



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**HUAWEI TECHNOLOGIES CO., LTD.
HUAWEI OCEANSTOR™ S6800T**

SPC-1 V1.12

**Submitted for Review: October 21, 2012
Submission Identifier: A00121**

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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Test Sponsor Primary Contact	Huawei Technologies Co., Ltd. – http://www.huawei.com/en/ Eric He – eric.heji@huawei.com Tianchen Road 88# Chengdu, Sichuan, P.R. China 611711 Phone: 86 28 62905595 FAX: 86 28 62905793
Test Sponsor Alternate Contact	Huawei Technologies Co., Ltd. – http://www.huawei.com/en/ Xu Zhong – xuzhong@huawei.com Tianchen Road 88# Chengdu, Sichuan, P.R. China 611711 Phone: 86 28 62905591 FAX: 86 28 62905793
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	V1.12
SPC-1 Workload Generator revision number	V2.3.0.0
Date Results were first used publicly	October 21, 2012
Date the FDR was submitted to the SPC	October 21, 2012
Date the Priced Storage Configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	October 19, 2012

Tested Storage Product (TSP) Description

Huawei OceanStor S6800T is a new generation of high-end enterprise-class storage system. Based on its industry-leading hardware specifications, the S6800T integrates the advanced technologies of high-density disk design, TurboModule (high-density and hot-swappable I/O modules), and TurboBoost (three-level performance boost), and multi-level data protection, satisfying the application requirements of large OLTP/OLAP databases, high-performance computing, digital media, Internet operation, centralized storage, backup, disaster recovery, and data migration.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: Huawei OceanStor™ S6800T	
Metric	Reported Result
SPC-1 IOPS™	250,388.92
SPC-1 Price-Performance	\$3.32/SPC-1 IOPS™
Total ASU Capacity	86,973.088 GB
Data Protection Level	Protected (<i>Mirroring</i>)
Total TSC Price (including three-year maintenance)	\$830,462.06

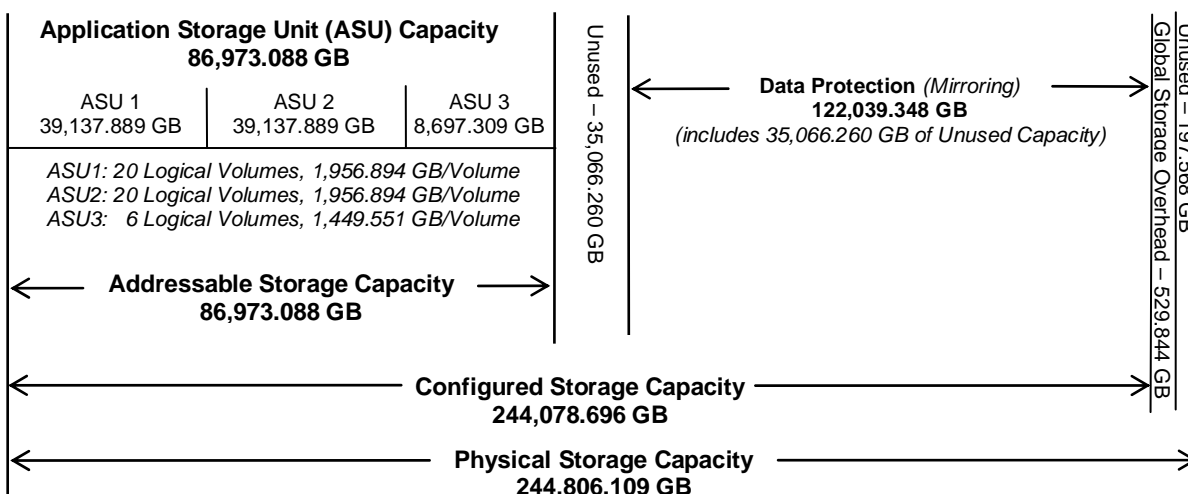
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

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 Protected** using *Mirroring* configures two or more identical copies of user data.

Storage Capacities, Relationships, and Utilization

The following diagram and table document the various storage capacities, used in this benchmark, and their relationships, as well as the storage utilization values required to be reported.



SPC-1 Storage Capacity Utilization	
Application Utilization	35.53%
Protected Application Utilization	71.05%
Unused Storage Ratio	28.73%

Application Utilization: Total ASU Capacity (*86,973.088 GB*) divided by Physical Storage Capacity (*244,806.109 GB*)

Protected Application Utilization: Total ASU Capacity (*86,973.088 GB*) plus total Data Protection Capacity (*122,039.348 GB*) minus unused Data Protection Capacity (*35,066.260 GB*) divided by Physical Storage Capacity (*244,806.109 GB*)

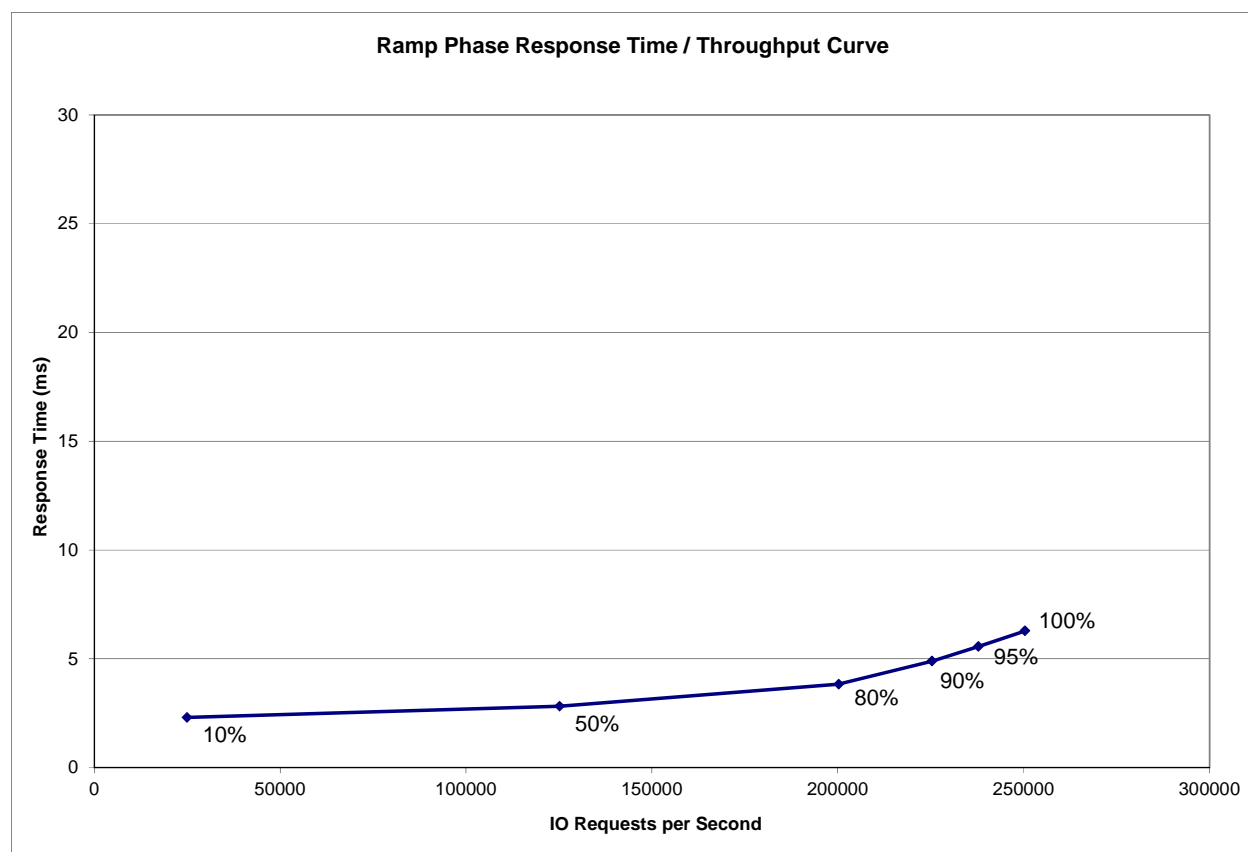
Unused Storage Ratio: Total Unused Capacity (*70,330.089 GB*) divided by Physical Storage Capacity (*244,806.109 GB*) and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 21-22 in the Full Disclosure Report.

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	25,003.10	125,210.54	200,298.32	225,358.02	237,849.52	250,388.92
Average Response Time (ms):						
All ASUs	2.30	2.82	3.83	4.89	5.57	6.28
ASU-1	3.05	3.59	4.56	5.44	6.24	6.98
ASU-2	3.03	4.00	5.47	6.74	7.98	8.88
ASU-3	0.40	0.68	1.57	2.93	3.08	3.67
Reads	5.25	6.16	7.45	8.81	10.12	11.33
Writes	0.38	0.65	1.48	2.34	2.60	3.00

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

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

Priced Storage Configuration Pricing

Part Number	Description	Quantity	Unit Price(\$)	Total Price(\$)
Control module				75,196.66
SPE61C0200-S63-2C192G-DC-BASE	SPE61C0200-64 Controller Enclosure(Dual Controller,AC,384GB Cache,w ith UPS Cache Protected Module,w ithout Front-End & Back-End Port,w ith HS Storage Array Control System Softw are)	1	75,196.66	75,196.66
Disk Enclosure				102,576.32
DAE12435U4-AC	DAE12435U4-03 Disk Enclosure(4U,3.5",AC,SAS Expansion Module,w ithout Disk Unit,w ith HS SAS in Band Management Softw are, includes 2 SAS cables)	32	3,205.51	102,576.32
Hard Disk Drives				371,032.32
SAS300-15K	300GB 15K RPM SAS Disk Unit(3.5")	720	465.65	335,268.00
SAS600-15K	600GB 15K RPM SAS Disk Unit(3.5")	48	745.09	35,764.32
IO Interface				13,149.25
LPU4F8	4*8Gbps Fibre Channel I/O modules (Total 4 ports, includes four 8Gbps SFPs)	4	1,218.20	4,872.78
LPU2S6	2*24Gbps SAS-w ide I/O modules(Total 2 ports)	8	1,034.56	8,276.47
Accessory				1,153.00
SS-OP-D-LC-M-3	Patchcord,DLC/PC-DLC/PC,Multimode,2mm Parallel,3m	16	11.00	176.00
MINI-SAS-3	Purchased Cable,MiniSAS Cable,Key246,3m	1	67.00	67.00
MINI-SAS-6	Outsourcing Cable,External Mini SAS Cable,6m,External Mini SAS 26 Pin Plug,24AWG*8P,External Mini SAS 26 Pin Plug	10	91.00	910.00
Storage management softw are				8,555.91
LIC-S6A-ISM02-V1R5	HS Integrated Storage Manager-Device Management License for OceanStor S6800T(V100R005)	1	6,617.39	6,617.39
LIC-UltraPath02-V1R5	OceanStor HS UltraPath Softw are License	1	1,938.51	1,938.51
Third Party				13,584.00
N8GHBA000	QLOGIC QLE2562 HBA Card,PCIe,8Gbps DualPort ,Fiber Channel Multimode LC Optic Interface,English Manual,Driver CD	8	1,698.00	13,584.00
Total of Product				585,247.46
Maintenance Support Service				
Hi-Care Premier On-Site Service (3 years)		1	216,753.00	216,753.00
300GB 15K RPM SAS Disk Unit(3.5") upgrade to On-Site Service (3 years)		720	35.72	25,718.40
600GB 15K RPM SAS Disk Unit(3.5") upgrade to On-Site Service (3 years)		48	57.15	2,743.20
Total of Service (3 years)				245,214.60
Total Price				830,462.06
Notes: Hi-Care Premier On-Site Service include: 7*24 Technical Assistance Center Access. Access to all new software updates and Online Support. 24*7*4 Hours Onsite Hardware Replacement.				

The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- Acknowledgement of new and existing problems with four (4) hours.
- Onsite presence of a qualified maintenance engineer or provision of a customer replaceable part within four (4) hours of the above acknowledgement for any hardware failure that results in an inoperative Priced Storage Configuration that can be remedied by the repair or replacement of a Priced Storage Configuration component.

Huawei Technologies Co., Ltd. only sells its products to third-party resellers, who in turn, sell those products to U.S. customers. The above pricing, which also includes the required three-year maintenance and support, was obtained from one of those third-party resellers. See page 82 (*Appendix F: Third-Party Quotation*) in the Full Disclosure Report for a copy of the third-party reseller quotation.

Priced Storage Configuration Diagram

Huawei OceanStor™ S6800T

dual controllers - Active-Active

192 GB cache per controller (384 GB total)

2 – FC 4-port I/O modules per controller
(8 Gbps, 4 modules total)

4 – 2x24 Gbps SAS-wide I/O modules
per controller (8 modules total)

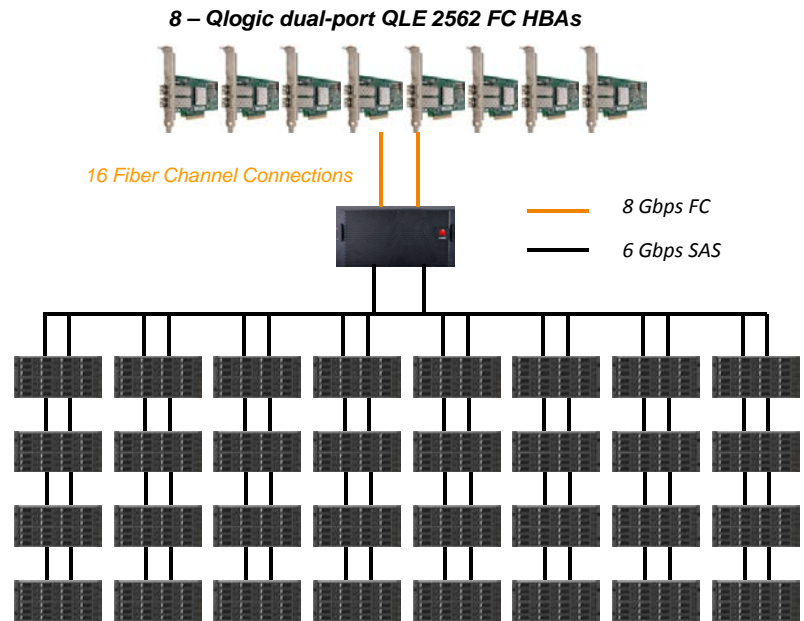
32 - disk enclosures

24 - disk drives per enclosure

768 - 15K RPM SAS disk drives

48 - 600GB 15K RPM SAS disk drives

720 - 300GB 15K RPM SAS disk drives



Priced Storage Configuration Components

Priced Storage Configuration:
8 – Qlogic dual-port QLE2562 FC HBAs
Huawei OceanStor™ S6800T dual controllers – Active-Active 192 GB cache per controller (384 GB total) 2 – FC 4-port I/O modules per controller (8 Gbps, 4 modules total) 8 – 8 Gbps front-end connections per controller (16 total, 16 used) 4 – 2x24 Gbps SAS-wide I/O modules per controller (8 total) (2 ports per modules) 8 – 2x24 Gbps SAS backend connections per controller (16 total, 16 used)
32 – Disk Enclosures 24 – 3.5” HD slots per enclosure 24 – disk drives in each enclosures
768 – 15K RPM SAS disk drives 720 – 300 GB disk drives 48 – 600 GB disk drives