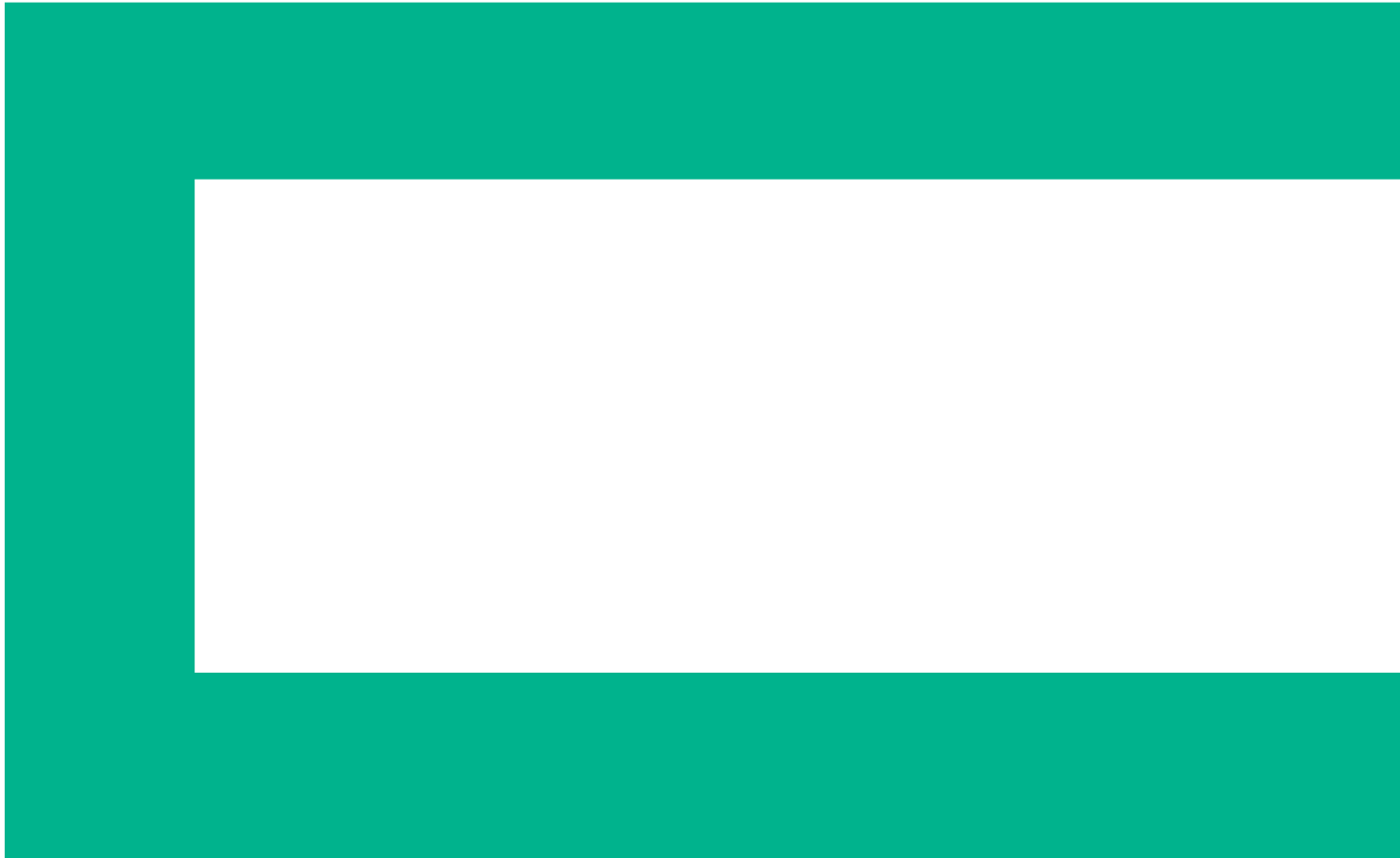




# **MODERN DATA PROTECTION WITHOUT LIMITS**

For mission- and business-critical applications and data

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# THE IDEA ECONOMY IS ALWAYS AVAILABLE

**In today's economy, most businesses require instant data access. With more applications being identified as mission- or business-critical, data protection and availability are more important than ever.**

## TABLE OF CONTENTS

- 2 BUSINESS AVAILABILITY REQUIREMENTS**
- 3 Meeting your data protection goals
- 4 HPE PRIMARY STORAGE ARRAYS AND VEEAM**
- 5 HPE STOREONCE SYSTEM AND VEEAM**
- 6 HPE APOLLO SERVER BACKUP TARGET AND VEEAM**
- 6 HPE NIMBLE STORAGE BACKUP TARGET AND VEEAM**
- 6 HPE CLOUD VOLUMES BACKUP AND VEEAM**
- 7 MODERN IT INFRASTRUCTURE FOR HAUGESUND, NORWAY**
- 7 BUSINESS CONTINUITY FOR INVADO**
- 8 INCREASING APPLICATION AVAILABILITY**
- 10 HPE AND VEEAM—PARTNERS FOR MODERN DATA PROTECTION**

### Downtime can strike any time

There are many causes of downtime. Some are technical, but others are not. Leading causes of downtime include:

- UPS failure
- Cybercrime
- Human error

This white paper describes the requirements driving the need for increased availability, less complexity, and improved reliability, which all help optimize resources. It also shows how Veeam 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 business needs. The paper provides examples of how organizations have used these technologies to attain mission-critical application availability, meet recovery time objectives (RTOs) and recovery point objectives (RPOs), and provide fast, reliable disaster recovery capabilities for their modern data centers.

## BUSINESS AVAILABILITY REQUIREMENTS

Today, globalization has become the norm. With explosive data growth and ubiquitous internet access, your customers now demand that data, apps, and services be constantly available. Recent COVID-19 work-from-home requirements mean that your employees need 24x7 access to corporate resources, too. These types of requirements drive the need for increased levels of availability and recoverability for business data and services.

It is important to understand the impact that downtime has on business. True, downtime is clearly time that users are unable to access the applications and resources they need. But loss of operational capabilities are only part of the cost. Downtime can also erode customer confidence, damage brand reputation, impact employee productivity, and reduce confidence in IT. Outside of the organization, there might be financial impact to partners and downstream businesses. The bottom line is that any amount of downtime equals lost revenue.

It's equally important to understand that the root causes of downtime are not preventable: cybercrime, natural disasters, and system failure are inevitable, and you need to be prepared on multiple fronts. The modern data center comprises 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.

HPE and Veeam have the technology and expertise to help ensure application availability, help you meet your backup and restore objectives, and take advantage of reliable, high-speed disaster recovery capabilities, resulting in decreased resource constraints and increased employee productivity.



### Meeting your data protection goals

Companies have turned to virtualization to improve efficiency, increase workload performance, and enhance business continuity. These changes have driven the need for simpler 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 not only purpose-built for virtual environments to protect their virtual machines (VMs), but can also serve as a holistic data protection solution across virtual, physical, and cloud environments.

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 software maintenance and increase support costs. Plus, agent-based technology does not work at all when VMs are powered off, unavailable, or newly provisioned. Furthermore, more organizations are using multiple hypervisors, and in many cases, each hypervisor uses a different backup solution, resulting in increased management demands.

Veeam uses agentless technology that is designed from the ground up to protect VMs. The integration of Veeam software with [HPE Storage solutions](#) lets you create application-consistent backups from HPE Primera, HPE Nimble Storage, and HPE Nimble Storage dHCI snapshots for fast and efficient data protection. Veeam software integrates with [HPE Primera](#), [HPE Nimble Storage](#), [HPE Nimble Storage dHCI](#), [HPE Apollo](#), [HPE StoreOnce](#), and [HPE StoreEver](#) products to provide a complete data protection strategy with improved availability. Veeam software expands backup options and restore capabilities when protecting workloads running on [HPE SimpliVity](#), in addition to enabling workload replication to third-party infrastructure.

The combination of Veeam and HPE Storage technologies provides a comprehensive strategy for meeting recovery and retention requirements.



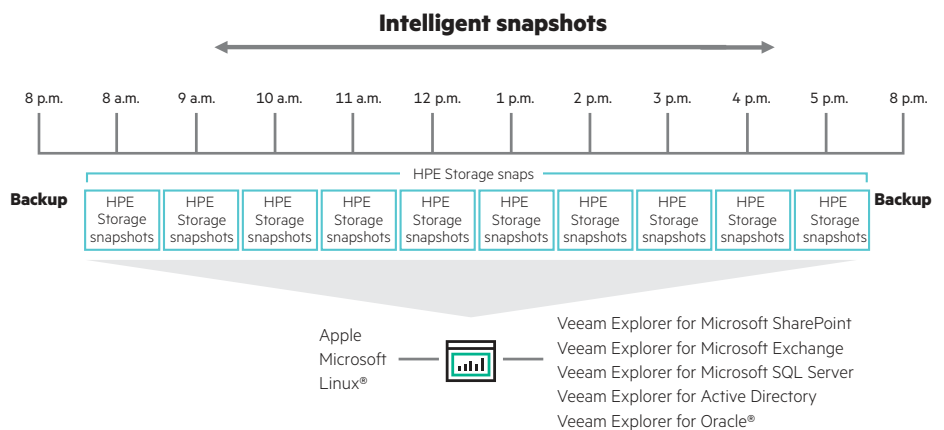


## HPE PRIMARY STORAGE ARRAYS AND VEEAM

HPE Primera, HPE Nimble Storage, and HPE Nimble Storage dHCI arrays can take fast, frequent snapshots of VMware® volumes without impacting production workloads. HPE Primera can take snapshots as frequently as every 15 minutes. Figure 1 shows an example of storage snapshots being taken as frequently as once an hour during peak business hours. With Veeam integration with HPE Storage, you can leverage snapshots with the integration of Veeam 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.

HPE primary storage snapshots and Veeam radically improve RPOs by providing multiple up-to-date recovery points. Veeam integration with HPE primary storage 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. Up to 999 HPE Nimble Storage snapshots can be specified in the backup job wizard, and they can be used to protect the volumes with backup data. In case backups are accidentally or maliciously removed from the Veeam GUI, the backups can be restored from these snapshots.

Veeam Explorer for Storage Snapshots provides visibility directly into the HPE primary storage snapshots, enabling granular recovery of entire VMs with VMware Instant VM Recovery or the recovery of individual guest operating system files and application items. The process works also when the VM has disks on different volumes and arrays. Veeam Explorer for Storage Snapshots with HPE primary storage can shorten RTOs to less than five minutes, leveraging data 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 1.** Using HPE primary storage snapshots with Veeam Backup & Replication

Veeam Backup & Replication also can 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 reducing the need for VMware VM snapshots. This capability, although not new to the industry, is 20 times faster than the competition as a result of the use of VMware Changed Block Tracking (CBT).<sup>1</sup> 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.

Recent updates to Veeam software provide asynchronous snapshot replication on HPE Primera (as similarly supported on HPE Nimble Storage) and Instant Disk Recovery from storage snapshots, leading to faster backups and restores and less impact to production environments.

<sup>1</sup> Veeam internal testing.





## HPE STOREONCE SYSTEM AND VEEAM

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%.<sup>2</sup> This allows a greater number of backup images to be stored on disk, providing more recovery points and faster restores from backups. HPE StoreOnce 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.

Recent enhancements in Veeam Backup & Replication software includes reliable security and ransomware protection that fends off increasing risks of cyberthreats now and into the future, delivering unprecedented resiliency for companies of any size. HPE StoreOnce Catalyst effectively isolates critical data so attackers cannot access it without resorting to direct physical interactions. Even in instances where a single location is physically compromised, federated HPE StoreOnce Catalyst stores continue to protect mission-critical data by effectively isolating the data from traditional lines of communication and command sets leveraged by ransomware attackers.

The HPE StoreOnce Catalyst store is hidden from attackers behind an application programming interface (API) that enhances and simplifies the process of backing up and deduplicating data. This makes it practically impossible for ransomware to attach to backup stores directly.

Catalyst stores can do more than just house primary backup data. Restore points written to Catalyst stores can be copied to other stores through storage-based replication using Catalyst Copy jobs managed by Veeam. Veeam software orchestrates the workflow and is aware of the multiple copies. In a disaster recovery configuration, these copies can be sent to other HPE StoreOnce systems. With Catalyst Copy and Veeam, any mix of 1-to-N and cascade replication models is supported with a high number of parallel streams.

Additional capabilities from recent updates to Veeam software are:

- Asymmetric retention for Catalyst Copy jobs to enable backup copy replication from HPE StoreOnce to HPE Cloud Volumes Backup or other targets with longer retention at destination
- Catalyst Copy from Veeam Backup Copy job
- Tape out from a Catalyst Copy target to provide backup copy replication from the central replica-destination copies for low cost and longer retention
- NAS device backups to StoreOnce to take advantage of HPE StoreOnce capacity-optimized backups

<sup>2</sup> As compared to a fully hydrated backup.

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.



StoreOnce VSA, a stand-alone software solution, can be integrated into an HPE StoreOnce Backup Appliance running on any existing x86 server, turning it into a deduplication target that is ideal for small remote offices. Veeam can copy restore points from any primary repository to [HPE 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 off-site. This strategy also allows for more than 50 recovery capabilities in 15 minutes or less.

## HPE APOLLO SERVER BACKUP TARGET AND VEEAM

The HPE Apollo server and Veeam solution delivers a cost-effective data protection infrastructure for virtualized environments. By writing backup data to local storage in the HPE Apollo server, backups and restores of critical applications and workloads are faster compared to using a separate storage resource with a Fibre Channel or Ethernet transfer medium. In addition to providing hundreds of terabytes of local storage capacity, the HPE Apollo server has the compute resources needed to run the Microsoft Windows operating system and Veeam Availability Suite software on the same server. This converged approach greatly simplifies the solution compared to designs based on compute-only and storage-only components. No additional storage licenses are required to deploy the storage capacity of the HPE Apollo server.

Recent enhancements in Veeam Backup & Replication software provide capabilities such as NUMA awareness, unbuffered writes, and shared memory transport to enable faster backups and restores as well as simpler deployment by consolidation of Veeam roles.

## HPE NIMBLE STORAGE BACKUP TARGET AND VEEAM

HPE Nimble Storage can be used not only as a primary storage array, but also as secondary storage where backups and restores of applications are critical and workloads are fast. The HPE Nimble Storage Adaptive Flash Array is truly adaptive. Designed for both primary and secondary flash workloads, the systems contain SSDs and HDDs for mixed primary workloads where cost-efficient flash performance is important. It can also serve as a secondary flash array for backup and disaster recovery, with native high availability provided for continuous backup operations. In addition, backups on HPE Nimble Storage can be used for test and development. A read-only copy of the backup file can be placed into a sandbox where testing, development, and application updates can occur.

## HPE CLOUD VOLUMES BACKUP AND VEEAM

HPE Cloud Volumes Backup enables a cloud experience for enterprise protection and is managed by HPE for HPE customers. Built on HPE Catalyst technology, it provides dynamically provisioned, cloud-backed Catalyst stores with simplified web-based management, flexible deployment options, and pay-as-you-go usage. HPE Cloud Volumes backup is most commonly used in Veeam environments as a Catalyst Copy target from an on-premises HPE StoreOnce backup appliance.

With integration of HPE Cloud Volumes Backup and Veeam software, existing datasets can be backed up using current Veeam-based workflows with the following common use cases:

**Cloud backup at remote sites:** No need to deploy new hardware at the edge (with space, power, and cooling constraints) or at the data center with additional bandwidth to drag remote data back.

**Secondary backup site replacement:** No need to buy backup infrastructure or new software at a second site (does not replace disaster recovery infrastructure).

**Tertiary copy to cloud:** No need to deploy new hardware or software at the data center.

**Secondary copy in the cloud:** No need to even have a second site.





Benefits of HPE Cloud Volumes Backup and Veeam software include:

**Ease of use with workflows from a single console after an HPE Cloud Volumes Backup is created with a few clicks**

**Built-in security with encryption in transit and at rest**

**Reduced bandwidth cost with HPE Catalyst technology**

**Recovery back to any on-premises location and storage technology**

## MODERN IT INFRASTRUCTURE FOR HAUGESUND, NORWAY

The municipality of Haugesund, Norway is a cultural center that hosts numerous festivals and tourists. The citizens enjoy a slower pace of life, but they rely on the same kind of public services as any community, large or small. Education, child welfare, water and sewage, social security, building permits, and medical services must be available any time of the day or night. In today’s digital world, it takes technology to deliver these services.

According to Roy Ratcliff, ICT consultant for servers and storage, the municipality has relied on HPE technology for 15 years. When it was time to modernize their infrastructure, they evaluated other vendors but didn’t see any reason to change. By migrating to HPE Primera with HPE InfoSight, Haugesund improved the speed and agility of key processes such as social security requests and child welfare reports to deliver more responsive, higher-quality service for its citizens. The self-managing, self-healing capabilities of HPE InfoSight help to assure the town that the storage system is available and performing optimally to deliver on its commitment to citizens.

As an additional measure to protect mission critical data, Ratcliff uses Veeam Backup & Replication with the HPE ProLiant servers and HPE Primera storage. “I was worried we might end up with double backups when we made the transition from our old storage to HPE Primera, but everything has been very smooth,” he notes. “We’ve had no issues with the transition.” With HPE Primera fully replicated to the disaster recovery site, Ratcliff also has added assurance of a quick recovery from any major site outage.

To learn more about how the municipality uses Veeam and HPE technologies to boost performance and agility, read the success story: [Intelligent Data Platform Helps Haugesund Deliver Quality Citizen Services.](#)

## BUSINESS CONTINUITY FOR INVADO

INVADO has built an industry-leading business across Europe by producing doors and doorframes that are strong, secure, durable, and designed to each customer’s requirements. A company built on such a solid foundation naturally expects the same from the data storage systems that drive its production operations.

Storage is critical for running INVADO’s core manufacturing systems, business intelligence applications, and Microsoft SQL Server databases. The IT team deployed a redundant pair of HPE Nimble Storage adaptive arrays across two data centers running dozens of VMware VMs. The VMs are replicated and backed up using Veeam Backup & Replication. This intelligent solution optimizes the performance, availability, and efficiency of VMware virtualized mission-critical applications.

The integration between Veeam and HPE Nimble Storage has also strengthened data protection and business continuity. Marcel Chyra, IT specialist at INVADO, says, “It is much easier for us to do backups with Veeam and HPE Nimble Storage than our previous solution. We take snapshots throughout the day and replicate them to our backup data center. If we ever had a disruption to our primary data center, we could resume business nearly immediately and not lose more than five minutes of data.”

To learn more about how INVADO helps keep mission-critical virtual applications and databases running with Veeam and HPE, read the success story: [Intelligent Data Platform Eliminates Storage Disruptions and Guesswork for INVADO.](#)



**“The transition to HPE Primera was perfect. We thought we’d have to schedule some downtime, but there was none. Users didn’t even know we made this major change in the infrastructure.”**

– Roy Ratcliff, ICT Consultant, Server and Storage, Municipality of Haugesund

## INCREASING APPLICATION AVAILABILITY

Availability data management starts with choosing a primary storage platform that provides the levels of high availability and performance that your business-critical applications require. HPE Primera and HPE Nimble Storage provide a proven, highly available, Tier 1 architecture common across midrange, all-flash, and high-end storage array models. HPE Primera and HPE Nimble Storage offer the only six-nines (99.9999) guaranteed availability program in the storage market and provide a storage system with the availability required for your most critical business data.

HPE Primera Persistent Cache eliminates any performance impacts that might be caused by a node outage. Plus, HPE Primera 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, HPE Primera 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 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 rollback for data that reside on the HPE Storage arrays.

The tight integration of HPE Storage solutions and Veeam brings improved business continuity and better application availability. Veeam Availability Suite 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 Availability Suite with HPE Primera and HPE Nimble Storage snapshots lets you recover VMs in minutes by using Instant VM Recovery from storage snapshots. Using Veeam with HPE snapshots allows far faster backup and recovery than traditional snapshot technologies. For example, although hypervisor-based snapshots do not 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. After recovery is complete, the snapshot mounting process must be undone to clean up. Veeam provides intelligence to the HPE Storage snapshot allowing for streamlined, efficient, and fast granular recovery of VMs, guest operating system files, and application items directly from those 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.

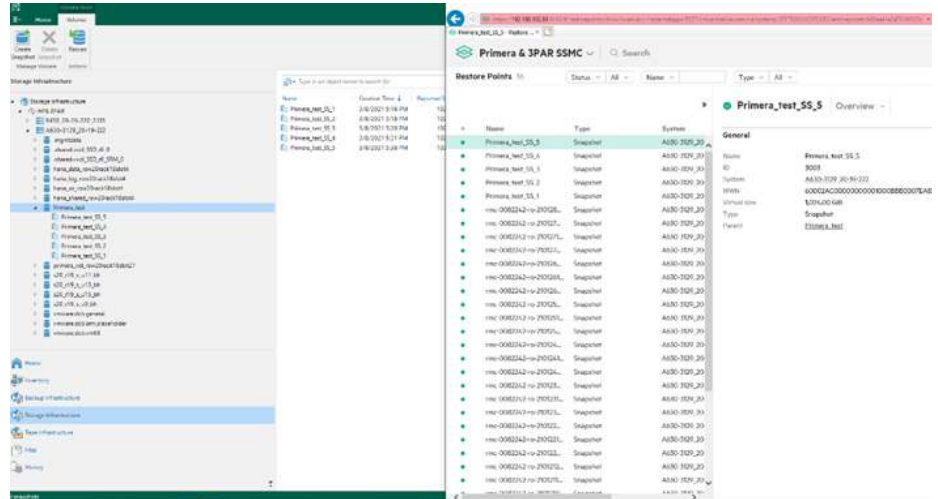
With Instant VM Recovery, you can quickly restore a VM from a storage snapshot to production, reducing recovery time and improving application availability. After the VM is restored, you can use VMware vSphere® Storage vMotion® or Veeam Quick Migration to migrate from the storage snapshot to the production volume.

As shown in Figure 2, a snapshot can be created from the HPE StoreServ Management Console (SSMC) or from the Veeam management console using a feature named “Snapshot Orchestration.” This feature enables synchronous and asynchronous storage-based snapshot replication orchestrated by Veeam with independent snapshot retention on the source or target array. The HPE Primera and HPE SSMC list available snapshots and the Veeam management console lets you easily recover VMs with just a few clicks.





To recover a VM or its contents, select the snapshot that you want to use and then select the VM that you want to recover. Then select options for using Instant VM Recovery, restoring application items, and restoring guest operating system files. Instant VM Recovery will restore the entire VM after you select the recovery point in time and destination. The Restore Application Items option will start one of the Veeam Explorers.



**FIGURE 2.** 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, and 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, 2013, and 2016 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.

Options for subscription licenses, perpetual licenses, or Veeam delivered through HPE GreenLake enable customers to purchase Veeam up front or pay annually.

The Veeam Universal License (VUL) is a flexible and portable solution for protecting multiple, different workloads on-premises and in the cloud. Universal licensing makes protecting and restoring backups to cloud environments easier than ever and avoids additional fees that other vendors may charge. VUL works for Veeam Availability Suite, Veeam Backup & Replication, and Veeam Backup Essentials.





## HPE AND VEEAM—PARTNERS FOR MODERN DATA PROTECTION

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 intelligent data management software increases your application availability while minimizing disruption and downtime. HPE and Veeam deliver 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 complete visibility. The Veeam Availability Suite, combined with efficient and powerful HPE Primera, HPE Nimble Storage, HPE Nimble Storage dHCI, HPE SimpliVity, HPE Apollo Server, HPE StoreOnce, and HPE Cloud Volumes Backup, is a solution that provides your business with data protection without limits.

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