# HP 3PAR Operating System Software Suite

## Effortless storage from the start

### HP 3PAR StoreServ Storage: Agile tier 1 storage capabilities from the midrange to the enterprise

As an organization that constantly makes leaps and strides toward growth, you've seen firsthand what it means to maintain a perfect balance between managing large and increasing data volumes, unpredictable application workloads, cost efficiency, and flexibility to meet changing business demands. And while you juggle these multiple facets within your business, you also consider advancements and changes on the outside that can deeply impact what goes on inside your business.

HP 3PAR StoreServ Storage is an easy-to-deploy, affordable, scalable, and flash optimized system designed from the ground up to meet fluctuating and mixed workload demands. With efficient, autonomic, and bulletproof capabilities and a unique, multi-node-capable architecture, HP 3PAR StoreServ Storage provides affordable scalability to meet your application demands and support business growth. HP 3PAR StoreServ Storage prepares you for what's next by supporting your data center, regardless of what your future holds—including server virtualization, an infrastructure refresh, or simplifying storage to more efficiently handle rapid data growth.

### The software foundation for HP 3PAR StoreServ Storage

The HP 3PAR Operating System Software Suite provides the software foundation for HP 3PAR StoreServ Storage, giving you everything you need to get up and running quickly and efficiently. With support for the enterprise-class, tier 1 storage features that are available across the entire HP 3PAR StoreServ platform, this foundational software suite gives you the simplicity, efficiency, and resiliency you need to accelerate new application deployments and support server virtualization, the cloud, ITaaS, or whatever else your future may hold.

As part of the HP 3PAR Operating System Software Suite, HP 3PAR Operating System Software comes preinstalled on HP 3PAR StoreServ Storage systems and includes a collection of advanced internal virtualization capabilities that increases storage efficiency and reduces administration time.

HP 3PAR StoreServ and the 3PAR OS are optimized for flash, addressing the four flash design requirements for storage: performance acceleration, efficiency optimization, data mobility, and system resiliency.

# Key features and benefits

### Simple to install, own, and upgrade
- New software suites simplify purchasing and reduce cost

- SmartStart[1] and Rapid Provisioning get you up and running in minutes

- Simple management via HP 3PAR StoreServ Management Console

- Gather and track historical storage system information via a flexible, intuitive, Web-based, capacity management tool—HP 3PAR System Reporter

- Online import makes upgrading from HP EVA Storage system or EMC Storage system[2] or HDS Storage system[3] effortless

- Adaptive flash cache automatically reduces application response time for read intensive I/O Workloads and improves write throughput in mixed workload environment

- VMware® Virtual Volumes (VVols) integration enables simple, granular VM level control and disaster recovery

### Start thin, get thin, stay thin, and redefine thin
- Reduce storage capacity requirements by 50 percent or more—guaranteed[4]

- "Thin" legacy storage to reduce technology refresh CAPEX

- Preserve high-capacity utilization levels over time

- Inline hardware assisted deduplication and zero detection to bring the cost of flash down, bringing it on parity with performance HDD based storage solutions

### Enterprise-class data persistence, resilience, and security
- Persistent technologies deliver high availability and tier 1 resiliency

- Maintain service levels in the virtual data center

- Deliver customized security features

The HP 3PAR StoreServ Management Console simplifies administration through a unified, point-and-click interface that supports all HP 3PAR StoreServ Storage models, making management effortless. Rich instrumentation combined with robust and customizable reporting capabilities reduces the need for add-on software tools and consulting services related to diagnosis and troubleshooting. Open administration support is provided via simple network management protocol (SNMP) and storage management initiative specification (SMI-S), and the recently added Web Services API.

Additional software included in the Operating System Software Suite offers enhanced capabilities including: rapid installation and provisioning, simple HP EVA Storage system or EMC Storage systems[5] or HDS Storage systems[6] to HP 3PAR StoreServ data migration, autonomic management, thin storage technologies, and data persistence.

[1] SmartStart available only for the HP 3PAR StoreServ 7200, 7400, and 7450 models.

[2,5,7,9,16] HP 3PAR Online Import support for EMC Storage extends to EMC VMAX, EMC VNX2, EMC CLARiiON CX4 Storage systems.

[3, 6, 8, 10, 17] HP 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.

# Incredibly simple to install, own, and upgrade

HP 3PAR StoreServ Storage leads the industry in providing array management features that remove the layers of complexity that typically weigh down storage administration. Simplicity saves you money, but it must be there from the start. As part of the HP 3PAR StoreServ Operating System Software Suite, the following software gets you up and running quickly, makes management incredibly simple, and provides effortless upgrades:

• HP 3PAR SmartStart: SmartStart simplifies the installation of HP 3PAR StoreServ Storage and gets you up and running in six quick and easy steps. An easy to follow wizard helps set up your storage—including installation of the HP 3PAR Management Console, HBA drivers, and HP 3PAR Host Explorer. Once complete, your storage is fully ready to use—often within minutes of installation. Available for the 7200, 7400, and 7450 models only.

• HP 3PAR Rapid Provisioning: Rapid Provisioning eliminates array planning by delivering instant, application-tailored provisioning through the highly virtualized HP 3PAR architecture. Provisioning is managed intelligently and autonomically, while system-wide data striping provides high and predictable service levels for all workload types.

• HP 3PAR Autonomic Groups: Autonomic Groups is a feature designed to simplify storage provisioning for clustered and virtual server environments. It gives you the flexibility to create host, volume, and domain groups to further automate and expedite storage provisioning, both now and in the future. Three clicks and 60 seconds are all you need to fully create and provision multiple volumes to multiple servers. All of these volumes are reconfigurable in just seconds, without disruption and without compromise. This greatly lessens the chance of human error by reducing manual repetition of tedious commands, making the provisioning process simpler and more reliable.

• HP 3PAR Host Explorer: Host Explorer is an autonomic storage management tool that establishes secure communication channels between storage and hosts. Host Explorer uses this connection to automate host discovery and the collection of detailed host configuration information that is critical to speeding storage provisioning and simplifying maintenance. Host Explorer automatically and securely communicates host information such as Fibre Channel Worldwide Name (WWN) and host multipath data to the HP 3PAR StoreServ Storage to reduce manual administration.

• HP 3PAR System Reporter: HP 3PAR System Reporter tracks the performance and capacity utilization data for HP 3PAR StoreServ Storage systems, regardless of location. System Reporter allows a broad range of report customizations and groupings for service level agreements (SLAs) and chargeback support HP 3PAR System Reporter software provides detailed, information-rich historical reports and both tabular and pictorial charting for ease of analysis. System Reporter software provides information on how to optimize and plan future configuration changes to improve infrastructure investments.

• HP 3PAR Scheduler: Scheduler also helps automate storage management, reduce administration time, and decrease the chance of administrative error. Scheduler does this by giving users full control over the creation and deletion of virtual copy snapshots—a process that is now completely automated with HP 3PAR StoreServ Storage.

• HP 3PAR Online Import: Online Import allows existing HP EVA Storage or EMC Storage[7] or Hitachi Storage systems[8] customers to move data quickly and easily to HP 3PAR StoreServ Storage. HP 3PAR Online Import saves CAPEX on your technology refresh because it uses the HP 3PAR Gen4 ASIC to power the simple and rapid conversion of inefficient, "fat" volumes on your legacy storage to more efficient, higher-utilization "thin" volumes on the HP 3PAR StoreServ Storage. This process couldn't be simpler, and doesn't require complex planning or depend on extra tools. HP 3PAR StoreServ Storage is everything you could want in a next generation of HP EVA or EMC Storage[9] or Hitachi Storage[10] systems—and more.

- HP 3PAR Web Services API: HP 3PAR Web Services API delivers a well-defined application programming interface for implementing durable automation of storage management tasks with HP 3PAR StoreServ Storage systems. This enables open administration support you can use for incorporating your storage infrastructure into your platform for end-to-end automation of your service delivery and management. The Web Services API implementation is based on RESTful Web API service using HTTPS, principles of REST, and data structures represented with JavaScript Object Notation (JSON).

- HP 3PAR Autonomic Rebalance: HP 3PAR Autonomic Rebalance optimizes the use of future capacity expansions without requiring administrator intervention. It analyzes how volumes on the HP 3PAR Storage System are using physical disk space and makes intelligent, autonomic adjustments to ensure optimal volume distribution when new hardware is added to the system.

- HP 3PAR Adaptive Flash Cache: HP 3PAR Adaptive Flash Cache provides on-board DRAM cache extensions by leveraging HP 3PAR StoreServ best in class virtualization technologies. This functionality enables a portion of SSD capacity to augment the array's primary cache, reducing application response time for read intensive I/O workloads and increasing write throughput in mixed workloads. Adaptive Flash Cache is supported on HP 3PAR StoreServ 7000, 10000, and 20800 Storage arrays, with up to 32 TB of Flash Cache in the HP 3PAR StoreServ 20800 Storage array.

- HP 3PAR Express Writes: HP 3PAR Express Writes acceleration feature is built in to HP 3PAR OS version 3.2.1 and later it optimizes CPU utilization and depending on workload, delivers greater throughput, up to 30 percent more IOPS, and up to 20 percent reduced latency.[11] All currently supported HP 3PAR StoreServ Storage HBAs and hosts support the HP 3PAR Express Writes, and its benefits extend to both spinning drives and flash-based media.

## Start thin, get thin, stay thin, and redefine thin

HP 3PAR StoreServ Storage enables you to meet your performance and service-level objectives with a minimum of 50 percent less capacity due to superior Thin Provisioning technologies.[12] Save on the cost of a storage technology refresh and then maximize storage ROI over time by keeping incremental purchases, administration, and operating costs to a minimum. In fact, the HP Get Thin Guarantee promises new HP 3PAR StoreServ customers a minimum 50 percent reduction in capacity requirements by replacing legacy storage with HP 3PAR StoreServ Storage—guaranteed.[13]

HP 3PAR StoreServ Storage makes these savings possible by offering one of the industry's most comprehensive approaches to thin storage. This approach is built on thin technologies that combine both software and hardware innovations unique to HP 3PAR StoreServ Storage that enable your organization to not only start thin, but to get thin, stay thin, and even redefine thin.

### Start thin: HP 3PAR Thin Provisioning Software
HP 3PAR Thin Provisioning Software improves storage system efficiency and optimizes capacity utilization system-wide. It does this by addressing the problem of capacity over-allocation through eliminating the need to dedicate storage capacity up-front and on a per-application basis.

Since its introduction, Thin Provisioning has given customers the ability to meet green IT targets and reduce capacity purchases. Thin provisioning makes this possible by cutting SAN costs, floor space requirements, and energy expenses. No more dedicating resources for each application or service level. No more paying to power, house, and cool disks that you may never need.

[11] Based on a random, 100 percent write workload with an 8k Block size.

[12] As compared to your legacy storage array. See HP's Get Thin Guarantee hp.com/storage/getthin programs for more details.

[13] The above is intended to highlight certain aspects of our Get Thin Guarantee and does not contain the full terms, conditions, limitations, definitions, and other provisions ("Terms") of the Get Thin Guarantee. The Terms shall be contained in a written Get Thin Guarantee Terms and Conditions which shall take precedence over the above. Qualification for our Get Thin Guarantee is subject to your acceptance of a Get Thin Guarantee Terms and Conditions and your satisfaction of those Terms.

**Get thin: HP 3PAR Thin Conversion Software**

In an ideal world, all your storage would start thin using HP 3PAR Thin Provisioning Software. But what if starting thin has not been an option because you've been limited to legacy arrays from a traditional storage vendor? Or what if you've already created volumes on an HP 3PAR Storage System without the use of Thin Provisioning?

It's never too late to become more efficient. When combined with HP 3PAR Thin Conversion Software bundled in the HP 3PAR OS Software Suite, the zero-detection mechanism built into the HP 3PAR Gen4 ASIC gives HP 3PAR StoreServ Storage the power to remove allocated but unused space without impacting performance.

HP 3PAR Thin Conversion Software extends the benefits of Thin Provisioning to your existing storage volumes for "fat-to-thin" conversions compatible with any host volume. HP 3PAR StoreServ Storage is the only platform in the industry to offer this built-in, hardware-accelerated, fat-to-thin conversion capability. This reduces up to 50 percent of your legacy capacity by allowing the simple and rapid conversion of fully provisioned storage to thin provisioned storage.[13]

**Stay thin: HP 3PAR Thin Persistence and Thin Copy Reclamation Software**

To realize the ultimate efficiency and cost-saving benefits of starting thin or getting thin, you also need to stay thin. An industry first, HP 3PAR Thin Persistence Software ensures that thin volumes on the HP 3PAR StoreServ Storage stay as lean and efficient as possible. Thin Persistence accomplishes this by reclaiming unused space associated with deleted data within system storage volumes—simply, quickly, and without disruption.

Thin Copy Reclamation is similar to Thin Persistence but instead of applying the space reclamation for thin volumes, this software reclaims unused space from thin copies (virtual copy snapshots and remote copies).

**Redefine thin: HP 3PAR Thin Deduplication Software and Thin Clones Software**

To capitalize the benefits of flash media, it is imperative to keep the cost of flash solutions down. To achieve this and as an extension of the existing Thin Technologies feature, HP 3PAR StoreServ offers a unique solution—HP 3PAR Thin Deduplication. Thin Deduplication avoids storage of duplicate data thereby positively impacting the cost of the flash solution. HP 3PAR Thin Deduplication is completely inline, and is hardware assisted which helps to bring the overall cost of flash solutions down, at par with performance based drives. Not only this, HP 3PAR Thin Deduplication is array based functionality and can be turned ON and OFF for individual applications.

HP 3PAR Thin Clones acts as an extension of Thin Deduplication for server virtualization environments providing host—assisted deduplication that produces non duplicative VM clones for Microsoft® Hyper-V and VMware ESXi.

Along with Thin Technologies, Thin Deduplication can offer up to 75 percent of flash media savings, along with ensuring a higher transaction per second with 10X more IOPS and 5X better latency.

On average, with thin technologies, HP 3PAR StoreServ Storage customers can purchase 60 percent less capacity than would have been necessary with traditional storage arrays. Thin Persistence and Thin Copy Reclamation can improve this average capacity savings by another 10 percent for a total savings of up to 70 percent. All volumes and snapshots stay thin to help sustain green IT targets, defer the cost of purchasing raw capacity to handle new data growth, and keep costs down—without having to purchase special host-based software or retaining professional services.

# Enterprise-class data persistence, resilience, and security

The HP 3PAR Operating System Software Suite offers several data resilience and security products designed to deliver tier 1 availability to the midrange.

- HP 3PAR Persistent Cache: Persistent Cache is a resiliency feature built in to the HP 3PAR OS that prevents data availability from being impacted by unplanned component failures—a key requirement for maintaining service levels in the virtual data center. Persistent Cache eliminates the substantial performance penalties associated with traditional arrays and "write-through" mode so that HP 3PAR StoreServ Storage can maintain required service levels even in the event of a cache or controller node failure. Persistent Cache leverages the array's unique design to preserve write caching by rapidly re-mirroring the cache to other nodes in the cluster in the event of a failure. Persistent Cache is supported on all quad-node and larger HP 3PAR StoreServ models, including the HP 3PAR StoreServ quad-node storage array—making HP 3PAR StoreServ the only vendor to incorporate this industry-leading service level protection capability into midrange as well as enterprise arrays.

- HP 3PAR Persistent Ports: Persistent Ports makes software upgrades on HP 3PAR StoreServ Storage systems and attached HBAs non-disruptive, allowing them to take place online without reliance on multipathing software and without the need to initiate failover. HP 3PAR StoreServ is the first storage array to offer this tier 1 resiliency feature for the entire midrange. Persistent Ports also autonomically fails over a front-end controller node port that experiences physical connection loss from a cable pull or a failed switch. This unique capability improves resiliency in the midrange as well as in the enterprise.

- HP 3PAR Persistent Checksum: Persistent Checksum is a security feature built in to the HP 3PAR OS that ensures data integrity for end to end data protection via a T10 Data Integrity Field (DIF). Persistent Checksum addresses media and transmission errors that can be caused by any component in the I/O stack and provides additional protection above CRC transmissions for FC and iSCSI protocols. Persistent Checksum is application independent and offers elaborate host OS support. When using supported HBAs, T10-DIF[14] tags are added and verified on HP 3PAR StoreServ. When using unsupported HBAs, T10-DIF tags are added and verified on the array target ports and back-end HBAs, making the data protected all the way from the hosts right to the drives.[15]

- HP 3PAR Full Copy: HP 3PAR Full Copy software flexibly delivers point-in-time (PIT) clones with independent service level parameters so you can share and protect data from almost any application simply and affordably. Full Copy offers rapid resynchronizations with base volumes as needed and is Thin Provisioning-aware for excellent capacity utilization.

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[14] T10-DIF: Industry standard end to end data protection via T10 Data Integrity Field (DIF)

[15] HP 3PAR Persistent Checksum feature is available | supported on HP 3PAR StoreServ 20000 Storage systems

# Software suites for HP 3PAR StoreServ Storage

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| **HP 3PAR Operating System Software Suite** | Required for all new HP 3PAR StoreServ systems, this foundational software suite gives you everything you need to get up and running quickly and efficiently. Powered by HP 3PAR ASIC, HP 3PAR StoreServ's Thin Technologies which include HP 3PAR Thin Provisioning, HP 3PAR Thin Persistence, HP 3PAR Thin Conversion, HP 3PAR Thin Deduplication form the base of this software suite. Performance acceleration is assured with HP 3PAR Adaptive Flash Cache by reducing application response time. |
| | Simplified management is offered by HP 3PAR Operating System, HP 3PAR StoreServ Management Console, HP 3PAR Host Explorer, and HP SmartStart—software designed to get you off to a quick start with your new HP 3PAR StoreServ system; HP 3PAR System Reporter and HP 3PARInfo software are designed to track performance and capacity utilization trends for multiple HP 3PAR StoreServ Systems. Other highlights of this suite include HP 3PAR Full Copy, autonomic rebalancing capabilities that help you optimize the use of future capacity expansions, and support for standard multipathing software for high availability in clustered environments. An one year license for online import is included to enable migration from HP EVA or EMC[16] or HDS [17] Storage systems. |
| **HP 3PAR Replication Software Suite** | This suite bundles HP 3PAR Virtual Copy with HP 3PAR Remote Copy software, both also sold separately for all HP 3PAR StoreServ models. While HP 3PAR Virtual Copy software protects and shares data affordably with rapid recovery using reservation-less, non-duplicative, copy-on-write snapshots; HP 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 ensures automatic transparent failover across data centers using Remote Copy Synchronous mode. For HP 3PAR StoreServ 20000 the Suite also includes Cluster Extension Software which enables automatic failover over distance using Remote Copy Asynchronous mode. |
| **HP 3PAR Data Optimization Software Suite** | This software bundle combines HP 3PAR Dynamic Optimization, HP 3PAR Adaptive Optimization, HP 3PAR Peer Motion, and HP 3PAR Priority Optimization software together. HP 3PAR Dynamic Optimization delivers the required service levels for the lowest possible cost throughout the data lifecycle. HP 3PAR Adaptive Optimization improves storage utilization by enabling cost-optimized storage tiering. HP 3PAR Peer Motion enables load balancing at will wherein, movement of data and workloads between arrays is initiated without impacting applications, users or services. HP 3PAR Priority Optimization assures service levels with QoS controls for mission-critical applications. The four software titles bundled in this suite are also sold separately for all HP 3PAR StoreServ models. Depending on purchase date, titles included in this suite may vary. Check the HP 3PAR Software QuickSpecs for complete details. |
| **HP 3PAR File Persona Suite** | This software suite enables file protocol services and an Object Access API to extend the spectrum of primary storage workloads natively addressed by HP 3PAR StoreServ Storage Systems with Converged Controllers. With this solution, the architectural benefits of HP 3PAR StoreServ Storage can be extended to the following use cases: home directory consolidation, group, departmental and corporate shares; and custom cloud applications. |
| **HP 3PAR Security Software Suite** | This software suite bundles HP 3PAR Virtual Domains and HP 3PAR Virtual Lock software, both also sold separately for all HP 3PAR StoreServ models. 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. |
| **HP 3PAR Application Software Suite for VMware** | Everything you need to make your VMware environment more agile and efficient—including HP 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 HP 3PAR VAAI Plug-in, and the HP 3PAR Management Plug-in for VMware View.[18] |
| **HP 3PAR Application Software Suite for Hyper-V** | Protect your Microsoft Hyper-V environment with HP 3PAR Recovery Manager for Microsoft Hyper-V and the HP 3PAR VSS Provider software, included in this suite. |
| **HP 3PAR Application Software Suite for Exchange** | This bundle gives you the essentials for use with Microsoft Exchange, including HP 3PAR Recovery Manager for Exchange and the VSS Provider software. |
| **HP 3PAR Application Software Suite for Oracle** | Everything you need for protecting Oracle databases, including HP 3PAR Recovery Manager for Oracle and Oracle space reclamation capabilities. |
| **HP 3PAR Application Software Suite for SQL** | Protect Microsoft SQL databases with HP 3PAR Recovery Manager for Microsoft SQL and the HP 3PAR VSS Provider software, bundled with this suite. |
| **HP StoreOnce Recovery Central Manager** | By combining the performance of snapshots with the protection of backups, this software integrates HP 3PAR StoreServ Primary Storage with HP StoreOnce Backup Systems 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 snapshots can be combined with the reliability and cost effective retention of deduplicated backups. |

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

# HP Technology Services for HP 3PAR StoreServ Storage

Customize your IT lifecycle management, from acquisition of new IT, management of existing assets, and removal of unneeded equipment. **hp.com/go/hpfinancialservices**

**Expert HP 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.

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

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

### Operate and support
Find the level of personalized, proactive, and simplified support right for your business (Note: Specific service availability varies by product):

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

• HP 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 HP to help prevent problems and reduce downtime.

• HP Proactive Care Advanced—Incorporates and builds on Proactive Care to give customers personalized technical and operational advise 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.

• HP 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 HP and others' products.

Get connected and get back to business—HP Storage Technology Services provide the path to getting your HP Storage solutions and your business connected to HP. 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.

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

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

**Learn more at**
**hp.com/go/3parstoreserv**

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