

Eliminate compromise

HPE 3PAR StoreServ Storage—the only primary storage architecture you need



Hewlett Packard
Enterprise

Flash-optimized, modern Tier-1 storage

IT has never been more important to doing business, which means that IT infrastructure must be simpler, smarter, faster, more flexible, and more business-aligned than ever. In the idea economy, business success is defined by how quickly you can turn ideas into value. Is your infrastructure ready?

When it comes to Tier-1 storage, HPE 3PAR StoreServ Storage has you covered. The foundation of the HPE Converged Storage portfolio, HPE 3PAR StoreServ Storage offers a range of models that give you effortless, Tier-1 flash with midrange affordability and help you affordably consolidate all of your applications onto enterprise flash.



Maintain “6-nines” uptime

HPE 3PAR StoreServ Storage systems are designed to deliver data high availability with 99.9999 percent uptime, giving you all of the benefits of HPE Converged Storage for your mission-critical environment without the risk.

HPE 3PAR StoreServ Storage allows you to break down the silos that stand between you and the efficiency and agility required to succeed in the idea economy. It's the last primary storage architecture you need—regardless of whether you are a small to midsize enterprise experiencing rapid growth in your virtualized environment, a large enterprise looking to support IT as a Service (ITaaS), or a global service provider building a hybrid or managed private cloud.

Respond to any demand—effortlessly, without exception, and without compromise

Explosive data growth, new technology choices, and the proliferation of siloed architectures are pushing legacy storage beyond its brink. With a modern, Tier-1 architecture that is both massively scalable and flash-optimized, HPE 3PAR StoreServ Storage is the only primary storage platform you need to break down data center silos and respond to change with agility and efficiency.

- Cut capacity requirements by up to 75 percent with data compaction technologies¹
- Provision storage instantly and manage block, file, and object access from a single interface
- Serve a broad spectrum of storage workloads including server virtualization, databases, applications, home directories and user shares, content management and collaboration, data preservation and governance.
- Remove bottlenecks with a flash-optimized, scale-out architecture capable of multiple petabytes and millions of IOPS²
- Assure service levels with fine-grained QoS optimization tools and consistent, sub-millisecond latency
- Serve unpredictable and mixed workloads while flexibly adapting to shifts in application service levels
- Create an elastic pool of capacity for one-click workload rebalancing without external virtualization appliances or management overhead
- Address storage efficiency at the data center level with seamless data movement between arrays
- Protect your data with flat backup that frees you from the need for ISV software and traditional server-based backup processes³
- Simplify backup and restores with application-aware, storage-integrated data protection
- Achieve near-synchronous RPOs with flexible, transparent, model-agnostic remote replication
- Reduce complexity with iSCSI for Ethernet and speed configuration with automated storage networking

HPE 3PAR StoreServ Storage lets you do all of this while driving up efficiency and resource utilization with hardware acceleration that allows you to consolidate with confidence while lowering your total cost of ownership for storage.

¹ Based on the use of data compaction technologies including thin provisioning and inline deduplication.

² Based on SPC-1 and SPC-2 benchmarks available at storageperformance.org

³ Currently supported in VMware®, Oracle, and Microsoft SQL Server environments.

Thin Deduplication with Express Indexing

A feature of the HPE 3PAR OS, HPE 3PAR Thin Deduplication software with patented Express Indexing is the only solution in the industry that delivers **inline deduplication** at scale with hardware acceleration for all-flash arrays.

Available on all HPE 3PAR StoreServ Storage arrays with SSDs, Thin Deduplication increases usable capacity, lowers total cost of ownership, and extends flash media lifespan. In cases where there is a large amount of duplicate data, Thin Deduplication also improves write throughput and performance. Other storage architectures that support deduplication are not able to offer these benefits at the same capacity scale or at the same performance level.

HPE StoreFront Remote

HPE StoreFront Remote is a secure web portal that complements on-premise management by providing insights and analytics into your HPE 3PAR StoreServ Storage arrays and HPE StoreOnce backup environment from anywhere at any time. When you use the HPE StoreFront Remote portal, you gain remote access to an intuitive dashboard that presents unique insights into your primary storage and backup environment in one place.

With ability to monitor multiple systems at once, HPE StoreFront Remote can help you make better decisions, identify capacity and performance issues early, and maximize array utilization for greater efficiency.

When you use HPE StoreFront Remote, you get:

- Anytime, anywhere access to information regarding your 3PAR and StoreOnce environment over a secure web portal at no additional cost.
- Insightful analytics about capacity and performance for all of your registered 3PAR arrays and StoreOnce backup targets.
- An intuitive web portal that shares design consistency with HPE 3PAR StoreServ Management Console (SSMC) and HPE OneView tools for simplicity of use.
- Powerful and intuitive capacity trend analysis, performance trend analysis, and capacity forecasting capabilities so you can make better data center decisions.

Here are some of the benefits of choosing flash-optimized HPE 3PAR StoreServ Storage:

Consolidate with confidence for greater efficiency and agility

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. Federate multiple systems to form an elastic resource pool with one-click workload rebalancing.

HPE 3PAR StoreServ offers a modern architecture that scales to more than 20 Petabytes (PiB) of usable capacity, provides true convergence of block and file workloads as well as object access, and delivers Tier-1 resiliency paired with secure administrative segregation of users, hosts, and application data. Industry-leading density lets you consolidate 560 Terabytes (TiB) of usable capacity into a single 2U drive chassis and more than 11 PiB usable onto single floor tile while full hardware redundancy means complete system resiliency—even when the unexpected happens.

Autonomic configuration prevents human error while remote diagnostic capabilities and web-based monitoring with the HPE StoreFront Remote portal let you tap into proactive monitoring and management to protect against unforeseen issues. End-to-end data integrity protects all of your workloads while remaining completely transparent to hosts and applications.

Non-disruptive, bi-directional data mobility allows you to federate multiple systems to support rigorous on-demand infrastructure by forming an elastic resource pool with up to 60 PiB of usable capacity capable of serving millions of IOPS at sub-millisecond latencies with up to 300 GB/s in front-end bandwidth.⁴ Single-click data movement lets you dynamically rebalance workloads to meet changing business needs and service level demands. And unlike approaches that require external SAN virtualization appliances to pool capacity, no additional hardware is required—meaning that business agility does not come at the cost of additional appliances or virtualization management overhead.

Deliver uncompromising QoS for even the 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.

Fine-grained, system-wide striping of data across all internal resources (disks, ports, loops, cache, processors, etc.) assures high and predictable service levels for all workload types. As a result, as the use of the system grows—or in the event of a component failure—service conditions remain high and predictable.

Prioritize your most mission-critical applications and workloads by specifying performance and latency goals as well as IOPS and bandwidth caps. If goals are not met or if caps are exceeded, the system automatically adjusts the service levels of lower-priority applications and workloads in order to assure that necessary QoS levels for your highest priority applications are always met.

You can also specify thresholds to protect individual tenants as well—for example, to prevent a single workload from monopolizing array resources. This capability removes the last barrier to consolidation by allowing you to assure QoS levels without having to physically partition resources or maintain discreet storage silos.

Unlike application-centric approaches to storage, one-click autonomic rebalancing on HPE 3PAR StoreServ Storage enables you to deliver the right QoS levels at all times without service disruption, preplanning, or the need to deploy multiple arrays.

⁴ Based on SPC-1 and SPC-2 benchmarks available at storageperformance.org

Read and Write Acceleration

HPE 3PAR Express Writes is a built-in HPE 3PAR OS write acceleration feature that manages CPU utilization to increase throughput, deliver up to 30 percent more IOPS, and reduce latency by up to 20 percent, depending on workload.⁵ These benefits extend to both spinning drives and flash-based media. For read acceleration, HPE 3PAR Adaptive Flash Cache allows SSDs to act as an extension of DRAM cache. This feature can as much as double read rates and reduce latency up to 70 percent with HPE 3PAR StoreServ Storage arrays that are configured with SSDs.

Get Thinner Guaranteed!
Need a sure thing? The **HPE 3PAR Get Thinner Guarantee Program**

promises up to 75 percent reduction in capacity requirements when you replace legacy storage with all-flash HPE 3PAR StoreServ Storage—guaranteed.⁶

To learn more, ask for your free storage assessment from HPE, which includes:

- A complete efficiency audit of your current storage
- Storage utilization ratios and standard capacity
- Array sizing needed to meet SLAs

Accelerate performance with a flash-optimized architecture

Available in a range of models and configurations depending on your business needs, HPE 3PAR StoreServ Storage offers a single flash-optimized architecture that gives you a choice between:

- All-flash arrays and all-flash starter kits
- Converged flash arrays with the option to support low-cost spinning media in addition to flash
- Tiered storage arrays capable of extending DRAM cache onto SSDs for application acceleration

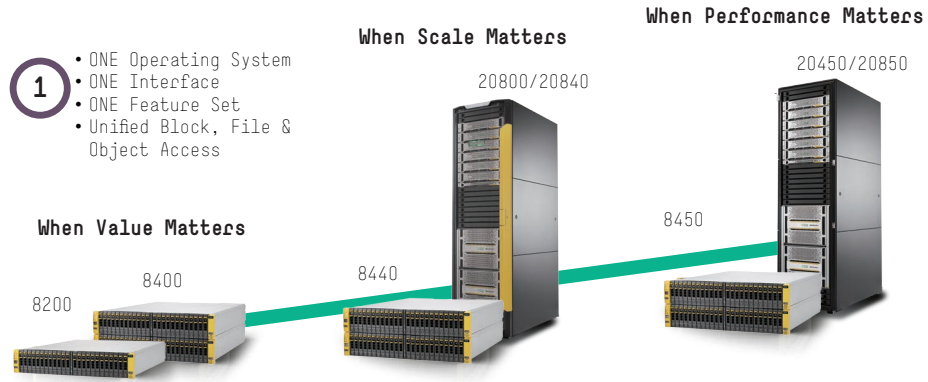


Figure 1. HPE 3PAR StoreServ Storage models

Other storage architectures cannot offer this range of deployment options, which provide you with a high degree of flexibility and adaptability as your needs change over time—all with the same operating system, the same management interface, and a robust set of data protection options.

Deliver the highest service levels at the lowest possible cost, no matter what your deployment scenario is like or how it may change. Protect your business not just from application outages due to hardware failures or data corruption, but from larger events such as corruption of an entire database and data center outages such as those caused by natural disaster.

Serve a broad spectrum of workloads

With an optional HPE 3PAR File Persona Suite software license, you get a tightly integrated solution for provisioning block storage volumes as well as file shares from a single converged system.

The HPE 3PAR File Persona Suite is a licensed feature of the HPE 3PAR OS that enables a rich set of file protocols, an Object Access API, and file data services. Purchasing this optional license lets you extend all of the architectural benefits that the platform already delivers for block workloads to file shares and object access in a way that is simple to integrate and administer.

Enabling the HPE 3PAR File Persona Software adds home directory consolidation, file sharing, and custom cloud application capabilities to the array, extending the ability to serve virtualization, database, and application workloads that use block protocols to new file use cases—all from the same storage capacity and the same unified management interfaces.

With this truly converged solution, you get up to 71 percent⁷ data center space savings and significant power savings with a single, converged solution. You also get seamless compaction of file data using the system's built-in zero-detection capabilities and inline deduplication for systems configured with SSDs.

Respond faster with autonomic management

Simplify, automate, and expedite management with storage that is self-configuring, self-provisioning, and self-optimizing. HPE 3PAR StoreServ Storage does away with traditional manual storage planning and change management with autonomic management and optimization features that are intelligent, take place at a subsystem level, and don't require administrator intervention.

⁵ Based on a random, 100 percent write workload with an 8 KB block size.

⁶ Subject to qualification and compliance with the HPE 3PAR Get Thinner Guarantee Program Terms and Conditions.

⁷ Hewlett Packard Enterprise internal analysis compared to EMC VNX, April 2016.



Looking to replace your HDS, IBM XIV, EMC VMAX, CLARiiON CX4, or VNX array?

Every HPE 3PAR StoreServ Storage system comes with

HPE 3PAR Online Import software

at no charge for one year—giving you painless migration so you can finally say goodbye to traditional storage silos.

Double virtual machine density, guaranteed

Get more out of your virtualization deployment. With HPE 3PAR StoreServ Storage, you can double virtual machine density on your physical servers,

backed by the **HPE 3PAR Get Virtual Guarantee**⁸

These features not only minimize the opportunity for human error, but they let you respond faster by shrinking provisioning time from hours, weeks, and days to just seconds. Provision a volume in only 15 seconds. Deliver high performance to all applications, even under failure conditions. Quickly adapt to the unpredictable by optimizing QoS levels with one click.

Integration with Microsoft® System Center and VMware vCenter gives enhanced visibility into storage for application owners while **HPE StoreOnce Recovery Manager Central** provides superior granularity and control of array-based snapshots for backup administrators using management tools provided by VMware, Oracle⁹, or Microsoft.

Meet unpredictable and dynamic application demands

HPE 3PAR StoreServ Storage supports federated data mobility across all arrays so you can manage resources at the data center level rather than the system level.

Peer-based storage federation lets you move data and workloads between arrays without impact to applications, users, or services. Scale massively without sacrificing simplicity, pool resources without the cost and complexity of external virtualization appliances, and flex to meet unpredictable workloads and business demands.

Simply and non-disruptively shift data and thinly provisioned virtual volumes between any model HPE 3PAR StoreServ Storage array to boost resource utilization, avoid hotspots and bottlenecks, assure service levels, manage unpredictable growth, and meet stringent SLAs.

Move data between existing and new devices for more effective storage asset management (Such as technology refreshes and asset re-purposing) without time-consuming planning and migration.

Maintain business continuity in the event of a disaster or data center-wide outage with replication and recovery between systems. Use these relationships to allow server and application maintenance operations to take place non-disruptively.

Improve data availability and protection in clustered VMware and Microsoft Hyper-V environments.

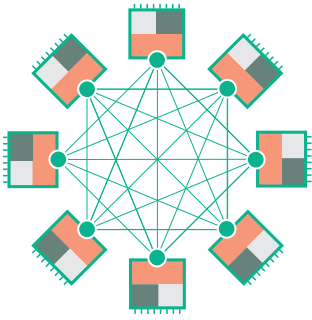
Shield your business from application downtime

Application downtime can be fatal to your business and can come from a variety of sources—from human error to natural disasters. As a result, data protection is a continuum that must cover a wide range of scenarios.

⁸ Subject to qualification and compliance with the Get Virtual Guarantee Program Terms and Conditions.

⁹ Recovery Manager Central for Oracle supports RHEL and OEL environments. For Solaris SPARC, IBM AIX, and HP-UX environments, use the HPE 3PAR Applications Suite for Oracle.

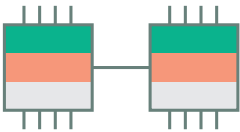
Mesh-Active Cluster



HPE 3PAR Architecture: Full-mesh interconnect

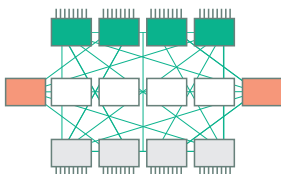
- ✓ Cost-effective
- ✓ Scalable
- ✓ Resilient
- ✓ Meets cloud-computing requirements for efficiency, multi-tenancy, and autonomic management

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

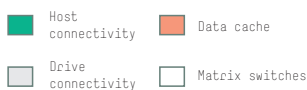


Figure 2.
HPE 3PAR Architecture vs. Traditional Architectures

HPE 3PAR StoreServ Storage offers a highly resilient, Tier-1 architecture that provides the first line of defense against application outages with high availability features such as fault tolerance and hardware redundancy. In addition,

- Point-in-time (PIT) snapshots add additional protection against application errors and data corruption or loss.
- Low-cost remote replication protects against site-wide outages and natural disasters with the flexibility to replicate between any member of the HPE 3PAR StoreServ family—regardless of model.
- Asynchronous streaming replication enables replication that balances latency, distance, and recovery time and is especially well suited to the all-flash data center. Asynchronous streaming does away with the latency overhead of synchronous replication while allowing for a near-exact data copy with recovery point objectives (RPOs) that can be measured in seconds.
- Online, disk-based backup with HPE StoreOnce Backup physical or virtual appliances protects against array failures and data corruptions for comprehensive data protection.

HPE StoreOnce Backup increases your application protection level by letting you maintain more frequent snapshots for longer and for less. Free up flash capacity on your HPE 3PAR StoreServ array by offloading snapshots to more cost-effective backup. Free your data center from dependence on traditional backup infrastructure by taking advantage of flat backup to reduce backup ISV licensing costs.¹⁰

In VMware, Microsoft, and Oracle⁹ environments, flat backup between HPE 3PAR StoreServ and HPE StoreOnce with HPE StoreOnce Recovery Manager Central software lets you 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 physical or virtual appliances for cost-effective backup retention and reducing software licensing costs. The native movement of snapshots from HPE 3PAR StoreServ Storage to HPE StoreOnce systems mean that any online storage threats are quickly mitigated with always-available, single-click data recovery.

Architecture that sets new standards for agility and efficiency

As IT evolves away from application-centric computing and towards more efficient and flexible service delivery models, infrastructure requirements are changing too. With a modern architecture built for virtualization, cloud, and ITaaS, HPE 3PAR StoreServ Storage anticipates these new requirements with a resilient, secure, multi-tenant platform.

Flash-optimized architecture featuring a Mesh-Active design

HPE 3PAR StoreServ Storage features a Mesh-Active design based on a unique system of controller interconnects as part of a flash-optimized architecture. This architecture combines the benefits of monolithic and modular architectures while eliminating price premiums, scaling complexities, and performance bottlenecks of legacy storage designs. As a result, the HPE 3PAR Architecture delivers sustainable performance for diverse and unpredictable workloads that scales even with extremely high levels of capacity utilization.

Unlike legacy “Active-Active” controller architectures—where each volume is active on only a single controller—the HPE 3PAR Architecture features a Mesh-Active design that allows each volume to be active on every controller in the system.

A high-speed, full-mesh interconnection joins multiple storage controllers to form a cache-coherent, Mesh-Active cluster of up to eight controller nodes for low-latency, high-performance, inter-node communication. This Mesh-Active design is one of many features that make the HPE 3PAR StoreServ Storage architecture flash-optimized, eliminating the performance bottlenecks that can choke general-purpose disk arrays once flash-based media is introduced.

¹⁰ Currently supported in VMware environments only.

Media lifespan mechanisms extend flash storage investments

Within each storage controller, purpose-built HPE 3PAR Gen5 Thin Express ASICs provide an efficient, silicon-based, zero-detection mechanism that powers **inline, thin deduplication** for block and file data compaction and the removal of allocated but unused space without impacting performance—thereby extending the life of flash-based media by avoiding unnecessary writes. Adaptive Read and Write is another feature that helps extend the life of flash drives by automatically matching host I/O size reads and writes.

Adaptive Sparing technology

HPE 3PAR Adaptive Sparing is a patented technology that improves flash performance and endurance through a unique approach to sparing (the practice of reserving capacity to be used in the event of a drive failure). The latest generation of this technology—Adaptive Sparing 2.0—is so powerful that it can increase SSD endurance by up to 5x as compared to the standalone endurance offered by individual SSDs while simultaneously improving write performance in the process.

The mechanism behind this improved endurance and performance is a more efficient, system-wide approach to sparing that alleviates the need to designate entire drives or a significant portion of each drive for sparing purposes. Instead, much of the spare capacity typically reserved by individual drives can be unlocked at the firmware level then used by the 3PAR OS to improve performance and endurance at a system level—a capability entirely unique to 3PAR.

Due in part to Adaptive Sparing technology, HPE is able to offer an unconditional 5-year warranty on all HPE 3PAR StoreServ SSDs, including media failure and drive wear-out. In addition, this technology is a fundamental enabler of HPE's continued leadership in bringing new flash drive technologies and sizes to market more rapidly and cost-efficiently than other platforms today.

The controllers that form the system's tightly-coupled, cache-coherent, Mesh-Active cluster feature Gen5 Thin Express ASICs that use Direct Memory Access (DMA) to enable a local ASIC in one node to directly access memory in other nodes to reduce latency times. These ASICs also connect every controller in the system with every other controller over dedicated, high-bandwidth, low-latency links, enabling I/O workloads to be spread widely across the array.

Mixed workload support for consistently high performance

Another major benefit of the Gen5 Thin Express ASIC is the support for mixed workloads with extremely high performance levels. Transaction- and throughput-intensive workloads run on the same storage resources without contention, enabling consolidation without compromise. This is particularly valuable in virtual server environments, where HPE 3PAR StoreServ Storage allows you to double virtual machine density so you can increase server and storage consolidation and improve ROI.

Multi-tenant I/O processing enables performance optimization for mixed workloads by breaking large I/O into 32 KB, sub-I/O units to assure small reads don't get held up behind large I/O requests. With flash-based media, this granular approach assures consistently high performance as you scale workloads to hundreds of thousands of IOPS and beyond.

The accelerated performance of the Gen5 Thin Express ASIC, combined with Rapid RAID Rebuild capabilities, also fuel the platform's Fast RAID 5 and Fast RAID 6, which enable the system to achieve the performance of traditional RAID mirroring with up to 66 percent less storage capacity.¹¹

Fine-grained virtualization and system-wide striping

The HPE 3PAR StoreServ architecture uses three levels of storage virtualization to drive up capacity utilization and accelerate performance. This fine-grained virtualization divides each physical disk into granular allocation units, or chunklets, each of which can be independently assigned and dynamically reassigned to different logical disks that are used to create virtual volumes. Breaking media devices (both disk- and flash-based) into chunklets virtualizes physical drives to enable higher utilization and avoid stranded capacity. This fine-grained virtualization unit also enables mixed RAID levels on the same physical drive, therefore doing away with dedicated RAID groups and seamlessly supporting new media technologies as they become available.

Logical disks are the virtualization layer at which QoS parameters are applied, such as availability level, drive media type, RAID level, etc. This enables sub-LUN tiering and the system-wide striping of data and I/O for each volume across all system resources. This system-wide striping delivers simultaneously high capacity utilization and performance levels. Even a small volume can leverage the performance of hundreds of media devices and all of the system's storage controllers for optimal performance without compromising capacity utilization.

For flash-based media, fine-grained virtualization combined with system-wide striping also drives uniform I/O patterns by spreading wear evenly across the entire system. Should there be a media failure, system-wide sparing helps guard against performance degradation by enabling faster many-to-many rebuilds. Because HPE 3PAR StoreServ Storage autonomically manages this system-wide load balancing, no extra time or complexity is required to create or maintain an optimally configured system.

Dynamic caching designed for flash

Caching is an important element of the HPE 3PAR Architecture, where it is performed dynamically and in a manner that extends flash-based media longevity. The HPE 3PAR caching algorithm is dynamic in that it adapts itself to media type (HDD vs. SSD), drive type (7.2k rpm vs. 15k rpm), and workload type (random vs. sequential; read vs. write). In addition, the ability to adapt reads and writes to match host I/O sizes enables a more granular caching approach when handling flash-based media. This minimizes the number of times that data is accessed, thereby significantly reducing I/O latency, avoiding unnecessary flash media wear-out, and boosting backend performance.

¹¹ See the [HPE 3PAR Architecture technical white paper](#) for details.

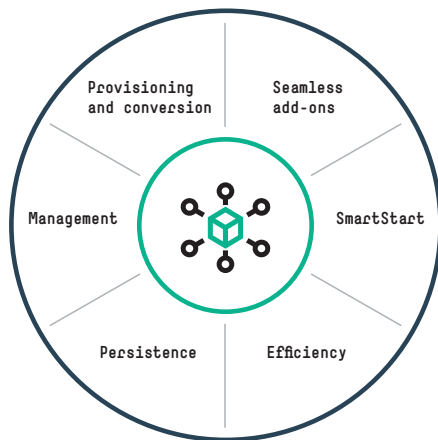


Figure 3. HPE 3PAR Software Suites enhance the agility and efficiency of your infrastructure

To assure consistent random I/O performance with flash media even under mixed workload conditions, the HPE 3PAR StoreServ caching algorithm breaks down large sequential I/O into smaller blocks before sending them to the backend. Designed to serve unpredictable multi-tenant workloads, this caching algorithm also adjusts autonomically to changes in workload patterns. For example, autonomic offloading of cache removes cache bottlenecks by adjusting the frequency with which data is offloaded from cache to flash-based media using historical cache utilization rates.

Another important aspect of the cache offload algorithm is the determination of which cached data should be flushed to the backend. HPE 3PAR StoreServ Storage keeps track of read cache hits and keeps “hot” data in cache itself, thereby lowering latencies of frequently accessed data.

HPE 3PAR Software Suites

HPE 3PAR StoreServ Storage leads the industry in providing array management features that remove the layers of complexity typically weighing down storage administration and products that enhance visibility and control while eliminating costly, repetitive, and error-prone manual tasks.

Building on HPE 3PAR Operating System software, Hewlett Packard Enterprise offers a range of software products and bundled software suites to enhance the agility and efficiency of your infrastructure and enable you to eliminate compromise.

Available software suites are as follows:

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 the 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 reduces application response times. Network simplification and security are covered with iSCSI VLAN tagging. Simplified management is offered by the HPE 3PAR Operating System, HPE 3PAR StoreServ Management Console and HPE 3PAR Host Explorer software. HPE 3PAR System Reporter and HPE 3PAR Info 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 make the best use of future capacity expansions, and support for standard multi-pathing software for high availability in clustered environments. A one year license for HPE 3PAR Online Import is included to enable migration from HPE EVA, EMC,¹² or HDS¹³, or IBM¹⁴ systems.

HPE 3PAR Replication 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 reservationless, 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 enables transparent automatic transparent failover over metropolitan distances using Remote Copy Synchronous mode. For HPE 3PAR StoreServ 20000 and 8000 systems, this Suite also includes HPE 3PAR Cluster Extension Software, which enables automatic failover across data centers using Remote Copy Asynchronous mode.

¹² HPE 3PAR Online Import support for EMC Storage extends to EMC VMAX, EMC VNX, and EMC CLARiiON CX4 Storage systems.

¹³ HPE 3PAR Online Import support for Hitachi Storage systems extends to Hitachi Data Systems (HDS) TagmaStore Network Storage Controller (NSC), Universal Storage Platforms (USP), and Virtual Storage Platforms (VSP) Storage systems.

¹⁴ HPE 3PAR Online Import support for IBM Storage extends to IBM XIV Gen 2 and IBM XiV Gen 3 systems.

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 is initiated without impacting 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 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/immaturity, 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. Truly unified management is delivered via the HPE 3PAR StoreServ Management Console and/or the powerful, scriptable HPE 3PAR CLI.

HPE 3PAR Security 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 bundle.

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 Manager Central Suite—This suite bundles everything you need to protect your critical applications running on HPE 3PAR StoreServ Storage. HPE StoreOnce Recover Manager Central (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 Oracle¹⁵ environments. In addition, RMC allows you to perform flat backup to HPE StoreOnce systems for converged data protection.

Application-managed storage solutions for any scale or performance requirement

Hewlett Packard Enterprise invests in technologies and partnerships to support key strategic IT initiatives, working with partner companies such as VMware, Citrix®, Red Hat®, Oracle, Symantec, and Microsoft to develop integrated, platform-specific storage solutions that work with HPE 3PAR StoreServ Storage.

Storage built for ITaaS, virtualization, and cloud apps

Exclusive virtualization and automation features built into HPE 3PAR StoreServ Storage work with our software products and solutions to deliver unique benefits for VMware vSphere, VMware View, Microsoft Windows Server® Hyper-V, Citrix XenServer, Red Hat Enterprise Virtualization (RHEV), and Oracle VM.

¹⁵ 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.

HPE StoreServ Integration Services

Want to maximize the benefit of HPE 3PAR StoreServ Storage? HPE Technical Services Storage Consulting now offers HPE 3PAR StoreServ Integration Services to help you realize the maximum benefit from your storage investments by integrating your new HPE 3PAR StoreServ storage solution into your existing server and SAN infrastructure. Learn more at hpe.com/services/storage

How well do you know your backup environment?

Find out with a free assessment from HPE.

See how moving to any HPE StoreOnce solution can reduce your backup capacity requirements by up to 95%. Sign up and receive a no-obligation, no-cost, and non-invasive backup assessment. This assessment doesn't access your confidential data and will provide you with a detailed report that includes

- Your current backup capacity and performance
- Key performance indicators such as backup windows, backup success rates and more
- Opportunities for cost reduction
- Potential licensing cost reduction with StoreOnce Recovery Manager Central software

Register today or contact your HPE sales representative for details.

Only HPE 3PAR StoreServ Storage has the performance and confidence to guarantee 2X VM density on your existing servers and the ability to reduce capacity requirements by 50 percent so you can maximize ROI on virtualization and cloud computing projects. HPE 3PAR StoreServ's advanced storage technologies and hypervisor integration optimize your VM density and storage efficiency. It's why VMware chose 3PAR StoreServ as the Fiber Channel reference platform for the development of its Virtual Volumes (VVols) technology.

A flash-optimized design enables predictable and assured performance, up to 15 PB usable capacity, and rich Tier-1 data services, including a 99.9999 percent data availability guarantee program, all for \$1.50/GB for usable capacity which is less than performance-oriented HDDs in hybrid, auto-tiered arrays.

HPE 3PAR StoreServ Storage is perfect for consolidation of ITaaS and able to deliver maximum performance at the lowest possible per transaction cost without sacrificing Tier-1 availability, scale, and data services.

Flash array-integrated data protection

If you are looking for virtually instant application-consistent backups for your VMware, Microsoft SQL Server, or Oracle database environment, look no further than rapid and granular backup and recovery with HPE StoreOnce and HPE StoreOnce Recovery Manager Central software for fast, efficient, reliable, and simple backup and recovery with your HPE 3PAR StoreServ Storage system. This solution transforms traditional approaches to backup and recovery, giving you application-aware, storage-integrated data protection that bypasses traditional backup server-based processes. Seamlessly manage snapshots, backup, and recovery directly from within VMware vCenter.

Powering the data-driven enterprise

For today's enterprises, mission-critical Oracle, SAP®, and Microsoft® SQL Server deployments are at the heart of revenue generating activities. Transaction speed equals revenue, but apps also require scale to support growth. HPE 3PAR StoreServ Storage provides flash performance at the same dollar per gigabyte as performance-oriented HDD-based storage, and with HPE, you can get 99.9999% availability and petabyte scale.

HPE 3PAR StoreServ Storage offers a flash-optimized architecture for the cost of many hybrid arrays--one that is capable of delivering millions of IOPS at sub-millisecond application latency without forcing you to sacrifice Tier-1 availability, petabyte scale, or advanced data services such as flash array-integrated data protection. Tight solution integration with Oracle, SAP, and Microsoft SQL Server delivers increased levels of availability, simplified management, and increased performance. HPE StoreOnce Recovery Manager Central software support for Oracle and Microsoft SQL Server provides added resilience with ultra-fast flat backup.

Enabling workforce productivity

To be competitive, the modern enterprise needs to support seamless communications and foster richer collaboration amongst its employees while also protecting user data. A successful Exchange or SharePoint deployment requires the right storage foundation to support new growth or as part of application update and migration projects. HPE 3PAR StoreServ 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 Exchange¹⁶, you can recover email messages quickly, affordably, and from multiple points in time.

HPE's long-standing partnership with Microsoft provides comprehensive storage solution expertise for Exchange and SharePoint that is simple, scalable, always-on and efficient. Deploy Exchange and SharePoint on HPE StoreServ Storage with confidence by leveraging reference architectures and best practices that are tested and proven.

¹⁶ This software title is delivered via the HPE 3PAR Application Software Suite for Exchange.

HPE 3PAR StoreServ Storage models and specifications



Description and usage	When value matters most.		When scale matters most.		When performance matters most.			
	Model	8200	8400	8440	20800	20840	8450	20450
Storage controllers	2	2 or 4	2 or 4	2, 4, 6, or 8	2, 4, 6 or 8	2 or 4	2 or 4	2, 4, 6, or 8
Maximum host ports	12	24	24	160	160	24	80	160
16 Gb/s Fibre Channel	4–12	8–24	8–24	0–160	0–160	8–24	0–80	0–160
10 Gb Ethernet	0–4	0–8	0–8	0–48	0–48	0–8	0–24	0–48
10 Gb iSCSI/FCoE	0–4	0–8	0–8	0–80	0–80	0–8	0–40	0–80
Maximum initiators per system	2,048	4,096	4,096	8,192	8,192	4,096	8,192	8,192
Drive types (mixable)	SAS (performance, nearline, SSDs)	SAS (performance, nearline, SSDs)	SAS (performance, nearline, SSDs)	SAS (performance, nearline, SSDs)	SAS (performance, nearline, SSDs)	SAS SSDs	SAS SSDs	SAS SSDs
Max Drives (all types)	240	576	960	1920	2304	480	576	1152
Max Solid State Drives (SSDs)	120	240	480	1024	1152	480	576	1152
Maximum capacity raw	750 TiB	2400 TiB	3000 TiB	6000 TiB	9600 TiB ¹⁷	1843 TiB (SSD-only)	1966 TiB	8043 TiB ¹⁸ (SSD-only)

HPE Technology Services

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

Advice, 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.

¹⁷, ¹⁸Support scheduled for 2H 2016.



Calculate your savings

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 solution. [Click here](#) to go to the HPE Storage Quick ROI Tool.

HPE Financing

Customize your IT lifecycle management from acquisition of new IT, management of existing assets, and removal of unneeded equipment.

hp.com/go/hpfinancialservices

HPE Factory Express

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.

hp.com/go/factoryexpress

Training from

Hewlett Packard Enterprise

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. hp.com/learn/storage



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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 networking.

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 to focus on 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 securely connecting your products to HPE. Achieve up to 77% reduction in down time, near 100% 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 that are securely connected to HPE support.

For more information, visit hp.com/services/storage.

Learn more at
hp.com/storage/3PAR

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