Hewlett Packard Enterprise

Key features and benefits

Scalable—to meet growing enterprise requirements

- Scale capacity up to 9 PB[1] raw and more than 20 PB[2] usable with up to eight controllers in a Mesh-Active cluster

- Reduce performance bottlenecks with flash-optimized hardware and software for greater than 3 million IOPS at sub-millisecond latencies

- Lower the cost of all-flash equivalent to spinning disks without sacrificing performance

- Achieve a 6X density advantage with more than 11 PB of usable capacity in a single expansion rack

- Cut capacity requirements by as much as 75 percent without sacrificing performance

Flexible—to meet unpredictable business demands

- Support the most rigorous, on-demand infrastructure with a virtually limitless, elastic pool of storage

- Run workloads at the right cost and SLA with one-click workload balancing

- Slash management overhead with unified management of block, file, and object access and storage that is self-configuring, self-provisioning, and self-optimizing

Resilient—so you can consolidate with confidence

- Maintain high availability and Tier-1 resiliency with a complete set of persistent technologies

- Deliver consistent QoS with HPE 3PAR Priority Optimization Software

---

[1,] [2] Respective capacity support available in H2, 2016.

[3] Based on a 100 percent random read workload with a block size of 8K with RAID 5 protection and node local volume layout running on the all-flash HPE 3PAR StoreServ 20850 Storage system.

[4] Based on HPE internal comparative analysis comparing HPE 3PAR StoreServ 20000 Storage with all-flash vs. traditional high-end hybrid storage.

[5] When configured with 7.64 TiB SSDs and used with HPE 3PAR compaction technologies, the HPE 3PAR StoreServ 20800 and 20840 brings usable capacity to more than 20 petabytes.

[6] As compared to not using data compaction technologies. Based on a data compaction ratio of 4:1.

[7] **Storage Performance Council (SPC) Benchmark: HPE 3PAR StoreServ 20850 62,844.45 SPC-2™ MBPS**

HPE 3PAR StoreServ 20000 Storage Family

Enterprise flash for on-demand and hybrid IT

Enterprise flash meets modern, Tier-1 storage

Have cloud and IT-as-a-Service (ITaaS) environments forced you to settle for Tier-1 storage that compromises on performance, scalability, or data protection? Are you interested in processing six times more transactions per second with 90 percent fewer disks? Do you need massive consolidation—for block and file workloads as well as object access—with assured quality of service (QoS)?

The HPE 3PAR StoreServ 20000 Storage family is a class of enterprise flash arrays for massive consolidation of your most demanding workloads, with greater than 3 million IOPS, sub-millisecond latencies,[3] a 6X density advantage over the competition,[4] and scalability to more than 20 PB of usable capacity.[5] The family's flash-optimized architecture features the HPE 3PAR Gen5 Thin Express ASIC for silicon-based hardware acceleration, including inline deduplication, thin provisioning, and other compaction technologies that can reduce acquisition and operational costs by as much as 75 percent without compromising performance.[6]

With unmatched versatility, world record performance,[7] and scalability, HPE 3PAR StoreServ 20000 Storage has you covered. A choice of models gives you a range of options that support true convergence of block and file protocols, all-flash array performance and the use of spinning media to further optimize costs.

And it does this while delivering all the enterprise-class, Tier-1 features and functionality you have come to expect from the storage platform that powers many of the world's largest service providers. Enhanced storage capabilities provide continuous data access and fine-grained QoS controls ensure predictable service levels to each of your applications, workloads, and tenants without physical partitioning of resources. In addition, bi-directional data mobility allows you to create virtually limitless, elastic pools of storage to support rigorous on-demand infrastructure.

With support for asynchronous streaming replication, you'll be able to dramatically reduce the cost and complexity of data protection with disaster recovery that can be set up and tested in only minutes and is supported across all models in the HPE 3PAR StoreServ Storage family (figure 1). HPE 3PAR StoreServ 20000 also supports flat backup to HPE StoreOnce Backup systems for simple and efficient data protection that eliminates traditional backup processes.

- Achieve application-integrated recovery with near-synchronous RPOs
- Protect against unauthorized access with Data-at-Rest Encryption
- Simplify backup and restore with HPE StoreOnce Recover Manager Central for application-aware, storage-integrated data protection

Future-proof—to support hybrid and on-demand computing

- Modernize your EMC, HDS and IBM storage infrastructure with painless, no-cost data migration
- Seamlessly move data between any model HPE 3PAR StoreServ array
- Boost flash performance by 35 percent and reduce latency by 2.5X with 16 Gbps Fibre Channel

HPE 3PAR Architecture

Full-mesh interconnect

✔ Cost-effective
✔ Scalable
✔ Resilient
✔ Mesh-Active
✔ Meets cloud-computing requirements for efficiency, multi-tenancy, and autonomic management

Traditional architecture tradeoffs

Traditional modular storage

✔ Cost-efficient
✘ Typically active/passive or active/optimized
✘ Dual-controller design limits scalability and resiliency

Traditional monolithic storage

✔ Scalable, resilient, and active-active
✘ Complex and costly
✘ Static and inflexible

- Host connectivity
- Data cache
- Drive connectivity
- Matrix switches

Figure 2: Traditional storage architecture vs. HPE 3PAR StoreServ

Figure 1: HPE 3PAR StoreServ Storage Models

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

When value matters

When scale matters
20800/20840

When performance matters
20450/20850

8200
8400
8440
8450

Scalable—to meet growing enterprise requirements

HPE 3PAR StoreServ Storage removes the bottlenecks that prevent legacy storage from taking full advantage of flash-based media. A flash-optimized architecture enables optimal performance of flash-based SSDs that may also be used as a true extension of DRAM cache. Block-level storage tiering and mixed workload optimization also enable high levels of performance for both spinning and flash media.

This flash-optimized architecture allows the HPE 3PAR StoreServ 20000 Storage family to deliver multi-petabyte scalability with accelerated performance of over 3 million IOPS and sub-millisecond latency. This flash-optimized architecture relies on several unique HPE 3PAR StoreServ innovations:

- **Unique, clustered, Mesh-Active architecture (figure 2):** Up to eight controllers form a Mesh-Active cluster based on a unique system of controller node interconnects. Unlike traditional "Active-Active" architectures, this clustered design delivers robust, load-balanced performance, and greater headroom for cost-effective scalability that overcomes the tradeoffs typically associated with modular and monolithic storage.

- **HPE 3PAR Gen5 Thin Express ASIC:** Supports mixed workloads and enables thin technologies including inline deduplication with high performance levels to alleviate legacy storage performance concerns. The Thin Express ASIC supports mixed workloads with extremely high performance levels so that transaction- and throughput-intensive workloads run on the same storage resources without contention, enabling consolidation without compromise.

- **Adaptive read and write technology:** Matches host I/O size reads and writes to flash media at a granular level to avoid unnecessary data reads and writes to reduce latency, enhance backend performance, and extend flash media lifespan to lower the total cost of ownership (TCO) for storage.

- **Autonomic cache offload:** Reduces cache bottlenecks by automatically changing the frequency at which data is offloaded from cache to flash media based on utilization rate. This helps achieve consistently high performance levels as you scale up the workload to millions of IOPS.

- **Multi-tenant I/O processing:** Enables performance improvement for mixed workloads or virtual desktop infrastructure (VDI) deployments by breaking large I/O into smaller chunks so that small read requests don't get held up behind larger I/O requests, which helps ensure reduced latency.

- **Adaptive Flash Cache:** A feature that allows SSDs to act as a true extension of system cache. This feature can improve throughput and reduce latency[8] with HPE 3PAR StoreServ Storage arrays that are configured with SSDs.

- **Express Writes:** Write acceleration that helps optimize CPU utilization and, depending on workload, delivers greater throughput, up to 30 percent more IOPS, and up to 20 percent reduced latency.[9]

Flash-based storage you can afford

HPE 3PAR StoreServ Storage is and will continue to be on the cutting edge for flash media innovation to lower cost. Technologies built into the HPE 3PAR OS allow you to get the most out of your flash investments by protecting them with extended media lifespan, which is why all HPE 3PAR SSDs
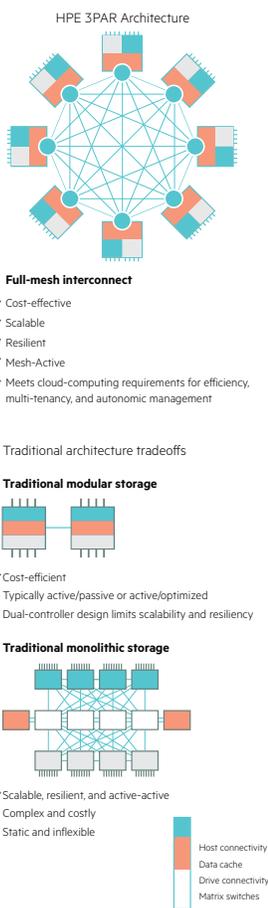
[8] Based on HPE internal testing with HPE 3PAR Adaptive Flash Cache enabled.

[9] Based on HPE internal testing using a random, 100 percent write workload with an 8K block size.

A new class of enterprise flash for massive consolidation and density

Adaptive Sparing and our compaction technologies not only drive flash affordability, but also improve scalability, specifically with relation to density.

Extending usable capacity by as much as 75 percent[11] means you can consolidate more data in a smaller footprint to accommodate:

• 600 TB usable capacity in a drive enclosure

• 11 PB usable capacity in a single rack

• More than 20 PB usable capacity in a single HPE 3PAR StoreServ 20800 or 20840 system

Up to 60 PB and 10 million IOPS of federated storage with zero added overhead
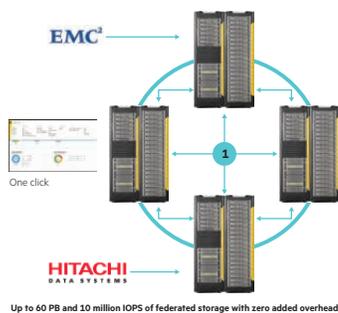
Figure 3: An elastic resource pool with one-click workload balancing

come with a 5-year warranty that includes replacement of the SSDs for any failure including write wear-level limit.

Adaptive Sparing technology is a feature of the HPE 3PAR Operating System that leverages the system's sparing approach to improve the performance and endurance of flash. Other architectures often reserve entire drives to use as 'hot' spares—these drives are not used unless another drive in the system fails which is expensive and inefficient. Instead, the HPE 3PAR architecture the system reserves a small amount of 'spare' space in each drive. HPE 3PAR's patented Adaptive Sparing technology takes the spare space and hands it back to the drive's firmware to increase the internal capacity used by the drive for housekeeping tasks. Adaptive Sparing 2.0 extends this functionality to allow the drive to use all unused space on the drive to extend its internal housekeeping space. Adaptive Sparing technologies are so powerful they can increase SSD endurance up to 5x over the drive's standalone endurance capability while also increasing write performance. Adaptive Sparing is the foundation behind HPE 3PAR's unconditional 5-year warranty on all SSDs.[10]

Another feature of the HPE 3PAR OS, HPE 3PAR Thin Deduplication Software with patented Express Indexing delivers inline deduplication with hardware acceleration at scale. Thin Deduplication runs on any HPE 3PAR StoreServ array with an SSD tier to increase usable capacity, lower total cost of ownership, and extend flash media lifespan.

When combined with high-density SSDs, HPE 3PAR Compaction Technologies lower the cost of flash storage to below that of spinning media. In cases where there is a large amount of duplicate data, HPE 3PAR Thin Deduplication Software also improves write throughput and performance. Other storage architectures that support deduplication are not able to offer these benefits at the same capacity and scale at the same performance level.

Flexible—to meet unpredictable business demands

Meet the needs of today's dynamic applications with the ability to move data and workloads not just between tiers, but between arrays—without impact to applications, users,

or services. With HPE 3PAR StoreServ 20000 Storage, you get rich storage federation capabilities, such as bi-directional data mobility. With this capability, you get the agility and flexibility to run workloads at the right cost and service level with one-click workload rebalancing (figure 3).

• Non-disruptively shift data between HPE 3PAR StoreServ 20000 Storage enterprise flash arrays and any other HPE 3PAR StoreServ array without additional management layers, appliances, or overhead impact to host resources.

• Map workloads to the right resources and establish tiers of storage across a data center for different SLAs.

• Lower costs and manage capacity at a data center level by thinly provisioning volumes with the freedom to non-disruptively move data between systems.

Flexible management that's so simple, it's autonomic

HPE 3PAR StoreServ Management Console (SSMC) offers a modern look and consistent feel for all HPE 3PAR StoreServ arrays, making management effortless. Flexibly manage block, file, and object access from a single interface serving diverse workloads. All the information you need at a glance with customizable reporting capabilities remove the need for add-on software tools, as well as diagnosis and troubleshooting that typically require professional services.

Assess what's happening across the entire data center in seconds via a simple dashboard and you are just one click away from collecting configuration and health information on any resource. Historical performance and capacity reports are also accessible with one click via HPE 3PAR System Reporter to help you optimize and plan future configuration changes to improve infrastructure investments.

HPE Smart SAN for HPE 3PAR StoreServ

HPE Smart SAN for HPE 3PAR StoreServ brings together a set of creative features based on FC in-band control and communication to SAN management. Smart SAN helps reduce end-to-end SAN complexity with automation and HPE 3PAR target orchestration. To address the complexity of traditional SANs zoning, HPE used an industry standard FC definition, added a set of creative software features on HPE 3PAR StoreServ

---

[10] See product specifications for details.

[11] As compared to not using data compaction technologies. Based on a data compaction ratio of 4:1.

Rapid SAN Provisioning (HPE Smart SAN)

- Protocol agnostic SAN Management and orchestration enabled via in-band metadata collection

- Automated Target Driven Zoning makes SAN zoning simple for HPE 3PAR StoreServ

- End-to-end support across hosts, switches and storage

- Diagnostics data collection

HPE StoreOnce Recovery Manager Central
Express Protect

Converged data protection with HPE StoreOnce Backup

If you are looking for virtually instant application-consistent backups for your VMware environment, look no further than rapid and granular backup and recovery with HPE StoreOnce Backup. With HPE StoreOnce Recovery Manager Central, you get fast, efficient, flat backup from HPE 3PAR StoreServ Storage to HPE StoreOnce Backup. This solution transforms traditional approaches to backup and recovery, giving you application-aware, storage-integrated data protection that bypasses traditional backup server-based processes.

By connecting HPE 3PAR StoreServ Storage directly to HPE StoreOnce Backup, you can maintain business productivity by expediting the backup and recovery process and eliminating application performance impact. This streamlined backup process also reduces total cost of ownership for storage by leveraging HPE StoreOnce Backup systems for cost-effective backup retention. The native movement of snapshots from HPE 3PAR StoreServ Storage to HPE StoreOnce Backup assures that any online storage threats are quickly mitigated with always-available, single-click data recovery. This is all made possible by HPE StoreOnce Recovery Manager Central, which allows VMware owners to seamlessly manage snapshots, backup, and recovery directly from within VMware vCenter.

and collaborated with server adapter (hosts) and switch vendors to implement end-to-end software based automated Target Driven Peer Zoning (TDPZ) to address traditional SAN complexity. The HPE approach called HPE Smart SAN for HPE 3PAR StoreServ is a holistic way to simplify end-to-end SAN complexity.

HPE Smart SAN also supports standards-based device registrations and diagnostic data collection for better configuration, visibility, and diagnostic purposes. This drastically improves the customer experience with significant reduction in overall SAN configuration time as well as making the whole process less error prone. As an example, in a mid-sized SAN consisting of nine fabric switches, zone configuration for 128 host initiators and eight HPE 3PAR target ports, resulted in a saving of over 80 percent configuration time with Target Driven Peer Zoning (TDPZ).

Storage customized for your applications

Your critical business infrastructure and applications require a single storage infrastructure that can deliver the service levels, application availability, and efficiencies that your business requires. HPE 3PAR StoreServ 20000 Storage allows you to consolidate applications onto a single, high-performance system, giving your business the flexibility to meet changing business needs, on demand.

Get more out of your virtualization deployment

HPE 3PAR StoreServ Storage is built to deliver performance that exceeds even the most stringent application demands along with transformative levels of simplicity, agility, and efficiency. Integration with Microsoft® System Center and VMware® vCenter, gives you enhanced visibility into storage resources and precise insight into how VMs are mapped to datastores and system volumes. Support for VMware Virtual Volumes (VVols) enables granular VM-level storage control, disaster recovery, and QoS in environments with VMware vSphere 6.

Integration with VMware vSphere API for Array Integration (VAAI), VMware vStorage APIs for Storage Awareness (VASA), Microsoft Offload Data Transfer (ODX), and thin provisioning enable HPE 3PAR StoreServ Storage to improve virtual infrastructure performance, efficiency, and scalability. Low latency levels allow you to get more out of

your VMware deployment, where extensive use of virtual memory pages to disk can limit VM consolidation on physical servers when paired with legacy storage. By contrast, deploying HPE 3PAR StoreServ Storage enables you to double VM density on your physical servers.

If you are looking for virtually instant application-consistent backups for your VMware environment, look no further than rapid and granular backup and recovery with HPE StoreOnce Backup. With HPE StoreOnce Recovery Manager Central, you get fast, efficient, flat backup from HPE 3PAR StoreServ Storage to HPE StoreOnce Backup. This solution transforms traditional approaches to backup and recovery, giving you application-aware, storage-integrated data protection that bypasses traditional backup server-based processes.

Make your databases more efficient, without tradeoffs

Database performance and availability are so critical that many organizations apply generous capacity and management resources to maintain needed service levels. HPE 3PAR StoreServ 20000 Storage removes these inefficiencies, helping eliminate tradeoffs between capacity utilization, efficiency, and performance. For example, with HPE 3PAR Thin Persistence Software and Oracle ASM Storage Reclamation Utility (ASRU), your Oracle databases stay thin by autonomically reclaiming stranded database capacity. And Hewlett Packard Enterprise offers the cost-effective Oracle- and SQL-aware snapshot technologies, HPE 3PAR Recovery Manager for Oracle and HPE 3PAR Recovery Manager for SQL. Low latency levels meet the requirements of response-time sensitive applications such as Oracle database and Microsoft Exchange.

Given the importance of Microsoft Exchange for mission-critical email communications, many organizations devote significant amounts of storage capacity and management resources to this essential application. HPE 3PAR StoreServ 20000 Storage enables you to support a large number of mailboxes with a larger size limit while reducing cost per mailbox from dollars to cents. In addition, with HPE 3PAR Recovery Manager for Exchange, you can recover email messages quickly, affordably, and from multiple points in time.

Resilient—so you can consolidate with confidence

With a modern architecture that provides true convergence of block, file, and object access while helping eliminate single points of failure, HPE 3PAR StoreServ Storage delivers Tier-1 resilience paired with secure administrative segregation of users, hosts, and application data. A unique set of data protection and security products power HPE 3PAR StoreServ 20000 Storage in delivering high availability and resilience for multi-tenant cloud and ITaaS environments. Serve multiple user groups and applications from a single storage system with complete confidence that access to your data will not be compromised or interrupted. Ensure data protection at the array level, across the data center, and with a robust backup and recovery strategy.

Persistent technologies meet virtual datacenter demands
On HPE 3PAR StoreServ 20000 Storage, Tier-1 resiliency is supported by persistent technologies unique to the platform:

- **Persistent Cache:** The use of Persistent Cache preserves service levels so they are not impacted by unplanned component failures—a key requirement for the virtual data center.

- **Persistent Ports:** A software feature allows non-disruptive upgrades to HPE 3PAR StoreServ 20000 Storage systems, Persistent Ports means you don't have to relying on multipathing software or failover initiation. This feature also automatically fails over a front-end controller node port that experiences physical connection loss due to a cable or switch failure in order to preserve service levels.

- **Persistent Checksum:** Ensures end-to-end data integrity, protecting against silent corruption from the host to the storage array.

- **Peer Persistence:** Federate storage across data centers, regardless of physical boundary constraints. Automated failover and failback between two sites or data centers is transparent to hosts, which keeps your VMware deployments seamlessly running even in the event of a disaster.

Secure multi-tenancy and data encryption support massive consolidation
Security concerns should not stand in your way when it comes to infrastructure consolidation. For this reason, HPE 3PAR StoreServ 20000 Storage supports the security features you need, such as:

- **Virtual Domains:** Unlike the use of multiple storage systems or traditional array partitioning schemes that rely on the physical segregation of resources, HPE 3PAR Virtual Domains uses a policy-based, logical implementation that preserves the benefits of distributing and sharing each application workload across all system resources. Virtual Domains is ideal for those who understand the benefits of consolidation but must enable secure, independent storage services to multiple administrators, applications, departments, and customers.

- **Data-at-Rest Encryption:** For environments that require protection from unauthorized data access, encryption protects your data from both internal and external security breaches. HPE 3PAR StoreServ 20000 Storage is fully FIPS 140-2 compliant, supports local and enterprise key managers that are FIPS certified and KMIP-compliant, and is available with encrypted FIPS 140-2 validated drives. These drives protect against unauthorized access, even if a drive is stolen, fails, or has to be retired.

- **Virtual Lock:** HPE 3PAR Virtual Lock Software enables organizations to securely lock down storage volumes, allowing read access but preventing accidental or intentional deletion. When used in conjunction with reservationless, non-duplicative snapshots, Virtual Lock delivers an efficient approach to governance and legal discovery.

Deliver uncompromising QoS for your most demanding workloads
Achieve higher service levels for more users and applications with less infrastructure. When combined with Tier-1 resiliency, the multi-controller scalability and extreme flexibility built into HPE 3PAR StoreServ Storage makes deploying and maintaining separate storage silos to deliver different QoS levels obsolete.

High and predictable levels of service for all workload types are assured through the massively parallel and fine-grained striping of data across all internal resources (disks, ports, loops, cache, processors, and more). With this massive and fine-grained approach, as use of the system grows—or in the event of a component failure—service conditions remain high and predictable.

With HPE 3PAR Priority Optimization Software, you can reduce contention by limiting maximum performance or setting a minimum goal for IOPS and bandwidth for a specific application, tenant, or workload. It provides high-priority applications with all the resources they need to meet service levels. It enables certainty and predictability for all applications and tenants.

Unlike application-centric approaches to storage, one-click autonomic rebalancing on HPE 3PAR StoreServ Storage enables you to help optimize QoS levels without service disruption, pre-planning, or the need to purchase separate arrays to support different service levels.

Affordable, flexible disaster recovery
High availability and uncompromising data protection are necessary for any enterprise data center. With HPE 3PAR StoreServ 20000 Storage, you can dramatically reduce the cost of remote data replication and disaster recovery with highly efficient, multi-mode replication across all HPE 3PAR StoreServ models (figure 4).

In order to meet service-level demands for modern IT and cloud environments, high availability and uncompromising data protection are necessary. With HPE 3PAR StoreServ 20000 Storage, you can decrease downtime while dramatically reducing the cost of remote data replication and disaster recovery with highly efficient, multi-mode replication across all HPE 3PAR StoreServ models.

HPE 3PAR Remote Copy Software, including new support for true asynchronous streaming (table 1), allows you to achieve low recovery time objectives (RTOs) and zero-data-loss recovery point objectives (RPOs) with
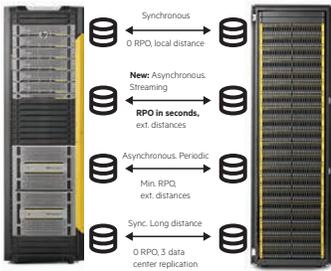
Figure 4: One software license for simple, efficient, and flexible disaster recovery

Table 1: HPE 3PAR Remote Copy Software benefits

Key attribute	HPE 3PAR	Other vendors
Autonomic configuration: Set up and test DR in minutes without professional services	√	×
Ease of operation: Unified management console for "do-it-yourself" DR	√	×
Cost efficiency: Multi-mode, multi-site replication supported between high-end and midrange arrays, keeping costs down	√	×
Capacity efficiency: Thin provisioning-aware replication cuts capacity purchases by as much as 75 percent[12]	√	×
Any-to-any native replication: Flexibly mirror data between any HPE 3PAR StoreServ model and varying service level (RAID level, drive type, and more)	√	×

Looking to replace your EMC or HDS or IBM array and cut capacity in half?
With HPE 3PAR StoreServ Storage, you can save on the cost of a storage technology refresh and then maximize storage ROI over time by keeping incremental purchases, administration, and operating costs to a minimum. In fact, the HPE Get Thinner Guarantee promises reduction in capacity requirements by as much as 75 percent when you replace legacy storage with HPE 3PAR StoreServ Storage—guaranteed.[13]

complete distance flexibility. And since HPE 3PAR Remote Copy configuration is autonomic, set-up only requires one step so you can protect your data from the start. Refer to the **HPE 3PAR Replication Software Suite data sheet** for additional details on Remote Copy and related functionality.

HPE 3PAR Peer Persistence Software, with VMware vSphere Metro Storage Cluster (vMSC) certification and support for Microsoft Windows Server® and Microsoft Windows® Hyper-V environments, delivers automated failover and failback between two sites or data centers that is transparent to hosts, which keeps your VMware deployments seamlessly running even in the event of a disaster.

Future-proof—to support on-demand computing

Data center transformation to address on demand computing in an investment. Protect your investment and maximize its effectiveness both today and into the future with a storage solution that not only aids you with today's data center refresh, but also ensures that your storage assets and infrastructure are always optimized for your workloads.

Refreshing your storage technology is effortless
With HPE 3PAR StoreServ Storage, you can refresh technology effortlessly by streamlining the movement of data from older systems and non-disruptively update storage without application impact. If you are looking to consolidate your HDS arrays, IBM XIV, EMC VMAX, CLARiiON CX4, or VNX arrays, HPE 3PAR Online Import Software make it easy for you.

Every HPE 3PAR StoreServ Storage system comes with this software at no additional charge for 1 year—giving you painless, non-disruptive migration. And if you are currently an HPE EVA Storage customer, you can use HPE 3PAR Online Migration to import data from your EVA system onto your new HPE 3PAR StoreServ array, providing you with a simple upgrade path.

Boost flash performance by 35 percent and reduce latency by 2.5X with 16 Gbps Fibre Channel
When replacing traditional HDD storage with hybrid or all-flash arrays to serve high performance workloads, it is critical to consider the role of your storage network and ensure that it isn't acting as a bottleneck. For example, a typical OLTP workload can saturate 8 Gbps host Fibre Channel (FC) bandwidth without fully utilizing all of your compute or storage resources. To ensure you receive the anticipated returns on your flash investments, you may need to consider increasing your storage networking performance.

HPE 3PAR StoreServ Storage support for 16 Gbps offers a simple and immediate solution. By replacing the 8 Gbps FC components with 16 Gbps FC on your all-flash HPE 3PAR StoreServ array, FC switch and host FC HBAs, you can easily increase I/O bandwidth and IOPS by up to 35 percent and realize a 2.5X or better latency improvement, remaining significantly and consistently under a millisecond. Need proof? See the results from the **Demartek Evaluation Report** All-Flash HPE 3PAR StoreServ 7450 Storage System and Generation 5 (Gen5) 16 Gbps FC. With older 4 Gbps FC infrastructure in its end-of-support life and 8 Gbps FC infrastructure starting to end-of-life, now is the time to evaluate 16 Gbps technology and the benefits it can bring your flash deployments.

[12,13] Subject to qualification and compliance with the HPE 3PAR Get Thinner Guarantee Program Terms and Conditions, which will be provided by your HPE Sales or Channel Partner representative.

Technical specifications

	HPE 3PAR StoreServ 20450 All-Flash	HPE 3PAR StoreServ 20800 Converged Flash	HPE 3PAR StoreServ 20850 All-Flash	HPE 3PAR StoreServ 20840 Converged Flash
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
Maximum total cache	1.8 TiB	33.8 TiB	3.6 TiB	51.6 TiB
Maximum on-node cache	896–1792 GiB	448–1792 GiB	896–3584 GiB	896–3584 GiB
Total flash cache	Not applicable	32 TiB	Not applicable	48 TiB
Maximum number of HDDs	Not applicable	1920	Not applicable	1920
Maximum number of SSDs	512	1024	1024	1024
Maximum raw capacity	1966 TiB	6000 TiB (flash + HDDs)	8043 TiB (all flash)**	9600 TiB (flash + HDDs)**
Maximum usable file capacity	512 TiB	512 TiB	512 TiB	512 TiB
16 Gbps FC host ports	0–80	0–160	0–160	0–160
10 Gbps iSCSI/FCoE ports	0–40	0–80	0–80	0–80
10 Gbps Ethernet ports for File Persona	0–24	0–48	0–48	0–48
Built-in 10 Gbps ports	2–4	2–8	2–8	2–8

** Respective capacity support available in H2, 2016

HPE 3PAR Software Suites

HPE 3PAR Operating System Software Suite	Required for all new HPE 3PAR StoreServ systems, this foundational software suite gives you everything you need to get up and running quickly and efficiently. Powered by HPE 3PAR Gen5 ASIC, HPE 3PAR Thin Technologies including—HPE 3PAR Thin Provisioning, HPE 3PAR Thin Persistence, HPE 3PAR Thin Conversion, and HPE 3PAR Thin Deduplication form the base of this software suite. Performance acceleration is assured by HPE 3PAR Adaptive Flash Cache which reduce application response times.
	Network simplification and security are covered with iSCSI VLAN tagging. Simplified management is offered by the HPE 3PAR StoreServ Management Console, and HPE 3PAR Host Explorer software. HPE 3PAR System Reporter and HPE 3PARInfo Software are designed to track performance and capacity utilization trends for multiple HPE 3PAR StoreServ Systems. Other highlights of this suite include HPE 3PAR Full Copy, autonomic rebalancing capabilities that help you optimize the use of future capacity expansions, and support for standard multipathing software for high availability in clustered environments. A one-year license for HPE 3PAR Online Import is included to enable migration from HPE EVA, or EMC[*1] or HDS[*2] or IBM[*3] systems.
HPE 3PAR Replication Software Suite	This suite bundles HPE 3PAR Virtual Copy with HPE 3PAR Remote Copy Software, both also sold separately for all HPE 3PAR StoreServ models. HPE 3PAR Virtual Copy Software protects and shares data affordably with rapid recovery using reservation-less, non-duplicative, copy-on-write snapshots. HPE 3PAR Remote Copy offers simple and cost effective data protection for efficient multi-tenant disaster recovery.
	Also included in this bundle is HPE 3PAR Peer Persistence which ensures transparent automatic failover over metropolitan distances Remote Copy Synchronous mode. For HPE 3PAR StoreServ 20000 and 8000, the Suite also includes HPE 3PAR Cluster Extension Software which enables automatic failover across data centers using Remote Copy Asynchronous mode.
HPE 3PAR Data Optimization Software Suite	This software bundle combines HPE 3PAR Dynamic Optimization, HPE 3PAR Adaptive Optimization, HPE 3PAR Priority Optimization, and HPE 3PAR Peer Motion software together. HPE 3PAR Dynamic Optimization delivers the required service levels for the lowest possible cost throughout the data lifecycle. HPE 3PAR Adaptive Optimization improves storage utilization by enabling cost-optimized storage tiering. HPE 3PAR Priority Optimization assures service levels with QoS controls for mission-critical applications. HPE 3PAR Peer Motion enables load balancing at will wherein movement of data and workloads between arrays does not initiated without impact applications, users or services. The four software titles bundled in this suite are also sold separately for all HPE 3PAR StoreServ models. Depending on purchase date, titles included in this suite may vary. Check the HPE 3PAR Software QuickSpecs for complete details.
HPE 3PAR File Persona Software Suite	This licensed feature of the HPE 3PAR Operating System enables rich file protocols from SMB/CIFS to NFS and FTP, file data services from quota management to file snapshots and retention/immutability, and a RESTful Object Access API for programmatic access to files. It extends the spectrum of workloads natively addressed by HPE 3PAR StoreServ Storage to include home directories and user shares, content management and collaboration, data preservation/governance, and custom cloud applications. Management is truly unified through the HPE 3PAR StoreServ Management Console and the powerful, scriptable HPE 3PAR CLI.
HPE 3PAR Security Software Suite	This software suite bundles HPE 3PAR Virtual Domains and HPE 3PAR Virtual Lock Software. With this suite, you can segregate access and deliver robust storage services for different applications and user groups with additional security attached to the retention of storage volumes.
HPE 3PAR Application Software Suite for Hyper-V	Protect your Microsoft Hyper-V environment with HPE 3PAR Recovery Manager for Microsoft Hyper-V and the HPE 3PAR VSS Provider Software, included in this software.
HPE 3PAR Application Software Suite for Exchange	This bundle gives you the essentials for use with Microsoft Exchange, including HPE 3PAR Recovery Manager for Exchange and the HPE 3PAR VSS Provider Software.
HPE StoreOnce Recovery Central Manager	This suite bundles everything you need to protect your critical applications running on HPE 3PAR StoreServ Storage. RMC software allows you to create, manage and automate crash-consistent snapshots for any application and app-consistent snapshots for VMware vSphere, Microsoft SQL Server and Oracle[*4]. In addition, RMC allows you to perform flat backup to HPE StoreOnce systems for converged data protection.

[*1] HPE 3PAR Online Import support for EMC Storage extends to EMC VMAX, EMC VNX and EMC CLARiiON CX4 Storage systems.

[*2] HPE 3PAR Online Import support for Hitachi Storage system extends to Hitachi Data Systems (HDS) TagmaStore Network Storage Controller (NSC), Universal Storage Platforms (USP), and Virtual Storage Platforms (VSP) Storage systems.

[*3] HPE 3PAR Online Import support for IBM Storage extends to IBM XiV Gen 2 and IBM XiV Gen 3 systems.

[*4] Recovery Manager Central for Oracle (RMC-O) supports RHEL and OEL environments. For Solaris SPARC, IBM AIX and HP-UX environments, use the HPE 3PAR Applications Suite for Oracle.

Optimize your IT investment strategy with new ways to acquire, pay for and use technology, in lock-step with your business and transformation goals. **hpe.com/solutions/hpefinancialservices**

HPE Factory Express provides customization and deployment services along with your storage and server purchases. You can customize hardware to your exact specifications in the factory—helping speed deployment. Visit **hp.com/go/factoryexpress**

Take five minutes to calculate the potential three-year cost savings and ROI you can expect by migrating from your current storage to an HPE 3PAR StoreServ Storage solution. **Click here** to go to the HPE Storage Quick ROI Calculator.

Gain the skills you need with ExpertOne training and certification from Hewlett Packard Enterprise. With HPE Converged Storage training, you will accelerate your technology transition, improve operational performance, and get the best return on your Hewlett Packard Enterprise investment. Our training is available when and where you need it, through flexible delivery options and a global training capability. Visit **hp.com/learn/storage**

[14] IDC

[15] HPE CSC reports 2014–2015

Sign up for updates

Hewlett Packard Enterprise

HPE Technology Services

The support services portfolio will help complement the performance and reliability of the HPE 3PAR StoreServ Storage infrastructure. HPE provides complete, end-to-end lifecycle services for your entire infrastructure—servers, storage, networks, and software. Our services also help you consolidate your support management and whenever necessary, we collaborate with independent software vendors directly. By integrating hardware and software services, we offer you a support experience that is relevant to your business needs.

Advise, transform, and integrate
Navigate through the complexities of storage, backup, archive, disaster recovery and Big Data with advisory, transformation and integration consulting.

Deploy and implement
Access expertise to support deployment, operations, relocation, sanitization and disposal plus improvement-focused education.

Operate and support
Find the level of personalized, proactive and simplified support right for your business.

Note: Specific service availability varies by product.

HPE Foundation Care
A comprehensive suite hardware and software services aimed to help increase the availability of IT infrastructure.

HPE Proactive Care
An integrated set of reactive and proactive services designed to help you improve the stability and operation of your converged infrastructure to achieve better business outcomes. HPE Proactive Care has been specifically designed to support devices in IT environments, providing enhanced support that covers servers, operating systems, hypervisors, storage, storage area networks (SANs) and networks.

HPE Proactive Care Advanced
This service expands on HPE Proactive Care Service and is designed to help maximize the benefits of IT investments, maintain IT infrastructure stability, achieve business and IT project objectives, reduce operational costs and free IT staff for other priority tasks. An assigned HPE Account Support Manager (ASM) provides personalized technical and operational advice, including HPE best practices gleaned from HPE's broad support experience.

HPE Datacenter Care
HPE's most comprehensive support solution tailored to meet specific data center support requirements. It offers a wide choice of proactive and reactive service levels to cover requirements ranging from the most basic to the most business-critical environments.

HPE Lifecycle Event Services
These services are sold on a per-event basis and include services to help deploy technologies and solutions as well as assessments and other services to help optimize and operate the IT infrastructure

Get connected and get back to business
Unlock all of the benefits of your technology investment by connecting your products to HPE Enterprise. Achieve up to 77 percent[14] reduction in down time, near 100 percent[15] diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7 monitoring, pre-failure alerts, automatic call logging and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server, storage and networking products, securely connected to HPE support.

To learn more, visit: **hp.com/services/storage**

Learn more at
hp.com/go/storeserv20000