Hewlett Packard Enterprise

HPE 3PAR StoreServ 20000 Storage Family

Enterprise flash for on-demand and hybrid IT

Key features and benefits

Scalable—to meet growing enterprise requirements

- Scale capacity up to 9 PB raw and more than 26 PB usable with up to eight controllers in a Mesh-Active cluster
- Reduce performance bottlenecks with flash-optimized hardware and software for greater than 3 million IOPS at sub-millisecond latencies
- Lower the cost of all-flash to as low as $1.20/GB with robust support including a 5-year warranty and 7-years of wear out.[6]
- Transition to all-flash data center with simple HPE 3PAR All-Inclusive software licensing

Flexible—to meet unpredictable business demands

- Get the savings you want with the performance you need with Adaptive Data Reduction, Deduplication, Compression and Data Packing
- Support the most rigorous, on-demand infrastructure with a virtually limitless, elastic pool of storage
- Run workloads at the right cost and SLA with one-click workload balancing
- Slash management overhead with unified management of block, file, and object access and storage that is self-configuring, self-provisioning, and self-optimizing

Enterprise flash meets modern, Tier-1 storage

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

The HPE 3PAR StoreServ 20000 Storage family is a class of enterprise flash arrays for massive consolidation of your most demanding workloads, with greater than 3 million IOPS, sub-millisecond latencies,[1] a 6X density advantage over the competition,[2] and scalability to more than 26 PB of usable capacity.[3] The family's flash-optimized architecture features the HPE 3PAR Gen5 ASIC for silicon-based hardware acceleration, including inline deduplication, compression, data packing, thin technologies and other compaction technologies that can reduce acquisition and operational costs by as much as 75% without compromising performance.[4]

With unmatched versatility, leading performance,[5] and scalability, HPE 3PAR StoreServ 20000 Storage has you covered. A choice of models gives you a range of options that support true convergence of block and file protocols, all-flash array performance and the use of spinning media to further optimize costs.

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

HPE 3PAR StoreServ 20000 enables you to federate storage across data centers without being constrained by physical boundaries. Peer Persistence with automated failover and failback between two sites or data centers is transparent to hosts, keeping your virtualized deployments seamlessly running. When disaster readiness over a geographic distance is required, add 3PAR StoreServ to a third site to assure extreme availability. New support for StoreVirtual VSA to 3PAR replication with HPE Peer Copy offers a low cost solution for data mobility in test environments and as well as affordable edge-to-core data protection. HPE 3PAR StoreServ 20000 also supports flat backup to HPE StoreOnce Backup systems for simple and efficient data protection that eliminates traditional backup processes.

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

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

[3] When configured with 7.68 TiB SSDs and used with HPE 3PAR compaction technologies, the HPE 3PAR StoreServ 20800 and 20840 brings usable capacity to more than 20 petabytes.

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

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

[6] All SSDs on 3PAR 8000/20000 purchased after June 1, 2015 with life left below 5% as determined by HPE and with drive age less than 7 years from warranty start date and no interruption in HPE support coverage. Wear out in years 6 and 7 applies to media and electronic failure replacements for all SSDs.

Resilient—so you can consolidate with confidence

- Maintain software defined extreme high availability with Peer Persistence support for 3 data centers and disaster recovery over distance
- Replicate data between StoreVirtual and 3PAR directly for remote office, low cost data protection
- Achieve application-integrated recovery with near-synchronous RPOs

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

- Modernize your EMC, HDS, and IBM storage infrastructure with painless, no-cost data migration
- Seamlessly move data between any model HPE 3PAR StoreServ array
- Increase SAN performance for all-flash with Gen6 32Gb FC. For a MS SQL 2016 Data Warehousing environment, test results show a 37% increase in read throughput, 54% of large block I/Os completed in less than 2ms, and 49% higher SQL transactions per sec.[7]

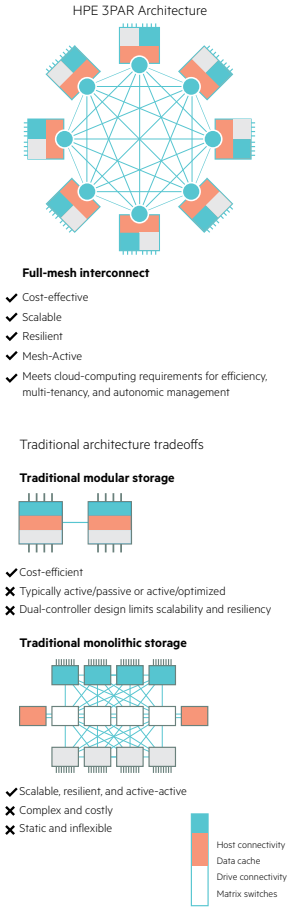

Figure 2. Traditional storage architecture vs. HPE 3PAR StoreServ

[7] **Demartek Evaluation Report: Improving Business Outcomes with HPE DL380 Gen9 Server, 3PAR StoreServ 8450 All-Flash Storage, StoreFabric SN6600B Switch and SN1600E HBA Gen6 32Gb FC Technology**

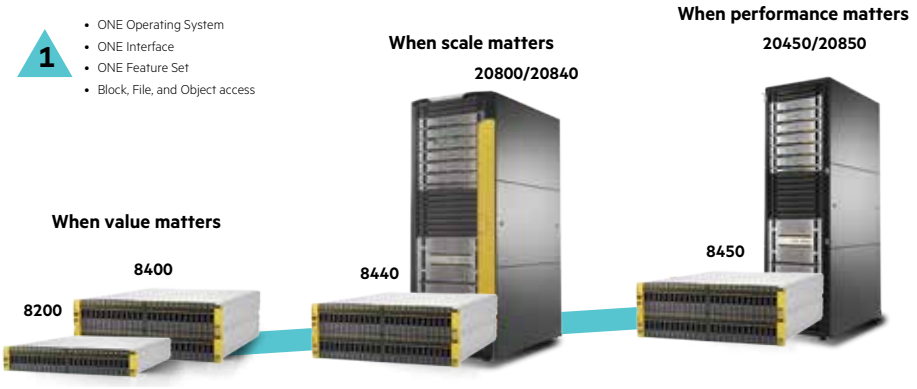

Figure 1. HPE 3PAR StoreServ Storage Models

Scalable—to meet growing enterprise requirements

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

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

- **Unique, clustered, Mesh-Active architecture (figure 2):** Up to eight controllers form a Mesh-Active cluster based on a unique system of controller node interconnects. Unlike traditional "Active-Active" architectures, this clustered design delivers robust, load-balanced performance, and greater headroom for cost-effective scalability that overcomes the tradeoffs typically associated with modular and monolithic storage.
- **HPE 3PAR Gen5 ASIC:** Supports mixed workloads and enables thin technologies including inline deduplication with high performance levels to alleviate legacy storage performance concerns. The ASIC supports mixed workloads with extremely high performance levels so that transaction- and throughput-intensive workloads run on the same storage resources without contention, enabling consolidation without compromise.
- **Adaptive read and write technology:** Matches host I/O size reads and writes to flash media at a granular level to avoid unnecessary data reads and writes to reduce latency, enhance backend performance, and extend flash media lifespan to lower the total cost of ownership (TCO) for storage.
- **Autonomic cache offload:** Reduces cache bottlenecks by automatically changing the frequency at which data is offloaded from cache to flash media based on utilization rate. This helps achieve consistently high performance levels as you scale up the workload to millions of IOPS.
- **Multi-tenant I/O processing:** Enables performance improvement for mixed workloads or virtual desktop infrastructure (VDI) deployments by breaking large I/O into smaller chunks so that small read requests don't get held up behind larger I/O requests, which helps ensure reduced latency.

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

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

- 600 TB usable capacity in a drive enclosure
- 11 PB usable capacity in a single rack
- More than 20 PB usable capacity in a single HPE 3PAR StoreServ 20800 or 20840 system

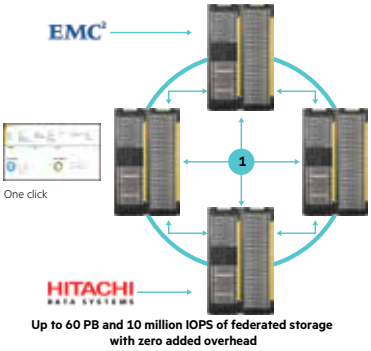

Figure 3. An elastic resource pool with one-click workload balancing

HPE 3PAR Flash Now: Maintain control of your data for less than the cost of outsourcing it to the public cloud
Evaluating the cloud but not sure you're ready to surrender your data? Looking to reduce storage costs but don't like the idea of ceding control and stomaching new security risks? Then it's time to look at new ways to plan for, acquire, and consume your data storage.

HPE 3PAR Flash Now is a new program that brings public cloud-like economics to your on-prem flash storage deployment. With this new program, you get only the best of on-prem and cloud with none of the drawbacks. Retaining total control and uncompromising security for the data you need to keep on-prem but benefit from converting OPEX to CAPEX and a host of other benefits that come with the program, such as non-disruptive, automated data migration and a built-in tech refresh options that keep you up to date on the latest flash and data protection technologies.

[8] Based on HPE internal testing with HPE 3PAR Adaptive Flash Cache enabled.

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

[10] See **technical specifications** for details.

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

- **Adaptive Flash Cache:** A feature that allows SSDs to act as a true extension of system cache. This feature can improve throughput and reduce latency[8] with HPE 3PAR StoreServ Storage arrays that are configured with SSDs.
- **Express Writes:** Write acceleration that helps optimize CPU utilization and, depending on workload, delivers greater throughput, up to 30% more IOPS, and up to 20% reduced latency.[9]

Flash-based storage you can afford

HPE 3PAR StoreServ Storage is and will continue to be on the cutting edge for flash media innovation to lower cost. Technologies built into the HPE 3PAR OS allow you to get the most out of your flash investments by protecting them with extended media lifespan, which is why all HPE 3PAR SSDs come with a 5-year warranty that includes replacement of the SSDs for any failure including write wear-level limit.

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

Adaptive Data Reduction is a collection of 3PAR software features that allow the system to run in a state of consistent high-capacity utilization without performance tradeoffs. Included in this collection are: 3PAR OS, HPE 3PAR Deduplication Software with patented Express Indexing delivers inline deduplication with hardware acceleration at scale; Compression with inline Express Scan that removes redundant data inline and prevents wasted CPU cycles and Data packing, which helps condense data into a single page and increases storage efficiency and bandwidth. You save on the cost of a storage technology refresh and increase storage ROI by keeping incremental purchases, administration, and operating costs low over time.

With HPE 3PAR Flash Now, you'll be up and running with your new all-flash HPE 3PAR StoreServ Storage before you ever pay HPE a cent for your new flash storage infrastructure and you'll only pay pennies per usable gigabyte per month. The program's built-in utility consumption model lets you scale your flash storage use up or down while only paying for what you consume. Best of all, you'll own your own destiny by keeping maintaining control of your data for less than the cost of outsourcing it to the public cloud.

3PAR Flash-Integrated Data Protection: Reducing Risk in the All Flash Data Center
If you are looking for virtually instant application-consistent availability and protection for your VMware®, Microsoft® SQL, Oracle and SAP HANA® environments, look no further than rapid and granular backup and recovery with HPE Recovery Manager Central (RMC) software and HPE StoreOnce. HPE Recovery Manager Central software integrates HPE 3PAR All-Flash arrays with HPE StoreOnce Systems to provide a converged availability and protection service optimized for flash environments. It augments traditional backup approaches, combining the performance of snapshots with the protection of backups. As a result RMC offers 23X faster backup with no backup impact on the application server, enables self-service application managed protection for VMware, Microsoft SQL, Oracle and SAP HANA environments, lowers cost and complexity by eliminating need for a backup application, and reduces risk by protecting applications running on 3PAR against storage platform outage, file loss or application corruption beyond the oldest snapshot.

Flexible—to meet unpredictable business demands

Meet the needs of today's dynamic applications with the ability to move data and workloads not just between tiers, but between arrays—without impact to applications, users, or services. With HPE 3PAR StoreServ 20000 Storage, you get rich storage federation capabilities, such as bidirectional data mobility. With this capability, you get the agility and flexibility to run workloads at the right cost and service level with one-click workload rebalancing (figure 3).

- Non-disruptively shift data between HPE 3PAR StoreServ 20000 Storage enterprise flash arrays and any other HPE 3PAR StoreServ array without additional management layers, appliances, or overhead impact to host resources.
- Map workloads to the right resources and establish tiers of storage across a data center for different SLAs.
- Lower costs and manage capacity at a data center level by thinly provisioning volumes with the freedom to non-disruptively move data between systems.

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

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

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

HPE Smart SAN for HPE 3PAR StoreServ

HPE Smart SAN for HPE 3PAR StoreServ brings together a set of creative features based on Fibre Channel Industry Association (FCIA) FC in-band control and communication to SAN management. Smart SAN for 3PAR helps reduce end-to-end SAN complexity for all-flash deployments with automation and HPE 3PAR target driven host orchestration. To address the complexity and tedious nature of traditional SANs switch zoning, HPE used an industry standard FCIA T-11 definition, added a set of creative software features on HPE 3PAR StoreServ and collaborated with HPE StoreFabric FC vendors to implement Smart SAN for 3PAR support in their solutions. Smart SAN for 3PAR support includes StoreFabric 16 Gb and 32 Gb FC server adapter (hosts) and StoreFabric B-series (16 Gb and 32 Gb) and converged HPE FlexFabric 5900 Switch Series switch vendors to implement end-to-end software based automated Target and 3PAR Federated Driven Peer Zoning (TDPZ) to address traditional SAN complexity and the tedious nature of switch zoning. The HPE approach called HPE Smart SAN for HPE 3PAR StoreServ is a holistic way to simplify end-to-end SAN complexity orchestrated from 3PAR across hosts and switches resulting in minutes to provision a host rather than hours or days with less human error—more SAN simplicity and greater SAN resiliency. As an example, in a mid-sized SAN consisting of nine fabric switches, traditional FC switch zone configuration for 128 host initiators, 1024 zones and eight HPE 3PAR target ports took hours, when using HPE Smart SAN for 3PAR to zone the same fabric it resulted in a saving of over 80 percent configuration time with Target Driven Peer Zoning (TDPZ).

HPE Smart SAN also supports FCIA standards-based device registrations and diagnostic data collection for better configuration, visibility, and diagnostic purposes. This drastically improves the customer experience with significant reduction in overall SAN configuration time as well as making the whole process less error prone and SAN healthier.

Storage analytics in the cloud with HPE StoreFront Remote

The HPE StoreFront Remote (SFRM) SaaS Portal provides proactive tools and integrated data collection from the HPE 3PAR StoreServ Storage arrays that call home to deliver unique insights and analytics all in one dashboard. Identify capacity and performance issues early through intuitive capacity and get recommendations to increase the wellness score of your HPE 3PAR StoreServ arrays. Get the most out of your storage investment and continuously optimize your infrastructure based on remedial actions suggested by SFRM. Go to **HPE StoreFront Remote** for information on how to register your arrays.

Get more out of your virtualization deployment

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

Integration with VMware vSphere API for Array Integration (VAAI), VMware vStorage APIs for Storage Awareness (VASA), Microsoft Offload Data Transfer (ODX), and thin provisioning enable HPE 3PAR StoreServ Storage to improve virtual infrastructure performance, efficiency, and scalability. Low latency levels allow you to get more out of your VMware deployment, where extensive use of virtual memory pages to disk can limit VM consolidation on physical servers when paired with legacy storage. By contrast, deploying HPE 3PAR StoreServ Storage enables you to double VM density on your physical servers.

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

Make your databases more efficient, without tradeoffs

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

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

Resilient—so you can consolidate with confidence

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

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

- **Persistent Cache:** Preserves service levels so they are not impacted by unplanned component failures—a key requirement for the virtual data center.
- **Persistent Ports:** Allows non-disruptive upgrades to HPE 3PAR StoreServ 20000 Storage systems without relying on multi-pathing software and without initiating failover. This feature also automatically fails over a front-end controller node port that experiences physical connection loss due to a cable or switch failure in order to preserve service levels.
- **Persistent Checksum:** Ensures end-to-end data integrity, protecting against silent corruption from the host to the storage array.
- **Peer Persistence:** Delivers effortless resilience that comes with VMware vSphere Metro Storage Cluster (vMSC) certification and support for Microsoft Windows Server® and Microsoft Windows® Hyper-V environments. With Peer Persistence, you also federate storage across data centers without being constrained by physical boundaries. Automated failover and failback between two sites or data centers is transparent to hosts, which keeps your virtualized deployments seamlessly running even in the event of a disaster.

  HPE 3PAR Peer Persistence provides extreme data protection whereby customers have not only non-disruptive data mobility in case of local storage failure, but also a complete disaster recovery plan by replicating the same data to a third site. Peer Persistence configurations provide the best in class high availability solution combined with an efficient disaster recovery solution based on asynchronous periodic replication.

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

- **Virtual Domains:** Unlike the use of multiple storage systems or traditional array partitioning schemes that rely on the physical segregation of resources, HPE 3PAR Virtual Domains uses a policy-based, logical implementation that preserves the benefits of distributing and sharing each application workload across all system resources. Virtual Domains is ideal for those who understand the benefits of consolidation but must enable secure, independent storage services to multiple administrators, applications, departments, and customers.
- **Data-at-Rest Encryption:** For environments that require protection from unauthorized data access, encryption protects your data from both internal and external security breaches. HPE 3PAR StoreServ 20000 Storage is fully FIPS 140-2 compliant, supports local and enterprise key managers that are FIPS certified and KMIP-compliant, and is available with encrypted FIPS 140-2 validated drives. These drives protect against unauthorized access, even if a drive is stolen, fails, or has to be retired.
- **Virtual Lock:** HPE 3PAR Virtual Lock Software enables organizations to securely lock down storage volumes, allowing read access but preventing accidental or intentional deletion. When used in conjunction with reservationless, non-duplicative snapshots, Virtual Lock delivers an efficient approach to governance and legal discovery.

Figure 4. HPE 3PAR Remote Copy

Table 1. HPE 3PAR Remote Copy Software benefits

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

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

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

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

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

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

Ensure the highest levels of data availability

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

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

HPE 3PAR Remote Copy Software, including support for true asynchronous streaming, allows you to achieve low recovery time objectives (RTOs) and zero-data loss recovery point objectives (RPOs) with complete distance flexibility. In addition, since HPE 3PAR Remote Copy configuration is autonomic, setup only requires one step so you can protect your data from the start.

Refreshing your storage technology is effortless

With HPE 3PAR StoreServ Storage, you can refresh technology effortlessly by streamlining the movement of data from older systems and non-disruptively update storage without application impact. If you are looking to consolidate your HDS arrays, IBM XIV, HDS arrays, IBM XIV, EMC VMAX, CLARiiON CX4, DMX4 or VNX arrays, HPE 3PAR Online Import Software make it easy for you. Also, Online Import support will be available within SSMC for IBM XIV.

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

Future-proof—to support on-demand computing

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

Boost all-flash SAN performance further by upgrading SAN infrastructure to Gen6 32Gb FC
When replacing traditional HDD storage with hybrid or especially all-flash arrays to serve high-performance workloads, it is critical to consider the role of your storage network and confirm that it is not acting as a bottleneck. For example, a typical OLTP workload can saturate 8 Gb host Fibre Channel (FC) bandwidth without fully utilizing all of your compute or storage resources. To ensure you receive the anticipated returns on your all-flash investments, you may need to consider increasing your storage networking performance with Gen5 16Gb FC technology or even Gen6 32Gb FC.

HPE 3PAR StoreServ Storage support for 16 Gb FC offers a simple and immediate SAN performance solution. By replacing older 8 Gb FC SAN components with Gen5 16 Gb FC on your all-flash HPE 3PAR StoreServ array, HPE StoreFabric FC switch and host FC HBAs, you can significantly increase I/O bandwidth and IOPS with lower latency too for latency sensitive applications. By replacing SAN infrastructure HPE StoreFabric FC host bus adapters and switching to Gen6 32Gb FC while the target is at 16Gb FC, you can boost performance even further without any performance tuning for applications like MS SQL 2016 running a data warehouse workload, see Demartek Evaluation results in listed in this data sheet. With older 4 Gbps FC infrastructure end-of-support life (EOL) and 8 Gb FC infrastructure starting to EOL, now is the time to evaluate 16 Gb Gen5 technology or Gen6 32Gb FC for your flash deployments.

Technical specifications

	HPE 3PAR StoreServ 20450 All-Flash	HPE 3PAR StoreServ 20800 Converged Flash	HPE 3PAR StoreServ 20850 All-Flash	HPE 3PAR StoreServ 20840 Converged Flash
Controller nodes	2 or 4	2 or 4 or 6 or 8	2 or 4 or 6 or 8	2 or 4 or 6 or 8
Maximum total cache	1.8 TiB	33.8 TiB	3.6 TiB	51.3 TiB
Maximum on-node cache	896–1792 GiB	448–1792 GiB	896–3584 GiB	896–3584 GiB
Total flash cache	Not applicable	32 TiB	Not applicable	48 TiB
Maximum number of HDDs	Not applicable	2304	Not applicable	2304
Maximum number of SSDs	576	1152	1152	1152
Maximum raw capacity	4021 TiB	9600 TiB (flash + HDDs)	8043 TiB (all flash)	9600 TiB (flash + HDDs)
Maximum raw capacity (SSD only)	4021 TiB	8043 TiB	8043 TiB	8043 TiB
16 Gbps FC host ports	0–80	0–160	0–160	0–160
10 Gbps iSCSI/FCoE ports	0–40	0–80	0–80	0–80
10 Gbps Ethernet ports for file	0–24	0–48	0–48	0–48
Persona Built-in 10 Gbps ports	2–4	2–8	2–8	2–8

The complete HPE 3PAR software portfolio

Manage

StoreServ Management Console
Command Line Interface
System Reporter
Service Processor
File Persona
Smart SAN
HPE OneView integration
WSAPI, SMI-S and SNMP
OpenStack integration
VMware integration
Dockers containers support

Protect

Remote Copy
Peer Persistence & CLX
Recovery Manager Central
Data-at-Rest Encryption
File Store snapshots
Persistent Checksum
Persistent Cache
Persistent Ports
Virtual Lock and File Lock
VSS Provider

Optimize

Adaptive Sparing
Adaptive Flash Cache
Priority Optimization
Federation (Peer Motion, Online Import)
Adaptive Optimization
Express Protect
Adaptive Reads and Writes
Express Writes
Autonomic Cache Offload
Mixed Workload Technology

Efficient

Zero Detect
Deduplication
Compression
Data Packing
Thin Provisioning
Virtual Copy
Thin Conversion
Thin Persistence
Express Layout
Express Indexing
Scan

Predictive analytics powered by StoreFront Remote

Manage: Everything you need to get up and running quickly and efficiently.	Simplified management is offered by the **HPE 3PAR StoreServ Management Console (SSMC)**. The scriptable **HPE 3PAR Command Line Interface (CLI)** gives you powerful customization capabilities that are simple to configure and reduce the need for extra management tools. **HPE 3PAR System Reporter** helps track performance and capacity utilization trends for multiple HPE 3PAR StoreServ systems. Remote error detection along with support for diagnostics and maintenance activities is offered via **HPE 3PAR Service Processor**. Rich file protocols from SMB/CIFS to NFS and FTP, and a RESTful Object Access API for programmatic access to files are offered with **HPE 3PAR File Persona**. Built-in automated SAN configuration is offered with **HPE 3PAR Smart SAN**. **HPE OneView integration**, gives you a web-based interface that is common across enterprise servers, storage, and networking. Support for the **Storage Management Initiative Specification (SMI-S)** provides simplified storage management from within the Microsoft System Center Management framework. With **OpenStack integration**, over both iSCSI and Fibre Channel protocols, the flexibility and cost-effectiveness of a highly resilient cloud-based open source platform that meets the requirements of your mission-critical applications, is offered. HPE 3PAR StoreServ Storage **integration with VMware vSphere** enables you to take advantage of architectural benefits such as wide striping, a Mesh-Active clustered controller design, mixed workload support, and hardware-assisted VMware vSphere APIs for Array Integration (VAAI) support. **Dockers containers support** helps deliver enterprise-grade storage availability, resiliency and performance for stateful containers.
Protect: Safeguard your most mission-critical of applications.	**HPE 3PAR Remote Copy** offers simple and cost-effective data protection for efficient multi-tenant disaster recovery. **HPE 3PAR Peer Persistence** ensures transparent autonomic failover over metropolitan distances. **HPE 3PAR Cluster Extension Software** enables automatic failover across data centers using Remote Copy Asynchronous mode. **HPE Recovery Manager Central** allows you to create, manage, and automate crash-consistent snapshots for any application and app-consistent snapshots for VMware vSphere, Microsoft SQL Server, Oracle, and SAP HANA. **HPE 3PAR StoreServ Data-at-Rest Encryption** protects data from both internal and external security breaches by securely encrypting all data as it is written to the drive. End-to-end data integrity, protection against silent corruption from the host to the storage array is offered via **HPE 3PAR Persistent Checksum**. **HPE 3PAR Persistent Cache** maintains service levels, so they are not impacted by unplanned component failures—a key requirement for the virtual data center. Non-disruptive upgrades to HPE 3PAR StoreServ 8000 Storage systems without relying on multi-pathing software and without initiating failover is initiated via **HPE 3PAR Persistent Ports**. **HPE 3PAR Virtual Domains and HPE 3PAR Virtual Lock Software** helps 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 File Lock** enables data preservation to meet the enterprise governance requirements.
Optimize: Make the best use of the available storage capacity.	**HPE 3PAR Adaptive Sparing** leverages the system's sparing approach to improve the performance and endurance of flash. Performance acceleration is assured by **HPE 3PAR Adaptive Flash Cache**, which reduces application response times. **HPE 3PAR Priority Optimization** assures service levels with QoS controls for mission-critical applications. **HPE 3PAR Peer Motion** enables load balancing at will, wherein movement of data and workloads between arrays does not impact, applications, users, or services. **HPE 3PAR Online Import** is included to enable migration from HPE EVA, EMC, HDS or IBM Storage systems. **HPE 3PAR Adaptive Optimization** improves storage utilization by enabling cost-optimized storage tiering. **HPE 3PAR Express Protect** enables backups to StoreOnce—all through the familiar RMC GUI. **HPE 3PAR Adaptive Reads and Writes** help to avoid unnecessary data reads and writes to reduce latency, enhance backend performance and extend flash media lifespan. **HPE 3PAR Express Writes** enhances write acceleration that helps optimize CPU utilization and depending on workload, delivers greater throughput. **HPE 3PAR Autonomic cache offload** helps reduce cache bottlenecks by automatically changing the frequency at which data is offloaded from cache to flash media based on utilization rate. **HPE 3PAR Multi-tenant I/O processing** enables performance improvement for mixed workloads or virtual desktop infrastructure (VDI) deployments by breaking large I/O into smaller chunks so that small read requests don't get held up behind larger I/O requests, ensuring reduced latency.
Efficient: Get maximum performance with minimum expenditure.	**HPE 3PAR Zero Detect** reduces the cost of storage by identifying and removing repeated data from incoming data streams. **HPE 3PAR Deduplication** helps reduce the amount of flash needed to store data by preventing the storage of duplicate data. **HPE 3PAR Compression** helps reduce the amount of flash needed to store data by reducing the data footprint. **HPE 3PAR Data Packing** helps improve storage efficiency and bandwidth by condensing multiple smaller data sets together. **HPE 3PAR Virtual Copy Software** protects and shares data affordably with rapid recovery using reservationless, non-duplicative, copy-on-write snapshots. **HPE 3PAR Thin Technologies**—including **HPE 3PAR Thin Provisioning, Thin Conversion, Thin Persistence, and Thin Copy Reclamation**—achieve data compaction by leveraging built-in hardware capabilities. **HPE 3PAR Express Layout**, allows HPE 3PAR controller nodes to share access to SSDs in order to drive efficiency. **HPE 3PAR Express Indexing** helps deduplicate data inline and with a high degree of granularity. **HPE 3PAR Express Scan helps** remove redundant data inline and prevents wastage of CPU cycles.

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

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

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

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

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

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

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

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

Note: Specific service availability varies by product.

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

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

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

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

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

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

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

Learn more at
HPE 3PAR StoreServ 20000

[14] IDC

[15] HPE CSC reports 2014–2015

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