Higher levels of application availability for your business

In order to keep the corporate wheels turning, companies like yours rely on applications ranging from enterprise resource planning to payroll systems and external-facing applications designed for everything from selling products to automating the supply chain. Downtime for any of these business-critical applications could be catastrophic. Top-of-mind causes of failure include fire and natural disasters such as floods, tornades, and hurricanes. Less top-of-mind, but perhaps more common, are the failures that don’t count as a true disaster. A fire in another part of the building can cause smoke and water damage in even the most well-protected data centers. Human errors can range from throwing the wrong circuit breaker to an accidental discharge of fire-suppression material. When a failure occurs, its scope can range from a system to a rack to an entire site.

Traditional high-availability solutions are costly, hard to implement, and difficult to manage. By reducing implementation cost and complexity, server virtualization delivers substantial relief to organizations searching for high availability and fault tolerant solutions. For complete application availability, however, your server virtualization needs to be combined with a highly available shared storage infrastructure. HP has innovative storage solutions that, when combined with VMware® vSphere™, allow you to slash planned and unplanned downtime to deliver the highest levels of application availability.

HP Storage Virtualization with VMware vSphere

VMware vSphere—VMware vSphere builds important application availability capabilities into your data center infrastructure, capabilities transparent to operating systems and applications running in virtual machines. You can easily configure these features to be used by all the virtual machines on a physical host, reducing the cost and complexity of providing higher availability. Key high-availability capabilities include the following:

- VMware Fault Tolerance (FT) features zero downtime, zero data loss, and continuous availability in the face of server hardware failures for any application running in a virtual machine.
- VMware High Availability (HA) ensures rapid, automated restart of virtual machines. VMware HA automatically and intelligently restarts affected virtual machines on production servers.

HP StorageWorks—For small and midsize businesses, the HP StorageWorks P4000 G2 SAN and P4000 Virtual SAN Appliance Software eliminate single points of failure across the SAN with an innovative approach to application data availability in VMware deployments. This solution reduces risk without driving up costs.

For enterprise firms, the SAN Virtualization Services Platform (SVSP) with HP Enterprise Virtual Arrays (EVAs) enables high scalability, top performance, and high availability of all SAN resources.

HP has additional NAS and SAN solutions certified and integrated with VMware vSphere. These have high-availability features such as active/active controllers, dual-ported drives, redundant hardware components, and storage replication software.
## Solutions to meet small, medium, and enterprise business needs

This illustration shows a typical small office solution, which includes three servers, VMware Essentials Plus software, and HP P4000 Virtual SAN Appliance (VSA) Software.

<table>
<thead>
<tr>
<th>App</th>
<th>App</th>
<th>App</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>OS</td>
<td>OS</td>
</tr>
</tbody>
</table>

---

**HP P4000 VSA**

**VMware vSphere Essentials Plus**

**Windows Server**

**Failover Manager**

---

**Small office deployments**—The HP P4000 Virtual SAN Appliance (VSA) Software with VMware vSphere Essentials Plus provides the features for maintaining business continuity in the face of hardware failures and data loss—at a small-office price point. This solution, designed exclusively for small-office deployments, implements virtual server high availability without requiring the costs and complexity of separate external shared-storage devices. At the same time, it delivers the performance and reliability of the VMware platform. You can maintain application and data availability despite drive failures and server failures. In addition, you can easily move applications with the optional VMware VMotion™ to minimize scheduled downtime.

---

**Midsize businesses**—HP P4000 G2 SAN technology delivers efficient, cost-effective storage optimized for virtualized computing environments. In the HP P4000 G2 SAN, Network RAID stripes and protects multiple copies of data across a cluster of storage nodes, eliminating any single point of failure. In the event of failure of a disk, controller, storage node, power, network, or site, VMware virtual machines (VMs) running on VMware vSphere have continuous data availability. The P4000 combined with VMware HA and/or VMware FT delivers the ultimate in application availability. It is also simple to implement and cost-effective, with no additional software to purchase. The P4000 Multi-Site SAN also gives you the ability to stretch a VMware vSphere cluster across two sites to provide full fault tolerance and built-in zero downtime between the two sites.

---

### HP P4000 G2 Multi-site SAN and VMware High Availability and Fault Tolerance across two locations

![Diagram showing a typical small office solution with HP P4000 Virtual SAN Appliance (VSA) and VMware vSphere Essentials Plus software.](image)

- **Site 1**
  - VMware ESX
  - VMware Management Console (vCenter)
  - HP P4000 VSA

- **Site 2**
  - VMware ESX
  - VMware Management Console (CMC)
  - Failover Manager

---

- **1GB switch**
- **Low latency link**
- **VMware highly available server infrastructure**
- **Single volumes "stretched" across two locations**
Enterprise solution using SAN Virtualization Services Platform (SVSP), HP Enterprise Virtual Arrays (EVAs), and HP Continuous Access synchronous mirroring

Enterprises—For enterprise firms experiencing significant storage growth, the HP StorageWorks SAN Virtualization Services Platform (SVSP) is a network-based virtualization application that helps you improve efficiency, simplify operations, and lower the total cost of ownership (TCO) by enabling the pooling and sharing of storage resources such as the HP Enterprise Virtual Arrays (EVAs). The SVSP mirrors data between arrays using SVSP Continuous Access for a complete disaster-tolerant storage solution that guarantees data integrity in the event of a storage system or site failure. The SVSP provides transparent storage failover for VMs in support of VMware HA and VMware FT to minimize or eliminate unplanned downtime. Both campus and metropolitan area disaster-tolerant solutions are available.

How HP High Availability Solutions with VMware vSphere enhance your business

- Provide higher availability independent of hardware, operating system, and applications
- Deliver continuous application data availability in the event of server, disk, controller, storage node, power, network, or site failure
- Reduce the cost and complexity associated with highly available IT and make the most of existing resources
- Leverage multiple data centers or campus environments by enabling VMware VMotion, HA, or FT over distances

Tested, proven solutions simplify deployment

As a VMware Global Technology Alliance Partner, HP engineering teams work closely with VMware engineering teams to certify, integrate, and validate HP StorageWorks with VMware technologies and solutions. HP teams produce a wealth of VMware-specific best practices guides, reference architectures, technical white papers, and solution blocks to eliminate risk and cut your time and effort needed to deploy HP and VMware solutions. Many of these documents cover not only storage, but the server, networking, and application aspects of the solution, providing the breadth of information you need to quickly and easily deploy a complete converged infrastructure consisting of servers, storage, networking, and software based on HP and VMware technologies.
HP and VMware High Availability Solutions in action

University of Paderborn
“They brought up the storage servers at the new location, and the machines immediately found each other. The cluster was still intact, but now extended across two data centers, providing full redundancy and resulting higher availability. That was a clear demonstration of the reliable, flexible, robust architecture of the P4000 SAN. Setting up a cluster can be a lot of work with other vendors. With the P4000 SAN it was easy.”

Our Lady of the Lake University
Now, instead of taking days or weeks to fully recover services following a major disaster, it will take just minutes in most cases. “All of our virtual machines are on clustered blade servers at two physically separate sites, sharing clustered SAN storage,” Hoberer says. “If some of those hosts or an entire site disappears from the network, the load gets automatically shifted to the other site. So we really expect recovery within a matter of minutes.”

Bridgnorth Aluminum
The new solution has brought significant financial and operational benefits for Bridgnorth with increased performance and high data availability supported by close integration between HP StorageWorks Continuous Access and VMware.

For more information
HP and VMware have tested, validated, and documented our joint solutions. To learn more about HP and VMware high availability or other solutions, please contact your HP sales representative or Channel Partner, or visit:
www.hp.com/go/vmware