Solution Brief:
Virtual Machine Data Protection and Recovery with HP StoreVirtual and Veeam
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Executive Summary

In this solution brief, HP and Veeam present an end-to-end storage and data protection solution that is optimized for virtual environments. Utilizing SAN snapshots on HP StoreVirtual Storage—which includes 4000 series hardware and the VSA software—along with Veeam Backup & Replication™ forms the foundation of this best-in-class architecture.

HP Storage has teamed up with Veeam to offer the industry’s best recovery capabilities for virtualization. This solution delivers fast recovery time (the Recovery Time Objective or RTO) and recovery of granular objects—down to the application level. The HP and Veeam solution also reduces the amount of data at risk by using a combination of storage snapshots and frequent backups to secondary storage, capable of meeting Recovery Point Objectives (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.

Key Points:

• Recover VMware vSphere Virtual Machines (VMs) in minutes from StoreVirtual snapshots with little impact on production systems with Veeam Explorer™ for SAN Snapshots. This tool is included in all versions of Veeam Backup & Replication and it’s available at no charge in Veeam Backup™ Free Edition.

• HP StoreVirtual Storage customers can leverage their existing investment, having the best of both worlds. SAN snapshots have minimal resource overhead, and as a result, they can be taken more frequently than backups. Implement StoreVirtual snapshots several times a day for short-term recovery (hourly) and low RPO while utilizing Veeam for backup and longer-term recovery (daily).

• HP StoreVirtual and Veeam will save the customer money by minimizing data loss and downtime with frequent recovery points and the fastest recovery of entire virtual machines guest files and application items (i.e. Exchange mail messages, contacts, appointments, etc.).

• Implement a complete VM data protection solution that includes VM recovery from StoreVirtual snapshots, agentless image-level backup to disk and off-site replication of virtual machines, all from one familiar and easy-to-use Windows interface.
Virtual Machine Data Protection Challenges

Today’s virtual environments present new challenges for protecting and recovering data. Legacy backup methods using agents running inside VM guests can create resource bottlenecks on the hypervisor host. 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 another piece of software. The recovery process with legacy backup is also cumbersome and unreliable, particularly when applied to virtual machines.

When tape is maintained as the sole backup media, the issues of tape corruption and being able to locate the correct tape can lengthen the time it takes to recover a VM, negatively impacting service levels. By deploying image-level VM backup to disk you can eliminate issues with tape location and integrity while simultaneously increasing backup performance. More importantly, image-level backup to disk will shorten the time it takes to recover virtual machines.

Disk-based backup is designed to augment legacy backup methodologies that are currently in place, not replace them. A wholesale replacement of an existing backup methodology has been described as “tearing the plumbing out of your house.” Backing up to tape is still a viable way to archive data off site, while using agent-based backup continues to be a sound means of backing up physical servers.

For backup and recovery of virtual machines, the best method of protection is a solution which was built from the ground up for virtualization and uses image-based backup to disk. With HP StoreVirtual Storage and Veeam you can deploy an easy-to-use VM protection strategy in a matter of hours that co-exists with your legacy backup solution, without having to “tear the plumbing out.”

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 files. Backing up to disk provides faster backup and recovery while eliminating the need to find the correct tape and hope that its backup data or media has not been corrupted.

Disk storage systems have also evolved to include recovery capabilities that augment backups. Snapshot functionality built into the storage system can capture points in time of production data at the volume level. A snapshot made via hardware by a SAN storage system is referred to as a SAN-based snapshot. There are tradeoffs in using SAN-based, volume-
level snapshots. SAN snapshots have the advantage of having a very low impact on the production workload and as a result they can be created at frequent intervals throughout the day. SAN snapshots are also excellent for rolling back an entire volume to a point in time. However, in a virtualized environment that volume could contain dozens of VMs.

Using SAN-based snapshots for recovery of individual VMs 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. 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 in order to clean up. In many cases this same process must be followed to recover an individual file. This multiple step process lengthens recovery time and leaves room for error.

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.

**A New Approach for Recovering Virtual Machines**

Developed in conjunction with HP, Veeam Explorer for SAN Snapshots features provides granular recovery of VMs, guest files and application items from StoreVirtual SAN snapshots in just a few clicks from the easy-to-use Veeam management interface.

The time-consuming process of recovering a VMware vSphere VM from a mounted volume snapshot is reduced to a simple automated task that takes two minutes, significantly improving RTOs. And because 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 SAN Snapshots, administrators shorten both RPOs and RTOs using StoreVirtual Storage and fast 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 or guest OS files 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 backups to secondary disk backup targets and recovery from SAN snapshots, you can implement a multi-tier backup and recovery strategy. If a VM, a guest file or an application object needs to be recovered quickly from the StoreVirtual Storage snapshot, this can be accomplished with Veeam Explorer for SAN Snapshots. If the StoreVirtual snapshot becomes unavailable, VMs can be recovered from their backup images on disk or from replica files that have been copied off site via a WAN link to a remote host.

Customers can take advantage of the fast recovery technology of Veeam Explorer for SAN Snapshots at no cost with Veeam Backup Free Edition. The advanced features of Veeam Backup & Replication that include scheduled backups to secondary storage, VM replication, and granular recovery of VMs, files and application items from the secondary storage can be activated simply by purchasing a full license and entering the key.

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 interrupt production activity and also takes advantage of the existence of StoreVirtual SAN to offload transport of the backup directly to the SAN, preserving the host network for end-user access.

The VMs defined in a backup job can take advantage of built-in compression and deduplication to reduce the amount of bandwidth required to transport backups off site, as well as improve storage utilization. Even in a compressed and deduplicated state, these VMs can be started directly from the disk-based backup with Veeam’s patent-pending vPower® technology. Instant VM Recovery can meet a RTO similar to recovering directly from production storage SAN snapshots (as little as a few minutes). Depending on the performance of the backup storage, the performance of the 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.
To assure that every recovery will succeed when you need it, vPower technology also provides the ability to verify backups using the SureBackup® feature. SureBackup, available with Veeam Backup & Replication Enterprise Edition, can automate recovery verification. Virtual machines are automatically started from their backup images and the OS and applications are automatically tested for integrity. A report is e-mailed at the conclusion of each backup to highlight the status of the VMs that were processed in the previous run.

**Backup Repositories**

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

When a server with DAS is used as a disk backup target, you can provide very fast recovery from the backup image of a VM. The server and DAS repository typically has a low acquisition cost and low cost per GB, at the expense of relatively short backup retention periods, when compared to other types of storage.

HP Storage primary disk arrays like the P2000 MSA, StoreVirtual (LeftHand) and 3PAR 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 compared to servers with DAS, while still providing fast recovery from backup when necessary.

Backup appliances like the 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 a good solution. 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 StoreVirtual as a primary disk array, fast recovery can be achieved with Veeam Explorer for SAN 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 Items

Another challenging recovery scenario that IT staffs face is recovering Exchange items such as deleted mail messages, contacts or 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—included with Veeam Backup and Replication and Backup Free Edition—you can browse the backup of an Exchange VM’s virtual disk, open the Exchange database (.edb) and search it in less than two minutes.

With this solution, administrators can use advanced search capabilities across multiple Microsoft Exchange Server 2010 databases and object types. Exchange items can then be exported to .pst and .msg files or attached to mail messages. With the Enterprise Edition of Veeam Backup & Replication, Exchange 2010 items can be restored to their original location.

When this Exchange recovery capability is paired with Veeam Explorer for SAN Snapshots and StoreVirtual snapshots of vSphere volumes, an administrator can recover Exchange items directly from production storage, taking advantage of the low RPO provided by Veeam Explorer for SAN Snapshots. With fast and reliable Exchange item recovery, IT staffs 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 virtual machines, 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 StoreVirtual, can replicate application consistent copies of volumes to compatible storage in off-site locations for Disaster Recovery 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 resulting replica is simply a copy of the VM and its files, not a compressed and deduplicated backup image. When the VM reaches its destination it is decompressed and registered with the selected host and written to the remote datastore in a powered-off state.
This replica VM that is copied to the recovery destination is an application consistent, point-in-time copy made with hypervisor snapshot technology utilizing VMware Tools and Microsoft VSS. These replica VMs are standing by, ready to be powered on with a moment’s notice using native hypervisor tools such as Microsoft Virtual Machine Manager or VMware vCenter. The replication feature of Veeam Backup & Replication is included at no additional cost and requires no additional add-ons, plug-ins or licensing.

**A Multi-tiered Approach for Virtual Machine Backup and Recovery**

Consider implementing a multi-tiered backup and recovery strategy with HP and Veeam. When VMs reside on StoreVirtual Storage, the SAN-based snapshots of production volumes can be used as a first tier of recovery. By using Veeam Explorer for SAN Snapshots to automate the recovery of VMs from StoreVirtual volume-level snapshots, you will achieve the lowest possible RPO and RTO.

With a solid tier one VM recovery strategy in place you can focus on implementing more 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 implemented. The first tier, StoreVirtual Storage snapshots with Veeam Explorer for SAN Snapshots, provides the fastest possible recovery and the lowest RPO and RTO. 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 and Hyper-V.

- Leverage your existing StoreVirtual Storage investment by utilizing SAN-based snapshots to 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.

- Ensure that your backup jobs will work with automatic 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.

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 will save money by dramatically reducing the time it takes to 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 virtual machine recovery process.
HP StoreVirtual and Veeam VM Recovery Architecture

**Recovery from Backup**
Fast and simple recovery of VMs and files from backup images on disk

**Recovery from Snapshots**
Fast and simple recovery of VMs and files from HP StoreVirtual and StoreVirtual VSA snapshots