	\$0.00	\$0	20%	\$0
5921A	Intel Xeon X5670, 6C, 2.93 GHz, 95W, 12MB Cache, 6.4 GT/s QPI, Intel Turbo Boost Technology, Intel HT Technology Processor without Heatsink for Sun Fire X4170 M2 & Sun Fire X4270 M2 Servers. For Factory Integration Only. RoHS-6.	1	\$2,499.00	\$2,499	20%	\$1,999
				\$22,285		\$15,554

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

3 – Sun Flash Accelerator F20 PCIe Cards
12 – 24 GB SLC Flash modules
(4 modules per card)



Oracle Sun Fire X4270 M2 Server

Benchmark Configuration/Tested Storage Configuration Components

Benchmark Configuration (BC) / Tested Storage Configuration (TSC):	
<p>Oracle Sun Fire X4270 M2 Server 1 – Intel Xeon 5670 series processor 6 cores, 2.93 GHz, L1 cache: 32 KB instruction/32 KB data, L2 cache: 256 KB unified L3 cache: 12 MB shared inclusive</p>	<p>1 – Sun Storage 6 GB SAS PCIe HBA <i>(used for system disk)</i></p>
<p>12 GB – main memory</p>	<p>Sun Flash Accelerator F20 PCIe Cards 3 – 96 GB Sun Flash Accelerator PCIe cards each with: 4 – 24 GB SLC Flash modules <i>(12 total)</i> 2 -4-wide SAS-1 ports for internal disks</p>
<p>Solaris 10 10/09</p>	<p>Each card directly connected via PCIe Gen 2</p>
<p>PCIe</p>	