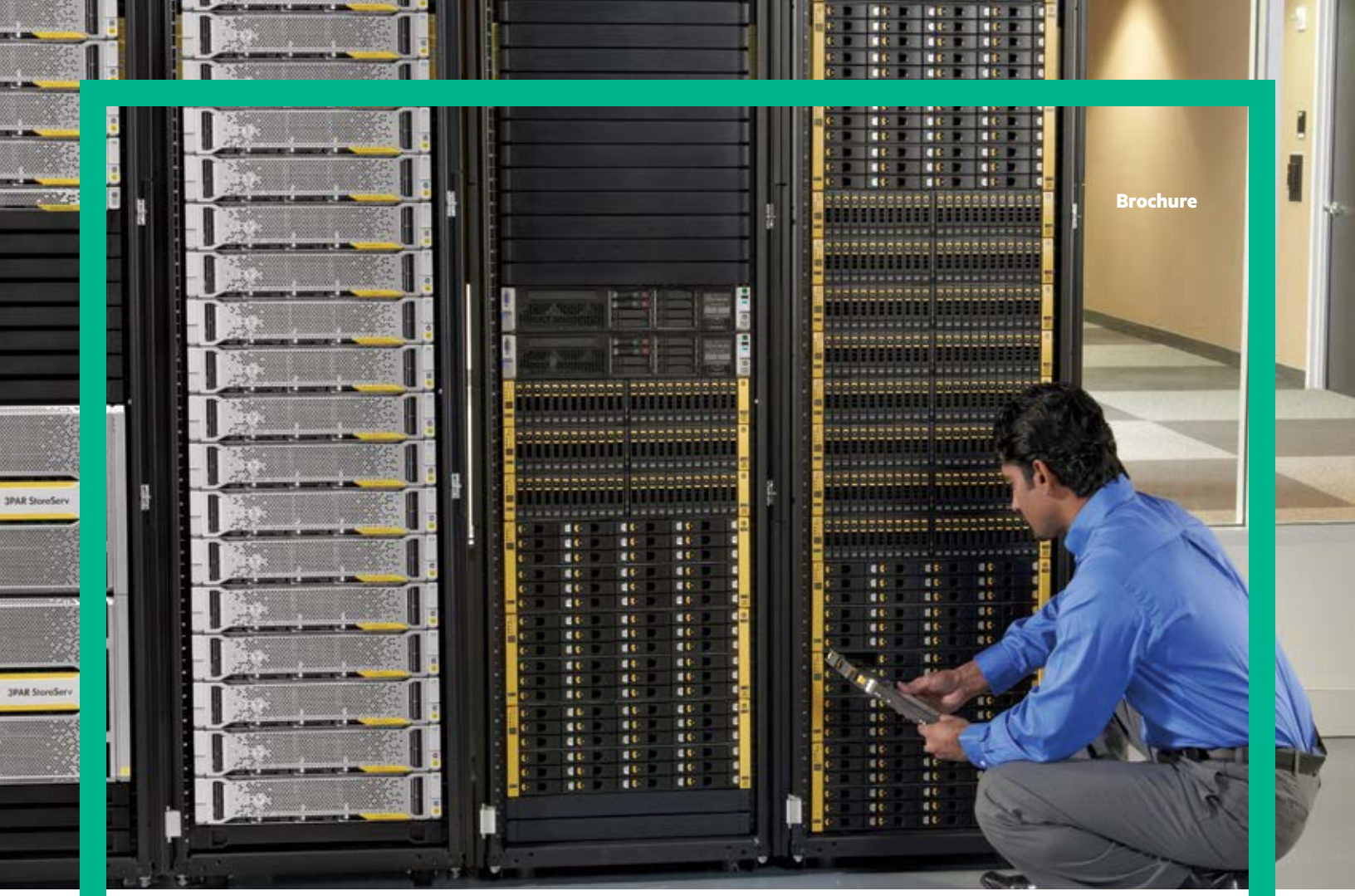


Brochure

Eliminate compromise

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

Hewlett Packard
Enterprise

Flash-optimized, modern Tier-1 storage for the New Style of Business

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. The world is moving rapidly towards a New Style of Business where 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 consolidate all of your applications onto enterprise flash.

HPE 3PAR StoreServ Storage allows you to break down the silos that stand between you and the efficiency and agility required for the New Style of Business. It's the last primary storage architecture you need—regardless of whether you are a 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 private cloud.

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.

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 so you can respond to change with agility and efficiency.

- Cut capacity requirements by up to 75 percent with data compaction technologies[1]
- Provision storage instantly and manage block, file, and object access from a single interface
- Serve a broad spectrum of primary storage workloads including server virtualization, databases, enterprise file sync and share, home directory consolidation, group/corporate shares, and custom cloud applications
- Remove bottlenecks with a flash-optimized, scale-out architecture and up to 1 million IOPS[2]
- Assure service levels with QoS optimization 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 processes[3]
- 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 internal Hewlett Packard Enterprise testing performed in June 2015.

[3] Currently supported in VMware® 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.

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 15 Petabytes (PiB) usable, provides true convergence of block and file workloads as well as object access, and delivers Tier-1 resilience paired with secure administrative segregation of users, hosts, and application data. Industry-leading density lets you consolidate 280 Terabytes (TiB) of usable capacity into a single 2U drive chassis and 5.5 PiB usable onto single floor tile while full hardware redundancy means complete system resilience—even when the unexpected happens.

Autonomic configuration prevents human error while remote diagnostic capabilities 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 more than a million 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.

System-wide striping of data assures high and predictable service levels for all workload types through the massively parallel and fine-grained striping of data across all internal resources (disks, ports, loops, cache, processors, etc.). 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 Hewlett Packard Enterprise internal testing performed in June 2015.

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 Thin, Guaranteed!
Need a sure thing? The HPE 3PAR Get Thin Guarantee program promises 50 percent reduction in capacity requirements when you replace legacy storage with HPE 3PAR StoreServ Storage—guaranteed.[6]

HPE 3PAR StoreServ Storage features industry-leading thin and data compaction technologies that reduce capacity requirements with a comprehensive approach to space efficiency. This approach does away with over-provisioning, uses fast and simple space reclamation, and applies inline deduplication to get more out of flash capacity.

The Gen5 Thin Express ASICs in each storage controller not only deliver mixed workload support, but provide the high-performance engine for hardware-accelerated thin technologies. These technologies allow you to purchase 50 percent less storage to meet your application requirements without compromising performance or utilization.

Accelerate performance with a flash-optimized architecture

Meet even the most stringent SLAs with performance acceleration for your most frequently accessed data. 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

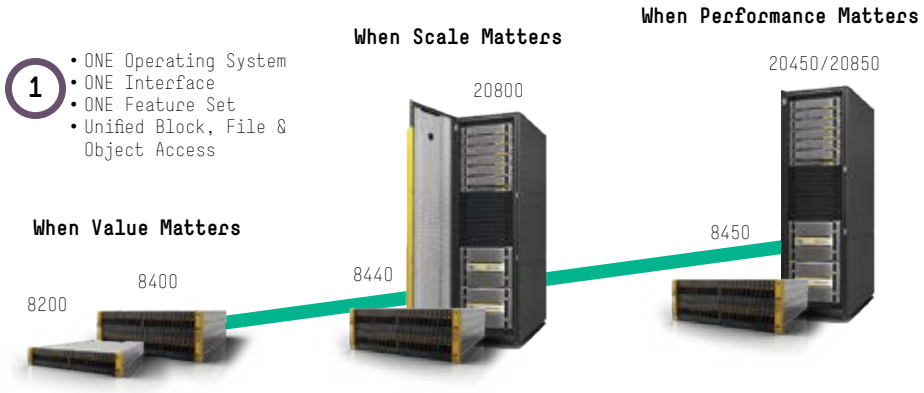


Figure 1. HPE 3PAR StoreServ Storage models

Other storage architectures cannot offer this range of deployment options, providing 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

HPE 3PAR StoreServ Storage features optional HPE 3PAR File Persona Suite software to deliver a tightly integrated, converged 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 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.

With this truly converged solution, you get up to 71 percent[7] 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 Thin Guarantee Program Terms and Conditions.

[7] Hewlett Packard Enterprise internal analysis compared to EMC VNX, September 2014.

Looking to replace your HDS, 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 for VMware provides superior granularity and control of array-based snapshots in vCenter for backup administrators.

Meet unpredictable and dynamic application demands

HPE 3PAR StoreServ Storage supports federated data mobility across all arrays—from value flash to enterprise flash—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.

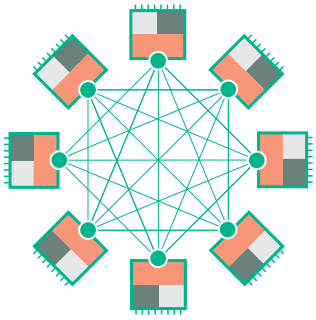
Maintain business continuity in the event of a disaster or data center-wide outage with replication and recovery between systems. Use these relationships to allow server and application maintenance operations to take place non-disruptively.

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.

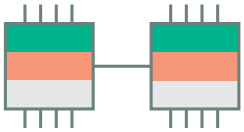
[8] Subject to qualification and compliance with the Get Virtual Guarantee Program Terms and Conditions.



HP 3PAR Architecture: Full-mesh interconnect

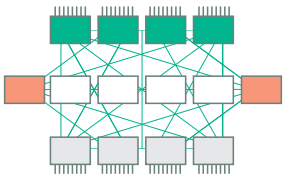
- ✔ Cost-effective
- ✔ Scalable
- ✔ Resilient
- ✔ Mesh-Active
- ✔ Meets cloud-computing requirements for efficiency, multi-tenancy, and autonomic management

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

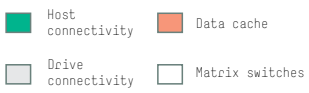


Figure 2.
HPE 3PAR Architecture vs. Traditional Architectures

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 that minimizes your risk.

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.[9]

In VMware 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 Backup means 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 Mesh-Active design, along with a storage virtualization strategy that uses three levels of abstraction, allows each volume to be active on every controller in the system. This forms a Mesh-Active cluster of up to eight controllers that delivers robust, load-balanced performance and greater headroom for cost-effective scalability that overcomes the tradeoffs typically associated with modular and monolithic storage.

[9] 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.

All-Flash for $1.50 USD per usable gigabyte[10]

HPE 3PAR Adaptive Sparing is a unique technology that extends flash-based media endurance by adjusting the system's sparing approach to minimize impact on SSDs. While other architectures generally reserve entire drives to use as spares, HPE 3PAR StoreServ systems reserves spare space within each drive. When using flash, sparing policies are adjusted on-the-fly to avoid using SSDs for sparing, lengthen media lifespan, and drive down the cost of flash performance. HPE 3PAR innovations around flash such as Adaptive Sparing not only bring down the effective cost of flash to $1.50 USD per usable gigabyte,[11] but allow Hewlett Packard Enterprise to offer a five-year warranty on all HPE 3PAR StoreServ SSDs that includes media wear-out.

A high-speed, full-mesh interconnection joins multiple storage controllers to form a cache-coherent, Mesh-Active cluster designed 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.

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.[12]

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 such as SSDs.

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.

[10], [11] Requires the use of 3.84 TB cMLC SSDs with HPE 3PAR StoreServ compaction technologies.

[12] See the HPE 3PAR Architecture technical white paper for details.

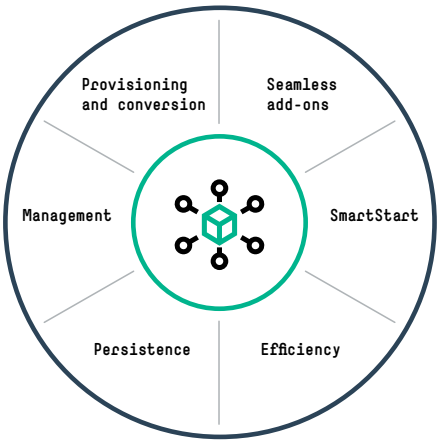


Figure 3. HPE 3PAR Software Suites enhance the agility and efficiency of your infrastructure

Dynamic caching designed for flash

Caching is an important element of the HPE 3PAR StoreServ 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.

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 and 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 VLAN tagging.
Simplified management is offered by the HPE 3PAR Operating System, HPE 3PAR StoreServ Management Console, HPE 3PAR Host Explorer, and HPE SmartStart software, which is designed to get you off to a quick start with your new HPE 3PAR StoreServ system. 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 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 Storage,[13] or HDS Storage[14] 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 Peer Persistence, which enables transparent automatic transparent failover over metropolitan distances using Remote Copy Synchronous mode.

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

[14] 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.

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.

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 software suite enables a rich set of file protocols and an Object Access API to extend the spectrum of primary storage workloads natively addressed by HPE 3PAR StoreServ Storage Systems with Converged Controllers. With this solution, the architectural benefits of HPE 3PAR StoreServ Storage can be extended to the following use cases: enterprise file sync and share, home directory consolidation; group, departmental and corporate shares; and custom cloud applications.

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 VMware—Everything you need to make your VMware environment more agile and efficient—including HPE 3PAR Recovery Manager for VMware, Host Explorer for VMware, vSphere APIs for Storage Awareness (VASA) support, and three essential plug-ins: the VMware Site Replication Manager (SRM) Adapter, the HPE 3PAR VAAI plug-in, and the HPE 3PAR Management Plug-in for VMware View. [15]

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 3PAR Application Software Suite for Oracle—Everything you need for protecting Oracle databases, including HPE 3PAR Recovery Manager for Oracle and Oracle Space Reclamation capabilities.

HPE 3PAR Application Software Suite for SQL—Protect Microsoft SQL databases with HPE 3PAR Recovery Manager for Microsoft SQL and the HPE 3PAR VSS Provider software.

HPE StoreOnce Recovery Manager Central—By combining the performance of snapshots with the protection of backups, this software integrates HPE 3PAR StoreServ with HPE StoreOnce Backup to provide a converged availability and flat backup service that augments traditional backup processes. With this automated, non-intrusive software, the simplicity and performance of local and remote snapshots can be combined with the reliability and cost-effective retention of deduplicated backups.

[15] HPE 3PAR Application Software Suite for VMware support extends to HPE 3PAR StoreServ 7000 and 10000 Storage systems with the OS version up to OS 3.2.1.

Application-managed storage

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

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 hp.com/services/storage.

Server and desktop virtualization

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.

Through collaboration with VMware on its Virtual Volumes (VVols) storage architecture, all HPE 3PAR StoreServ Storage now support simple, granular VM-level storage control, disaster recovery, and quality of service in VMware environments. Hewlett Packard Enterprise and VMware partnered for over three years on the definition, development, and testing of the VVols specification, with VMware using HPE 3PAR StoreServ as the Fibre Channel reference platform this new storage architecture.

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 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.

Databases

Database performance and availability are so critical that many organizations apply generous capacity and management resources to maintain needed service levels. HPE 3PAR StoreServ Storage removes these inefficiencies, eliminating tradeoffs between capacity utilization, efficiency, and performance. For example, with HPE 3PAR Thin Persistence software and the Oracle ASM Storage Reclamation Utility (ASRU), your Oracle databases stay thin by autonomically reclaiming stranded database capacity. Hewlett Packard Enterprise also offers the cost-effective
Oracle- and SQL-aware snapshot technologies HPE 3PAR Recovery Manager for Oracle and HPE 3PAR Recovery Manager for SQL Server.[16]

Email and communications

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 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,[17] you can recover email messages quickly, affordably, and from multiple points in time.

[16] These software titles are delivered via the HPE 3PAR Application Software Suite for Oracle and the HPE 3PAR Application Software Suite for SQL, respectively.

[17] 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	8450	20450	20850
Storage controllers	2	2 or 4	2 or 4	2, 4, 6, or 8	2 or 4	2 or 4	2, 4, 6, or 8
Maximum host ports	12	24	24	160	24	80	160
16 Gb/s Fibre Channel	4–12	8–24	8–24	0–160	8–24	0–80	0–160
10 Gb Ethernet	0–4	0–8	0–8	0–48	0–8	0–24	0–48
10 Gb iSCSI/FCoE	0–4	0–8	0–8	0–80	0–8	0–40	0–80
Maximum initiators per system	2,048	4,096	4,096	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 SSDs	SAS SSDs	SAS SSDs
Max Hard Disk Drives (HDDs)	240	576	960	1920	N/A	N/A	N/A
Max Solid State Drives (SSDs)	120	120	480	1024	480	512	1024
Maximum capacity raw	750 TiB/ 460.8 TiB SSD	2400 TiB/ 921.6 TiB SSD	3000 TiB/ 1843.2 TiB	6000 TiB/ 3932 TiB SSD	1843.2 TiB (SSD-only)	1966 TiB	3932 TiB (SSD-only)

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.
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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.
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HPE Technology Services for HPE 3PAR StoreServ Storage

Expert Hewlett Packard Enterprise storage consultants and service professionals sit down with you and your team to map your storage needs. Not only can we help you accelerate implementation and reduce deployment risk, but we can also help you realize the full value of your storage purchases as you transform storage for the New Style of Business.

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.

Operate and support
Find the level of personalized, proactive, and simplified support right for your business. Specific service availability varies by product.

HPE Foundation Care
System-level IT hardware and software support delivers a flexible coverage window and response time for more choice and simplicity.

HPE Proactive Care
Combined reactive and proactive services provide easy-to-purchase, cost-efficient, system-level support coupled with personalized expert advice and products connected to Hewlett Packard Enterprise to help prevent problems and reduce downtime.

HPE Proactive Care Advanced
Incorporates and builds on Proactive Care to give customers personalized technical and operational advice from an assigned, local Account Support Manager for personalized technical collaboration, flexible access to specialist skills to help optimize business-critical IT, and enhanced Critical Incident Management to help, so the business is not affected if there is a system or device outage.

HPE Datacenter Care
Get the support you need to deploy, operate, and evolve your data center environment to be hybrid cloud-ready with single-point-of-accountability for Hewlett Packard Enterprise and others' products.

Get connected and get back to business—HPE Storage Technology Services provide the path to getting your HPE Storage solutions and your business connected to Hewlett Packard Enterprise. Once connected, our experts are able to scan your system and run health checks, then use that data to create personalized reports and recommendations for actions to take to prevent problems and downtime. For more information, visit hp.com/services/storage.

Learn more at
hp.com/go/StoreServ

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