



VEEAM & HP TECHNICAL CONVERSATION GUIDE: Identifying opportunities for Veeam and HP StoreOnce

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

November, 2013

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Veeam product and solution overview

Veeam Backup & Replication: Veeam® Backup & Replication™ is one of the most powerful solutions for virtual machine (VM) backup, replication and recovery in VMware vSphere and Microsoft Hyper-V environments. With Veeam Backup & Replication, VMs can be backed up to disk, copied to low-cost storage or replicated from one host to another. Recovery of VMs can occur in a matter of minutes using Veeam's patented technology integrated with HP Storage.

Components: The major components of Veeam Backup & Replication consist of a management server, proxy servers, backup repository servers and disk-based backup repositories. The backup proxy servers are Windows-based installations. The backup repositories can be Windows or Linux based, network attached storage systems or tape. These resources can be virtual or physical depending upon the storage and network topology, desired throughput of backup and recovery data streams, as well as the available server resources.

Veeam architecture: With Veeam Backup & Replication, a copy of a VM's data is stored as a backup image on a disk-based backup repository. These repositories can be DAS, SAN, Local or NAS (CIFS). NFS is also an option when using a Linux server as a repository server. These backup image files are appended with .vbk (full backup), .vib (incremental backup) and .vrb (reverse incremental backup) file extensions.

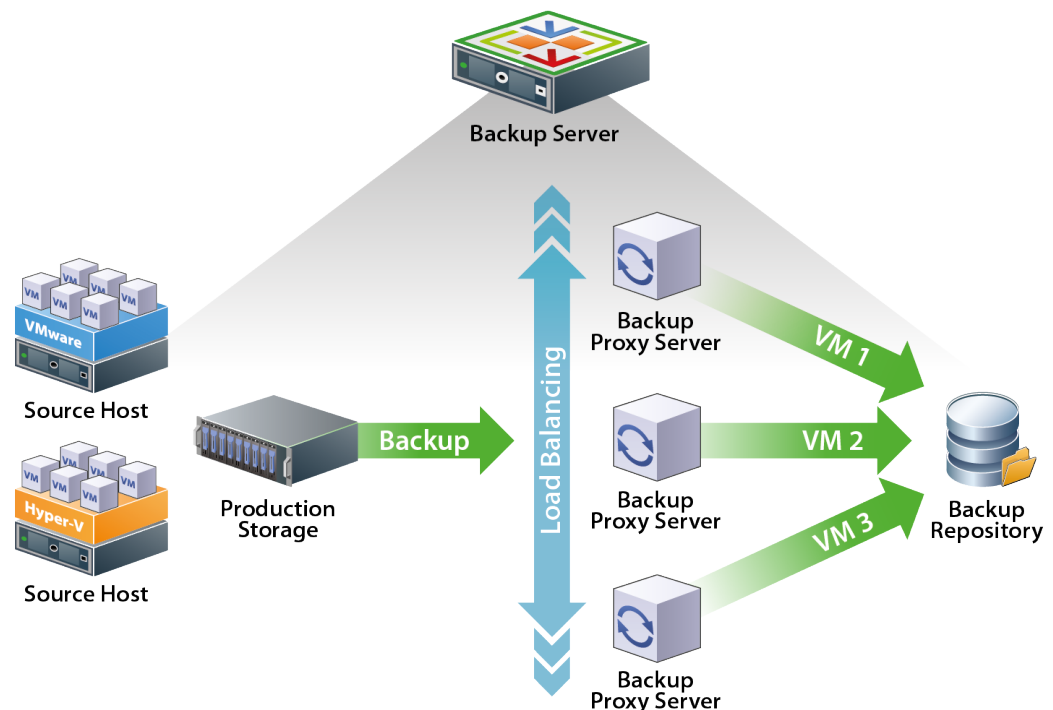


Figure 1: Veeam backup architecture

Veeam replication: A second copy of a VM can be made with host-based replication, which involves making a replica of a running virtual machine. The VM is replicated across an IP network and registered with an ESX(i) or Hyper-V host. This VM replica can then be failed over into production in the event that recovery is required for a whole VM, VM files or guest OS files. Automated IP address and network mapping adjustments for Windows guest OS VMs is also available.

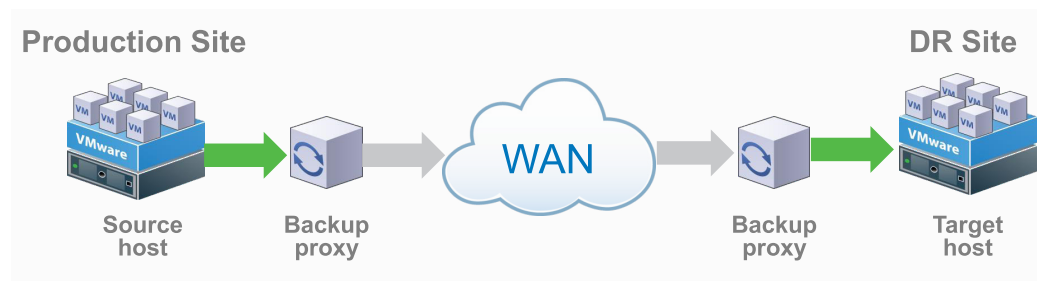


Figure 2: Veeam replication architecture

Veeam HP Storage integration: Veeam integrated HP 3PAR StoreServ Virtual Copy (SAN snapshot) & HP StoreVirtual snapshot technology to create Veeam Explorer™ for Storage Snapshots and Backup from Storage Snapshots. This integration enables a VM recovery point objective (RPO) of 30 minutes or less, automated recovery in minutes and superior backup performance which is non-disruptive to production VM workloads.

Veeam Explorer for Storage Snapshots provides fast recovery of VMs, Windows or Linux guest files, SharePoint and Exchange items (messages, meetings, etc.) directly from the snapshots on primary storage. SAN snapshots can enable VM RPOs of as little as five minutes with HP 3PAR StoreServ Virtual Copies and 30 minutes with HP StoreVirtual snapshots.

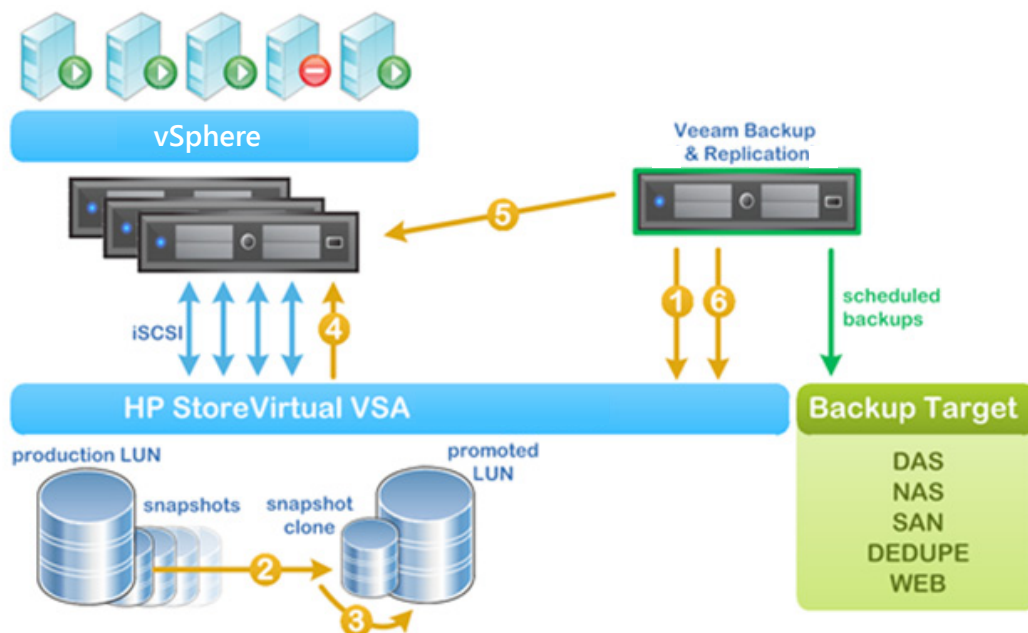


Figure 3: Veeam Explorer for Storage Snapshots

NOTE: HP 3PAR StoreServ storage systems require a Virtual Copy license to enable storage snapshot functionality.

Summary of Veeam Backup & Replication editions and features

	Veeam Backup & Replication Standard Edition	Veeam Backup & Replication Enterprise Edition	Veeam Backup & Replication Enterprise Plus Edition
Veeam Explorer for Storage Snapshots • Snapshot-assisted recovery	✓	✓	✓
Backup from Storage Snapshots • Snapshot-assisted backup	✗	✗	✓
Veeam Explorer for Microsoft Exchange • Exchange 2010/2013 message-level recovery	✓	✓	✓
Veeam Explorer for Microsoft Exchange • Direct recovery to mailbox ¹	✗	✓	✓
Veeam Explorer for Microsoft SharePoint ²	✓	✓	✓
Native tape support ³	✓	✓	✓
U-AIR® (Universal Application Item Recovery) • Exchange 2003/2007 message-level recovery • SQL and Active Directory object-level recovery	✗	✓	✓

1. Veeam Backup & Replication Enterprise Plus Edition also supports dissimilar mailbox restore targets (e.g. foreign mail domain, Office 365, etc.).
2. All editions support restore via save, send and export. Enterprise and Enterprise Plus editions also support restore to original location.
3. All editions support copying Windows, Linux and VM backup files to tape. Enterprise and Enterprise Plus editions add tight integration with backup jobs and support full tracking of VMs and restore points on tape.

Table 1: Veeam Backup & Replication editions and features

Design points

- Veeam Backup & Replication can be architected for multiple tiers of data protection
 - A VM backup image file is written to disk to create the first copy of a virtual machine
 - VM replicas are used to create a second copy of a VM off premises
 - Recovery of VMs, guest files as well as SharePoint and Exchange items from HP StoreVirtual and HP StoreServ SAN snapshots can be achieved directly from production storage with a hardware snapshot copy
 - Backup files can be copied off premises for additional retention using:
 - Backup Copy to disk
 - Tape
 - Public and private clouds
 - Veeam's data protection infrastructure can be recovered by simply deploying a new Windows server (physical or virtual) with Veeam Backup & Replication. Veeam's configuration database and backups can be imported for immediate recovery.
- Data flow with HP StoreServ and HP StoreVirtual production storage (VMware environments)
 - Veeam Explorer for Storage Snapshots
 - An application-consistent SAN snapshot of a vSphere VMFS volume is created on the primary HP storage system
 - SAN snapshot is automatically cloned and mounted to the host for recovery within two minutes
 - VESS provides fast recovery of VMs, Windows or Linux guest files, as well as Exchange and SharePoint items (messages, meetings, documents, etc.) from the snapshots on primary storage

- Backup from Storage Snapshots
 - An application-consistent SAN snapshot of a vSphere VMFS volume is created on the HP StoreVirtual or HP StoreServ primary storage system
 - VMware snapshot is triggered by Veeam backup job for VMs on volume
 - SAN snapshot is automatically created and mounted to Veeam proxy for backup
 - CBT map is queried for fast incremental backup of quiesced VMs from the snapshot clone
- Deduplication backup appliance considerations and trade-offs
 - Deduplication appliances provide the highest level of data reduction and the longest retention periods at the expense of longer VM recovery time objectives (RTOs)
 - Primary storage systems provide a balance of scalability and fast recovery performance (low RTO) versus a more capacity-efficient deduplication appliance
 - Servers with direct-attached (DAS) or local storage offer the best VM recovery performance (lowest RTO)
 - When there is a demanding recovery time objective (generally under one hour), it is strongly encouraged to have a landing zone for short-term backups (primary, local or DAS storage)
 - Backup jobs can be configured to automatically copy backup images, or even entire backup repositories from faster disks in a landing zone to more efficient StoreOnce appliances for longer retention periods
 - Deduplication appliances should be deployed with the (default) forward incremental backup mode enabled
 - Deduplication appliances should be used with Veeam's compression turned off, or using the option to decompress before storing data
- Veeam Backup & Replication's software deduplication (source side) complements HP StoreOnce hardware deduplication for greater data reduction benefits
 - Veeam offers inline deduplication at the backup job-level to reduce network traffic – use the default setting of "Local" (1024KB block size) for HP StoreOnce devices
 - HP StoreOnce Backup Systems deduplicate data at the backup repository-level with 4KB variable chunk sizes

Qualifying questions for discovering Veeam opportunities with HP StoreOnce

Backup administrators and operational staff

What is your virtual infrastructure (VMware, Hyper-V, etc.)?

What keeps you up at night?

What is your average daily backup workload? How many VMs? How many TBs?

How long are your backup windows? Are you able to complete backups during those times?

How often do you have failed backups?

Did you encounter restore failures?

Do you test and verify your backups on a regular basis? Is this important for your organization? *(If yes, a pre-StoreOnce landing zone should be recommended).*

Are backup and recovery SLAs defined for your virtual infrastructure? Do they differ across the various business entities within your company? Are they being met?

How often are you required to restore data? Were you ever forced to restore a complete application environment? How long does it take?

Which solution(s) are you using for data protection today; do they differ for virtual and physical?

Are you currently storing backups off site (tape, cloud, etc.)?

What type of network are you running (FC SAN, 1GigE, 10 GigE)? Are there plans to change the network technology?

Does your organization have defined recovery point and recovery time objectives? *(If an RTO of less than one hour is required, a pre-StoreOnce landing zone is recommended)*

How often do you perform DR tests? How and how often? Are you measured by their success?

What is your average data growth per year and over the lifetime of the solution?

Do you have remote offices? How does your current data protection solution accommodate these offices? Do they manage their own backups, or is that done centrally?

What are the average data and client growth rates per year? Over the life-time of the solution?

Management and executive management

Where is the business heading within the next year? In two – five years? Are mergers or acquisitions planned?

What new business initiatives are underway?

Are backup and recovery SLAs defined for your virtual infrastructure? Do they differ across various business entities within your company?

Do you keep recovery SLAs?

How often are DR tests performed?

Are you measured on the success of your DR tests?

What are the average data and client growth rates per year? Over the lifetime of the solution?

Sizing Veeam/HP StoreOnce opportunities

In order to accurately size Veeam backup infrastructure, you must estimate the amount of space required, the performance requirements of the underlying storage and the proxy and management server resources. When estimating the amount of disk space required, you must first know the following:

- Total size of VMs being backed up (used not provisioned)
- Frequency of backups
- Retention period for backups
- Rate of change

You must also make assumptions on compression, deduplication ratios, change rates and other factors. The following figures are typical for most sites, however, it is important to understand your environment if there are exceptions.

- Minimal deduplication ratio with Veeam is 2:1, but much more can be expected when bundled with HP StoreOnce Backup Systems.
- Typical environments with average change rates of 2-5% daily and an eight-hour backup window is assumed. This can vary tremendously per server and some environments are much higher.
- Include additional space for one-off full backups, and so on.

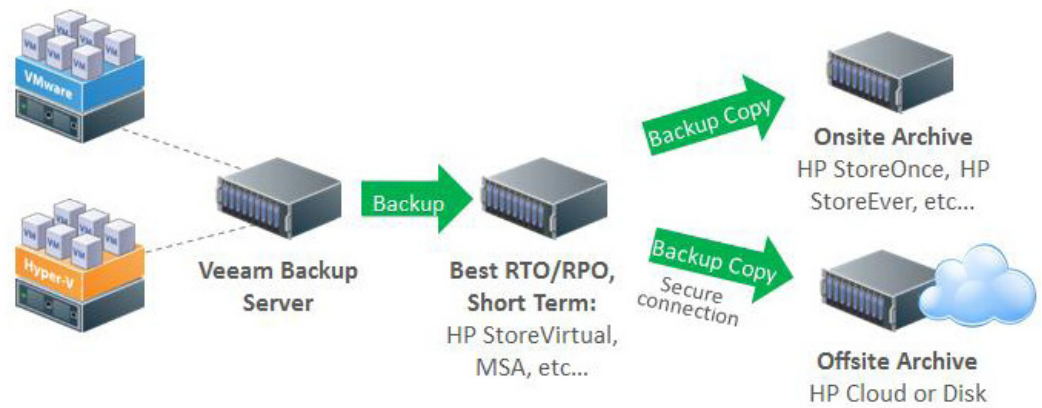


Figure 4: Veeam Backup Copy jobs

In order to achieve the fastest possible backup (e.g. the shortest backup window) and the fastest possible recovery (e.g. the shortest recovery time objective) the backup infrastructure resources must be taken into consideration. Three factors directly affect the performance and effectiveness of this infrastructure: production (e.g. source) storage performance; backup (e.g. target) performance; and the performance of the backup management and proxy servers.

For maximum performance in a direct SAN environment, physical hardware with direct FC or iSCSI connectivity is ideal. However, virtual hardware can achieve acceptable performance in most environments and can actually be the best option in some cases. There are several advantages and disadvantages to consider when deciding between physical and virtual servers.

Physical server proxy	
Pros	Cons
<ul style="list-style-type: none"> • Provides best throughput, especially when using direct SAN access for FC and iSCSI storage • Multi-core processors can run more simultaneous jobs meaning less proxies to manage • No added multipathing or CPU load on virtual infrastructure • Easier and more robust recovery from catastrophic failures involving failed virtual infrastructure • Target storage can be attached directly to physical servers 	<ul style="list-style-type: none"> • Provides best throughput, especially when using direct SAN access for FC and iSCSI storage • Multi-core processors can run more simultaneous jobs meaning less proxies to manage • No added multipathing or CPU load on virtual infrastructure • Easier and more robust recovery from catastrophic failures involving failed virtual infrastructure • Target storage can be attached directly to physical servers

Virtual server proxy	
Pros	Cons
<ul style="list-style-type: none"> • Can use existing virtual machines • Leverages existing infrastructure • Requires no additional hardware • Generally the highest-performance option for NAS and DAS datastores • Simpler setup and configuration 	<ul style="list-style-type: none"> • Virtual proxies are limited by vCPU resources • Multiple proxies in the infrastructure can have significant impact on host resources • Generally requires more proxies to achieve the same throughput as physical • Target storage typically must be accessed via network which can be a potential bottleneck

The following recommendations are provided as starting points; significant variation can occur based on environmental factors. We assume typical environments with average change rates of 2-5% daily and an eight-hour backup window.

- Virtual proxy – one (1) four-vCPU VM for every 100 VMs or 10TB of data. This assumes two jobs each producing approximately 50MB/s each for full backups.
- Physical proxy – one 16-core physical system for every 400 VMs or 40TB of data. This assumes physical SAN connectivity and eight concurrent jobs each producing ~100MB/s each for full backups.

NOTE: You must have sufficient network bandwidth available to the physical server to achieve this level of performance. High-speed interconnects such as 8Gb Fibre Channel and 10Gb Ethernet are highly recommended.

Deploying test proxies and running jobs to measure throughput is essential to determine more accurate numbers for the specific environment.

For physical proxies, use SAN Access mode. Remember, SAN Access mode requires the physical server to be provisioned with access to the storage subsystem, either via Fibre Channel or iSCSI.

- For virtual proxies, use Hot-Add transport mode. Remember, Hot-Add mode requires the proxy server be located on a VM in the same cluster/host as the VM you are backing up.
- Use Network transport mode only when other modes are not available.

If a datastore cannot be accessed by Direct SAN or Hot-Add mode by any proxy, then the system will use Network mode to retrieve the VM disks via the ESXi management interface. When using Network mode, Veeam Backup & Replication attempts to locate a proxy that is on the same subnet as the ESXi management interface to reduce the risk of crossing slow, layer-3 networks. In this mode, the VM data is transferred over the IP management network so it is important that this network has the ability to handle sustained high-speed data transfer without interfering with normal management traffic.

Important: If you plan to deploy proxy server(s) on existing VM(s), and a virtual proxy is set-up to backup or replicate itself, be aware that CBT will be disabled and the job will automatically failover to Network mode. This can have a noticeable impact on backup performance.

Proxy servers are the real workhorse of Veeam Backup & Replication as such they consume considerable CPU resources. In general, assuming default compression options, it is recommended that one CPU be available for every active job:

- One (1) core for every job (physical servers) and one (1) vCPUs for every active job (virtual servers).
- At least four (4) vCPUs allocated for virtual proxies to leave resources available for other server functions.

For memory sizing, assume the proxy server's data mover agent will use the maximum memory (1.7GB), leaving additional headroom to be safe. Therefore, the requirement is 2GB of RAM per concurrent process as a minimum.

For increased backup repository performance, use the fastest possible disk and mirrored RAID levels. Fast VM recovery will necessitate a disk backup target with good random read capability such as a disk array (i.e. P2000 MSA, HP StoreVirtual, EVA, HP StoreServ, etc.) or Direct-Attached Storage (i.e. SMART Array P421/BBWC and D2600 JBOD enclosures). Fast backup targets can be deployed using existing DAS or SAN resources provided they're adequately sized (RAM; multi-core CPUs; number of HDDs and RPM speed; >= Gb speed networking).

For more information, please see the [Configuration Guide: Best Practices...with HP Storage and Veeam](#).

Appendices

Appendix A – Positioning

- [HP Discover 2013 Video](#)

Appendix B – Technical Resources

- [HP-Veeam Best Practices](#)
- [Veeam Best Practices for deployment & configuration \(VMware\)](#)
- [Veeam VMware & Hyper-V User-Guides](#)
- [Veeam Backup & Replication Download](#)
- [Veeam Backup from Storage Snapshots technical overview video \(29 min\)](#)

Appendix C – Marketing/Sales Resources

- [Veeam Backup & Replication v7 product overview video \(5 min\)](#)
- [Veeam Explorer for Storage Snapshots demonstration video \(1 min\)](#)
- [Veeam Backup Management Suite v7 video \(3 min\)](#)
- [Customer Success Story – Vallejo Sanitation & Flood Control District video \(4 min\)](#)
- [HP-Veeam Joint Solution Brief](#)

Appendix D - Veeam Terminology [HP Data Protector to Veeam Translation Table]

Disk agent	Proxy Server, Repository Server
DP Cell Server/Media Agent	Veeam Management Server
DP ZDB integration	Veeam Explorer for Storage Snapshots Veeam Explorer for Microsoft Exchange (2010/2013) Veeam Explorer for Microsoft SharePoint

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™](#) provides all the benefits and features of Veeam Backup & Replication along with advanced monitoring, reporting and capacity planning for the backup infrastructure. [Veeam Management Pack™](#) (MP) extends enterprise monitoring to VMware through Microsoft System Center and also offers monitoring and reporting for the Veeam Backup & Replication infrastructure. 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 more than 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>.

Modern Data Protection

Built for Virtualization

Powerful

Easy-to-Use

Affordable

Veeam Backup & Replication

#1 VM Backup for VMware and Hyper-V

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

Join the 80,000 organizations who have already modernized their data protection with Veeam. **Download Veeam Backup & Replication** today!

