SPC BENCHMARK 2™

EXECUTIVE SUMMARY

HEWLETT-PACKARD COMPANY
HP STORAGEWORKS 8000
ENTERPRISE VIRTUAL ARRAY

SPC-2™ V1.0

Submitted for Review: December 14, 2005
Submission Identifier: B00004

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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Revision Information and Key Dates

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SPC-2 Specification revision number	V1.0
SPC-2 Workload Generator revision number	spc2rc9g
Date Results were first used publicly	December 14, 2005
Date FDR was submitted to the SPC	December 14, 2005
Date the TSC will be available for shipment to customers	March 14, 2005
Date the TSC completed audit certification	December 5 2005

SPC-2 Reported Data

SPC-2 Reported Data consists of three groups of information:

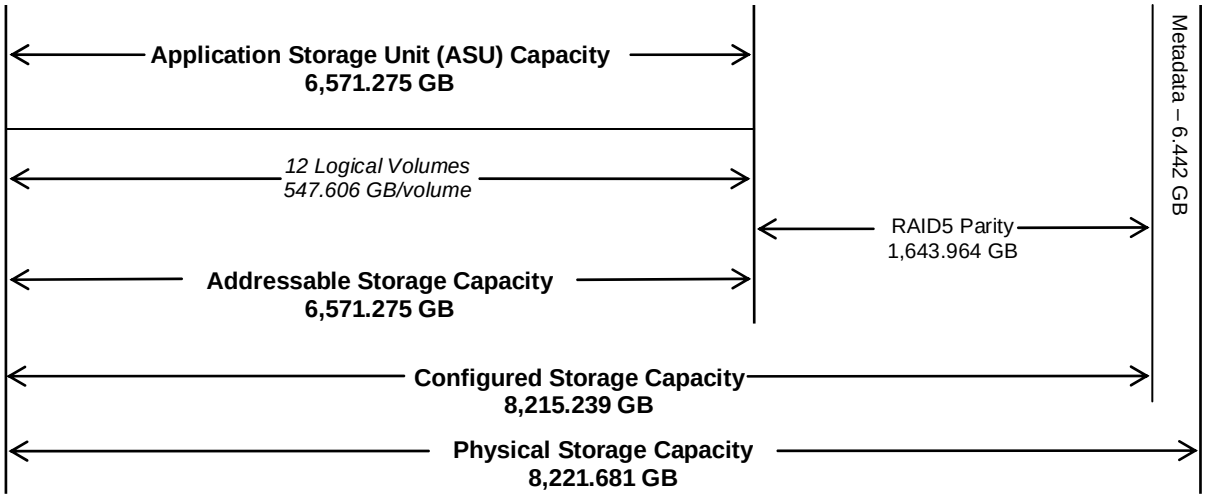
- The following SPC-2 Primary Metrics, which characterize the overall benchmark result:
  - SPC-2 MBPS™
  - SPC-2 Price Performance
  - Application Storage Unit (ASU) Capacity
- Supplemental data to the SPC-2 Primary Metrics.
  - Total Price
  - Data Protection Level

Reported Data for each SPC Test: Large File Processing (LFP), Large Database Query (LDQ), and Video on Demand Delivery (VOD) Test.

SPC-2 Reported Data				
HP StorageWorks 8000 Enterprise Virtual Array				
SPC-2 MBPS™	**SPC-2 Price-Performance**	**ASU Capacity (GB)**	**Total Price**	**Data Protection Level**
1,137.78	$346.42	6,571.275	$394,152.00	RAID5
The above SPC-2 MBPS™ value represents the aggregate data rate of all three SPC-2 workloads: Large File Processing (LFP), Large Database Query (LDQ), and Video On Demand (VOD)				
SPC-2 Large File Processing (LFP) Reported Data				
	Data Rate	**Number of Streams**	**Data Rate per Stream**	**Price-Performance**
LFP Composite	894.64			$440.57
Write Only:				
1024 KiB Transfer	531.13	80	6.64	
256 KiB Transfer	533.88	80	6.67	
Read-Write:				
1024 KiB Transfer	832.55	80	10.41	
256 KiB Transfer	830.24	80	10.38	
Read Only:				
1024 KiB Transfer	1,366.89	80	17.09	
256 KiB Transfer	1,273.15	80	15.91	
The above SPC-2 Data Rate value for LFP Composite represents the aggregate performance of all three LFP Test Phases: (Write Only, Read-Write, and Read Only).				
SPC-2 Large Database Query (LDQ) Reported Data				
	Data Rate	**Number of Streams**	**Data Rate per Stream**	**Price-Performance**
LDQ Composite	1,260.42			$312.71
1024 KiB Transfer Size				
4 I/Os Outstanding	1,315.81	40	32.90	
1 I/O Outstanding	1,238.73	40	30.97	
64 KiB Transfer Size				
4 I/Os Outstanding	1,271.27	40	31.78	
1 I/O Outstanding	1,215.87	40	30.40	
The above SPC-2 Data Rate value for LDQ Composite represents the aggregate performance of the two LDQ Test Phases: (1024 KiB and 64 KiB Transfer Sizes).				
SPC-2 Video On Demand (VOD) Reported Data				
	Data Rate	**Number of Streams**	**Data Rate per Stream**	**Price-Performance**
	1,258.29	1,600	0.79	$313.24

Storage Capacities and Relationships

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



Tested Storage Configuration Pricing *(Priced Storage Configuration)*

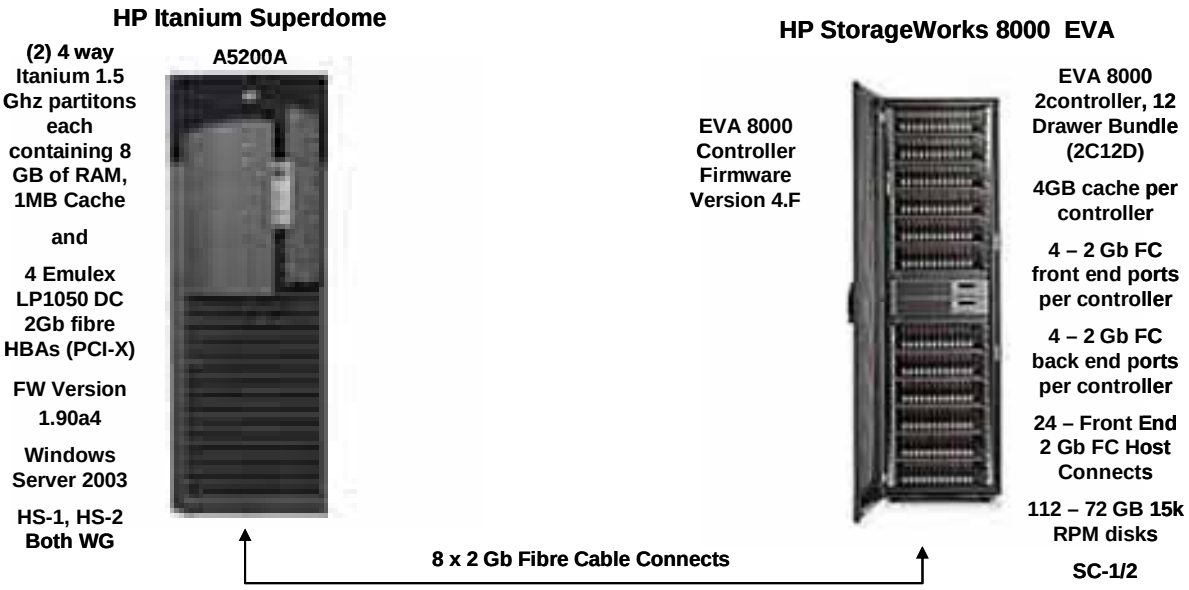
Qty.	Part No.	Description	List Price
1	AD522A	EVA8000, 2C12D-C (60 Hz)	$146,600
112	293568-B23	FC HDD INT CTO 72G 15K Fact ...$1450/per drive, or	$162,400
1	T4256B	HP EVA4K/6K/8K 5.0a Controller Media Kit	$100
1	T3732A	HP CV EVA8000 v4.0 Unlim use per EVA LTU	$36,000
8	263895-004	SPS-CA Optical Cable LC-LC 15M ...$119, or	$952
8	AB466A	2GB FC HBA .....$2450, or	$19,600
1	HA110A3#8WN	3rd year support (array)	$13,940
112	HA110A3#8GZ	3rd year support $130 per Disk Drive	$14,560
		Total	**= $394,152**

The above pricing provides maintenance/support for 24 hours per day, 7 days per week for three years with four hour acknowledgement and four hour subsequent response (support engineer onsite or customer replaceable part available).

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

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

Benchmark Configuration/Tested Storage Configuration Diagram



Host System(s) and Tested Storage Configuration Components

Host Systems:	Tested Storage Configuration (TSC):
UID=HS-1/2	8 – Emulex LP1050 DC 2 Gb FC HBAs *(4 per Host)*
2 – HP Itanium Superdome A5200A 4 – Intel Itanium 1.5 GHz CPU per Host 1 – MB cache per Host	***UID=SC-1/2:*** 2 – HP StorageWorks 8000 Enterprise Virtual Array 2 controller, 12 drawer bundle, 4 GB cache/controller
8 GB main memory per Host	4 – 2 Gb FC front-end ports per controller
Windows Server 2003	4 – 2 Gb FC backend ports per controller
	24 – front-end 2 Gb FC Host connects
WG	112 – 72 GB 15K RPM disk drives