QuickSpecs

Overview

HPE Nimble Storage Adaptive Flash Arrays

Like having two flash arrays in one
The HPE Nimble Storage Adaptive Flash array is truly adaptive. It is designed for both Primary and Secondary flash workloads. It is a Hybrid Flash array for mixed, primary workloads, where cost-efficient flash performance is important. It is a Secondary Flash array for backup and DR while allowing you to put your backup data to work.

Experience the Power of Predictive
HPE Nimble Storage Adaptive Flash Arrays combine a flash-efficient architecture with HPE InfoSight predictive analytics to achieve fast, reliable access to data and 99.9999% guaranteed availability[1]. Your storage investment made today will support you well into the future, thanks to our technology and business-model innovations.

What's new
The HPE Nimble Storage family of adaptive flash arrays deliver the functionality of two cost-effective flash arrays in one – Hybrid flash and Secondary flash. The new arrays are up to 65% faster and more than twice as scalable as previous adaptive flash arrays. The arrays use inline variable block deduplication and compression for maximum data reduction. Adaptive arrays are designed to deliver business value today and tomorrow as demonstrated by our **timeless storage**.

NOTE: For more information about the entire HPE Nimble Storage product portfolio, go to **https://www.hpe.com/us/en/storage/nimble.html**.

HPE Nimble Storage Adaptive Flash Array[3]
(Base array, 4U; 21 bays hold carriers with Large Form Factor HDDs,
3 bays hold Dual Flash Carriers with Small Form Factor SSDs)

HPE InfoSight predictive analytics
- Automatically predicts and resolves 86% of problems before you even know there is an issue[3].
- Transforms the support experience through predictive automation and Level 3-only support.
- Sees across the infrastructure stack and resolves problems beyond storage.
- Simplifies planning with prescriptive forecasts into capacity, performance, and bandwidth needs.
- Makes infrastructure smarter and more reliable by learning from the installed base.

Radical Simplicity

Hewlett Packard Enterprise

Overview

- Simple to deploy. Simple to use. Simple to manage.
- Cloud-ready. Deploy flash on-premises or in the cloud with common data services and mobility between all-flash, hybrid flash, and HPE Cloud Volumes.
- Timeless Storage means no worries today or tomorrow. Flash arrays come with a satisfaction guarantee, all-inclusive software licensing, flat support pricing, no forklift upgrades, and an option to receive a free faster controller upgrade after three years.
- Radically easy to integrate with many ecosystems. Deep integration with VMware, MS applications, Oracle, Veeam, and others.
- No data worries. 99.9999% (six-nines) guaranteed availability[1]. Triple+ Parity RAID tolerates 3 simultaneous drive failures plus additional protection through intra-drive parity.

Flash Performance for Mixed, Mainstream Workloads

- Speed and efficiency for mixed workloads with sub-millisecond response and greater efficiency than other hybrid arrays[3].
- Write to cost-optimized disk at flash speeds through write serialization – defying the physics of mechanical spindles.
- Assign and change the service level of any volume at the click of a button ("Auto Flash", "All Flash", or "Minimal Flash").
- Always-on data reduction delivers up to 5X or more space savings without performance penalty[4].

Put Your Backup Data to Work

- Secondary storage that does real work: Flash performance lets you use your backup data for development/test, QA, analytics, and more.
- Eliminates the need for full backups: And speeds synthetic full backups from hours to minutes. Native application-consistent snapshots and replication plus integration with leading backup software.
- Restore backup data instantly. Fast backup verification - test backups more often. Eliminate the need to restore by running workloads directly.
- Deep integration with Veeam availability software. Array capabilities accessible through the Veeam GUI.
- Backup and DR at a third of the cost, when replicating from all-flash to adaptive flash.
- Very cost-effective with powerful dedupe and compression. App-granular, FIPS-certified encryption provides data at-rest and over-the-wire protection. Secure data shredding is built-in.

Overview

HPE Nimble Storage Adaptive Flash Array models

HPE Nimble Storage HF-Series array[1, 2]	HF20	HF20H	HF20C	HF40	HF60	Scale-out[3] 4X HF60
Raw capacity (TB/TiB)[4]	21-210/19-191	11-211/10-192	21-1260/19-1146	21-504/19-458	21-1260/19-1146	5040/4584
Usable capacity (TB/TiB)[4]	16-169/14-153	7-164/6-149	16-1016/14-924	16-406/14-369	16-1016/14-924	4065/3697
Effective capacity[5]	81-845/74-768	34-821/31-746	32-2032/29-1848	81-2030/74-1846	81-5080/74-4621	326-20324/297-18484
Max. # of expansion shelves	6	6	6	6	6	24
Flash capacity (TB/TiB)[4]	23/21	15/13	23/21	23/21	23/21	92/84
RAID level	Triple+ Parity					
Onboard iSCSI/Mgmt. 1 Gb/10 Gb ports per array[6]	4	4	4	4	4	16
Optional iSCSI 1 Gb ports per array6	4, 8, 12, 16	4, 8, 12, 16	4, 8, 12, 16	4, 8, 12, 16, 20, 24	4, 8, 12, 16, 20, 24	96
Optional iSCSI 10 Gb ports per array6	4, 8, 12, 16	4, 8, 12, 16	4, 8, 12, 16	4, 8, 12, 16, 20, 24	4, 8, 12, 16, 20, 24	96
Optional FC 8 Gb/16 Gb ports per array	4, 8, 12, 16	4, 8, 12, 16	4, 8, 12, 16	4, 8, 12, 16, 20, 24	4, 8, 12, 16, 20, 24	96
Max. power requirement (watts/kVA)	750/0.833	650/0.722	750/0.833	850/0.944	900/1.000	3600/4.000
Thermal (BTU)	2460	2132	2460	2788	2952	11,808

NOTES:

1 HPE Nimble Storage HF20 and HF40 Adaptive Flash array support scale up to any model within the HF family. HF20H Adaptive Flash array supports scale up to the HF40 Adaptive Flash array.

2 The HF20H Adaptive Flash array consists of up to 22 HDDs and 2 Dual Flash Carriers (DFCs). All other HF-Series models consist of up to 21 HDD drives and 3 DFCs (holding up to 6 SSDs).

3 Scale-out configuration consists of 4X HF60 Adaptive Flash arrays, each with six maximum capacity expansion shelves.

4 Raw, usable, and effective capacities are shown in TB (10^{12} bytes) and TiB (2^{40} bytes). Usable and effective capacities take into account space used for parity, spares, SSD cache, and system overhead.

5 Deduplication currently supported on HF20H, HF20, HF40, and HF60; the HF20C does not support dedupe and is capacity optimized to scale to over 1PB.

6 Each array controller has 2 x 10GbE ports built in. Optional ports are 1GbaseT, 10GbaseT, or 10GbE SFP+, or 8/16G FC.

Overview

Expansion Shelves for HPE Nimble Storage Adaptive Flash Arrays

	ES3 Expansion Shelf for Adaptive
Raw capacity (TB/TiB)[8]	21–210/18–190
Usable capacity (TB/TiB)[8]	16–169/14–154[10]
Effective capacity (TB/TiB)[8, 9]	32–337/28–308
Flash capacity (TB/TiB)[8]	0.7–108/0.7–98
Max. power requirement (Watts/kVA)	500/0.56
Thermal (BTU)	1638

NOTES:
[8] Raw, usable, and effective capacities are shown in TB (10^{12} bytes) and TiB (2^{40} bytes). Usable and effective capacities take into account space used for parity, spares, SSD cache, and system overhead.
[9] Scale-out configuration consists of 4X HF60 Adaptive Flash arrays, each with six maximum capacity expansion shelves.
[10] When attached to a HF20H Adaptive Flash array, capacity is 16–167/14–152.

Host OS Support

Microsoft® Windows® Server, including Microsoft® Hyper-V™ | VMware vSphere™ | HP-UX® | Ubuntu

SUSE® Linux Enterprise | SUSE® Linux Virtualization | Red Hat® Enterprise Linux® | Red Hat® Enterprise Virtualization

CentOS | Oracle® Linux® (UEK and RHEL compatible kernels) | Oracle® Solaris Citrix® | IBM® AIX®

NOTE: For the latest information on supported operating systems refer to Single Point of Connectivity Knowledge (SPOCK) for HPE Storage products, including HPE Nimble Storage: **http://www.hpe.com/storage/spock**

Service and Support and Warranty Information

Warranty

HPE Nimble Storage arrays come with the following warranties:

- 1 year; parts-only warranty for hardware components
- 90 day; software updates for defects

Additionally, HPE Nimble Storage will provide phone support for replacing a defective part. Additional support coverage is required for HPE Nimble Storage Arrays.

NOTE: For hardware warranty claims, defective part must be received before replacement parts are shipped.
NOTE: Warranty is provided by HPE Nimble Storage.
NOTE: Link to **HPE Global Limited Warranty and Technical Support**

Service and Support

Support is required for all HPE Nimble Storage Arrays. Support SKUs provide up to five years of 24x7 telephone and email support for the arrays with a choice of Next Business Day (NBD) parts exchange, 4-hour parts delivery, or 4 hour onsite support, access to the HPE InfoSight predictive analytics platform and software updates.
NOTE: Support contract is mandatory for all HPE Nimble Storage products.

Installation Service

HPE Nimble Storage Array Start-up service
On-site installation of a new HPE Nimble Storage Array in a data center with up to six (6) shelves.

HPE Nimble Storage Upgrade service
On-site installation of upgrades kits or expansion shelves for an existing HPE Nimble Storage Array.

NOTE: Installation services are optional for all HPE Nimble Storage products.

Configuration Information

Step 1 - Choose a Base configuration

All HPE Nimble Storage Adaptive Flash Arrays come in a 4U form-factor chassis with
- (2) controllers with fans and NVDIMM, and
- (4) 1GbE/10GbE network ports, i.e. (2) per controller for iSCSI or management traffic, and
- (2) power supplies and
- All-inclusive software including HPE InfoSight predictive analytics

Additional host connectivity per controller is indicated in the product descriptions below.
Flash Cache upgrades, network upgrades and expansion shelves are available for integration in the field. Upgrade information will be supplied in the next QuickSpecs update.

HPE Nimble Storage HF-Series Adaptive Flash Arrays – Base Configuration
Base Array

Q8H70A   HPE Nimble Storage HF20C Adaptive Dual Controller 10GBASE-T 2-port Configure-to-order Base Array

Q8H71A   HPE Nimble Storage HF20H Adaptive Dual Controller 10GBASE-T 2-port Configure-to-order Base Array

Q8H72A   HPE Nimble Storage HF20 Adaptive Dual Controller 10GBASE-T 2-port Configure-to-order Base Array

Q8H39A   HPE Nimble Storage HF40 Adaptive Dual Controller 10GBASE-T 2-port Configure-to-order Base Array

Q8H40A   HPE Nimble Storage HF60 Adaptive Dual Controller 10GBASE-T 2-port Configure-to-order Base Array

Step 2 – Choose Head HDD Capacity

All HPE Nimble Storage Adaptive Flash Arrays come with (21) LFF Hard Drives included as standard and supports (3) Dual Flash Carriers with SFF Solid State Drives. The configurations below include three SFF SSDs and accept one optional Flash Upgrade Kit to increase the Flash Cache. Additional capacity can be added by connecting up to (6) expansion shelves to the base array.

NOTE: R2 and non-R2 SKUs are functionally equivalent. The OCA quote tool will guide to the appropriate SKU option when configuring a model. Table below shows Adaptive Flash Array compatibilities with SSD Options.

Head SSD Capacity Options

Only ONE of the following options can be selected:		HF20H	HF20C	HF20	HF40	HF60
Q8B67B	HPE Nimble Storage HF20H Adaptive Array 11TB (11x1TB) FIO HDD Bundle[2]	Yes				
Q8B68B	HPE Nimble Storage HF20/20C Adaptive Array 21TB (21x1TB) FIO HDD Bundle[1]		Yes	Yes		
Q8B69B	HPE Nimble Storage HF20/20C Adaptive Array 42TB (21x2TB) FIO HDD Bundle[1]		Yes	Yes		
Q8H75A	HPE Nimble Storage HF20/20C Adaptive Array 84TB (21x4TB) FIO HDD Bundle[1]		Yes	Yes		
Q8H76A	HPE Nimble Storage HF20/20C Adaptive Array 126TB (21x6TB) FIO HDD Bundle[1]		Yes	Yes		
Q8H77A	HPE Nimble Storage HF20/20C Adaptive Array 210TB (21x10TB) FIO HDD Bundle[1]		Yes	Yes		
Q8H44A	HPE Nimble Storage HF40/60 Adaptive Array 21TB (21x1TB) FIO HDD Bundle				Yes	Yes
Q8H45A	HPE Nimble Storage HF40/60 Adaptive Array 42TB (21x2TB) FIO HDD Bundle				Yes	Yes
Q8B55B	HPE Nimble Storage HF40/60 Adaptive Array 84TB (21x4TB) FIO HDD Bundle				Yes	Yes

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Q8B56B	HPE Nimble Storage HF40/60 Adaptive Array 126TB (21x6TB) FIO HDD Bundle				Yes	Yes
Q8B57B	HPE Nimble Storage HF40/60 Adaptive Array 210TB (21x10TB) FIO HDD Bundle				Yes	Yes
Min-Max addressable Head Capacity (RAW) range (per platform basis)		211 TB	1260 TB	210 TB	504 TB	1260 TB

Step 3 – Choose Head SSD Cache Capacity

Head HDD Capacity	Typical capacity*
11TB	960GB
21TB	1.44TB
42TB	2.88TB
84TB	5.76TB
126TB	11.52TB
210TB	17.28TB

Head SSD Capacity Options

For combinations of Bank A and Bank B of the DFC: 1. When both banks are populated, adjacent banks should not differ by more than one step function in SSD capacity e.g. 3x480GB can have 3x240GB or 3x480GB or 3x960GB in the adjacent bank. Not allowed in the adjacent bank would be 3x1920GB or 3x3840GB.						
ONE or TWO SSD-packs of the following SSD cache options can be selected.		HF20H	HF20C	HF20	HF40	HF60
Q8B77B	HPE Nimble Storage HF20H Adaptive Array 480GB (2x240GB) FIO Cache Bundle[1]	Yes				
Q8B79B	HPE Nimble Storage HF20H Adaptive Array R2 960GB (2x480GB) FIO Cache Bundle[1]	Yes				
HF20C: ONE or TWO SSD-packs of the following SSD cache options can be selected. Packs must the same (e.g. "DD") or must be adjacent capacities "DC" or "DE".						
Q8B80B	HPE Nimble Storage HF20C Adaptive Array 720GB (3x240GB) FIO Cache Bundle[2]		Yes			
Q8B82B	HPE Nimble Storage HF20C Adaptive Array R2 1.44TB (3x480GB) FIO Cache Bundle		Yes			
Q8H80A	HPE Nimble Storage HF20C Adaptive Array R2 2.88TB (3x960GB) FIO Cache Bundle		Yes			
Q8H81A	HPE Nimble Storage HF20C Adaptive Array 5.76TB (3x1.92TB) FIO Cache Bundle		Yes			
Q8H82A	HPE Nimble Storage HF20C Adaptive Array 11.52TB (3x3.84TB) FIO Cache Bundle		Yes			
HF20: ONE SSD-packs of the following SSD cache options can be selected.						
Q8J28A	HPE Nimble Storage HF20 Adaptive Array 1.44TB (6x240GB) FIO Cache Bundle			Yes		
Q8J29A	HPE Nimble Storage HF20 Adaptive Array R2 2.88TB (6x480GB) FIO Cache Bundle			Yes		
Q8J30A	HPE Nimble Storage HF20 Adaptive Array R2 5.76TB (6x960GB) FIO Cache Bundle			Yes		
Q8J31A	HPE Nimble Storage HF20 Adaptive Array 11.52TB (6x1.92TB) FIO Cache Bundle			Yes		
Q8J32A	HPE Nimble Storage HF20 Adaptive Array 23.04TB (6x3.84TB) FIO Cache Bundle			Yes		
HF40/HF60: ONE SSD-packs of the following SSD cache options can be selected.						

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Q8H48A	HPE Nimble Storage HF40/60 Adaptive Array 1.44TB (6x240GB) FIO Cache Bundle				Yes	Yes
Q8H49A	HPE Nimble Storage HF60 Adaptive Array 2.88TB (6x480GB) FIO Cache Bundle					Yes
Q8B62B	HPE Nimble Storage HF60 Adaptive Array 5.76TB (6x960GB) FIO Cache Bundle					Yes
Q8H50A	HPE Nimble Storage HF40 Adaptive Array R2 2.88TB (6x480GB) FIO Cache Bundle				Yes	
Q8B63B	HPE Nimble Storage HF40 Adaptive Array R2 5.76TB (6x960GB) FIO Cache Bundle				Yes	
Q8B64B	HPE Nimble Storage HF40/60 Adaptive Array 11.52TB (6x1.92TB) FIO Cache Bundle				Yes	Yes
Q8B66B	HPE Nimble Storage HF40/60 Adaptive Array 23.04TB (6x3.84TB) FIO Cache Bundle				Yes	Yes

Platform RAM installed (GB)	32	32	32	64	160
Min SSD capacity (RAW) range per platform basis (GB)	960	720	1440	720GB	960
Max SSD capacity (RAW) range per platform basis (GB)	15360	23040	23040	23040	15360
Platform Max SSD capacity (RAW)= (Head SSD + ES3 SSD) capacity (GB)	28TB	28TB	28TB	28TB	28TB

Step 4 – Choose Head Networking Option

Only ONE of the following options can be selected. Please refer to configuration guidelines for specific support of networking options on HF-Series arrays.

Head Networking Options

Select one of the following:		HF20H	HF20C	HF20	HF40	HF60
Q8B84B	HPE Nimble Storage 2x1GbE 2-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8B85B	HPE Nimble Storage 4x1GbE 2-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8B88B	HPE Nimble Storage 2x10GbE 2-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8B89B	HPE Nimble Storage 4x10GbE 2-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8B86B	HPE Nimble Storage 2x10GBASE-T 2-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8B87B	HPE Nimble Storage 4x10GBASE-T 2-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8B90B	HPE Nimble Storage 2x16Gb Fibre Channel 2-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8B91B	HPE Nimble Storage 4x16Gb Fibre Channel 2-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8B92B	HPE Nimble Storage 6x16Gb Fibre Channel 2-port FIO Adapter Kit				Yes	Yes
Q8B95B	HPE Nimble Storage 4x10GBASE-T 2-port and 2x16Gb Fibre Channel 2-port FIO Adapter Kit				Yes	Yes
Q8B96B	HPE Nimble Storage 2x10GbE 2-port and 4x16Gb Fibre Channel 2-port FIO Adapter Kit				Yes	Yes
Q8B93B	HPE Nimble Storage 2x10GBASE-T 2-port and 2x16Gb Fibre Channel 2-port FIO Adapter Kit2				Yes	Yes
Q8B94B	HPE Nimble Storage 2x10GBASE-T 2-port and 4x16Gb Fibre Channel 2-port FIO Adapter Kit				Yes	Yes
Q8B98B	HPE Nimble Storage 4x10GbE 2-port and 2x16Gb Fibre Channel 2-port FIO Adapter Kit				Yes	Yes

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Q8B97B	HPE Nimble Storage 4x10GBASE-T 2-port and 2x16Gb Fibre Channel 2-port Adapter Kit				Yes	Yes
Q8B99B	HPE Nimble Storage 2x1GbE 2-port and 2x10GBASE-T 2-port FIO Adapter Kit				Yes	Yes
Q8C00B	HPE Nimble Storage 2x1GbE 2-port and 4x10GBASE-T 2-port FIO Adapter Kit				Yes	Yes
Q8C01B	HPE Nimble Storage 6x10GbE 2-port FIO Adapter Kit				Yes	Yes
Q8C02B	HPE Nimble Storage 6x10GBASE-T 2-port FIO Adapter Kit				Yes	Yes
Q8C03B	HPE Nimble Storage 2x16Gb Fibre Channel 4-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8C04B	HPE Nimble Storage 4x16Gb Fibre Channel 4-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8C05B	HPE Nimble Storage 6x16Gb Fibre Channel 4-port FIO Adapter Kit				Yes	Yes
Q8C17B	HPE Nimble Storage 2x10GbE 4-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8C18B	HPE Nimble Storage 4x10GbE 4-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8C19B	HPE Nimble Storage 6x10GbE 4-port FIO Adapter Kit				Yes	Yes
Q8C20B	HPE Nimble Storage 2x10GBASE-T 4-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8C21B	HPE Nimble Storage 4x10GBASE-T 4-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8C22B	HPE Nimble Storage 6x10GBASE-T 4-port FIO Adapter Kit				Yes	Yes
Q8C23B	HPE Nimble Storage 2x10GbE 4-port and 4x16Gb Fibre Channel 4-port FIO Adapter Kit				Yes	Yes
Q8C06B	HPE Nimble Storage 2x10GbE 2-port and 4x16Gb Fibre Channel 4-port FIO Adapter Kit				Yes	Yes
Q8C24B	HPE Nimble Storage 4x10GbE 4-port and 2x16Gb Fibre Channel 4-port FIO Adapter Kit				Yes	Yes
Q8C07B	HPE Nimble Storage 4x10GbE 2-port and 2x16Gb Fibre Channel 4-port FIO Adapter Kit				Yes	Yes
Q8C08B	HPE Nimble Storage 2x10GbE 2-port and 2x16Gb FC 4-port and 2x16Gb FC 2-port FIO Adapter Kit				Yes	Yes
Q8C09B	HPE Nimble Storage 2x1GbE 4-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8C11B	HPE Nimble Storage 4x1GbE 4-port FIO Adapter Kit	Yes	Yes	Yes	Yes	Yes
Q8C12B	HPE Nimble Storage 6x1GbE 4-port FIO Adapter Kit				Yes	Yes
Q8C13B	HPE Nimble Storage 2x1GbE 4-port and 2x16Gb Fibre Channel 2-port FIO Adapter Kit2				Yes	Yes
Q8C14B	HPE Nimble Storage 2x1GbE 4-port and 2x10GbE 2-port FIO Adapter Kit				Yes	Yes
Q8C15B	HPE Nimble Storage 2x1GbE 4-port and 4x16Gb Fibre Channel 2-port FIO Adapter Kit				Yes	Yes
Q8C16B	HPE Nimble Storage 2x1GbE 4-port and 4x10GbE 2-port FIO Adapter Kit				Yes	Yes
Q8C10B	HPE Nimble Storage 2x10GBASE-T 2-port and 4x16Gb Fibre Channel 4-port FIO Adapter Kit				Yes	Yes

Configuration Information

Step 5 – Add Expansion Shelves

ES3 Adaptive Expansion Shelves

Add up to 6 ES3 Adaptive expansion shelves to each HF-Series array. Mix any options below up to array maximum capacity.
Please refer to configuration guidelines for specific array capacity limits.

Mix any of the following options up to platform max:		HF20H	HF20C	HF20	HF40	HF60
Q8B48B	HPE Nimble Storage HF20/20C/20H Adaptive ES3 21TB (21x1TB) HDD 1.44TB Cache CTO Expansion Shelf[1]	Yes	Yes	Yes		
Q8B49B	HPE Nimble Storage HF20/20C/20H Adaptive ES3 42TB (21x2TB) HDD 2.88TB Cache CTO Expansion Shelf[1]	Yes	Yes	Yes		
Q8B50B	HPE Nimble Storage HF20/20C/20H Adaptive ES3 84TB (21x4TB) HDD 5.76TB Cache CTO Expansion Shelf[1]	Yes	Yes	Yes		
Q8B51B	HPE Nimble Storage HF20/20C/20H Adaptive ES3 126TB (21x6TB) HDD 9.6TB Cache CTO Expansion Shelf[1]	Yes	Yes	Yes		
Q8B52B	HPE Nimble Storage HF20C Adaptive ES3 210TB (21x10TB) HDD 17.28TB Cache CTO Expansion Shelf[2]		Yes			
Q8H33A	HPE Nimble Storage HF40/60 Adaptive ES3 21TB (21x1TB) HDD 1.44TB Cache CTO Expansion Shelf[3]				Yes	Yes
Q8H34A	HPE Nimble Storage HF40/60 Adaptive ES3 42TB (21x2TB) HDD 2.88TB Cache CTO Expansion Shelf[3]				Yes	Yes
Q8H35A	HPE Nimble Storage HF40/60 Adaptive ES3 84TB (21x4TB) HDD 5.76TB Cache CTO Expansion Shelf[3]				Yes	Yes
Q8G47B	HPE Nimble Storage HF40/60 Adaptive ES3 126TB (21x6TB) HDD 9.6TB Cache CTO Expansion Shelf[3]				Yes	Yes
Q8G48B	HPE Nimble Storage HF40/60 Adaptive ES3 210TB (21x10TB) HDD 17.28TB Cache CTO Expansion Shelf[3]				Yes	Yes

	HF20H	HF20C	HF20	HF40	HF60
Platform Max SSD capacity (RAW)= (Head SSD + ES3 SSD) capacity (GB)	28TB	28 TB	28 TB	60 TB	156 TB

Optional Cache for ES3 Expansion Shelves

Only ONE of the following options can be selected per shelf. **Please refer to configuration guidelines for specific array cache capacity limits.**

ONE of the following SSD cache options can be selected:		HF20H	HF20C	HF20	HF40	HF60
Q8C25B	HPE Nimble Storage HF Adaptive ES3 Expansion Shelf 2.88TB (3x960GB) FIO Cache Bundle[1]	Yes	Yes	Yes	Yes	Yes
Q8C26B	HPE Nimble Storage HF Adaptive ES3 Expansion Shelf 5.76TB (3x1.92TB) FIO Cache Bundle[1]	Yes	Yes	Yes	Yes	Yes
Q8C28B	HPE Nimble Storage HF Adaptive ES3 Expansion Shelf 11.52TB (3x3.84TB) FIO Cache Bundle	Yes	Yes	Yes	Yes	Yes

	HF20H	HF20C	HF20	HF40	HF60
Min SSD capacity (RAW) range per platform basis (GB)	1920	2880	2880	2880	2880
Max SSD capacity (RAW) range per platform basis (GB)	23040	23040	23040	23040	23040
Platform Max SSD capacity (RAW)= (Head SSD + ES3 SSD) capacity (GB)	28TB	28TB	28TB	60TB	156TB

Configuration Information

Step 6 – Add Support (Mandatory)

Support recommendations are designed to help you enhance technology operations, lower risk and make it easier for you to seek the right balance between affordability and service-level commitments. Depending on your individual support needs, choose from three levels of care that cover the entire lifecycle to better address your needs from 1, 3, 4 and 5 year durations for service levels ranging from Next Business Day parts exchange to 4 hour onsite response.

NS 1/3/4/5Y FC NBD Parts Exchange Support	HT7A1A1/3/4/5*
NS 1/3/4/5Y FC NBD Parts Exchange w DMR Support	HT7A2A1/3/4/5
NS 1/3/4/5Y FC 4H Parts Exchange Support	HT6Z0A1/3/4/5
NS 1/3/4/5Y FC 4H Parts Exchange w DMR Support	HT6Z1A1/3/4/5
NS 1/3/4/5Y FC 4H Onsite Exchange Support	HT6Z2A1/3/4/5
NS 1/3/4/5Y FC 4H Onsite Exchange w DMR Support	HT6Z3A1/3/4/5
NS 1/3/4/5Y FC NBD Onsite Exchange Support	HT6Z4A1/3/4/5**
NS 1/3/4/5Y FC NBD Onsite Exchange w DMR Support	HT6Z5A1/3/4/5**

NOTES:

* Minimum support required 1 year Next Business Day Parts Exchange.

** Support level available in Japan only.

Configuration Information

Installation Services

Installation Services are intended to guide you from start to finish and to help make your installation a success. Our engagement includes the following phases:

Array Installation
- Inventory and verify HPE Nimble Storage equipment against the sales order
- Physically rack and cable all HPE Nimble Storage equipment, including connecting network
- cables provided by the customer
- Conduct power-on tests and verify operation
- Add the array to an existing HPE Nimble Storage group, if applicable
- Configure array's basic management, monitoring, & reporting capabilities
- Configure array for additional data networks / SAN connectivity as needed
- Upgrade the array to the latest recommended HPE Nimble OS version

NOTE: Installation services are optional.

HPE Nimble Storage Array Start-up service	HA114A1#5MR
HPE Nimble Storage Array Upgrade service	HA124A1#5MS

Racks

HPE Nimble Storage arrays and expansion shelves are compatible with industry standard 4-post EIA 19 inch racks with square mounting holes, including HPE 36U, 42U and 47U Enterprise Shock Racks.

For more information on the HPE rack offerings, please see the following URL:
https://www.hpe.com/info/rackandpower
For more information on rack options, see:
http://www.hpe.com/products/rackoptions
For more information on PDUs, see:
http://www.hpe.com/servers/pdu

Configuration Information

Required and additional power cords

HPE Nimble Storage Arrays and expansion shelves do not ship with any power cords by default and require a minimum of two power cords per system. Please ensure these are selected at time of quoting. A pair of C13/C14 power cords are required when connecting base arrays or expansion shelves to Rack-Mounted Power Distribution Units (PDU). A pair of country/region specific power cords are required when connecting base arrays or expansion shelves to standard office wall power outlets.

HPE Nimble Storage AS3112 to C19 250V 16Amp 1.8m AU FIO Power Cord	Q8J02A
HPE Nimble Storage Schuko to C19 250V 16Amp 1.8m EU FIO Power Cord	Q8J03A
HPE Nimble Storage BS 1363 UK10 to C19 250V 16Amp 1.8m UK FIO Power Cord	Q8J04A
HPE Nimble Storage NEMA 5-15P to C19 125V 15Amp 1.8m US FIO Power Cord	Q8J05A
HPE Nimble Storage GB2099 to C19 250V 16Amp 1.8m CN FIO Power Cord	Q8J06A
HPE Nimble Storage KSC8305 to C19 250V 16Amp 1.8m KR FIO Power Cord	Q8J07A
HPE Nimble Storage JIS8303 to C19 125V 15Amp 1.8m TW/JP FIO Power Cord	Q8J08A
HPE Nimble Storage JIS8303 6-15 to C19 250V 15Amp 1.8m JP FIO Power Cord	Q8J09A
HPE Nimble Storage IS1293 to LS-60 250V 16Amp 1.8m IN FIO Power Cord	Q8J10A
HPE Nimble Storage SAN164-1 to C19 250V 16Amp 1.8m ZA FIO Power Cord	Q8J11A
HPE Nimble Storage SI32 to C19 250V 16Amp 1.8m IL FIO Power Cord	Q8J12A
HPE Nimble Storage CEI 23-16 to C19 250V 16Amp 1.8m IT FIO Power Cord	Q8J13A
HPE Nimble Storage C19 to C20 250V 16Amp 1.8m PDU Base Array FIO Power Cord	Q8J14A
HPE Nimble Storage AS 3112 to C13 250V 10Amp 1.8m AU FIO Power Cord	Q8J15A
HPE Nimble Storage Schuko to C13 250V 10Amp 1.8m EU FIO Power Cord	Q8J16A
HPE Nimble Storage BS1363 UK10 to C13 250V 10Amp 1.8m UK FIO Power Cord	Q8J17A
HPE Nimble Storage NEMA 5-15P to C13 125V 10Amp 1.8m US FIO Power Cord	Q8J18A
HPE Nimble Storage GB2099 to C13 250V 10Amp 1.8m CN FIO Power Cord	Q8J19A
HPE Nimble Storage KSC8305 to C13 250V 10Amp 1.8m KR FIO Power Cord	Q8J20A
HPE Nimble Storage JIS8303 to C13 125V 12Amp 1.8m TW/JP FIO Power Cord	Q8J21A
HPE Nimble Storage JIS8303 6-15 to C13 250V 15Amp 1.8m JP FIO Power Cord	Q8J22A
HPE Nimble Storage IS1293 to C13 250V 10Amp 1.8m IN FIO Power Cord	Q8J23A
HPE Nimble Storage SANS164-1 to C13 250V 10Amp 1.8m ZA FIO Power Cord	Q8J24A
HPE Nimble Storage SI32 to C13 250V 10Amp 1.8m IL FIO Power Cord	Q8J25A
HPE Nimble Storage CEI23-16 to C13 250V 10Amp 1.8m IT FIO Power Cord	Q8J26A
HPE Nimble Storage C13 to C14 250V 10Amp 1.8m Universal FIO Power Cord	Q8J27A

Technical Specifications

Physical Dimensions	Width in/mm	Depth in/mm	Height in/mm/U	Weight lb/kg
HPE Nimble Storage HF20/20H/20C/40/60/80	17.3/439	35/890	6.92/175.8/4	135/65
HPE Nimble Storage ES3 Expansion Shelf	17.3/439	35/890	6.92/175.8/4	115/52

Power Requirements	HF20	HF20H	HF20C	HF40	HF60
Input Voltage					
AC PCM option		100-120V, 50-60Hz 200-240V, 50-60Hz			
Max power requirements (Watts/kVA)	750 W / 0.833 kVA	650 W 0.722 kVA	750 W 0.833 kVA	850 W 0.944 kVA	900 W 1.000 kVA
Thermal (BTU)	2460 BTU	2132 BTU	2460 BTU	2788 BTU	2952 BTU

Environmental Specifications[4]

Operating Temperature	10 - 35° C (50 - 95° F) Reduce rating by 1° F for each 1000 ft altitude (1.8° C/1,000 m)
Shipping Temperature	0° C - 40° C (32° F - 104° F) Maximum rate of change is 20°C/hr (36°F/hr)
Operating Altitude (ft/m) max.	10,000 ft / 3,048 m
Shipping Altitude (ft/m) max.	40,000ft/ 12,192 m
Humidity	8 - 90%, non-condensing
Shipping Humidity	5 - 95%, non-condensing
Operating Vibration	0.25 G, Sine 5 - 200 Hz (approx. 15 min/axis); 0.4 GRMS, Random 5 - 200 Hz (approx. 60 min/axis)
Non-operating Vibration	0.5 G, Sine 5 - 200 Hz (approx. 15 min/axis); 0.98 GRMS, Random 5 - 500Hz (approximate 30 min/axis)
Operating Shock	20 G, 2.5ms, half-sine, one shock on each side
Non-operating Shock	20 G, 10ms, square wave, one shock on each side
Electromagnetic Compatibility	Subpart B of Part 15 of FCC Rules for Class A digital devices ICES-003, Issue 6, dated January 2016 (Class A) VCCI V-3: April 2014 (Class A) EN 55022:2010 CISPR 22:2008 AS/NZS CISPR 22:2009 +A1:2010 EN55032:2012 CISPR 32:2012 EN 55024:2010 CISPR 24:2010 +A1:2015 TCVN 7189:2009 NBTC TS 3001-2555 TP TC 020/2011
Safety	EN60950-1:2005 (Second Edition); Am1:2009 + Am2:2013 IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013

Technical Specifications

EN60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013
UL/IEC 60960-1 2nd Ed. Am1 + Am2
CNS14336-1 ('99)
CNS13438 ('95)
NOM-019-SCFI-1998
NBTC TS 4001-2550
TP TC 004/2011
IS 13252 (PART 1):2010 +A1:2013 + A2:2-15
SANS IEC 60950-1

NOTE: [4] Specifications are subject to change without notice.

Certifications / Markings		
	UL	NOM
	cUL	MoEc
	CE	NBTC SDoC
	FCC Class A	CITC/CoC*
	IC Class A	EAC
	VCCI Class A	BIS
	RCM	LOA (S. Africa)
	BSMI Class A	RoHS 2011/65/EU, EN50581:2012
	KC	WEEE
	CCC Exemption	

Summary of Changes

Date	Version History	Action	Description of Change
14-May-2018	From Version 5 to 6	Changed	Overview section was revised.
07-May-2018	From Version 4 to 5	Changed	Overview, Configuration Information, and Technical Specifications were revised.
13-Nov-2017	From Version 3 to 4	Changed	Overview and Configuration Information were revised.
06-Nov-2017	From Version 2 to 3	Changed	Added information on the entire HPE Nimble Storage CS-Series portfolio.
12-Jun-2017	From Version 1 to 2	Changed	Detail on included power cords and SAS cables.
05-Jun-2017	Version 1	Created	Created first version, including CS1000 and CS1000H.

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