

Data availability without limits

For mission- and business-critical applications and data





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The idea economy is always on

In the idea economy, “always-on” is a requirement for most businesses. With more applications being identified as mission- or business-critical, data protection and availability are more important than ever.

In this white paper, you'll learn about the requirements driving the need for increased availability, less complexity and improved reliability. Then you'll see how Veeam software and Hewlett Packard Enterprise solutions can help you meet your availability objectives, future-proof your data center investment, and gain capabilities that provide data protection without limits to meet your always-on business needs. You'll also see examples of how other organizations have used these technologies to attain mission-critical application availability, meeting recovery time objectives (RTOs) and recovery point objectives (RPOs), and providing fast, reliable disaster recovery capabilities for their modern data centers.

Always-on business

Today, globalization has become the norm. The explosion of mobile device usage and Internet access now requires your website to be constantly available. Additionally, employees need 24/7 access to corporate resources. These types of requirements drive the need for increased levels of availability and recoverability for your business services.

Downtime can be extremely costly. A recent Gartner study revealed that the average cost of downtime for a business is \$5600 per minute, which is roughly \$300,000 per hour.¹ That particular study was an average across all businesses. For many organizations, it can be much more. For instance, according to Forbes.com, a 30-minute outage for Amazon in 2013 cost the company an estimated \$3 million in lost revenue.²

It's important to understand that downtime isn't just the time that a given resource is unavailable. True, downtime must be counted as the time that users are unable to access the applications and resources they need. But loss of revenue and operational capabilities are only part of the costs. Downtime can also result in lost customer confidence, damaged reputation, employee productivity losses, and reduced confidence in IT. Outside of the organization, there might be financial impact to partners. The bottom line is that any amount of downtime equals lost business.

System failure is inevitable. The modern data center is comprised of many components, leading to significant complexity. To ensure application availability, you need to build in availability technologies, including data protection strategies, as you build out your infrastructure. Hewlett Packard Enterprise and Veeam help you ensure your application availability, meet your backup and restore objectives, and take advantage of reliable, high-speed disaster recovery capabilities.

Downtime can strike any time

There are many causes of downtime. Some are technical, but others are not. Some of the leading causes of downtime are:

- Hardware failure
- Software failure
- Operations errors
- User errors
- Natural disasters

¹ Blog, “[The Cost of Downtime](#),” Gartner, July 2014

² “[Amazon.com Goes Down, Loses \\$66,240 Per Minute](#),” Forbes, August, 2013



Meeting your data protection goals

Companies have turned to virtualization in order to improve efficiency, increase workload performance, and enhance business continuity. These changes have driven the need for less complicated solutions. Companies are executing on their digital transformation strategies to meet customer and business needs.

Improving availability, backup, and recovery are at the core of all enterprise data protection strategies. Today's virtual environments present new challenges for protecting and recovering data. Legacy backup tools were built with physical servers in mind, which can cause long backup cycles, performance constraints, and limited recovery capabilities in a virtual environment. Due to the limitations of legacy backup tools for virtual environments, companies are turning to solutions that are purpose-built for virtual environments to protect their virtual machines (VMs).

One key factor is that legacy backup tools typically rely on agents running inside the VM to accomplish backup and recovery operations. These agents, running inside VMs, can create resource problems. They use guest CPU cycles and consume network bandwidth and memory. Agents also add to the complexity of maintaining software, and increase support costs. Plus, agent-based technology doesn't work at all when VMs are powered off, unavailable, or newly provisioned. Adding further to this, more organizations are using multiple hypervisors, and in many cases each hypervisor utilizes a different backup solution, resulting in increased management demands.

Veeam uses agentless technology that is designed from the ground up to protect VMs. Veeam's integration with HPE storage solutions lets you create application-consistent backups from HPE 3PAR StoreServ and StoreVirtual snapshots for fast and efficient data protection. Figure 1 shows an overview of how Veeam can work with HPE 3PAR StoreServ, StoreVirtual, StoreOnce, and StoreEver products to provide a complete data protection strategy with improved availability.

In the overview you can see how the combination of Veeam and HPE storage technologies provide a comprehensive strategy for achieving any recovery and retention requirements. For long-term external storage, HPE StoreOnce provides deduplication for efficient storage utilization and fault isolation for data. StoreOnce can copy backups to StoreEver tape storage or to the cloud for long-term off-site data archival. This strategy enables you to meet the “3-2-1 rule” of data protection where there are three copies of the data, on two different media types, and one copy is kept offsite. This strategy also allows for more than 50 recovery capabilities in 15 minutes or less.

HPE 3PAR StoreServ and StoreVirtual storage arrays can take fast, frequent snapshots of VMware volumes without impacting production workloads. The HPE 3PAR StoreServ can take snapshots as frequently as every 15 minutes, while StoreVirtual can take snapshots every 30 minutes. In Figure 2 you can see an example of storage snapshots being taken as frequently as once an hour during peak business hours. With Veeam’s integration with HPE Storage you can leverage snapshots with the integration of Veeam’s Explorer for Storage Snapshots. You can now recover instantly from any one of the snapshots in minutes, reducing downtime and providing improved workload availability for any application.

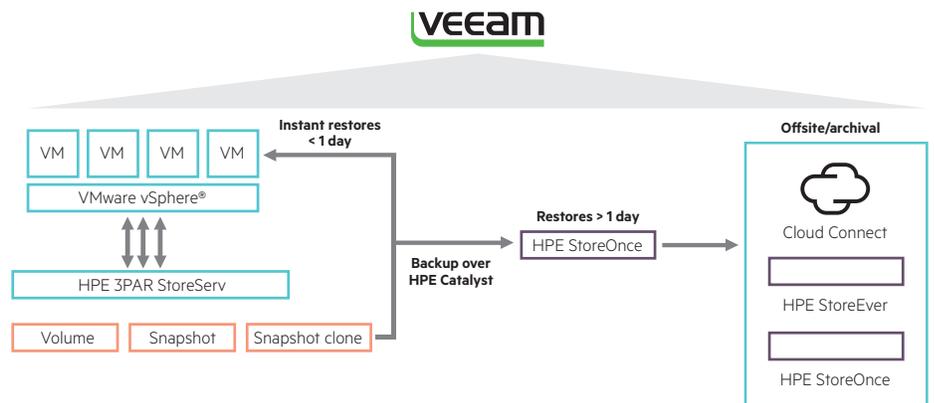


Figure 1: Veeam and HPE storage enable 3-2-1 data protection

HPE 3PAR StoreServ and StoreVirtual snapshots and Veeam radically improve RPOs by providing multiple up-to-date recovery points. Veeam’s integration with HPE 3PAR StoreServ and StoreVirtual snapshots allows you to recover your VMs and data directly from these frequent snapshots, thus minimizing any possible data loss and ensuring your data is as up-to-date as possible. Veeam Explorer for Storage Snapshots provides visibility directly into the HPE 3PAR StoreServ/StoreVirtual snapshots, enabling granular recovery of entire VMs with instant VM Recovery or the recovery of individual guest operating system files and application items. Veeam Explorer for Storage Snapshots with HPE 3PAR StoreServ and HPE StoreVirtual storage can shorten both RPOs and RTOs to less than 15 minutes and enable you to recover data quickly from snapshots that could be just minutes old. This also enables you to implement a near-continuous data protection strategy without additional cost or complexity, thereby ensuring availability for all applications.

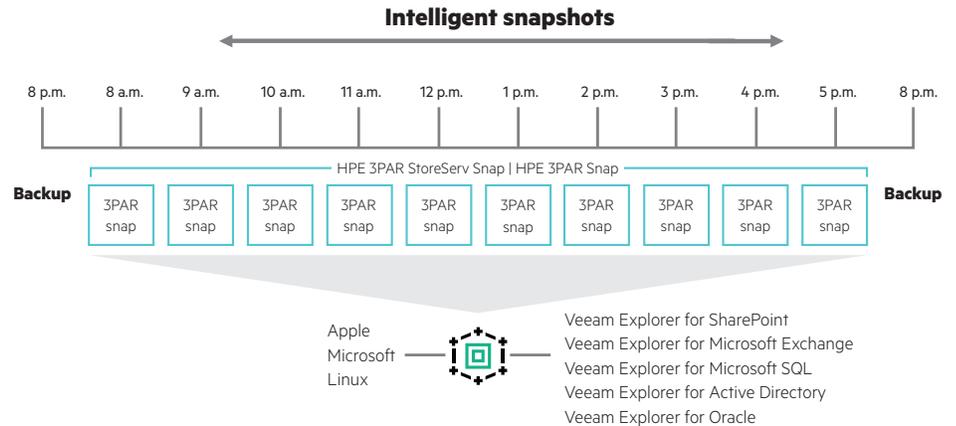


Figure 2: Using HPE 3PAR StoreServ or StoreVirtual snapshots with Veeam Backup & Replication

Veeam Backup & Replication also has the ability to back up from storage snapshots where the Veeam backup proxy server can mount storage snapshots directly. This capability enables fast, non-disruptive image-level backups by cutting down the need for VMware VM snapshots. This capability, while not new to the industry, is 20 times faster than the competition due to the use of VMware’s Changed Block Tracking (CBT).³ If you have multiple backup proxy servers, Veeam uses automatic load-balancing to choose the backup proxy server that will best execute a VM backup—each time the backup job runs. The automatic load-balancing detects which backup proxy server has a combination of the best datastore connectivity and the lowest current task load. Together, these and other Veeam technologies can drastically decrease your backup window.

Veeam Backup & Replication is also integrated with HPE StoreOnce Catalyst and provides faster backups and recovery. HPE StoreOnce is a highly efficient deduplication solution that can increase a system’s backup capacity by almost 95 percent.⁴ This allows a greater number of backup images to be stored on disk, providing more recovery points and faster restores from backups. HPE StoreOnce’s variable length deduplication provides a fine grained deduplication capability that increases the overall storage efficiency of backups and reduces costs. HPE StoreOnce allows you to deduplicate across Veeam backup jobs, further improving deduplication efficiency. HPE StoreOnce is available in multiple form factors and ranges in capacities from 5.5 TB all the way to the HPE StoreOnce 6500 which scales from 120 TB raw (72 TB usable) to 2240 TB raw (1728 TB usable). The HPE StoreOnce scale-out architecture allows you to add nodes to match your data growth. HPE StoreOnce supports in-flight encryption using IPsec and at-rest encryption using industry standard AES 256-bit encryption. HPE StoreOnce also delivers centralized system recovery for virtual or physical servers (from p2v or v2p) from a single backup. HPE also offers StoreOnce VSA, a standalone software solution, but it can be integrated into HPE’s Backup Appliance series running on any existing x86 server, turning it into a deduplication target that is ideal for small remote offices.

⁴ As compared to a fully hydrated backup. See StoreOnce Get Protected Guarantee Program

Approximately

60%

of Gatwick's IT infrastructure is virtualized on VMware vSphere—250 virtual machines with 38 TB of backup data.

Gatwick Airport

Gatwick Airport deployed Veeam with its HPE 3PAR and StoreOnce equipment to get the most out of its IT resources and provide comprehensive availability solution to meet the needs of the airport.

An aircraft takes off or lands nearly every minute during peak times at Gatwick Airport. Any significant IT failure can lead to downtime, data loss and passenger delays, which can be costly to the airport, airlines and onsite business partners and lead to negative media coverage.

IT plays a role in almost every airport operation including passenger check-in, security, flight information screens, baggage sorting, gate wayfinding, and baggage carousels. Airport processes and workflows are supported by more than 25 mission-critical systems such as security, identity management, Airport Operational Database (AODB) and an enterprise service bus (ESB). These systems are often rooted in niche and bespoke applications as well as pervasive back-office applications including Oracle, Microsoft SQL Server, Active Directory, SharePoint, and Exchange. Approximately 60% of Gatwick's IT infrastructure is virtualized on VMware vSphere—250 virtual machines with 38 TB of backup data. More of the infrastructure will be virtualized, but several legacy applications will not be virtualized in the short term.

Veeam Backup & Replication helps Gatwick maintain resilience in its virtualized environment and avoid the risk of downtime, data loss, passenger delays, needless costs, and negative publicity.

"Veeam plays a key role in our high availability strategy by enabling rapid backup and recovery of critical virtualized systems," said Sherif Darwish, Head of IT Infrastructure. "If one of our VMs fails, we can restore it instantly with Veeam to become resilient again."

Another way Gatwick can restore quickly is with Veeam Explorer for Storage Snapshots. Application items, guest files, and entire VMs can be recovered from HPE storage snapshots in minutes. Veeam Software and HPE worked closely to leverage the integration of storage snapshots for recovery to ensure 24/7/365 availability.

To learn more about how Gatwick Airport uses Veeam and Hewlett Packard Enterprise technologies to meet its application availability requirements read the success story

[Gatwick Airport Takes Off Toward High Availability with Veeam](#)

"Veeam proved its value a second time when one of our critical VMs became inoperable after a change. The issue hadn't been identified during testing, and it was initially unclear why the change had caused an outage. Had this situation persisted, it could have caused an airport disruption and a reputational knock. However, Veeam restored the VM quickly, and we placed it back in service."

– Sherif Darwish, Head of IT Infrastructure, Gatwick Airport

Increasing application availability

Availability starts with choosing a primary storage platform that provides the levels of high availability and performance that your business-critical applications require. HPE 3PAR StoreServ provides a proven, highly available, Tier-1 architecture common across midrange, all-flash, and high-end storage array models. HPE 3PAR StoreServ offers the only six-nines (99.9999) guaranteed availability program in the storage market.⁵ Using HPE's new four-node or larger HPE 3PAR StoreServ 20000, 8400, or All-Flash 8450 storage system will provide a storage system with the availability required for your most critical business data.

HPE 3PAR Persistent Cache eliminates any performance impacts that might be caused by a node outage. Plus, the HPE 3PAR StoreServ eliminates all active single points of failure by using completely redundant components and power paths. Clustering allows each volume to be active on all nodes at all times. For proactive maintenance, the HPE 3PAR StoreServ implements a dedicated service processor with phone-home capabilities that can notify you and HPE support of system alerts, enabling you to address any potential issues or errors.

HPE 3PAR Virtual Copy Software enables you to take instant point-in-time copies of your data volumes with little or no impact to your applications, providing a built-in solution for storage as well as resource efficient, volume-level protection and roll back for data that reside on the HPE 3PAR StoreServ array.

The tight integration of HPE storage solutions and Veeam brings improved business continuity and better application availability. Veeam Backup & Replication enables VMs to be backed up to disk for fast recovery, and copied to low-cost storage media like HPE StoreOnce for long-term retention. Using Veeam Backup & Replication in conjunction with HPE 3PAR StoreServ or StoreVirtual snapshots lets you recover VMs in minutes using Veeam's Instant VM Recovery from Storage Snapshots. Using Veeam with HPE snapshots allows far faster backup and recovery than traditional snapshot technologies. For instance, while hypervisor-based snapshots don't require any special hardware integration with the storage platform, they negatively impact VM and application performance. Likewise, recovery from standard SAN-based snapshots is a time-consuming process requiring multiple manual steps. With volume-level snapshot technology, the snapshot must first be promoted to a volume, then mounted to a host, and then the process of recovering the VM or data can begin. Once the recovery is complete, the snapshot mounting process must be undone to clean up. Veeam, in combination with HPE 3PAR StoreServ and StoreVirtual snapshots, provides intelligence to the storage snapshot allowing for streamlined, efficient, and fast granular recovery of VMs, guest OS files and application items directly from those HPE snapshots. The resulting high performance and low overhead of leveraging storage snapshots enables you to create more frequent restore points and increases granular protection. This, in combination with the rapid recovery capabilities, improves your RTO, minimizing downtime.

Veeam's Instant VM Recovery enables you to quickly restore a VM from a storage snapshot to production, reducing recovery time and improving application availability. Once the VM is restored, VMware vSphere® Storage vMotion®, or Veeam Quick Migration can be used to migrate from the storage snapshot to production volume. Figure 3 shows an example of initiating Instant VM Recovery using HPE 3PAR StoreServ snapshots.

⁵ Qualification for the [HPE 3PAR Get 6-Nines Guarantee Program](#) is subject to your compliance with the Get 6-Nines Guarantee Terms and Conditions, which will be provided by your HPE Sales or Channel Partner representative.

The HPE 3PAR StoreServ Management Console is shown on the right side of Figure 3, and the available snapshots are listed under the Virtual Volumes tab. The Veeam management console shown on the left side of the figure lets you easily recover VMs with just a few clicks. In Figure 3, you can see how Veeam is able to intelligently display the contents of the Pro_R5_S3_13 snapshot. To recover a VM or its contents you select the snapshot that you want to use and then select the VM that you want to recover. The context menu provides options for Instant VM Recovery, restore application items, and allows for guest OS files restore. Instant VM Recovery will restore the entire VM and another window will prompt you for recovery point-in-time and destination. The Restore application items option will start one of the Veeam Explorers that are covered in the following section.

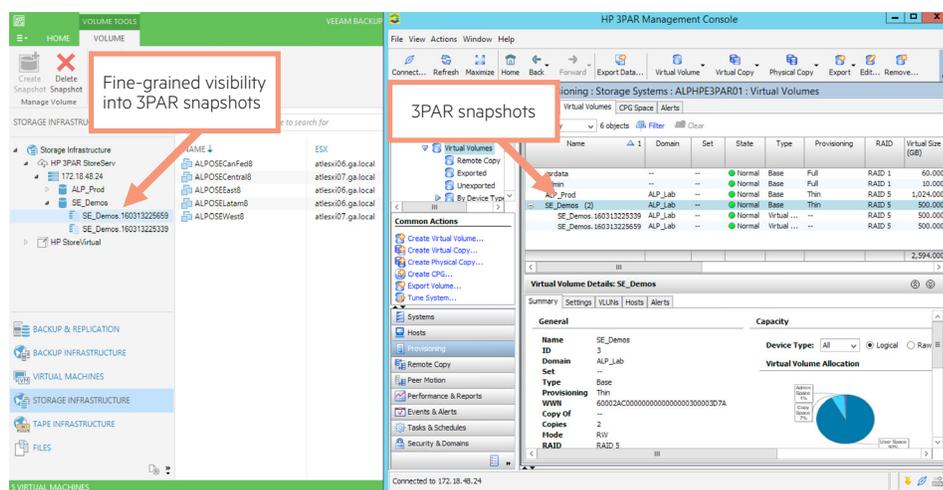


Figure 3: Running a recovery using Veeam

Veeam enables you to perform granular restore options from backups or directly from storage snapshots using Veeam Explorer for Storage Snapshots. Veeam Explorer lets you browse and search the contents of Veeam backup files, then optionally restore VMs, individual files, and the following application items:

- **Veeam Explorer for Microsoft Active Directory**—Search for and restore all Active Directory object types, including users, groups, computer accounts, and contacts. You can also restore user and computer passwords.
- **Veeam Explorer for Microsoft Exchange**—View Exchange Server 2010 and 2013 backups. The Explorer provides advanced search capabilities and quick recovery of individual Exchange items, including individual email messages, contacts, and notes.
- **Veeam Explorer for Microsoft SQL Server**—Accomplish fast, transaction-level recovery of SQL Server databases. You can restore your SQL Server databases to a precise point in time using agentless transaction-log backup and replay.
- **Veeam Explorer for Microsoft SharePoint**—Browse SharePoint 2010 and 2013 backups. You can search for specific SharePoint files and quickly recover items to their original SharePoint server, or you can send them as email attachments.
- **Veeam Explorer for Oracle**—Accomplish fast transaction-level recovery of Oracle databases. You can restore your Oracle databases to a precise point in time using agentless transaction-log backup and replay.

Vodafone ensures application availability with Veeam and HPE StoreVirtual

Vodafone Netherlands operates in a dynamic and competitive environment that requires fast response to their customers' evolving requirements. Vodafone has hundreds of VMs spread across multiple data centers in the Netherlands. These VMs run Microsoft SQL Server, Oracle, SAP, Zend Server, and a proprietary back-office portal and service navigator. Vodafone uses HPE ProLiant servers and HPE StoreVirtual Virtual Storage Appliance storage.

“We needed the best data protection for our production environment, and Veeam offers frequent and reliable backup, storage integration, a smaller storage footprint, high-speed recovery, replication for failover, and improved monitoring and reporting. We didn't have to make any hardware investments, and Veeam integrates seamlessly with HPE StoreVirtual.”

— Nikola Stojanovski, Technical Specialist, Vodafone

Vodafone requires 24/7 availability. The company uses Veeam to ensure the high availability of its virtualized applications and data by backing up its VMs from HPE StoreVirtual snapshots. Backing up from StoreVirtual snapshots has little to no impact on production VMs. Many Veeam customers take backups from snapshots every 30 minutes to improve their RPOs. To meet their RTOs Vodafone uses Veeam Explorer for Storage Snapshots to recover VMs, files, and application items. Vodafone reduced its backup storage footprint by two and a half times

by combining deduplication and data compression in Veeam with deduplication in Microsoft Windows Server 2012 R2. Veeam Availability Suite provides 80% faster backup and recovery is five times faster than the older legacy backup tool.

To learn more about how Vodafone uses Veeam and HPE to meet its application availability requirements read the success story [**Veeam Helps Vodafone Netherlands Ensure 24x7 Availability of Telecommunication Services**](#).

Reliable, streamlined disaster recovery

Disaster recovery is another vital component of an enterprise data protection plan. Businesses need the ability to replicate their data to multiple sites using multiple media types. Those sites might be dedicated disaster recovery sites, other regional offices, or the cloud, using Veeam's Cloud Connect network of partners. Veeam Backup & Replication includes the built-in ability to provide near-continuous data protection (near-CDP) for your VMs, providing offsite disaster recovery for your virtual environment. Veeam's Backup & Replication provides you with a copy of your VMs in a ready-to-start state. If one or more VMs go down, you can immediately fail over to the replica VMs with a failover plan that powers on replica VMs in an order that is required for applications—Domain Controller before Exchange Server, for example—and run them from a remote site. Veeam Backup & Replication provides the ability to fail over and fail back. It can synchronize data changes between the replica and the primary VM, and it can perform automated IP readdressing to accommodate different networking configurations at the failover site.

Veeam's SureBackup and SureReplica automatically verify the recoverability of every VM backup and replica. SureBackup automatically starts the saved VMs in an isolated Virtual Lab environment. This capability can be used when there is a non-dedupe landing zone set up for the initial backups. StoreOnce is then used for longer term retention. It then goes on to perform a set of tests, checking for things like the heartbeat, networking, and application status. After the tests are complete, SureBackup sends a status report to your mailbox



indicating the recoverability of all your VM backups. Similarly, SureReplica automatically tests every restore point in every VM replica for recoverability. SureReplica validates VM replica data for consistency, checks the replica configuration, and tests the replica by running it to the required restore point in an isolated Virtual Lab. SureReplica then creates a report detailing the recoverability of all VM replicas. SureBackup and SureReplica make sure that your VMs are recoverable, and they do so automatically.

Veeam's ability to create a virtual lab for HPE storage snapshots, VM backups, and replicas provides an on-demand testing environment that can be leveraged to test application updates and service packs, and perform test and dev tasks, eliminating the need for dedicated hardware. Leveraging Hewlett Packard Enterprise primary storage with Veeam's On-demand sandbox expands storage capability and utilization.

Built-in WAN acceleration utilizes global caching, variable block length data fingerprinting and traffic compression to reduce bandwidth requirements by an order of magnitude and to get VMs offsite up to 50 times faster than transferring raw data. WAN Acceleration requires no changes to existing network infrastructures. Basically, a WAN accelerator works by caching duplicate files (or parts of files) so they can be referenced in the global cache instead of having to be sent across the WAN again. Data sent across the WAN link can be secured with end-to-end AES-256 encryption using a password. Optionally, you can leave local backups unencrypted for faster backup and restore performance, then encrypt backups that are copied to offsite targets or to tape.

For cloud-based backup archival Veeam provides Cloud Connect, a cloud-agnostic Veeam Backup & Replication component that lets ISPs act as cloud repositories that you can use to store your Veeam backups and perform recoveries from. You don't need any additional software, but you do need to find an ISP that offers Veeam Cloud Connect support. You can use Veeam's **Service Provider Lookup** to find ISPs that offer Veeam Cloud Connect repositories.



Veeam and Hewlett Packard Enterprise: partners for the idea economy

In today's modern data center, availability is paramount and data protection must be built into the infrastructure. It's not something that can be added on later. The combination of HPE storage solutions and Veeam data protection software increases your application availability while minimizing disruption and downtime. Veeam and HPE provide more than 50 ways for fast recovery of VMs, files, and other application objects, delivering RPOs and RTOs of less than 15 minutes. Veeam Availability Suite includes Veeam Backup & Replication for enterprise-level data protection and Veeam ONE for monitoring reporting and virtualization management. The Veeam Availability Suite, combined with HPE's efficient and powerful 3PAR StoreServ, StoreVirtual, and StoreOnce, is a solution that provides your business with data protection without limits.

Learn more at

hpe.com/us/en/storage.html

veeam.com/hpe-availability-solution.html



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