



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**HUAWEI TECHNOLOGIES CO., LTD.
HUAWEI OCEANSTOR DORADO5100**

SPC-1 V1.12

**Submitted for Review: August 13, 2012
Submission Identifier: A00119**

EXECUTIVE SUMMARY

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	V2.3.0.0
Date Results were first used publicly	August 13, 2012
Date the FDR was submitted to the SPC	August 13, 2012
Date the Priced Storage Configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	August 8, 2012

Tested Storage Product (TSP) Description

Huawei OceanStor Dorado5100 is a SAN storage system using all solid-state technology, it is designed to eliminate IO bottlenecks, and accelerate mission-critical applications by reducing latency. The exclusive features of Dorado5100, for example solid-state architecture, Active- Active dual-controller, and hot-swappable modules, make the quick and highly available SAN deployment possible. Dorado5100 is the best choice for promoting business efficiency.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: Huawei OceanStor Dorado5100	
Metric	Reported Result
SPC-1 IOPS™	600,052.49
SPC-1 Price-Performance	\$0.81/SPC-1 IOPS™
Total ASU Capacity	6,442.451 GB
Data Protection Level	Protected (<i>Mirroring</i>)
Total TSC Price (including three-year maintenance)	\$488,617.00

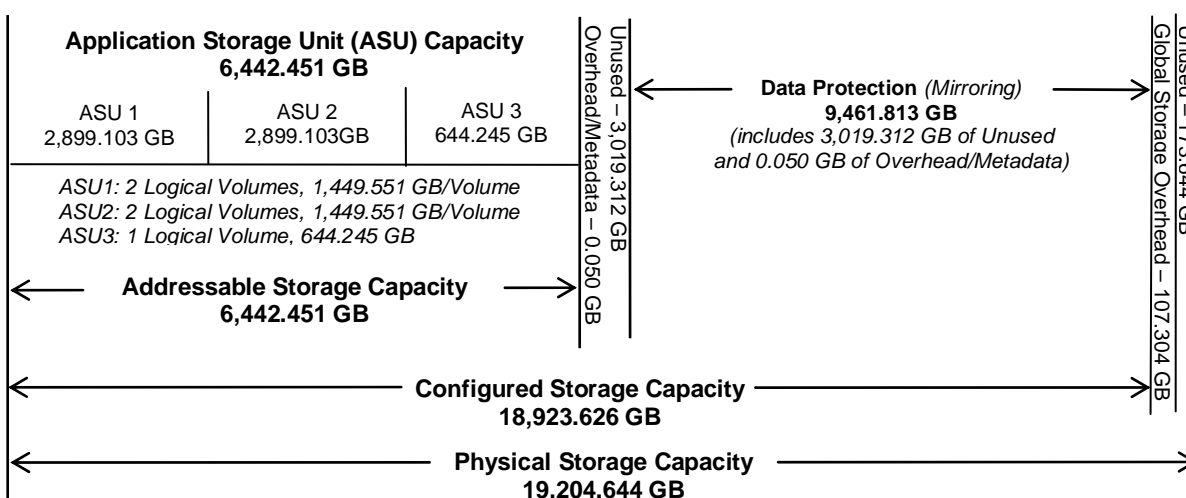
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

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	33.55%
Protected Application Utilization	67.09%
Unused Storage Ratio	32.35%

Application Utilization: Total ASU Capacity (6,442.451 GB) divided by Physical Storage Capacity (19,204.644 GB)

Protected Application Utilization: Total ASU Capacity (6,442.451 GB) plus total Data Protection Capacity (9,461.813 GB) minus unused Data Protection Capacity (3,019.312 GB) divided by Physical Storage Capacity (19,204.644 GB)

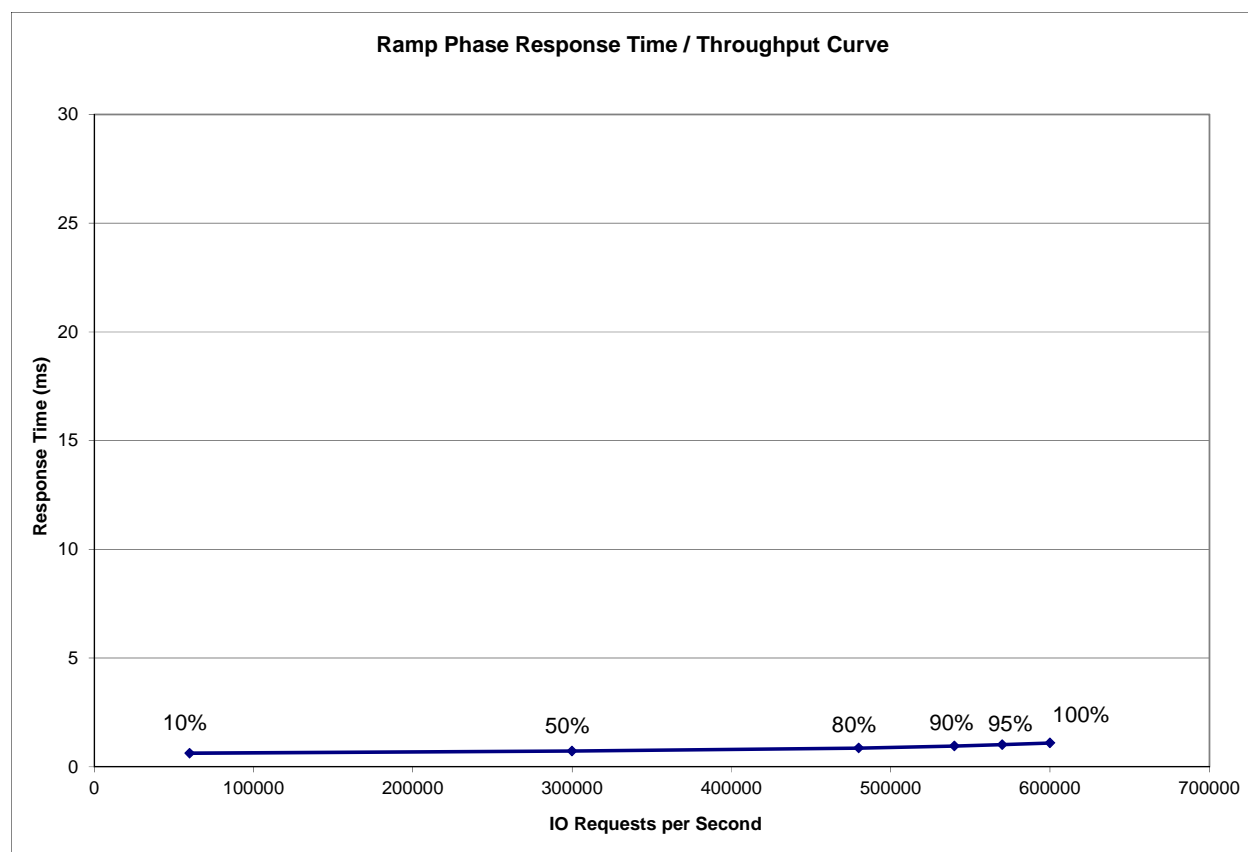
Unused Storage Ratio: Total Unused Capacity (6,212.268 GB) divided by Physical Storage Capacity (19,204.644 GB) and may not exceed 45%.

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	59,995.56	300,013.97	480,006.68	540,030.87	570,021.13	600,052.49
Average Response Time (ms):						
All ASUs	0.62	0.72	0.86	0.95	1.02	1.09
ASU-1	0.66	0.76	0.91	1.01	1.08	1.16
ASU-2	0.78	0.91	1.07	1.19	1.28	1.37
ASU-3	0.49	0.57	0.66	0.73	0.77	0.82
Reads	0.57	0.69	0.87	0.97	1.04	1.11
Writes	0.66	0.74	0.85	0.94	1.01	1.08

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
STTZ14SPES	OceanStor Dorado5100 High Performance Solid State Storage System Controller Enclosure(AC,1000000 IOPS,8GBps Bandwidth,8*8G FC Front-End Port,4*4*6G SAS Back-End Port,with HS HSSD Controller System Software,SPE61C0200)	1	16,214.00	16,214.00
LPU2S6	2*24Gbps SAS-wide I/O modules(Total 2 ports)	6	1,020.00	6,120.00
LPU4F8	4*8Gbps Fibre Channel I/O modules(Total 4 ports)	2	866.00	1,732.00
STTZ06DAE24	High Performance Solid State Storage System Disk Enclosure-4.8TB(2U,AC,24*200GB SLC,with HS SAS in Band Management Software,DAE12425U2)	4	89,873.00	359,492.00
SS-OP-D-LC-M-3	Patchcord,DLC/PC-DLC/PC,Multimode,2mm Parallel,3m	8	11.00	88.00
LIC-Dorado-ISM02	HS Integrated Storage Manager-Device Management License for Dorado	1	4,557.00	4,557.00
QLE2562-CK	QLogic Dual Port 8Gb Fibre Channel to PCI Express Host Bus Adapter (QLE2562-CK)	4	2,598.00	10,392.00
mini-SAS-1	Purchased Cable,MiniSAS Cable,28AWG,Key246,1m	8	38	304.00
Product Total				398,899.00
Total Service 3-year Hi-Care Premier Support service				89,718.00
Grand Total				488,617.00

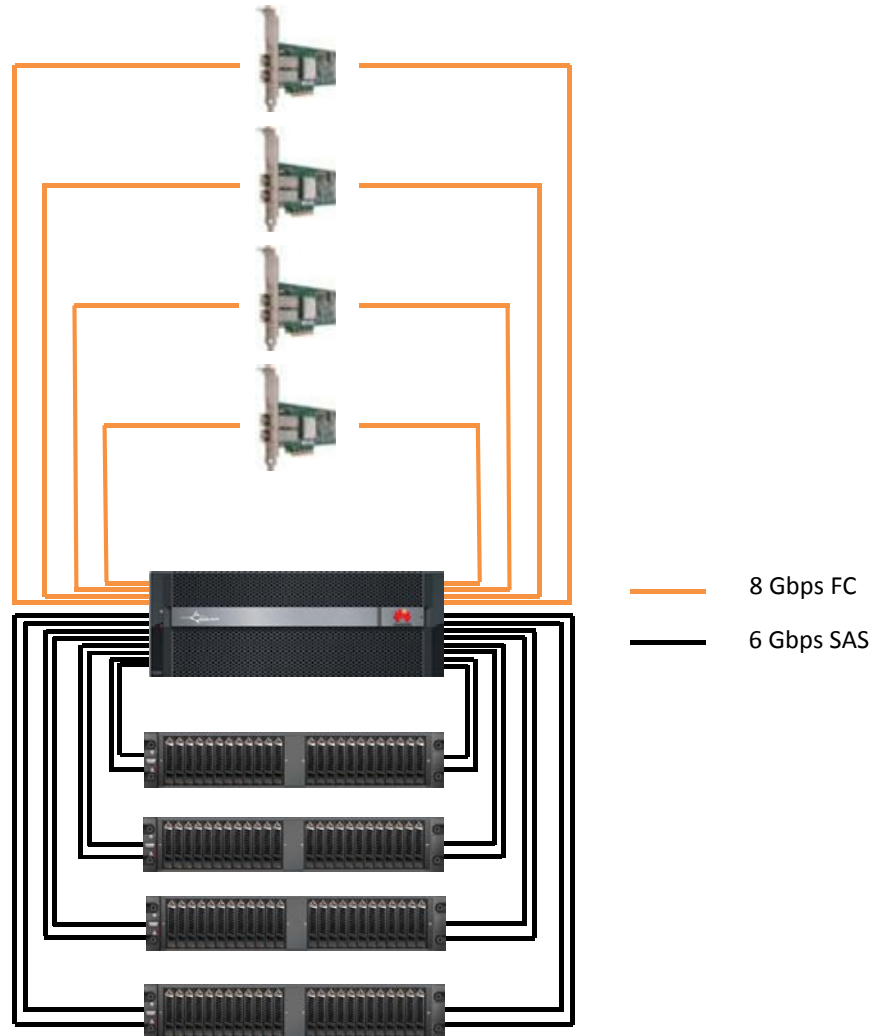
The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- 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 71 (“Appendix F: Third-Party Quotation”) in the Full Disclosure Report for a copy of the third-party reseller quotation.

Priced Storage Configuration Diagram

4 - QLogic dual-ported QLE 2562 FC HBAs



Huawei OceanStor Dorado5100

2 - Active-Active controllers

48 GB per controller (96 GB total)

2 - FC 4-port 8 Gbps I/O module per controller

4 - 4x6 Gbps SAS-wide I/O modules per controller

4 - Disk Enclosures

**24 - 200 GB Solid State Disks (SSDs)
per enclosure (96 total)**

Priced Storage Configuration Components

Priced Storage Configuration:
4 – QLogic dual-ported QLE2562 FC HBAs
Huawei OceanStor Dorado5100 2 – Active-Active controllers 48 GB cache per controller (<i>96 total</i>) 2 – FC, 4-port, 8 Gbps I/O modules per controller (<i>4 total</i>) 8 – 8Gbps FC front-end ports per controller (<i>16 total, 8 used</i>) 16 – 8 Gbps SFPs 4 – 4x6 Gbps SAS-wide I/O modules per controller (<i>8 total</i>) 8 – 4x6 Gbps SAS-wide backend connections per controller (<i>16 total and used</i>)
4 –Disk Enclosures
96 – 200 GB Solid State Disks (SSDs) (<i>24 SSDs per Disk Enclosure</i>)