Brochure

Enabling a flexible, easy, and cost-effective storage strategy

HP StoreVirtual 4000 Storage

Today, server virtualization is more important than ever before—helping organizations to increase application availability and enhance business agility. For many organizations, the savings that come from server consolidation are the primary reason for server virtualization.

Many of virtualization's additional benefits—including built-in, cost-effective high availability (HA) and disaster recovery (DR)—require external shared storage with a comprehensive feature set to support them. Without proper planning, savings from server virtualization can easily be misdirected toward inefficient storage systems. iSCSI storage is now being seen as an option that can help overcome the cost and management limitations of traditional storage area networks (SANs) and is becoming very popular in virtualized server environments.

Organizations, today, need a storage environment that is easy to learn, is intuitive to manage and change, scales to meet business demands without creating IT bottlenecks or application downtime, and offers application data high availability—all without costing a fortune. The good news is that these requirements can be met with HP StoreVirtual 4000 Storage.

The scale out difference

HP StoreVirtual 4000 Storage is an iSCSI-based array that uses storage clustering—a form of scale out storage to create a scalable storage pool. The storage cluster aggregates a number of storage systems into a single pool of resources. The cluster accepts and responds to iSCSI requests as a single system. In HP StoreVirtual, all physical capacity is aggregated and is available to volumes created on the cluster.

When more storage is needed, additional HP StoreVirtual storage nodes can be added to the cluster online; the cluster seamlessly, non-disruptively reorganizes data to incorporate the new node into the cluster.

Built-in support for HA and DR implementations, superior, scalable performance, and simplified management make HP StoreVirtual Storage the preferred choice to support virtualized infrastructure.

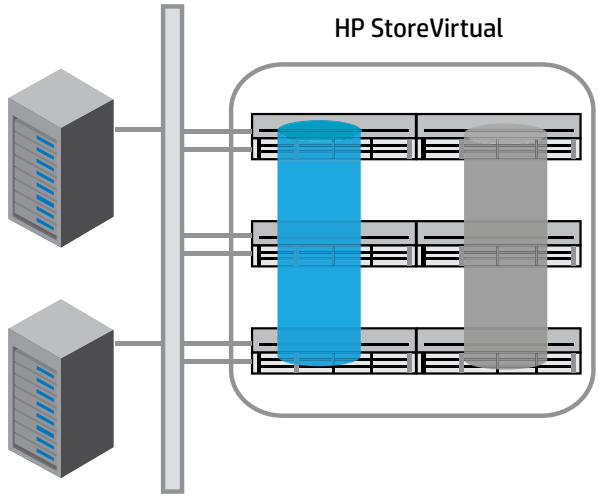
Advantages of HP StoreVirtual Storage

- **Cost and simplicity**
  Buy only what you need today and grow your storage non-disruptively in the future. Most storage architectures require you to plan for growth and over-purchase today. With HP StoreVirtual, you can start with a small cluster and scale to hundreds of terabytes, all managed from an intuitive user interface.
- **Scalable performance**
  Because the resources of all HP StoreVirtual nodes in the cluster are aggregated, capacity and performance of the entire cluster increases each time a storage node is added; this avoids expensive and complicated controller upgrades. Adding HP StoreVirtual nodes into a cluster is done online, without disruption—thus avoiding downtime and complex coordination with server, application, and network teams.
- **Availability**
  HP StoreVirtual Storage can sustain multiple system failures and still keep data online and accessible. Most storage architectures use dual controllers for high availability, but they do not protect against power failures, air conditioning failures, or any type of failure that is outside of the box. HP StoreVirtual provides levels of data availability beyond what traditional dual controller storage and hardware RAID can provide.

Click here to compare the total cost of ownership (TCO) in migrating to a HP StoreVirtual Storage solution and learn how you can realize significant cost savings over three years.

Figure 1.

HP StoreVirtual storage clustering allows you to create pools of storage composed of HP StoreVirtual nodes. The cluster accepts and responds to iSCSI requests as a single, clustered array.



HP StoreVirtual storage clustering—scale your storage with ease

HP StoreVirtual storage clustering allows you to create pools of storage composed of StoreVirtual nodes. Storage clustering provides online scalability, both within a volume and across the entire storage cluster. All available physical capacity is aggregated and available to the volumes created on the cluster.

For increased business protection, customers can deploy nodes across the IP network. Within a facility, HP StoreVirtual nodes can be spread out between the server room and a network closet. A single HP StoreVirtual cluster can also be spread across physical sites or data centers to remove the risk of data loss or downtime from a site or data center failure.

Customers can use HP StoreVirtual storage clustering to implement different tiers of storage. For instance, a SAS-based cluster can be implemented for optimal performance or one with solid state disks for high performance while a midline SAS-based array is used for higher density and storage capacity, with all tiers managed from a single interface.

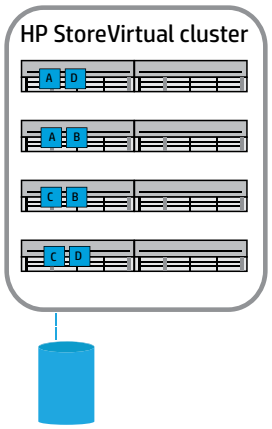
Scalable performance

In order to scale capacity and/or performance, simply add HP StoreVirtual nodes into the storage cluster. HP StoreVirtual automatically redistributes the data for better data availability and performance. All the capacity, processing power, memory, and bandwidth included in each node is aggregated across the entire cluster, increasing the performance as the cluster grows. To make the process even easier, HP StoreVirtual lets you expand volumes and add storage nodes online, without taking the volumes offline or causing application downtime.

Network RAID—delivering unprecedented availability

HP StoreVirtual features Network RAID, which stripes and protects multiple copies of data across a cluster of storage nodes, removing any single point of failure in the storage cluster. Applications have continuous data availability in the event of a disk, controller, storage node, power, network, or site failure.

Figure 2.
Network RAID stripes and protects up to four copies of each data block across the cluster (two copies are shown here). A logical volume's block replication with Network RAID 10 is illustrated. In addition, each HP StoreVirtual node offers disk RAID 5, 6, and 10.



Storage administrators can manage redundancy on a per-volume basis to improve storage utilization and match the data protection of the volume to the application data on that volume. Customers choose Network RAID 10, 10+1, or 10+2, 5 or 6 to protect data across storage nodes, allocating additional storage space only for data that warrants additional protection.

Built-in self-healing technology allows Network RAID to proactively repair bad blocks on the storage array before applications encounter them. In addition, Network RAID automatically fine-tunes the data layout of a volume over time, providing high performance no matter how old or full the volume becomes.

Better than traditional arrays

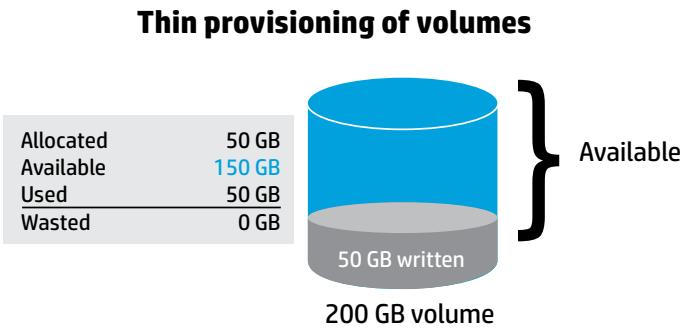
Traditional storage arrays make you define RAID groups ahead of time by allocating the disks to a particular RAID group. Changing a volume's RAID level means taking its RAID group down for restriping or moving the volume to a different RAID group—either way, all the applications that depend on it suffer downtime during the move. Relying on hardware RAID alone for your data protection locks you into your RAID configuration. When using Network RAID you can configure your hardware RAID to give you high capacity efficiency along with the ability to change Network RAID levels on the fly—allowing you to closely match storage characteristics to your business requirements.

Thin provisioning—provision actual storage only as you need it

Most storage arrays place the provisioning burden on storage administrators, asking them to predict how much space will be needed for volumes, snapshots, and remote copies, and what the expected growth rates will be. That is because most storage provisioning models call for preallocation of space on the storage array. Worse yet, if you over-allocate storage, it is nearly impossible to reclaim that unused space.

HP StoreVirtual does not require preallocation of storage space. LeftHand Thin Provisioning manages all the storage allocations underneath a given volume, and it allocates space only as data is actually written to that volume. Thin provisioning lets you purchase only the storage needed today and then add more storage to the cluster as application data grows; this raises the overall utilization and efficiency of the cluster and ultimately increases the return on investment (ROI) associated with the storage array.

Figure 3.
LeftHand Thin Provisioning lets you create larger volumes than you need today, and let them fill as your application data grows.



Give your volumes room to grow

Thin provisioning lets you size your volumes with room to grow. You can create a volume with the size you expect it to be in the future, create a file system in it, and allow your application data to grow to fill the volume over time. HP StoreVirtual incorporates advanced monitoring and alerting mechanisms that make over provisioning safe for day-to-day use. Thin provisioning is an attribute of each volume, so you can switch back and forth online between thin and full provisioning as you wish—it is as easy as a click of the mouse. This enables greater flexibility, efficiency, and lower cost.

Application-managed snapshots—instant, point-in-time backups

Snapshots create thinly provisioned, instant point-in-time copies of data on a per-volume basis. Administrators can access snapshots to recover individual files from the volume, or rollback an entire volume in both VMware and Microsoft® virtualized environments.

LeftHand Application Aware Snapshot Manager supports one-click, application-consistent, point-in-time snapshots for VMware VMFS datastores to help offer fast and reliable virtual machine recovery. This feature combines the benefits of native VMware snapshots with the functional advantages of snapshots on HP StoreVirtual Storage, and is fully integrated with LeftHand Remote Copy.

Snapshot and Remote Copy integration for Windows® servers and applications including Microsoft Exchange Server, Microsoft SQL Server, Microsoft SharePoint and Microsoft Hyper-V make application backup and recovery simple. Application integration provides automated quiescing for Microsoft VSS applications.

Create application-managed snapshots manually, ad hoc, on a scheduled, or scripted basis and then access these point-in-time snapshots to recover individual files or folders from the volume—or rollback an entire volume.

Unlike most storage arrays that require a snapshot reserve, HP StoreVirtual creates snapshots that are always thin-provisioned for efficiency—consuming storage space on the cluster only for the data written to the snapshot, and removing the need for any upfront space reservation or guesswork that could lead to snapshot and backup job failures. LeftHand Application-managed Snapshots open up a range of new possibilities for the IT organization:

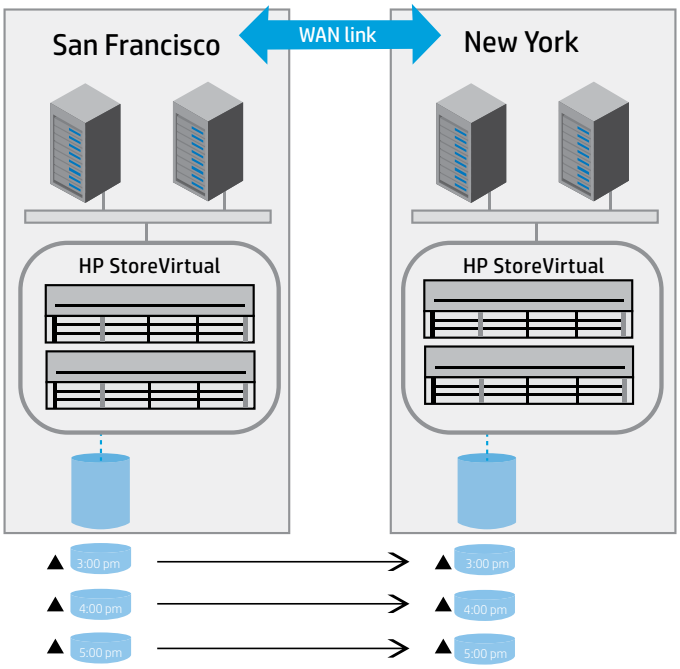
- Virtually any backup software can access the snapshots, including products that update backup times in the volume itself.
- Snapshots can be mounted read/write, and you can work with the snapshot without affecting the live volume.
- Application-managed snapshots for VMware and VSS-aware applications can be scheduled within the HP StoreVirtual console for automated application quiescing.
- Use HP StoreVirtual Storage for fast restores; retrieve a previous version of a file, or recover an entire volume instantly.

Remote Copy—recover your data with minimal disruption

LeftHand Remote Copy functionality lets you replicate thin-provisioned snapshots between primary and remote locations. Because the remote copies are thin-provisioned, no space reservation at the remote location is required. Remote Copy is used for centralized backup and disaster recovery and can be set up on a per-volume basis. Placing your remote copies on a recurring schedule lets you achieve point-in-time asynchronous replication of the data between locations, sites, or data centers.

A failover/failback wizard is also included with Remote Copy for step-by-step, easy-to-execute DR procedures when needed most.

Figure 4.
LeftHand Remote Copy functionality uses space-efficient snapshots to create consistent, point-in-time remote copies for backup and disaster recovery.



- HP StoreVirtual creates a snapshot of the volume.
- The snapshot is copied to the remote cluster. Watermarks prevent confusion.
- Asynchronous replication schedules send only the changed blocks to the remote site. Different retention policies enable you to save recent copies or a history of copies for recovery.
- Remote volumes can be promoted for DR or simple backup.

Integrated HA and DR

Both synchronous and asynchronous replication is integrated—at no additional cost—with HP StoreVirtual and can be set for each volume individually. HP StoreVirtual strikes the perfect balance of storage high availability and capacity utilization. With synchronous replication to support high availability as well as asynchronous replication to support DR, HP StoreVirtual enables you to implement cost-effective HA and DR solutions.

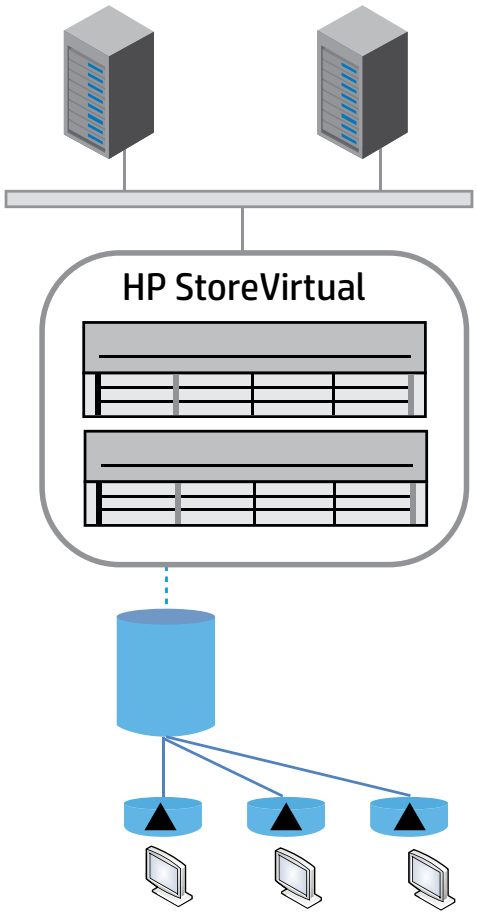
HP StoreVirtual incorporates HA to provide data availability above and beyond a single storage node. High availability is implemented with Network RAID, a synchronous replication technique that is completely transparent to application servers. Failover and failback are automatic and transparent, with the cluster maintaining a consistent logical volume state at all times.

Asynchronous replication is implemented as Remote Copy with a series of scheduled snapshots which are replicated to another site. HP StoreVirtual understands the relationship of any given snapshot to the sync point. Thus, to accomplish asynchronous replication, HP StoreVirtual only copies the blocks that have changed since the last copy. Asynchronous replication is integrated with HP StoreVirtual's snapshot mechanism, so you don't have to worry about write ordering should a failure occur while a remote copy is in progress. Each remote copy is exactly the same as its source snapshot.

Intelligent bandwidth management

You probably do not have infinite bandwidth between your sites, and Remote Copy helps you to intelligently manage and share your network resources so that you can support asynchronous replication while maintaining quality of service levels for the rest of your network traffic. HP StoreVirtual lets you physically move your initial volume copy via various transportable media types to your remote location, which saves you from transferring terabytes of data over the network. HP StoreVirtual can also monitor and adapt to changing network conditions for bandwidth and latency, throttling the data transfer accordingly.

Figure 5.
LeftHand SmartClone Technology makes space-efficient volume copies instantly for use by virtual machines and physical servers.



SmartClone Technology—instant, space-efficient volume clones

LeftHand SmartClone Technology instantly provides clones of volumes and data sets without requiring additional storage space. Each volume clone is a virtual copy that enables you to save time and space in a variety of environments and applications, including server and desktop provisioning, boot-from-SAN provisioning, and rapid copying of production data into test and development environments.

LeftHand SmartClone Technology essentially breaks down the cost and technology barriers to using virtualization. For example, copies of existing virtual machines can be used to scale existing applications by adding identical server instances, to create virtual desktop systems based on "golden master" images, and to create test and development environments based on existing production systems. Making new virtual server instances is easy, but most traditional storage arrays require the time and space consuming process of copying existing logical volumes for use by the new virtual machines. LeftHand SmartClone Technology changes that, letting you make as many volume copies as you need—all in an instant, and with minimal use of storage. This is possible because:

- Volume clones are based on an original source volume so they are space-efficient and instantaneous.
- Clones can be accessed from physical servers, virtual servers, and virtual desktops.
- LeftHand SmartClone Technology is a space efficient copy of server and desktop images—so there is only one copy of operating system files on the storage cluster, which helps raise storage utilization and increases the return on storage investments.
- Cloned volumes are thin-provisioned, allocating only the storage you actually use, when you use it, increasing your storage ROI.

Everyday storage operations are simple and worry-free

The entire storage environment is managed from the HP StoreVirtual Centralized Management Console (CMC). An administrator simply connects via the IP network to the HP StoreVirtual nodes. Multiple data centers and storage sites can be managed from a "single pane of glass"— no matter where the nodes are physically located. The CMC also includes an integrated performance management system, providing you with detailed, real-time metrics and the ability to export statistics. All of the HP StoreVirtual features are managed from the CMC.

A single point of management

The CMC lets you configure, manage, and monitor your HP StoreVirtual Storage easily, making everyday operations simple and worry-free. Part of what makes managing HP StoreVirtual simple is the superior architecture, which lets you scale storage, change a volume's Network RAID level, or migrate volumes between storage tiers without taking applications offline. The CMC simplifies access to all array features on all HP StoreVirtual Storage, whether local or remote.

Everyday administration is efficient and easy. When you need to change attributes of a volume, such as its size, its Network RAID level, its location, or whether it is thin or fully provisioned, the CMC puts these management tasks just a click of the mouse away. When you need to do something more complex, such as failing back to an original volume after a failover to a remote site, wizards and tools take the guesswork out of operations where time and accuracy are critical.

Storage virtualization at remote offices

Virtualization enables small or remote offices to do more with less by using a smaller number of servers to support the applications they need. The cost of deploying a physical storage system in a remote office is often prohibitive. HP StoreVirtual VSA (Virtual Storage Appliance) Software provides a low-cost, virtual solution that utilizes a server's storage capacity in branch offices as well as central data centers.

Small sites and remote offices can enable high availability and cut costs by turning a server's internal drives into shared storage. Additionally, VSA can repurpose unused iSCSI and FC SANs. As an appliance running as a virtual machine, the VSA converts existing DAS and SAN storage into HP StoreVirtual storage that can be clustered and managed just like a physical HP StoreVirtual Storage node. Not only does it provide a cost-effective way to deploy shared storage in remote offices, but it also allows you to do more with the storage you already have.

Why HP StoreVirtual Storage?

Virtualization opens up a new range of possibilities for data centers such as the economies of server consolidation, higher server utilization, and high availability and DR. HP StoreVirtual represents shared, highly scalable and highly available storage, perfectly matched to virtual server environments. HP StoreVirtual helps you drive down costs by increasing storage utilization. It helps you work within your budget constraints by allowing you to purchase storage only when you need it, not months or years in advance. With HP StoreVirtual, every storage node adds capacity and performance, making the most of your storage investments and avoiding the bottlenecks of traditional, monolithic storage arrays. Built-in HA and DR features enhance server virtualization capabilities to deliver better business continuity—without disruption. The ease of management HP StoreVirtual provides means that both server and storage administrators can manage the storage environment.

Service and support

HP Factory Express

HP Factory Express is designed to help you get a better return on your IT investment by providing customization, integration, and deployment services along with your storage and server purchases. It provides predictable, trusted, and tested IT solutions tailored to your business needs. We allow you to customize hardware to your exact specifications in the factory—helping to speed up deployment and free up internal resources. Visit **hp.com/go/factoryexpress**.

Technical training

Consider education as an integral part of your strategy to get a first-rate ROI for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving, and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to onsite training customized to your needs or online. Visit **hp.com/learn/storage** for more information.

HP Financial Services

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HP Services

Tap into the HP support services advantage, backed by the strategic and technical know-how of our consulting experts—for a single source solution that makes the most of your investments. Depending on your individual support requirements, choose from three levels of care that cover the entire lifecycle to better address your needs:

Support:

Optimized Care, for best performance and stability:

Support: Proactive Care 24x7; Plus, 20 credits/year

Additional Options:

- **3-year HP Storage Proactive Care Personalized Support**
- **3-year HP Storage Personalized Support, additional day service**
- **3-year Proactive Select 30 Credit Service**

Standard Care, for maintaining high level of uptime:

Support: HP Proactive Care 24x7; Plus, 10 credits/year

Additional options:

- **3-year HP Storage Proactive Care Personalized Support**
- **3-year HP Storage Personalized Support, Additional Day Service**
- **3-year Proactive Select 30 Credit Service**

Basic Care, for minimum recommended support:

Support: HP Support Plus 24; Plus, 10 HP Proactive Select credits per year

Additional options:

- **3-year HP Proactive Select 30 Credit Service**
- **1-year HP Proactive Select 10 Credit Service**

Implementation:

- **HP Installation and Startup Service for P4000 SAN Solutions**
- **HP StoreVirtual 4000 Storage Installation and Startup Service**
- **HP StoreVirtual VSA Software Installation and Startup Service**
- **HP P4800 G2 SAN Solution for BladeSystem Installation and Startup Services**
- **HP P4000 SAN/iQ Central Management Console Installation and Startup Service**

Integration

- **HP Proactive Select**

Consulting

- **Storage Efficiency Analysis (SEA)**
- **Storage Impact Analysis**
- **Storage Modernization**
- **HP Storage Data Migration Services**

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Learn more

To understand how HP StoreVirtual 4000 Storage can help reduce the cost of storing and managing data, while increasing data protection and availability, visit **hp.com/go/StoreVirtual**.

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