



**Hewlett Packard
Enterprise**

Hewlett Packard Enterprise MSA Product Family



Presentation Agenda



What's New with MSA's 5th Generation Array

MSA 1050/2050/2052 Product Overview

MSA Gen 5 Advanced Data Services

MSA Use Cases

Summary



MSA 1050/2050/2052

5th Generation MSA – What's New

NEW HPE 5th Generation MSA Storage Family

Seriously simple and affordable high-performance storage

Budget-Optimized



MSA 1050 Storage

HPE's most affordable entry SAN array.

Flash-ready

Flexible Base Model



MSA 2050 Storage

2X more performance than previous generation for the same price.

Flash-ready

Performance-Optimized



MSA 2052 Storage

Save 40% with all-inclusive software and 1.6 TB of flash capacity included.

Hybrid Flash Model

The leading entry FC SAN platform for eight years running
Over 500,000 HPE MSA Storage systems sold worldwide*

New HPE MSA 1050 Storage

Lowest priced MSA offering for when budgets are tightest



Configurations starting at \$5,500*

Factory-configured, dual-controller array with 4 host ports of 8Gb FC, 1GbE iSCSI, 10GbE iSCSI and 12Gb SAS



HPE's most affordable entry SAN array.



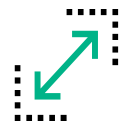
Simple, proven Gen10 ProLiant compatible shared storage

MSA continues its heritage of providing affordable, easy to use shared storage without a big learning curve. Intuitive setup and management for ProLiant administrators. New look-and-feel will fit right in with your Gen10 ProLiant servers



Advanced virtualization data services with simplified licensing approach

Leverage flash with easy to use, easy to maintain tiering and read cache technologies. No storage expertise necessary, system dynamically responds to workload changes, so you don't have to



Expandable and upgradable to meet new demands

Add new HDDs or disk expansions to your MSA 1050. Upgrade to the MSA 2050 through data-in-place upgrades: a simple 15 minute upgrade! No migrations required

* Est US Street Price (MSA 1050 base unit, dual 1GbE iSCSI controllers, four 300GB HDDs); prices are subject to change without notice

New: 5th Generation HPE MSA starting with MSA 2050/2052

Serious flash storage. Don't let the simplicity and low cost fool you.



200,000+ IOPS starting at under \$10K* for affordable app acceleration

Flexible base model delivers 2x more performance than previous generation for the same price. Save 40% on hybrid flash model with all-inclusive software and 1.6 TB of SSD capacity included.



MSA 2050 Flexible Base Model



Advanced data services with no experience required

Easy to install, easy to use, easy to maintain—no storage expertise necessary. Automated tiering dynamically responds to workload changes, so you don't have to.



MSA 2052 Hybrid Flash Model



Keep your business running with expanded data protection features

New virtualized snapshot technology makes data protection and instant recovery a snap. Remote replication with FC and iSCSI supports affordable disaster recovery.



Grow flexibly now and into the future

Data-in-place upgrades protect drive investments and eliminate data migrations. Start small and scale as needed with any combination of SSD, Enterprise or Midline SAS drives.

* Est US Street Price (MSA 2050 SAN base unit, 1GbE iSCSI SFP+ modules, four 300GB HDDs); prices are subject to change without notice

MSA 1040 - MSA 1050 Spec Comparison



		MSA 1040	MSA 1050	Comments
Array	Introduction Timing	Feb 2014	Sept 2017	
	Access Type	Block	Block	
	Form Factor	SFF and LFF	SFF and LFF	
	Controllers Per Array	2	2	
	Host Ports per Controller	2	2	
	FC Host Connectively	8Gb	8Gb	
	iSCSI Host Connectively	1/10GbE	1/10GbE	
	SAS Host Connectivity	6/12Gb July 2017*	6/12Gb Sept 2017*	*aligned with ProLiant Gen 10 release cycles
	Data cache+system memory (per controller)	6GB	6GB	
	RAID Levels supported Virtual mode	1,5,6,10	1,5,6,10	
	Raid Levels supported Linear mode	0,1,3,5,6,10,50	Not Supported	Linear not supported on 1050
NEBS	N/A	N/A	Look to MSA 2050 for NEBS/DC Power	
Enclosure	Max expansion drive enclosures	3	3	
	SFF/LFF array/enclosure mixing	Supported	Supported	
	SFF Enclosure	D2700	MSA SFF (new)	Supports D2700 for 204x upgrades New MSA SFF enclosure w/faceplate
	LFF Enclosure	MSA LFF	MSA LFF (new)	Existing MSA LFF enclosure w/faceplate
	Drive enclosure interface type	6Gb SAS	6Gb SAS	
Drives	Max HDDs/SSDs per array	99SFF / 48LFF	96SFF/48LFF	SFF now uses 24 slot Disk Enclosure
	SSDs integration	No	No	Consider MSA 2052 for integrated SSDs

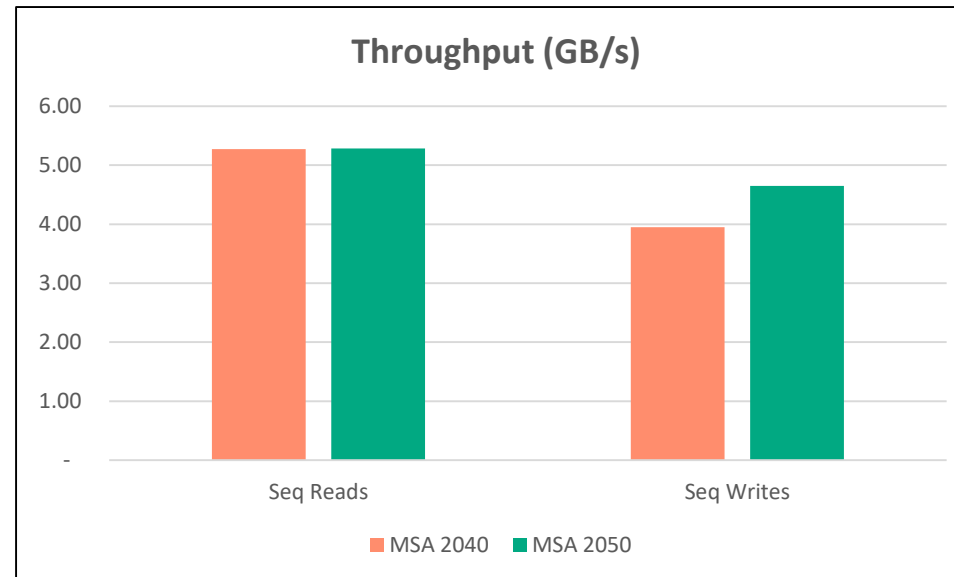
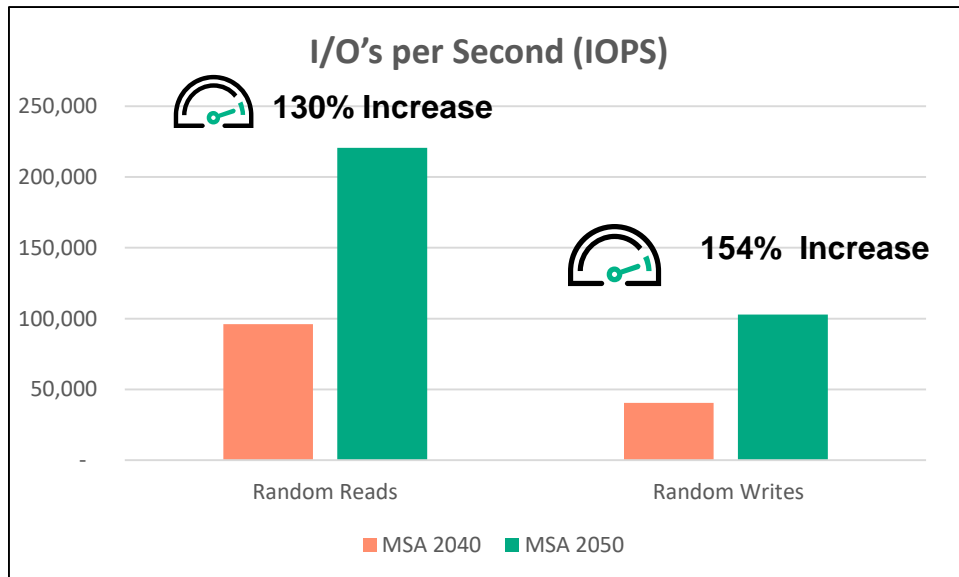
MSA 2040 - MSA 2050 Spec Comparison



		MSA 2040/2042	MSA 2050/2052	Comments
Array	Introduction Timing	June, 2013	June, 2017	FC and iSCSI in June, SAS Sept 2017
	Access Type	Block	Block	
	Form Factor	SFF and LFF	SFF and LFF	
	Controllers Per Array	2	2	
	Host Ports per Controller	4	4	
	FC Host Connectively	8/16Gb	8/16Gb	
	iSCSI Host Connectively	1/10GbE	1/10GbE	
	SAS Host Connectivity	6/12Gb July 2017*	6/12Gb Sept 2017*	*aligned with ProLiant Gen 10 release cycles
	Data cache+system memory (per controller)	6GB	8GB	
	RAID Levels supported Virtual mode	1,5,6,10	1,5,6,10	
	Raid Levels supported Linear mode	0,1,3,5,6,10,50	Not Supported	Linear not supported on 205x
NEBS	Yes	Yes	Pre-Configured SFF Models	
Enclosure	Max expansion drive enclosures	7	7	
	SFF/LFF array/enclosure mixing	Supported	Supported	
	SFF Enclosure	D2700	MSA SFF (new)	Supports D2700 for 204x upgrades New MSA SFF enclosure w/faceplate
	LFF Enclosure	MSA LFF	MSA LFF (new)	Existing MSA LFF enclosure w/faceplate
	Drive enclosure interface type	6Gb SAS	6Gb SAS	
Drives	Max HDDs/SSDs per array	199SFF / 96LFF	192SFF/96LFF	SFF now uses 24 slot Disk Enclosure
	SSDs integration (MSA 2042/2052)	Over-pack (2x400GB)	Pack-in (2x800GB)*	* Integration is planned

MSA 204x - MSA 205x Performance Comparisons

Workload	MSA 204x Virtual Mode	MSA 205x Virtual Mode
8k 100% RR RAID 1 at <5ms latency, 16Gb FC - All SSD	96,000 IOPS	220,600 IOPS
8K 100% RAID 1 RW at <5ms latency, 16Gb FC - All SSD	40,500 IOPS	102,800 IOPS
256K RAID 5 100% Sequential read bandwidth, 16Gb FC - All HDD	5.27 Gb/s	5.28 GB/s
256K RAID 5 100% Sequential write bandwidth, 16Gb FC - All HDD	3.95 GB/s	4.65 GB/s



MSA 1050 – Prices and SKU's Quick Look



	MSA 1040				MSA 1050			
	1GbE iSCSI	12Gb SAS	8Gb FC	10GbE iSCSI	1GbE iSCSI	12Gb SAS	8Gb FC	10GbE iSCSI
SFF SKU #	E7W02A	K2Q89A	E7W00A	E7W04A	Q2R23A	Q2R21A	Q2R19A	Q2R25A
List Price	\$6,500	\$7,250	\$7,500	\$8,500	\$6,500*	\$7,250*	\$7,500*	\$8,500*
LFF SKU #	E7W01A	K2Q90A	E7V99A	E7W03A	Q2R22A	Q2R20A	Q2R18A	Q2R24A
List Price	\$6,250	\$7,000	\$7,250	\$8,250	\$6,250*	\$7,000*	\$7,250*	\$8,250*

* Prices shown are preliminary US Reference List Prices (US\$)
 All systems are pre-configured, dual controller units with prescribed SFP+ modules

MSA 2050/2052 – Prices and SKU's Quick Look



	MSA 2040/2042				MSA 2050/2052			
	MSA 2040 SAN	MSA 2040 SAS	MSA 2042 SAN	MSA 2042 SAS	MSA 2050 SAN	MSA 2050 SAS	MSA 2052 SAN	MSA 2052 SAS
SSD included	None	None	800GB	800GB	None	None	1.6TB	1.6TB
SFF SKU #	K2R80A	K2R84A	Q0F06A	Q0F08A	Q1J01A	Q1J29A	Q1J03A	Q1J31A
List Price	\$11,070	\$10,970	\$12,396	\$12,293	\$11,070*	\$10,970*	\$13,732*	\$13,620*
LFF SKU #	K2R79A	K2R83A	Q0F05A	Q0F07A	Q1J00A	Q1J28A	Q1J02A	Q1J30A
List Price	\$10,670	\$10,570	\$12,396	\$12,293	\$11,070*	\$10,970*	\$13,732*	\$13,620*

* Prices shown are preliminary US Reference List Prices (US\$)

All systems are pre-configured, dual controller units, SAN units require SFP+ modules (sold separately)

MSA Gets a Facelift



MSA 1050/2050/2052



New Gen10
ProLiant DL Servers



Advanced

Enterprise

Solution

New HPE Rack Branding



Hewlett Packard
Enterprise

MSA SAS Connectivity Options For HPE Servers

MSA Array SAS Connectivity Options – ProLiant ML/E

MSA 2040/2042 and MSA 2050/2052



ProLiant Generation	SAS Card Options	MSA 2040/2042 SAS		MSA 2050/2052 SAS	
		Connection Speed	Cable P/Ns	Connection Speed	Cable P/Ns
Gen8	H221	6Gb/s	<u>Mini-SAS HD to Mini-SAS Cables</u> 1.0m 716189-B21 2.0m 716191-B21 4.0m 716193-B21	6Gb/s	<u>Mini-SAS HD to Mini-SAS Cables</u> 1.0m 716189-B21 2.0m 716191-B21 4.0m 716193-B21
Gen8*	P431/2GB	12Gb/s	<u>Mini-SAS HD to Mini-SAS HD Cables</u> 1.0m 716195-B21 2.0m 716197-B21 4.0m 716199-B21	N/A	<u>Mini-SAS HD to Mini-SAS HD Cables</u> 1.0m 716195-B21 2.0m 716197-B21 4.0m 716199-B21
Gen9*	H241** P441/4GB	12Gb/s 12Gb/s		12Gb/s 12Gb/s	
Gen10	E208e-p** P408e-p	12Gb/s 12Gb/s	<u>Mini-SAS HD to Mini-SAS HD Cables</u> 1.0m 716195-B21 2.0m 716197-B21 4.0m 716199-B21	12Gb/s 12Gb/s	<u>Mini-SAS HD to Mini-SAS HD Cables</u> 1.0m 716195-B21 2.0m 716197-B21 4.0m 716199-B21

** Recommended SAS connectivity for MSA
 For quick reference only. HPE SPOCK is official source for supported configurations



MSA Array SAS Connectivity Options – ProLiant ML/DL

MSA 1040 and MSA 1050

ProLiant Generation	SAS Card Options	MSA 1040 – MAS 1050 SAS		
		Connection Speed	Fanout Cable P/Ns	Cable P/Ns
Gen8	H221	6Gb/s	<u>Mini-SAS HD to Mini-SAS Fanout Cables</u> 1.0m K2R02A 2.0m K2R03A 4.0m K2R04A	<u>Mini-SAS HD to Mini-SAS Cables</u> 1.0m 716189-B21 2.0m 716191-B21 4.0m 716193-B21
Gen8*	P431/2GB	12Gb/s	<u>Mini-SAS HD to Mini-SAS HD Fanout Cables</u> 1.0m K2Q99A 2.0m K2R00A 4.0m K2R01A	<u>Mini-SAS HD to Mini-SAS HD Cables</u> 1.0m 716195-B21 2.0m 716197-B21 4.0m 716199-B21
Gen9*	H241** P441/4GB	12Gb/s 12Gb/s	<u>Mini-SAS HD to Mini-SAS HD Fanout Cables</u> 1.0m K2Q99A 2.0m K2R00A 4.0m K2R01A	<u>Mini-SAS HD to Mini-SAS HD Cables</u> 1.0m 716195-B21 2.0m 716197-B21 4.0m 716199-B21
Gen10	E208e-p** P408e-p	12Gb/s 12Gb/s	<u>Mini-SAS HD to Mini-SAS HD Fanout Cables</u> 1.0m K2Q99A 2.0m K2R00A 4.0m K2R01A	<u>Mini-SAS HD to Mini-SAS HD Cables</u> 1.0m 716195-B21 2.0m 716197-B21 4.0m 716199-B21

Fanout is ONLY supported on MSA 1040/1050




MSA Array SAS Connectivity Options - BladeSystem



ProLiant Generation	SAS Card Options	SAS Switch	Connection Speed	MSA 1040/204X SAS Cable P/Ns	Connection Speed	MSA 1050/205X SAS Cable P/Ns
Gen8	P721m P731m	HPE 6Gb/s SAS BL Switch for BladeSystem	6Gb/s	<u>Mini-SAS HD to Mini-SAS Cable</u> 1.0m 716189-B21 2.0m 716191-B21 4.0m 716193-B21	6Gb/s	<u>Mini-SAS HD to Mini-SAS Cable</u> 1.0m 716189-B21 2.0m 716191-B21 4.0m 716193-B21
Gen9	P741m/2GB					
Gen10	P408e-m		12Gb/s	<u>Mini-SAS HD to Mini-SAS HD Cables</u> 1.0m 716195-B21 2.0m 716197-B21 4.0m 716199-B21	12Gb/s	<u>Mini-SAS HD to Mini-SAS HD Cables</u> 1.0m 716195-B21 2.0m 716197-B21 4.0m 716199-B21

For quick reference only. HPE SPOCK is official source for supported configurations



MSA 1050/2050/2052 5th Generation MSA – Product Overview

NEW HPE 5th Generation MSA Storage Family

Seriously simple and affordable high-performance storage

Budget-Optimized



MSA 1050 Storage

HPE's most affordable entry SAN array.

Flash-ready

Flexible Base Model



MSA 2050 Storage

2X more performance than previous generation for the same price.

Flash-ready

Performance-Optimized



MSA 2052 Storage

Save 40% with all-inclusive software and 1.6 TB of flash capacity included.

Hybrid Flash Model

*The leading entry FC SAN platform for eight years running**
Over 500,000 HPE MSA Storage systems sold worldwide

The MSA 1050 Family

MSA 1040 to MSA 1050 Refresh



- Cost optimized platform with solid performance. Flash-ready; add SSDs for Read Cache or Tiering
 - 70,000+ Random Read IOPS*
 - 29,000+ Random Write IOPS*
 - 3.1GB/Sec*

**Preliminary, subject to change*

Same MSA Simplicity, Same Flexibility, Simplified Ordering

- 8 Pre-configured dual controller systems – MSA 1050 models
 - 8Gb FC, 1GbE iSCSI, 10GbE iSCSI or 12Gb SAS
 - SFF or LFF models
- No need to add Advanced Virtualization license – Included in MSA 1050 base units

Modern look and feel aligned with Gen10 ProLiant Branding

The MSA 2050/2052

New 5th Gen MSA Architecture Refresh



- Fast just got faster! Taking hybrid flash configurations to the next level
- Optimized 5th Gen controllers: faster processors, more memory, more performance
 - 200,000+ Random Read IOPS **2.3X increase vs 4th Gen MSA**
 - 100,000+ Random Write IOPS **2.5X increase vs 4th Gen MSA**
 - >5GB/Sec **Excellent throughput/sequential performance**

Same MSA Simplicity, Same Flexibility, Same Product Coverage

- Pre-configured dual controller systems SFF/LFF systems – MSA 2050 models
 - Converged SAN Controllers for FC and/or iSCSI – **New, June 2017**
 - 12Gb SAS Controllers – **Available Q3 CY2017 (aligned to ProLiant Gen 10 SAS schedule)**
- Pre-configured Hybrid Flash systems – MSA 2052 models – **New**
- NEBS and DC Power configurations – **New**

Modern look and feel aligned with Gen10 ProLiant Branding

MSA's Top-Level Families

- **MSA 1040/2040 1050/2050 Base Arrays** - SFF/LFF variants



- **MSA 2042/2052 Hybrid Arrays** - SFF/LFF options



Includes 2x400GB SSDs and
Advanced Data Services Suite
in base MSA 2042 models



Includes 2x800GB SSDs and
Advanced Data Services Suite
in base MSA 2052 models

new **MSA 2050/2052 Converged SAN Controller**

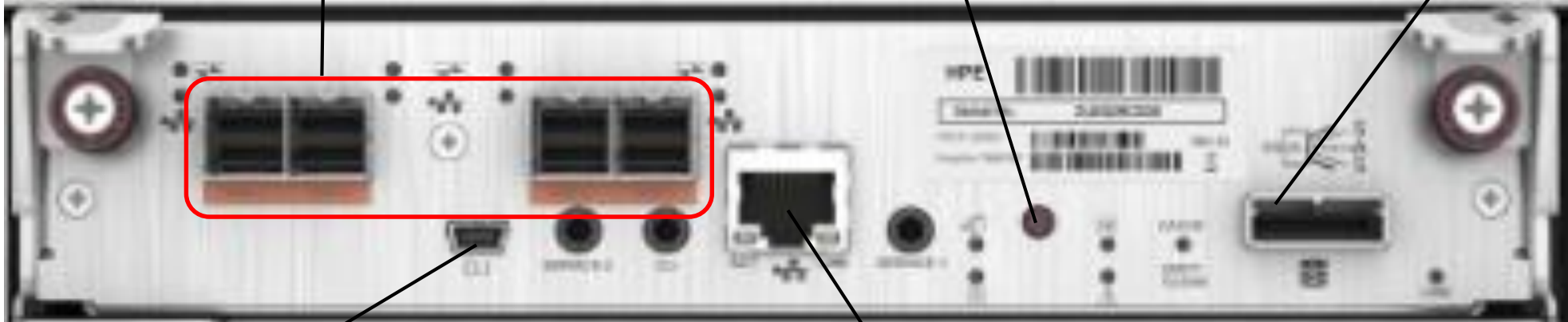
- Available SFP Modules
- 8Gb FC
 - 16Gb FC
 - 1GbE or 10GbE iSCSI



4 Port Converged SAN Controller -
SFP+ modules define SAN interface personality

LED
Indicators

SAS Expansion Port



USB Management Port

Network Management Port

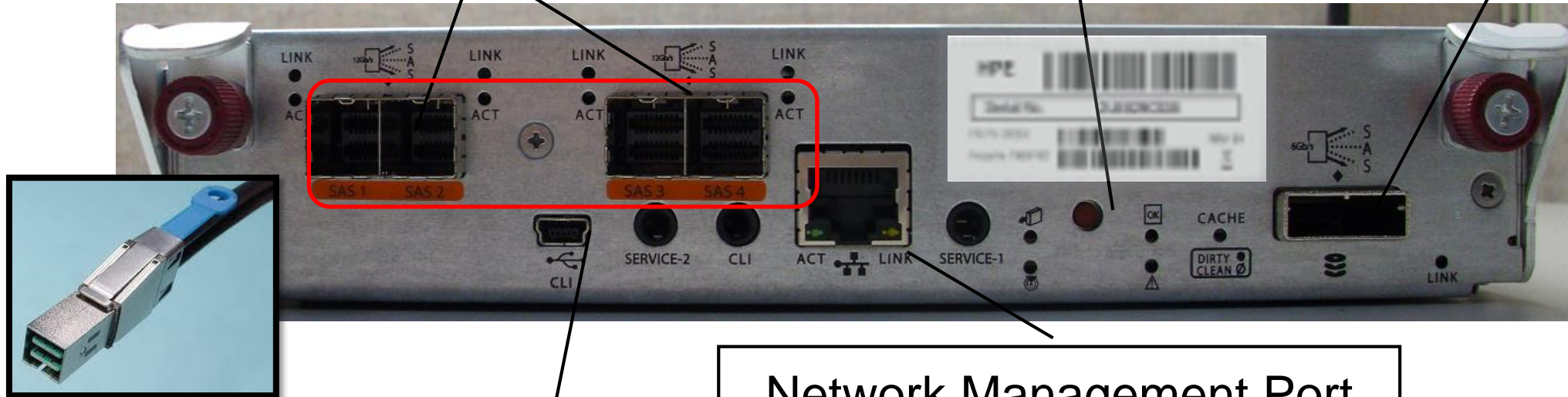


MSA 2050/2052 SAS Controller (release aligned to Gen10 SAS HBA – Q3 CY2017)

Four 12Gb SAS Ports

LED Indicators

SAS Expansion Port



Network Management Port

USB Management Port

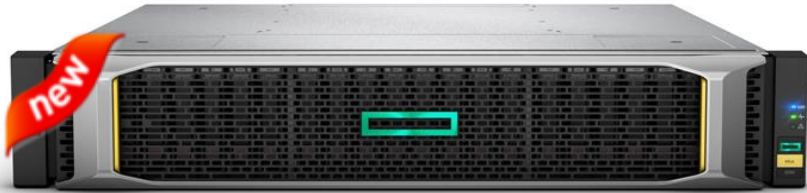
HPE MSA 204X/205X Storage Arrays

Building on the MSA P2000 heritage – Taking MSA to the next level

HPE MSA 204X SFF Array



HPE MSA 205X SFF Array



HPE MSA 204X LFF Array



HPE MSA 205X LFF Array



MSA Architecture Attributes

- Dual Controller Active-Active design
- Redundant data paths
- Dual power supplies
- 6Gb SAS internal infrastructure to HDDs

MSA 204X/205X Controller Architecture

- Two options:
 - Converged SAN (FC/iSCSI) or 12Gb SAS
- 4-Ports/controller
- MSA 204X: 6GB total controller memory (4 GB data cache, 2 GB system memory)
- MSA 205X: 8GB total controller memory (4 GB data cache, 4 GB system memory)



Unmatched Scalability with the HPE MSA 204X/205X

Mix and Match LFF and/or SFF Disk Enclosure

D2700 SFF Disk Enclosure



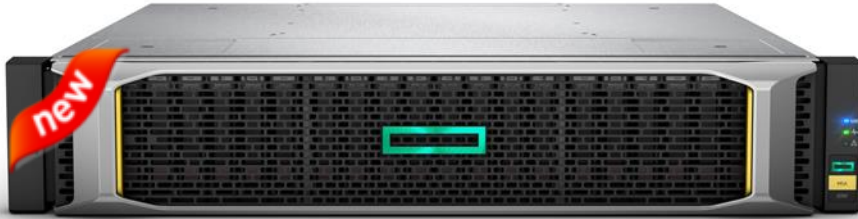
- 2U with 25 SFF HDD bays

MSA 2040 LFF Disk Enclosure



- 2U with 12 LFF HDD bays

MSA 205X SFF Disk Enclosure



- 2U with 24 SFF HDD bays

MSA 205X LFF Disk Enclosure

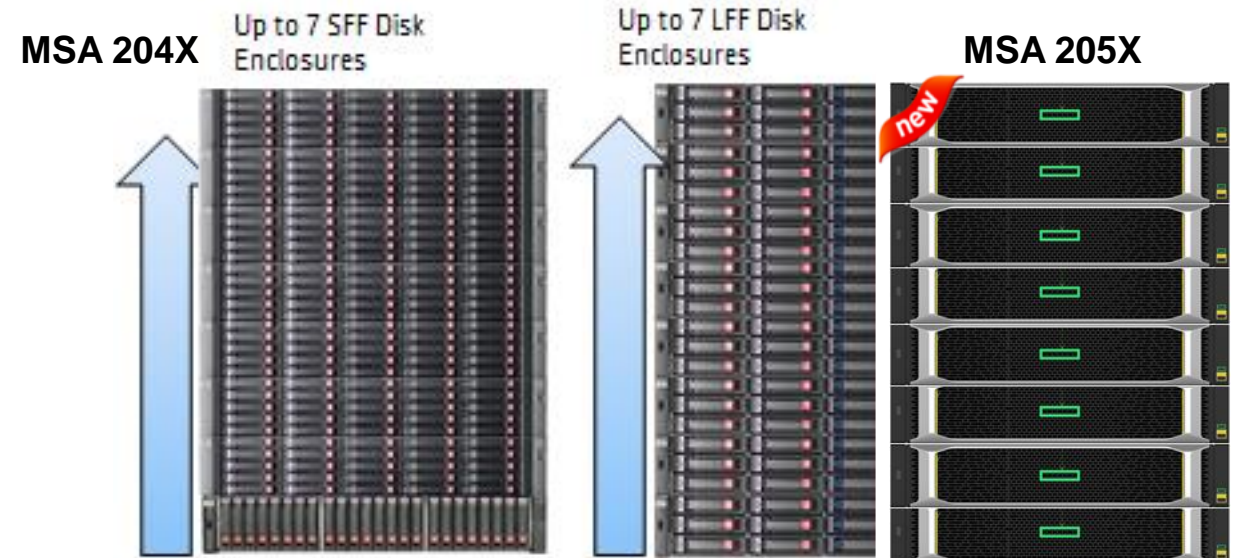


Scale up as you grow:

- up to 7 Disk Enclosures
- Mix LFF and/or SFF Disk Enclosures

Max Drive Counts

- Up to 96 LFF HDDs/SSDs
- MSA 204X: Up to 199 SFF HDDs/SSDs
- **MSA 205X: Up to 192 SFF HDDs/SSDs**



HPE MSA 1050/2050/2052 – Supported HDDs/SSDs/SEDs

Drive Type – Description – Capacity(s)
Solid State SAS Drives
2.5-inch Mixed Use 12Gb SAS SSDs – 400GB, 800GB, 1.6TB, 3.2TB (3 yr Warranty) – 3 DWPD
3.5-inch Mixed Use 12Gb SAS SSDs (SFF/LFF Converter Drives) – 400GB, 800GB (3 yr Warranty) – 3 DWPD
Small Form Factor SAS Drives (SFF 2.5-inch)
2.5-inch 15K Enterprise 12Gb SAS HDDs – 300GB, 600GB, 900GB (3yr Warranty)
2.5-inch 10K Enterprise 12Gb SAS HDDs – 300GB, 600GB , 900GB, 1.2TB, 1.8TB* (3yr Warranty)
2.5-inch 7.2K Midline 12Gb SAS HDDs – 1TB*, 2TB* (1yr Warranty)
Large Form Factor SAS Drives (LFF 3.5-inch)
3.5-inch 7.2K Midline 12Gb SAS HDDs – 2TB, 4TB*, 6TB*, 8TB*, 10TB* (1yr Warranty)
Large Form Factor SED SAS Drives (LFF 3.5-inch) – Only supported on MSA 2050
3.5-inch 7.2K Midline 12Gb SAS HDDs – 4TB (1yr Warranty)
Small Form Factor SED SAS Drives (SFF 2.5-inch) – Only supported on MSA 2050
2.5-inch 10K Enterprise 12Gb SAS HDDs – 1.2TB (3yr Warranty)

* 512e drives

This is an overview list only. Refer to MSA QuickSpecs for actual supported drives and SKU numbers

Investment Protection: Data-in-Place Upgrades



MSA 205x SFF or LFF

MSA 1040/204x SFF or LFF

Leverage HDD/SSD Investments

Minimize Downtime: <10 Minute Data-in-Place swap and reboot

No risky, long data migrations required



Restrictions:

- 12Gb HDD/SSDs only
- Only Virtual Components (Pools, Volumes, Snapshots) upgraded in-place
- Linear Components require host migration to virtual storage prior to upgrade

MSA 1050/205x Operating Systems

- Microsoft Windows Server 2016
- Microsoft Windows Server 2012 R2
- Microsoft Hyper-V 2012
- VMware 6.5
- Red Hat Linux 6/7 (x64)
- SuSE SLES 11/12 (x64)
- HP-UX 11.31
- Solaris 11 (x64)
- Oracle Linux 6/7 (x64)
- Citrix XenServer 7
- MAC OS X (10.12)¹
- OpenVMS IA64 8.4¹
- CentOS²

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- 1) Support planned post NPI
- 2) Requires DER

HPE SPOCK is the most reliable source for OS support



HPE MSA 1040/2040/2042 Hardware Building Blocks

Base Enclosure

2.5-in SFF



MSA 1040/2040/2042
(2 Controllers, 24 SFF slots)

3.5-in LFF



MSA 1040/2040/2042
(2 Controllers, 12 LFF slots)

Host Interconnect Options

MSA 1040

4-port 8Gb FC

4-port 10GbE iSCSI

4-port 12 Gb SAS

4-port 1GbE iSCSI

MSA 2040

8-port 12Gb SAS

8-port SAN (iSCSI/FC)

MSA 2042 w/two 400GB SSDs*

8-port 12Gb SAS

8-port SAN (iSCSI/FC)

Drives



SFF SAS
HDDs/SSDs



LFF SAS
HDDs/SSDs

Optional Selections

Drive Enclosures (DE)

2.5-in SFF



HPE D2700 DE
(25 SFF slots)

3.5-in LFF



HPE MSA LFF DE
(12 LFF slots)

Rack



HPE Intelligent
Series Rack



Customer-supplied rack
(4-post, square hole,
EIA standard, 19-in)

Software

MSA 1040 –
Adv Virt Serv

Advanced Data
Services Suite

Performance
Tiering

512
Snapshots

Remote
Snapshot
Replication

File Data
Services

StoreEasy
Gateway

HPE MSA 1050/2050/2052 Hardware Building Blocks

Base Enclosure

2.5-in SFF



MSA 1050/2050/2052
(2 Controllers, 24 SFF slots)

3.5-in LFF



MSA 1050/2050/2052
(2 Controllers, 12 LFF slots)

Host Interconnect Options

MSA 1050 (Q3 2017)

4-port 8Gb FC

4-port 10GbE iSCSI

4-port 12 Gb SAS

4-port 1GbE iSCSI

MSA 2050

8-port 12Gb SAS (Q3 2017)

8-port SAN (iSCSI/FC)

MSA 2052 w/two 800GB SSDs*

8-port 12Gb SAS (Q3 2017)

8-port SAN (iSCSI/FC)

Drives



SFF SAS
HDDs/SSDs



LFF SAS
HDDs/SSDs

Optional Selections

Drive Enclosures (DE)

2.5-in SFF



HPE MSA SFF DE
(24 SFF slots)

3.5-in LFF



HPE MSA LFF DE
(12 LFF slots)

Rack



HPE Intelligent
Series Rack



Customer-supplied rack
(4-post, square hole,
EIA standard, 19-in)

Software Licenses

Advanced Data Services Suite

Includes:

- Performance Tiering
- 512 Snapshot Upgrade
- Remote Snapshot Replication

File Data Services

StoreEasy Gateway

HPE MSA 2040/2050 NEBS/DC Power Offerings



Today's NEBS MSA 2040

- 8/16GB FC and/or 1GbE/10GbE iSCSI on SFF MSA 2040 SAN configurations (via SFP modules)
- 48VDC-Power Carrier Grade SFF Chassis
- 48VDC-Power Carrier Grade SFF Drive Enclosure
- NEBS Level 3 Certified
 - GR-63-Core and GR-1089-Core
- Seismic Zone 4 rated
- Seismic rack support (AH335A)
- Support for factory integration



New NEBS MSA 2050

- 8/16GB FC and/or 1GbE/10GbE iSCSI on SFF MSA 2050 SAN configurations (via SFP modules)
- 48VDC-Power Carrier Grade SFF Chassis
- 48VDC-Power Carrier Grade SFF Drive Enclosure
- NEBS Level 3 Certified
 - GR-63-Core and GR-1089-Core
- Seismic Zone 4 rated
- Seismic rack support (AH335A)
- Support for factory integration

What's new?

- >2x performance improvement
- New Look and Feel aligned with ProLiant Gen10



MSA Data Services

MSA 2xxx FW Chronology

Linear

- GL100 – Initial FW Release with MSA 2040 FC version only
- GL105 – Added iSCSI and Mixed Mode Support to MSA 2040 Converged SAN Controller. Introduced MSA 2040 SAS Controllers
- GL110 – Introduced MSA 1040 FC/iSCSI models
- GL200 – Introduced new Virtual Storage Architecture. Allows users with existing Linear Storage to add new Virtual or Linear Volumes. Introduced new virtualized data services (Thin technologies, Read Cache, Sub-LUN tiering, RoW Snapshots, new v3 GUI, Wide Striping. No Charge Upgrade for MSA 2040 customers but is a paid license for MSA 1040
- GL210 – Introduced MSA 1040 SAS and MSA 2040 Energy Star qualified SKUs. FW also featured SSD performance optimizations providing boost in max RR IOPS from 85k to 122k
- GL220 – Enabled SSD support on MSA 1040 platform. Still requires MSA 1040 Advanced Virtualization License for MSA 1040 virtualization data services. Dramatically lowered Advanced Virtualization SW fee (to \$350 from \$3500). Added larger pool support, virtual replication services and scheduling

Virtual

MSA 205X FW Chronology

-  VL100 – Initial FW Release with MSA 2050/2052
-  VE100 – Initial FW Release with MSA 1050

HPE MSA User Interface – Making your Array Work

No Training Required – Field proven by over 350,000 users (MSA 2000 Gen1 to today)

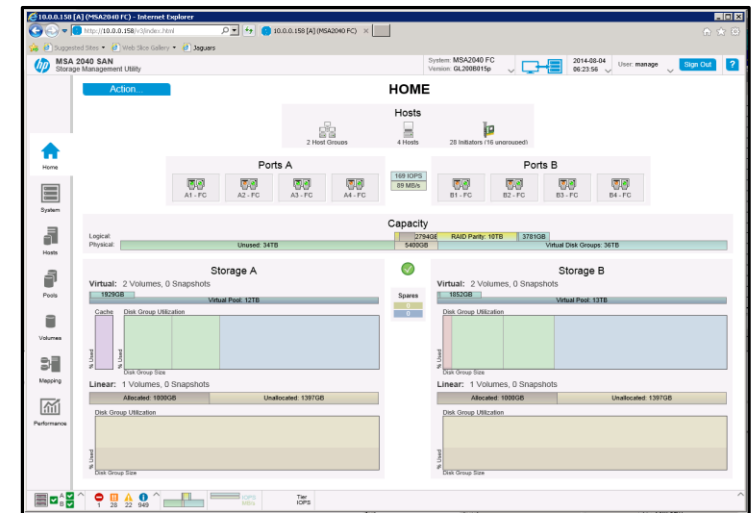
MSA Storage Management User Interface (SMU v3.0)

MSA Implementation

- Powerful embedded Web-Based Interface – No Agents to install
- Fully scriptable CLI - key for automating tasks
- Combination of embedded tools facilitates management / monitoring from array, to controller, to vdisk to single HDD
- SMI-S v1.5 provider – Key for Windows and Hypervisor integration

Benefits

- Intuitive user interface – shortens the learning curve
- Single dashboard view with “hover” popups – Get information quicker
- Action-based icons – Do things much quicker
- Smart select, fill, apply UI engine – less typing, fewer mistakes, less time to accomplish tasks



HPE MSA Data Services

Core Data Services are Standard vs. Paid options

Asynchronous Replication through Snapshot Technologies




MSA Snapshot Services




Snapshots are highly leveraged in third party software integration*

Examples – D2D backup apps, VMware SRM, MS VSS, etc

Application-aware Snapshots through integration with Host SW applications

HPE Recovery Manager(Exchange/SQL) and ISV apps that leverage VSS

- ✓ 64 Snapshot
- ✓ Volume Copy Services (Linear & Virtual Volumes)
- ✓ 512 Snapshot Upgrade
- ✓ Remote Snapshot Replication (RSR) license
 - iSCSI and  Fibre Channel connections (Virtual Volumes only on MSA 2050/2052)

MSA 1040	MSA 2040	MSA 2042
 1050	 2050	 2052
Std	Std	Std
Std**	Std	Std
Opt	Opt	Std
Opt**	Opt	Std

* Virtual replications cannot replicate the last snapshot of a volume and so is not as easily integrated with third party software

** MSA 1040 Advanced Virtualization Upgrade required for virtual storage on MSA 1040

HPE MSA Virtualized Array Data Services

Bringing Enterprise-like Data Services to Entry-Level SANs

Functionality enabled with MSA's Virtualized Storage Architecture***



Thin Technologies (Thin Provisioning, T10 Reclaim, Thin Rebuilds)



SSD Read Cache functionality



Automated Sub-LUN Tiering utilizing an efficient real-time I/O Engine

Archive Tiering (Ent-SAS to SAS-Midline)

Performance Tiering (SSD to Ent-SAS)

Virtual Tier Affinity



Large Pool Support



Wide Striping (pooling)



Redirect-on-Write Snapshot technology with Virtual Volumes

	MSA 1040 /1050	MSA 2040/2050	MSA 2042/2052
Thin Technologies (Thin Provisioning, T10 Reclaim, Thin Rebuilds)	Opt*/Std	Std	Std
SSD Read Cache functionality	Opt*/Std	Std	Std
Automated Sub-LUN Tiering utilizing an efficient real-time I/O Engine			
Archive Tiering (Ent-SAS to SAS-Midline)	Opt*/Std	Std	Std
Performance Tiering (SSD to Ent-SAS)	Opt*/Opt	Opt	Std
Virtual Tier Affinity	Opt*/Std	Std**	Std
Large Pool Support	Opt*/Std	Std**	Std
Wide Striping (pooling)	Opt*/Std	Std	Std
Redirect-on-Write Snapshot technology with Virtual Volumes	Opt*/Std	Std**	Std

* MSA 1040 Advanced Virtualization Upgrade: Std on MSA 1050

** Requires GL220 or newer FW (all MSA 2042 shipped with GL220 or newer)

*** Advanced Virtualization features were introduced in GL200 or later FW. Some features require specific versions or later

HPE MSA Virtualized Array Data Services

Bringing Enterprise-like Data Services to Entry-Level SANs

Thin Provisioning

MSA Implementation

- Allow users to “Over Allocate” physical storage; user-defined Capacity Alerts
- Users provision very large volumes during setup without physical allocation of HDD capacity
- Seamlessly add physical disk space only when capacity is utilized
- OS Integration with space reclamation via T-10 UNMAP

Benefits

- Dramatically simplifies management at the OS and Application layers
- Eliminate risky and time consuming Volume Expansions due to capacity growth
- Drive better storage efficiency – buy physical storage when you need it
- Thin rebuilds only rebuild used data in case of HDD error



HPE MSA Virtualized Array Data Services

Bringing 3PAR-like Data Services to Entry-Level SANs

Wide Striping

MSA Implementation

- Allows volumes to utilize all resources in a storage pool
- Simplifies volume expansion with immediate utilization of added resources and automated rebalancing which will redistribute data across expanded pool in background

Benefits

- Users can utilize volume performance of more “spindles” than 16 in existing MSA P2000
- Allows seamless and instantaneous addition of spindles or capacity vs volume expansion in traditional linear systems
- Rebalancing happens automatically, leveling the pages across all HDDs in pool



HPE MSA Virtualized Array Data Services

Bringing 3PAR-like Data Services to Entry-Level SANs

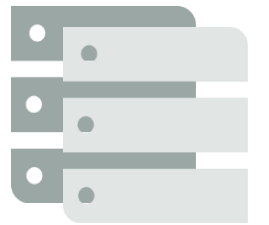
Redirect-on-Write Snapshot Services

MSA Implementation

- Improved performance using “redirect-on-write” algorithm
- All volumes have equal performance

Benefits

- Simplified management - Elimination of dedicated snapshot pools
- Delivers predictable performance
- Allows user to do complex snapshots: snaps of snaps, snaps of snaps of snaps



HPE MSA Virtualized Array Data Services

Bringing 3PAR-like Data Services to Entry-Level SANs

Snapshot Space Management

MSA Implementation

- Allows administrator to monitor and optionally control snapshot space usage
- Limit snapshot space as a percentage of the pool's physical capacity
 - The limit can range from 1% to 100%; the default is 10%
 - This is a soft limit; when the limit is reached, allocated snapshot space may continue to grow

Benefits

- Guarantee base volume never run out of space – disable overcommit
- Permit volumes logical space to exceed physical pool space – enable overcommit
- Monitor pool snapshot space
- Allow policy to control snapshot space automatically



HPE MSA Virtualized Array Data Services

Bringing 3PAR-like Data Services to Entry-Level SANs

SSD Read Cache

MSA Implementation

- Allows SSDs to be used as an “extension” of Controller Cache for Read I/O
- Not primary copy of data, no RAID requirements
- Intelligent I/O monitoring at controller identifies and copies “random” read pages into the Read Cache (Sequential Read I/O will not be moved as it is better processed from HDDs)

Benefits

- Dramatically reduces latency on Read Cache hits (~20ms vs <5ms)
- Only requires one SSD to get started (no RAID requirement)
- No management required – Add SSD(s) and system does work
- Standard feature on MSA 204X/205X – vs paid on most competitive platforms

Cut Read Latencies by up to **75%** Increase Cache Hits by **>50X**

HPE MSA Virtualized Array Data Services

Bringing 3PAR-like Data Services to Entry-Level SANs

Automated Tiering

MSA Implementation

- Innovative Real-Time Tiering Engine places data on the right tier, at the right time to deliver optimal performance and best \$/GB cost dynamics
- 4MB “pages” are moved between tiers every 5-10 seconds responding to changing I/O
- Smart write algorithm places incoming writes on the best tier (random vs sequential)
- A small number of hot or cold pages are promoted/demoted automatically to best layer, behind scenes and with ~1% of controller CPU

Benefits

- Zero management required – setup tiers, Real-Time Tiering Engine does the rest
- Scale performance and/or lower cost capacity to meet your needs
- MSA 5th Gen architecture was designed with tiering processor overhead in mind day one – Competition layered it on and must deal with off-peak processing



HPE MSA Virtualized Array Data Services

Bringing 3PAR-like Data Services to Entry-Level SANs

Automated Tiering – Performance Tiering*

MSA Implementation

- Innovative Real-Time Tiering Engine places data on the right tier, at the right time to deliver optimal performance and best \$/GB cost dynamics
- 4MB “pages” are moved between tiers every 5-10 seconds responding to changing I/O

Benefits

- Zero management required – setup tiers, Real-Time Tiering Engine does the rest
- Build easily scalable performance and cost optimized capacity system:
Add SSDs and/or high capacity Mid-line SAS HDDs

Boost Reads **AND** Write IOPS by **2-5X** with SSD hits.

Cut average latencies by up to **90%** (from ~20ms to ~2ms)



* Paid feature on MSA 1040/204X/205X, MSA 1040 requires Adv Virt license and GL220

HPE MSA Virtualized Array Data Services

Bringing 3PAR-like Data Services to Entry-Level SANs

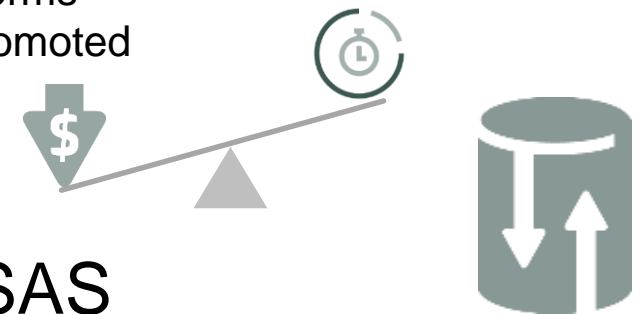
Automated Tiering – Archive Tiering*

MSA Implementation

- Innovative Real-Time Tiering Engine optimizes the data stored on Enterprise SAS HDD tier by moving “cold” pages to Mid-line SAS tier

Benefits

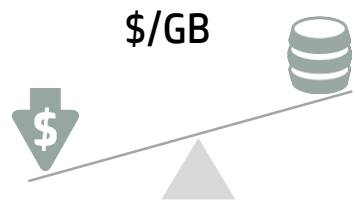
- Zero management required – setup tiers, Real-Time Tiering Engine does the rest
- Every IT Admin knows they have cold data....few have time to deal with it
- Archive Tiering allows a customer to take advantage of Mid-line SAS HDDs with costs in the **\$0.20-\$0.61/GB range vs \$0.84-\$2.06/GB** for Enterprise SAS HDDs
- Standard feature on MSA 2040 – vs paid (if it exists) on competitive platforms
- Archive tier is still “spinning” media (7.2k Mid-line SAS). Pages can be promoted



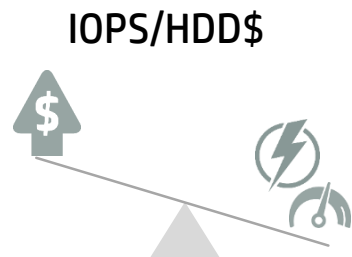
Cut \$/GB costs by **74-89%** compared to Ent SAS

Why Tiering is Important for Entry Storage

Maximizing Budget \$ on the Appropriate Axis (IOPS/\$ or \$/GB)



Storage Type	Form Factor	Capacity Range	Price Range	\$/GB	IOPS/HDD	IOPS/HDD \$
15k Ent SAS HDDs	LFF	300-600GB	\$439-539	\$1.72-\$1.86	150-200	0.34 IOPS/HDD \$
7.2k Mid-Line SAS HDDs	LFF	2TB-10TB	\$584-2300	\$0.20-\$0.29	75-100	0.13 IOPS/HDD \$



Storage Type	Form Factor	Capacity Range	Price Range	\$/GB	IOPS/HDD	IOPS/HDD \$
Enterprise SAS SSDs	SFF	200GB-3.2TB	\$1599-13899	\$4.34-\$7.99	10k-20k	9.38 IOPS/HDD \$
15k Ent SAS HDDs	SFF	300-900GB	\$567-1399	\$1.55-\$1.86	150-200	0.26 IOPS/HDD \$
10k Ent SAS HDDs	SFF	300GB-1.8TB	\$350-1299	\$0.72-\$1.17	120-140	0.34 IOPS/HDD \$
7.2k Mid-Line SAS HDDs	SFF	1TB-2TB	\$602-1093	\$0.55-\$0.60	75-100	0.12 IOPS/HDD \$

Key Takeaways:

- Value of 15k HDDs is getting squeezed by SSDs and 10k SFF HDDs
- Best IOPS/Drive = SFF SSDs at 10-20k IOPS per drive. This is 50-100X the fastest spinning HDDs
- Best \$/GB = 7.2k LFF HDDs. The 6TB and 8TB LFF HDDs offer game changing \$/GB
- 74-89% savings per \$/GB vs 10k/15k Enterprise HDDs

HPE MSA Virtualized Array Data Services

Bringing 3PAR-like Data Services to Entry-Level SANs

Virtual Tier Affinity

MSA Implementation

- Prioritizes data by assigning the appropriate affinity level (Performance, No Affinity & Archive) to volumes
- For existing volumes
 - Performance Affinity – Existing data is prioritized to move to higher tiers but no immediate actions are taken
 - No Affinity – Migrated volumes will automatically receive the “No Affinity” setting and data will migrate to tiers based on user access (Data-in-Place Upgrades)
 - Archive Affinity – Data is prioritized to Archive Tier
- For new volumes
 - Performance Affinity – New data writes will follow standard tiering policies
 - No Affinity – New data write will follow standard tiering policies
 - Archive Affinity – Data is written to the archive tier if space is available, otherwise the next highest tier

Benefits

- Allows for more effective use of all tier in the subsystem
- Releases capacity on the standard tier
- Allows for better utilization of the Archive Tier



HPE MSA Virtualized Array Data Services

Bringing 3PAR-like Data Services to Entry-Level SANs

Large Pool Support

MSA Implementation

- Improvements in system cache efficiencies have resulted in large pool support
- Pool capacities by firmware release:

	GL 220	GL220 or VL100 w/ Large Pool support
Capacity per virtual pool	300 TiB	512 TiB
Virtual capacity per system	600 TiB	1024 TiB
Snapshots per volume	254	8

Benefits

- Provides capacity for customers needing ultra deep pool capacity



MSA Flash Advisor

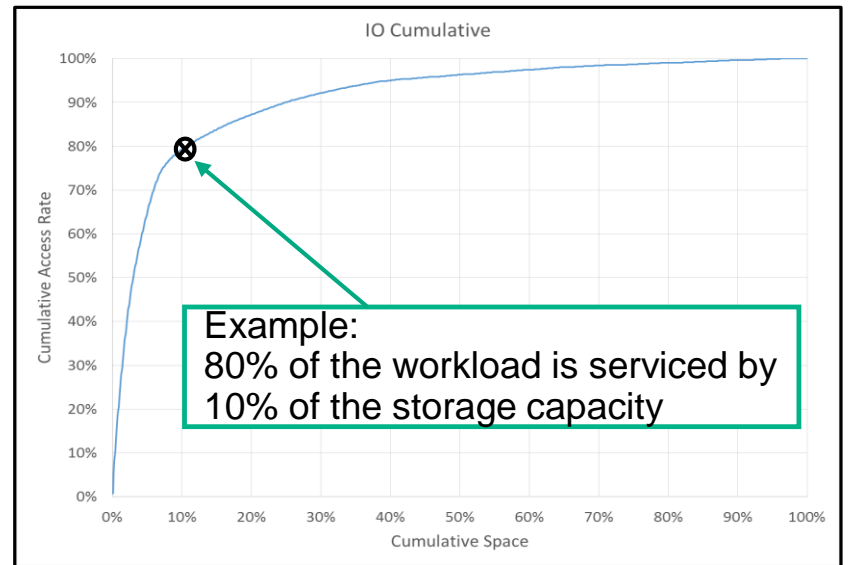
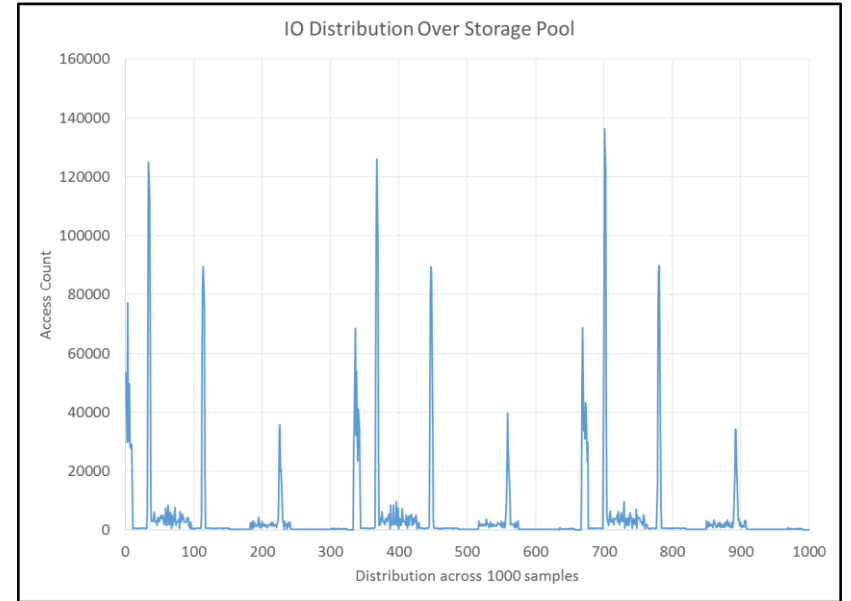
Free service to analyze customer workload

How it works

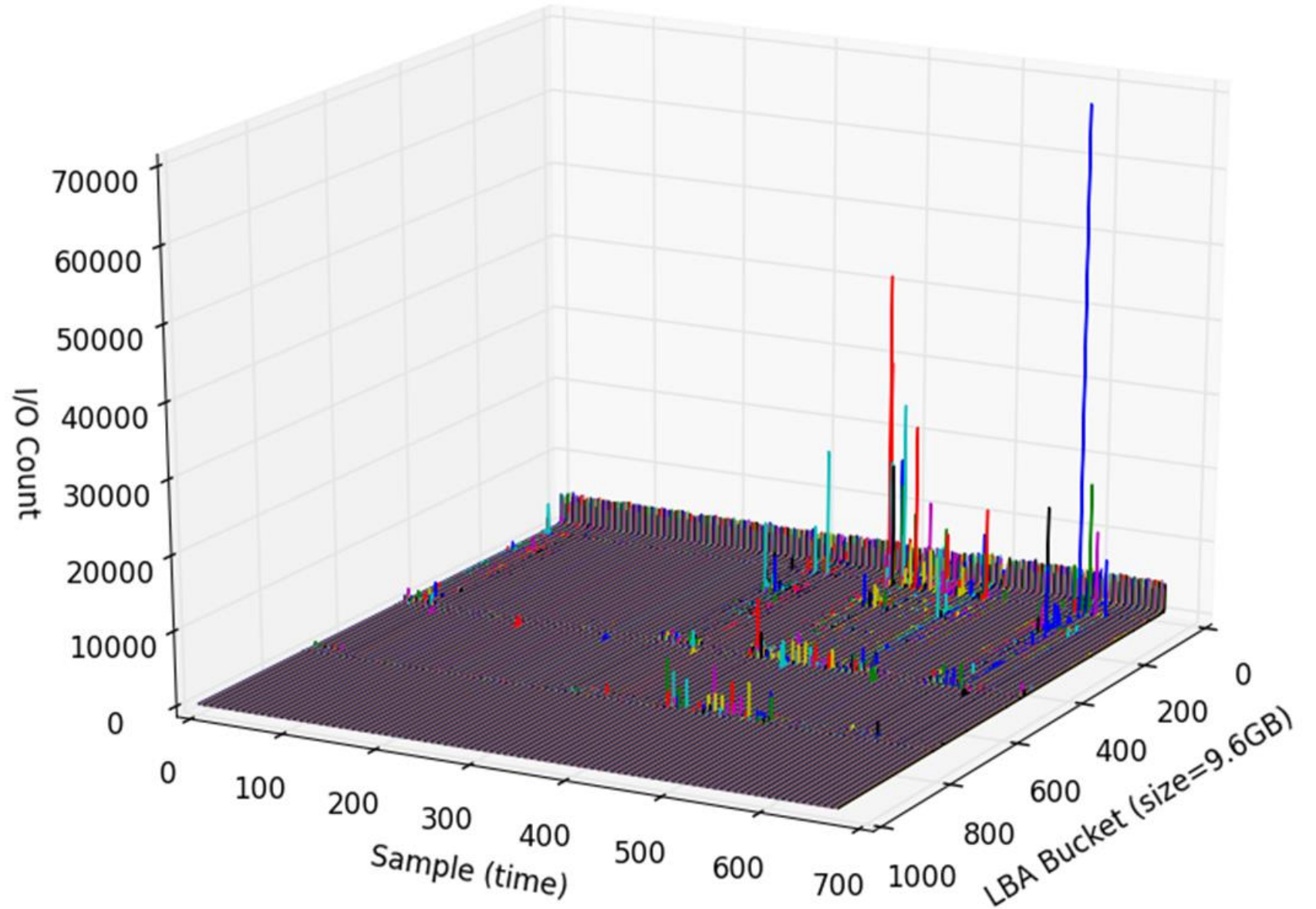
- Any MSA 2040 or 2050 array running GL210 or higher
- Run with targeted application workload for 1 week to fill I/O Logs
- Generate log file from array
- Fill out Flash Advisor Log Traveler Sheet
- Submit Log File and Traveler Sheet
- Report will be generated and returned to Customer and HPE/Partner contacts listed on Traveler Sheet
- If customer is adding SSDs, the process can be submitted again to see “before/after” picture

Benefits

- Get visibility into I/O workloads
- Get flash sizing recommendations
- Decode the benefit of adding flash



MSA Flash Advisor – 3D Heat Map





Need File Services for MSA?

StoreEasy 3850 File Gateway

HPE StoreEasy 3850 File Gateway

Accelerates my apps

Multiple diverse workloads supported, SMB3, NFSv4.1, FTP/FTPs, HTTP/HTTPs and WebDAV file protocols. Hosted BranchCache for remote office file caching for Windows 7, 8 and 10 clients.

Management that's simple

Deploy file shares in minutes. Straightforward and consistent management experience via Windows-based OS. Includes quotas, file screening and storage reports. Fully compatible with Windows Dynamic Access Controls and data management

Built-in resiliency

Redundant components built-in, online file system self-healing, transparent client connection failover, snapshots, replication, encryption for data at rest and in flight, run antivirus and backup software directly onboard

Grows with my business

Up to 30k concurrent connections, 100TBs of capacity, 4B+ files, sub-file deduplication for 50-60% capacity savings

HPE StoreEasy Storage for File Services with MSA



StoreEasy 3850 Gateway

Highly available rack mount providing file services for HPE disk storage arrays

Form factor	2U rack mount with 1-2 nodes
Network controller	Choice of 1GbE or 10GbE
Maximum concurrent users	30,000 users per node



StoreEasy 3850 Gateway Blade

Highly available blade providing file services for HPE disk storage arrays

Form factor	Half-height blade
Network controller	Choice of 10GbE or 20GbE
Maximum concurrent users	30,000 users

Protocols	NFS, SMB (CIFS), HTTP and HTTPS, FTP and FTPS, iSCSI
Base software	StoreEasy Dashboard, Sub-file Deduplication, Snapshots, Replication, File Classification, File Screening, Quotas, Reporting, Server Manager, iLO Advanced License
Warranty & support	3-year parts, 3-year labor, 3-year onsite, and next business day response for hardware; 1-year 9x5 telephone support for software



MSA 1050/2050/2052

Use Cases

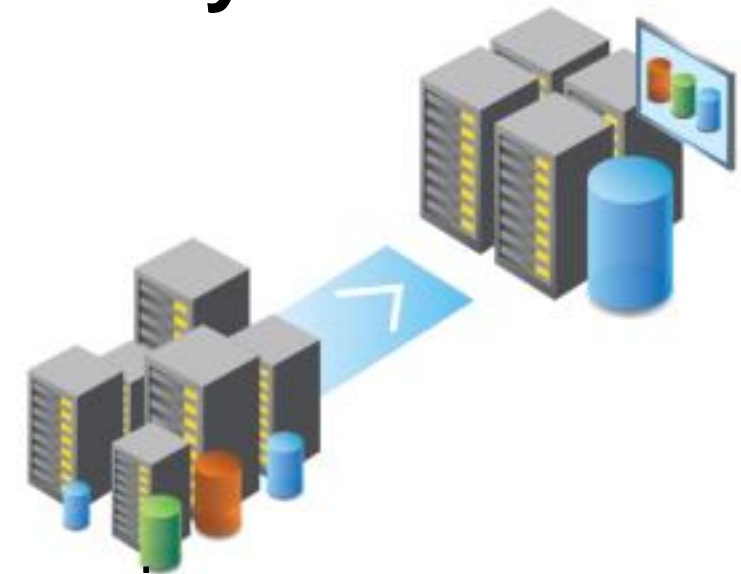
Consolidation: Break the Cycle - Save Money

Common Pain Points

- Silos of storage lead to management nightmare
- Wasted capacity, inefficient use of resources
- Management requirement of a SAN

Why Consolidate? Solution Benefits

- SAN must be simple, intuitive management – Shouldn't require training, practice, architect to setup and maintain
- Shared storage leverages investment and allows efficient use of resources
- Consolidation and virtualization go hand in hand. Extend the efficiencies
- SAN simplifies more advanced data protection and availability techniques



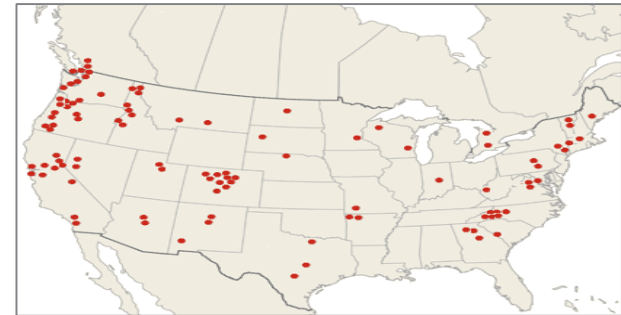
ROBO: The Challenges of Multiple Sites

Scenario/Customer Pain Points

- Some companies can't avoid Remote/Branch IT scenario
- Repeatability is Critical
- Costs are multiplied by "x" sites
- Branch Office management is not always consistent

Simplifying ROBO: Solution Benefits

- Most ROBOs leverage virtualization for simplicity
- Simple ROBO IT can be managed by HQ or Remote Sites
- Solutions are ultra-cost optimized yet with HQ IT features



Affordable Disaster Recovery/Archives

Customer Pain Points

- Need reliable/affordable shared storage for secondary data (ex - snapshots, copies or archives)
- Tight budgets. Added requirements on Tier-1 Storage
- Volume of data stretches transfer times. Increases risk
- Need on-line access times ... but at cheapest \$/GB

DR/Archive Solution Attributes

- Leverage the high capacity/low cost SAS Mid-line HDDs
- Sequential throughput critical to cut transfer times
- Connect to corporate SAN - latest host interconnects
- Scale HDD count as achieve grows with expansions
- Still on spinning media, reasonable retrievable speeds



HPE ProLiant Servers & MSA Storage:

Better Together for 20 years...and counting



ProLiant Server innovations

- MSA designed for and integrates well within ProLiant server ecosystem
- DAS to SAN transitions – Save time and money spent managing storage islands
- Departmental or Single Application Shared Storage using integrated SmartArray SAS infrastructure
- Boost performance with the latest SAN infrastructure (FC/iSCSI)
- Cut footprint, Reduce heat – More IT on less hardware

MSA Shared Storage

MSA Warranty and Service Offerings



Warranty Included with MSA 1050/2050/2052

Hardware Warranty includes 3 Years Parts Only Exchange, Next Business Day, Normal Business Hours

- SSD Warranty 3/0/0 warranty; Customer Self Repair (CSR) subject to maximum usage and or maximum supported lifetime limitations, whichever occurs first. Maximum Supported Lifetime is the period in years set to equal the warranty for the device. Maximum usage limit is the maximum amount of data that can be written to the device before reaching the device's write endurance limit.

Optional Software -- HP warrants only that the Software media will be free of physical defects for a period of ninety (90) days from delivery.

Note: If support and updates are desired for bundled software functionalities (such as 64 LTU Snap and/or Volume Copy etc in the MSA 2050/2052 product) a combination HW + SW support offering must be purchased. This would either be Proactive Care or Foundation Care.



Protect your business beyond warranty with HPE Support Services

- HPE Pointnext provides a comprehensive portfolio including Advisory and Transformational, Professional, and Operational Services to help accelerate your digital transformation. From the onset of your transformation journey, Advisory and Transformational Services focus on designing the transformation and creating a solution roadmap. Professional Services specializes in creative configurations with flawless and on-time implementation, and on-budget execution. Finally, operational services provides innovative new approaches like Flexible Capacity and Datacenter Care, to keep your business at peak performance. HPE is ready to bring together all the pieces of the puzzle for you, with an eye on the future, and make the complex simple.

Connect your devices

- Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Achieve up to 77%¹ reduction in down time, near 100%² diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7 monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to HPE support.
- Learn more about getting connected at www.hpe.com/services/getconnected

¹ IDC 2 – HP CSC reports 2014 – 2015

Proactive Care Service Levels

- **HPE Proactive Care* with 6 hour call-to-repair commitment, three year Support Service**
 - HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years' proactive reporting and advice with our highest level of hardware support - HPE's 24x7, six hour hardware call-to-repair. HPE is the only leading manufacturer who makes this level of coverage available as a standard service offering for your most valuable servers. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.
 - <http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf>
- **HPE Proactive Care* with 24x7 coverage, three year Support Service**
 - HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years' proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.
 - <http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf>

Foundation Care Services

- **HPE Foundation Care 24x7, three-year Support Service**

- HPE Foundation Care 24x7 gives you access to HPE 24 hours a day, seven days a week for assistance on resolving issues. This service includes need based Hardware onsite response within four hours. In addition, collaborative software support is included in this service that provides troubleshooting assistance on industry leading software running on your HPE server. Simplify your support experience and make HPE your first call to help resolve hardware or software problems.
- <http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

- **Parts and Materials**

- HPE will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.
- Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.
- The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HPE due to malfunction.



Recommended Deployment Service(s)

- **HPE Hardware Installation**

Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf>

- **HPE Installation and Startup Service** provides for the installation and startup of HPE technology including BladeSystems, C-Class enclosure, HPE ProLiant c-Class and Integrity server blades, storage blades, SAN switch blades, HPE Virtual Connect modules (Ethernet and Fibre Channel), Ethernet network interconnects, and InfiniBand, as well as the installation of one supported operating system type (Windows® or Linux).



HPE Datacenter Care and Flexible Capacity Services

HPE Datacenter Care Service

- HPE Datacenter Care helps improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services “building blocks.” You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with HPE via a single point of accountability for HPE and others’ products. For more information, visit www.hpe.com/services/datacentercare

HPE Flexibly Capacity

- With Flexible Capacity, you get the speed, scalability, and economics of the public cloud in the privacy of your data center. Gain the advantages of the public cloud—consumption-based payment, rapid scalability without worrying about capacity constraints. Reduce the “heavy lifting” needed to operate a data center. And retain the advantages that IT provides the business (i.e., control, security). Deliver the right user experience, choose the right technology for the business, manage privacy and compliance, and manage the cost of IT. And, you have the option to use the public cloud when needed.



Factory Express and TS Support Credits

HPE Factory Express for Servers and storage

- HPE Factory Express offers configuration, customization, integration and deployment services for HPE servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.
- Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HPE products supported through Factory Express include a wide array of servers and storage: HPE Integrity, HPE ProLiant, HPE Apollo, HPE ProLiant Server Blades, HPE BladeSystem, HPE 9000 servers as well as the MSA, 3PAR suite, XP, rackable tape libraries and configurable network switches.

Factory Express for Synergy service

- This is an all-inclusive solution deployment service for HPE Synergy that includes configuration, integration, and installation onsite. Factory Express for Synergy is based on Industry best practices and provides an Implementation Project Manager to oversee the solution deployment end to end. Detailed documentation on the solution and the service deliverables will be provided to the customer.

HPE Technology Services Support Credits

- HPE offers flexible services and technical skills to meet your changing IT demands. With a menu of service that is tailored to suit your needs, you get additional resources and specialist skills to help you maintain peak performance of your IT. Offered as annual credits, you can plan your budgets while proactively responding to your dynamic business.

Education Services and the Support Center

HPE Education Services

- Keep your IT staff trained making sure they have the right skills to deliver on your business outcomes. Book on a class today and learn how to get the most from your technology investment. www.hpe.com/ww/learn

HPE Support Center

- The HPE Support Center is a personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with HPE experts, access support resources or collaborate with peers. Learn more www.hpe.com/support/hpesc
- HPE's Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Support Service or HPE contractual support agreement.

*HPE Support Center Mobile App is subject to local availability

Summary



NEW HPE 5th Generation MSA Storage Family

Seriously simple and affordable high-performance storage

Budget-Optimized



MSA 1050 Storage

HPE's most affordable entry SAN array.

Flash-ready

Flexible Base Model



MSA 2050 Storage

2X more performance than previous generation for the same price.

Flash-ready

Performance-Optimized



MSA 2052 Storage

Save 40% with all-inclusive software and 1.6 TB of flash capacity included.

Hybrid Flash Model

The leading entry FC SAN platform for eight years running
Over 500,000 HPE MSA Storage systems sold worldwide*



Hewlett Packard
Enterprise

Thank You!

MSA Naming Convention

- MSA Family Name lives on
 - MSA stands for – “Modular Smart Array”
 - All future MSA product introductions will build on **MSA 20xx**
- Historical view of all Generations of the MSA Family
 - **MSA2000 G1** – First Generation of MSA 2000 architecture - Released in early 2008
 - **MSA2000 G2** – Second Generation of MSA 2000 architecture - Released in 2009-10
 - **MSA P2000 G3** (now being called **MSA 2000**) – Third Generation of MSA 2000 architecture - Released 2010-11
 - **MSA 1040** – Low-cost MSA arrays leveraging the 4th Generation MSA architecture – Released in 2014
 - **MSA 2040** – 4th Generation MSA architecture- Released in 2013
 - **MSA 2042** – Hybrid SSD/HDD MSA 2040 array- Released in August 2016
 - **MSA 1050** – New low cost offering. Uses new VE100 FW – to be released September 2017
 - **MSA 2050** – 5th Generation MSA architecture – Released June 2017
 - **MSA 2052** – Hybrid SSD/HDD MSA 2050 array with two 800GB SSDs – Released June 2017