



Solution brief: Modernized data protection with Veeam and HP Storage

Modern Data Protection | **#1 VM Backup**
Built for Virtualization

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Executive summary

In this solution brief, HP and Veeam® have teamed up to present an end-to-end storage and data protection solution optimized for virtual environments. Utilizing storage snapshots on HP 3PAR StoreServ and HP StoreVirtual platforms with Veeam Backup & Replication™ and HP StoreOnce backup systems, organizations are able to meet and exceed recovery and restore time objectives (RTOs and RPOs).

The combination of Veeam and HP delivers fast recovery of entire virtual machines (VMs), guest OS files, and granular application items from Microsoft Exchange and SharePoint—directly from HP 3PAR StoreServ and HP StoreVirtual snapshots. This reduces the amount of data at risk by using a combination of storage snapshots and frequent backups to HP StoreOnce and creates a joint solution capable of meeting RPOs of minutes rather than hours. With lower RPOs and RTOs you will be able to minimize downtime, provide better service levels and better protect your virtual environment.

HP and Veeam have extended this integration to performing backups and whole VM replication from HP 3PAR StoreServ and HP StoreVirtual snapshots, mitigating potential performance bottlenecks on VMs and hypervisors caused by traditional hypervisor snapshots, and achieving even tighter RPOs.

Key points

- Recover VMware VMs, guest files or application items in minutes from HP StoreVirtual and HP StoreServ snapshots with little impact on production systems with Veeam Explorer™ for Storage Snapshots (included with all editions of Veeam Backup & Replication).
- Back up vSphere VMs up to 20x faster from HP StoreVirtual and HP StoreServ snapshots with little impact on production VMs with Veeam Backup from Storage Snapshots (included with Veeam Backup & Replication Enterprise Plus Edition).
- HP StoreVirtual and HP StoreServ customers can leverage their existing investment and have the best of both worlds. SAN snapshots have minimal resource overhead, and as a result, can be taken more frequently than backups. This allows administrators to use HP StoreVirtual and HP 3PAR StoreServ for routine, short-term recovery and low RPOs while utilizing Veeam for backup and longer-term retention.

- HP StoreVirtual, HP StoreServ and Veeam save customers money by minimizing data loss and downtime with frequent recovery points and the fastest backup and recovery of entire VM, guest OS files and application items (i.e. Exchange mail messages, contacts, SharePoint items, etc.).
- Implement a complete VM data protection solution that includes VM recovery from HP StoreVirtual and HP StoreServ snapshots; agentless image-level backup to disk, tape and cloud backup storage; plus off-site replication of virtual machines – all from one familiar and easy-to-use Windows interface.
- Store VM backups on HP StoreOnce backup systems that deploy deduplication to reduce the footprint of backup data as much as 95%—delivering cost efficiencies while enabling more recovery points for accelerated restore of VMs from backup images.
- Archive VMs on HP StoreEver LTO-6 tape libraries for safer, reliable and cost-efficient, long-term retention of backup images for compliance or offline/offsite vaulting.

Virtual machine data protection challenges

Today's virtual environments present new challenges for protecting and recovering data. For example, legacy backup methods using agents running inside VMs can create resource contention. In addition to wasting precious CPU cycles, network bandwidth and memory resources, agents add licensing and support costs as well as the added complexity of maintaining additional software. The recovery process when using legacy backup solutions in a virtual environment is also cumbersome and time-consuming.

When using tape as the sole backup storage medium, managing tapes or dealing with the tape loss can lengthen the time it takes to recover a VM, negatively impacting service levels. Restore performance can also suffer when attempting to locate tape-based data, as random reads from tape do not lend themselves to high restore performance. By deploying image-level VM backups to disk first, you can eliminate issues with tape location and backup availability where you need it while simultaneously increasing backup performance. More importantly, image-level backup to disk will shorten the time it takes to recover VMs.

For backup and recovery of virtual machines, the best method of protection is a solution specifically built for virtualization and which uses image-based backups to disk. With HP Storage and Veeam, you can deploy an easy-to-use VM data protection strategy in a matter of hours without “tearing out the plumbing” for backups of physical machines or alternate operating systems (such as HP-UX, AIX and others).

Disk-to-disk backup storage: A step in the right direction

The dramatic decrease of disk prices over the past decade has given rise to disk-to-disk (D2D) backup methodologies where disk-based systems are used for storing backup data. Backing up to disk systems as the first step of a data protection approach provides faster backup and recovery while eliminating the need to perform tape media management as part of the backup process.

Disk storage systems include recovery capabilities that augment backups. Snapshot functionality built into the storage system can capture point-in-time copies of production data at the volume level. A snapshot made via hardware by an HP StoreVirtual or HP 3PAR StoreServ virtual copy is referred to in this brief as either “SAN snapshot” or “storage snapshot,” depending upon the use case. There are tradeoffs in using these volume-level SAN snapshots. SAN snapshots can be created at frequent intervals throughout the day and have a negligible impact on the production workload. SAN snapshots are excellent for rolling back an entire volume to a point in time. However, in virtualized environments, that volume could contain dozens of VMs.

Another important use case of the storage snapshot is to facilitate faster VM backups. With hardware-agnostic backups – e.g., with no snapshot integration at the hardware level—backups are created by reading a snapshot created in software by the hypervisor. While hypervisor-level snapshots don’t require special hardware integration with the storage platform, they can have a negative impact on busy VMs and neighboring VMs on the same storage system, and potentially the hosts themselves. Snapshots taken by the hypervisor can negatively impact VM and application performance during the “commit and stun” operation for VMware environments. This operation merges I/O that was pending while the snapshot was being taken back into the production VM after snapshot removal. This can have a noticeable impact on busy VMs including disruption of applications and it can even cause VMs to become unresponsive.

Veeam Backup from Storage Snapshots utilizes the storage snapshot technology of HP 3PAR StoreServ and HP StoreVirtual arrays to enable increases in backup performance—up to 20 times that of other technologies. This solution relies on vSphere VM snapshots being written to production VMFS volumes on HP 3PAR StoreServ or HP StoreVirtual Storage prior to a storage snapshot being taken. The vSphere VM snapshot is then immediately released after the storage snapshot is taken, after which the data transfer task of the VM backup will begin.

This process is an orchestrated sequence of communication between vSphere, Veeam Backup & Replication and the HP 3PAR StoreServ and StoreVirtual arrays. The first step of this process is a VMware snapshot of all of the VMs to be backed up on a volume is triggered by Veeam Backup & Replication. When the VM snapshots are written to disk by the hypervisor, a storage snapshot is made for a point-in-time copy of the entire volume by the storage system. The VMware snapshot of the VM is then removed. Next, the storage snapshot copy of the VMFS volume is directly read by Veeam as a source for reading VM snapshots and transforming them into backup images. The result is that the hardware-assisted snapshot backup does not disrupt the workload.

Leveraging disk systems for recovery

When it comes to VM recovery, using SAN-based snapshots alone is a time-consuming process with multiple manual steps required. With this volume-level snapshot technology, the snapshot must be promoted to a volume and mounted to a host and then one or more VMs inventoried in vSphere. After these steps are completed the process of recovering the VM can begin. Once the recovery of the VM is complete, the snapshot mounting process must be undone, and so on, in order to clean up. In many cases this same process must be followed just to recover an individual file. This multiple step process lengthens recovery time due to guess work and the margin for error when faced with the duress of an outage.

In addition to the challenges of recovering individual VMs, a snapshot copy of a volume residing on primary production storage is not a substitute for backing up to disk or tape. A catastrophic hardware failure of production storage could result in the loss of the original production volume and its associated snapshot copies. A distinction must be made that snapshot recovery from primary storage is not a substitute for backup to secondary storage.

As part of tiered backup and recovery strategy, backing up VMs to an external datastore is recommended to maintain business continuity and disaster preparedness. However, duplication of information across virtualized datastores drives enormous consumption of backup storage resources and associated capital expenditures. Veeam, when combined with HP StoreOnce backup, delivers a high efficiency deduplication solution to effectively increase the backup capacity of a system by almost 95%. This allows backup images to be stored on disk for long periods providing more recovery points and faster restores of VMs from backups.

A new approach for recovering virtual machines

Developed in conjunction with HP, Veeam Explorer for Storage Snapshots provides granular recovery of VMs, guest OS files and application items from StoreVirtual and StoreServ snapshots in just a few clicks from the easy-to-use Veeam Backup & Replication interface.

The time-consuming process of recovering a VMware VM from a mounted snapshot is reduced to a simple task that takes two minutes, significantly improving RTOs. Since SAN snapshots of production volumes can be taken frequently without disrupting production VMs, administrators can also lower RPOs by recovering from the most recent SAN snapshot instead of last night's backup. With Veeam Explorer for Storage Snapshots, administrators can shorten both RPOs and RTOs when using StoreVirtual and StoreServ Storage and Instant VM Recovery™ from Veeam to deliver improved service levels.

Complete end-to-end data protection for fast and reliable recovery

Fast recovery of a VM (including the files within the VM) is an important piece of the data protection puzzle. A complete solution for virtual environments must also include reliable backups written to separate backup repositories to mitigate the risk of scenarios like theft, geographic disaster or other events leading to catastrophic hardware failure.

By combining HP 3PAR StoreServ and HP StoreVirtual snapshot-assisted backups to HP StoreOnce and recovery from storage snapshots, you can implement a multi-tier backup and recovery strategy. If a VM, file or application object needs to be recovered quickly from the snapshot, it can be accomplished with Veeam Explorer for Storage Snapshots. If the storage snapshot becomes unavailable, VMs can be recovered a number of different ways. Backup images on designated backup storage disk systems, replicated VMs and offsite backups are all recovery options.

Customers can take advantage of Veeam Explorer for Storage Snapshots at no additional cost with any edition of Veeam Backup & Replication. The ability to reduce the overhead of performing backups enabled by Veeam Backup from Storage Snapshots is included in the Enterprise Plus Edition. The advanced features of Veeam Backup & Replication that include scheduled backups to disk, VM replication, and granular recovery of VMs, files and application items from the secondary storage can be activated simply by purchasing a single

host-based license and entering the key. For items or even entire VMs that need to be restored from backup images, HP StoreOnce backup systems enable fast recovery. In most cases, the restore speeds are about 80% of backup speed and that means less time waiting for recovery.

Backup, verification and recovery

A backup solution designed for virtualization is critical when protecting a virtual environment. Veeam's agentless solution delivers efficient backup that does not interfere with the VM. Furthermore, a backup product built specifically for virtualization can natively leverage the storage network (iSCSI or Fibre Channel) to perform VM backups.

The VMs defined in a backup job can take advantage of built-in compression and deduplication to reduce the amount of storage required for disk-based backups. Even in a compressed and deduplicated state, these VMs can be started directly from their backup image on disk with Veeam's patented vPower® technology. Instant VM Recovery can meet an RTO of as little as a few minutes. Depending on the performance of the backup storage, the performance of the recovered VM will be correspondingly slower, but even with reduced performance the ability to restore critical VMs in minutes from backup storage is an indispensable asset to business continuity plans. The Instant VM Recovery task also completes the process by migrating the VM back to production storage using Veeam Quick Migration or Storage vMotion, if available.

To assure that every recovery will succeed when you need it, vPower technology also provides the ability to verify backups using the SureBackup® feature. Available with Veeam Backup & Replication Enterprise and Enterprise Plus Editions, SureBackup automates recovery verification. Virtual machines are automatically started from their backup images while the OS and applications are automatically tested for recoverability. A report is e-mailed at the conclusion of each SureBackup session to highlight the status of the VMs that were verified.

HP StoreOnce Backup repositories

A disk-based repository for VM backup images can be created from local storage directly attached to a server (DAS), Network Attached Storage appliance (NAS), shared SAN storage array or a disk-to-disk (D2D) backup appliance with deduplication. As with any choice in IT, the type of storage deployed as a backup target has tradeoffs including acquisition cost, speed of recovery from backup, the length of backup retention periods and efficient capacity utilization (cost per GB).

HP Storage primary disk arrays like the HP P2000 MSA, HP StoreVirtual and HP StoreServ are typically used to store production data, but can also be deployed as repositories for storing backup images of VMs on a separate set of disks. A primary disk array used in this role can provide higher storage capacity for longer retention of backups.

Backup appliances like the HP StoreOnce Backup System employ data deduplication coupled with relatively low RAID overhead to reduce cost by saving disk space. The result is a purpose-built D2D backup appliance providing highly efficient capacity utilization. For the lowest overall cost per GB and efficient mass storage, a purpose-built backup appliance with deduplication is an excellent solution for companies whose data is growing 30% or more year over year. Though D2D backup appliances can store more VM backup images using less disk space, the recovery is not as fast when compared to DAS or SAN-based storage.

It is possible to avoid these tradeoffs with the right combination of storage and backup from HP and Veeam. By using HP StoreVirtual and HP StoreServ as a primary disk array, fast recovery can be achieved with Veeam Explorer for Storage Snapshots. With day-to-day recovery tasks handled by primary storage SAN snapshots, you can focus on achieving long backup retention periods, high capacity utilization and low cost per GB from your disk-based backup repository.

Recovering Microsoft Exchange and SharePoint items

Another challenging recovery scenario that IT staffs face is that of recovering SharePoint and Exchange items such as deleted MS Office documents, mail messages, contacts and calendar items. There are products on the market that address this challenge, but not without the use of agents on mail servers and expensive add-on licensing. With Veeam Explorer for Microsoft Exchange and Veeam Explorer for Microsoft SharePoint—included with Veeam Backup and Replication—you can browse the backup of an Exchange or SharePoint VM's virtual disk, open the database and search it in less than two minutes.

With this solution, administrators can use advanced search capabilities across multiple Microsoft SharePoint and Exchange Server databases and object types. Exchange items can be exported to .pst and .msg files or attached to mail messages. With Veeam Backup & Replication Enterprise and Enterprise Plus editions, Exchange items can be restored to their original mailbox location or to a different mail server.

When this capability is paired with Veeam Explorer for Storage Snapshots and HP StoreVirtual and HP StoreServ snapshots of VMFS volumes, administrators can recover Exchange and SharePoint items directly from storage snapshots, taking advantage of the low RPO provided by Veeam Explorer for Storage

Snapshots. With fast and reliable item recovery, IT staff can spend time managing instead of reacting.

Replicating datastores and virtual machines off site

Once you have established sound backup and recovery methodologies, the next step on the path to a complete data protection solution is to replicate VMs, production volumes and backup repositories to a safe location to mitigate events such as major hardware failures, power outages or site outages.

HP Storage systems, including HP StoreVirtual and HP StoreServ, can replicate application-consistent copies of volumes to compatible storage in offsite locations for disaster recovery (DR) or archiving. These volume copies can be made of production volumes and backup repositories.

At the VM level, Veeam Backup & Replication compresses VMs before replicating them over a network link, typically a Wide Area Network (WAN), to a remote host or cluster. The result is an inventoried and runnable virtual machine within the virtual infrastructure. Replicated VMs with Veeam reside on different storage, different hosts, different sites (or a combination of all three) in a powered-off state with multiple replica restore points. Additional features include IP address change management and failback logic.

The replica VM copied to the recovery destination is an application-consistent VM made in the same manner as that of Veeam's backup engine. These replica VMs are standing by, ready to be powered on with a moment's notice through the Veeam console or native virtualization administration interfaces. The replication feature of Veeam Backup & Replication is included at no additional cost and requires no additional add-ons, plug-ins or licensing.

For DR purposes, the backup files on StoreOnce can be replicated to another StoreOnce device. Since HP StoreOnce only replicates changing data, the result is a reduction in network traffic by almost 90%, saving tremendous bandwidth costs while delivering efficient protection.

Finally, for backups that need to be retained longer term and stored off site, tape offers the most reliable and cost-efficient platform. The backup copies that no longer need to be stored on HP StoreOnce backup system can be moved to HP StoreEver tape libraries to satisfy extended retention, compliance requirements, as well as the need to store an offline copy of data at an offsite location. HP StoreEver provides Write Once Read Many (WORM), 256-bit AES encryption along with proactive monitoring of media and drives by HP TapeAssure software provides reliable, durable and safe retention of assets.

A multi-tiered approach for virtual machine backup and recovery

When VMs reside on HP StoreVirtual and HP StoreServ storage, the SAN-based snapshots of production VMFS volumes can be used as a first tier of recovery as well as for improving backup performance by an order of magnitude or two. By using Veeam Explorer for Storage Snapshots to automate the recovery of VMs from HP StoreVirtual and HP StoreServ volume-level snapshots, you will achieve the lowest possible RPOs and RTOs.

With a solid VM recovery strategy in place, you can focus on implementing efficient storage repositories for the backup tier. If a large number of VMs need to be stored at the lowest cost per GB, an HP StoreOnce Backup System can be deployed. The first tier, HP StoreVirtual and HP StoreServ Storage snapshots with Veeam Explorer for Storage Snapshots, provides the fastest possible recovery and the lowest RPOs and RTOs. The backup tier, comprised of the HP StoreOnce Backup System, provides the highest efficiency and the overall lowest cost per GB by reducing backup images up to 95% with deduplication.

In summary

- Save money and improve service levels by minimizing downtime and disruption with the fastest possible recovery and the lowest RPO and RTO.
- Stretch limited IT budgets with HP and Veeam, the most affordable data protection and recovery solution for vSphere.
- Leverage existing investments in HP StoreVirtual and HP StoreServ storage by utilizing SAN-based snapshots to accelerate backups as much as 20x faster and recover vSphere VMs in minutes for the lowest RPO and RTO.
- Save time and improve operational efficiency by streamlining VM recovery down to the level of an Exchange message or calendar item with a simple wizard-driven interface and a few clicks, all from an agentless backup.
- Ensure that backup jobs will work with automatic recovery verification with SureBackup—part of Veeam Backup & Replication.
- Save time and improve operational efficiency with a complete VM data protection solution that you can install and use in a matter of hours, not days.
- Reduce costs of storing backup images for a longer term by using HP StoreOnce deduplication in conjunction with built-in deduplication for further cost savings and reduced storage footprint.
- Increase reliability and durability of archives by deploying HP StoreEver tape libraries for safe and durable long-term retention option.

The bottom line

HP Storage and Veeam reduce cost by minimizing disruption and downtime with the fastest recovery of virtual machines, minimizing your RPO and RTO. A complete VM data protection recovery solution from HP and Veeam saves money by dramatically reducing the time it takes to back up and recover a VM, guest file or application object back into production. With HP and Veeam you will realize savings by eliminating the cost and complexity associated with the VM recovery process.

Veeam VM Recovery Architecture

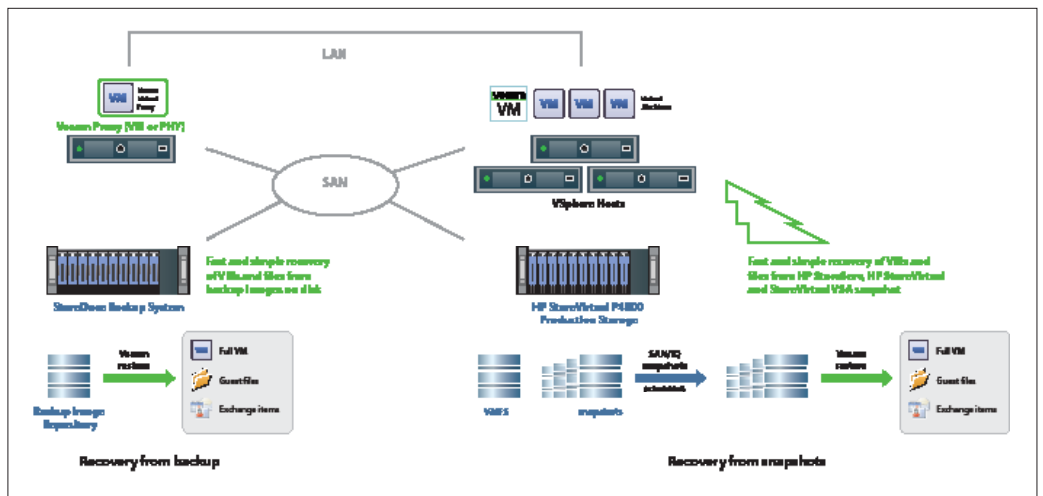


Figure 1: Veeam VM recovery using HP Storage

About Veeam Software

Veeam® is Modern Data Protection™ - providing powerful, easy-to-use and affordable solutions that are Built for Virtualization™ and the Cloud.

Veeam Backup & Replication™ delivers VMware backup, Hyper-V backup, recovery and replication. This #1 VM Backup™ solution helps organizations meet RPOs and RTOs, save time, eliminate risks and dramatically reduce capital and operational costs. Veeam Backup Management Suite™ combines Veeam Backup & Replication and Veeam ONE™ into a single integrated solution to protect virtualization investments, increase administrator productivity and help mitigate daily management risks. Veeam Management Pack™ (MP) extends enterprise monitoring to VMware through Microsoft System Center. Veeam also provides free tools for the virtualization community.

Founded in 2006, Veeam is privately-owned and has been profitable since 2009. Veeam currently has over 20,000 ProPartners and 80,000 customers worldwide. Veeam's global headquarters are located in Baar, Switzerland and has offices throughout the world. To learn more, visit <http://www.veeam.com>.



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Virtualization changes everything – especially backup. If you've virtualized on **VMware or Hyper-V**, now is the time to move up to the data protection solution Built for Virtualization: **Veeam Backup & Replication**.

Unlike traditional backup that suffers from the "3C" problem (missing capabilities, complexity and cost), Veeam is:

- **Powerful:** Dramatically improve your RPOs and RTOs
- **Easy-to-Use:** Save time and eliminate risk
- **Affordable:** Reduce TCO and increase ROI

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