



HP 3PAR StoreServ 8000 Storage - what's new

October 2015

HP 3PAR StoreServ is eliminating boundaries



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- ONE Operating System
- ONE Interface
- ONE Feature Set
- Block, File & Object access

When Scale Matters

8440/20800

New

When Performance Matters

8450/20450/20850

New

When Value Matters

8200/8400

New



HP 3PAR StoreServ 8000 Storage



Affordable: Lower your cost of storage by up to 75%
All-flash as low as \$19K with 5-year warranty on all SSDs, no caveats



Accelerated: Deliver performance without compromise
Remove bottlenecks with a flash-optimized, scale-out architecture



Resilient: Avoid downtime and consolidate without compromise
Maintain high availability and Tier-1 resiliency with a complete set of persistent technologies



Simple: Respond effortlessly to unpredictable and changing demands
Grow with freedom in any direction, from as little as 3TB to 7PB usable in a single system

\$19K

All-flash starting price

1M+

IOPS @ Less Than 1ms

5.5PB

Usable in rack



Effortless, Tier-1 flash with midrange affordability. **All Flash. No Limits**

HP 3PAR StoreServ 8000 Storage Overview

New hardware to lead the mid-range segment

What's new

HP 3PAR Gen5 ASIC

Intel Ivy Bridge Processors

Onboard 16 Gb/s FC

12Gb SAS Backend

PCI Express Gen3



- **1M IOPS**
- **24GB/s**
- **Greater FE/BE port bandwidth**
- **Lower latency for host IOs**



Hyper-Dense.



Largest **3.84TB** cMLC
(5 year warranty)



First Enclosure

280TB usable in
the first 2U

24 SFF drives

First Rack

5.5PB usable in
the first rack

480 SFF drives



1 System



7.3PB usable in
a system

480 SFF drives
192 LFF drives
1.8 racks



Using 3.84TB cMLC SSDs for SFF drives and 6TB NL HDDs for LFF drives
Assuming 4:1 compaction (2:1 Thin Provisioning and 2:1 Dedupe) for SSDs, 2:1 compaction for HDDs, and 25% overhead



HP 3PAR StoreServ 8000 Storage Hardware Overview



HP 3PAR StoreServ 8000 Storage Models



Item	8200	8400	8440	8450
Number of Controller Nodes	2	2 or 4	2 or 4	2 or 4
HP 3PAR Gen5 ASICs	2	2 or 4	2 or 4	2 or 4
CPU (per controller node)	6-core Ivy Bridge – 2.2GHz	6-core Ivy Bridge – 2.2GHz	10-core Ivy Bridge – 2.4GHz	10-core Ivy Bridge – 2.4GHz
Total Cache	800 GiB	1.6 TiB	3.4 TiB	384 GiB
Total Flash Cache	768 GiB	1500 GiB	3000 GiB	Not applicable
Total On-Node Cache	64 GiB	128 GiB	384 GiB	384 GiB
Max Number of HDDs	240	576	960	Not applicable
Max Number of SSDs	120	240	480	480
Max Raw Capacity	750 TiB	2400 TiB	3000 TiB	1843 TiB
Drive Enclosures	SFF (24 slots in 2U) and LFF (24 slots in 4U)			
Max Drive Enclosures	9	22	38	18
Maximum Host Ports	12	24	24	24
16Gb/s Fibre Channel Host Ports	4 – 12	4 - 24	4 - 24	4 - 24
10Gb/s iSCSI Host Ports	0 - 4	0 - 8	0 - 8	0 - 8
10Gb/s FCoE Host Ports	0 - 4	0 - 8	0 - 8	0 - 8
1Gb/s Ethernet Adapter	0 - 8	0 - 16	0 - 16	0 - 16
10Gb/s Ethernet Adapter	0 - 4	0 - 8	0 - 8	0 - 8



HP 3PAR StoreServ 8000 vs. 7000 models

←
Converged Flash
→
All-Flash
→

	8200 2N	7200c 2N	8400 4N	7400c 4N	8440 4N	7440c 4N	8450 4N	7450c 4N
CPU	6C Ivy Bridge	6C Sandy Bridge	6C Ivy Bridge	6C Sandy Bridge	10C Ivy Bridge	8C Sandy Bridge	10C Ivy Bridge	8C Sandy Bridge
ASIC	GEN 5	GEN 4	GEN 5	GEN 4	GEN 5	GEN 4	GEN 5	GEN 4
Control Cache / node	16GiB	16GiB	16GiB	16GiB	64GiB	32GiB	64GiB	32GiB
Data Cache / node	16GiB	4GiB	16GiB	8GiB	32GiB	16GiB	32GiB	16GiB
Control Cache / system	32GiB	32GiB	64GiB	64GiB	256GiB	128GiB	256GiB	128GiB
Data Cache / system	32GiB	8GiB	64GiB	32GiB	128GiB	64GiB	128GiB	64GiB
Flash Cache (optional)	768 GiB	768 GiB	1536 GiB	1536 GiB	8000 GiB	3000 GiB	Not Applicable	Not Applicable
Host I/O	16Gb FC (onboard) 10Gb iSCSI/FCoE 1GbE/10GbE	8Gb / 16Gb FC 10Gb iSCSI/FCoE 1GbE/10GbE	16Gb FC (onboard) 10Gb iSCSI/FCoE 1GbE/10GbE	8Gb / 16Gb FC 10Gb iSCSI/FCoE 1GbE/10GbE	16Gb FC (onboard) 10Gb iSCSI/FCoE 1GbE/10GbE	8Gb / 16Gb FC 10Gb iSCSI/FCoE 1GbE/10GbE	16Gb FC (onboard) 10Gb iSCSI/FCoE 1GbE/10GbE	8Gb / 16Gb FC 10Gb iSCSI/FCoE 1GbE/10GbE
Max HDDs	240	240	576	576	960	960	N/A	N/A
Max SSDs	120	120	240	240	480	240	480	240
Max Drive Enclosures	9	9	22	22	38	38	18	18
Max Raw Capacity	750TiB	500TiB	2400TiB	1600TiB	3000TiB	2000TiB	1843TiB	921TiB
Performance*	320K @ < 1ms	302K @ < 1ms	650K @ < 1ms	605K @ < 1ms	>1M @ < 1ms	900K @ < 0.7ms	>1M @ < 1ms	900K @ < 0.7ms
SW licensing Caps	48	48	168	168	320	320	168	168

* 8K 100% Random Read, RAID 1, CPVV, Node Local

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HP 3PAR StoreServ 8000 Storage – Key Performance Metrics

Platform	Workload	Performance Metric	7450c Compare	Improvement
8440/8450	8K 100% Random Read, RAID 1, CPVV, Distributed	790K IOPS at <1ms	564K IOPS	+ 40%
8440/8450	8K 100% Random Read, RAID 5, CPVV, Distributed	>700K IOPS at <1ms	550K IOPS	+ 32%
8440/8450	8K 100% Random Write, RAID 1, CPVV, Distributed	>400K IOPS at <1ms	>300K IOPS	+ 39%
8440/8450	256K 100% Seq. Read, RAID 1, CPVV, Distributed	13 GB/s	5.8 GB/s	> 2x
8440/8450	256K 100% Seq. Write, RAID 1, CPVV, Distributed	6.9 GB/s	3.1 GB/s	> 2x

Configuration based on:

- 4 nodes per array
- 48 MLC SSDs per node pair
- Built-in SAS ports
- 1 FC HBAs per node
- All drive enclosures and hosts balanced across all ports

Preliminary numbers
Final numbers will
come out of NINJASTARS

Performance & Sizing
TekTalk on Sep 3rd



What has changed from the 7000

	StoreServ 7000	StoreServ 8000	What you get
CPUs	Intel Sandy Bridge 6C/8C	Intel Ivy Bridge 6C/10C	More compute
ASIC	Gen4 ASIC	Gen5 ASIC	Next Gen
Bus Architecture	PCI Gen2 - 4Gb/s	PCI Gen3 – 8Gb/s	2x
FC Built-in ports	8Gb FC	16Gb FC	2x
Max 16Gb FC ports	8	24	3x
GbE Built-in ports	1 GbE for RC	1 GbE for RC or File Persona	Flexibility
Data Cache / Node	4-8GiB / 16GiB	16GiB / 32GiB	2x
Max raw capacity	500/1600/2000 TiB	750/2400/3000 TiB	50% more
Max SSD raw capacity	921 TiB	1843 TiB	2x
SAS Backend	6Gb SAS (copper only)	12Gb SAS (copper and optical)	2x



HP 3PAR Gen5 Thin Express ASIC

**Thin & SHA256 based
Dedupe Built In**
Zero & Duplicate Block Detection for
Block & File

**Fast RAID 5/6 and
Rapid RAID Rebuild**
Integrated XOR Engine



Tightly-Coupled Cluster
2x inter-ASIC Bandwidth,
Low Latency Interconnect achieves
write latency <200us

Mixed Workload
Independent Metadata and Data
Processing

Data Integrity
T10 PI – Persistent Checksums



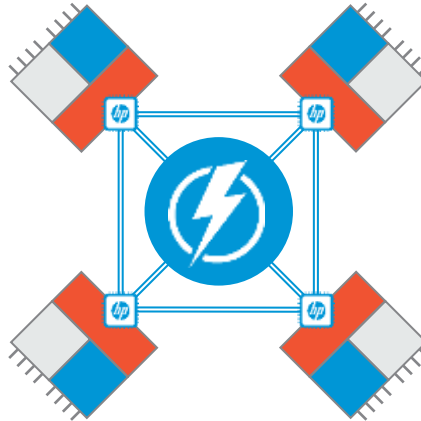
HP 3PAR StoreServ 8000 System Architecture

Same as 3PAR StoreServ 7000

- 1 ASIC per node
- 1 CPU per node

8000 Full Mesh Interconnect

- Low Latency / High Bandwidth
- 4.0 GB/s ASIC to ASIC bandwidth
- 4-node Interconnect Bandwidth 48GB/s
- Completely Passive



HP 3PAR StoreServ 8440/8450 maximum configuration

- 4 x Controller Nodes
- 4 x Gen 5 ASICs
- 4 x Intel 10-core CPUs
- 256 GB Control Cache
- 128 GB Data Cache

HP 3PAR 8000 StoreServ SAS Cables

Passive Copper and Active Optical



12Gb Mini-SAS HD copper cables

- 1m - Enclosure to daisy-chained enclosure
- 2m - Controller to enclosure within main rack



12Gb SAS Active Optical Cables (AOC)

- 10m – Controller/enclosure to expansion rack
- 25m – Controller/enclosure to expansion rack

HP 3PAR StoreServ 8000 Storage Drives Overview

	SAS 15K	SAS 10K	SAS 7.2K	SSD
SFF 2.5"	300GB SFF 600GB SFF	600GB SFF 1.2TB SFF 1.8TB SFF	2TB SFF	480GB MLC SFF 480GB cMLC SFF 1.92TB cMLC SFF 3.84TB cMLC SFF
LFF 2.5" FIPS *	600GB SFF FE	1.2TB SFF FE	N/A	920GB MLC SFF FE 1.92TB cMLC SFF FE
LFF 3.5"	N/A	N/A	2TB LFF 4TB LFF 6TB LFF	480GB cMLC LFF
LFF 3.5" FIPS *	N/A	N/A	6TB LFF FE	N/A

Only 8000 drives are supported on HP 3PAR StoreServ 8000 Storage

7000 drives are not qualified on the 8000

- Currently some drives (cMLC SSDs) are 6Gb and may share the same SKU with the respective 12Gb drive
- Why is this NOT an issue?
 - ✓ System performance characteristics are similar
 - ✓ NinjaSTARs performance modeling is based on 6Gb drives
 - ✓ We ensure that a failed 12Gb drive is NOT replaced by a 6Gb drive (6Gb and 12Gb drives have different FRUs)

* Array Encryption License required / Encrypted and non-encrypted drives cannot be mixed in an encrypted array



Raw capacity limits are expressed in TiB/PiB

Capacity limits are expressed in TiB/PiB

What's changed

- Raw capacity limits are expressed in **TiB/PiB** rather than TB/PB
 - ✓ 1 PiB = 1024 TiB = 1024² GiB
 - ✓ 1 TiB = 1.09951 TB

Effect

- The Quoting Tool (Watson/SBW) shows capacities in GiB/TiB and is aligned with the Sizing Tool

Description	Qty	GiB	GiB Total	TiB Total
HP 3PAR StoreServ M6710 600GB 6G SAS 15K SFF(2.5in) Hard Drive		546		
HP 3PAR StoreServ M6720 4TB 6G 7.2K LFF(3.5-in) SAS Nearline Hard Drive	100	3611	361100	352.64
HP 3PAR StoreServ M6710 480GB 6G SAS SFF(2.5in) cMLC Solid State Drive		446		
HP 3PAR StoreServ M6710 1.92TB 6G SAS SFF(2.5in) cMLC Solid State Drive		1787		
HP 3PAR StoreServ M6710 3.84TB 6G SAS SFF(2.5in) cMLC Solid State Drive		3574		
Total	100		361100	352.64

Rationale/Benefit

- Collaterals and the **Quoting Tool** (Watson/SBW) are aligned with the **Sizing Tool** (NinjaSTARS) with regards to raw capacity limits

Who is affected

- All 3PAR models: 7000, **8000**, 10000, 20000

Model	Max capacity (TiB)	Max capacity (TB)
8200	750 TiB	825 TB
8400	2400 TiB	2638 TB
8440	3000 TiB	3298 TB
8450	1843 TiB	2026 TB



HP 3PAR StoreServ 8000 Storage Software Overview



HP 3PAR StoreServ Software Suites



Operating System Suite

Thin Deduplication, Adaptive Flash Cache, System Reporter, StoreServ Management Console (SSMC)



Replication Suite

Virtual Copy
Remote Copy
Peer Persistence
Cluster Extension



Data Optimization Suite v2

Dynamic Optimization
Adaptive Optimization
Priority Optimization
Peer Motion



File Persona Suite

SMB & NFS protocols
Object Access API
File and user services



Security Suite

Virtual Domains
Virtual Lock



Recover Manager Central

Flat backup & restore
E2E application protection



Application Integration

Microsoft Hyper V
Microsoft® SQL
Exchange
Oracle



For more information:

<http://h18006.www1.hp.com/storage/solutions/3par/software.html>



HP 3PAR StoreServ 8000 Storage Software Licensing

What's new

- **3PAR OS Suite now includes System Reporter**
 - ✓ Thin Suite, System Reporter, StoreServ Management Console, Adaptive Flash Cache, and 1 year Online Import license
- **Few standalone software titles**
 - ✓ Peer Persistence, Virtual Domains and Virtual Lock are NOT offered as standalone software titles
- **HP 3PAR Application Suite for VMware replace by RMC**

Drive-based licenses

HP 3PAR OS Suite

HP 3PAR Replication Suite

HP 3PAR Data Optimization Suite v2

HP 3PAR Security Suite

System-based licenses

File Persona Suite

HP 3PAR Application Suite for Exchange

HP 3PAR Application Suite for SQL

HP 3PAR Application Suite for Oracle

HP 3PAR Application Suite for Hyper-V

Recovery Manager Central



Licensing

Licenses are enforced by the 3PAR Array

- **Drive-based licenses**
 - Two licenses to buy software title
 - ✓ **Base LTU:** One per system
 - ✓ **Drive LTU:** One per drive up to the LTU cap
- **System-based licenses**
 - 1 LTU per system

HP 3PAR StoreServ Storage

SW LTU Cap

HP 3PAR StoreServ 8200 Storage

48

HP 3PAR StoreServ 8400 Storage

168

HP 3PAR StoreServ 8440cStorage

320

HP 3PAR StoreServ 8450 Storage

168

