



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**HUAWEI TECHNOLOGIES CO., LTD.
HUAWEI OCEANSTOR™ S8100 (8-NODE)**

SPC-1 V1.12

Submitted for Review: November 11, 2010

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EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
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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	V2.1.0
Date Results were first used publicly	November 11, 2010
Date the FDR was submitted to the SPC	November 11, 2010
Date revised FDR was submitted to the SPC Updated company name, logo and product name to reflect the complete acquisition of Huawei Symantec by Huawei Technologies Co., Ltd.	December 13, 2012
Date the priced storage configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	November 10, 2010

Tested Storage Product (TSP) Description

Huawei OceanStor™ S8100 storage system (hereinafter referred to as the S8100) is a new generation, high-end, storage product that is used by enterprises for mission-critical applications. Boasting high reliability, high performance, high scalability, large capacity, comprehensive data protection, and diversified value-added features, the S8100 is applicable to the scenarios of large-scaled core database, high availability computing, high performance computing, and integrated storage, backup, and retrieving of mass data, and is the best choice for investment saving.

Summary of Results

SPC-1 Results	
Tested Storage Product (TSP) Name: Huawei OceanStor™ S8100 (8-node)	
Metric	Reported Result
SPC-1 IOPS™	300,062.04
SPC-1 Price-Performance	CNY 48.96/SPC-1 IOPS™
Total ASU Capacity	160,920.000 GB
Data Protection Level	Protected (<i>Mirroring</i>)
Total TSP Price (including three-year maintenance)	CNY14,692,707

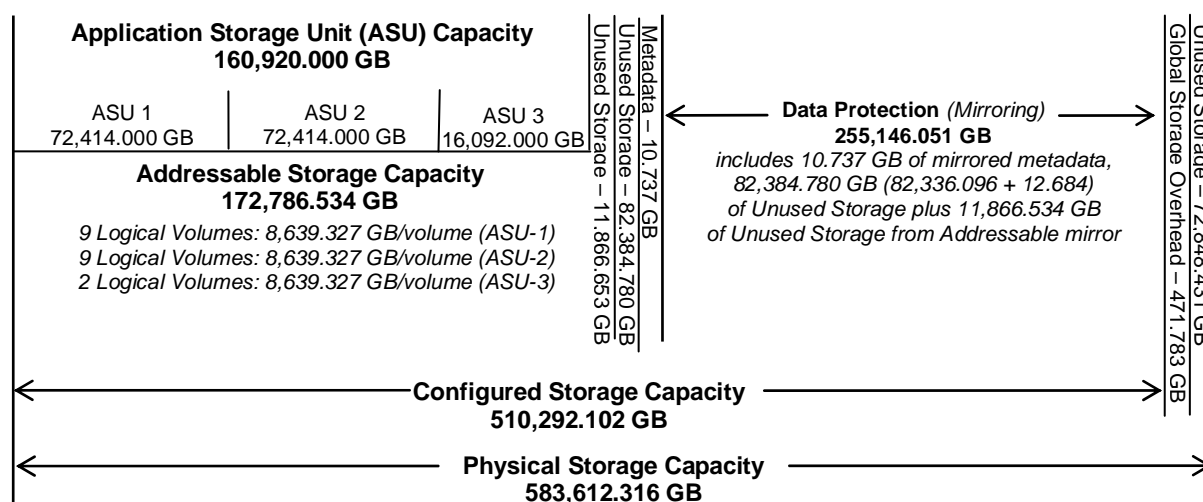
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

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 and Relationships

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	27.57%
Protected Application Utilization	69.26%
Unused Storage Ratio	44.77%

Application Utilization: Total ASU (160,920.000 GB) divided by Physical Storage Capacity (583,612.316 GB)

Protected Application Utilization: (Total ASU Capacity (160,920.000 GB) plus total Data Protection Capacity (255,146.051 GB) minus unused Data Protection Capacity (11,866.534 GB) divided by Physical Storage Capacity (583,612.316 GB)

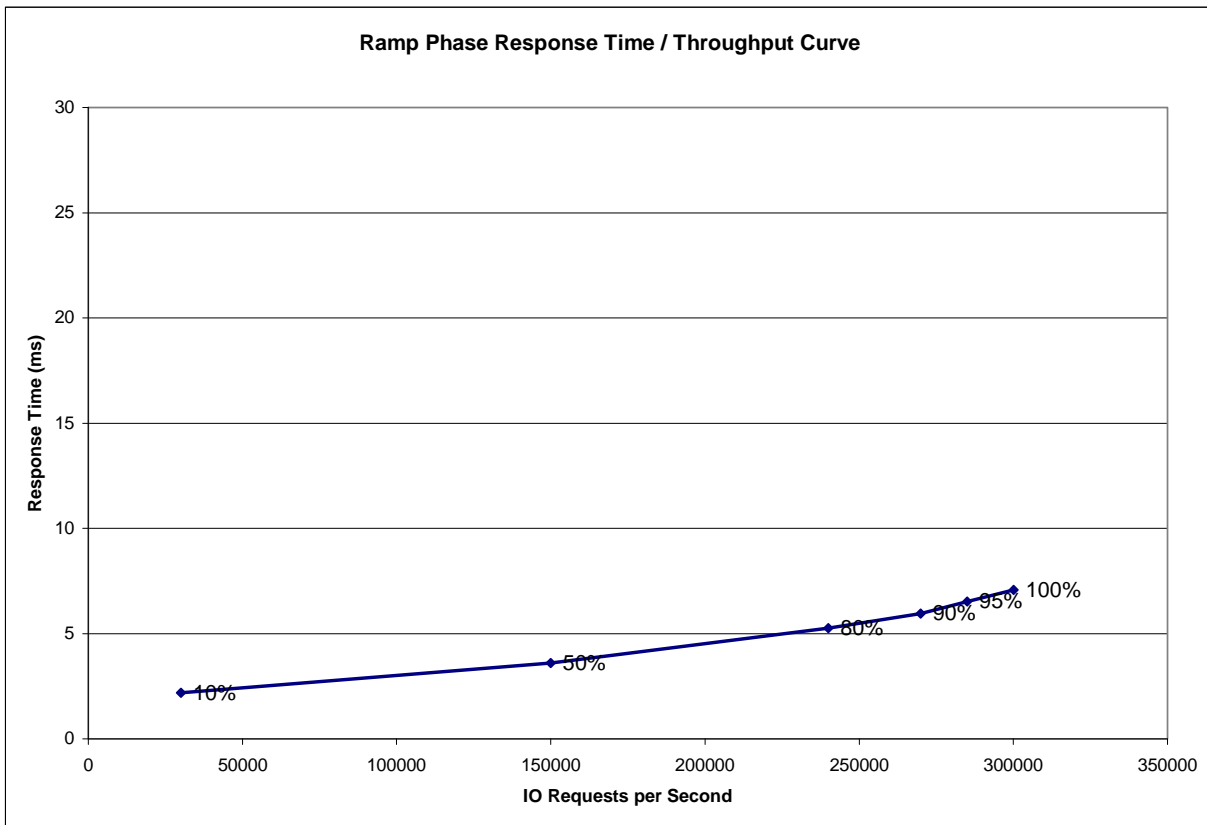
Unused Storage Ratio: Total Unused Capacity (261,279.058 GB) divided by Physical Storage Capacity (583,612.316 GB) and may not exceed 45%.

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	29,987.81	150,000.17	239,959.52	269,976.29	285,031.74	300,062.04
Average Response Time (ms):						
All ASUs	2.18	3.60	5.26	5.95	6.53	7.08
ASU-1	2.76	4.54	6.49	7.33	7.97	8.59
ASU-2	2.79	4.83	7.96	9.49	10.63	11.75
ASU-3	0.68	1.09	1.46	1.48	1.67	1.81
Reads	4.58	7.55	11.19	12.92	14.08	15.26
Writes	0.62	1.03	1.39	1.41	1.61	1.74

Priced Storage Configuration Pricing

Product Name	Quantity	Unit Price(CNY)	Total Price(CNY)
S8100 System Rack	1	58,005	58,005
S8100 Service Controller Group *16 GB of memory, 8 GB per controller *8 - 4 Gbps SFPs	4	121,911	487,644
S8100 Management Switch Module	2	8,550	17,100
S8100 Data Switch Module	2	87,113	174,226
Fibre Channel 4-Port Adapter(4Gbps)	16	20,700	331,200
Ethernet 4-Port Adapter(1Gbps)	8	4,500	36,000
S8100 Expansion Rack	8	48,840	390,720
S8100 Data Controller Group (32GB) *32 GB of memory, 16 GB per controller *20 - 4 Gbps SFPs	8	90,504	724,036
S8100 Disk Expansion *4 - 4 Gbps SFPs	56	21,129	1,183,249
300GB/15Krpm (4Gbps) FC disk drive	194	5,400	1,047,600
450GB/15Krpm (4Gbps) FC disk drive	330	7,950	2,623,500
600GB/15Krpm (4Gbps) FC disk drive	628	10,350	6,499,800
Storage Management Base License	1	33,000	33,000
Storage Management 1TB (>251TB)	583	600	349,800
UltraPath Base License	1	7,500	7,500
UltraPath For Windows/Linux License	2	750	1,500
S8000 First Installation Service , per Set per Time	1	541,875	541,875
UltraPath First Installation Service , per Set per Time	2	1,200	2,400
5-Meter Fiber Optic Cable	160	90	14,400
Blank panel	384	70	26,880
Dual-port Qlogic QLE2562 Fiber Channel HBA	8	17,659	141,272
Total (3-Year Maintenance Included)			14,691,707

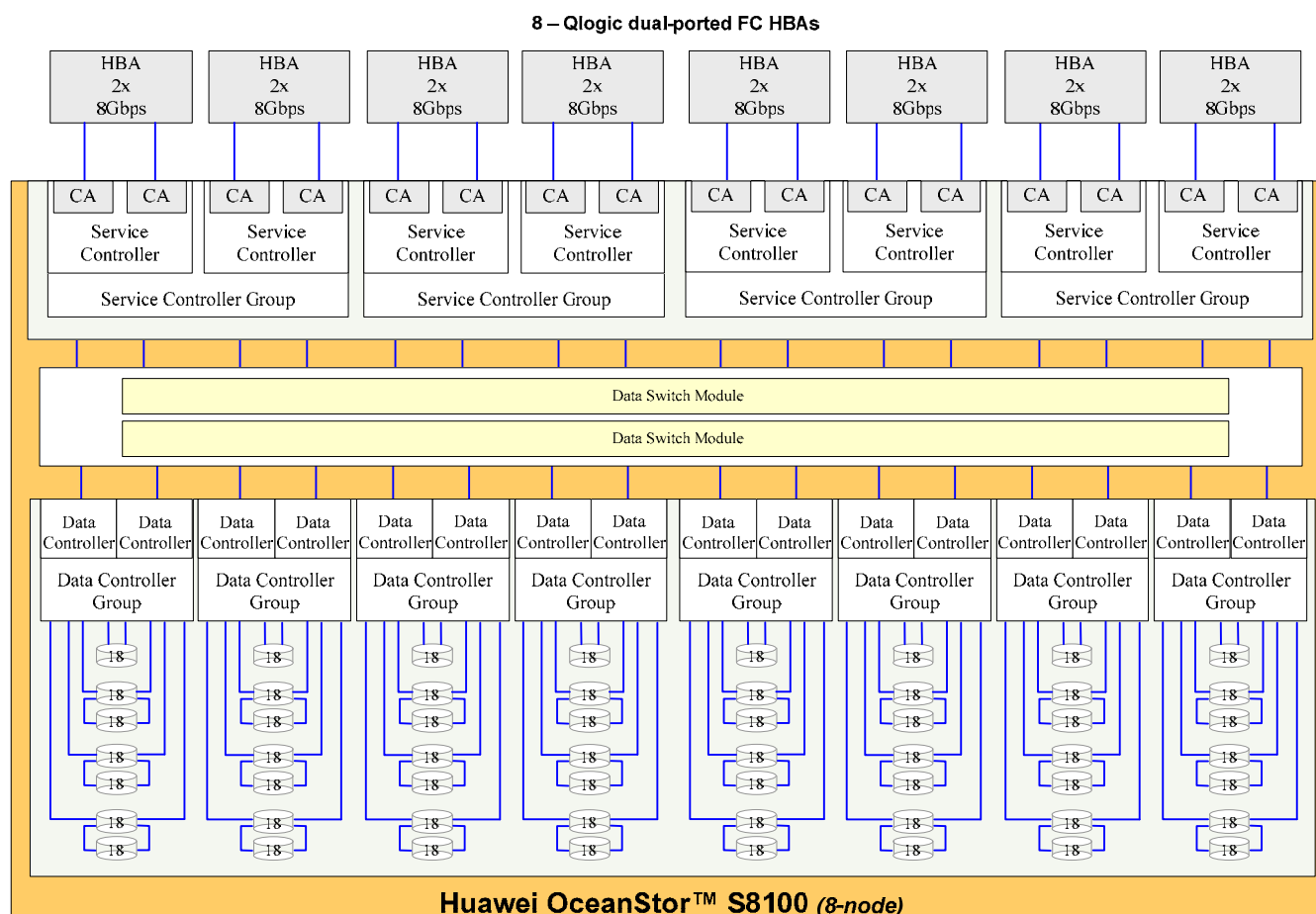
The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- Acknowledgement of new and existing problems with four (4) hours.
- Onsite present 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.

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

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

Priced Storage Configuration Diagram



16 FC connections (HBAs – CAs)

8 – Active-Active service controllers

Two controllers per service controller group
 8 GB cache per service controller (64 GB total)
 2 – **Management Switch Modules
 8 – **Ethernet 4-Port Adapters (1 Gbps)
 16 – ** Fibre Channel 4-port adapters (4 Gbps)
 32 – 4 Gbps SFPs

2 – Data Switch Modules

16 – Active-Active data controllers

Two controllers per data controller group
 16 GB cache/controller (256 GB total)
 160 – 4 Gbps SFPs
 18 – disk drives included in each data controller group

56 – S8100 Disk Expansions

18 – disk drives per S8100 Disk Expansion
 224 – 4 Gbps SFPs (4 SFPs/disk expansion)

1,152 – 15K RPM FC disk drives

628 – 600 GB 15K RPM disk drives
 330 – 450 GB 15K RPM disk drives
 194 – 300 GB 15K RPM disk drives

***The 2 Management Switch Modules and 8 Ethernet 4-Port Adapters are used by the service controller controllers (nodes) to communicate and synchronize with each other. The 16 Fibre Channel 4-Port Adapters, labeled as “CA” in the above diagram, are used by the service controllers for connectivity with the data controllers and Host Systems.*

Priced Storage Configuration Components

Priced Storage Configuration:
Huawei UltraPath For Windows/Linux
8 – Qlogic dual-port QLE2562 FC HBAs
Huawei OceanStor™ S8100 (8-node)
8 - Active-Active service controllers in 4 service controller groups: 2 service controllers per service controller group 8 GB cache per service controller (64 GB total) 16 – Fibre Channel 4-port adapters (4 Gbps) 4 – 4 Gbps front-end connections per service controller (32 total, 16 used) 32 – 4 Gbps SFPs
16 - Active-Active data controllers in 8 data controller groups: 2 data controllers per data controller group 16 GB cache per data controller (256 GB total) 4 – 4 Gbps backend connections per data controller (64 total, 64 used) 160 – 4 Gbps SFPs 18 – 15K RPM FC disk drives included in each data controller group (144 disk drives total)
2 – Data Switch Modules
2 – Management Switch Modules
8 – Ethernet 4-Port Adapters (1 Gbps)
56– S8100 Disk Expansion each with four 4 Gbps SFPs (224 SFPs total) and 18 15K RPM FC disk drives (1,008 disk drives total)
1,152 –15K RPM FC disk drives 628 – 600 GB 15K RPM disk drives 330 – 450 GB 15K RPM disk drives 194 – 300 GB 15K RPM disk drives