Configuration Guide: Best Practices...with HP ConvergedSystem 300, VMware and Veeam
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**Intended audience**

This guide is intended for those involved in the design, acquisition and implementation of data protection solutions for the HP ConvergedSystem 300. It was written for IT generalists and specialists alike, whether they need to back up a dozen or hundreds of VMs. The audience includes but is not limited to: Systems Administrators responsible for servers, hypervisors, storage, and backup; Sales Engineers; Systems Engineers; Solution Architects; Professional Services Engineers; and Consultants. The technical information contained herein is intended as a starting point for designing and implementing a Veeam VM data protection solution. This backup and replication solution has been tested and certified jointly by HP and Veeam®.

**Veeam Backup & Replication overview**

Veeam Backup & Replication™ is one of the most powerful solutions for VM backup, replication and recovery in VMware vSphere and Microsoft Hyper-V environments. With Veeam Backup & Replication, VMs can be backed up to disk, archived to low-cost storage and 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.

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.
Adding Veeam to HP ConvergedSystem 300

Configuring backup infrastructure

Install Veeam Backup & Replication on a virtual Windows system. The Veeam User Guide for VMware outlines detailed instructions and system requirements. You can Download the latest version of Veeam Backup & Replication from: http://www.veeam.com/vmware-esx-backup/download.html

In this guide a single server is used for the Veeam Backup Server and Backup Proxy. The Veeam backup infrastructure is scaled by adding additional Veeam Backup Proxy Servers to move data and disk-based backup storage resources in the form of CIFS shares, LUNs or storage hosted on Linux servers. Configuration with HP StoreOnce using CIFS will be shown later in this guide.

**NOTE:** The Veeam VM should have a minimum configuration of one modern 64-bit capable processor (minimum six cores) and 16 GB of RAM when running the supplied SQL Express instance (standalone SQL servers can be used).

Add vCenter or host information

The virtual infrastructure to be protected, as well as servers to be used as proxies or repositories can be added to Managed Servers via the Add Server wizard.
NOTE: Additional Backup Proxy Servers should be configured with at least one modern x64 processor (minimum one core) and 2 GB RAM per active backup job. Repositories should be configured with at least one modern x64 processor (minimum one core) and 4 GB RAM for each concurrent backup job.

NOTE: If you plan to deploy a proxy server on an existing VM that is being protected by Veeam, be sure that a different proxy is used for those jobs, otherwise VMware CBT will be disabled and the job will failover to Network mode. This can have a noticeable impact on backup performance.

HP StoreOnce Backup Systems

Veeam interacts with HP StoreOnce directly by using CIFS or NFS shares exported to a Linux server. In this guide CIFS is covered in detail. For NFS, an NFS share from StoreOnce must be mounted to a Linux server that is added to Managed Servers on the Veeam Backup Server, and chosen as a repository.

NOTE: If using Linux repositories with HP StoreOnce the following mount options are recommended: `mount -o nfsvers=3,sync <storeonce_ip_or_fqdn>/nas/<share_name> /path/to/mount/point`

Type the path to the shared folder on HP StoreOnce, followed by continuing through the wizard and finishing. All other options can’t be left as default.
NOTE: It is strongly recommended that the network used for sending data to StoreOnce be a dedicated backup network, separate of other Veeam traffic. In deployments where a Linux repository with NFS shares is used on a single network for all traffic, Large Receive Offload (LRO) should be disabled. See VMware KB Article 1027511 for more details.

Veeam integration with HP StoreVirtual VSA for VMware

Veeam integrates with HP StoreVirtual snapshot technology to create Veeam Explorer™ for 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

Veeam Explorer for Storage Snapshots integrates Veeam fast recovery with the efficiency of HP StoreVirtual VSA snapshots. Once a StoreVirtual VSA snapshot of a vSphere VMFS volume is created, it becomes visible on the Veeam Backup Server. Veeam Explorer for Storage Snapshots use these snapshots for fast recovery of VMs, guest OS files, SharePoint and Exchange items from the snapshots on storage array. Veeam Explorer for Storage Snapshots can enable RPOs of as little as 30 minutes.
In a restore scenario, Veeam has StoreVirtual VSA create a clone of the desired storage snapshot and mounts it to a VMware host. Veeam Explorer for Storage Snapshots uses fast recovery of VMs, Windows or Linux guest files, SharePoint and Exchange items (messages, meetings, etc.).

1. SAN snapshot clone is created
2. Snapshot is promoted to a volume in VMware
3. Veeam recovery is performed from snapshot
4. Veeam dismounts and deletes snapshot clone

*Veeam Explorer for Storage Snapshots*
Veeam Backup from Storage Snapshots

Veeam Backup from Storage Snapshots can reduce backup windows by hours – utilizing HP StoreVirtual snapshots and HP StoreServ Virtual Copies as the source for creating full and incremental backup images. Without the use of storage snapshots, VM backup images must be created using VMware snapshots alone. When VMware snapshots are used to backup heavily utilized VMs, performance of the hosts, storage system, VM and application can be seriously impacted. With Backup from Storage Snapshots, the hypervisor snapshot is used briefly to create an application-consistent state for the storage snapshot. The hypervisor snapshot is then released after the storage snapshot is taken. This hardware-level storage snapshot then becomes the source of the VM backup, independent of the production VM.

The storage snapshot is read by a Veeam proxy as the backup source. The VM’s CBT map is queried for fast incremental backup of quiesced VMs from the snapshot clone to disk without mounting the storage snapshot to the hypervisor or registering the VM with the host. The use of CBT for storage snapshot backup sources is unique to the industry and is responsible for the dramatic reduction in backup windows when deploying HP Storage and Veeam.

NOTE: Veeam Explorer for Storage Snapshots is included in all version of Veeam Backup & Replication, while Veeam Backup from Storage Snapshots is part of the all-inclusive Enterprise Plus Edition. HP 3PAR StoreServ storage systems require a Virtual Copy license to enable storage snapshot functionality.
Configuring SAN infrastructure

In the SAN Infrastructure tab on the Veeam Backup Server add the array IP address and credentials for automatic importation of VMFS volumes, snapshots and associated VMs. To utilize hardware-assisted backup with storage snapshots, the Veeam Backup Proxy must be connected into the SAN fabric. This is not a requirement for hardware-assisted recovery.

![Configuring SAN infrastructure](image)

**NOTE:** Virtual Veeam Backup Proxies must be added to vSwitch hosting iSCSI traffic on the ESXi host for direct SAN fabric access.

Configuring backups with HP StoreVirtual VSA for hardware-assisted backup of vSphere VMs

By default, Veeam Backup & Replication jobs are set to use storage snapshots as the method of retrieving VM data. However, it is possible to enable or disable this capability manually by right clicking on a backup or replication job and clicking *Edit*, followed by *Storage*, and choosing the *Advanced* button. You will see a tab labeled *Storage Integration*.

![Configuring backups with HP StoreVirtual VSA](image)
Configuring backup jobs to use StoreOnce repositories

Settings for compression and deduplication are found in the properties dialog of Veeam backup jobs by navigating to the Storage window and choosing Advanced. Enabling deduplication combined with a compression setting of Dedupe-friendly can assist in reducing network traffic on congested networks, however, the addition of compression will reduce deduplication ratios on the StoreOnce appliance. In most cases both compression and deduplication should be turned off.

Optimal block size for backup streams

Default settings in backup jobs send backup data to backup repositories in 1 MB blocks. Increasing this block size to 8 MB may provide better backup performance with StoreOnce, however restore speeds may be impacted. As with the use of compression and deduplication, if congested networks are being used, reducing the block size to 512 KB may be optimal. These settings are defined on the Storage tab with compression and deduplication, and are as follows:

- **Local Target - 16TB+ Backup Files (Best backup performance)** – 8 MB Blocks
- **Local Target (Default)** – 1 MB Blocks
- **LAN Target (Reduced network traffic and better restore performance)** – 512 MB Blocks
**NOTE:** The following options should be chosen for most Veeam deployments using HP StoreOnce backup repositories.
- Compression and Deduplication = OFF
- Block Size = 512KB (LAN Target)
- Incremental Backup Mode with Active Full Backups
## General best practices for backup jobs

While two virtual infrastructures are rarely the same when it comes to data size, application types, or even SLA’s and RPOs, there are several data protection practices that remain constant.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create jobs that contain a manageable amount of data.</td>
<td>For maximum performance and reliability, it is recommended to meet the following guidelines for total size of VM data within a job:</td>
</tr>
<tr>
<td></td>
<td>• Local Target (1MB blocks): 32TB</td>
</tr>
<tr>
<td></td>
<td>• LAN Target (512KB blocks): 16TB</td>
</tr>
<tr>
<td></td>
<td>• WAN Target (256KB blocks): 8TB</td>
</tr>
<tr>
<td>Note:</td>
<td>These are maximum suggested job sizes based on the backup architecture; however, there can be very good reasons to keep jobs smaller than this: smaller backup files are easier to manage or move to new storage, they need less time and space when running a full backup, and require smaller staging areas for restores from tape</td>
</tr>
<tr>
<td>Select objects based on resource pools, virtual infrastructure folders, or datastores. For example, if you need to perform backup of VMs residing on one datastore, instead of creating several backup jobs working with this datastore, you can create a single backup job and add the datastore as a VM container to it.</td>
<td>Creating jobs based on resource pools, folders, or datastores can simplify management of backups. New machines that become members of these groups are automatically included in the backup job.</td>
</tr>
<tr>
<td>Notes:</td>
<td>• This approach requires monitoring of jobs to make sure there is enough space.</td>
</tr>
<tr>
<td></td>
<td>• If using datastores (or a mix of resource pools), make sure you do not get overlap in object selection, since VMs have disks in multiple datastores.</td>
</tr>
<tr>
<td>Limit the number of exclusions used in backup object selection.</td>
<td>While exclusions can be very useful, virtual infrastructure has a tendency to be dynamic and changes over time, and you must carefully consider their use in your environment. It’s quite easy for a VM to be moved to a folder or resource pool that is excluded and move jobs, or become unprotected.</td>
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</tbody>
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Summary of Veeam Backup & Replication Editions and Features:

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<tbody>
<tr>
<td>Veeam Explorer for Storage Snapshots</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>• Snapshot-assisted recovery</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Backup from Storage Snapshots</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>• Snapshot-assisted backup</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Veeam Explorer for Microsoft Exchange</td>
<td></td>
<td>✓</td>
<td>✓</td>
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<td>• Exchange 2010/2013 message-level recovery</td>
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<tr>
<td>Veeam Explorer for Microsoft Exchange</td>
<td></td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>• Direct recovery to mailbox¹</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Veeam Explorer for Microsoft SharePoint²</td>
<td></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Native tape support³</td>
<td></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>U-AIR® (Universal Application Item Recovery)</td>
<td></td>
<td>×</td>
<td>✓</td>
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<tr>
<td>• Exchange 2003/2007 message-level recovery</td>
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<tr>
<td>• SQL and Active Directory object-level recovery</td>
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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.
Resources

Veeam Backup and Replication User Guide for VMware
Veeam Community Forums – Backup and Replication
HP Storage Landing Page
HP-VEEAM Landing Page on Veeam.com
HP Business Support Center
Veeam Support
Veeam Community Forums
**About Veeam Software**

Veeam® enables the Always-On Business™ by providing solutions that deliver Availability for the Modern Data Center™, which provides recovery time and point objectives (RTPO™) of less than 15 minutes for the majority of applications and data. Veeam recognizes the challenges in keeping a business up and running at all times and addresses them with solutions that provide high-speed recovery, data loss avoidance, verified protection, risk mitigation and complete visibility. Veeam Backup & Replication™ leverages technologies that enable the modern data center, including VMware vSphere, Microsoft Hyper-V, NetApp storage, and HP 3PAR StoreServ and StoreVirtual Storage, to help organizations meet RTPOs, save time, mitigate risks, and dramatically reduce capital and operational costs. Veeam Availability Suite™ provides all of the benefits and features of Veeam Backup & Replication along with advanced monitoring, reporting and capacity planning for the backup infrastructure.

Veeam Management Pack™ extends Microsoft System Center monitoring to enterprise vSphere environments and also offers monitoring, reporting and capacity planning for the Veeam Backup & Replication infrastructure. The Veeam Cloud Provider Program (VCP) offers flexible monthly and perpetual licensing to meet the needs of hosting, managed service and cloud service providers. VCP currently has more than 4,500 service provider partners worldwide. Monthly rental is available in more than 70 countries from more than 50 Veeam aggregators.

Founded in 2006, Veeam currently has 25,000 ProPartners and more than 101,000 customers worldwide. Veeam's global headquarters are located in Baar, Switzerland, and the company has offices throughout the world.
IT JUST WORKS!™

AVAILABILITY™
for the Modern Data Center

To learn more, visit http://www.veeam.com/backup