Hewlett Packard
Enterprise

Hewlett Packard Enterprise Storage

Product reference guide

Get started >

Product reference guide
For HPE and Channel Partner internal use only.

Table of contents

How to use this guide

The objective of this guide is simplicity, to help you get access to information quickly and easily and all in one place.

The guide is divided into sections and designed to allow you to access the information you need within two clicks.

At the top level Directory you can click on any of the sections, topics, or products **Section 2: Table of contents** and it will take you directly to that page.

Each section has a Table of Contents, which has additional details. Clicking on any of the topics in any of the Table of Contents will bring you right to that page and subject matter. **HPE 3PAR StoreServ 8000/9450**

You can also navigate around the guide via the buttons at the bottom of each page.

Throughout the guide, there are hyperlinks **hpe.com/go/StoreOnce** to both product-specific web pages and program information.

Internal URL:

WW Storage Sales Portal

Regional Partner Portal URL's:

hpe.com/partners/HPStorageProductReferenceGuide-NA

hpe.com/partners/HPStorageProductReferenceGuide-EME

hpe.com/partners/HPStorageProductReferenceGuide-LAR

hpe.com/partners/HPStorageProductReferenceGuide-APJ

Overview

Hewlett Packard Enterprise is one of the world's largest providers of information technology infrastructure, software, services, and solutions to individuals and organizations of all sizes.

HPE is the #1 or #2 leader in almost all product categories in which we compete. What does that mean to you? It means that we have the best solutions you need to drive your organization forward.

$50.1
billion in revenue

$4.5
billion operating profit

9%
operating margin

#1
server vendor
worldwide shipments &
revenue

#1
private cloud

#1
in Windows
in Linux revenue &
units worldwide

#1
entry storage market
leader—over 500K
units in production

#1
midrange array
best in class

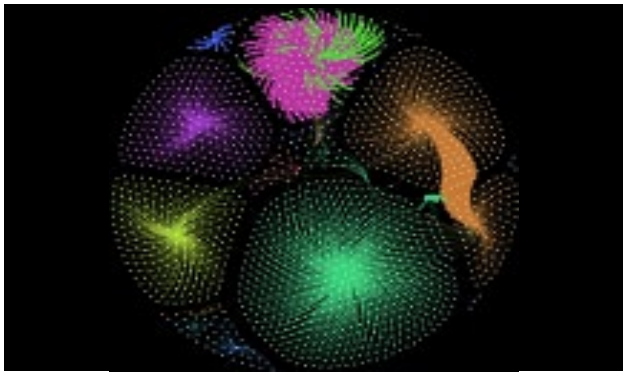
#1
worldwide leader in tape
drives and automation

Innovating into the future

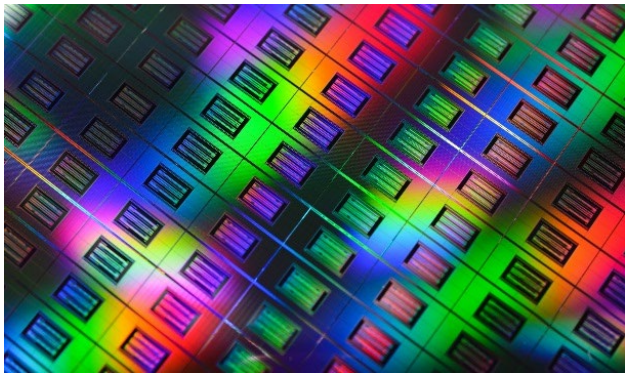
Disruptive innovations fueling HPE's transformation

Developed with Hewlett Packard Labs

Breakthroughs in photonics transmit data via light, delivering quantum leaps in speed and power-efficiency.



Powerful, intuitive tools to analyze, visualize and convert Big Data into actionable intelligence.



Massive, universal memory enables software-defined computing from the personal to the zettascale.

75

Click to see short video Celebrating over 75 years

Go ‘beyond the box’ to enable Hybrid IT

ACCELERATE
Apps

Acceleration of established and emerging apps

SIMPLIFY
Ops

Seamless scale and automation for composability

MITIGATE
Risks

Data integrity, app availability, and protection

OPTIMIZE
Investments

Architectural and financial flexibility to go anywhere

DELIVER

The **Right Mix** of on-premises and off-premises access, control, and data mobility

We are in the third wave of the all-flash transition. First was performance, second was economics, the third wave is the new normal.

In the third wave you can’t win on individual array features alone. It’s not what customers want and it’s too easy to fall into a defensive posture vs. the competition. You need to set the agenda for customers and make competitors play our game.

Change the discussion and focus on 4 key areas.

- First is the **App**: Not just traditional business apps but recognize the importance of persistent storage as customers are exploring the move to new technologies like containers.
- Second is **Ops**: Agility is top of mind for everybody and you have a unique opportunity to talk about automation and composability across servers, storage and networking.
- Third is **Risk**: We have to actively address this opportunity. Flash is enabling massive consolidation and density so more data is in less infrastructure meaning it’s even more important to protect that data.
- Forth is **Investment**: Shift to ‘as-a-service’ based consumption to help customers deal with some of the cloud pressure they are seeing from their business leaders.

HPE Storage portfolio and categories

Fabric attached storage

HPE 3PAR StoreServ

High end and midrange mission-critical Tier-1 storage arrays designed for IT-as-a-Service (ITaaS)

Nimble Storage

Simple, predictive and cloud ready storage. All Flash Adaptive Flash Secondary flash

Storage networking

HPE XP7

Tier-1 high-end storage for traditional data centers requiring the highest availability or performance

HPE StoreFabric

Fibre Channel Switches, Directors, Converged Networks, HBAs, CNAs Transceivers, Cables SAN software

Backup & data protection

HPE StoreOnce

Disk-based backup and recovery appliances with federated deduplication

HPE StoreEver

LTO tape, DAS and LAN autoloader, MSL tape libraries, media TFinity tape libraries

Entry storage

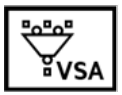
D2000
D3000
D6000
Disk enclosures

HPE MSA
Entry-level SAN storage arrays

HPE StoreEasy
File storage appliances and gateways

Software-defined storage

HPE StoreVirtual VSA
Software-defined storage for scale-out primary storage



HPE StoreOnce VSA
Software-defined storage for backup and recovery

HPE SimpliVity
Hyper Converged Software-defined infrastructure

OneView and HPE StoreFront
Converged storage management and CI management

HPE Converged Storage | **Traditional storage** | **Established products**

Section 1: Table of contents

Section 1: HPE StoreFabric

Industries most comprehensive Fibre Channel & Ethernet technology portfolio

FC Host Bus and Converged Network Adapters

Fabric & Director Switches

Storage-Optimized Ethernet Switches

HPE Smart SAN for 3PAR StoreServ

Converged Switches

Multi-fabric Switches

Storage Networking Software

Transceivers (optics) and cables

#1

Installed SANs World Wide

>25K

SAN implementations World Wide

HPE StoreFabric

What is HPE StoreFabric?

Enabling connectivity between HPE Storage and Servers

- Fibre Channel (FC) Switches: B-series, C-series
- Ethernet Switches: M-series
- Converged Networks (FC + iSCSI + FCoE)
- Host Bus Adapters (HBAs) & Converged Network Adapters (CNAs)
- Fiber Optic Cables (OM3, OM4)
- Transceivers, DAC, AOC: SFP, SFP28, QSFP, QSFP28, and breakout cables
- Automatic SAN Orchestration for 3PAR all-flash fabrics with HPE Smart San for 3PAR Software

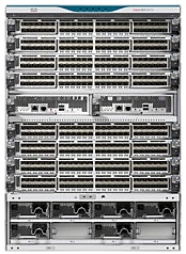
HPE StoreFabric Ethernet Switches (M-series)

HPE StoreFabric FC Switches

HPE StoreFabric Host FC & CNA Adapters

HPE StoreFabric Routers

HPE StoreFabric FC Directors



Cables, Transceivers, DAC, AOC

HPE StoreFabric offers Storage-Optimized Ethernet switches and Gen6/Gen5 (32/16 Gb) FC Storage Networking solutions to ensure your SAN doesn't suffer from outdated infrastructure, and that it is designed to meet the needs of server virtualization and flash based Storage.

HPE StoreFabric M-series Ethernet switches and Gen6 FC Storage Networking offers not just improved performance & latency for Flash based arrays—they also offers:

- Flash-ready performance meeting the need for applications that demand more throughput/lower-latency
- 3-generations of investment protection (32 Gb-16 Gb-8 Gb) FC
- 3-generations of investment protection (10, 25, 40, 50, 100) GbE
- Greater interoperability, reliability for HPE ecosystems
- Greater scalability (8-ports to thousands of ports)
- Lower operational costs
- Extensive management, monitoring and Health tools

The HPE StoreFabric FC and Ethernet Storage portfolio consists of:

- Gen 5/6 Host Bus Adapters
- Gen 5/6 Fabric Switches and Directors
- Low-latency, storage-optimized Ethernet switches
- Transceivers and Cables
- Storage Networking Software
- High-speed Ethernet NICs (in HPE servers)

Both offers customers a simple, affordable path to upgrade their SAN or Ethernet Network Infrastructure to meet the needs of their new Servers and Storage.

HPE StoreFabric

Quick view

Fiber Channel

HPE Fibre Channel Switches

Gen6 FC 32 GB and Gen5 FC 16 GB

- Protocol support—4/8/16/32 GB/s Fibre channel
- Ports—8 to 96; active ports vary by model
- **Availability**
  - ClearLink diagnostics
  - StoreFabric PowerPack+ SAN management software (B-series only)
  - NVMe fibre channel over Fabric ready and VMID ready (B-series only)
  - Ports on demand (POD) with no downtime

Brocade 16 GB Fibre Channel Blade Switches

Gen 5 FC (16 GB FC) (embedded FC switches) for HPE Synergy, or BladeSystem (c-class)

- 12-16 downlinks Internal ports and 12 uplink (SFP+); QSFP ports, **active ports vary by model**
- **Availability**
  - Monitoring and Alerting Policy Suite
  - HPE OnBoard Administrator (included with HPE BladeSystem)
  - One View integration for composability

HPE SAN Director Switches

Gen6 FC 32 GB and Gen5 FC 16 GB Gen6 B-series only and Gen5 C-series

- Ports—32 GB: 48-511-ports model dependent
- 16 GB models available as well
- **Availability**
  - Supports “six nines” availability (i.e., 99.9999%)
  - Redundant hot-swappable components
- StoreFabric PowerPack+ SAN management software (B-series only)
- NVMe fibre channel over Fabric ready and VMID ready (B-series only)
  - Automatic control processor failover
  - Non-disruptive “hot” software code loads
  - Data Center Network Manager (DCNM) (Cisco)

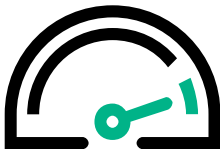
Product positioning

First Time SAN or no brand preference	Have existing infrastructure & need higher performance	Converged Protocol (FCoE/iSCSI/FC)	Large scale virtualized or Director class needs	Have existing Cisco infrastructure (entry to director class)
C-series, lowest cost p/p fibre channel, cost p/p for < 48 ports 16 GB FC, B-series 16 GB FC (lead with\(Brocade B-series; if Cisco preference lead with C-series	B-series & C-series all offer scalability & upgrade paths	HPEN 5900CP, 5930 (16 or 8 GB FC model dependent)	Lead with B-series Gen6 32 GB FC products	C-series scales Midmarket to Director class
HPE MSA, HPE 3PAR StoreServ		**HPE MSA, HPE 3PAR StoreServ, HPE XP, HPE StoreOnce**		

Gen6 Fibre Channel

Accelerate data access, adapt to evolving requirements, and drive always-on business operations with Gen6 Fibre Channel Solutions

Breakthrough Performance

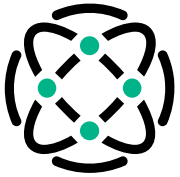


Shatter application performance barriers supporting up to 1 billion IOPS

Simplified manageability

Achieve greater control and insight to identify problems and maintain SLAs

Increased Reliability



Deliver business resiliency at scale with Gen6 FC and IP Storage Extension

Investment Protection

Protect investments to meet evolving storage requirements

Scalability, performance and availability are model dependent

HPE StoreFabric

Quick view

Ethernet Portfolio

	 **HPE StoreFabric SN2100M**	 **HPE StoreFabric SN2410bM**	 **HPE StoreFabric SN2410M**	 **HPE StoreFabric SN2700M**
Description	Ideal 25/40/50/100GbE half width ToR switch	10GbE ToR switch with 40/100GbE uplinks	25GbE ToR switch with 40/100GbE uplinks	100GbE Aggregation/ToR switch
Ports Speeds	• 16 x 40/100GbE • 32 x 50GbE • 64 x 10/25GbE	• 48 x 1 or 10GbE • + 8 x 40/100GbE	• 48 x 1 or 10GbE • + 8 x 40/100GbE	• 16 x 40/100GbE • 32 x 50GbE • 64 x 10/25GbE
Minimum Configuration	8 Ports—with 8 port license option	24x10 + 4x100 Ports—with 24 port license option	24x10/25 + 4x100 Ports—with 24 port license option	16 Ports—with 16 port license option
Size	1U half-width (½ 19" wide)	1U	1U	1U
Switching Capacity	3.2 Tb/s	2.56 Tb/s	4 Tb/s	6.4 Tb/s
Processing Capacity	4.76 Bpps	3.8 Bpps	5.95 Bpps	9.52 Bpps
Forwarding Technology	Cut Through	Cut Through	Cut Through	Cut Through
Latency	300 ns	300 ns	300 ns	300 ns

Product positioning

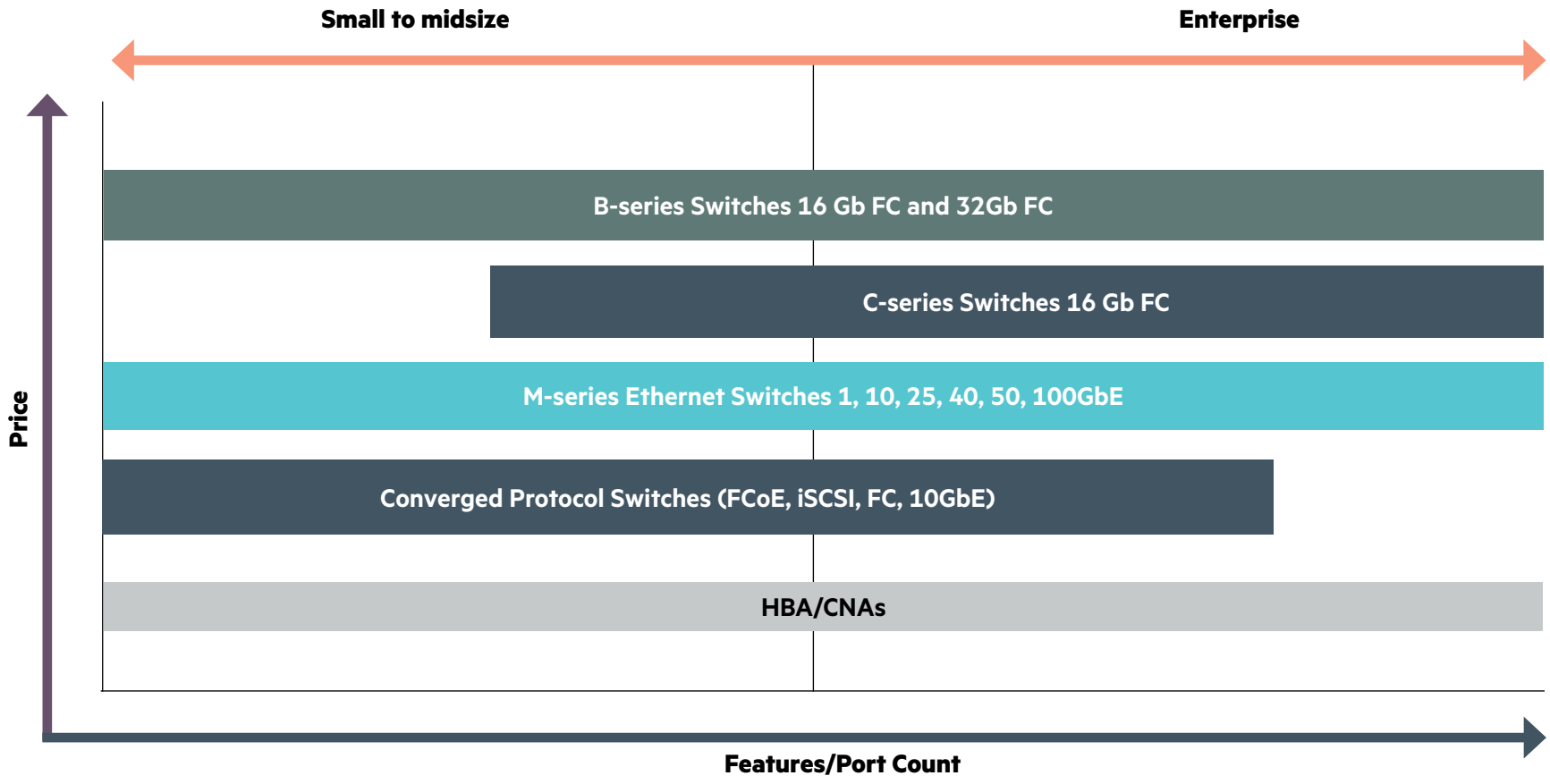
New Ethernet based SAN or file/object/hyperconverged cluster StoreFabric M-series (SN2100M, SN2410bM, SN2410M, SN2700M)	Have existing infrastructure & need higher storage network performance Lead with M-series with high bandwidth (up to 100 Gb/s) and ultra-low-latency (300 ns port-to-port)	Connectivity to block, file, or object storage, or hyperconverged Storage-Optimized M-series (SN2100M, SN2410bM, SN2410M, SN2700M)	Want Best Price/Performance Lead with M-series with the lowest cost per Gb/s	Connect up to 3 generations of Servers/Storage using Ethernet M-series with 1, 10, 25, 40, 50, 100GbE connectivity; ready for NVMe and NVMe-oF

HPE 3PAR StoreServ, HPE Nimble, HPE MSA, HPE SimpliVity

HPE StoreFabric

High-level positioning

HPE StoreFabric Family



HPE StoreFabric

Where to sell

HPE StoreFabric Storage Networking products solve your customers connectivity challenges; they increases your deal size, margins and account control. Key areas to look for:

- Ethernet-based connectivity for block (iSCSI), file, or object storage, or hyper-converged & Big Data servers
- Need for high performance, low latency and lower-cost Ethernet based fabrics
- Aging Fibre Channel SAN infrastructure e.g. 4 Gb, 8 Gb FC or even 16 Gb FC for more demanding SAN requirements
- Customer applications and storage such as 3PAR all-flash storage that demand flash-ready performance in the fabric
- Best assurance of interoperability and connectivity to HPE Server/Storage ecosystem
- Centralized automatic SAN orchestration (SAN zoning) for 3PAR StoreServ Storage with HPE Smart SAN for 3PAR software
- Moving from Direct Attached Storage (DAS) to their first FC or iSCSI SAN
- HPE 3PAR and Converged File/object and block; consider HPE Converged Protocol Switches
- Extending beyond the limitation of 3PAR Flat SAN
- Taking first step into storage consolidation of HPE ProLiant or BladeSystems server deployments
- Server virtualization or hyperconverged infrastructure (HPE SimpliVity) projects
- ToR server edge for converged networking and FC HBAs and or CNAs
- Remote Office/Branch Office (ROBO) networking opportunities
- Looking for a cost-effective to highly-available Disaster Recovery repository/archive
- Large scale, high-speed networking aggregation & core switching

Customer benefits

HPE StoreFabric Storage Networking Advantage—From small and midsized operations to data centers and cloud, HPE StoreFabric has dynamic end-to-end solutions that meet even your most challenging storage networking needs. HPE offers a comprehensive portfolio of state-of-the-art storage networking products and accessories for your entry-level, midrange and high-end environments, including FC switches, Ethernet switches, converged protocol switches and directors as well as routers, HBA, CNAs, transceivers and cables.

Why choose HPE StoreFabric Storage Networking?

Integrated—tested, certified, and serviced for the HPE storage, server and storage networking ecosystem

Differentiated—software-defined storage networking application automatically orchestrates a 3PAR all-flash fabric in minutes, not hours, simplifying a storage administers time spent on SAN configuration

Optimized—lower costs, better performance and efficiency for virtual server and cloud environments

Comprehensive—Ethernet & FC switches, directors, multi-protocol routers, data migration appliances, adapters, cables, SAN software

HPE supported—Best in class worldwide support and consulting services

HPE Smart SAN for 3PAR StoreServ

Automatic SAN Orchestration for 3PAR StoreServ all-flash deployments

Ideal for

- Starter Kit—type customers
- It Staff with limited SAN administration resources
- Seasoned SAN administrators with larger FC fabrics

Supported configurations

- Fibre Channel deployments
- StoreFabric B-series SANs, HPN 5900CP
- StoreFabric FC HBAs
- Gen6 or Gen5 FC SANs

	Number of steps
Without Smart SAN	10
With Smart SAN	2

80%
fewer steps

	Amount of time
Without Smart SAN	2 hours
With Smart SAN	1 minute

99%
less time

What is HPE Smart SAN for 3PAR?

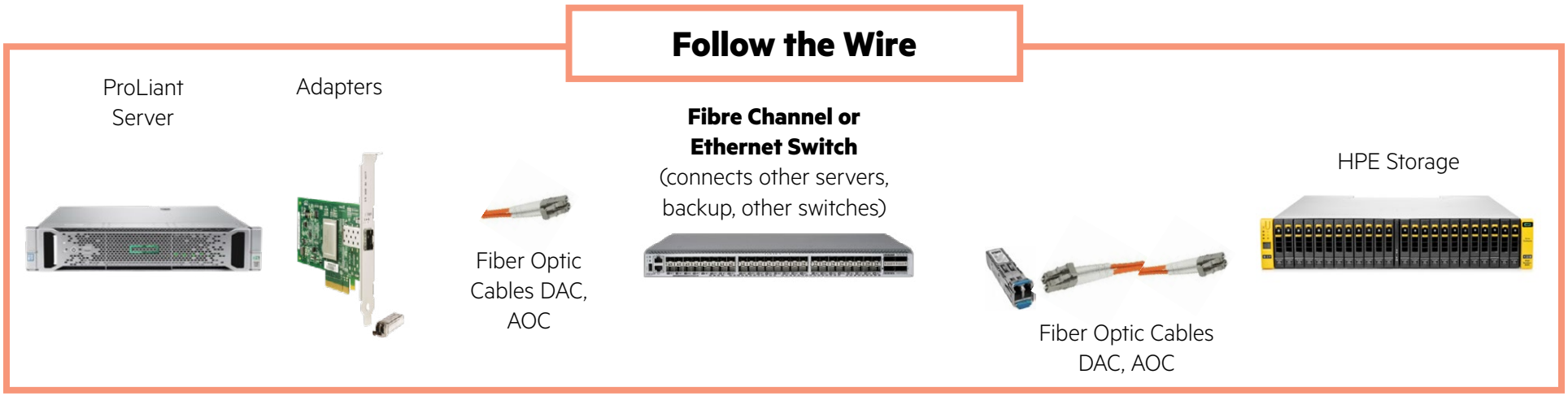
- **HPE differentiated**, over 15 patents filed, full HPE StoreFabric collaboration as an end-to-end solution with partners Brocade, Cavium (Qlogic) and Broadcom (Emulex) for assurance of fabric interoperability, Smart SAN functionality and roadmap
- Centralized SAN orchestration from 3PAR CLI/SSMC
- Software defined networking application distributed across 3PAR, and StoreFabric HBAs and Switches
- Fibre Channel Standards based:
  - –Target Driven Peer Zoning simplifies host provisioning
  - –Standards-based device discovery using fabric device management interface (FDMI)
  - –Standards-based diagnostics data collection based on read diagnostic parameters (RDPs) standards
- 3PAR IP driven SAN configuration (Target Orchestration) enabling ease of deployment- **Empowering 3PAR to drive SAN configuration and management (auto zoning)**
- Protocol agnostic framework FC today iSCSI in the future

HPE StoreFabric

- Adapters installs in the ProLiant server
- The FC or Ethernet connection cables between the ProLiant and storage
- Fibre Channel or Ethernet switch which routes traffic between ProLiant & Storage
- The storage—disk array and/or data protection
- **HPE Unique SAN technology—HPE Smart SAN for 3PAR software**

Follow the Wire

- Increase share of wallet and GM at all points in the SAN
- #1 Value-add—HPEs Ecosystem testing, certification and added quality for customer deployments
- Include storage networking in all your storage discussions, virtualization, Flash, Big Data are requiring faster networks
- Ethernet-based connectivity (M-series) for block (iSCSI), file, or object storage, or hyper-converged & Big Data servers
- Promote 32 Gb FC adapters in Gen9 or Gen8 servers even with 16/8 Gb FC SAN Gen6, still provides that extra performance boost on the host without buying switches
- Price is often a factor, work with HPE
  –HPE often has programs from the OEMs to assist on deals



HPE StoreFabric

Systems, Storage & Networking Vendors

Systems, Storage & Networking Vendors

- ALL systems and storage vendors offer leading FC switches and directors, adapters, and some transceivers through various routes to market such as: Resell, OEM, co-branded/non-branded and mix and match products from companies like Mellanox, Brocade, Cisco, QLogic, Emulex, Broadcom, Avago, etc.
- HPE's primary value add is in HPE ESSN integration and testing and added quality into the HPE ecosystem, and HPE unique software defined networking with HPE Smart SAN for 3PAR.
- HPE's SAN expertise is extensive and fully supported by an end-to-end global support and consultative organization.
- HPE provides "one stop shopping" for storage, servers and infrastructure—One PO for all your customers needs.
- HPE IT has one of the largest WW FC Brocade SAN networks—we understand Fabrics.
- HPE Offers the first line of Ethernet switches optimized for storage with StoreFabric M-series. Other systems and storage vendors either don't sell Ethernet switches or offer general-purpose datacenter switches that are not optimized for storage.

Competitive

DELL Technologies

NetApp

CISCO

IBM

HDS

lenovo FOR THOSE WHO DO.

Section 1: Entry Storage

Enclosures
D3000/D6000

HPE MSA Storage
1040/2040/2042

HPE StoreEasy
1000/3000

HPE Software-Defined Storage
VSA

HPE SimpliVity
380

#1
Entry FC SAN
MSA Storage

#1
NAS under $15K
StoreEasy Storage

Over
20K
in production
StoreVirtual VSA

Enclosures—D3000/D6000

Quick view

D3000

- 2U, 6 GB or 12 GB SAS—SAS 2.0/3.0
- 12 LFF/25 SFF Drive bays
- Dual power Supplies and fans
  - Increased system throughput with end-to-end 12 GB SAS and Smart Carriers
  - Dual Domain, Zoning
  - Scalability to 96/200 HDDs
  - Direct attach behind: HPE Gen8/9 ProLiant, Integrity servers and c-Class BladeSystem

D6000

- 5U, 6 GB SAS
- SAS 2.0
- 70 LFF HDD drive bays
  - 6 GB SAS host connectivity
  - Dual Domain, Zoning
  - Direct attach behind: HPE Gen8/9 BladeSystem and HPE Gen8/9 ProLiant DL/ML servers

Product positioning

D Series array is likely the best fit unless...

Customer is virtualizing, wants to leverage Software Defined Storage and their own x86 Server HW	Customer needs SAN with FC, SAS or iSCSI connectivity, is focused on low entry price, and is looking to get into flash	Customer is looking to migrate from traditional storage, while seeking a new, simple support approach. Needs high availability and the performance of hybrid flash
↓	↓	↓
StoreVirtual VSA	**HPE MSA**	**HPE Nimble Storage**

Enclosures best fit when—Customer has a need to expand storage capacity outside of a server's internal storage capabilities.

Manage your small and midrange business's growing storage needs by deploying the HPE D3000 or D6000 Disk Enclosures. Low-cost, flexible, tiered external storage system supporting 6 GB or 12 GB SAS with both Large (3.5") and Small (2.5") form factor drives.

The new D3000 Disk Enclosure utilizes Gen8/9 Smart Carriers and is the preferred solution for ProLiant Gen9 servers.

HPE D-Series Disk Enclosures are ideal for small application environments in small and medium businesses, remote offices and departmental locations.

hpe.com/storage/enclosures

Enclosures—D3000/D6000

Where to sell

The HPE D-Series Storage is ideal for customers where:

- Server storage is growing by leaps and bounds, exceeding their current server system capacity
- Utilizing Direct Attached Storage (DAS) and need room for growth
- Has little IT expertise, specifically regarding storage management
- Remote Office/Branch Office (ROBO) environments
- Large/enterprise customers needing departmental storage for simple application deployments

Just starting out with Microsoft Exchange or Microsoft SQL

HPE D-Series Disk Enclosures are designed for small-application environments in SMBs, remote offices, and departmental locations. This solution is ideal for customers needing to expand their storage capacity outside of the server's internal storage capabilities with the ability to grow and add capacity seamlessly.

HPE D-Series Disk Enclosures work with Exchange and the world-class HPE server lineup to provide an affordable price point along with the needed scalability to grow the size and number of mailboxes in Exchange deployments.

HPE D-Series Disk Enclosures work with SQL Server and the world-class HPE server lineup to provide an affordable price point along with the needed scalability to grow SQL Server deployments in size and number of transactions.

30-year partnership with Microsoft

Competitive

Dell/EMC, HDS, NetApp, Compellent, and Xiotech do not offer direct-attached storage. HPE offers SAN or DAS options for traditional or virtualized environments for private/public/hybrid cloud deployments; SAS, FC, or iSCSI; and all integrated tightly with data protection and server technologies.

HPE MSA Storage—MSA 1050/2050/2052

Quick view

MSA 1050—Entry SAN price leader

- Pre-configured dual-controller units 8 GB FC, 1GbE or 10GbE iSCSI, or 12 GB SAS
- MSA Gen 5 Architecture
- 4 host ports and 12 GB cache per system
- Virtualization features standard—New!
- Supports solid state drives (SSDs)
- Upgradeable to MSA 205x with Data-in-Place Upgrades

MSA 2050—Entry SAN performance leader

- Two high performance controllers with 16 GB total Cache and MSA Gen 5 Architecture
- 4-Port Converged SAN Controller supports 8 GB or 16 GB FC and/or 1GbE/10GbE iSCSI
- 4-Port 12 GB SAS Controller
- Virtualization features standard
- SSD support with integrated lifecycle integration
- SED Encryption support
- Scalability to 96/192 LFF/SFF drives (SSDs or HDDs)

MSA 2052—Hybrid flash optimized

- Comes standard with 1.6 TB (2 x 800 GB) mixed-use SSDs
- All-inclusive software suite, simple management tools included at no cost
- Built-in data tiering, standard
- 512 snapshots out-of-the-box and remote replication included
- Scale to 960 TB to stay ahead of unpredictable data growth
- Data-in-place upgrades eliminate migration and extend drive investments

Product positioning

MSA 205x is likely the best fit unless...

Customer wants to leverage Software-defined storage and their own x86 server hardware	Customer needs, or is focused on lowest entry price for traditional SAN. Installed base MSA customer	Customer looking to migrate from traditional storage, while seeking a new, simple support approach	Customer expects to grow past 16 Virtual Machines or Host Connects quickly, will need to expand to multi PB's of usable capacity
↓	↓	↓	↓
HPE StoreVirtual VSA	**HPE MSA 1050**	**HPE Nimble Storage**	**HPE 3PAR StoreServ**

#1

Low-End External FC array since 2008 with over 500,000 MSA units shipped worldwide.

The new HPE Modular Smart Array (MSA) storage systems—based on 5th generation architecture, the MSA is designed for entry-level customers looking to enhance their traditional IT with enhanced SAN technologies. The MSA arrays feature advanced data services to leverage the latest storage and host-connect technologies while offering excellent price/performance value and tools to drive storage efficiencies up. These systems are ideal for those customers with small budgets or limited storage expertise.

The new HPE MSA 2052 further drives the HPE MSA family into the world of flash acceleration with a new set of MSA models which include flash/solid-state drives (SSDs) in small and large form factor configurations. In addition to including SSDs in the base configurations, the new MSA 2052 arrays include the new all-in license in the base units delivering great value and provides a rich set of Snapshot services and sub-LUN tiering capabilities at a very attractive price compared to other hybrid or spinning array configurations.

hpe.com/storage/msa

HPE MSA Storage—MSA 1050/2050/2052

Where to sell

The HPE MSA is the ideal solution for customers:

- Moving from Direct Attached Storage (DAS) to their first SAN
- Taking first step into storage consolidation of HPE ProLiant or BladeSystems server deployments
- Initial or entry-level server virtualization projects
- Remote Office/Branch Office (ROBO) environments
- Upgrading to the latest Fibre Channel, iSCSI or SAS infrastructure
- Looking for a cost effective Disaster Recovery repository/archive
- Customers searching for lowest cost modular/building block shared storage for scale-out applications
- Needing a storage solution that protects their investment and grows as the business grows
- Looking to take their first steps into Flash on a limited budget
- Have unallocated capacity that you want to use for file shares or services

Customer benefits

The HPE MSA storage systems—designed for a wide range of use cases or deployment models. The MSA systems feature modern data services and leverage the latest host interconnect technologies. The MSA arrays feature the latest data services to leverage the latest storage and host-connect technologies while offering excellent price/performance value and tools to drive storage efficiencies up. These systems are ideal for those with small budgets or limited storage expertise. MSAs are for customers looking for storage to meet entry-level SAN and virtualization requirements. With its modular architecture, redundant hardware, and range of flexible configuration options, MSA systems provide tight integration with HPE servers and virtualization software, such as VMware vSphere or Microsoft Hyper-V. The MSA family supports flash technology and is ideal for your performance-hungry applications.

Don’t forget to attach

Remember when talking to your customers about HPE MSA also discuss:

- Backup and data protection, and HPE solutions StoreEver tape drives & auto loaders
- HPE StoreOnce disk to disk backup solutions
- HPE StoreFabric switches and HPE Networking
- HPE StoreEasy File Gateways

hpe.com/storage/msa

HPE MSA Storage—MSA 1050/2050/2052

HPE MSA 1050/205x highlights

Price band positioning	
PB6 ($50K–99.9K)	
PB5 ($25K–$49.9K)	
PB4 ($15K–$24.9K)	✓
PB3 ($10K–$14.9K)	✓
PB2 ($5K–$9.9K)	✓
PB1 (< $4.9K)	

Primary Interconnects	**FC, SAS, ISCSI**
Family Models	MSA 1050, MSA 2050 and MSA 2052
Ideal for	First SAN for SMB, Entry consolidation/virtualization ROBO, Departmental needs in larger companies
Environment	Non-storage admins (IT generalists)
Virtualization Adoption	Basic or evolved virtualized environment
Number of Hosts	4 to 12
Business Continuity	Single site, multi-site
Performance Scalability	MSA 205x > 200K Random Read IOPs > 100K Random Write IOPS
Base Software	64 snapshot and volume copy Std (MSA 1050/2050) 512 snapshot and volume copy Std (MSA 2052) Advanced virtualized data services Std (MSA 1050/2050/2052
Optional Software	Advanced Data Services (MSA 1050/2050) (Std on MSA 2052) Includes Performance Tiering, 512 Snapshots and Remote Snap capabilities
Primary Competitors	IBM StorWize v5010, EMC Unity 300, Dell SCv2020

HPE MSA Storage—MSA 1050/205x

Competitive Dell Technologies

HPE competitor: Dell EMC Unity 300

- HPE's entry SAN strategy has been reliable with four generation of products with similar designs and management. Customers don't need to learn something entirely new. With the introduction of EMC Unity 300 the VNX series of offering's road map is unclear, at best.
- Only HPE MSA provides investment protection by offering Data-in-place upgrades from previous generations which eliminate timely data migrations and costly drive investments. EMC does not offer a similar risk free migration solution. If a customer is looking to migrate from the VNX/VNXe series it is going to be a risky/expensive affair for the customer.
- The EMC Unity runs on a completely different OS as compared to the VNX series and the customers will be forced to learn entirely a new platform making the transition difficult.
- HPE MSA 205X is future-proof with support for 8 GB/s FC, 16 GB/s FC, 1GigE, 10GbE, 12 GB SAS host interfaces. The Unity 300 do not support a SAS host connectivity option.
- HPE MSA 205X can support up to 7 drive enclosures and supports up to 192 SFF drives and 96 LFF drives as compared to Dell EMC Unity 300 can support only up to 6 drive enclosures with just about 150 drives.
- HPE MSA series support RAID 1, 5, 6 and 10 while the Unity 300 supports RAID 0/1, 5 & 6.
- Don't get tricked, under the bundled Unity Software Packaging Licenses as Dell EMC products tend to have a complex licensing model capacities increase.

Why MSA wins

- **Steady and predictable entry SAN strategy:** HPE MSA storage continues to offer unmatched investment protection through five generations of data-in-place upgrades from HPE MSA2000 G1 to the current HPE MSA 1050/205x. Don't get stranded with technology shifts seen in other vendors!
- **Modular design** allows MSA 205x to start very small and scale incrementally to 192 SFF drives or 96 LFF drives.
- **Flexibility and higher performance:** HPE MSA 205x gives higher flexibility with its converged SAN controllers, which support 8/16 GB FC and/or 1/10GbE iSCSI on the same SAN controller via SFPs.
- **Cost effective and fewer add-on items:** HPE MSA 1050 and 2050 products ship standard with 64 snapshots and volume copy functionality. The MSA also avoids costly host Interface add-on cards—no Turbo key options!
- **Avoid complex maintenance** of replacing batteries through battery-free cache back up. Drive spin down capability lowers the chances of drive failure and helps reduce power consumption.

HPE MSA Storage—MSA 1050/205x

Competitive Dell Technologies

The Dell-EMC merger raises serious questions as to what products will survive, versus which products will go End-of-Life and which products will receive engineering dollars? The MD-Series is a likely candidate for EOL as it is an OEM model from NetApp (a major competitor of EMC).

HPE competitor: Dell EMC SCv2020

- With the acquisition of EMC, Dell EMC's entry portfolio is a cluttered line of products with too many overlaps for the customers to handle. Dell MD–series overlaps with it's own SCv series and each of them significantly overlap with EMC's VNX-series and Unity 300 respectively. Dell EMC has not communicated a clear roadmap to its customers and partners that creates confusion and hesitation for a long term investment plans. On the contrary, HPE MSA family offers unmatched investment protection for many years into the future.
- HPE MSA 205x offers investment protection through data-in-place upgrades from MSA P2000 G3 or MSA 1040 to MSA 205x. Dell does not offer any such investment protection for upgrades increasing overhead for customers.
- HPE MSA series supports a broader platform that includes Windows, VMware, HP-UX, Red Hat, Linux, SUSE SLES Linux while the Dell SCv2020 support is limited to just Microsoft, VMware, SLES, Citrix and Red Hat.
- HPE MSA series goes up to a drive count of up to 192 SFF w/7 x drive enclosure, 96 LFF w/7 x drive enclosure and up to 960 TB LFF; 614 TB SFF raw capacity; while the Dell SCv 2020 can go up to just 168 drives with a 672 TB capacity based on maximum number of drives.
- In September, 2017 Dell EMC announced the SCv3000 series arrays. A few key takeaways that should be noted:
  - Dell claimed 270,000 IOPS for the SCv3000, but this is for sequential reads and gives a misleading performance metric. The MSA 205x is estimated to be 70% faster than the SCv3000 based on random read or write IOPS, which is a industry standard for measuring performance.
  - The SCv3000 models lack compatibility with the previous generation of SCv2000 models and cannot replicate with one another. Again, customers are at a technology dead end with Dell EMC.

Bottom Line

HPE MSA 205x series performance and investment protection should be the key factor to break through the minds of Dell EMC customers who are already skeptical and hesitant on investing in a Dell SCv2020 series. As Dell EMC is struggling its way thro its challenges of preserving and growing its existing product portfolio and minimizing portfolio rationalization this would be the right time for HPE to convert the competitor's challenges to HPE opportunities.

HPE MSA Storage—MSA 1050/205x

Competitive IBM

HPE competitor: : IBM StorWize V5010

- In the IBM StorWize V5010 HyperSwap* is not supported, a feature IBM claims to offer high availability function that allows business continuity in a hardware failure, power failure, connectivity failure, or disasters, such as fire or flooding.
- HPE MSA offers improved security with the data Encryption feature included as default while the IBM StorWize V5010 does not offer encryption functionality at all.
- Similarly IP Replication that enables the use of lower-cost Ethernet connections for remote mirroring capability is available as a chargeable option on the entire StorWize family while Remote Replication feature is included as default on the MSA 2052.
- FlashCopy a point-in-time copy capability is offered as a licenses feature and licensed per array enclosure on the StorWize models. On the contrary, customers are offered up to 64 snapshots as s standard on the MSA 2050 upgradable to 521 snapshots and on the MSA 2052 customers are provided with 512 snapshots as standard feature; no optional software purchase required.
- On the IBM StorWize only 1 GB iSCSI is offered as standard connectivity and 16 GB Fibre Channel, 12 GB SAS, 10 GB iSCSI/FCoE, 1 GB iSCSI are all offered as optional connectivity and are charged heavily for the adapter pairs depending on the warranty period. While HPE MSA 205x is more flexible with a converged SAN controller supporting both FC and iSCSI connectivity through SFPs avoiding higher add-on costs on I/O cards. MSA 1050 gives dedicated host protocol implementations enabling users to buy what they need at lower entry price points.
- IBM Easy Tier is offered as a feature that is licensed per enclosure increasing the overhead for the customers while the Archive and Standard Tiers are provided at no charge on HPE MSA 2050 platform and along with the Archive and Standard tier Sub-LUN Tiering from SAS MDL (Archive Tier) to Enterprise SAS (Standard Tier) drives is provided at no charge for HPE MSA 2050/2052.
- IBM StorWize does not report its performance numbers.

Key Attack Point against IBM

- IBM lacks a solution based approach (Server group sold)
- Investment protection
- Cost overheads for customers needing more features

* The HyperSwap is a high availability function that allows business continuity in a hardware failure, power failure, connectivity failure, or disasters, such as fire or flooding

HPE StoreEasy—1000/3000

Quick view

HPE StoreEasy 1000 Storage

HPE StoreEasy 3000 Gateway Storage

StoreEasy 1000 Storage	StoreEasy 3000 Gateway Storage
• Supports 10s–1000s of users concurrently	• Supports up to 30,000 users concurrently
• Up to 280 TB internal storage capacity	• 100s of TBs of storage*
• Single controller	• Turnkey clustered controllers
• Simplified management for IT-generalists	• Simplified management
• 1GbE standard; options for 10GbE	• 1GbE standard; options for 10GbE, 25GbE

Product positioning

Affordable general purpose NAS for diverse user-generated and small-scale application data		Affordable SAN storage for application data and virtualization workloads	
HPE StoreEasy 1000 Storage	**HPE StoreEasy 3000 Storage**	**HPE MSA Storage**	**HPE Nimble Storage**
 **Up to 280 TB Up to 1000s of users Resilient single-node NAS**	 **10–100s TBs based on array Up to 30,000 users Cluster-ready for HA**	**Customer needs SAS or iSCSI connectivity immediately or is focused on absolute lowest entry price**	**Customer requires advanced data services (tiering, application aware, etc.) with less price sensitivity**

StoreEasy best fits when—Customer is looking for heterogeneous file sharing, home directory consolidation, file sync and share, and Remote Office/Branch Office (ROBO) environments.

HPE StoreEasy Storage is a powerful family of optimized, efficient, secure, and highly available storage to simply address the file and application data storage challenges of customers' small and medium business, branch office, and workgroup environments. Built with industry leading HPE ProLiant DNA and Microsoft Windows Storage Server, it integrates easily into new and existing environments with a straightforward, consistent management experience for IT generalists.

With the 5th generation of StoreEasy Storage family you get up 211% higher capacity, 21% lower $/GB, 2X data transfer speed, 61% increase in supported users and up to 25X faster RAID rebuilds.[1]

[1] HPE internal analysis—comparison between the previous generation 1x40 vs. the new 1650 Expanded

* Depends on available storage in attached disk array

hpe.com/storage/StoreEasy

HPE StoreEasy—1000/3000

Where to sell

HPE StoreEasy is the ideal solution for customers who are:

- Requiring homogeneous and heterogeneous file sharing for multiple client platforms.
- Looking to implement home directory consolidation for Windows users.
- Looking to simplify deployment and management of file services for Remote/Branch Offices.
- Planning to deploy File Services for Block arrays.
- Planning to deploy Hyper-V and SQL workloads over SMB or iSCSI.

Customer benefits

HPE StoreEasy Storage—offers non-intrusive data deduplication and compression that provides an average of 50–60 percent in space-savings. It also offers multidimensional security through features such as built-in encryption, sophisticated access controls, online snapshots, and the ability to run endpoint protection and backup software onboard, with auto-enabled malware protection already installed, so that data is protected at rest and in flight.

HPE StoreEasy Storage, makes it easy to protect and retain your data. Also, iTernity Compliant Archive Solution (iCAS) software, validated to meet SEC 17a-4(f) requirements, simplifies compliant archiving (optional license required) with HPE StoreEasy Storage. In addition, protect your critical HPE StoreEasy data with Double-Take Availability's real-time byte-level replication (optional license required). Both iCAS and Double-Take are available for purchase through HPE Complete.

Don't forget to attach

Remember when talking to you customers about StoreEasy also discuss:

- HPE StoreOnce disk to disk backup solutions
- HPE StoreEver tape drives and auto loaders
- HPE Data Protector software

hpe.com/storage/StoreEasy

HPE StoreEasy—1000/3000

HPE StoreEasy highlights

	StoreEasy 1X50	StoreEasy 3850
PB5 ($25–49.9K)		✘*
PB4 ($15–24.9K)	✘	
PB3 ($10–14.9K)	✘	
PB2 ($5–9.9K)	✘	
PB1 (<$4.9K)		

* Includes attached SAN

Primary Protocols and Interconnects	**SMB/CIFS and NFS over Ethernet**
Secondary Protocols and Interconnects	iSCSI Block over Ethernet; Fibre Channel for backup
Ideal for	Addressing file serving and application storage challenges of small to large orgs, branch offices, and workgroups
Sweet Spot Environment	Active Directory based authentication, IT generalist administered, single tenant
Number of Users	Up to 7,900 (StoreEasy 1850) Up to 30,000 (3PAR FC v3/StoreEasy 3850)
Capacity	5-500 TB+ (depends on StoreEasy model)
Business Continuity	Single site through multi-site disaster recovery
Base Software	Sub-file Deduplication, Snapshots, Replication, File Classification, File Screening, Quotas, Reporting, StoreEasy Server Manager, iLO Advanced License
Optional Software	Third party Double-Take Availability for scalable replication and DR, iTernity iCAS for retention and WORM

hpe.com/storage/StoreEasy

HPE StoreEasy—1000/3000

Competitive overview

StoreEasy 1000—Why we win

HPE StoreEasy 1000 Storage supports large numbers of users concurrently. Save space with granular deduplication and improve use of resources with advanced data management. Data stored on the StoreEasy 1000 is secured with virus scanning, snapshots, file and/or disk encryption and backup. StoreEasy 1000 is highly available with HPE Active Health System, mirrored operating system disks, hot plug redundant fans and power, advanced memory protection, and a 3-year hardware warranty.

StoreEasy 3000—Why we win

HPE StoreEasy 3000 Gateway Storage is a new breed of efficient, secure, and highly available storage to simply address the file storage challenges of customers' medium to large business and branch office SAN environments. StoreEasy 3000 Storage, built on industry leading ProLiant DNA and Microsoft® Windows® Storage Server 2012 R2, integrates easily into new and existing SAN environments with a straightforward, consistent management experience for IT generalists or storage administrators. You can get support from file storage experts.

StoreEasy 1000 Storage

Supports large numbers of users concurrently and integrates easily into new and existing environments with a straightforward, consistent management experience for IT generalists.

StoreEasy 3000 Gateway Storage

Helps consolidate file and block data by adding file services to Fibre Channel, iSCSI, or SAS-based Storage Area Networks (SANs). This provides higher ROI for your SAN and is easier to maintain than separate file and block storage pools.

HPE StoreEasy 1000 appliances

Competition

Standard features for NAS appliances	HPE StoreEasy	DIY file server	Dell Storage NX	Small office NAS (QNAP etc.)	NetApp FAS 2x20
Simplified storage configuration tools optimized for IT generalists	✓	✗	✗	✓	✗
Health, performance, and capacity monitoring dashboard	✓	✗	✗	✓	✓
Dual node capable system	Resilient single node	✗	✗	✗	✓
Efficient, non-intrusive deduplication and compression for maximum usability	✓	OS-dependent	✓	Compression only	Performance intrusive
Encryption for data at rest and in flight plus auto-enabled onboard malware protection	✓	OS-dependent	✗	Open source download	AV server required
Data access policies based on autonomic file classification	✓	OS-dependent	✓	✗	$$$ Third party software
Built-in replication with seamless failover* for disaster recovery/ multi-site redundancy	✓	OS-dependent	✓	✗	$$$
Responsive and comprehensive hardware and software support	✓	✗	$$$ Hardware only	✗	$$$

Unlike public cloud, you get the cost-predictability, performance, and security you want from file storage

HPE StoreEasy—1000/3000

Selling the HPE differentiators

Four areas that separate HPE StoreEasy from the competition

1. Optimized: tailored for file storage

- Pre-configured hardware and OS
- Installation wizards for fast deployment
- Best practices-driven storage provisioning tool
- Enhanced HPE StoreEasy health, performance, and capacity monitoring dashboard

3. Secure: protect your data always

- Built-in drive, file system and data in-flight encryption
- Sophisticated data access policies based on file classification
- Installed antivirus software onboard
- Optional compliant archive software

2. Efficient: save time and money

- Support for tens to thousands of concurrent users
- Multiple diverse workloads
- Non-intrusive sub-file deduplication for 50–60 percent space savings
- File sync and share from anywhere
- Simple, affordable, dense capacity expansion

4. Highly available: prevent business and user disruption

- Continuous health monitoring with HPE Active Health System
- File system online self-healing
- Replication for data distribution and disaster recovery
- Three-year hardware warranty plus one-year 24x7 telephone software support from storage specialists

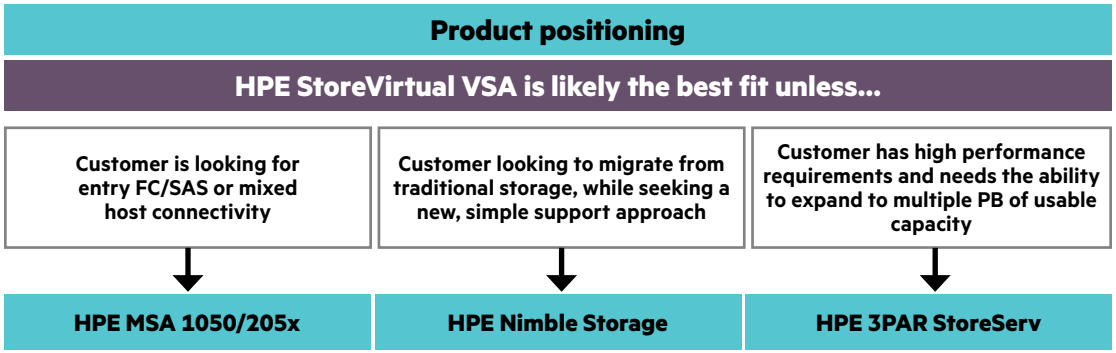
HPE StoreVirtual VSA

Quick view

HPE Software-Defined Storage

Flexibility of Software

- Network RAID—synchronous replication
- Peer Motion data mobility
- Non-disruptive, linear scaling of capacity and performance
- Adaptive Optimization auto-tiering
- Space-efficient thin provisioning
- Two-node quorum & integrated disaster recovery
- Split networks
- Space reclamation & multi-pathing
- Snapshots, Remote Copy, Multi-site stretch clusters



HPE StoreVirtual VSA Leader in Software-Defined Storage

HPE StoreVirtual VSA is hypervisor independent, hardware agnostic software that turns any x86 virtualized server's storage into a virtual array. It uses the server's internal, direct-attach, or external storage allowing customers to leverage the many advanced virtualization features that require fully featured shared storage without purchasing dedicated storage solutions. Sell into virtualized environments looking for convergence within the server infrastructure.

- Supports iSCSI protocol
- Supports physical and virtual host servers
- Provides persistent storage for stateful containers, deployed with Docker, through either a native Docker plug-in or OpenStack Cinder drivers
- Flexible drive options support mix of drives (SSDs, HDDs, or SSDs + HDDs)
- No licensing penalty for implementing all-flash deployment model
- Leverage any kind of storage that vSphere can use (JBOD, SAN, local)
- Built-in sync/async replication without additional software
- Integrated with HPE Recovery Manager Central; supports replication with 3PAR (Peer Copy)

hpe.com/storage/StoreVirtual VSA

HPE Software-Defined Storage—VSA

Where to sell

The HPE StoreVirtual VSA is the ideal solution for the following use cases:

- Consolidation within virtualized environments—main data center or remote locations
- Test/Dev environments for the ability to repurpose servers quickly
- Leveraging existing x86 servers and repurposing as shared storage

Software-Defined Storage

Software-Defined Storage describes how software applications can layer on server infrastructures and delivers advanced data services such as snapshots, thin provisioning, and multi-site disaster recovery.

VSA

Click on icon for addition details

Get HPE StoreVirtual VSA for free and maximize the benefits of server virtualization. Create resilient shared storage inside HPE ProLiant servers without increasing costs or footprint.

VSA

Click on icon for addition details

hpe.com/storage/StoreVirtual VSA

HPE Software-Defined Storage—VSA

HPE StoreVirtual VSA
Leader in Software-Defined Storage

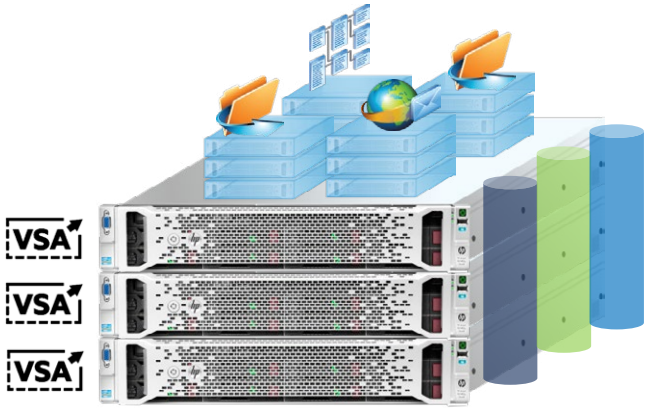
Turn servers into fully featured, highly available arrays

- Supports any server certified for VMware vSphere or qualified from Microsoft Hyper-V
- Convert existing direct-attached storage into StoreVirtual Storage
- Leverage/Repurpose existing hardware

Hardware Agnostic
Any x86 server or storage platform

Hypervisor independent
VMware MS Hyper-V KVM

Federated & Scale-Out
Move data between sites & systems



Shipping since 2007

Over 20 thousand licenses purchased

80% Lower capital investment

50% Less physical footprint

60% Reduce energy costs

hpe.com/storage/StoreVirtual VSA

HPE Software-Defined Storage—VSA

Competitive VMware

Why HPE StoreVirtual VSA wins

- Non-restrictive hardware requirements supports any storage on vSphere HCL
- No lock-in to vSphere—customers can migrate to another hypervisor
- One vendor support for both software (VSA) & hardware (server)
- Best of breed all HPE hardware & software stack
- Combine with StoreOnce VSA for backup with dedupe
- Interoperability with physical StoreVirtual storage appliances

	HPE StoreVirtual VSA	VMware VSAN
Multi-hypervisor support	Yes	No (limited to vSphere)
Useable with physical servers	Yes	No (Can only be used by ESXi hosts in cluster)
Single vendor for both software (SDS) & hardware (server)	Yes	No
Licensing based on per node capacities	Yes	No (Pricing is per host CPU)
Support included in licensing	Yes	No
No application VM limits	Yes	No (capped at 200 VMs)

HPE Software-Defined Storage—VSA

Competitive EMC ScaleIO

Why HPE StoreVirtual VSA wins

- Future proof with non-disruptive upgrades to high-performance storage appliances
- Combine with software-defined dedupe—HPE StoreOnce VSA
- Automatic protection with Network RAID
- Auto-tiering with SSDs support high performance **AND** usable capacity
- Metro-cluster support (vMSC certified)
- Supports physical and virtual servers—deploy on only 2 servers
- Compatible with physical StoreVirtual storage appliances
- Leverage both DAS and External Storage (SAN)

	HPE StoreVirtual VSA	EMC ScaleIO
Only servers contributing storage are licensed	Yes	No (servers using storage also require licensing)
DAS or SAN support as storage target	Yes	No (DAS only)
Active-active synchronous replication	Yes	No (local replication only)
Metro-clustering capabilities	Yes (vMSC certified)	No
Compatible with physical storage appliances	Yes	No

HPE SimpliVity 380

Quick view

Providing an unmatched data virtualization platform

- **Guaranteed data efficiency**—Guaranteed 90% capacity savings across VM storage and backup through de-duplication, compression, and optimization
- **Built-in resiliency, backup, and disaster recovery**—Highest levels of data integrity and availability ensured by built-in resilience, backup, and replication
- **Global VM-centric management and mobility**—Simple, global management through VMware vCenter enables quick deployment, backup, cloning, movement, and restoration of VMs. 1 TB VM restore in under 60 seconds

Product positioning

HPE SimpliVity 380 is likely the best fit unless...

Customer is not ready for hyperconverged, but looking to leverage software-defined storage and take advantage of their existing x86 server hardware	Customer is not ready for hyperconverged, but is looking to migrate from traditional storage, while seeking a new, simple support approach	Customer requires the most flexible, unified storage for larger scale deployments and demanding applications in an all-flash datacenter, with the ability to expand to multi PB's of usable capacity
↓	↓	↓
HPE StoreVirtual VSA	**HPE Nimble Storage**	**HPE 3PAR StoreServ**

Powerhouse hyperconverged infrastructure

The HPE SimpliVity 380—The industry's most powerful hyperconverged platform, uniting best-in-class data services with the world's bestselling server.

- **Fully integrated system:** Combines servers, storage, networking and all other devices below they hypervisor, into a single hyperconverged system. Simplifies management and delivers great cost efficiency and agility with increased visibility and control.
- **Peak and predictable performance:** An all-flash portfolio provides predictable and linear performance at near-wire speeds with reduced latency. Hardware-assisted inline deduplication, compression, and optimization helps minimize I/O and network traffic, improving performance while delivering great storage and bandwidth efficiency.
- **Scale in and scale out:** Easily expand or shrink configurations as your needs change. Each node supports a large number of fully protected virtual machines (VMs), with the networked collection of nodes at both local and remote sites managed as a single entity.

hpe.com/simplivity

HPE SimpliVity 380

Where to sell

The HPE SimpliVity 380 is the ideal solution for customers who are considering moving from traditional IT infrastructure

- SMB customers looking for an affordable hyperconverged solution that includes built-in data protection and integrated disaster recovery
- Midmarket data center consolidate
- Large enterprise organizations that are looking to simplify and consolidate infrastructure for some or all of their virtualized workloads
- ROBO—Enterprise with globally distributed branch offices that are struggling with deploying consistent strategy for production apps and backup across entire enterprise
- Data Center consolidation—The enterprise customer looking to reduce complexity and add efficiencies in capex and opex
- Data protection—Enterprise needing to provide critical services like backup and DR, to protect from threats like ransomware while minimizing complexity and cost
- Data and workload migration—Enterprises experiencing rapid growth and struggling to make infrastructure decisions that will scale over time
- Tech refresh—Enterprises looking to modernize infrastructure to achieve better functionality, simplicity, and TCO savings as they grow. May also be forced by changing vendor landscape
- VDI—Enterprises struggling to keep pace with growth demanded by virtual desktop infrastructure

Customer benefits

With HPE SimpliVity, you can streamline and enable IT operations at a fraction of the cost of traditional and public cloud solutions by combining your IT infrastructure and advanced data services into a single, integrated solution. HPE SimpliVity is a powerful, simple, and efficient hyperconverged platform that combines advanced data services with the world's best-selling server and offers the industry's most complete guarantee.

HPE SimpliVity 380 assimilates 8 to 12 core data center functions such as the hypervisor, compute, storage, storage network switching, backup, replication, cloud gateway, caching, WAN optimization, real-time deduplication, and more. It delivers the performance, reliability, availability, security, efficiency, backup, and disaster recovery that enterprises expect, in a fully integrated, easy-to-deploy system. Furthermore, the HPE SimpliVity solution consolidates these capabilities into a single x86 building block that scales out with additional nodes, resulting in up to three-fold TCO savings.

Remember

When talking to your customers about HPE SimpliVity 380, also discuss:

- SimpliVity 380 Rapid DR options
- Other backup and data protection offerings from HPE

hpe.com/simplivity

HPE SimpliVity HyperGuarantee

- **HyperEfficient:** save 90% capacity across storage and backup combined
- **HyperProtected:** under 1 minute to complete a local backup or local restore of a 1 TB VM
- **HyperSimple:** 3 clicks to back up, restore, move, or clone a VM from a single console
- **HyperManageable:** under 1 minute to create or update backup policies for 1000s of VMs across dozens of sites
- **HyperAvailable:** add or replace HPE SimpliVity systems with zero downtime for local or remote sites
  - –Zero disruption to local or remote SimpliVity backups
  - –Zero reconfiguration of SimpliVity backup policies for local or remote sites
  - –Zero re-entry of IP addresses in remote sites

HPE SimpliVity HyperGuarantee applies to current HPE SimpliVity and HPE OmniStack products and the new HPE SimpliVity 380 product

HPE SimpliVity 380

Competitive Nutanix

HPE SimpliVity 380		Nutanix	
✓	**Data efficiency—Always-on compression and de-duplication** No tradeoffs on performance vs. storage efficiency	✗	**Must weigh benefit vs. cost for dedupe and compression** Must consider tradeoffs for any workload scenario
✓	**Data protection and resilience—Can sustain multiple drive failures across multiple nodes without exposing data to loss** Very high and robust enterprise data protection and resiliency	✗	**Limited Software based RAID—Loss of a single disk can expose data to loss** Requires RF3 to match data resiliency of HPE SimpliVity
✓	**Lowest entry cost start for Small Businesses/ROBO** 2-node cluster configuration entry point	✗	**Higher startup cost** Minimum entry level of 3 node cluster is required
✓	**Built-in business continuity** Very high enterprise data protection and resiliency	✗	**Required purchase of VEEAM or other backup service = Money** for full backup and resiliency
✓	**Simple/Streamlined operations with global VM-centric management** simplify operations—Roadmap for data mobility with OneView powered OE	✗	**Added costs for multi-site configurations/management** Higher tier software required for multi-site configurations
✓	**Consistent, validated performance** proven through customer deployments	✗	**No public benchmarks or performance comparisons** information sharing not allowed with current EULA
✓	**Single-vendor Level 1 and Level 2 WW support by World Class HPE Support** on the entire stack: hardware, software, hypervisor, and cloud	✗	**Multiple support contact points** dependent on OEM vendors for support; inconsistent coverage across the globe

Section 2: Table of contents

Section 2: Fabric Attached Storage—Midrange

HPE Nimble Storage

HPE InfoSight

HPE Nimble Storage Adaptive Flash

HPE Nimble Storage All Flash

HPE 3PAR StoreServ

3PAR 8000/9450

Converged & All-Flash Arrays

The Power of Predictive

#1

Midrange Array Best-in-Class Two Years in a Row

HPE InfoSight—AI for the Data Center

HPE InfoSight™ eliminates wasted time and headaches by transforming how storage is managed and supported. Through cloud-based predictive analytics and machine learning, InfoSight predicts and resolves 86% of problems before your business is impacted and ensures 99.9999% of guaranteed availability. And, as it analyzes millions of sensors every second, all customers benefit as their systems get smarter and more reliable.

InfoSight watches over your infrastructure 24/7 so you don't have to spend your days, nights, and weekends dealing with storage issues anymore.

Predicts and Prevents Problems

- **Proactive Resolution:** InfoSight automatically predicts and resolves 86% of problems before you even know there is an issue.
- **Solves Problems Beyond Storage:** By collecting and correlating data across the infrastructure stack, InfoSight uncovers the root cause of problems spanning storage to VMs. In fact, 54% of problems it resolves are outside of storage.
- **Prevents Known Issues:** If a problem is detected in one system, InfoSight learns to predict the issue and prevent other systems in the installed base from experiencing the same problem.

Global Visibility and Learning

- **Sees What Others Can't:** InfoSight sees from the past to the future and across your infrastructure, providing deep health and performance insights from storage to VMs.
- **Simplifies Planning:** InfoSight takes the guess work out of planning. It accurately predicts capacity, performance, and bandwidth needs. It also lets you explore multiple scenarios using models derived through installed-based learning.
- **Storage Gets Smarter:** Every system gets better and more reliable by learning from the collective insights and experiences of the installed base.

Support You Actually Like

- **No More Escalations:** Proactive resolution means there's no need for Level 1 or 2 support. In the rare case support is needed, speak directly with a Level 3 expert who will quickly resolve the problem. No more mundane questions, no more painful escalations, no more being asked to recreate the problem and send large log files—just the support you've always wanted.
- **Rapid Root Cause:** Nimble support engineers have deep expertise in storage, servers, OSs, hypervisors and applications. And, since InfoSight already has all the information about the problem and your environment, the root cause for even the most complex issues are quickly identified.
- **We Call You:** If InfoSight detects something that can't be automatically resolved, our engineers proactively investigate and reach out to you with prescriptive recommendations—even if the problem is outside of storage. Never worry about who to call because we call you.

hpe.com/Nimble

HPE Nimble Storage—Flash Arrays

HPE Nimble Storage Adaptive Flash CS-Series arrays

- CS1000, CS3000, and CS5000 support scale up to any model within the CS family
  - CS1000H supports scale up to the CS3000H
- The CS1000H consists of up to 22 HDDs and 2 DFCs (Dual Flash Carriers). All other CS Series models consists of up to 21 HDD drives and 3 DFCs (holding up to 6 SSDs)
- Each array controller has 2x 10GbE ports built in
  - Optional ports are 1GbaseT, 10GbaseT or 10GbE SFP+
- All HPE Nimble Storage arrays support iSCSI and Fibre Channel storage protocol

HPE Nimble Storage All-Flash AF-Series arrays

- Scales up to 8 PB+ and 1.2 million IOPS at sub-ms latency
- Scale-up capacity and performance non-disruptively in an array
- Scale-out with up to four arrays managed as one
- Each array controller has 2x 10GbE ports built in
  - Optional ports are 1GbaseT, 10GbaseT or 10GbE SFP+
- All HPE Nimble Storage arrays support iSCSI and Fibre Channel storage protocol

Product positioning

HPE Nimble Flash array is likely the best fit unless...

Customer is not interested in deploying Storage as a stand alone infrastructure. They show strong affinity towards hyper-converged architecture	**Customer has older MSA arrays and is looking to upgrade to newer units. Or they require an affordable storage array for the performance needs of small sites, remote office/branch office, consolidation and taking first steps into flash on a budget**	**Customer requires the most flexible, unified storage for larger scale deployments and the most demanding applications in an all-flash datacenter, with the ability to expand to multi PB's of usable capacity**
↓	↓	↓
HPE SimpliVity	**HPE MSA**	**HPE 3PAR StoreServ**

Quick view

Predictive
Radically Simple
Cloud Ready

HPE All Nimble arrays—combine a flash-optimized architecture with InfoSight™ Predictive Analytics to provide fast, reliable access to data and measured availability greater than 99.9999 percent.[2]

HPE Nimble's Multicloud Flash Fabric unifies All-Flash Arrays, Adaptive Flash (hybrid) Arrays, and Multicloud storage into a single solution with common data services and easy mobility. Now flash storage can be optimized for any workload whether on-premises or in the cloud. By combining All-Flash Arrays, Adaptive Flash Arrays, and HPE Nimble Storage Cloud Volumes into a single Multicloud Flash Fabric, workload requirements and SLAs are easily achieved without compromise or overprovisioning performance or capacity.

The HPE Nimble Secondary Flash Array represents a new type of data storage optimized for both capacity and performance, a single device optimized for backup, DR and secondary storage. Put your backup data to work and run secondary workloads with flash performance.

More details on the HPE Nimble SF-Series in the Backup, Recovery and Archive section of the guide

[2] Based on actual customer data collected by the Nimble Storage Support organization as of March 2017

hpe.com/Nimble

HPE Nimble Storage—Flash Arrays

Where to sell

The HPE Nimble Adaptive Flash Array is the ideal solution for customers:

- Upgrading from traditional and legacy SAN storage to flash while seeking a new, simple, support approach
- Looking for a cost effective modular storage solution, that includes flash, for scale-out applications
- Wanting a highly-available hybrid flash solution where they can start small and grow without disruption
- Customer is concerned that on-premises purchases today may not fit with flash or cloud strategy for tomorrow

The HPE Nimble All-Flash Array is the ideal solution for customers:

- Looking for cost-effective all-flash storage modular building block for scale-out applications
- Current infrastructure doesn't meet performance requirements
- Wanting a highly-available all flash solution where they can start small and grow without disruption
- Needs greater performance for latency-sensitive apps, or faster performance for VM intensive workloads
- Customer is concerned that on-premises purchases today may not fit with flash or cloud strategy for tomorrow

Customer benefits

By bringing together the existing HPE flash storage portfolio with Predictive Analytics from Nimble Storage, now a Hewlett Packard Enterprise company, HPE is positioned to offer customers the broadest and deepest storage portfolio for hybrid IT.

Simple, predictive flash storage with cloud hooks, HPE Nimble Storage is ideal for customers of any size needing robust, always on data services with the Multicloud Flash Fabric making it easy to deploy flash everywhere. Designed as flash storage from the ground up, customers can use any combination of all-flash and hybrid flash across private and public clouds. Transparently migrate data from anywhere to anywhere, future-proofing your data center for the cloud with HPE Nimble Cloud Ready Flash arrays.

Don't forget to Attach

Remember when talking to your customers about nimble Flash Storage also discuss:

- HPE StoreFabric switches and HPE Networking
- HPE Nimble Secondary Flash arrays
- HPE StoreOnce disk to disk backup solutions
- HPE Cloud Volumes to support applications in Microsoft Azure and Amazon AWS

hpe.com/Nimble

HPE Nimble Storage—Flash Array highlights

HPE Nimble Adaptive Flash Arrays

Speed and Efficiency—Purpose-built flash architecture delivers sub-millisecond performance with unparalleled efficiency. And it's five times faster than other hybrid solutions.

Adaptive—Assign, or change, the service level on an application with the click of a button.

- **Auto Flash:** High performance for mainstream applications.
- **All Flash:** Guaranteed flash performance for the most performance sensitive applications.
- **Minimal Flash:** Optimized for lowest cost of capacity.

Simple to manage—Storage is pre-configured and optimized for applications out-of-the-box.

- Manage storage at VM-level granularity using VMware VVols or through a vCenter plugin.
- Integration and certification with major hypervisors, applications, and infrastructure components.

HPE Nimble All-Flash Arrays

Performance—Built for speed, Nimble Storage All Flash arrays deliver the performance and low latency needed to power the flash data center. The Multicloud Flash Fabric allows seamless application mobility between all flash, hybrid and the cloud.

Lower TCO—All flash performance at less than the cost of legacy performance disk solutions and one to two thirds lower TCO than other all flash arrays.

Data Protection—Nimble Storage cost-optimized Adaptive Flash arrays can be used for backup, DR, test/dev and archival even when primary copies are stored on All Flash.

Scale Out—Scale-to-Fit, grow capacity and performance of an array independently and non-disruptively and managed as a single entity.

"HPE's $1+ billion acquisition of Nimble Storage, a midrange vendor of both hybrid flash arrays and all-flash arrays, will make HPE's ability to sell highly flash-optimized enterprise storage to midmarket and small and medium-sized business (SMB) customer much stronger. **This is a bold, strategic move on HPE's part that will benefit HPE and Nimble's customers alike.**"—IDC

hpe.com/Nimble

HPE Nimble Storage—Beating the competition

HPE advantages

True predictive analytics:
InfoSight, with the resulting operational simplicity, is the number one reason customers choose HPE Nimble Storage over competitors. It has allowed HPE Nimble to achieve greater than 99.9999% measured availability across its entire installed-base. And, with machine learning, your array continually gets smarter as InfoSight learns to inoculate systems against known issues.

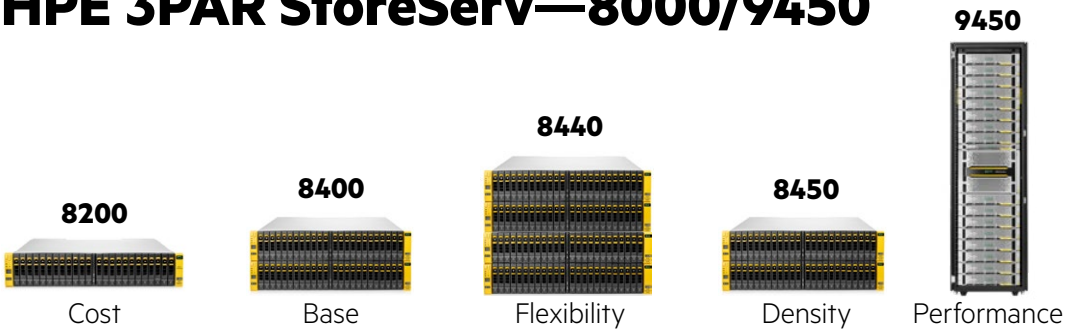
Common platform for All Flash and Hybrid Flash:
Unlike Pure Storage, both HPE Nimble and 3PAR span both all-flash and hybrid flash enabling customers to setup disaster recovery at a third of the cost. Transparently move applications between any type of array without application interruption.

Cloud-ready:
HPE Nimble Cloud Volumes, an enterprise-grade storage service for Amazon Web Services and Microsoft® Azure, make Nimble arrays cloud-ready. EMC and Pure Storage are limited to on-premises storage deployments only.

Efficient and scalable:
Industry-leading flash efficiency with always on inline deduplication and compression to achieve up to 5X or more data reduction at the perfect price/performance/capacity sweet spot. Modular and simple scalability with non-disruptive scale-up and scale-out.

Better together:
HPE is unique if you position the entire portfolio and elevate “beyond the box”. From Flash to SAN Networking to Compute to Composability (with HPE Synergy) and Services, you can change the game. Dell+EMC is losing market share in external storage and Pure Storage is a “one trick flash pony”. HPE uniquely delivers stability and innovation and now 3PAR combined with HPE Nimble Storage provides best in class flash storage and predictive analytics for a wide range of needs.

HPE 3PAR StoreServ—8000/9450



Spinning or flash media | **All-flash media**

	8200	8400	8440	8450	9450
Controller nodes	2	2 or 4	2 or 4	2 or 4	2 or 4
Processors	2 6-core 2.2 GHz	2-4 6-core 2.2 GHz	2-4 10-core 2.4 GHz	2-4 10-core 2.4 GHz	4-8 10-core 2.4 GHz
Max total cache	832 GiB	1664 GiB	8383 GiB	384 GiB	896 GiB
Max host ports	12 ports	24 ports	24 ports	24 ports	80 ports
Max raw capacity	1000 TiB	2400 TiB	4000 TiB	3351 TiB	6000 TiB
Max usable file capacity	2-128 TiB	2-256 TiB	2-256 TiB	2-256 TiB	2-512 TiB
16 GB/s Fibre Channel Host Ports	4-12 ports	4-24 ports	4-24 ports	4-24 ports	0-80 ports
10 GB/s iSCSI Host Ports	0-4 ports	0-8 ports	0-8 ports	0-8 ports	0-40 ports
10 GB/s FCoE Host Ports	0-4 ports	0-8 ports	0-8 ports	0-8 ports	0-24 ports
1 GB/s Ethernet Adapter	0-8 ports	0-16 ports	0-16 ports	0-16 ports	NA
10 GB/s Ethernet Adapter	0-4 ports	0-8 ports	0-8 ports	0-8 ports	0-24 ports

Which HPE 3PAR StoreServ is the best fit...

Cost	**Base**	**Flexibility**	**Density**	**Horsepower**
Price is driving factor. Capacity up to 1000 TB is adequate	Upgradeable with up to 4 controller nodes	Converged flash w/all-flash performance, at price of hybrid	All-flash with > 1 Million IOPs, optimized for a 4U footprint	All-flash with > 2 Million IOPs, 18 PiB usable
↓	↓	↓	↓	↓
8200	**8400**	**8440**	**8450**	**9450**

Quick view

Effortless tier1 storage with midrange affordability

HPE 3PAR StoreServ delivers one architecture from midrange to enterprise, including an all-flash array with integrated file, block and object access and common data services and common management across the portfolio. More transactions, better availability, lower costs regardless of how you consume storage, with a cloud-like pay as you grow model or a traditional capital expense model. Hewlett Packard Enterprise, has you covered.

HPE 3PAR StoreServ 8000 Storage, with the lowest all-flash starting price, delivers the performance advantages of a purpose-built, flash-optimized architecture without compromising resiliency, data services, or data mobility. The performance of all-flash, the affordability of a hybrid storage with converged file, block and object access and the scalability and resiliency of high-end storage.

HPE 3PAR StoreServ 9000 Storage is based on the proven HPE 3PAR architecture and is purpose built for all-flash consolidation, delivering the performance, simplicity and agility needed to support your hybrid IT environment. Whether your applications are virtualized, containerized, or traditional, the HPE 3PAR StoreServ 9000 Storage offers you a solution that can deliver improved business results. The HPE 3PAR StoreServ 9000 Storage can scale to 18 PiB of usable all-flash capacity or 6 PiB raw, offering plenty of room for growth. Consolidate multiple midrange systems for more performance and more scale for your all-flash data center.

hpe.com/storage/3PAR 8000
hpe.com/storage/3PAR 9000

HPE 3PAR StoreServ—8000

Where to sell—8000 family

HPE 3PAR StoreServ 8000 is the ideal solution for customers who:

- Need an affordably priced, non-disruptive solution that is scalable to 4 nodes
- Looking for true convergence of file, block and object access
- Require a single architecture to take advantage of common data services, including integrated file services, and common management across their data center
- Deploy some or all applications and data types in physical or virtual environments and the cloud
- Need to upgrade their SAN especially in virtualized environments or to address unpredictable workloads with a modern architecture
- Require low latency, higher speed support for higher VM density
- Are large customers/enterprise customers needing departmental storage

HPE 3PAR StoreServ 8440/8450 is the ideal solution for customers who:

- Have performance demands with new workloads such as OLTP, VDI, and analytics
- Have virtualized much of their infrastructure with the exception of mission-critical applications for fear that they'd suffer a performance penalty
- Want increased performance needs for business critical applications in the mainstream. With usable capacity at $1.10/GB, 3PAR StoreServ 84x0 is affordable for any application or workload
- Don't want to introduce a new silo'ed solution to when adding an AFA to their environment
- Need to optimize their existing database without a major re-architecting
- Require a single architecture to take advantage of common data services and common management across their data center
- Require low latency, higher speed support for higher VM density

Customer benefits—8000 family

Redefining the midrange

You can now find Tier 1 scalability, resiliency and advanced features at a mid-range price. With up to four controllers and replication between any 3PAR StoreServ models, compromising between application availability and affordability is now a thing of the past.

When performance matters

HPE 3PAR StoreServ 84x0 Storage meets the needs of virtually all organizations. It is ideal for those that run applications where milliseconds can represent millions of dollars and where business decisions based on analytics need to be made rapidly in hours and minutes vs. weeks and days.

*Starting price

$15K

Expand your sales and margins

Thanks to all-inclusive software licensing, 3PAR is the only array with included software that optimizes the entire I/O path for flash at no additional cost:

- File Persona increases capacity requirements by opening up new file based workloads for consolidation
- Smart SAN simplifies StoreFabric attach with SAN zoning automation of 16/32 GB switches
- Recovery Manager Central (RMC) drives StoreOnce attach with flash-integrated data protection

* Estimated US street price—HPE 3PAR StoreServ 8200, six 400 GB SSD drives, all-inclusive single-system software ~ $15K

hpe.com/storage/3PAR 8000

HPE 3PAR StoreServ—9450

Where to sell—9450

HPE 3PAR StoreServ 9450 is the ideal solution for customers who:

- Looking to consolidate enterprise data center applications and workloads from legacy storage.
- Looking for an enterprise-class all-flash storage platform that delivers the highest levels of performance along with data compaction efficiencies like compression and deduplication that make it affordable.
- Needing to accelerate performance for critical applications while reducing footprint, power, and cost.
- Looking to improve density of storage and support mixed workloads.
- Looking to transition to Hybrid IT with a need for flash storage that goes beyond just array hardware and offers integration at the data center level.
- Wanting to transition to an all-flash data center, has limited footprint.
- Bottlenecks due to legacy Fibre Channel SAN infrastructure.
- Looking for cloud-like storage model.

Customer benefits—9450

Best in class all-flash consolidation

The HPE 3PAR 9450 continues our trend of disrupting the midrange market by not only delivering close to twice the all-flash performance of the 3PAR 8450, with 1.8 million IOPS at sub millisecond latency, it is also a consolidation monster with 18 PBs of usable storage. Add unified agility for any file or block workload, giving you up to 80 total host ports to maximize those unified capabilities, enabling unprecedented flexibility to connect to all those different workloads and run as many data services as you need.

Expand your sales and margins

Thanks to all-inclusive software licensing, 3PAR is the only array with included software that optimizes the entire I/O path for flash at no additional cost:

- File Persona increases capacity requirements by opening up new file based workloads for consolidation
- Smart SAN simplifies StoreFabric attach with SAN zoning automation of 16/32 GB switches
- Recovery Manager Central (RMC) drives StoreOnce attach with flash-integrated data protection

hpe.com/storage/3PAR 9000

HPE 3PAR StoreServ

Flash benefits

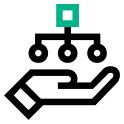
At a price customers can afford
$1.10 per GB usable for All-Flash & Converged Flash

Uses Case	Performance Increase examples	So What
OLTP/Database	**5-10x** increase in average performance	Acceleration for increased Agility: the ability to offer new services or add more concurrent users Consolidation for increased efficiency: standardize multiple databases onto a smaller pool of servers and reduce storage footprint
OLTP/Database	**6x** improvement in data load	
Web 2.0	**9x** query processing throughput	
Web 2.0	**6x** faster searches	
Business Analytics	**4x** faster response times	
Business Analytics	**40x** faster data warehouse queries	The power to pull together many sources of data in real time, discover actionable insights and optimize your business results
Desktop Virtualization (VDI)	**20x** improvement in login times	Significantly improve user experience and reduce the cost of VDI deployment by as much as 50%

HPE 3PAR StoreServ

All-Inclusive Software

HPE 3PAR All-inclusive Software Contents




Management	Protection	Optimization	Efficiency
StoreServ Management Console	Remote Copy	Adaptive Sparing	Zero Detect
Command Line Interface	Recovery Manager Central	Adaptive Flash Cache	Deduplication
System Reporter	File Store snapshots	Priority Optimization	Compression
Service Processor	Persistent Checksum	Adaptive Optimization	Data Packing
File Persona	Persistent Cache	Express Protect	Thin Provisioning
Smart SAN	Persistent Ports	Adaptive Reads and Writes	Virtual Copy
HPE OneView integration	Virtual Domains	Express Writes	Thin Conversion
WSAPI, SMI-S and SNMP	Virtual Lock and File Lock	Autonomic Cache Offload	Thin Persistence
OpenStack integration	VSS Provider	Mixed Workload Technology	Express Layout
VMware integration			Express Indexing
Dockers containers support			Express Scan

Peer Persistence & CLX **Federation (Peer Motion, Online Import)**

Data-at-rest encryption

Existing customers can transition at their own pace

Part of all-inclusive single system software licensed as part of 3PAR hardware

Part of all-inclusive multi system software license (frame)

Part of HPE 3PAR Data-at-Rest Encryption software license (frame)

So we've made it simple. Really simple.

Every 3PAR system now ships with every feature you need to manage a single array*

For multiple systems, add a single Multi-system Software option for Remote Copy, Federation, Peer Persistence and CLX

* Data-at-rest encryption licensed as a separate option

For more information: **HPE 3PAR StoreServ Software Suite**

HPE 3PAR File Persona Software—Built into 3PAR OS

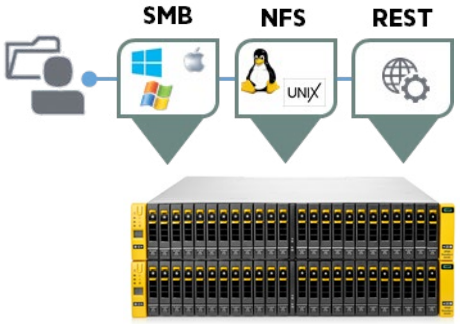
HPE 3PAR File Persona Software—built into HPE 3PAR OS

Unlike established unified and multi-protocol systems, 3PAR StoreServ with the default Block Persona and optional File Persona does not create inflexible capacity groups between block and file, or require you to run server workloads that are best served by block storage such as virtualization, databases, and applications over file protocols which are actually best today for client workloads (ie. Enterprise file sync and share, home directory consolidation, department/ group and corporate shares, and custom cloud applications).

Instead, you get a truly converged solution with truly converged controllers, truly agile capacity, and truly unified management that is both flash optimized and built to address a broad spectrum of server and client workloads.

- **A licensed feature of the HPE 3PAR OS**
- Includes: rich set of **file protocols, Object Access API (REST)**, and **file data services**
- Inherits the benefits of Block Persona
- **Extends the spectrum of primary storage workloads** natively addressed by 3PAR StoreServ
- Supported on the new Converged Controller models

Easier to provision | Easier to monitor | Less data center space



Better ROI and greater agility with uncompromising efficiency & performance

Converged controllers with mixed workload and flash optimization utilizing a single capacity group. Hardware accelerated Zero Detect and Thin Provisioning; Adaptive and Dynamic Optimization.

Lower OpEx with converged management of VM's, Files Shares, & Cloud Applications

Autonomic capabilities and unified 3PAR StoreServ Management. Support a rich set of file protocols; Object Access API (REST); and Active Directory, local and LDAP authentication.

Consolidate with confidence with file access built into a proven tier-1 platform

Continuously Available file shares; user driven file recovery from snapshots; antivirus and backup/restore software support; Remote Copy; and Data At Rest encryption.

HPE 3PAR StoreServ—File Controller

File Controller highlights

	StoreServ File Controller v3
PB5 ($25–49.9K)	✖
PB4 ($15–24.9K)	
PB3 ($10–14.9K)	
PB2 ($5–9.9K)	
PB1 (<$4.9K)	

Primary Protocols and Interconnects	**SMB/CIFS and NFS over Ethernet**
Secondary Protocols and Interconnects	iSCSI Block over Ethernet; Fibre Channel for backup
Ideal for	**Addressing file serving and application storage challenges of small to large orgs, branch offices, and workgroups**
Sweet Spot Environment	Active Directory based authentication, IT generalist administered, single tenant
Number of Users	Up to 20,000 per File Controller node
Capacity	Depends on attached 3PAR StoreServ array
Business Continuity	Single site through multi-site disaster recovery
Base Software	StoreEasy Dashboard, Sub-file Deduplication, Snapshots, Replication, File Classification, File Screening, Quotas, Reporting, StoreEasy Server Manager, iLO Advanced License
Optional Software	LiveVault, HPE CLX for hands-free failover/failback; Third party Double-Take Availability for scalable replication and DR, iTernity Compliant Archiving Software (iCAS) for legally compliant data archiving

HPE 3PAR StoreServ

Competitive Dell/EMC Unity

Quick comparison summary

	HPE 3PAR	Dell/EMC Unity
Quad-controller scalability	Yes	No
Truly Active/Active to every Volume with no limitations	Yes	No
Front-end port laser loss detection and auto-failover to partner port	Yes	No
Erasure Coding	Yes	No
Granular QoS control IOps/Bandwidth/Latency	Yes	No
Full Data Reduction Deduplication/Compression/ Data Packing	Yes	No Compression Only
Hardware accelerated mixed workload performance	Yes	No
Cloud Ready	Yes	Yes
NVMe	Yes	No

Why are customers voting for HPE 3PAR?

Tier1 capabilities at a mid-range price—Why settle for less?

- All the competitive advantages of 3PAR are now available management, tiering.)
- Online starting at $15k USD (Efficiency, multi-tenancy, autonomic firmware upgrades are easy and safe with 3PAR's patented Persistent Ports and Persistent Cache compared to other mid-range arrays that rely on host multi-pathing.
- 3PAR StoreServ can be configured with up to 4 mesh-active controllers for the industry's best mid-range high availability—sustaining performance and availability even during controller failure or code upgrades.
- Unity, all models, are limited to 2 controllers.
- 3PAR is fully active/full mesh to all volumes. Unity is Active/Passive with only portions of a given volume available to the passive node through lock management.
- 3PAR offers full Data Reduction, Compression, Dedup, & Data Packing. Unity is Compression only.
- 3PAR now offers Predictive Analytics with the addition of InfoSight. There are no Predictive Analytics with any of Dell EMC's solution.

HPE 3PAR StoreServ

Competitive Dell/EMC VMAX/Unity

Questions to ask Dell/EMC

Q: Why don't Dell/EMCs VMAX/Unity platforms offer deduplication?

A: The performance impact of deduplication is just too much overhead for VMAX/Unity to overcome.

Q: Are Unity & VMAX still managed like traditional monolithic arrays?

A: Yes. While the interface for Unity has been simplified greatly all the same traditional, "old school" rules of storage still apply. That means Raid Groups, Active/Passive, and multiple layers of traditional disk protocols just to name a few.

Q: Why doesn't EMC offer any kind of Predictive Analytics for any of its storage arrays?

A: While developing to the level of InfoSight is many years away from them, they could at least start with something basic but nothing comparable exists.

Q: What is the future direction of their overall storage portfolio?

A: We completely understand and agree with the fact that 'no one size fits all' which is why we offer both Nimble & 3PAR. But Dell EMC has 5: VNX (still), SC Series (Compellent), XtremIO, Unity, and VMAX. Unlike Nimble & 3PAR, which are mostly complementary, Dell EMC's solutions are directly competitive, including the VMAX 250. (Only the VMAX 950 is excluded)

Dell/EMC FUD

VMAX AF is more modern than 3PAR and designed for Flash in a much more progressive way.

Response: Modern Flash Arrays are OS based, with all the features included as part of the OS. 3PAR pioneered this model to perfection. The VMAX is still a microcode based system that layers features on top of the code. Thin Provisioning is software required for a wide stripe, for example. It has no deduplication. There even lacks any true mechanism for dealing with wear sensitivity of the SSD.

VMAX & Unity get much better reduction from Compression than 3PAR.

Response: Outside of a biased report published by EMC there is no truth to this. However, even if it were true, EMC offers no Deduplication nor Data Packing for either VMAX or Unity. Both VMAX & Unity also have much more capacity overhead than 3PAR does. In fact VMAX's raw capacity is actually greater than its total effective capacity. (Capacity after Compression reduction.) When measuring Raw to Usable, which is the only true way to capture capacity efficiency, 3PAR is much greater than either VMAX or Unity by a wide margin.

HPE 3PAR StoreServ

Competitive Pure

Pure strengths:

- Highest Data Reduction Ratio
- 100% money-back guarantee (Within 30 days)
- Simple Management
- Great Marketing
- Evergreen:
  - –Sometimes Free Controller Upgrades
  - –All upgrades done online transparently
- NVMe

Pure weaknesses:

- Data Reduction is Post Process
- Lacks true QoS (Only generic policy based controls)
- No independent synchronous replication, only integration with Cluster File Systems
- No scale-out: 2 Controllers Max
- NVMe story lacks Storage Class Memory
- Raw2Usable is one of the worst in the industry: 52-55% capacity overhead
- Terrible financial profile

Why 3PAR StoreServ wins:

- Bigger, Stronger Faster:
  - –3PAR Scales bigger: More controllers, more capacity
  - –3PAR has more features: + Data Reduction is fully inline
  - –3PAR handles multi-tenant workloads for much greater IOPs with lowest latencies
- True QoS (IO, Bandwidth, & Latency)
- Storage Class Memory
- Low $/GB for usable capacity—$1.10

Pure

The Pure flash array story

- Evergreen: Subscription model that allows for free hardware upgrades over time
- Simplicity Everywhere:
  - –Simple to buy
  - –Simple to install
  - –Simple to manage
  - –Simple to upgrade
- Highest Data Reduction Ratios in the industry
- Never sells on performance. “Fast Enough for specific Apps”
- Added new features: Generic Policy Based QoS, Active Cluster (Peer Persistence), NVMe Modules (//X70 only)

Pure FUD

3PAR is monolithic.
Response: A monolithic array is rigid and inflexible. It’s managed storage with raid groups and active/passive parts littered throughout. 3PAR is the exact opposite of this. This is an attempt by Pure to pigeon hole 3PAR as ‘old’ and lump it in with completely inflexible systems like VMAX, NetApp, or HDS. 3PAR is actually more flexible than Pure is with its ability to adjust protection and scale-out. Pure actually fits the definition of ‘monolith’ more than 3PAR does.

3PAR was designed for spinning disk.
Response: This FUD isn’t relegated solely to Pure, as other start-ups make the same claims. 3PAR is now and has always been designed solely for IO processing. Separating metadata from data, parallel processing of both supported by the hardware platform is 100% unique to 3PAR. Only Nimble, with its variable block size and data locality comes close to the IO focused design 3PAR has. Pure’s IO processing is as linear & subject to being CPU bound as any ‘disk system’ which is evidenced by Pure’s post-process data reduction when IO loads increase.

HPE 3PAR StoreServ

Competitive NetApp

NetApp strengths:

- Software offerings are most widely recognized:
  - –On-Tap Cloud
  - –Metrocluster
  - –SnapMangers
  - –Integration with everything
- Unified Storage, specifically NAS
- Originators of "Simple Storage"
- Highly Focused, well positioned Marketing/Sales Force
- Price has come way down

NetApp Weaknesses:

- WAFL for everything
- Block Only Deployments
- One of the worst Capacity Overheads of all storage solutions
- Inferior Data Reduction Technologies
- Traditional Active/Passive design
- Multi-tenant workloads

Why 3PAR StoreServ wins:

- Traditional Storage Advantages:
  - –Performance
  - –Capacity Efficiency
  - –Scale
- Software is on par with NetApp in every way, better with more advanced features like Compression, Deduplication, and Peer Persistence
- True QoS (IO, Bandwidth, & Latency)
- Storage Class Memory

NetApp

- No less than 5 different Flash products before settling on the AFF, "WAFL for Flash"
- 3 different Flash products:
  - –EF Series for high performance, no features
  - –SolidFire for Cloud, currently being converted to HCI
  - –AFF Series, FAS with only Flash
- NAS is the answer to every question
- Refocused their sales strategy w/significant reinvestment into existing accounts:
  - –Top Reps dedicated to Enterprise/Strategic Accounts
  - –Next Tier reps dedicated to next tier customers
  - –100% of all other resources dedicated to partners
- Leveraged 3PAR success into a similar marketing message

NetApp FUD

3PAR is extremely expensive while NetApp can deliver exactly what's needed at a much lower price.

Response: This is NetApp's "good enough" story—as in "not as fast as 3PAR but 'fast enough' for what you need or 'not as capacity efficient but 'capacity efficient enough' to make the $/GB worth it. Couple this with NetApp's simplistic interface and quick turnaround with quoting/equipment is a very effective strategy for NetApp. The most effective strategy against NetApp so far—aside from price matching—has been clear technical differentiation between NetApp's architecture & 3PAR's. Truly Active/Active, Full Mesh, extremely capacity efficient, full in-line Data Reduction, etc. Add to that conversation Predictive Analytics to counter NetApp's Cloud/software story and 3PAR becomes a more compelling offering.

HPE 3PAR StoreServ

Competitive IBM

IBM strengths:

- Storage Virtualization:
  - –Easy to upgrade (ie Evergreen-esque)
  - –Easy to migrate to
- Loyal Customer Base:
  - –Lots of references
- V-Series (SVC + Flash) scales from very low to very high
- Software Defined SVC solution

IBM weaknesses:

- Practically not a hardware company anymore
- Nothing unique about any of their storage solutions outside of virtualization:
  - –Not faster, bigger, or feature rich
  - –Not easier, more integrate, or more modern
- V-Series has no native deduplication
- A-Series/V-Series completely overlap

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IBM—FlashSystem

The IBM FlashSystem array story

- The FlashSystem '900' is based on the Texas Memory Systems acquisition in 2012. This is purely a performance system with no features at all
- The V-Series (3/5/7/9) are all SVC based, JBOF (Just Bunch of Flash) systems. This system performs well and has most of the important features
  - –Lacks Deduplication
- The A-Series has been their most focused product as of late
- Recently found their most success with the A9000
- Key strength for IBM continues to be Storage Virtualization
  - –Controller online upgrades like Evergreen
  - –Easy to migrate and consume third party storage
- Big push for Software Defined and SVC in the cloud as latest strategy
- Lacks credibility as a hardware vendor except to IBM loyalists
  - –The significant portfolio overlap of the V/A series doesn't help their cause
- With the exception of storage virtualization, which is quickly becoming a niche feature, nothing stands out about their storage portfolio in any way:
  - –It's not particularly easy or easier
  - –It's not bigger, stronger, or faster WITH features
  - –Best features are Software version of SVC & 'Evergreen-esque' upgrade ability

Section 2: Enterprise Storage

HPE 3PAR StoreServ

20000 Series **Enterprise flash for on-demand and Hybrid IT**

HPE XP7 **99.99999 percent up time**

HPE 3PAR StoreServ 20000 Enterprise Storage—20000 series

Quick view

HPE 3PAR StoreServ 20000

	20450	20800	20850	20840
Controller Nodes	2 or 4	2 or 4 or 6 or 8	2 or 4 or 6 or 8	2 or 4 or 6 or 8
Max. Total Cache	1.8 TiB	34.5 TiB	3.6 TiB	51.6 TiB
Max. On-Node Cache	1792 GiB	2560 GiB	3584 GiB	3584 GiB
Total Flash Cache	N/A	32 TiB	N/A	48 TiB
Max # of HDDs/SDDs	N/A/576	2304/1152	N/A/1152	2,304/1,152
Max Raw Capacity	4021 TiB all-flash	9600 TiB	8043 TiB all-flash	9600 TiB
16 GB/s FC host ports	0–80	0–160	0–160	0–160
10 GB/s iSCSI/FCoE ports	0–40	0–80	0–80	0–80
10 GB/s FBO NIC ports	0–24	0–48	0–48	0–48
Built-in 10 GB RC ports	2–4	2–8	2–8	2–8

Product positioning

3PAR StoreServ 20000 is the best fit unless...

Price is a driving factor	Capacity up to 864 TB is adequate	Highly scalable is not a critical factor	Up to 1M IOP Flash performance is adequate
↓	↓	↓	↓
3PAR StoreServ 8200/8400			**StoreServ 8440/8450**

When scale matters

HPE 3PAR StoreServ 20000 Storage is a new class of enterprise flash arrays for massive consolidation of your most demanding workloads:

- **Hyper-scalable:** Massive scalability with up to 8 Mesh-Active Clustered Nodes for up to 9.6 PB raw and 24 PB usable, to meet growing enterprise requirements.
- **Flexible:** Meet unpredictable business demands. Flash-optimized with greater than 3.8 million IOPS at less than 1millisecond of latency, 40 GB/s bandwidth.
- **Resilient:** Consolidate with confidence, assure service levels with enterprise-class BC/DR using Async Streaming replication and assure end-to-end data integrity with Persistent Checksum.
- **Futureproof:** Support on-demand computing with NVMe ready storage, eliminate complexity with federated data mobility and serve any workload with unified storage.

hpe.com/storage/3PAR 20000

HPE 3PAR StoreServ—20000 series

Where to sell

HPE 3PAR StoreServ 20000 is the ideal solution for customers who:

- Need massive consolidation with workloads that require up to 3.8 million IOPS and/or scalability up to 9 PB raw
- Have large mission-critical projects like ERP roll out, private cloud
- Next-gen data center requirements that require latest infrastructure, density, power and cooling
- Require complex disaster recover and need to fan in or fan out multiple systems
- Need to reduce the number of storage systems and consolidate/upgrade their legacy SANs

Customer benefits

Platinum standard for Modern Tier 1 Storage

With models that give you a range of options that support true convergence of block and file protocols, all-flash array performance for the cost of spinning disk, and the use of solid state drives (SSDs) with spinning media, HPE 3PAR StoreServ 20000 Storage has you covered with unmatched versatility, performance, and scalability.

Expand your sales and margins

Thanks to all-inclusive software licensing, 3PAR is the only array with included software that optimizes the entire I/O path for flash at no additional cost:

- File Persona increases capacity requirements by opening up new file based workloads for consolidation
- Smart SAN simplifies StoreFabric attach with SAN zoning automation of 16/32 GB switches
- Recovery Manager Central (RMC) drives StoreOnce attach with flash-integrated data protection

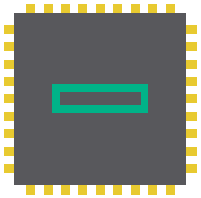
HPE 3PAR StoreServ 20000

Enterprise flash scale and performance

1 Drive Enclosure
1.1 PiB usable capacity in 2U 24 SFF drives

1 System
24 PiB usable capacity in a single system, 1920 SFF drives

HPE 3PAR GEN5 Thin Express ASIC



Made for Solid State

Scales massively with System Wide-Striping
up to a 8 Node Active-Mesh scale-out architecture for Flash

Offloads CPU to boost performance
with less than 200µs write latency

Powers adaptive data reduction technologies
without compromising performance or scale

Ensures end to end data integrity
by way of Persistent Checksum

Drives data services like Async Replication
with no compromises on performance vs. data protection

hpe.com/storage/3PAR 20000

HPE 3PAR StoreServ—File Controller

File Controller highlights

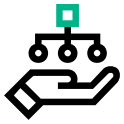
	StoreServ File Controller v3
PB5 ($25-49.9K)	✖
PB4 ($15-24.9K)	
PB3 ($10-14.9K)	
PB2 ($5-9.9K)	
PB1 (<$4.9K)	

Primary Protocols and Interconnects	**SMB/CIFS and NFS over Ethernet**
Secondary Protocols and Interconnects	iSCSI Block over Ethernet; Fibre Channel for backup
Ideal for	Addressing file serving and application storage challenges of small to large orgs, branch offices, and workgroups
Sweet Spot Environment	Active Directory based authentication, IT generalist administered, single tenant
Number of Users	Up to 20,000 per File Controller node
Capacity	Depends on attached 3PAR StoreServ array
Business Continuity	Single site through multi-site disaster recovery
Base Software	StoreEasy Dashboard, Sub-file Deduplication, Snapshots, Replication, File Classification, File Screening, Quotas, Reporting, StoreEasy Server Manager, iLO Advanced License
Optional Software	LiveVault, HPE CLX for hands-free failover/failback; Third party Double-Take Availability for scalable replication and DR, iTernity Compliant Archiving Software (iCAS) for legally compliant data archiving

HPE 3PAR StoreServ

All-inclusive Software

HPE 3PAR All-inclusive Software Contents




Management	Protection	Optimization	Efficiency
StoreServ Management Console	Remote Copy	Adaptive Sparing	Zero Detect
Command Line Interface	Recovery Manager Central	Adaptive Flash Cache	Deduplication
System Reporter	File Store snapshots	Priority Optimization	Compression
Service Processor	Persistent Checksum	Adaptive Optimization	Data Packing
File Persona	Persistent Cache	Express Protect	Thin Provisioning
Smart SAN	Persistent Ports	Adaptive Reads and Writes	Virtual Copy
HPE OneView integration	Virtual Domains	Express Writes	Thin Conversion
WSAPI, SMI-S and SNMP	Virtual Lock and File Lock	Autonomic Cache Offload	Thin Persistence
OpenStack integration	VSS Provider	Mixed Workload Technology	Express Layout
VMware integration			Express Indexing
Dockers containers support			Express Scan

Peer Persistence & CLX **Federation (Peer Motion, Online Import)**

Data-at-rest encryption

Existing customers can transition at their own pace

Part of all-inclusive single system software licensed as part of 3PAR hardware

Part of all-inclusive multi system software license (frame)

Part of HPE 3PAR Data-at-Rest Encryption software license (frame)

So we've made it simple. Really simple.
Every 3PAR system now ships with every feature you need to manage a single array*

For multiple systems, add a single Multi-system Software option for Remote Copy, Federation, Peer Persistence and CLX

* Data-at-rest encryption licensed as a separate option

For more information: **HPE 3PAR StoreServ Software Suite**

HPE 3PAR StoreServ—20000 series

Competitive Dell/EMC VMAX

Questions to ask Dell/EMC

Q: Why does the Dell/EMC VMAX3 require customer funded LUN space reservations?

A: VMAX requires you to precreate LUNs and keep them in a reserve LUN pool for future use by snapshots and remote copy volumes. HPE 3PAR StoreServ 20000 Storage does not require this, and offers superior capacity utilization.

Q: Why does Dell/EMC VMAX AF have greater RAW Capacity than Effective Usable?

A: 3PAR is the most capacity efficient array on the market today. Raw2Usable capacity is optimized at 25%. VMAX is so capacity inefficient that the Raw capacity is larger than what a customer receives **after** thin provisioning & compression are applied.

Q: Dell/EMC VMAX3 and HPE 3PAR StoreServ 20000 both have published SPC-2 benchmarks. What were the results?

A: The HPE 3PAR StoreServ 20850 Storage result is the FIRST all-flash system to feature in both top-ten tables for Performance AND price-performance. This shows that all-flash CAN compare favorably with all HDD on cost. Compared to Dell/EMC VMAX 400K results, HPE 3PAR StoreServ 20850 provides 13% greater performance, 65% lower cost, and half the footprint.

Q: Why does the VMAX AF still require Raid Groups and Dedicated Spares?

A: For all of Dell/EMC's marketing, the VMAX All-Flash is still very much a legacy, monolithic array with the same Enginuity code as all the other VMAX models. The system still uses generic Raid 5 or Raid 6 as an option and still requires dedicated spare drives. 3PAR uses Erasure Coding to protect data that eliminates Raid & Raid Groups. 3PAR originated distributed sparing in a many-to-many approach that increases resiliency, and usable capacity.

Dell/EMC FUD

VMAX AF is more modern than 3PAR and designed for Flash in a much more progressive way.

Response: Modern Flash Arrays are OS based, with all the features included as part of the OS. 3PAR pioneered this model to perfection. The VMAX is still a microcode based system that layers features on top of the code. Thin Provisioning is software required for a wide stripe, for example. It has no deduplication. There even lacks any true mechanism for dealing with wear sensitivity of the SSD.

HPE 3PAR used to be ahead in thin provisioning, but now, all major competitors are the same.

Response: There is more to 3PAR Thin Provisioning than any other vendor can offer. This is especially true of the VMAX. Thin Provisioning on the VMAX and other legacy monoliths, such as Hitachi, is a software layer ON TOP of their microcode base. This ensures the layout to be consistently "chubby." Dell/EMC best practices for performance on VMAX3 still recommend traditional volumes w/o Thin Provisioning applied.

In November 2015 the HPE 3PAR StoreServ 20850 set the new SPC-2 world record with > 62.8 MBPS, eclipsing the VMAX 55.6. And the 3PAR StoreServ 20850 did it:

- At 65% lower cost than Dell EMC VMAX 4000
- Using half the foot print of the Dell EMC VMAX 400
- At half the TCO of the Dell EMC VMAX 400

HPE 3PAR StoreServ—20000 series

Competitive IBM XIV

HPE competitive advantages vs. IBM XIV

HPE 3PAR 20000 Storage Peer Motion Software offers online, non-disruptive data migration, which is an enabler for load balancing, seamless technology refresh, and cost-optimized asset lifecycle management. IBM XIV does not have anything that directly compares to Peer Motion Software.

HPE 3PAR 20000 Storage can provide secure, administrative multitenancy for up to 1024 separate virtual domains, while maintaining massive parallel processing. The IBM XIV supports only one large partition.

HPE 3PAR 20000 Storage offers multiple arrays based on performance and capacity requirements. The IBM XIV is limited to a maximum configuration of 180 drives and has poor capacity utilization—requiring greater than 55% capacity overhead on every system.

HPE 3PAR 20000 Storage uses Erasure Coding with simple "Raid-like" Configurability. IBM XIV only supports a quasi RAID 1 redundancy scheme of duplicating "partitions." This results in the IBM XIV using too much overhead capacity.

LUN sizing: The IBM XIV decimal notation approach to sizing LUNs does not deliver the requested LUN sizes and forces users to make complex calculations to get the capacity they need.

HPE 3PAR Storage offers better QoS and Flexibility vs. XIV with one RAID type and single drive type (SATA or SAS) support. The limited configurability of the XIV yields poor scalability, since only three configurations are available.

Their biggest issues with the XIV are the rigid requirements around disk upgrades–all disks must be the same type—except if you start with all 1 TB, then there is an upgrade for 2 TB, but only 1 TB of the 2 TB disk will be recognized—as well as their double disk failure issues, LUN+Snapshot limitation, and usable capacity limitations.

IBM FUD

HPE 3PAR used to be ahead in thin provisioning, but now, all major competitors are the same.

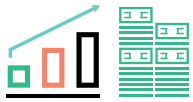
Response: IBM XIV Thin Provisioning has 1 significant limitation: 17 GB chunks. XIV cannot increase allocation at the "byte" level, such as 3PAR's 16 Kb allocation. This ensures thin volumes are ALWAYS going to be "fat" over time. XIV cannot convert volumes from "thick" to "thin". XIV cannot persist "thin". XIV TP has no zero removal integrated. Data Reduction is Compression only, with no Deduplication. And capacity overhead on an XIV is well over 55% ensuring a Raw2Usable that is atrocious as compared to 3PAR.

XIV is much easier to manage than HPE 3PAR Storage System.

Response: There is no single feature on XIV that is easier than 3PAR. However there is a "a catch-22". 3PAR offers significantly more features than XIV and more features equal more "knobs" which can be perceived as complex. It isn't. 3PAR Replication offers 5x what XIV offers and can be set up and configured in less than 10 minutes. 3PAR offers Federation, Dedupe AND Compression, QoS (with Latency), and so much more than XIV it's not even close.

HPE 3PAR Flash Now

All-flash, on-prem Starting at $0.03/GB usable per month



Optimize cash flow

Meet SLAs

Minimize risk

Why StoreServ wins

HPE 3PAR Flash Now initiative is a way to provide your customers with all-flash technology, on-premises for as little as $0.03 per usable GB per month. Aside from a lower cost of flash making it easier to adopt, HPE is also bringing embedded data protection and application availability, as well as security and control for the data kept on-premises, through programs such as HPE Flexible Capacity and Pre-Provisioning.

What you get with HPE Flash Now

Accelerated and non-disruptive

- Consume All-flash HPE 3PAR StoreServ Storage on premises, for pennies per usable gigabyte per month
- Rapid deployment with the option to defer payments for the first 90 days
- Accelerate your transformation to all-flash storage with built-in non-disruptive migration tools

End to End Data Protection

- Reduce SAN complexity with error-proof zoning automation through HPE Smart SAN technology
- Support your mission-critical objective with optional participation in the HPE 3PAR Get 6-Nines Guarantee Program
- Protect workloads at the speed of flash with HPE Recovery Manager Central to integrate HPE 3PAR StoreServ Storage with HPE StoreOnce Backup

Risk free

- Keep up with the latest flash and data protection technologies without disruption to your environment
- Keep control your data and your infrastructure by avoiding long-term lock-ins
- Reduce the risk associated with the removal of aging IT. Leveraging HPE expertise and best practices

5-step path to Flash Now ChalkTalk

HPE 3PAR StoreServ

Why 3PAR wins

HPE 3PAR StoreServ Storage is storage made effortless, with Tier 1 storage capabilities at a midrange price. In that HPE 3PAR StoreServ Storage uses a common software architecture for all models, SMB customers have access to the same value as large enterprise customers:

- Flash optimized architecture for consistent, real world performance without sacrificing any data services.
- ASIC-assisted HPE Adaptive Data Reduction technologies offers assured storage efficiency for your workload—guaranteed.
- Simple administration for ready-to-use storage which can be reconfigured in just seconds.
- Low entry price with non-disruptive scalability up to four mesh-active nodes (unique in the midrange).
- Priority Optimization offers optional tenant and application throttling control.
- Data-At-Rest (DAR) encryption.
- Native drivers for containerized applications and orchestration capabilities.
- Flash-optimized data protection capabilities with Express Protect and Recovery Manager Central.

Tier-1 data services **Common management** **Complete data mobility**

HPE 3PAR 8000
The #1 midrange storage array on the market, available all-flash or hybrid

HPE 3PAR 9000
Unified storage for all-flash consolidation for every application and workload

HPE 3PAR 20000
Industry leading enterprise flash scale and density with resiliency to match

HPE 3PAR StoreServ

We Guarantee it!

Just to make it that much easier for you to start the conversation, position and sell HPE StoreServ, we have 2 unique Guarantee Programs. Only HPE StoreServ enables you to not only deliver the best overall storage solution for these customer critical applications, you can **Guarantee it**.[3]

3PAR Data Reduction Guarantee—Change the economics of flash and reduce your storage footprint. Average savings are typically 2.5-6x for VDI, 1.5-2.5x for virtual servers, and 2.0-3.5X for databases.[4]

Get 6-Nines Guarantee—HPE 3PAR StoreServ not only provides the industries best data availability, we are delivering the ultimate—99.9999% data availability. That means ~30 seconds of unplanned downtime a year.

Click on the icon for additional information

[3] Subject to Terms and Conditions of individual Guarantee program
[4] Data reduction saving per workload based on HPE internal study of the HPE 3PAR telemetry data

HPE XP Storage—XP7

	XP7 Single Rack Configuration	XP7 Max Configuration
Max internal disks/modules	384 2.5" HDD 192 3.5" HDD 384 SSD 144 FMD	2304 2.5" HDD 1152 3.5" HDD 384 SSD 192 FMD
Max virtual capacity	External 247 PB	External 247 PB
Host ports	192 Fibre Channel 176 FICON 176FCoE	192 Fibre Channel 176 FICON 176 FCoE
Max IOPS	4.8M (@ < 1 ms latency)	4.8M (@ < 1 ms latency)
Cache size max	2 TB	2 TB
Fully configured power consumption with 2.5" HDDs		35 KVA
Business copy pairs	32K	32K
Continuous access pairs	64K	64K
LUNs/LDEVs	64K	64K

Product Positioning

Where XP fits best

Virtualized cloud service provider; IT as a service (ITaaS)	**Migrate from legacy XP to XP7 with no host reboots or disruptions**	**Virtualize heterogeneous storage arrays**	**OS support for mainframe or HPE NonStop**	**Disaster recovery with active-active High Availability**	**Hi-density all flash modules with sub millisecond latency**	**Require the highest availability, and a 7-nines platform**
↓	↓	↓	↓	↓	↓	↓
HPE 3PAR StoreServ	**HPE XP Storage**					

Quick View

HPE XP Storage best fits when—Your data needs mission-critical 7-Nines reliability and advanced active-active disaster recovery solutions with superior performance, consolidation, and TCO, delivering the lowest risk and highest levels of data protection.

HPE XP Storage is designed to meet the most demanding requirements for availability, reliability, performance, and advanced disaster recovery.

HPE XP7 Storage—XP7 is a 7-Nine's platform with proven 100% data availability. New multi array virtualization technology enables active-active High Availability, always-on disaster recovery, and fully Online Data Migration plus all the features of previous XP generations. The XP7 has unmatched performance and penalty-free 2:1 inline compression.

hpe.com/storage/XP Storage

HPE XP Storage

Where to sell

HPE XP Storage is the ideal solution for customers who:

- Require 7-nines availability or robust multi-site disaster recovery with 14-nines solution availability.
- Require disaster avoidance active-active virtualized High Availability solution for zero RPO and RTO.
- Require a storage virtualization layer to ease server and application maintenance operations.
- Require heterogeneous storage array virtualization as part of their storage landscape.
- Require data compression with no performance penalty.
- Have "always on" requirements for solutions which provide zero downtime, zero RPO and zero RTO even in the case of a data center disaster.
- Want to migrate from a legacy XP system to the XP7 with no interruption to their applications and no interruption to their Disaster Recovery solution.
- Have specific OS requirements such as mainframe or HPE NonStop, which are only supported by HPE XP storage.
- Run traditional and/or legacy mission critical applications such as OLTP, ERP, CRM and Manufacturing.
- Have very high demands for response times or performance on specific workloads which also require the highest availability, disaster protection, encryption or data protection.
- More conservative customers who prefer tried and proven technology solutions for their data center.

Customer benefits

HPE XP Storage is designed to meet the most demanding requirements for availability, reliability, performance, and advanced disaster recovery, to solve the most demanding enterprise computing disk storage challenges.

XP7 Storage provides:

- Extreme Availability Always-on disaster recovery and High Availability
- Top performance with Flash Module Device (FMD)
- Guaranteed* 2:1 compression with no performance penalty
- Easy Consolidation with Multi array virtualization and External Storage and inline hardware compression on FMDs

HPE continues to provide maximum backward compatibility with previous XP generations and long lifecycle support for legacy XPs.

Don't forget to attach

Remember when talking to you customers about HPE XP Storage also discuss:

- HPE 3PAR Storage; complete datacenter solutions with both XP and 3PAR, meeting all your storage challenges
- HPE StoreEver Tape Libraries and StoreOnce disk backup
- HPE StoreFabric switches and HPE Networking

* Program terms and conditions apply

hpe.com/storage/XP Storage

HPE XP Storage

Software Features

XP7 family of software

Array Manager Suite—A new software bundle with Array Manager, Thin Provisioning, Resource Partition and External Storage virtualization software.

High Availability—A new XP7 software title which presents virtualized storage to hosts and separates it from the physical layer. Features includes zero downtime local and remote replication high availability and improved data and VM mobility without losing storage access.

3DC High Availability Suite—A new XP7 software bundle for 3 Data Center solution on XP7 along with Active-Active High Availability at the metropolitan site. It leverages the XP7 HA software capability.

Online Data Migration Suite—A new XP7 software title which enables user controlled online data migration from legacy XP to XP7 systems.

Mainframe Basic Suite—A new mainframe software bundle which includes Thin Provisioning, Resource Partition and External Storage virtualization software along with mainframe software features.

Mainframe Tiering Suite—A new optional tiering software bundle for Mainframe systems which includes Smart Tiers and Smart Manager for Mainframe.

Continuous Access Suite—A new remote replication software bundle which includes Continuous Access Journal and Continuous Access Synchronous.

Command View Advance Edition Suite—A new optional management software bundle which includes Command View Advance Edition software and Replication Manager software.

XP7 software highlights

XP7 High Availability—Provides a fourteen 9's available solution with zero recovery time, avoids downtime and failover operations, and eases server management by using XP7 multi array virtualization technology to increase availability and storage access, reducing risk and increasing efficiency and automating DR processes.

External Storage virtualization of other disk arrays (bundled with Array Manager Suite)—Virtualization of heterogeneous storage arrays behind the XP and providing all the functionality of the XP array software.

Smart Tiers software—Automated movement of sections of LUNs between faster and slower media automatically managed by the array based on usage patterns and pre-set policies. Supports external storage as a tier.

Performance Advisor—Performance monitoring and reporting of XP7 Storage.

Resource Partition SW (bundled with Array Manager Suite)—Role-based access controls for XP7 Storage for cloud storage environments.

A simple, fast, easy to use graphical user interface and CLI—Local and remote replication—For disaster recovery, backup, and development solutions.

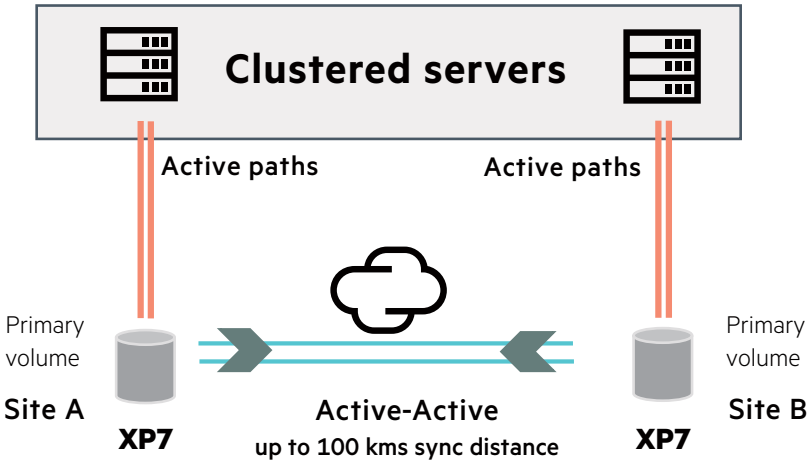
Online Data Migration as a HPE Service—Migrate from older XP generations to the XP7 with no host downtime, no host reboots, no disruptions.

Software compression and Deduplication—Introducing software compression and dedupe with V05 firmware capable of post process data reduction Reduces bit cost and overall TCO for XP7 storage. Data reduction applicable on all media—FMD, HDD, SSD and external storage.

HPE XP Storage

7-Nines Uptime

Continuous data availability



Active-Active HA—Disaster resistant, 100% storage uptime even when an array and/or entire datacenter goes offline. Provides zero RPO, and zero RTO—while avoiding recovery operations and failovers with 14-nines availability.

100% Data Availability Guarantee

Active-Active Access—Non-disruptive, transparent VM and/or clustered application mobility between servers within the same data center or at different sites.

XP7 Active, Disaster Resistant High Availability

14-nines availability—With two 7-nines XP7 systems in constant replication with each other, and XP7 multi-array virtualization presenting virtualized storage to servers, the XP7 High Availability solution results in 14-nines of average availability.

Multiple operating systems support—Support for all major open systems operating systems and clusters:

• Windows, Linux, VMware, ESX, AIX, HPE-UX & Solaris

Single, multiple and clustered server configurations—Flexible configurations for single servers, multiple servers and stretched clusters.

Single or multiple data centers—Design for single data center high availability or advanced synchronous replication for data centers up to 100 kilometers in distance as well as three data center solution with high availability.

Software enabled, easy to install, easy to mange—no additional hardware or external appliance required—Simple solution design requires XP7 High Availability software licenses, and no additional hardware or external appliance. The solution does not require an XP7 Continuous Access SW license.

HPE XP Storage

Competitive EMC VMAX

Feature Comparison Summary

XP7 offers more value where it counts	XP7	VMAX
Third-party proven SPC-1, SPC-2 performance	✓	
7-Nine's mission critical storage platform	✓	
100% Data Availability Guarantee Program*	✓	
New XP7 High Availability with 14-9'availability, zero downtime, zero RPO, zero RTO	✓	
Single vendor Solution/Resolution (hosts, storage, network, solutions)	✓	
Modern flash-optimized architecture, 6 GB SAS backplane	✓	
Completely online data migrations including constant DR protection	✓	
Minimum RPO exposure due to temporary replication link outages	✓	
Leading External Storage connectivity (> 200 PB, > 100 array types)	✓	
Industry leading Marketing		✓

* Program terms and conditions apply

HPE XP7 advantages

- Array based virtualization technology
- Penalty free HW inline compression
- Flash optimized extreme low sub- millisecond latency
- 3rd party verified performance
- Single vendor end to end solution and support

HPE XP Storage

Competitive IBM DS8000

Feature Comparison Summary

XP7 offers more value where it counts	XP7	DS8870
Thin Provisioning with sub-page data migration, ~64k LUNs	✓	✓
Sync and Async 2DC and Cascaded 3DC remote replication	✓	
Non-disruptive upgrades & small form factor disks	✓	✓
100% Data Availability Guarantee Program*	✓	×
Higher estimated SPC scores	✓	×
Higher IOPS, Gen3 PCIe	✓	×
Journaled remote 2DC/3DC replication	✓	×
Multi-Cast 3DC disaster recovery configuration	✓	×
Most snapshots	✓	×
Native External Storage	✓	×

* Program terms and conditions apply

HPE XP7 Advantages

- 4.8M IOPS, all flash configurations, Gen3 PCIe
- Cutting edge use of high density XP flash modules
- 24x more efficient thin page size
- Native 0's reclaim with minimal performance impact
- Virtualized storage via external arrays
- Minimal user funded storage overhead
- A very high addressable range
- 16 GB FC, and FCoE support
- Efficient 14D+2P RAID-6 support

Section 3: Table of contents

Section 3: Data Protection and Archive

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3000/5000/6000

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Software-defined storage

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HPE Nimble
Secondary Flash Array

HPE StoreEver Tape
LTO/MSL Tape Libraries
ESL G3 Tape Libraries

HPE StoreOnce Federated Deduplication

What is Federated Deduplication?

HPE StoreOnce Federated Deduplication enables customers to deploy a single backup technology from the smallest remote site in the most distant location to the largest data center or disaster recovery site to almost any scale. It reduces cost, removes risk and eliminates complexity across the data protection environment.

- Federated deduplication enables centralized management through a single pane of glass to reduce management time and hassle.
- It can be deployed in a variety of solutions from hardware, to software, to software defined, allowing backup solutions to be tailored to the needs of each location at an affordable cost.
- The single deduplication engine enables the communication and movement of data across the entire organization without rehydrating the data permitting data to be moved from location to location over affordable low-bandwidth links.
- Federated Catalyst reduces management by enables an 8x increase in capacity per backup store while optimizing deduplication efficiency, maximizing performance and providing high resiliency with failover and autonomic restart.

HPE StoreOnce Recovery Manager Central 4.1 (RMC)

Welcome to flash-integrated data protection

HPE Recovery Manager Central (RMC) software integrates HPE 3PAR StoreServ primary storage with HPE StoreOnce Systems to provide a converged, snapshot, replication and backup service that augments traditional backup approaches.

What's new...

Flash-Speed Recovery for Mission-Critical Applications

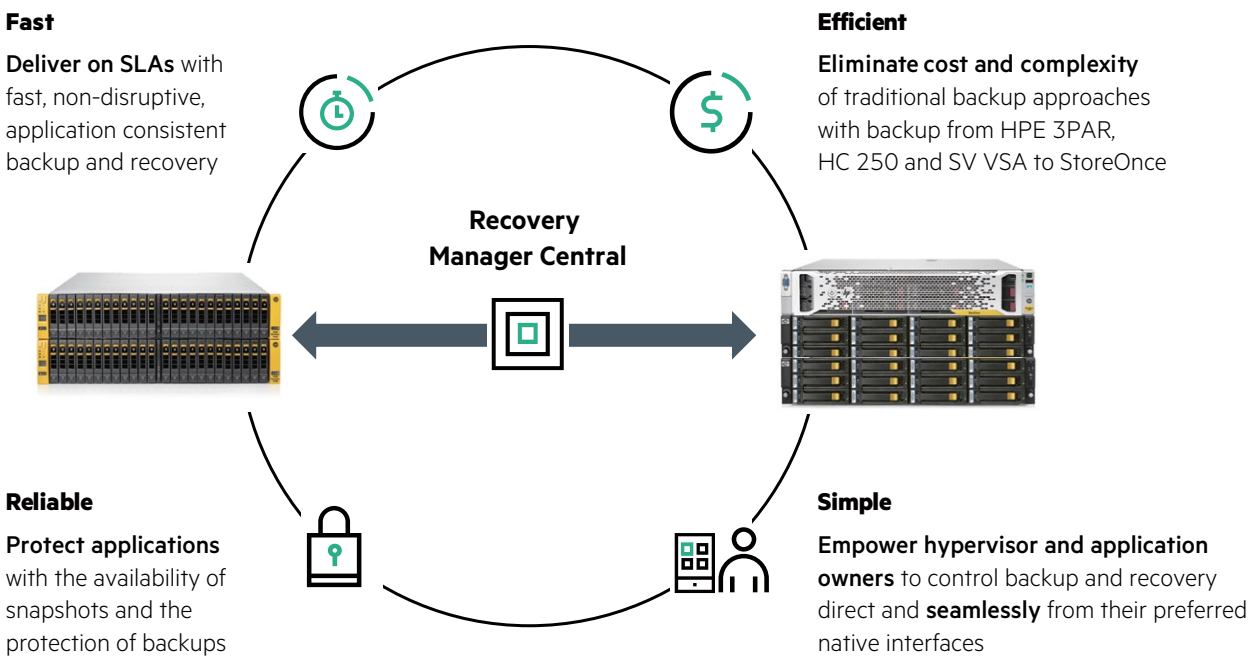
HPE RMC Express Restore provides VMware, Microsoft SQL, Oracle, and SAP HANA application owners with 15X faster recovery than traditional methods while reducing cost and complexity.

Granular Recovery with HPE RMC and Veeam Explorer Integration

Veeam Explorer lets you perform granular recovery for VMware vSphere virtual machines directly from RMC for VMware Express Protect backups. Rapidly recover anything from Microsoft Active Directory, Exchange, SharePoint, SQL Server, and Oracle.

Protecting Data and Applications in the Cloud

RMC support for HPE StoreOnce Cloud Bank Storage enables long term retention of up to 68 PB of data in the public and private cloud. Cloud Bank Storage is available via an Early Access program.



hpe.com/storage/rmc

HPE StoreOnce—3000/5000 series
HPE StoreOnce VSA

Quick view

Data protection and disaster recovery; rapid recovery from data loss, data centers and remote office/branch office environments (ROBOs); cost-effective

The only federated deduplication solution available today, HPE StoreOnce redefines deduplication with up to five times faster backup and three times faster recovery than competing systems. Overcome the gaps, inefficiencies, and costs associated with fragmented, first-generation deduplication technologies.

Delivered as a VMware or Hyper-V virtual appliance. StoreOnce VSA is hardware agnostic, cost effective, and easy-to-deploy for virtualized branch offices and small and midsized business environments and supports VMware, Hyper-V.



HPE StoreOnce

- 3000 Series—Catalyst, iSCSI VTL, CIFS/NFS
- 5000 Series—Catalyst, iSCSI/FC VTL, CIFS/NFS
- Hardware-based RAID 5 or RAID 6[5]
- Usable capacity: from 5.5 TB usable to 864 TB usable[5]
- Logical Capacity with deduplication from 110 TB to 17.2 PB[6]
- Security: StoreOnce Integrity Plus and StoreOnce Security Pack

HPE StoreOnce VSA

- Hardware and Hypervisor agnostic
- Provides scalable capacity up to 4 TB, 10 TB, 20 TB, 32 TB or 50 TB
- Flexibility to deploy on any x-86 platform and also on Microsoft Azure Cloud (up to 32 TB)
- Protocol support: StoreOnce Catalyst, CIFS, NFS, iSCSI VTL
- Centralized deployment capability for large volume of remote offices
- Replication compatible with StoreOnce hardware appliances
- Security: StoreOnce Security Pack

[5] Based on model
[6] Assumes 20:1 deduplication ratio

Product positioning

Super fast ingest and restore performance

Deduplicate anywhere—VM, application server, backup server, hardware appliance and backup software

Single deduplication engine from a small single office to multiple sites/ROBO or DR site

Non-virtualized infrastructure → **HPE StoreOnce 3xxx/5xxx**

Fast backup & restore performance → **HPE StoreOnce 3xxx/5xxx**

Any x86 server or storage platform → **HPE StoreOnce VSA**

Supported on VMware, Hyper-V → **HPE StoreOnce VSA**

Storing both primary and secondary copies. Retrieving large files, long term storage for compliance and monetization. Storing long-term for archival and lowest cost of ownership → **HPE StoreEver Tape Solutions**

hpe.com/storage/StoreOnce

hpe.com/storage/StoreOnceVSA

HPE StoreOnce—3000/5000 series
HPE StoreOnce VSA

Where to sell

HPE StoreOnce 3000/5000 systems are the ideal solution for small and midsize organizations, remote offices and Cloud Service providers:

- Improving backup efficiency and shortening backup and recovery times
- Improving availability
- With virtualized environments
- Integrating deduplication and replication
- Protecting and automating remote office/branch office (ROBO) environments

Customer benefits

Deduplicate anywhere, replicate everywhere

- Affordable balance of cost, capacity and performance for your small data center, workgroup or remote and branch offices.
- Secure, scalable data protection for your midsize data centers and regional offices.
- Highly scalable backup architecture that effectively handles issues such as rapid data growth and complexity while meeting ever-increasing SLAs.

Don’t forget to attach

When talking to your customers about HPE StoreOnce, remember to discuss:

- Backup and Compliance with HPE StoreEver tape drives, autoloaders and libraries

hpe.com/storage/StoreOnce

hpe.com/storage/StoreOnceVSA

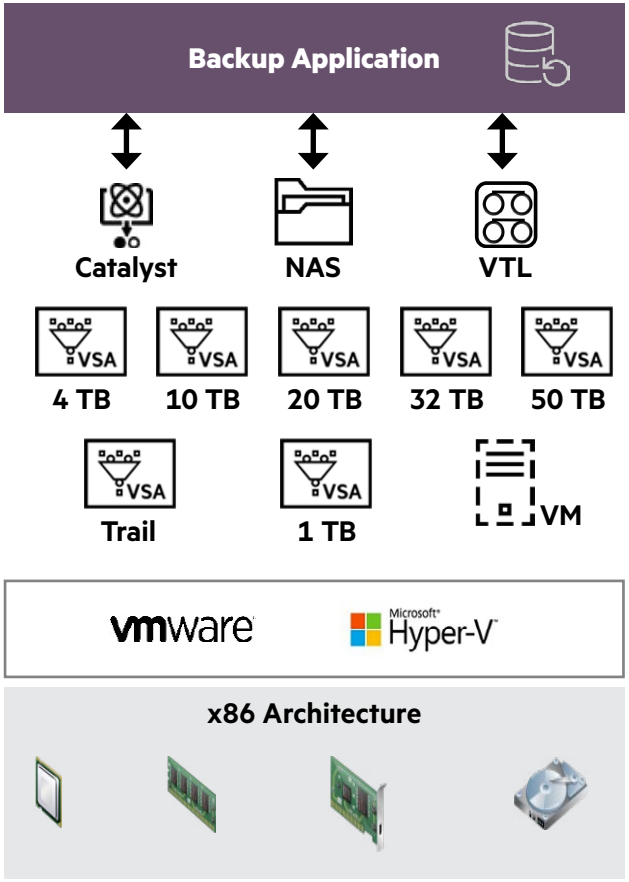
HPE StoreOnce—3000/5000 series

HPE StoreOnce VSA/3000/5000 Series Highlights

	StoreOnce VSA	StoreOnce 3100	StoreOnce 3520	StoreOnce 3540	StoreOnce 5100	StoreOnce 5500
						
Usable Capacity	1 TB to 50 TB	5.5 TB	7.5 TB to 15.5 TB	15.5 TB to 31.5 TB	36 TB to 216 TB	36 TB to 864 TB
Scalability Options	4 TB to 10 TB 10 TB to 20 TB 20 TB to 32 TB 32 TB to 50 TB	N/A	12x2 TB LTU upgrade	12x4 TB LTU upgrade	Up to 5 upgrade kits	2 Drawer units Drawer 1 & 2 5 (capacity) upgrd kits Drawer 3 & 4 1 drawer upgrd kit 5 (capacity) upgrd kits
Catalyst Performance	Up to 12 TB/hr.	6.4 TB/hr.	12.7 TB/hr		26.7 TB/hr	37.7 TB/hr
Native Performance	Up to 3 TB/hr.	1.6 TB/hr.	4.6 TB/hr		13.8 TB/hr	20.4 TB/hr
Restore Performance	Up to 1.8 TB/hr.	1.4 TB/hr.	4.1 TB/hr		14.2 TB/hr	14.8 TB/hr

HPE StoreOnce VSA

HPE StoreOnce Virtual Storage Appliance (VSA)—Hardware and hypervisor agnostic deduplication for backup delivered as a virtual machine. StoreOnce VSA provides virtualized environments with deduplication for backup, scalable capacity, set-and-forget backup scheduling, and centralized monitoring and management that requires no manual intervention.



75%[7]
Lower $/TB

75%[8]
Lower physical requirements

77%[8]
Reduced energy costs

[7] Compared to EMC DD VE

[8] Compared to DD 2200

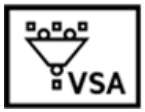
HPE StoreOnce VSA vs. Dell (EMC) Data Domain VE

- HPE StoreOnce VSA is far more cost efficient, with a cost per TB at $700; 4 TB VSA is $2,800; 50 TB VSA is $29.2K.
  - –Data Domain VE costs over $2,800 per TB; 4 TB is $11,000. DD VE 50 TB is $141K.
- StoreOnce VSA supports all features supported by any physical StoreOnce System including integrated data protection with RMC.
  - –EMC DD VE doesn't support the some of the features of a DD appliance like ProtectPoint, VTL protocols etc.
- StoreOnce VSA is a mature product, was first to market and has over 3 years of real world installations.
  - –Data Domain VE was late to market; in the market less than a year.

HPE StoreOnce VSA

Software-Defined Storage

Software-Defined Storage describes how software applications can layer on server infrastructures and delivers advanced data services such as snapshots, thin provisioning, and multi-site disaster recovery.



Click on icon for addition details

Try VSA free

Two options are available to you if you would like to try out StoreOnce VSA.

- A full 3 year 1 TB license without support. This product is a full product complete with replication capabilities for you to use for the duration of the 3 year term. There is no support available with this product.

Free 1 TB VSA—3 year license

- A 60 day trial after which you will need to purchase a license. All backup data will remain accessible after adding the license and all configuration settings will remain after adding the license, but you will not be able to backup more data to it.

60-day StoreOnce VSA trial

Customer benefits

Regardless of the size or focus of the company, data loss is intolerable. HPE StoreOnce VSA provides low cost data protection for virtualized environments and is fully compatible with all other StoreOnce products enabling you to replicate your data in deduplicated form for disaster recovery purposes.

Microsoft Azure customers can now deploy up to 32 TB of StoreOnce VSA in Azure cloud instance to protect their data and applications.

Who can benefit from HPE StoreOnce VSA?

- Enterprises wanting to centrally manage their ROBO backup
- SMB customers looking for comprehensive data protection solution
- Local backup with backup data off-siting as a service
- Backup and optional replication as part of SaaS
- Microsoft Azure customers

hpe.com/storage/StoreOnceVSA

HPE StoreOnce VSA

Competitive Dell EMC

StoreOnce VSA vs. Dell EMC DD2200

StoreOnce VSA offers 92 percent lower storage cost, 75 percent less footprint and 77 percent better energy efficiency than the Dell EMC DD2200 device.[9]

The concept of extending the benefits of deduplication to virtualized infrastructures as well as smaller and remote offices without the need for a dedicated hardware provides many benefits to customers who can choose between 1 TB, 4 TB, 10 TB, 20 TB, 32 TB and 50 TB VSAs depending on their budget and requirements and deploy them in VMware or Hyper-V environments.

HPE StoreOnce VSA vs. Dell EMC DD VE

StoreOnce VSA offers lower cost, more mature solution, offers greater flexibility i.e. can be deployed on any x-86 platform and Microsoft Azure cloud Feature rich i.e. all features of StoreOnce Systems including RMC is supported on StoreOnce VSA.

[9] Based on a comparison of published specifications of the StoreOnce VSA and Dell EMC DD2200. Price/performance comparisons are based on list prices

HPE StoreOnce—3000/5000 series

Competitive Dell EMC

HPE StoreOnce 3100 vs. Dell EMC DD2200

Better Performance: The HPE StoreOnce 3100 with Catalyst backs up data 36 percent faster than the Dell EMC DD2200 with Boost.

- HPE StoreOnce 3100 with StoreOnce Catalyst backs up data at 6.4 TB/hr.
- The Dell EMC DD2200 with DD Boost backs up data at 4.7 TB/hr.

HPE StoreOnce 3520/40 vs. Dell EMC DD2200

Better Performance: The HPE StoreOnce 3520/40 with Catalyst backs up data 2.7X faster than the Dell EMC DD2200 with Boost.

- The HPE StoreOnce 3540 with Catalyst backs up data at 12.7 TB/hr.
- The Dell EMC DD2200 with Boost backs up data at 4.7 TB/hr.

Note: Dell EMC never publishes the restore figures of DD.

HPE StoreOnce 5100 vs. Dell EMC DD6300

Better Performance: HPE StoreOnce 5100 offers more performance and greater scalability, HPE StoreOnce 5100 with Catalyst backs up data at 26.7 TB/hr.

- Dell EMC DD6300 with DD Boost backs up data at 24 TB/hr.

HPE StoreOnce 5500 vs. Dell EMC DD6800

Better performance: StoreOnce 5500 offers better performance and 3x scalability than Dell EMC DD 6800. HPE StoreOnce 5500 with Catalyst backs up data at 37.7 TB/hr.

- Dell EMC DD6800 with Boost backs up at 32 TB/hr.

HPE StoreOnce offers a broad SMB portfolio: HPE StoreOnce offers a broader portfolio compared to EMC Data Domain with prices to match your needs.

With the portfolio including not just dedicated hardware with the StoreOnce 3000 and 5000 series products, the StoreOnce VSA provides a cost effective solution for virtualized environments that is fully compatible with the 3000, 5000 and 6000 series solutions enabling a fully automated backup solution to be deployed however broad your IT environment. With single pane of glass management across the entire backup infrastructure the HPE StoreOnce solution provides a cost effective, simple to deploy, configure and manage backup solution.

HPE StoreOnce—6600

Quick view

HPE StoreOnce 6600

- **Raw Capacity:** 120-2240 TB
- **Useable Capacity:** 72-1728 TB
- **Scalability—additional disks (useable):** Multi-node scalability across 2x 42U racks
- **Performance (native VTL):** Up to 151.2* TB/hr.
- **Performance (StoreOnce Catalyst):** Up to 184* TB/hr.
- **High availability with failover and autonomic restart**
- **Protect up to 384 remote sites**
- **Deduplication-enabled replication:** Yes—StoreOnce & Catalyst
- **Data Encryption:** Security Pack

Product positioning

Need for the highest performance, both backup and restore	**Looking to reduce management overhead while coping with huge data growth**	**When availability is absolutely critical and backups cannot fail**

Storing both primary and secondary copies. Retrieving large files, long term storage for compliance and monetization. Storing long-term for archival and lowest cost of ownership

↓

HPE StoreEver Tape Solutions

The new era of disk backup

With the HPE StoreOnce 6600 you can backup huge amounts of data within short backup windows. High performance multi-streaming and HPE StoreOnce Catalyst delivers backup speeds of up to 184* TB per hour ensuring your data is always protected.

HPE StoreOnce 6600 also delivers rapid restore speeds up to 128.8 TB/hr. to ensure your business can be up and running again as quickly as possible in the event of a problem. With failover and autonomic restart your backups will keep on running. Centralize the backup of multiple remote sites with up to 384 backup streams replicating to a single fully configured StoreOnce 6600 target device.

* Performance figures are for full 4 couplet system

hpe.com/storage/StoreOnce

HPE StoreOnce—6600

Where to sell

HPE StoreOnce 6600 is the ideal solution for customers:

- Large enterprises with multiple data centers looking to simplify and centralize backup management.
- Enterprises dealing with significant data growth while needing to reduce risk and increase agility of data protection.
- Enterprises who require high end resiliency features like High Availability, Autonomic restart, etc.

Customer benefits

Fastest backup and restore on the market
Federated scale-out design with a highly resilient architecture and autonomic restart that reduces management complexity, eliminates failed backup jobs, and grows as your business requirements dictate.

HPE StoreOnce 6600 can backup data up to 2.7x faster than the competition.

Don’t forget to attach

When talking to your customers about HPE StoreOnce, remember to discuss:

- Backup and Compliance with HPE StoreEver tape drives, autoloaders and libraries

hpe.com/storage/StoreOnce

HPE StoreOnce Backup—6600

Orders-of-magnitude performance leadership—HPE 6600 with StoreOnce Catalyst offers 2.7x faster backup performance, and 5x faster restore performance, than Dell EMC Data Domain DD9800. Ask Dell EMC for their restore performance results (which they don't publish).

High Availability—HPE StoreOnce 6600 offers high availability with Autonomic Restart and redundancy built into every level, across couplet nodes, controllers, networking, cache, disks, data paths, and power and cooling subsystems, thereby reducing risk.

Federated Catalyst—Dell EMC's product line has limited scalability and each time a system is full you have to purchase an additional system increasing management overhead and limiting deduplication efficiency. HPE StoreOnce Federated Catalyst enables customer to scale their deduplication stores reduce management overhead by 87.5 percent, maximize performance due to automatic load balancing and optimize deduplication efficiency. Federated Catalyst also removes the need for future forklift upgrades and can automatically replicate data from an old system reaching the end of its maintenance period to a new system.

Competitive EMC

Performance—HPE StoreOnce 6600 offers 2.7x faster backup

- The HPE StoreOnce 6600 with Catalyst backs up data **184 TB/hr**
- Dell EMC DD9800 backs with Boost backs up data 68 TB/hr
- The HPE StoreOnce 6600 restores data at **128.8 TB/hr**

High Availability—HPE StoreOnce 6600 removes the problem of failed backups and enables automatic failover with autonomic restart failover without manual intervention. Dell EMC Data Domain DD9800 with active passive controllers pose high risk of failure with potential to disrupt backups and prevent restores.

Scalability—HPE StoreOnce 6600 Backup systems use a federated scale-up, scale-out architecture vs. Data Domain's scale-up approach, avoiding costly fork-lift upgrades for the customer. The 6600 scales both capacity and performance up to 1728 TB usable and 184 TB/hr. while reducing management overhead by 75%.

HPE StoreOnce/HPE StoreOnce VSA

Competitive EMC Data Domain

HPE StoreOnce

Product	VSA	3100	3520	3540	5100	5500	6600
Useable Capacity	1–50 TB	5.5 TB	7.5–15.5 TB	15.5–31.5 TB	36–216 TB	36–432 TB	72–1.728 TB
Catalyst Performance	Up to 12 TB/hr.	6.4 TB/hr.	12.7 TB/hr.		26.7 TB/hr.	864 TB/hr.	184 TB/hr.
Native Performance	Up to 3 TB/hr.	1.6 TB/hr.	4.6 TB/hr.		13.8 TB/hr.	20.4 TB/hr.	151.2 TB/hr.
Restore Performance	1.8 TB/hr.	1.7 TB/hr	4.1 TB/hr.		14.2 TB/hr.	14.8 TB/hr.	128.8 TB/hr.

EMC Data Domain

Product	DDVE	DD2200 (2 TB)	DD2200 (4 TB)	DD6300	DD6800	DD9300	DD9800
Usable Capacity	Up to 96 TB	4 TB–13.2 TB	17.2 TB	Up to 178 TB	Up to 288 TB	Up to 720 TB	Up to 1 PB
Boost Performance	NA	4.7 TB/hr.		24 TB/hr.	32 TB/hr.	41 TB/hr.	68 TB/hr.
Native Performance	NA	3.8 TB/hr.		NA	NA	NA	NA
Restore Performance	EMC does not publish its restore speeds						

EMC² datadomain

HPE Cloud Bank Storage for Hybrid IT data protection

Elevating protection and retention to a new tier using low-cost object storage

Cloud Bank Storage is an ideal solution when you are looking for:

- Benefits of object storage without changing your existing backup application environment
- Low cost of object storage for long-term retention or archiving of backup data which has to be kept available for regulatory or business requirements
- Protection of offsite backup data copies but do not want to invest in an owned off-site location
- Cloud-based disaster recovery but without the high costs associated with the transfer of large amounts of data to the cloud

Lower cost of long term protection with AWS, Azure, or on-prem object storage (Scality)

Optimize bandwidth usage via federated deduplication while object interface enables multi-cloud support

Instantly cloud-enable your backup ISV including flash-optimized protection for 3PAR

Supports major backup ISVs like Veritas NBU, Data Protector, etc. along with RMC for flash optimized data protection

Enable more flexibility and control over disaster recovery and long term retention

Use existing policies, support multi-cloud destinations, & restore Cloud Bank Storage stores to any on or off-prem store

Protect 100+ PB* of data with an object storage cost starting from $0.001 per GB/Month**

* Assuming dedupe ratio of 20:1 and the maximum logical capacity of StoreOnce 6600 of 34 PB
** Assuming dedupe ratio of 20:1 and AWS (S3) standard object storage pricing of $0.02 per GB/Month

HPE StoreOnce Get Protected Guarantee

We guarantee it!

Scale and Speed
6600

Value:
5500
6600

Cost:
3540
3520
3100

Software:
StoreOnce VSA
Data Protector
StoreOnce Catalyst

Get guaranteed efficiency with a StoreOnce backup solution from HPE

Reduce capacity requirements by 95 percent with any HPE StoreOnce Backup solution—**Guaranteed!**[10]

If not, HPE will make up the difference with free disk capacity and support.

How well do you know your backup environment?

Find out with a free assessment from HPE!

See how moving to any HPE StoreOnce System solution may allow you to cut your backup capacity requirements by 95%[11]—**Guaranteed!**

Click on the icons to go directly to web pages

[10] Subject to Terms and Conditions of individual Guarantee program

[11] As compared to a fully-hydrated backup

HPE Nimble Storage—Secondary Flash Arrays

Quick view

HPE Nimble Storage Secondary Flash Arrays SF-Series arrays

- SF100 and SF300 can work with either HPE Nimble Storage or non-HPE Nimble Storage
- All SF Series models consists of up to 21 HDD drives and 3 DFCs (holding up to 6 SSDs)
- Inline dedupe—Typical 3x to 18x savings, based on Backup retention policy
- Raw capacity
  - SF100 21 to 126 TB
  - SF300 42 to 252 TB
- Usable capacity
  - SF100 16 to 100 TB
  - SF300 33 to 200 TB
- Each array controller has 2x10GbE ports built in
  - Optional ports are 1GbaseT, 10GbaseT or 10GbE SFP+, along with 8 GB or 16 GB Fibre Channel
- All HPE Nimble Storage arrays support iSCSI or Fibre Channel storage protocol

Positioning within the HPE Storage Portfolio

Active Backup & Availability
Put your backup data to work using a secondary storage array. For Veeam backup customers using any primary storage array who want to run real workloads on secondary data (such as dev/test, QA, analytics).

→ **HPE Nimble SF-Series**

Comprehensive, Low-Cost Backup
Protect a broad range of applications, systems and arrays cost-effectively. Cost and performance-optimized for data protection ingest and recovery. Extensive ISV/app support to consolidate backup from multiple sources.

→ **HPE StoreOnce**

Put your backup data to work

The HPE Nimble Storage Secondary Flash Array represents a new type of data storage optimized for both capacity and performance, a single device optimized for backup, DR and secondary storage. Put your backup data to work and run secondary workloads with flash performance.

Designed to simply and efficiently handle tasks like Veeam backups and disaster recovery, HPE Nimble Storage Secondary Flash Arrays also offer the flash-optimized performance to run development/test, QA, and analytics on your backup data—plus production workloads when needed. Back up and recover data from any primary storage array nearly instantaneously. Save space with always-on, inline deduplication and compression and simplify data management through integration with leading availability software for virtualized environments from Veeam.

No More Restore Windows

- Near-instant snapshot-based backup—no more back-up windows and zero impact to host.
- Near-instant restore—access files, VMs, applications or entire systems directly on the SFA or rapidly copy them back to primary.
- Near-instant disaster recovery—failover to the SFA and run production workloads at full speed.

hpe.com/Nimble

HPE Nimble Storage—Secondary Flash Arrays

Where to sell

The HPE Nimble Storage Secondary Flash Array is the ideal solution for customers:

- Looking to optimize efficiency and consolidate footprint
- Need to improve backup and restore times; current recoveries slow and not meeting RTO
- Customer wants to be able to run real workloads on their secondary storage, putting their backup data 'to work'
- Looking for a new, simple, support approach that is cloud ready
- Needing a backup solution that works with Veeam backup software
- Remote site with limited to no on-site IT expertise
- Wants to do more with less—Backup, dev/test, QA all on one platform

Customer benefits

The HPE Nimble Storage Secondary Flash Array is unique in the backup market, having the flash performance to enable real work with backup data, like dev/test and analytics, while still delivering low cost per effective capacity. On top of this, none of our competitors have the predictive power of InfoSight.

Secondary Flash Array represents a new category of data storage optimized for both capacity and performance. Adding high performance flash storage to a capacity-optimized storage architecture makes for a unique backup platform that lets you put your backup data to work. The tight integration between the HPE Nimble Storage Secondary Flash Array and Veeam Backup & Replication software lets backup administrators access Nimble array-based capabilities without using a separate interface or having to become a hardware expert.

Don't forget to Attach

Remember when talking to your customers about HPE Nimble Storage Secondary Flash Storage also discuss:

- HPE StoreFabric switches and HPE Networking
- HPE StoreOnce disk to disk backup solutions

hpe.com/Nimble

HPE Nimble Storage—Secondary Flash Arrays

Performance—Run real workloads with flash performance, such as Dev/Test, QA, Patch testing and Analytics. Zero-copy clones let you re-use backup data and instantly spin up hundreds of application copies.

Simplicity—Backup, DR and secondary storage in a single device. Customers get multiple workloads onto fewer systems. Integration with leading data availability software streamlines data management letting backup Admins work through their familiar interface without having to be hardware experts.

Data Protection—Cost-optimized HPE Nimble Storage Secondary Flash arrays can be used for backup, DR, test/dev and archival even when primary copies are stored on All Flash.

"HPE's $1+ billion acquisition of Nimble Storage, a midrange vendor of both hybrid flash arrays and all-flash arrays, will make HPE's ability to sell highly flash-optimized enterprise storage to midmarket and small and medium-sized business (SMB) customer much stronger. This is a bold, strategic move on HPE's part that will benefit HPE and Nimble's customers alike."—IDC

Flash-enabled Storage

Dedupe & Capacity Optimized

Multicloud Flash Fabric™

InfoSight Predictive Analytics

HPE Nimble Storage Secondary Flash Array—Competition

ExaGrid and other 2nd tier HDD-based backup appliances

Legacy hard drive-based Backup targets are optimized for ingress (i.e. don't slow down the host or primary systems) but are slow for restores. Also they don't provide the performance to run anything on the backup data. ExaGrid is architected with twice as much capacity to enable fast backup ('landing zone') but then has to run Dedupe as an offline process. In contrast, SFA uses flash performance to enable fast backup and restores, dedupe inline, lets you do real work with backup data, and still delivers an attractive cost per effective GB.

Integrated Backup Appliances

Veritas (formerly Symantec) is a traditional leader with NetBackup and Backup Exec software, and has brought to market integrated Backup appliances that combine their software with OEM hardware from NetApp and Seagate to serve a simplicity-seeking buyer with an all-in-one solution that negates the need for separate storage arrays. SFA in contrast provides Flexibility to run the backup software of your choice.

Dell/EMC Data Domain

Data Domain has been in the market for 16 years and has a broad product line, with high-end systems (9xxx series) having advanced features, high throughput and scalability. But they are notoriously expensive and were not architected to let IT do work with the backup data. Many companies want a more affordable alternative and the SFA provides good dedupe, acceptable throughput, and competitive cost/GB to be a replacement, esp. for the lower end (2xxx series) Data Domain systems.

HCI based/Cloud gateway appliances

Rubrik and Cohesity are startups that have gotten mind share with innovative new offerings that provide high usability and an easy way to do 'cloud data management', spanning on premise and cloud-based backups through a single catalog.

Nimble Secondary Flash Arrays integrate with Veeam Backup software to deliver great usability, a single backup catalog, as well as cloud connectivity. Plus customers get cloud future-proofing with NCV.

Better together

HPE is unique if you position the entire portfolio and elevate "beyond the box". From Flash to SAN Networking to Compute to Composability (with HPE Synergy) and Services, you can change the game. Dell+EMC is losing market share in external storage and Pure Storage is a "one trick flash pony". HPE uniquely delivers stability and innovation and now 3PAR combined with HPE Nimble Storage provides best in class flash storage and predictive analytics for a wide range of needs.

HPE StoreEver—LTO Tape Drive/MSL Tape Libraries

Quick view

HPE StoreEver

LTO Tape Drives
- Multiple host interfaces
  - SAS, SCSI
- Capacity from 800 GB to 6.25 TB
- Half-Height, Full-Height, Internal, External and Rack-mount

Autoloaders
- Multiple host interfaces
  - Ultra320 LVD SCSI, 3 or 6 GB SAS, 8 GB FC
- 1U Rackmount; 8 cartridge slots
- Capacity—120 TB Compressed 2.5:1

HPE StoreEver

MSL Tape Libraries
- Multiple host interfaces
  - Ultra320 LVD SCSI, 3 or 6 GB SAS, 4 or 8 GB FC
- 2U-42U Form-factor; depending on model
- 24, 48, **80-560** cartridge slots; depending on model
- Capacity up to 8.4 PB Compressed 2.5:1
- Transfer rates of up to 105.8 TB/hr **Compressed 2.5:1**

Product positioning

HPE StoreEver Solutions

Simple, lowest cost direct attach backup, DR, archive	Low cost unattended backup, DR, archive for small servers and small networks	Unattended backup, DR, archive for mid size networks/entry level SANs with best in class scalability, density, and performance
Entry level DAS and LAN Backup and Archive	Entry-level automation for DAS and LAN backup/archive or remote office	Automation and management for DAS, LAN, and entry-level SAN backup or archiving
LTO Tape Drives	**Autoloaders**	**MSL Tape Libraries**

Delivering rapid recovery from loss; Storing a secondary copy of data Short-term storage: weeks—months

HPE StoreOnce

Protect it longer, for less

With the broadest and most advanced portfolio in the industry, HPE StoreEver features support for LTO-7. HPE StoreEver Tape provides tape storage that is critical to your customers comprehensive data protection and archiving.

As the worldwide leader in tape drives, tape media and tape automation, HPE StoreEver provides tape storage that is critical to comprehensive data protection and archiving. With a shelf life of 30 years, HPE StoreEver addresses all your long term retention needs and delivers the most reliable long-term archival storage.

hpe.com/storage/storeever

HPE StoreEver—LTO Tape Drive/MSL Tape Libraries

Where to sell

The HPE StoreEver is the ideal solution for customers:

- Implementing their first backup and/or archive of Direct Attached Storage (DAS)
- Need for backup/archive data to be retained for very long periods—years
- Off-site backups/archives are a requirement for Disaster Recovery (DR) or regulatory reasons
- Remote Office/Branch Office (ROBO) environments
- Looking for a cost effective and efficient Disaster Recovery repository/archive

Customer benefits

HPE StoreEver LTO tape drives—high capacity and low cost of ownership, proven reliability, best practice media rotation, cost-effective/durable archiving.

HPE StoreEver Tape Autoloaders—the ideal solution for archiving and long-term data retention with industry-leading affordability, capacity, and security features (encryption and WORM).

HPE StoreEver MSL Tape library—unattended backup, disaster recovery, and archive solution with Web-based remote management; the ideal solution for archive and long-term data retention due to industry-leading affordability; capacity, fast.

Don't forget to Attach

Remember when talking to your customers about HPE StoreEver, also discuss:

- HPE Tape Media
- HPE StoreOnce disk to disk backup solutions
- HPE StoreFabric switches and HPE Networking

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HPE StoreEver—LTO Tape Drive/MSL Tape Libraries

Competitive

HPE StoreEver MSL6480 vs. Oracle SL150, Quantum i5000, Dell TL series, and IBM TS series

Lower-cost/less complex encryption solution—HPE MSL6480 comes with an encryption kit built into the library that requires only license activation for a lower-cost and easier solution. Oracle, Quantum, Dell, and IBM require either a separate software purchase and installation or the deployment of a separate encryption appliance.

Investment protection—Existing HPE MSL8096 customers can reuse their tape drives in the new HPE StoreEver MSL6480. This lets HPE customers leverage their existing investment and reduce costs as they only need to purchase a base unit. No competitors offer this capability.

Faster performance—HPE StoreEver MSL6480 Tape Library is faster than all other midrange tape library competitors with speeds up to 105.8 TB per hour. This is 2.3x faster than Quantum, Dell, and IBM, and 2.1x faster than Oracle SL150.

Scalability—HPE StoreEver MSL6480 Tape Library beats all competitors in scalability with up to 8.4 PB of storage. This is 1.9x more that Oracle SL150 and 1.3x more than Quantum, Dell, and IBM.

Manageability—In environments that have both HPE MSL and ESL libraries, HPE enables these different families to be managed from HPE Command View. None of our competitors offer anything in the midrange to manage multiple midrange libraries, let alone across different library families.

HPE T950 Tape Library

Quick view

HPE T950 Tape Library

- Scales from 50 to 10,020 LTO slots (45 to 7,614 TS11xx slots)
- Store up to 285.5 PB* enterprise data
- 1 to 120 tape drives
- 1-8 frames
- Can be configured either for LTO-6 and LTO-7 or TS11xx tape technology
- BlueScale® manageability software
- HPE TeraPack® Media

Product Positioning

Address archive requirements with long term off line storage	**Scalability (up to 285.5 PB*), small footprint and industry best density**	**High performance, Unique flexibility, and advanced management features**

AND to deliver rapid recovery from loss; storing a secondary copy of data for short-term storage

↓

Use HPE StoreOnce Solutions in parallel

Meet data growth challenges head-on

The HPE T950 tape library combines field-proven reliability with storage innovation, to give you access to a full suite of enterprise capabilities, including powerful library management, superior and proactive data integrity administration, and the best total cost of ownership of any tape solution.

The HPE T950 can seamlessly scale up to 120 drives with over 10,000 media slots and can be configured either for LTO-6 and LTO-7 tape technology or TS11xx Technology Drives. Mixed media support is not available.

* Using 2.5:1 compression ratio with TS1155 drives and media, or 150 PB compressed using LTO-7 drives and media

hpe.com/storage/t950

HPE T950 Tape Library

Where to sell

The HPE T950 are suited for enterprise organizations that:

- Require archived data to be retained for very long periods of time
- Are experiencing unpredictable data growth
- Off-site backups/archives are a requirement for Disaster Recovery (DR) or regulatory reasons
- Remote Office/Branch Office (ROBO) environments
- Are looking for a cost effective and efficient Disaster Recovery repository/archive

Customer benefits

Flexible scalability for data growth

The HPE T950 scales horizontally with linear robots from 1 to 8 frames, with up 120 drives to store a maximum of 285.5 PB of enterprise data* and is designed to help organizations reduce risk and increase resilience for data integrity, data security and high reliability.

The T950 tape library has the ability to operate either LTO-6/LTO-7 or TS11xx tape technologies meaning organizations can develop customized workflows for every situation.

Every HPE T950 tape library has BlueScale® software interface built-in, so customers have intelligent command, control and data integrity functionality at the touch of a screen. A wide range of Spectra support options and professional services are also available to customers including Assisted Self-Maintenance (ASM), global spare drive options and installation and integration services.

* 2.5:1 compression ratio using TS1155 tape technology

HPE T950 Tape Library

Competitive

HPE T950 Competitive landscape

Library feature	HPE T950	Oracle SL3000	IBM TS3500	Quantum Scalar i6000
Linear scalability	**YES**	YES	YES	YES
Maximum slot capacity	**10,020 (LTO)** **7,614 (TS11xx)**	5925	20,000 (LTO) 15,000 (TS11xx)	12,006
Maximum drives	**120**	56	192	192
Dual robotics	**NO**	YES	YES	YES
Media pooling/partioning	**YES**	YES managed manually	NO	YES
19” rack form factor	**No 29-in free-standing**	No	NO	YES
Advanced reporting	**BlueScale®**	StorageTek ACSLS	Advanced Library Management System	iLayer
Maximum capacity	**150 PB (LTO-7)*** **285.5 PB (TS11xx)***	88 PB (LTO-7)* 118.5 PB (T10K-D)*	300 PB (LTO-7)* 375 PB (TS11xx)*	180 PB (LTO-7)*
Technology supported	**Either LTO-6/LTO-7 or IBM TS11xx**	Either LTO or Oracle T10K	LTO and IBM TS11xx	LTO

* Based on industry standard compression ratio 2.5:1

HPE TFinity ExaScale Tape Library

Quick view

HPE TFinity ExaScale Tape Library

- Scales from 50 to 53,460 LTO slots (45 to 40,680 TS11xx slots)
- Store up to 1.52 EB* enterprise data
- 1 to 144 tape drives
- Bulk import/export service bay frames
- Dual Robotic technology
- Can be configured either for LTO-6, LTO-7 or TS11xx tape technology
- BlueScale® manageability software
- HPE TeraPack® Media

Product Positioning

Address archive requirements with long term off line storage	**Scalability (up to 1.52 EB*), small footprint and industry best density**	**High performance, Unique flexibility, dual robotic technology and advanced management features**

AND to deliver rapid recovery from loss; storing a secondary copy of data for short-term storage

↓

Use HPE StoreOnce Solutions in parallel

Meet data growth challenges head-on

HPE TFinity® ExaScale Tape Libraries deliver enormous scalability to keep pace with unpredictable data growth. Choose from a range of base configurations and scale up to 53,460 LTO-7 tape cartridges, or 40,680 TS11xx technology cartridges in increments of 10 LTO of 9 TS11xx Technology slots for capacity on demand.

Incorporating between 1 and 144 tape drives you can consolidate and store up to 1.52 EB* (using TS11xx Technology) or 801 PB* (using LTO-7 tape cartridges) of enterprise data.

HPE's TFinity ExaScale tape library supports either LTO-6 and LTO-7, or TS11xx technology, enabling customers to avoid vendor lock-in and select the tape technology that suits their business needs.

* Using 2.5:1 compression ratio with TS1155 drives, or 801 PB compressed using LTO-7 drives

hpe.com/storage/tfinity

HPE TFinity ExaScale Tape Library

Where to sell

The HPE TFinity ExaScale tape libraries are suited for enterprise organizations that:

- Are experiencing unpredictable data growth
- Require a storage solution to manage exascale capacities
- Require archived data to be retained for very long periods of time
- Off-site backups/archives are a requirement for Disaster Recovery (DR) or regulatory reasons
- Remote Office/Branch Office (ROBO) environments
- Are looking for a cost effective and efficient Disaster Recovery repository/archive

Customer benefits

Enormous scalability to manage unpredictable data growth

The HPE TFinity ExaScale scales horizontally with linear robots from 3 to 44 frames, with up 144 drives to store a maximum of 1.52 EB of enterprise data* and is designed to help organizations manage unpredictable data growth.

The HPE TFinity ExaScale tape library can support LTO-6 and LTO-7, or TS11xx tape technology[12] meaning organizations can develop customized workflows for every situation. Using innovative “shelves” instead of slots, and TeraPack® containers in place of individual cartridges; HPE’s TFinity ExaScale industry-best density, delivers up to a 50% reduction in data center floor space required versus competing offerings. The HPE TFinity ExaScale is also equipped with dual robotics for high availability and bulk import and export Service Bay Frames for faster cartridge load and unload.

Every HPE TFinity ExaScale tape library has BlueScale® software interface built-in, so customers have intelligent command, control and data integrity functionality at the touch of a screen. A wide range of Spectra support options and professional services are also available to customers including Assisted Self-Maintenance (ASM), global spare drive options and installation and integration services.

* 2.5:1 compression ratio using TS1155 technology

[12] Oracle® T10000x support is enabled via a field migration service (delivered by Spectra Logic)

Competitive landscape

Both the HPE T950 and HPE TFinity ExaScale tape libraries provide the best storage density, lowest data center footprint and most energy-efficient tape libraries available in the current market and customers will typically benefit from the following enhancements over competitors offerings:

Best storage density

TFinity ExaScale is 29% more dense[13]
than IBM's TS4500 and is still capable of doubling in size to 44 total frames and over 53,000 slots

Lowest data center footprint

HPE T950 requires 39% less floor space[14]
than Quantum's i6000

Most energy efficient tape libraries

T950 is 34% more Power Efficient
than Quantum's i6000

EnergyAudit™ Power Monitoring Feature

EnergyAudit™, the BlueScale power monitoring feature, tracks power use over time and by component. Customers can use this information to adjust and optimize power use. Tracking this data becomes increasingly important as energy prices continue to climb.

[13] Data Density for TFinity EE: 20,000 slots | 120 tape drives | 19 frames

[14] Floor space required (m^2) for: 10,000 slots and 24 drives

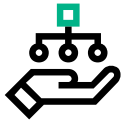
Competitive landscape

Both the HPE T950 and HPE TFinity ExaScale tape libraries provide the best storage density, lowest data center footprint and most energy-efficient tape libraries available in the current market and customers will typically benefit from the following enhancements over competitors offerings:

HPE offers higher scalability & capacity

HPE TFinity ExaScale is the only enterprise tape library on the market that is capable of being configured for 20,000 slots using 19 frames and 120 tape drives.

HPE T950 is the highest capacity single frame library, when compared to competing tape libraries—Quantum i6000 and IBM TS3500.



HPE provides powerful library management

IBM's Advanced Library Management System (ALMS) is included with the TS4500 but is not a standard feature on the TS3500 and will require an additional license for activation. ALMS provides reporting and management features similar to BlueScale which is included as standard with both libraries.

Quantum's Extended Data Life Management (EDLM) will require a license and potentially additional hardware when used to management the i6000.

HPE delivers intelligent media handling

IBM's tape libraries use dual robot pickers, attached to a single vertical column and has a High Density architecture to allow for an increased slot count, but this introduces many more moving parts such as spring mechanisms in each sleeve, which present multiple touchpoints for maintenance issues over the life of the library.

Quantum and IBM require a minimum of 100 LTO slots be licensed at a time and the robotics can only handle up to two LTO cartridges at a time.

Product reference guide
For HPE and Channel Partner internal use only.

Resource

Download the Reference Guide

To download the latest version Internal URL:
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Regional Partner Portal URL's:

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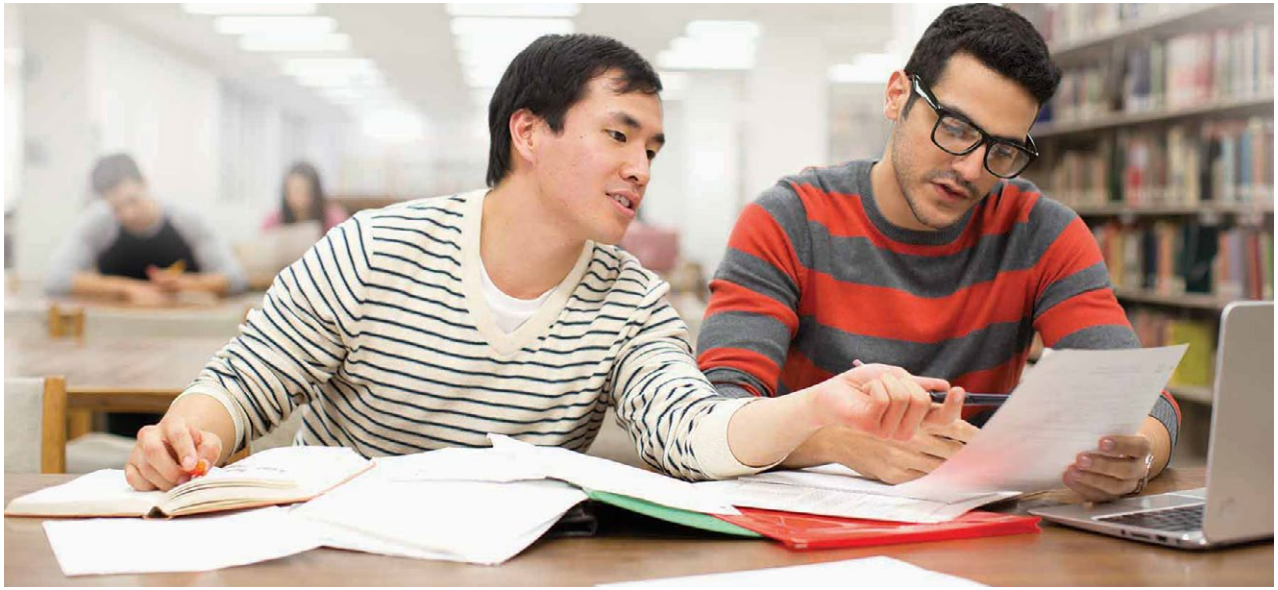

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4AA5-4251ENW, November 2017, Rev. 11