

Brochure



Invest for the future

Why you can't afford not to consider all-flash HP 3PAR StoreServ Storage

Think you can't afford flash? Think again.

Thin technologies make flash affordable from the start

- Built-in zero-detection and HP 3PAR Thin Deduplication reduce capacity requirements by up to 75 percent¹
- HP 3PAR Thin Provisioning and Thin Conversion reduce upfront storage requirements by 50 percent or more—guaranteed²
- HP 3PAR Thin Clones instantly creates capacity-efficient, non-duplicative virtual machine clones for Microsoft® Hyper-V and VMware ESXi
- Patented Express Indexing feature enables block and file data deduplication without capacity scalability constraints
- Reservationless snapshots reduce consumption by only using capacity for changed data

Adaptive technologies prolong flash media lifespan to lower TCO

- HP 3PAR Adaptive Sparing uniquely extends SSD usable capacity by 20 percent and aids wear management within the drive, offloading this task from the storage controllers³
- A fine-grained allocation unit and the HP 3PAR Adaptive Writes feature protect performance while extending SSD lifespan
- System-wide striping avoids hot spots to enable uniform wearing of SSDs
- Optional HP 3PAR Dynamic Optimization software lets you convert both "fat" and "thin" virtual volumes to deduplicated volumes (and vice versa) in order to free up capacity on your array

¹ Based on a compaction ratio of 4:1.

² Subject to qualification and compliance with the HP 3PAR Get Thin Guarantee Program Terms and Conditions, which will be provided by your HP Sales or Channel Partner representative.

³ With HP 3PAR Adaptive Sparing, a 400 GB drive yields 480 GB of usable capacity for a 20 percent net capacity extension.

⁴ Based on the comparison of the HP 3PAR StoreServ 7450 with 1.92 TB SSDs (65 TB usable capacity) versus an equivalent HDD configuration.

⁵ Based on a system capacity of 3.5 TB raw with 25 percent overhead and 4:1 compaction (subject to variation depending on workloads) through the use of data compaction results in 7 TB of usable capacity.

⁶ Based on comparison of US list prices for the HP 3PAR StoreServ 7200 All-Flash Starter Kit and EMC XtremIO with 5 TB of raw capacity and Pure Storage FA-405 entry-level configuration with 2.75 TB raw capacity.

⁷ Requires the use of 1.92 TB cMLCs and 3PAR compaction technologies, bringing usable system capacity to more than 1 PB at a cost of \$2 per GB usable.

If you're looking to make a primary storage investment in the near future, you can't afford not to consider an all-flash array. HP offers the only all-flash arrays on the market that are flash-optimized without being flash-limited—so you won't have to make business-limiting decisions when it comes to implementing flash or undergo painful rip and replace. Choose between the HP 3PAR StoreServ 7450 and the HP 3PAR StoreServ 7200 All-Flash Starter Kit with a price you can't afford to pass up!

All-flash and no compromise

Maybe you think you don't need the ultra-high IOPS and ultra-low latency that flash-based media delivers, but performance isn't the only reason to choose flash. More compact, more energy-efficient, and more predictable than spinning drives, flash-based media is no longer the future of storage—it has become mainstream. You need the storage platform you invest in today to meet your needs not just tomorrow, but well into the future, and that means you need to be considering flash today.

While an all-flash array certainly isn't your only choice, falling drive prices and lower-cost, higher-density SSD options such as commercial multi-level cells (cMLCs) are making all-flash arrays more affordable than ever. These are all indicators that flash is here to stay—and with good reason. Flash delivers incredible power in an unbeatably efficient package. For example, by using SSDs instead of HDDs, the all-flash HP 3PAR StoreServ 7450 uses 92 percent fewer disks, 76 percent less power, and 83 percent less rack space to deliver 7X better IOPS and 5X improved latency with an 86 percent reduction in software licensing costs.⁴

Think you can't afford it? Think again. The HP 3PAR 7200 All-Flash Starter Kit gives you a fully functional all-flash array with nearly 7 TB of usable capacity⁵ for roughly half the price of competing entry-level systems.⁶

Need additional scalability and quad-node resiliency? The all-flash HP 3PAR StoreServ 7450 Storage system lowers the cost of flash to as little as \$2 per usable gigabyte.⁷

Either way, you get the only architecture on the market that's flash-optimized, not flash limited.

Built-in resiliency and investment protection provides long-term cost control

- HP protects your flash investments with a 5-year warranty on all SSDs
- Proactive media management monitors flash utilization and wear so you can get the greatest utility from your flash drives
- Storage federation with HP 3PAR Peer Motion lets you non-disruptively move data between systems
- One operating system and a uniform feature set across all HP 3PAR StoreServ Storage models make forklift upgrades a thing of the past

HP stands behind the resiliency of the all-flash 3PAR StoreServ 7450 and all quad-node or larger arrays with the HP 3PAR Get 6-Nines Guarantee Program⁸

Express Backup to HP StoreOnce protects your applications

- Optional HP StoreOnce Recover Manager Central software delivers direct backup to HP StoreOnce
- Supported for VMware environments

Storage that is flash-optimized, not flash limited

To understand how the HP 3PAR StoreServ architecture is flash-optimized, it's critical to first understand some of the fundamental limitations of the other all-flash array options available today. These options give you a choice between two general categories. On one hand, you have all-flash and hybrid systems from major storage vendors that typically leverage legacy architectures that were never designed for flash, but are now being used to support SSDs. This is an inefficient and expensive way to deploy flash, and has resulted in a healthy ecosystem of startups looking to fill the gap with purpose-built, all-flash arrays.

Your other option is an all-flash system that is highly specialized—generally targeted at either delivering incredible flash-based media performance or lowering the cost of deploying flash. While some of these niche systems may deliver impressive performance or a low entry price point, they cannot deliver both ultra-high performance and a low all-flash array cost at the same time—so you have to trade one for the other.

What is even more troubling is that benefits offered by these niche systems come at the expense of adding another silo to your data center, meaning you have to sacrifice enterprise-class resiliency, scalability, federated data mobility, and in some cases advanced data services such as replication and quality of service (QoS) controls. So while it's true that, among these options, you can surely find an array that fits your specific needs today, they are all inherently limited.

Any architecture that relies on a modular design cannot offer Tier-1 resiliency. Any solution that is limited in scalability and lacks rich data services cannot give you the most return on your storage investment. Adding flash to the equation only magnifies these limitations.

All of the benefits and none of the limitations

HP offers a flash-optimized architecture unlike any other on the market. It is highly scalable in terms of both capacity and performance, and if you're already using HP 3PAR StoreServ Storage, it doesn't require you to introduce an entirely new architecture into your environment to get the benefits of flash. The entire family is flash-optimized, giving you a choice of all-flash models, flash-extended system cache, and the addition of a high-performance flash tier to completely eliminate the need to rip and replace. What's more, HP 3PAR StoreServ Storage offers the only all-flash array that delivers the performance and efficiency advantages that come with a flash-optimized architecture without compromising data mobility, cost efficiency, or rich data services.

True convergence of block, file, and object access

And now there's even more reason to choose flash-optimized HP 3PAR StoreServ Storage. Your flash-optimized array not only serves virtualization, database, and application workloads, but now supports file shares as well. With the HP 3PAR File Persona Software Suite, you can unlock the native file and object access capabilities within your HP 3PAR StoreServ array—not just with the all-flash models, but across the entire flash-optimized family—made possible by the HP 3PAR OS and the array's Converged Controllers. This approach offers a unique solution that incorporates multi-protocol support into the system architecture to deliver a tightly integrated, converged solution for provisioning both block storage volumes and file shares from a single storage system. The HP 3PAR File Persona Software Suite is a licensed feature of the 3PAR OS that enables a rich set of file protocols, an Object Access API, and file data services. By unlocking File Persona capabilities, you gain the ability to provision file shares and block volumes from a single user interface.

With the HP 3PAR File Services Suite software license, the entire flash-optimized family of HP 3PAR StoreServ Storage arrays supports home directory consolidation, group/departmental shares, and corporate shares in addition to workloads ideally suited for block protocols. You also get an Object Access API for custom cloud applications—all using the same hardware, the same system capacity, and the redesigned HP 3PAR StoreServ Management Console (SSMC).

⁸ Subject to qualification and compliance with the HP 3PAR Get 6-Nines Guarantee Program Terms and Conditions, which will be provided by your HP Sales or Channel Partner representative

The HP 3PAR StoreServ 7200 All-Flash Starter Kit

Looking for an all-flash array at the absolute lowest cost? The HP 3PAR StoreServ 7200 All-Flash Starter Kit gives you an incredibly affordable entry point without limiting your ability to grow or deploy advanced data services. With 7 TB of usable capacity to start, you can easily increase this initial configuration by adding more cMLCs from the start and scale to a total of 690 GB usable.⁹ Essential software and support are included with the Starter Kit, as is a free HP 3PAR Online Import software license for easy migration from HP EVA Storage or EMC CLARiiON, VMAX, and VNX arrays, so everything you need is rolled in to one easy package. An unconditional, 5-year warranty on all HP 3PAR StoreServ SSDs protects your flash media investment, and federated data movement between all HP 3PAR StoreServ Storage systems means that your new all-flash array won't become a stranded island in the middle of your data center.

The All-Flash HP 3PAR StoreServ 7450 Storage Array

When it comes to flash, the HP 3PAR StoreServ 7450 gives you the best of both worlds. Not only does a Mesh-Active design remove the bottlenecks that can choke legacy architectures and limit scalability, but it lowers your cost per usable gigabyte through an impressive lineup of unique hardware and software efficiencies that extend your flash investments. Simply put, the 7450 gives you all of the benefits of flash without any limitations, so you can invest in a storage system that doesn't just meet your immediate needs, but is designed to handle whatever your future might bring.

Table 1. How the HP 3PAR StoreServ 7450 stacks up against other all-flash arrays

	Flash Appliances	Flash Limited Arrays	HP 3PAR StoreServ 7450
Design focus	Hardware focused	Flash-only point solution	Flash-optimized adaptive architecture
Performance	1,000,000 IOPS	200,000–500,000 IOPS	900,000 IOPS
Architecture	Dual-controller	Dual-controller	Mesh-Active, Quad-controller
Data services	None	Limited	Complete
Data mobility	Siloed within appliance	Siloed	Federated. Peer motion to move data. Online Import to bring data across arrays
Capacity granularity	Coarse	Granular	Fine-grained
Raw Capacity scalability	60-280 TB	70-120 TB	460 TB
Usable capacity scalability	40-200 TB (with RAID5)	250-375 TB	1.4 PB
Cost¹⁰	Approximately \$6–\$10 USD/GB (usable)	Approximately \$4–\$8 USD/GB (usable)	Approximately \$2 USD/GB (usable) ¹¹

In addition, the HP 3PAR 6-Nines Guarantee Program⁸ stands behind the resiliency of all quad-node or larger HP 3PAR StoreServ Storage arrays—including the all-flash StoreServ 7450—by offering 99.9999 percent data availability.

⁹Based on 25 percent overhead and 4:1 compaction via the use of Thin Deduplication, which is included in the Starter Kit.

¹⁰Based on deduplication ratios of 4:1 to 6:1, depending on the system.

¹¹Requires the use of 1.92 TB cMLC drives.

Performance without compromise to drive down the cost of flash

HP 3PAR StoreServ Storage removes the performance bottlenecks, scalability restrictions, and other architectural limitations that prevent legacy systems and flash-based niche solutions from giving you the most from your flash investments. It's different from all other storage platforms in that it features an architecture that delivers performance without compromise—from midrange to high-end and across flash-optimized and hybrid arrays.

This is made possible by an extensible architecture designed to treat flash in an optimal manner—including multi-controller scalability to keep up with flash performance, a fine-grained virtualized operating system so that flash can be consumed efficiently, and mixed-workload support so that you can consolidate with confidence. These innovations help accelerate performance, improve the use of SSD capacity, and extend SSD lifespan to lower both the upfront and ongoing costs of storage.

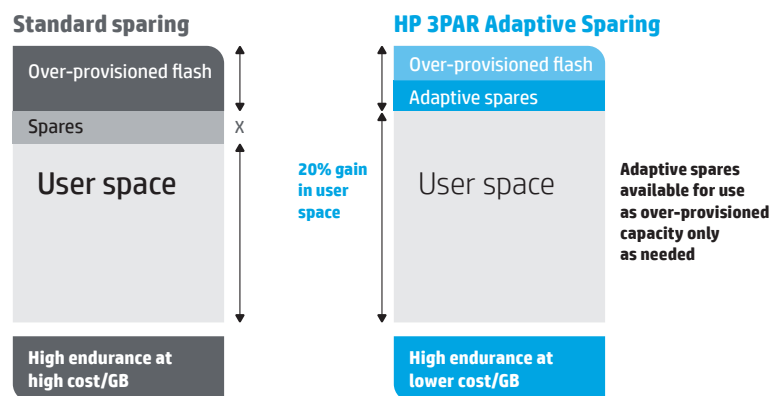
However, this is only the start of what makes the HP 3PAR StoreServ architecture unique. The following HP 3PAR StoreServ Storage features drive up the efficiency of flash to drive down costs without sacrificing performance, resiliency, scalability, or rich data services:

- **Mesh-Active architecture:** Unlike legacy architectures, a tightly coupled, Mesh-Active design allows each volume on HP 3PAR StoreServ Storage to be active on each controller at all times. A high-speed, full-mesh interconnect joins all controller nodes in the cluster to produce robust, load-balanced performance that removes flash bottlenecks and provides automatic and massive capacity and performance scalability.
- **Highly virtualized storage OS:** To accelerate performance and help increase capacity utilization, the HP 3PAR OS employs a tri-level mapping methodology similar to virtual memory architectures. This fine-grained approach to virtualization enables a single flash-based media device to support hundreds of volumes and up to a dozen RAID definitions at the same time, allowing both all-flash and hybrid arrays to make the most of SSDs.
- **Purpose-built ASICs:** By supporting mixed workloads with extremely high performance levels, the purpose-built HP 3PAR ASIC is one of the keys to alleviating legacy storage performance concerns. The HP 3PAR ASIC also features an efficient, silicon-based, zero-detection mechanism that gives HP 3PAR StoreServ Storage the power to remove allocated but unused space without significantly impacting performance.
- **Built-in zero-detection:** The zero-detection mechanism built into the HP 3PAR ASIC is the driving force behind data compaction using HP 3PAR Thin Technologies—including hardware-based acceleration that enables inline thin deduplication on HP 3PAR StoreServ 7450 arrays. Zero-detection removes streams of zeroes present in I/O prior to writing data on all StoreServ arrays in order to reduce capacity requirements and prolong SSD lifespan. HP 3PAR Thin Provisioning and Thin Conversion software leverage this zero-detection capability to reduce upfront storage requirements by 50 percent or more—guaranteed.¹²
- **Thin Deduplication with Express Indexing and Thin Clones:** HP 3PAR Thin Deduplication software uses this built-in zero-detection capability in combination with Express Indexing to deduplicate block data inline with a high degree of granularity. Hardware-accelerated thin deduplication delivers a level of capacity efficiency that is superior to other approaches without monopolizing CPU resources and degrading performance, thereby delivering the only primary storage deduplication solution in the industry that is truly enterprise-class. ASIC-assisted, block-level deduplication takes place “inline,” which carries multiple benefits including: increasing capacity efficiency, protecting system performance, and extending flash media lifespan.

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

- **Fat or Thin Volume Deduplication:** Optional HP 3PAR Dynamic Optimization software lets you convert both “fat” and “thin” virtual volumes to deduplicated volumes (and vice versa) in order to free up capacity on your array.
- **Express Writes:** HP 3PAR Express Writes is a built-in HP 3PAR OS write acceleration feature that optimizes CPU utilization to increase throughput, deliver up to 30 percent more IOPS, and reduce latency by up to 20 percent depending on your workload.¹³ These benefits extend to both spinning drives and flash-based media.
- **System-wide striping:** On all HP 3PAR StoreServ systems, data is striped across all system resources (controllers, ports, cache, HDDs, and SSDs), which enables the array to simultaneously deliver high capacity utilization without silos of any kind and high performance levels, with all resources supporting each volume, concurrent with system resiliency. System-wide striping also enables uniform I/O patterns across all media resources by spreading wear evenly across the entire system, thereby promoting SSD longevity.
- **Multiple SSDs options, including high-density cMLCs:** New 480 GB and 1.92 TB cMLC drives offer similar performance at a system level as compared to 480 GB and 920 GB MLC drives, but at a 30 percent lower cost per gigabyte. The use of these large-capacity, high-density drives allows industry-leading all-flash array scalability to 460 TB raw and over a petabyte of usable capacity with the HP 3PAR StoreServ 7450.¹⁴
- **5-year SSD warranty:** All currently available SSD options now carry an unconditional 5-year warranty to protect your flash storage investments. This warranty offers unconditional replacement due to drive failures, media wear-out, or both, and applies to HP 3PAR StoreServ 7000 and 10000 Storage systems.
- **Fine-grained allocation:** With its 16 KB write allocation unit, HP 3PAR StoreServ Storage has long been known for pioneering innovation in storage capacity efficiency. This granular allocation size enables only the right amount of flash media to be allocated, reducing upfront capacity requirements and prolonging flash-based media lifespan.
- **System-wide sparing:** Unlike many competitive arrays that reserve dedicated spare drives that then sit idle, system-wide sparing means that HP 3PAR StoreServ Storage spreads sparing across every single drive. This enables a balanced load that extends SSD lifespan by providing even flash-based media wear. It also protects against performance degradation by enabling “many-to-many” rebuild in the event of a failure.
- **Adaptive Sparing:** Using patented Adaptive Sparing technology, HP has collaborated with SSD suppliers to extend usable capacity per drive by up to 20 percent.¹⁵ This is achieved by reducing capacity typically reserved by media suppliers for wear-management and then using that space more efficiently. At a system level, increasing usable drive capacity also helps spread writes more broadly to extend SSD endurance. When combined with the new 1.92 TB cMLC drive, HP 3PAR Adaptive Sparing brings cost per GB to the lowest in the industry¹⁶ for an all-flash array and enables 45 TB in only 2U of space to reduce footprint and power cost.

Figure 1. HP 3PAR Adaptive Sparing—how it works



¹³ Based on a random, 100 percent write workload with an 8K block size.

¹⁴ 460 TB raw with 25 percent overhead and 4:1 compaction (subject to variation depending on workloads) results in 1.38PB of usable capacity.

¹⁵ With HP 3PAR Adaptive Sparing, a 400 GB drive yields 480 GB of usable capacity for a 20 percent net capacity extension.

¹⁶ Requires the use of 1.92 TB cMLC drives and HP 3PAR data compaction technologies.

- **Autonomic cache offload:** By automatically adjusting the frequency at which data is offloaded from cache to flash media based on utilization rates, autonomic cache offloading reduces cache bottlenecks. This helps achieve consistently high performance levels as workloads scale to hundreds of thousands of IOPS.
- **Multi-tenant I/O processing:** Multi-tenant I/O processing delivers performance improvement for mixed workloads and virtual desktop infrastructure (VDI) deployments by breaking large I/O into smaller chunks. This prevents small read requests from getting held up behind larger I/O requests to enable consistently low latencies that are expected of flash capacity.
- **Adaptive reads and writes:** This feature matches host I/O size reads and writes to flash media at a granular level to avoid excess writes that cause unnecessary wear to flash media. Removing non-essential data reads and writes reduces latency and enhances overall back-end performance. The net result enables consolidation of more high-performance applications, thereby driving lower storage total cost of ownership (TCO).
- **Reservationless snapshots:** Snapshots created with HP 3PAR Virtual Copy software only consume capacity for changed data to reduce overall capacity consumption, so fewer SSDs are required upfront and fewer writes are performed overall, thus extending media lifespan.
- **Thin Clones:** An extension of HP 3PAR Thin Deduplication for server virtualization environments, the HP 3PAR Thin Clones software feature provides non-duplicative VM cloning with Microsoft Hyper-V and VMware ESXi to reduce capacity requirements and increase media use.
- **Proactive media management:** Never be caught off guard by planning for future upgrades before your flash-based media is worn out. Media wear guides for each SSD keep you informed of the status of your flash-based media by monitoring the wear levels of each flash device at any given time, so you can get the most out of your flash capacity investments.

Converged data protection with HP StoreOnce

Converged Data Protection with HP StoreOnce: If you are looking for virtually instant application-consistent backups for your VMware environment, look no further than HP StoreOnce and HP StoreOnce Recovery Manager Central for simple, rapid, and granular backup and recovery for 3PAR StoreServ. This solution transforms traditional snapshot and replication management, giving you application-aware, storage-integrated data protection that bypasses traditional backup server-based processes.

By connecting HP 3PAR StoreServ Storage directly to HP StoreOnce backup appliances, 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 HP StoreOnce for cost-effective backup retention rather than storing backups on your primary storage array. The native movement of snapshots from HP 3PAR StoreServ Storage to HP StoreOnce assures that any online storage threats are mitigated so data is always available for recovery. This is all made possible by HP StoreOnce Recovery Manager Central, which allows VMware owners to seamlessly manage snapshots, backup, and recovery directly from within VMware vCenter.

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The last primary storage platform you'll ever need

HP 3PAR StoreServ Storage radically improves capacity and performance efficiency, making all-flash HP 3PAR StoreServ Storage arrays more affordable for a wider range of applications and a wider range of data centers than ever before.

Unlike bolt-on thin storage solutions available with legacy platforms, HP 3PAR StoreServ Storage features hardware-enabled data compaction technologies that allow systems to run in a state of consistently high capacity utilization without performance tradeoffs. In fact, the HP Get Thin Guarantee promises new HP 3PAR StoreServ customers at least 50 percent reduction in capacity requirements by simply replacing legacy storage with HP 3PAR StoreServ Storage—guaranteed.²

Whether you choose the all-flash 7450, the 7200 All-Flash Starter kit, or a hybrid HP 3PAR StoreServ Storage array with an SSD tier, innovations to the HP 3PAR StoreServ Storage platform based on the specific characteristics of flash deliver additional media endurance that enables you to extend the life of flash-based media. This lets you get the most out of every dollar and I/O for lower TCO and increased storage ROI, backed by a 5-year warranty on all HP 3PAR StoreServ SSDs.

If your organization is seeking to increase the productivity of employees while improving protection and security of user-generated file data, HP now offers you a truly converged primary storage platform that effectively addresses an expanded set of workloads. The HP 3PAR StoreServ File Persona Suite is your key to unlocking this capability within any HP 3PAR StoreServ Storage system with Converged Controllers, including all-flash arrays.

What's more, with HP 3PAR StoreServ Storage, you get the peace of mind that your performance-critical applications are backed by storage with Tier-1 resiliency by standing behind the ability of all quad-node and larger HP 3PAR StoreServ Storage systems to offer high data availability⁸ with the HP 3PAR Get 6-Nines Guarantee Program.

Combine this with the fact that the HP 3PAR StoreServ Storage family uses the same OS and offers the same rich set of enterprise-class data services across the entire portfolio—from midrange to high-end and across both all-flash and hybrid arrays—and the choice becomes simple.

Whether you are selecting an all-flash HP 3PAR StoreServ 7450 or another member of the HP 3PAR StoreServ family, investing in HP 3PAR StoreServ Storage is investing in your future by choosing the last primary storage platform you'll ever need.

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