Veeam Backup & Replication

Version 12

Quick Start Guide for Microsoft Hyper-V

February, 2023

NOTE

Read the End User Software License Agreement before using the accompanying software programs. Using any part of the software indicates that you accept the terms of the End User Software License Agreement.

Contents

Contacting Veeam Software

At Veeam Software we value feedback from our customers. It is important not only to help you quickly with your technical issues, but it is our mission to listen to your input and build products that incorporate your suggestions.

Customer Support

Should you have a technical concern, suggestion or question, visit the Veeam Customer Support Portal to open a case, search our knowledge base, reference documentation, manage your license or obtain the latest product release.

Company Contacts

For the most up-to-date information about company contacts and office locations, visit the Veeam Contacts Webpage.

Online Support

If you have any questions about Veeam products, you can use the following resources:

- Full documentation set: veeam.com/documentation-guides-datasheets.html
- Veeam R&D Forums: forums.veeam.com

Getting Started

Document Structure

The guide contains instructions on the following:

- Veeam Backup & Replication functionality: how to deploy Veeam Backup & Replication, perform backup, replication, and restore operations.
- Integration with Veeam Backup Enterprise Manager: a free tool for managing distributed infrastructure.
- Agent management: built-in Veeam Backup & Replication feature to back up physical machines using Veeam Agents.

Help and Support

This guide provides a high-level overview of Veeam Backup & Replication primary features and should be regarded as a supplement to existing technical documentation. The complete set of documentation can be found on the Veeam Technical Documentation page.

For technical support and assistance, use the following resources:

- Veeam R&D Forums
- Customer Support Portal

About Veeam Backup & Replication

What is Veeam Backup & Replication?

Veeam Backup & Replication is a data protection and disaster recovery solution for virtual, physical and cloud environments. With Veeam Backup & Replication you can:

- Create crash-consistent and application-consistent backups of virtual and physical machines.
- Quickly restore physical machines, EC2 instances, Microsoft Azure VMs, Google VM instances, VMs, VM disks, guest OS files and application items.
- Perform backup health check to verify that backups are not corrupted and are ready for restoring.
- Create VM replicas and switch to them in case of a disaster.
- Automate transferring of backups to tapes and other external repositories.

Note that in this guide, we will not overview all the Veeam Backup & Replication capabilities. You can find them in the Veeam Backup & Replication User Guide.

What Else Can I Do?

Veeam Backup & Replication provides utilities not mentioned in this guide that can help you secure and manage your data:

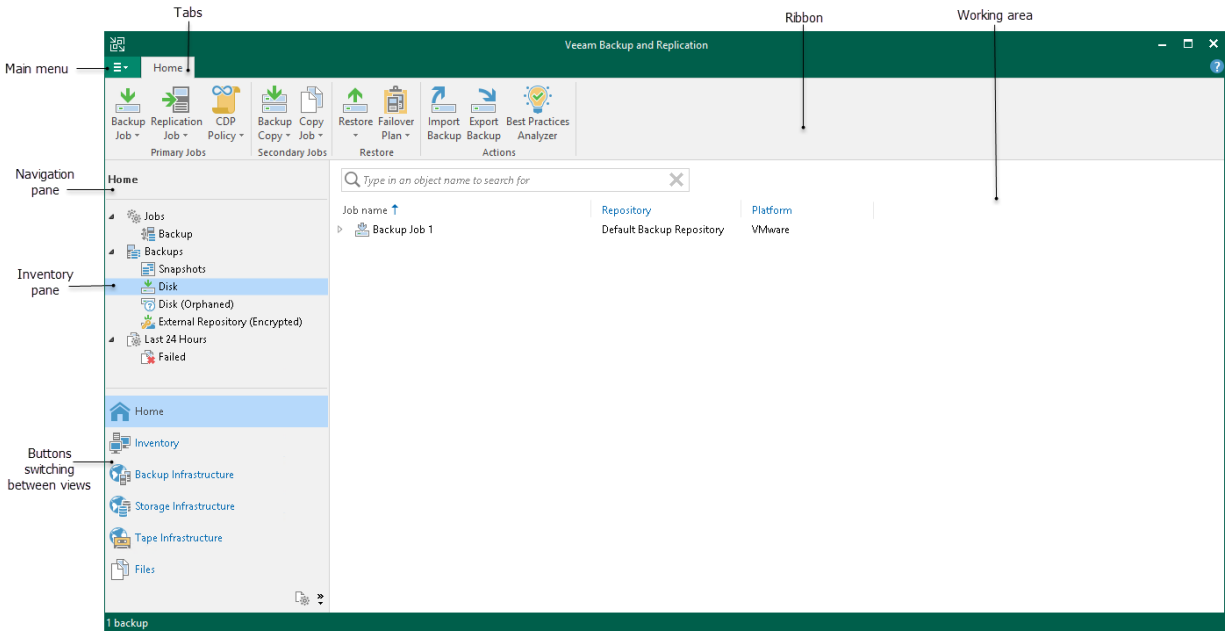
- Veeam Backup for Microsoft 365: backup and restore solution for Microsoft 365 data.
- Veeam Backup for Nutanix AHV: backup and restore solution for Nutanix AHV VMs.
- Plug-in for Veeam Backup for AWS: extension for integration with Veeam Backup for AWS.
- Plug-in for Veeam Backup for Microsoft Azure: extension for integration with Veeam Backup for Microsoft Azure.
- Plug-in for Veeam Backup for Google Cloud: extension for integration with Veeam Backup for Google Cloud.

Veeam Backup & Replication also provides the following tools for monitoring and management:

- Veeam ONE: real-time monitoring, reporting, alerting and managing tool for virtual and physical environments.
- Veeam Management Pack for Microsoft System Center: Microsoft System Center extension for managing and monitoring VMware vSphere, Microsoft Hyper-V, and Veeam Backup & Replication.
- Veeam Availability Orchestrator: a tool for automated creation and testing of DR plans that comply regulatory requirements.

Veeam Backup & Replication UI

The user interface of Veeam Backup & Replication is designed to let you quickly find commands that you need and perform data protection and disaster recovery tasks.



TIP:

To open online help, press [F1] in any Veeam Backup & Replication wizard or window. You will be redirected to the corresponding section of the Veeam Backup & Replication User Guide.

Reference

For details, see Veeam Backup & Replication UI section in the Veeam Backup & Replication User Guide.

Backup Infrastructure

This section describes main Veeam Backup & Replication infrastructure components and deployment scenarios.

Backup Infrastructure Components

To start working with Veeam Backup & Replication, you must set up the backup infrastructure. The basic Veeam Backup & Replication infrastructure consists of the following core components:

- **Backup server**

  A Microsoft Windows-based machine on which Veeam Backup & Replication is installed. The backup server performs main management operations: coordinates backup, replication and restore tasks, controls job scheduling and resource allocation.

- **Backup repository**

  A server where Veeam Backup & Replication keeps backup files, backup copies and metadata of replicated VMs.

- **Backup proxy (on-host or off-host)**

  A component that retrieves data from the source host, processes it and transfers to the backup repository.

- **Infrastructure servers and hosts**

  Microsoft Hyper-V servers that you plan to use as source and target for backup, replication and other activities. Microsoft Windows and Linux servers for which you plan to assign roles of a backup proxy or backup repository.

Reference

For details on all backup infrastructure components, see the Backup Infrastructure Components section in the Veeam Backup & Replication User Guide.

Deployment Scenarios

You can use Veeam Backup & Replication in virtual environments of any size and complexity. The architecture of the solution supports onsite and offsite data protection, operations across remote sites and geographically dispersed locations. Veeam Backup & Replication provides flexible scalability and easily adapts to the needs of your virtual environment.

Veeam Backup & Replication supports several deployment scenarios, and each one includes the core infrastructure components: backup server, backup proxy and backup repository. Depending on the size of your virtual environment, you can use one of the following scenarios:

- Simple deployment

  For small virtual environments. In this scenario, the roles of all components required for data protection tasks are assigned to one machine.

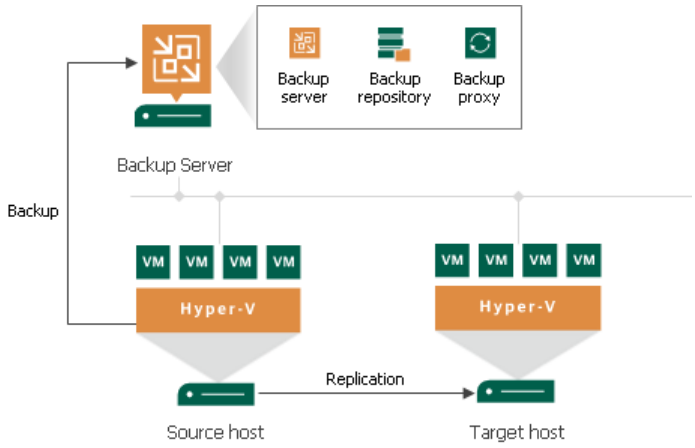
- Advanced deployment

  For medium-sized and large-scale virtual environments. In this scenario, the roles of components required for data protection tasks are assigned to dedicated machines.

Veeam Backup & Replication also supports the distributed deployment scenario for large geographically dispersed environments with multiple backup servers. We omit detailed description of this scenario because this guide is aimed for quick overview of basic features. For details on the distributed scenario, see the Distributed Deployment section in the Veeam Backup & Replication User Guide.

Simple Deployment

In the simple deployment scenario, the roles of the backup server, backup proxy and backup repository are assigned to a single machine. These roles are assigned automatically to the machine where you install Veeam Backup & Replication.



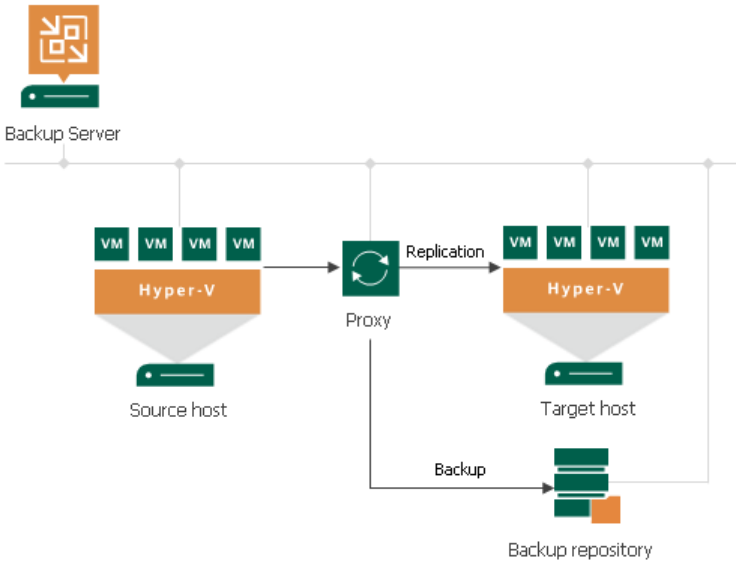
The drawback of the simple deployment scenario is that only the backup server handles and stores all data. For medium-sized or large-scale environments, the capacity of a single backup server may not be enough. To take the load off the backup server and balance it throughout your backup infrastructure, it is recommended to use the advanced deployment scenario.

Advanced Deployment

In the advanced deployment scenario, the roles of the backup server, backup proxy and backup repository are assigned to different machines. This gives the following advantages:

- The processing load is moved from backup server to backup proxy.
- Increased fault tolerance: you can store data on a separate machine (the backup repository).

Note that this scenario requires that you assign the roles of the proxy and repository manually.



Depending on production environment and backup and replication scenarios you plan to use, the advanced deployment scenario may include multiple backup proxies and backup repositories, both on-site and off-site, controlled by a single backup server.

Planning and Preparation

Before you install Veeam Backup & Replication, you must make sure that the virtual environment and machines that you plan to use as backup infrastructure components meet product hardware recommendations and system requirements.

System Requirements

Make sure that servers that you plan to use as backup infrastructure components meet the system requirements listed in the following sections of the Veeam Backup & Replication User Guide:

- System Requirements for Backup Server
- System Requirements for Backup Repository Server
- System Requirements for Enterprise Manager
- System Requirements for Supported Applications
- System Requirements for Veeam Explorer for Microsoft Active Directory
- System Requirements for Veeam Explorer for Microsoft Exchange
- System Requirements for Veeam Explorer for Microsoft SharePoint
- System Requirements for Veeam Explorer for Microsoft SQL Server
- System Requirements for Veeam Explorer for Oracle

Reference

For the full list of system requirements, see the System Requirements section in the Veeam Backup & Replication User Guide.

Used Ports

On backup infrastructure components, Veeam Backup & Replication automatically creates firewall rules for the required ports. These rules allow communication between the components.

You can find the lists of the ports in the following sections of the Veeam Backup & Replication User Guide:

- Backup Server Connections
- Microsoft Windows Server Connections
- Linux Server Connections
- Backup Proxy Connections
- Backup Repository Connections
- Mount Server Connections
- VM Guest OS Connections
- Veeam Backup Enterprise Manager Connections
- Veeam Explorer for Microsoft Active Directory Connections
- Veeam Explorer for Microsoft Exchange Connections
- Veeam Explorer for Microsoft SharePoint Connections
- Veeam Explorer for Microsoft SQL Server Connections
- Veeam Explorer for Oracle Connections
- Veeam Agent for Microsoft Windows Connections
- Veeam Agent for Linux Connections

Reference

For the full list of ports, see the Used Ports section in the Veeam Backup & Replication User Guide.

Deployment

To start using Veeam Backup & Replication, do the following:

1. Install Veeam Backup & Replication
2. Add virtual infrastructure servers
3. Configure backup proxy
4. Configure backup repository
5. Configure object storage repository (optional)
6. Configure scale-out backup repository (optional)

> **NOTE:**
>
> In the simple deployment scenario, Veeam Backup & Replication uses the backup server also as the backup proxy and backup repository. For this reason, you can skip the third and fourth steps.

Step 1. Installing Veeam Backup & Replication

Install Veeam Backup & Replication on a Microsoft Windows-based physical or virtual machine.

Before You Begin

Before you install Veeam Backup & Replication, check the following prerequisites:

- The machine on which you plan to install Veeam Backup & Replication must meet the system requirements for the backup server. For details, see System Requirements.
- A user account that you plan to use for installation must have local Administrator permissions.

Installing Veeam Backup & Replication

To install Veeam Backup & Replication, do the following:

1. Download the latest version of the Veeam Backup & Replication installation image from the Download Veeam products page.

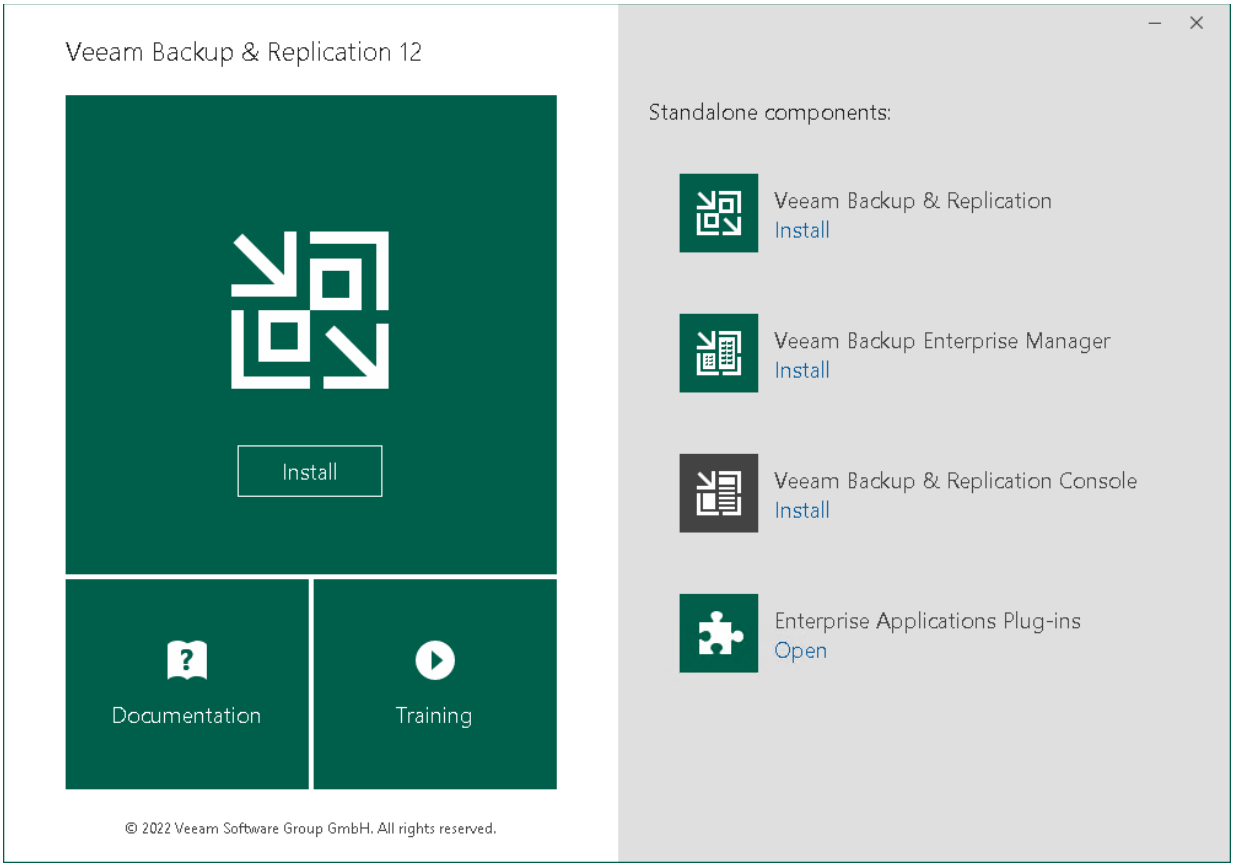
   You must sign in with your Veeam account. If you do not have the account, register with your business email address.

2. Mount the installation image to the machine on which you plan to install Veeam Backup & Replication or burn the image file to a flash drive or other removable storage device.

   If you plan to install Veeam Backup & Replication on a VM, use built-in tools of the virtualization management software to mount the installation image to the VM.

3. Run the `Setup.exe` file from the image or disk to open the splash screen.

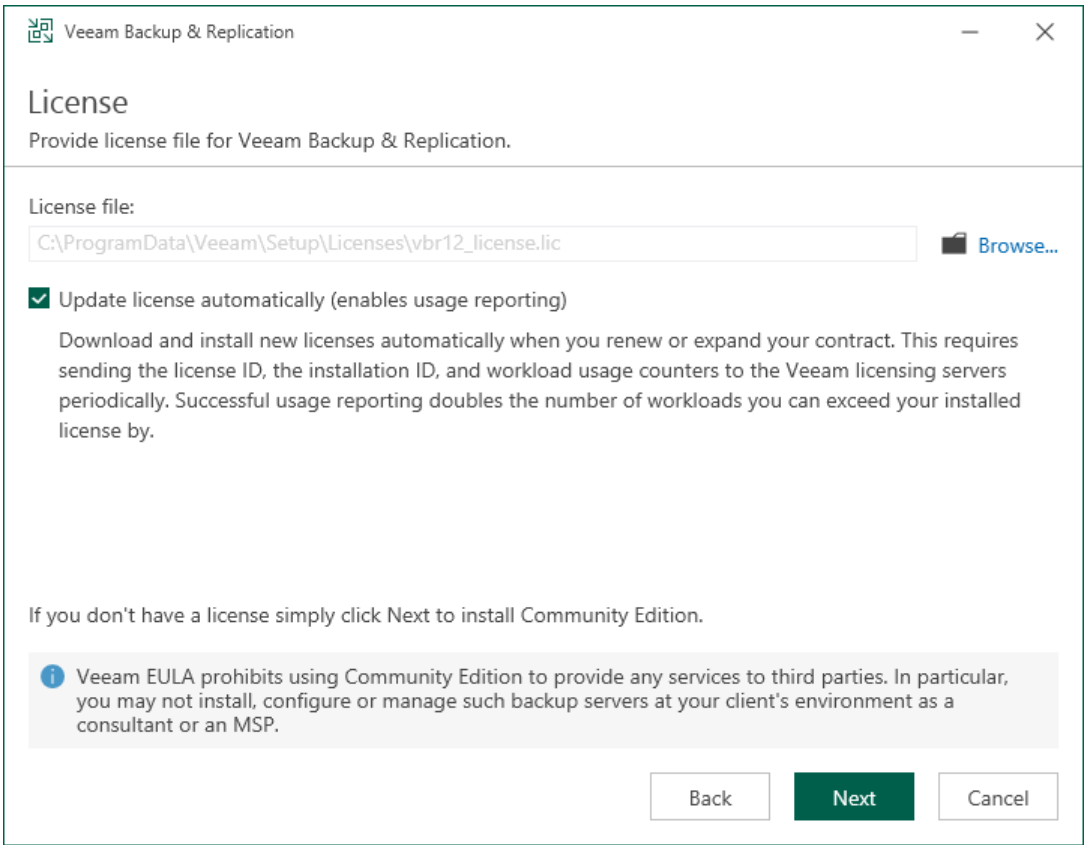
4. In the Veeam Backup & Replication section of the splash screen, click **Install**.



5. At the **License Agreement** step of the wizard, read the license agreements and click **I Accept**.

6. At the **License** step of the wizard, specify the path to the license key.

   If you skip this step, Veeam Backup & Replication will operate in the Community edition mode. You can switch to the full version of the product if you install the license. For more information, see Veeam Backup & Replication Community Edition.



7. At the **System Configuration Check** step of the wizard, install missing software components, if any.

   > **NOTE:**
   >
   > If all required components are already installed on the machine, the **System Configuration Check** step is skipped.

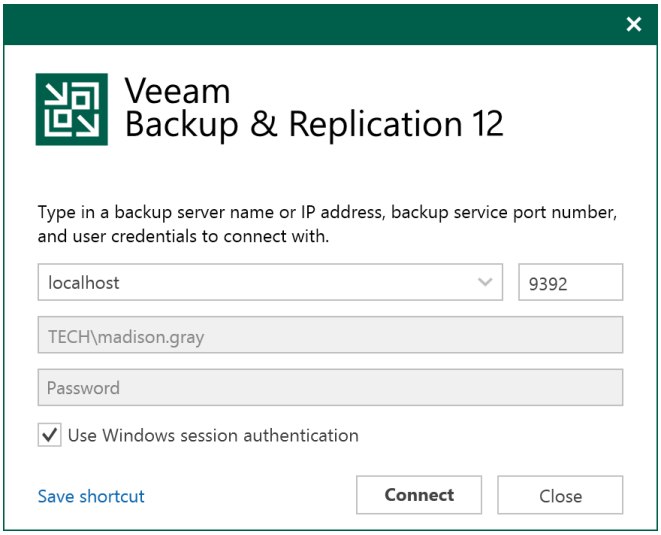
8. At the **Ready to Install** step of the wizard, click **Install** to begin the installation.

Starting Veeam Backup & Replication

To start Veeam Backup & Replication, do the following:

1. In the Microsoft Windows **Start** menu, select **Apps** > **Veeam** > **Veeam Backup & Replication Console**.

2. In the authentication window, click **Connect**.



Step 2. Adding Virtual Infrastructure Servers

To protect virtual machines with Veeam Backup & Replication, you must add the virtual infrastructure servers hosting these machines to the backup infrastructure.

You can add standalone Hyper-V hosts, Hyper-V clusters or SCVMM servers. If a Hyper-V host is a part of a cluster, it is recommended that you add the cluster, not a standalone Hyper-V host, to the backup infrastructure.

Before You Begin

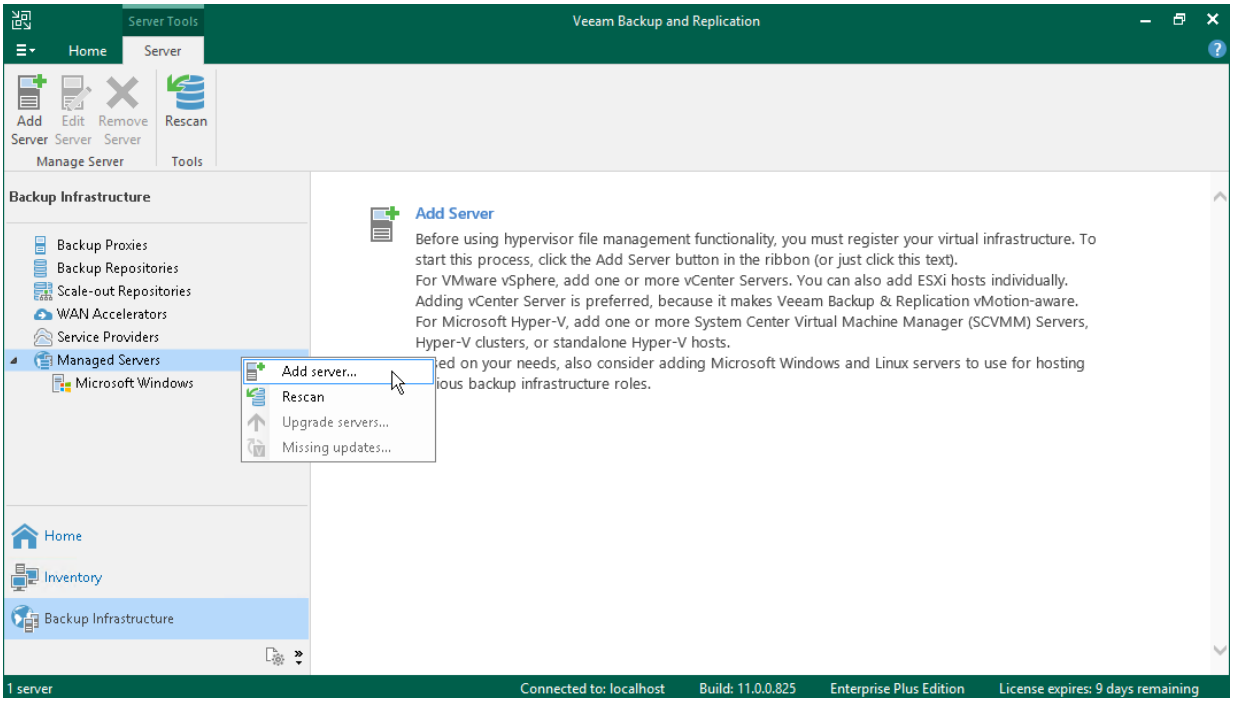
Check the following prerequisites:

- The version of your Microsoft Hyper-V platform must be supported. For details, see Platform Support in the Veeam Backup & Replication User Guide.
- You must enable file and printer sharing in the network connection settings of the host. Without sharing enabled, Veeam Backup & Replication fails to deploy the required components.

Adding Infrastructure Server

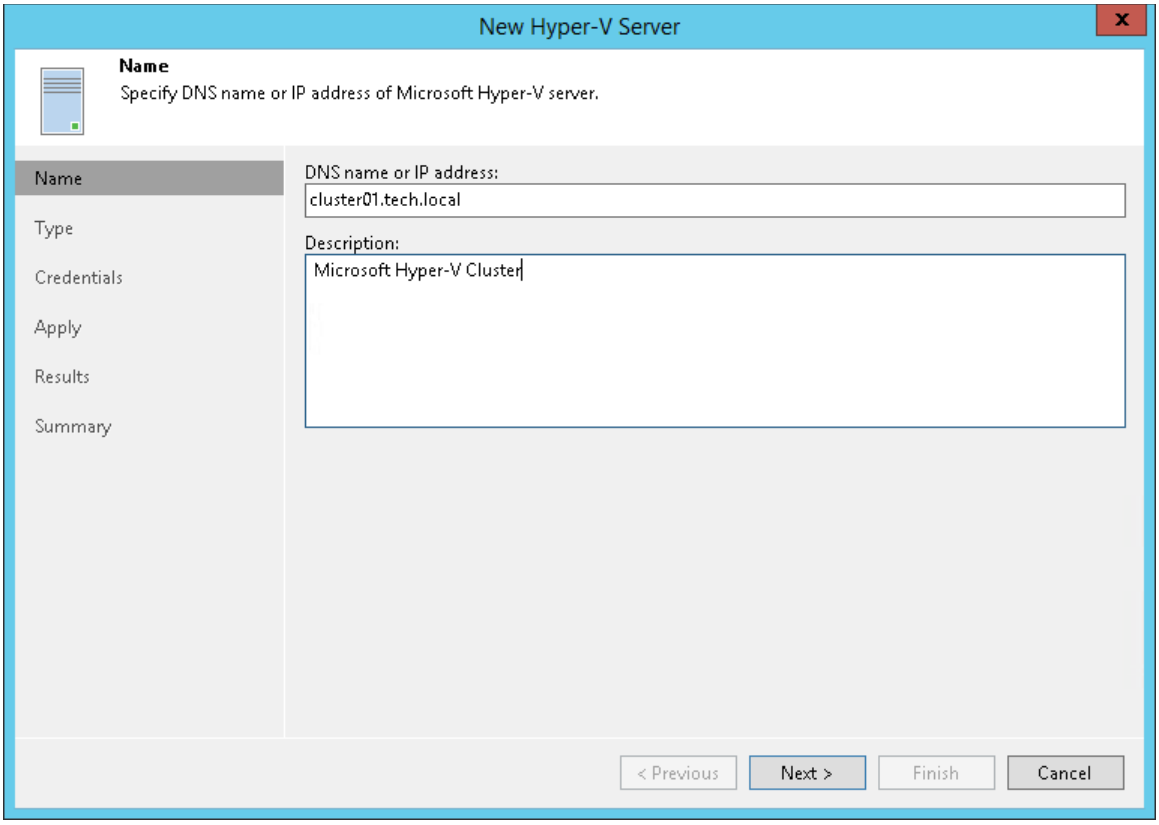
To add the server, do the following:

1. In the inventory pane of the **Backup Infrastructure** view, right-click the **Managed Servers** node and select **Add Server**.

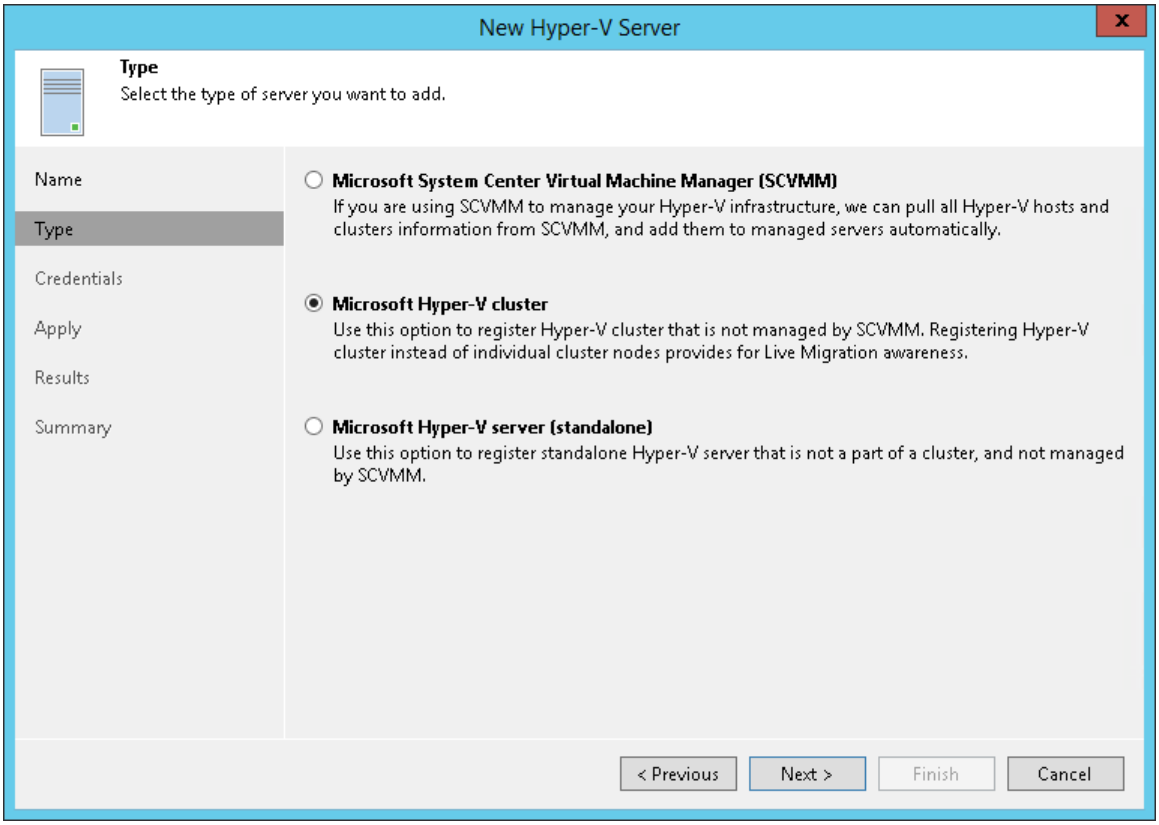


2. In the **Add Server** window, click **Microsoft Hyper-V** > **Hyper-V** to launch the **New Hyper-V Server** wizard.

3. At the **Name** step of the wizard, specify the DNS name or IP address of the server.



4. At the **Type** step of the wizard, select the server type that you want to add.



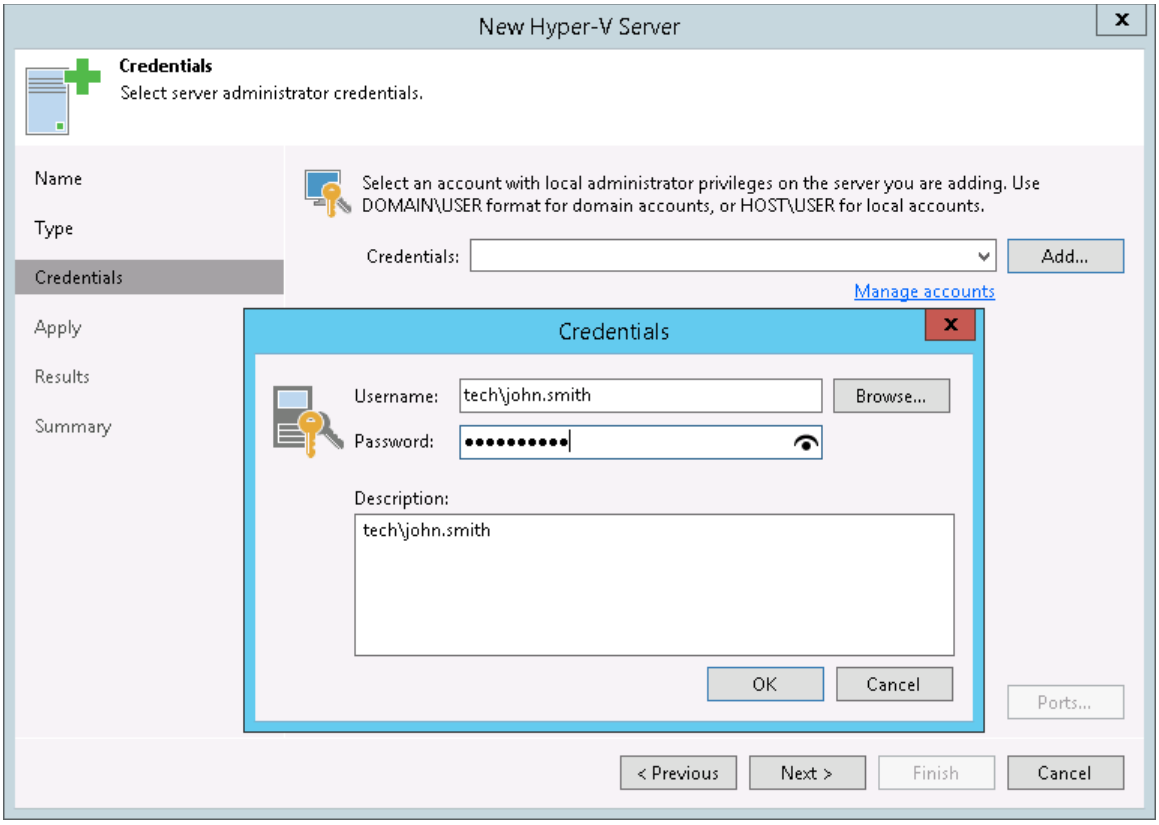
5. At the **Credentials** step of the wizard, specify credentials for the user account with Administrator permissions on the added server.

   To add the account, do the following:

   a. Click **Add**.

   b. In the **Credentials** window, specify the username and password used to connect to the added server.

   c. Click **OK**.



6. Follow the next steps of the wizard. At the **Summary** step, click **Finish**.

7. Open the **Backup Infrastructure** view and click the **Managed Servers** node. The added server must be available in the working area.

Reference

For details on adding virtual infrastructure servers, see the Virtualization Servers and Hosts section in the Veeam Backup & Replication User Guide.

Step 3. Configuring Backup Proxy

The backup proxy compresses, deduplicates and sends data to the backup repository. By default, the role of the backup proxy is assigned to the host. The on-host backup proxy does not need any manual configuration.

You can deploy an off-host backup proxy to remove unwanted overhead on the production Hyper-V host. The off-host backup proxy is used in complicated scenarios, that is why we omit its configuration in this guide. For more information, see the Off-Host Backup Proxy section in the Veeam Backup & Replication User Guide.

Step 4. Configuring Backup Repository

The backup repository is a storage where Veeam Backup & Replication keeps backup files and, in case of replication, metadata for replicated VMs. You can use different types of storage as the backup repository. The full list of storage types is available in the Backup Repository section in the Veeam Backup & Replication User Guide.

In this section, you will learn how to use a Microsoft Windows server as the backup repository. To configure the backup repository, you must add the server to the backup infrastructure and assign the role of the backup repository to it.

Before You Begin

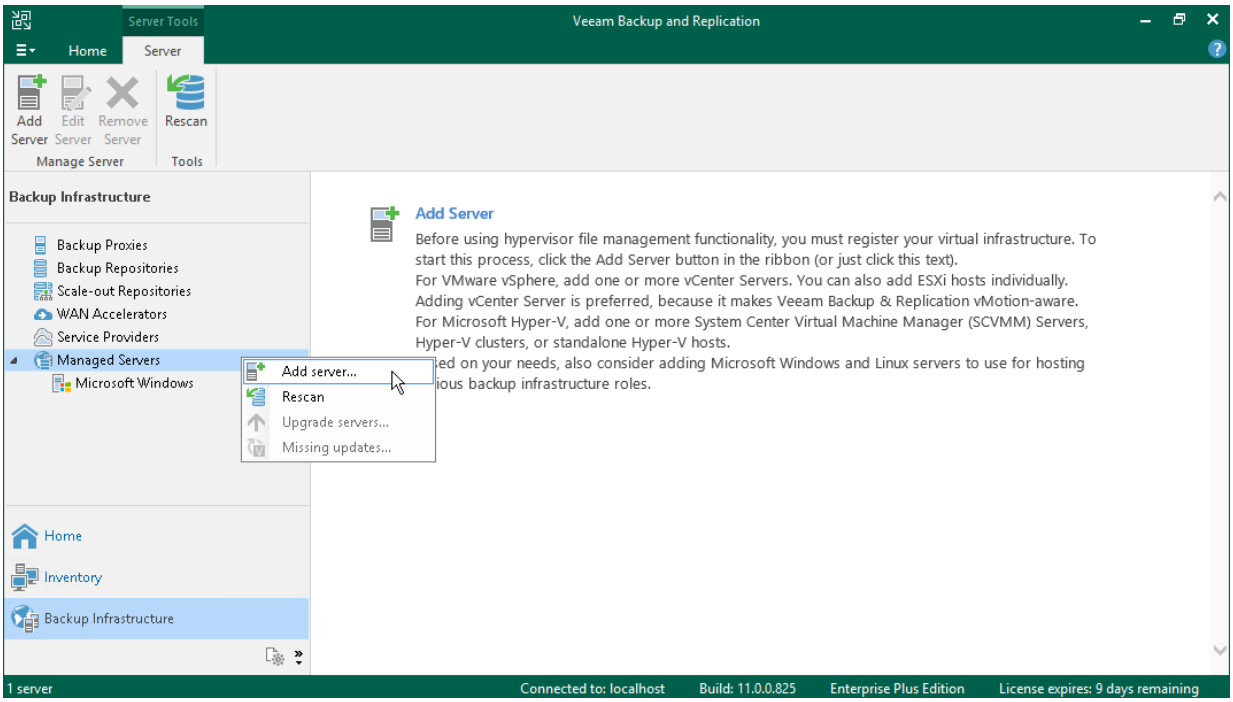
Check the following prerequisites:

- The Microsoft Windows machine that you plan to use as a backup repository must meet system requirements. For details, see System Requirements in the Veeam Backup & Replication User Guide.
- File and printer sharing must be enabled in network connection settings of the added Microsoft Windows machine. On this machine, Veeam Backup & Replication deploys the required components. Without sharing enabled, Veeam Backup & Replication fails to deploy these components.

Adding a Server

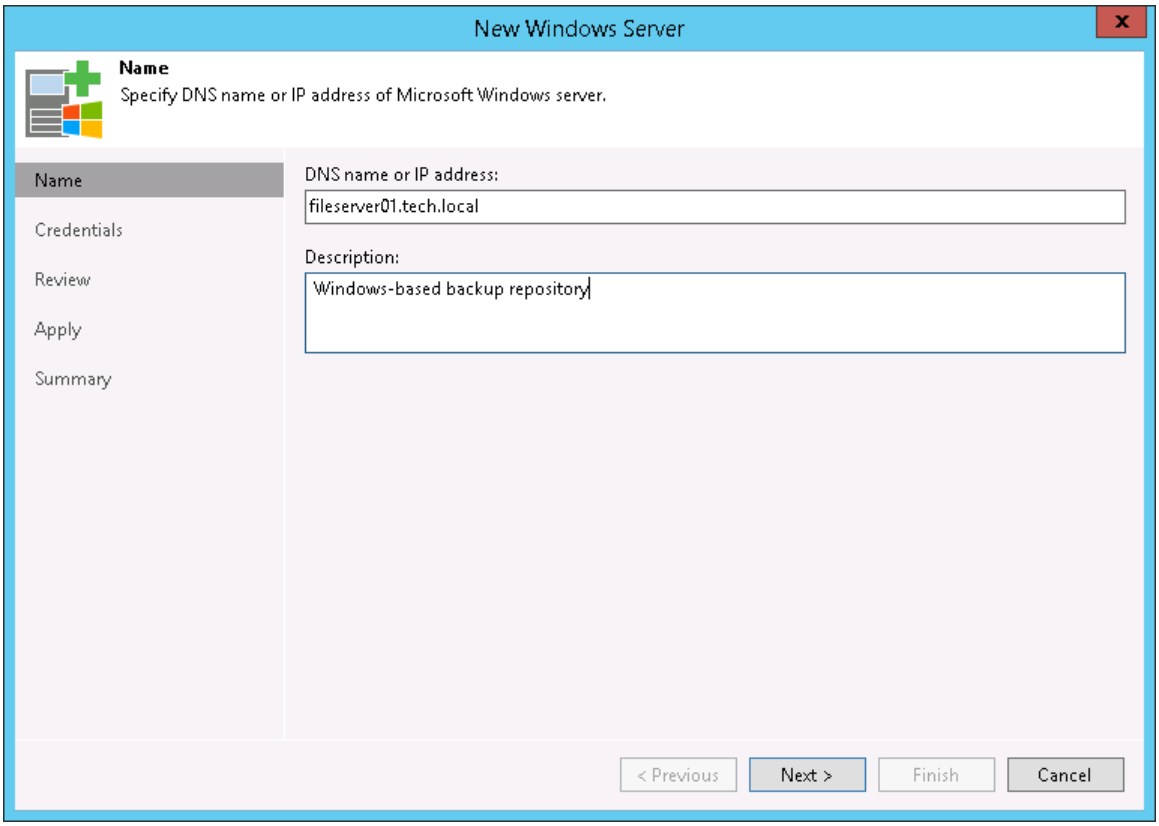
To add a server to the Veeam Backup & Replication infrastructure, do the following.

1. In the inventory pane of the **Backup Infrastructure** view, right-click the **Managed Servers** node and select **Add Server**.



2. In the **Add Server** window, select **Microsoft Windows** to launch the **New Windows Server** wizard.

3. At the **Name** step of the wizard, specify the DNS name or IP address of the server that will perform the role of the backup repository.



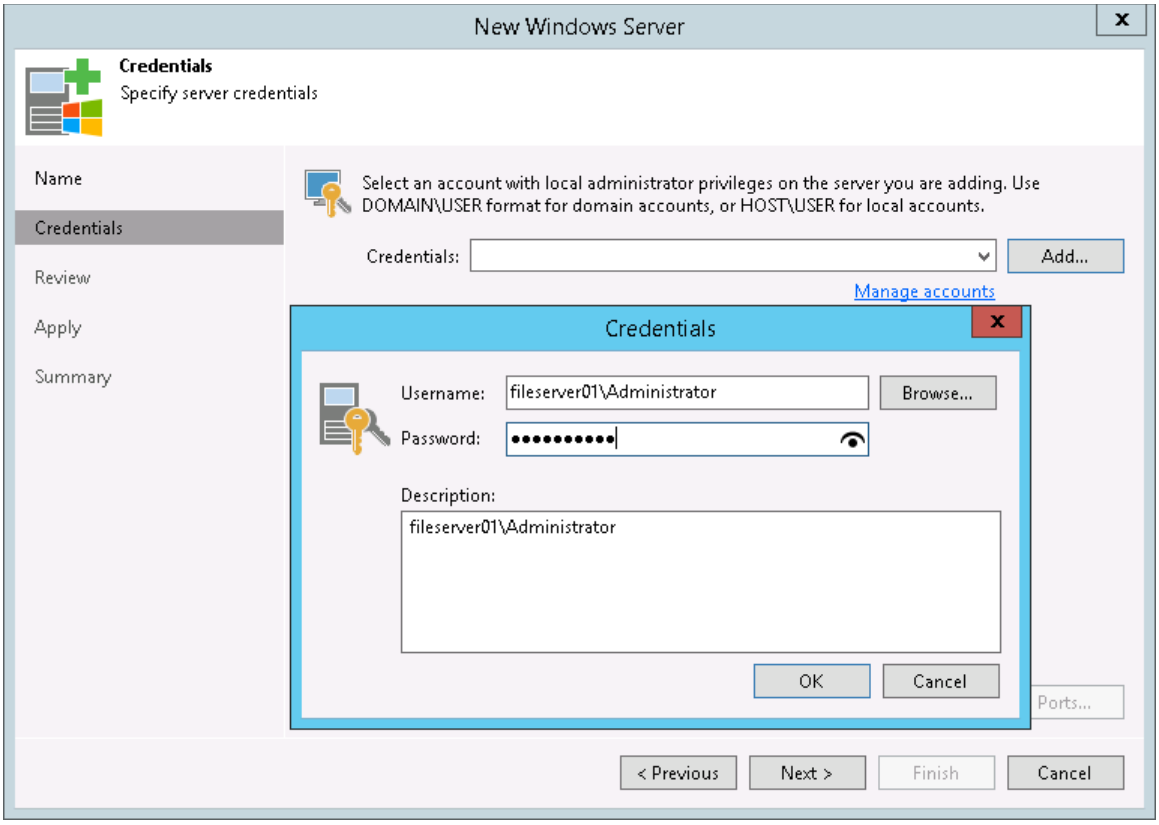
4. At the **Credentials** step of the wizard, enter credentials for the user account with local Administrator permissions to the added server.

   To add the account, do the following:

   a. Click **Add**.

   b. Specify the username and password used to connect to the added server.

c. Click **OK**.

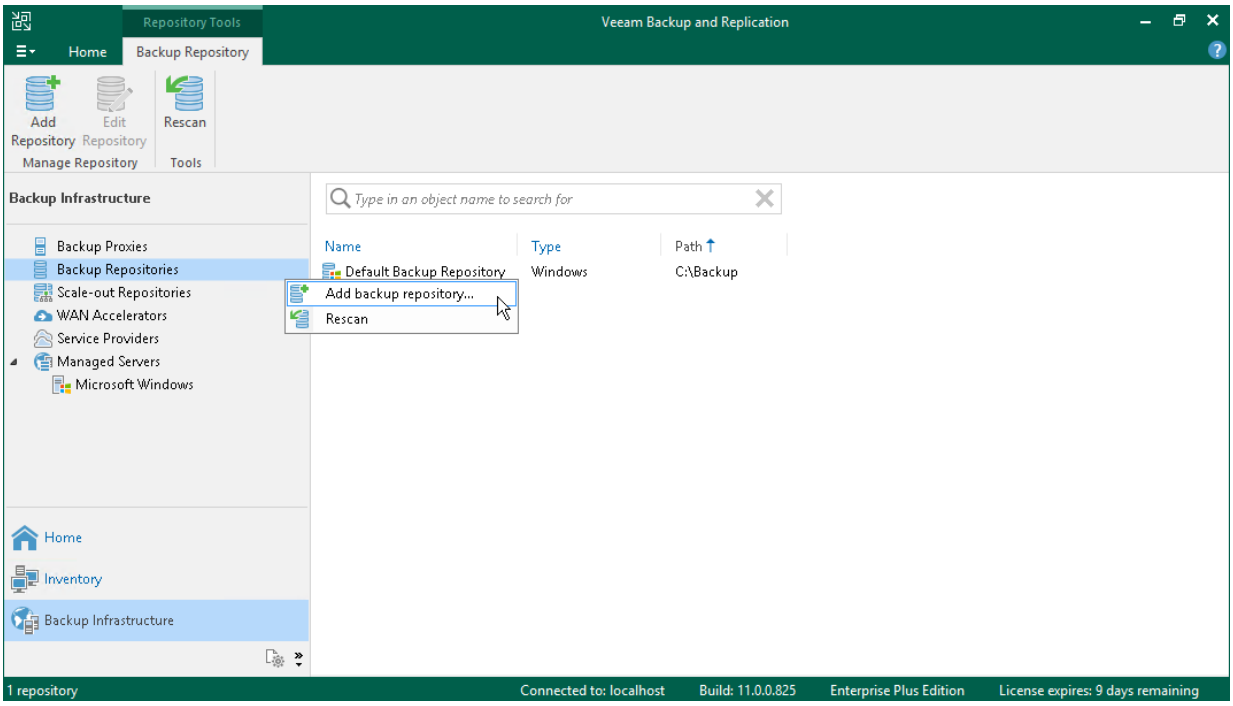


5. Follow the next steps of the wizard. At the last step of the wizard, click **Finish** to add the server.
6. Open the **Backup Infrastructure** view and click the **Managed Servers** node. The added server must be available in the working area.

Assigning Backup Repository Role to Added Server

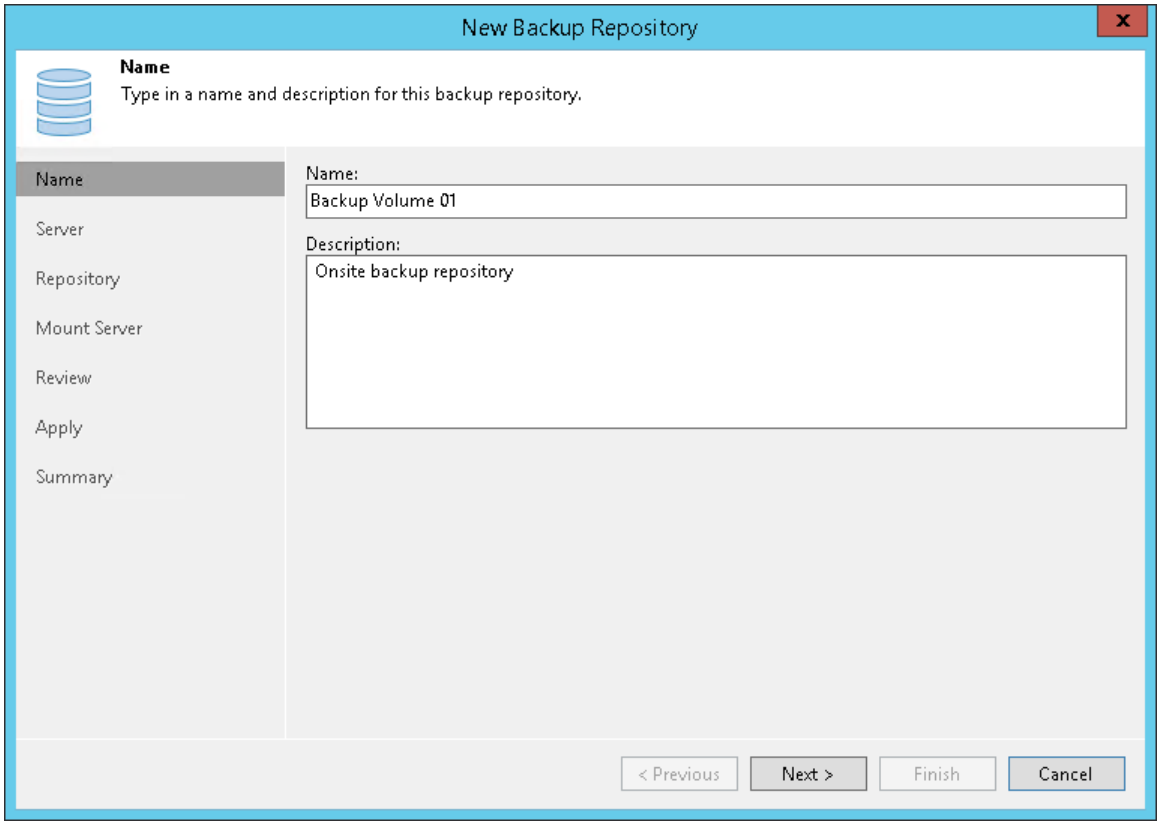
To assign the role of the backup repository:

1. In the inventory pane, right-click the **Backup Repositories** node and select **Add Backup Repository** to launch the **New Backup Repository** wizard.

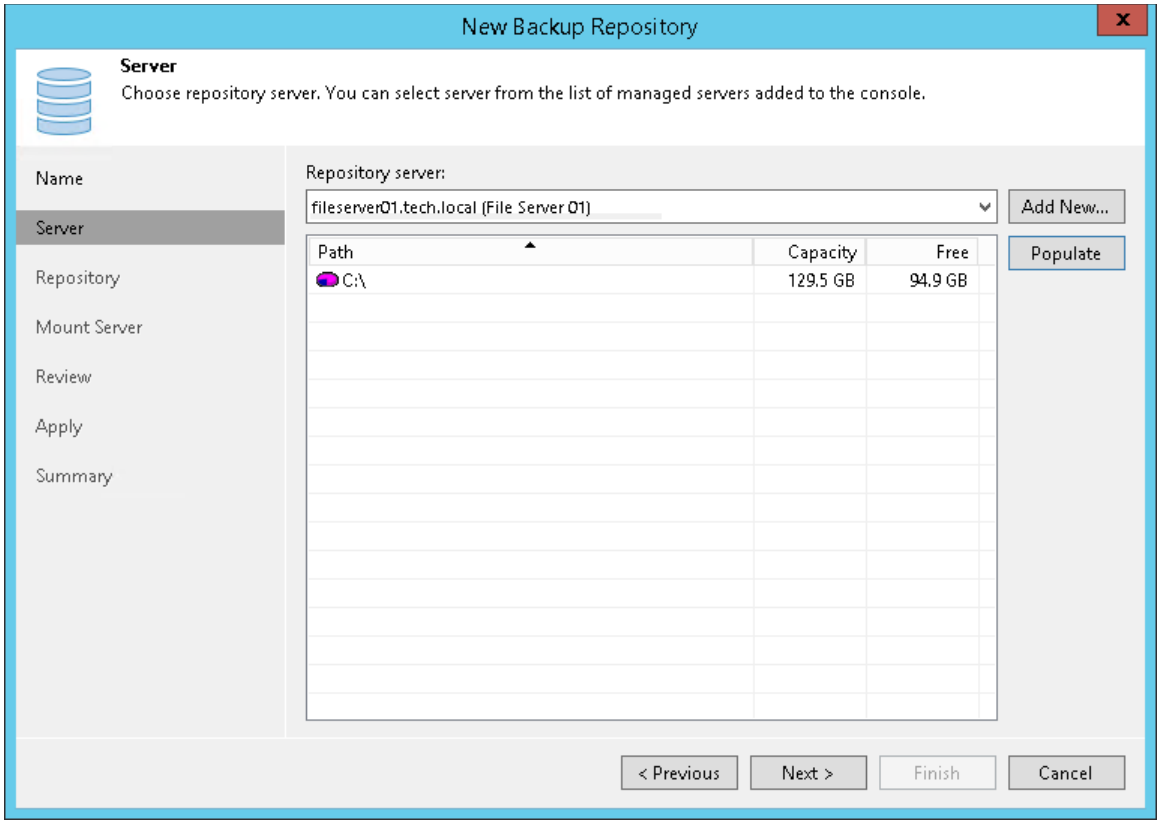


2. In the **Add Backup Repository** window, click **Direct attached storage** >**Microsoft Windows**.

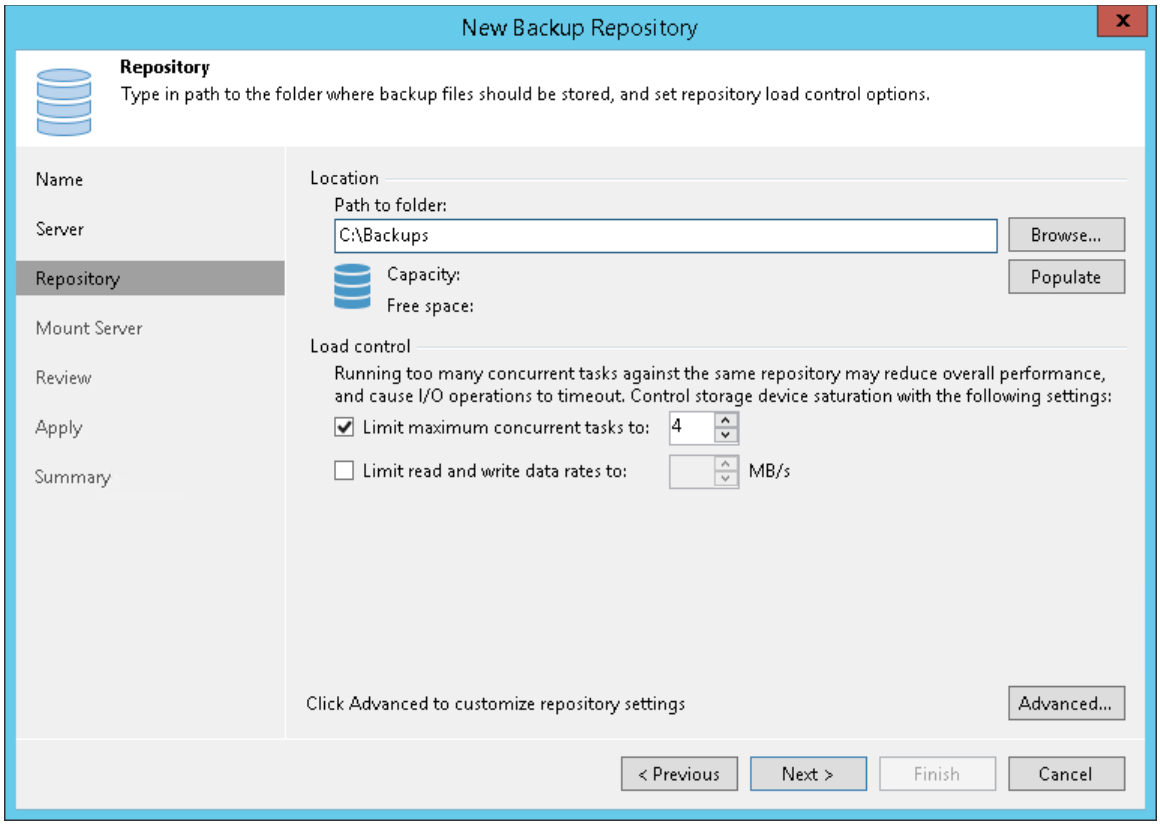
3. At the **Name** step of the wizard, specify the name for the added backup repository.



4. At the **Server** step of the wizard, select the machine that you have added.



5. At the **Repository** step of the wizard, specify a path to the folder where backup files will be stored. In addition to them, auxiliary replica files will be placed in this folder.



6. At the **Mount Server** step of the wizard, keep the default settings.

7. Follow the next steps of the wizard. At the **Summary** step, click **Finish**.
8. Open the **Backup Infrastructure** view and click the **Backup Repositories** node. The added backup repository must be available in the working area.

Reference

For details on the backup repository, see the Backup Repository section in the Veeam Backup & Replication User Guide.

Step 5. Configuring Object Storage Repositories

An object storage repository is a repository intended for long-term data storage. It can be based on either a cloud solution or an S3 compatible storage solution. Configuring an object storage repositories is an optional step.

Veeam Backup & Replication supports the following types of object storage repositories:

- S3 compatible
- Amazon S3, Amazon S3 Glacier and Amazon Snowball Edge
- Google Cloud
- IBM Cloud
- Microsoft Azure Blob, Azure Archive Storage and Azure Data Box

In this section, you will learn how to configure Amazon S3 Compatible storage system as a backup repository.

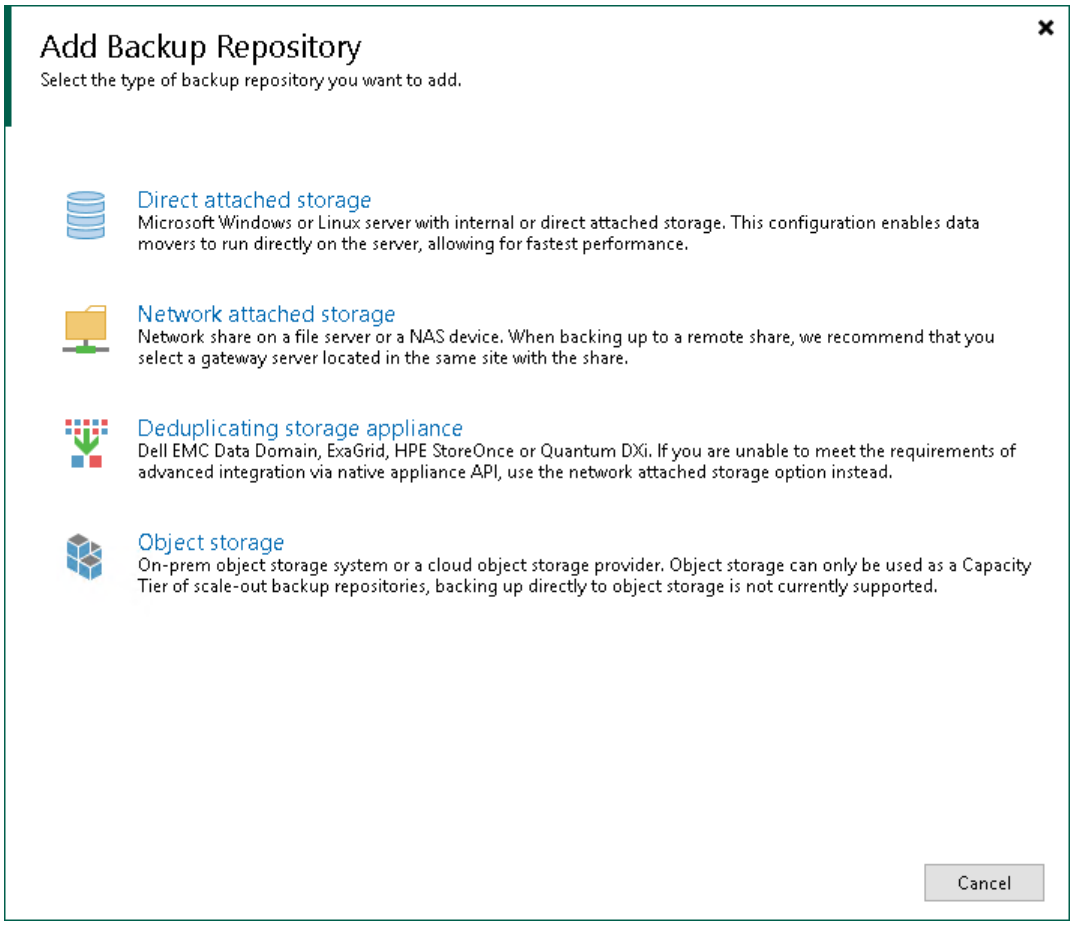
Before You Begin

Before you add an object storage repository, check limitations. To learn about limitations for different storage repositories, see Considerations and Limitations in the Veeam Backup & Replication User Guide.

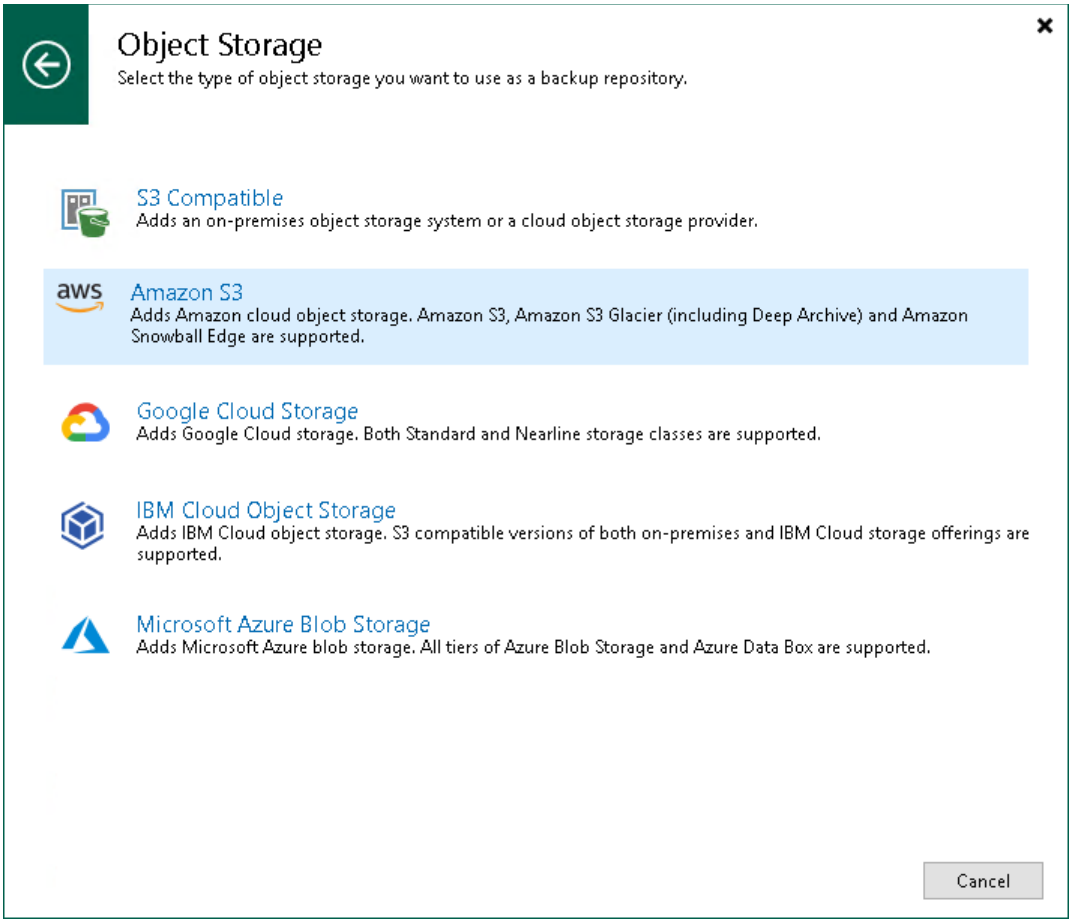
Configuring Object Storage Repository

To add an object storage repository to the Veeam Backup & Replication infrastructure, do the following:

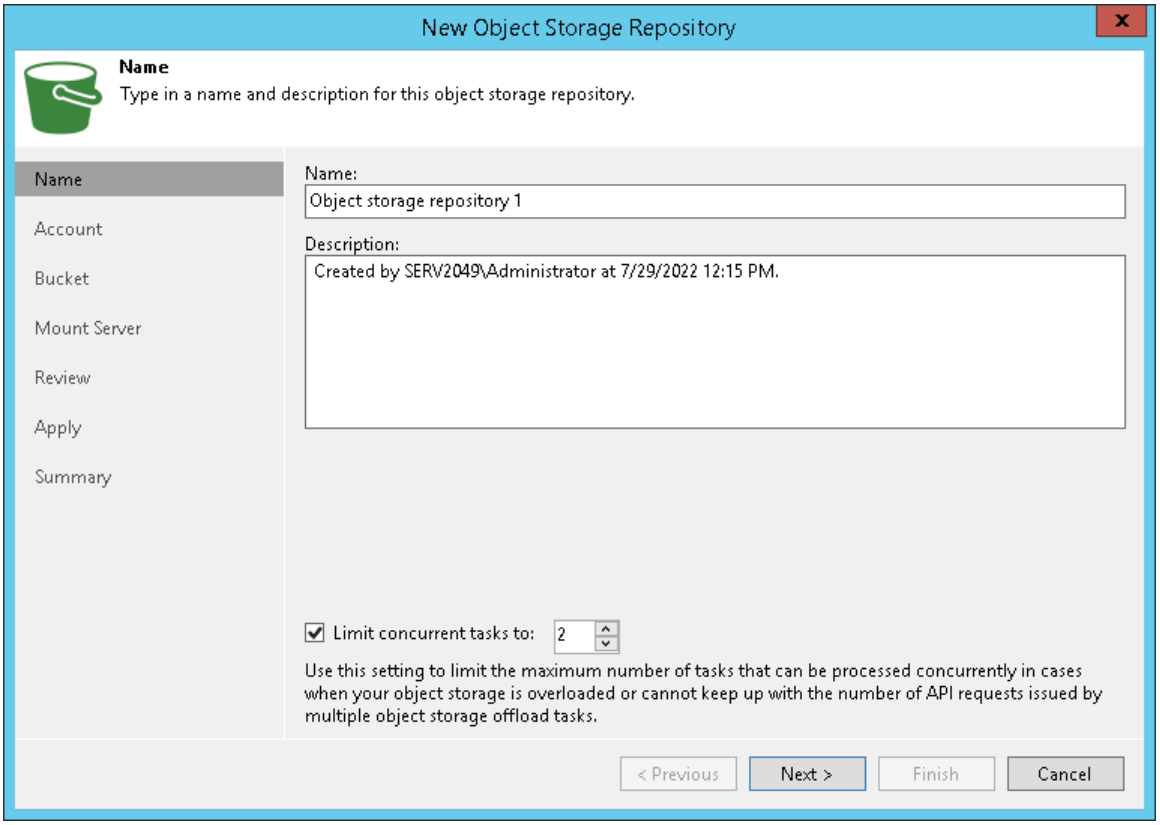
1. Open the **Backup Infrastructure** view. In the inventory pane, right-click the **Backup Repositories** node and select **Add Backup Repository**. In the **Add Backup Repository** dialog, select **Object Storage**.



2. In the **Object Storage** dialog, select **Amazon S3**.



3. At the **Name** step of the wizard, specify the name and description for the object storage repository.



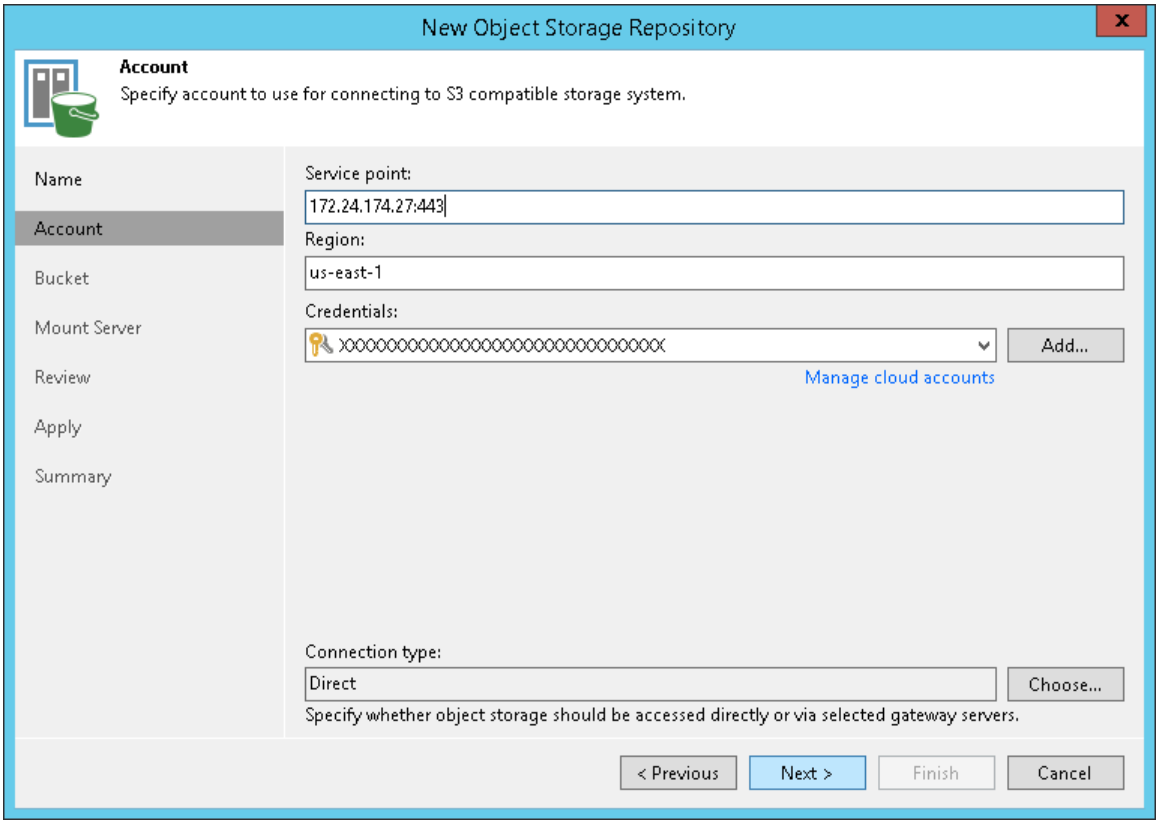
4. At the **Account** step of the wizard, specify the connection settings:

   a. [For AWS Snowball Edge, Azure Data Box, S3 Compatible, IBM Cloud] In the **Service point / Service endpoint** field, specify a service point address of your object storage.

   b. From the **Credentials** drop-down list, select user credentials to access your object storage. If you already have a credentials record that was configured in advance, select such a record from the drop-down list. Otherwise, click **Add** and provide your access and secret keys. For more information, see Cloud Credentials Manager in the Veeam Backup & Replication User Guide.

   c. In the **Region / Data center region** drop-down list, select a region type.

   If your organization has NAT or different types of firewalls and your access to the internet is limited, you may want to use a gateway server. To do so, select the **Use the following gateway server** check box and choose a server from the list.



5. At the **Bucket** step of the wizard, specify how your data will be stored.

   a. [For Amazon S3] From the **Data center region** drop-down list, select a region.

   b. From the **Bucket** drop-down list, select a bucket. Make sure that the bucket you want to use to store your backup data was created in advance.

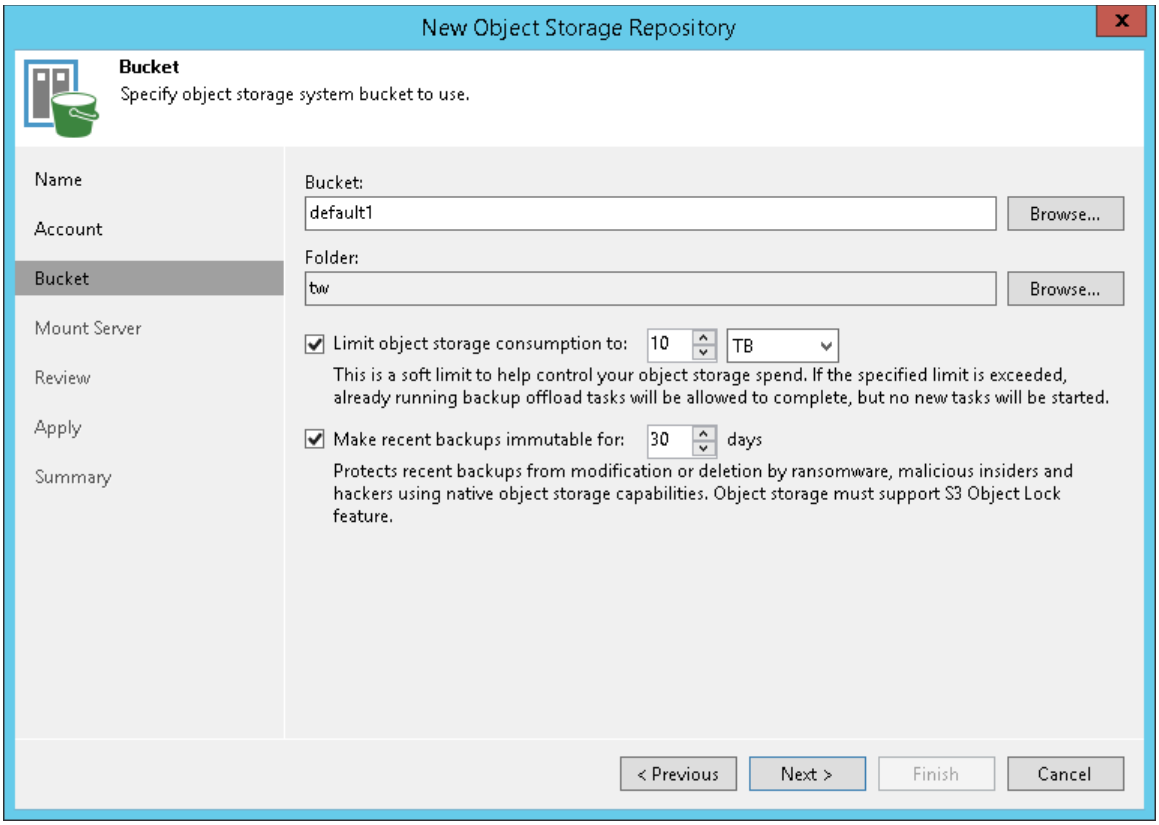
      [For Azure Blob, Azure Data Box] From the **Container** drop-down list, select a container. Make sure that the container you want to use to store your backup data was created in advance.

   c. In the **Folder** / **Select Folder** field, select a cloud folder to which you want to map your object storage repository. To do it, click **Browse** and either select an existing folder or create a new one by clicking **New Folder**.

   To define a soft limit for your object storage consumption that can be exceeded temporarily, select the **Limit object storage consumption to** check box and provide the value in TB or PB.

   [For Amazon S3, S3 Compatible] To prohibit deletion of blocks of data from object storage, select the **Make recent backups immutable for** check box and specify the immutability period.

[For Amazon S3] If you plan to access your backup data rarely, select the **Use infrequent access storage class** check box. To enable Amazon S3 One Zone-Infrequent Access, select the **Store backups in a single availability zone only** check box. For more information, see this Amazon article.



6. At the **Mount Server** step, leave the default settings.
7. At the **Summary** step of the wizard, review the settings and click **Finish**.
8. Open the **Backup Infrastructure** view and click the **Backup Repositories** node. The added object storage repository must be available in the working area.

Reference

For details on adding object storage repositories, see the Adding Object Storage Repositories section in the Veeam Backup & Replication User Guide.

Step 6. Configuring Scale-Out Backup Repositories

A scale-out backup repository is a repository system for multi-tier storage of data, where the capacities of all the added storage devices and systems are summarized. A scale-out backup repository consists of one or more backup repositories called performance extents, and can be expanded with an object repository called capacity extent.

Configuring a scale-out backup repository is an optional step. For more information on scale-out backup repositories, see the Scale-Out Backup Repository section in the Veeam Backup & Replication User Guide.

Before You Begin

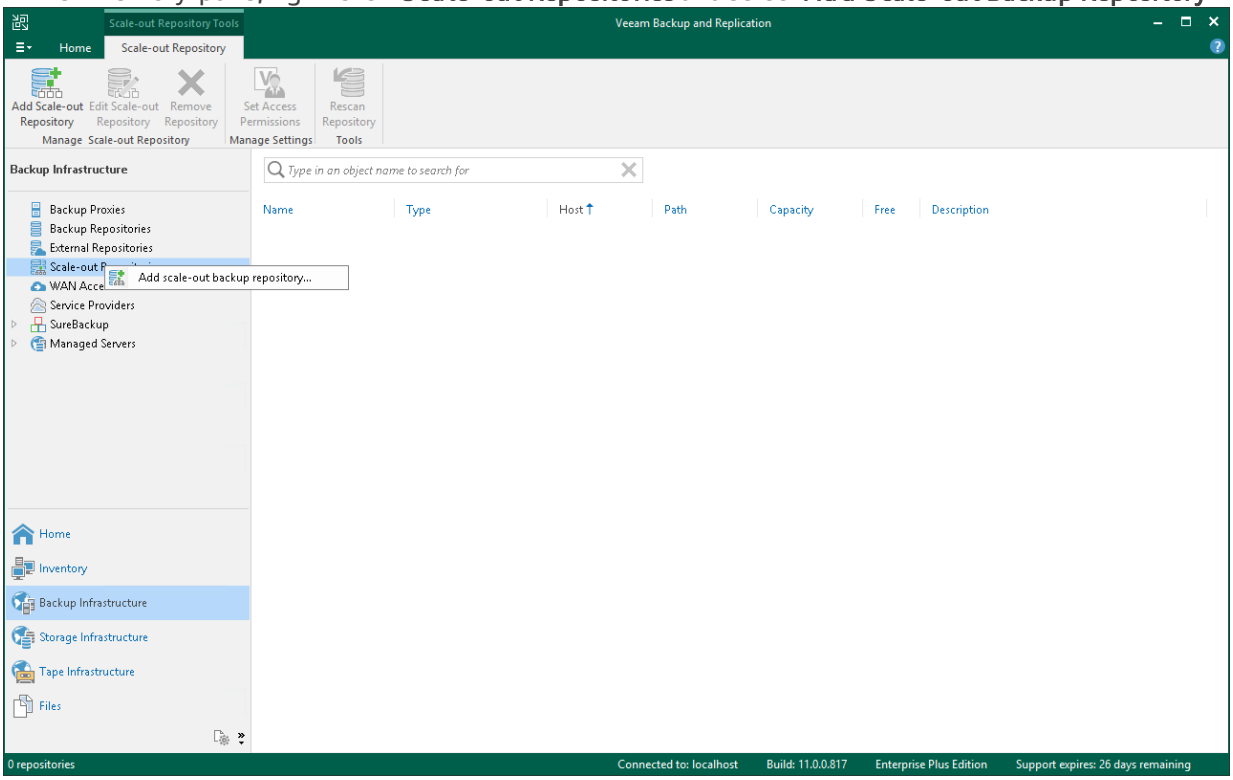
Before you add a scale-out backup repository to the backup infrastructure, check the following prerequisites:

- Backup repositories that you plan to add as performance extents to the scale-out backup repository must be added to the backup infrastructure. For more information, see Configuring Backup Repository.
- If you wish to use the capacity tier option of the scale-out backup repository, an object storage repository that you plan to add as a capacity extent to the scale-out backup repository must be added to the backup infrastructure. For more information, see Configuring Object Storage Repository.
- Check limitations for scale-out backup repositories. For more information, see Limitations for Scale-Out Backup Repositories in the Veeam Backup & Replication User Guide.

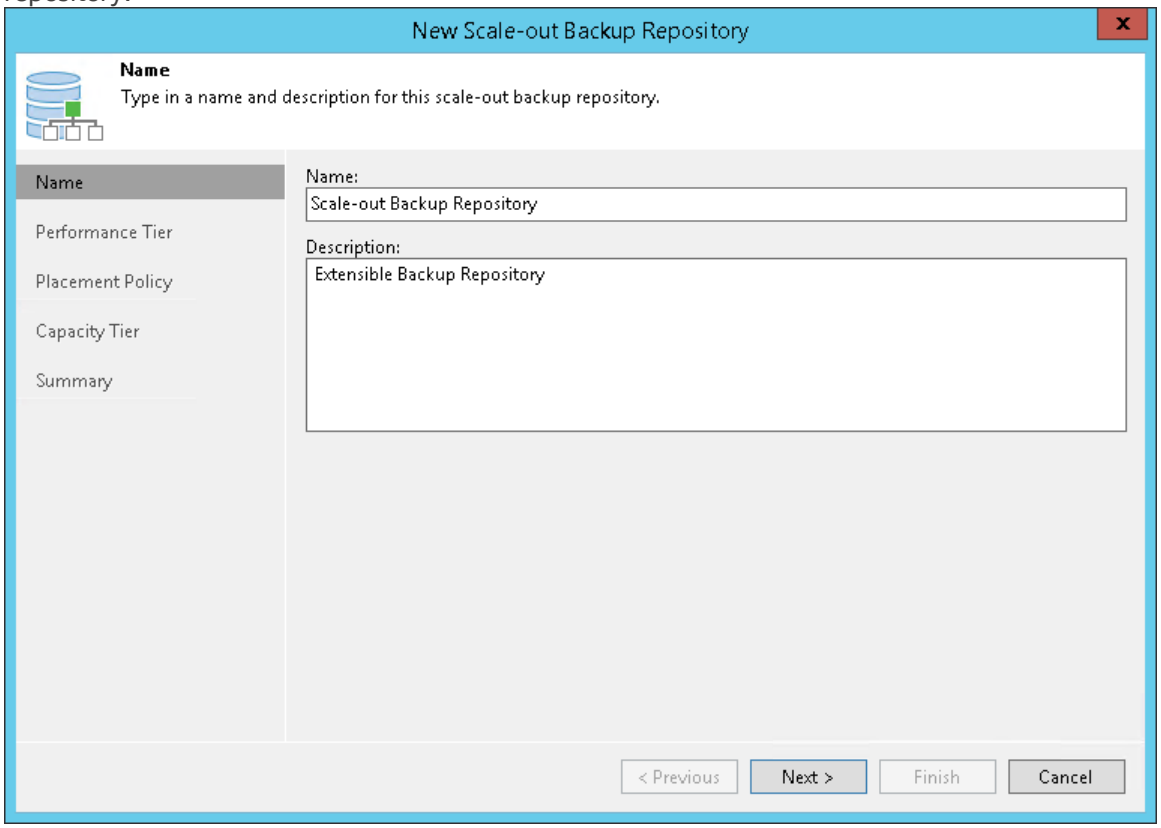
Configuring Scale-Out Backup Repository

To add a scale-out backup repository to the Veeam Backup & Replication infrastructure, do the following:

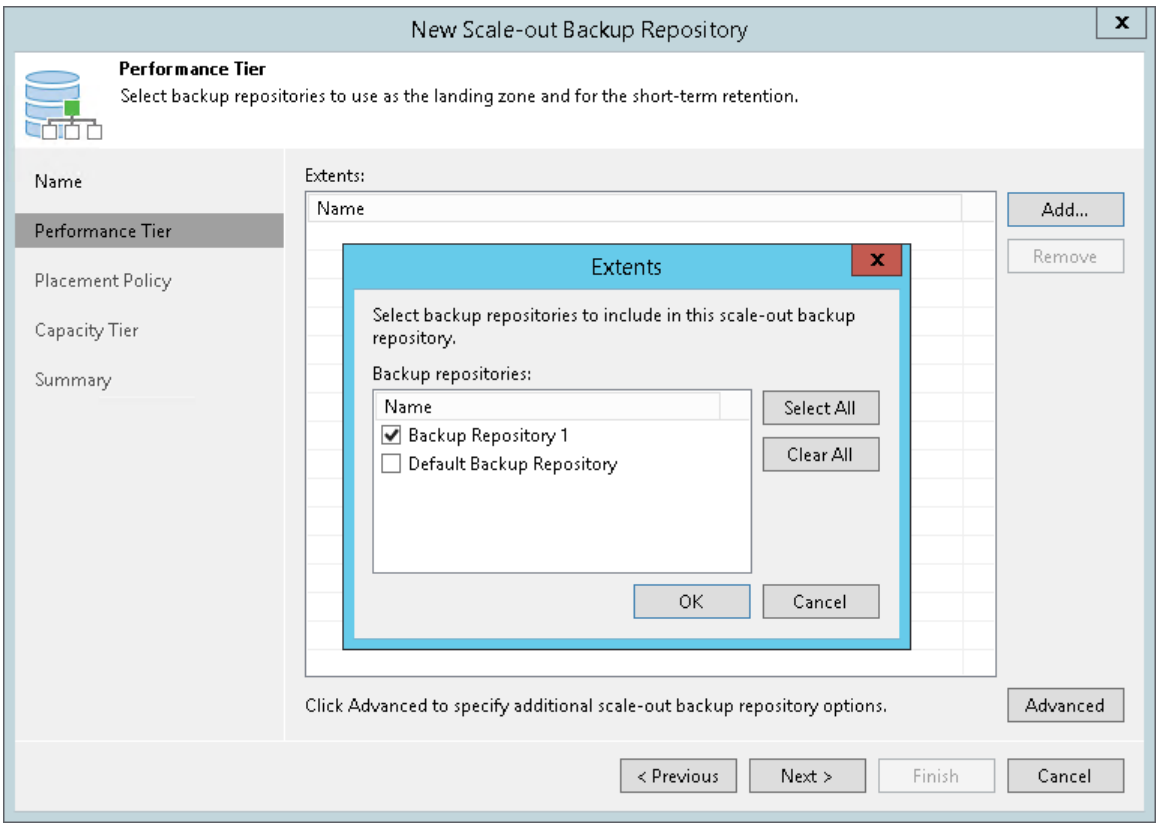
1. In the inventory pane, right-click **Scale-out Repositories** and select **Add Scale-out Backup Repository**.



2. At the **Name** step of the wizard, specify a name and an optional description for the scale-out backup repository.

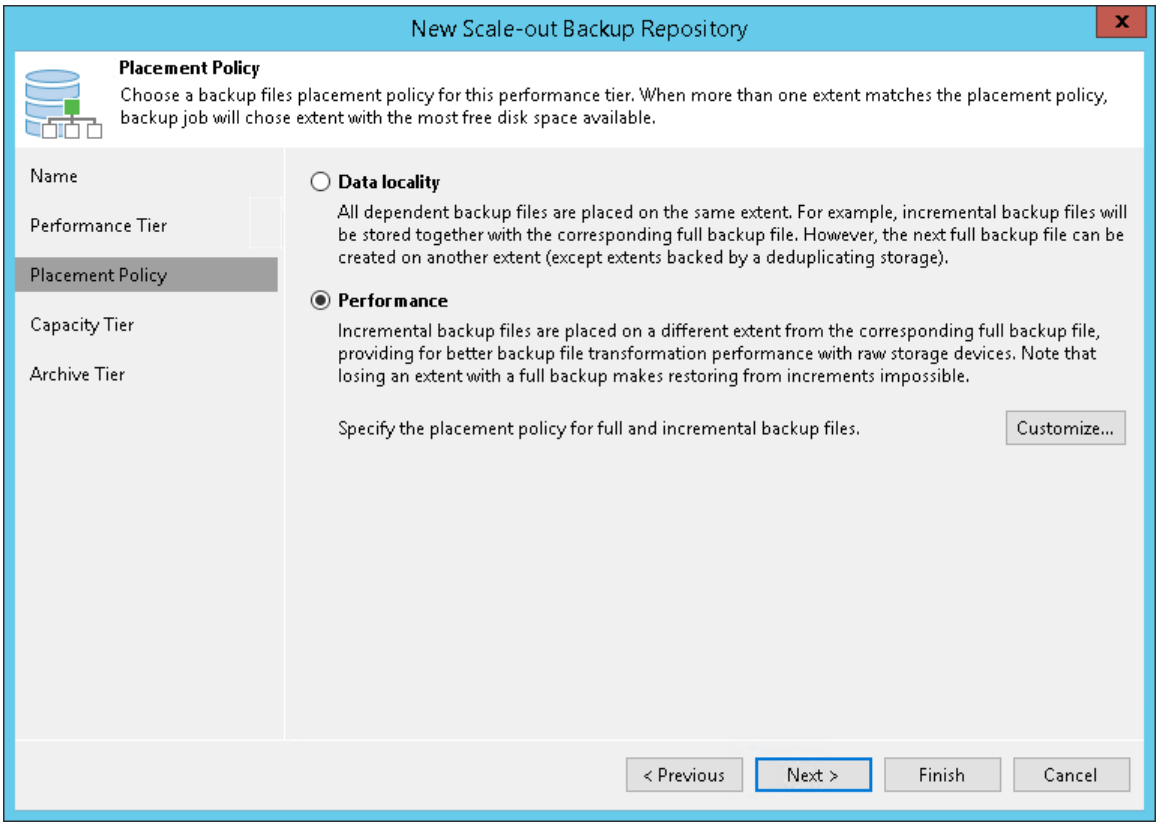


3. At the **Performance Tier** step of the wizard, specify which backup repositories you want to add as performance extents, and configure options for the scale-out backup repository. To do it, on the right side of the **Extents** list, click **Add**. In the **Extents** window, select check boxes next to backup repositories that you want to add as performance extents. Afterwards, click **OK**.



4. At the **Policy** step of the wizard, specify how you want to store backup files at the performance extents of the scale-out backup repository:
   - Select **Data locality** if you want to store backup files that belong to the same backup chain at the same performance extent.

- Select **Performance** if you want to store full and incremental backup files at different performance extents of the scale-out backup repository.



5. At the **Capacity Tier** step of the wizard, select an object storage repository that you want to add as a capacity extent and specify when to move and/or copy data. This is an optional step.

   To configure the capacity tier, do the following:

   a. Select the **Extend scale-out backup repository capacity with object storage** check box.

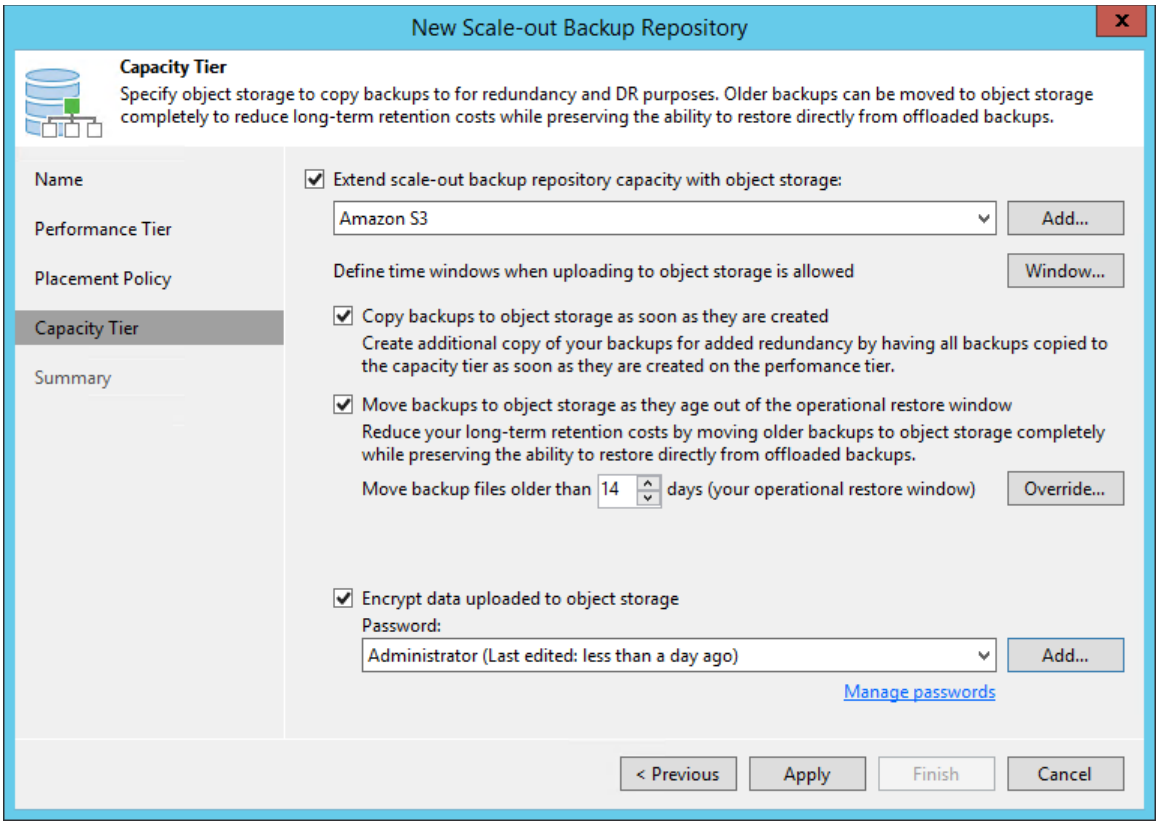
   b. From the drop-down list, select an object storage repository to which you want to offload your data.

   c. Click **Window** and specify when it is allowed or prohibited to move or copy data to object storage.

   d. Select the **Copy backups to object storage as soon as they are created** check box to copy new backups as soon as they are created.

   e. Select the **Move backups to object storage as they age out of the operational restores window** check box to move inactive backup chains to the capacity extent.

f. To offload data encrypted, select the **Encrypt data uploaded to object storage** check box and provide a strong password. If you have not created the password beforehand, click **Add** or use the **Manage passwords** link to specify a new password.



6. At the **Summary** step of the wizard, review the settings and click **Finish**.
7. Open the **Backup Infrastructure** view and click the **Scale-Out Repositories** node. The added scale-out backup repository must be available in the working area.

Reference

For details on adding scale-out backup repositories, see the Adding Scale-Out Backup Repositories section in the Veeam Backup & Replication User Guide.

VM Backup

When you perform a backup, Veeam Backup & Replication retrieves VM data from the source storage, compresses and deduplicates it. After that, Veeam Backup & Replication writes data to the backup repository in Veeam proprietary format.

In Veeam Backup & Replication, backup is a job-driven process. To perform the backup, you need to configure a backup job. For details, see Creating Backup Job.

During runs of backup jobs, Veeam Backup & Replication creates backup chains. The chain consists of the following backup files:

- Full backup file (.VBK) that contains a copy of the entire VM.
- Incremental backup file (.VIB or .VRB) that contains only those data blocks that have changed since the last backup job session.
- Metadata file (.VBM) that contains information on the backup job, VMs in the backup, number and structure of backup files, restore points and so on.

The amount of these files and how Veeam Backup & Replication places them depend on the chosen backup method. For details, see Backup Methods.

After you performed backups, you can use them to restore the following instances: entire VM, VM files, guest OS files and application items. For details on restore, see Data Restore.

Reference

For details, see the About Backup section in the Veeam Backup & Replication User Guide.

Backup Methods

Veeam Backup & Replication provides three methods for creating backup chains:

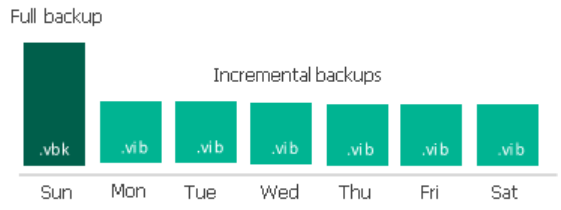
- Forever forward incremental backup
- Forward incremental backup
- Reverse incremental backup

Forever Forward Incremental Backup Method

The forever forward incremental backup method produces a backup chain that consists of the first full backup file (.VBK) and a set of forward incremental backup files (.VIB) following it.

During the first session of a backup job, Veeam Backup & Replication creates a full backup file on the backup repository. During subsequent backup job sessions, Veeam Backup & Replication copies only VM data blocks that have changed since the last backup job session and saves these blocks as an incremental backup file in the backup chain.

After adding a new restore point to the backup chain, Veeam Backup & Replication checks the retention policy for the job and deletes outdated restore points. For details, see Forever Forward Incremental Backup Retention Policy in the Veeam Backup & Replication User Guide.



Forward Incremental Backup Method

The forward incremental backup method produces a backup chain that consists of the first full backup file (.VBK) and a set of forward incremental backup files (.VIB) following it.

Additionally, the forward incremental backup chain contains full backup files that "split" the backup chain into shorter series. The subsequent full backup files can be the following:

- **Active**

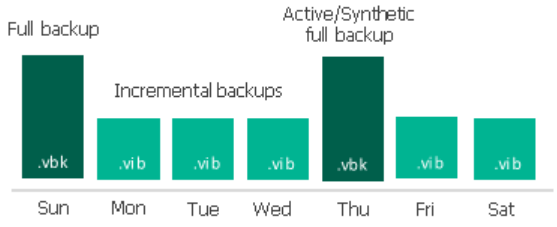
  The active full backup contains the copy of a VM. This backup is similar to the full backup created when you run a job for the first time. Veeam Backup & Replication retrieves data for the whole VM from the source, compresses and deduplicates it and stores it to the active full backup file.

- **Synthetic**

  The synthetic full backup also contains the copy of a VM. However, this copy is created from the backup files that you already have on the backup repository. Veeam Backup & Replication does not retrieve VM data from the source datastore.

During the first backup job session, Veeam Backup & Replication creates a full backup file. During subsequent backup job sessions, Veeam Backup & Replication copies only VM data blocks that have changed since the last backup job session and saves these blocks as an incremental backup file in the backup chain. On a day when the synthetic or active full backup is scheduled, Veeam Backup & Replication creates a full backup file and adds it to the backup chain.

After adding a new restore point to the backup chain, Veeam Backup & Replication checks the retention policy and deletes outdated restore points. For details, see Forward Incremental Backup Retention Policy in the Veeam Backup & Replication User Guide.

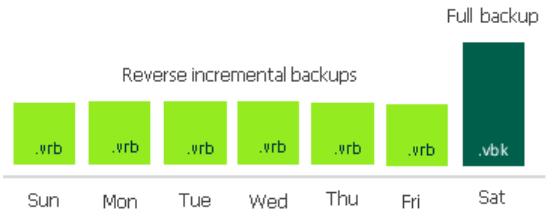


Reverse Incremental Backup Method

The reverse incremental backup method produces a backup chain that consists of the last full backup file (.VBK) and a set of reverse incremental backup files (.VRB) preceding it.

During the first backup job session, Veeam Backup & Replication creates a full backup file on the backup repository. During subsequent backup job sessions, Veeam Backup & Replication copies only VM data blocks that have changed since the last backup job session. Veeam Backup & Replication "injects" copied data blocks into the full backup file to rebuild it to the most recent state of the VM. Additionally, Veeam Backup & Replication saves the changed block in the reverse incremental backup file and places this file before the full backup file.

After adding a new restore point to the backup chain, Veeam Backup & Replication checks the retention policy and deletes outdated restore points. For details, see Reverse Incremental Backup Retention Policy in the Veeam Backup & Replication User Guide.



Reference

For details, see the following section in the Veeam Backup & Replication User Guide:

- Retention Policy
- Active Full Backup
- Synthetic Full Backup
- Backup Methods

Creating Backup Job

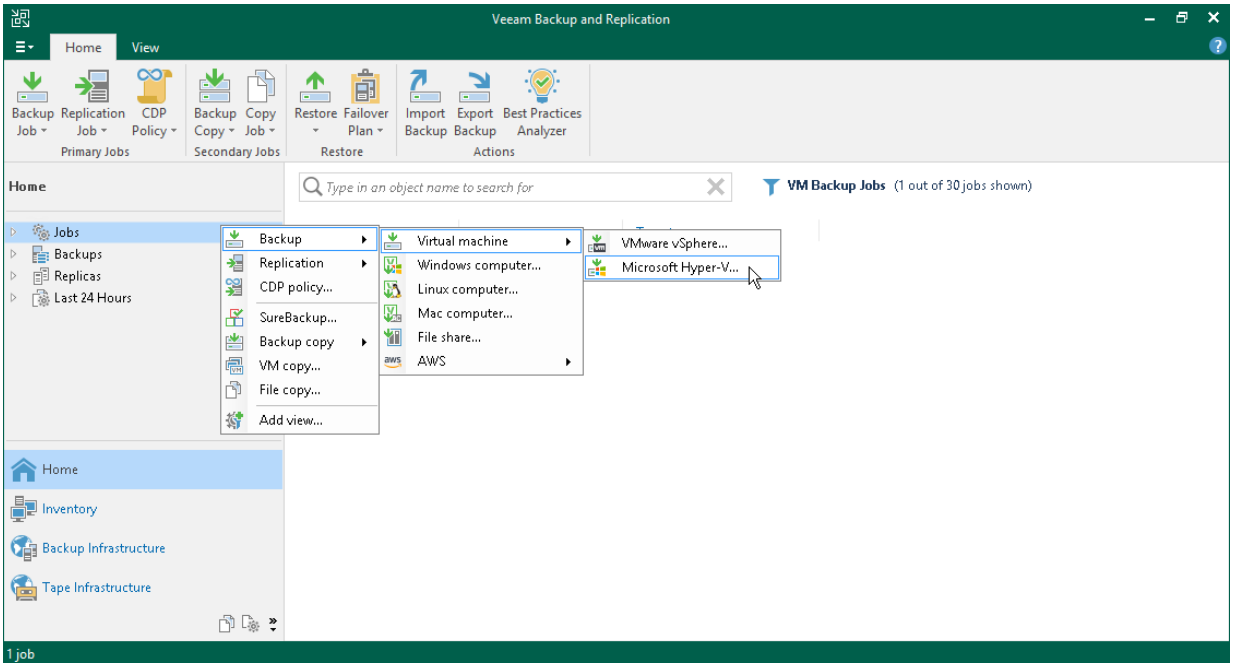
Before You Begin

Make sure that all backup infrastructure components that take part in the backup process are added to the backup infrastructure. These components include Microsoft Hyper-V hosts on which VMs are registered, backup proxy and backup repository.

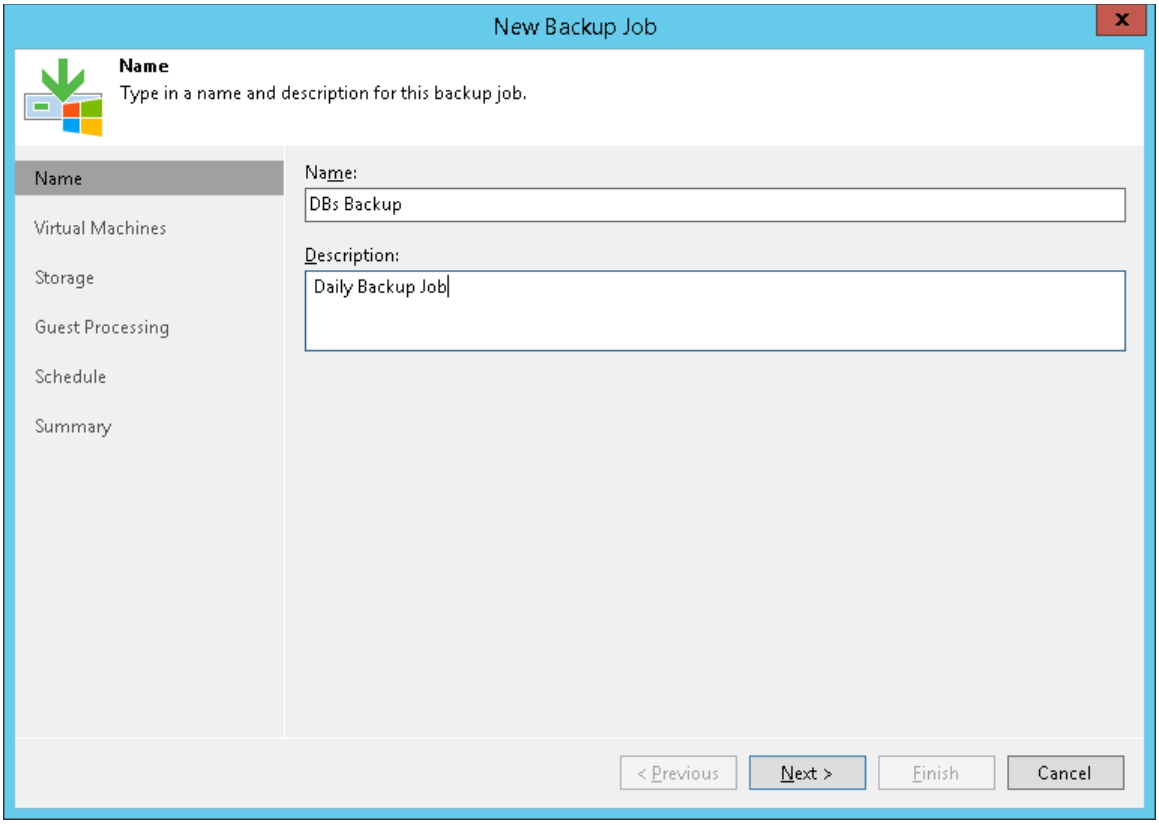
Creating Backup Job

To back up VMs, do the following:

1. In the inventory pane of the **Home** view, right-click **Jobs** and select **Backup** > **Virtual Machine** > **Microsoft Hyper-V** to launch the **New Backup Job** wizard.

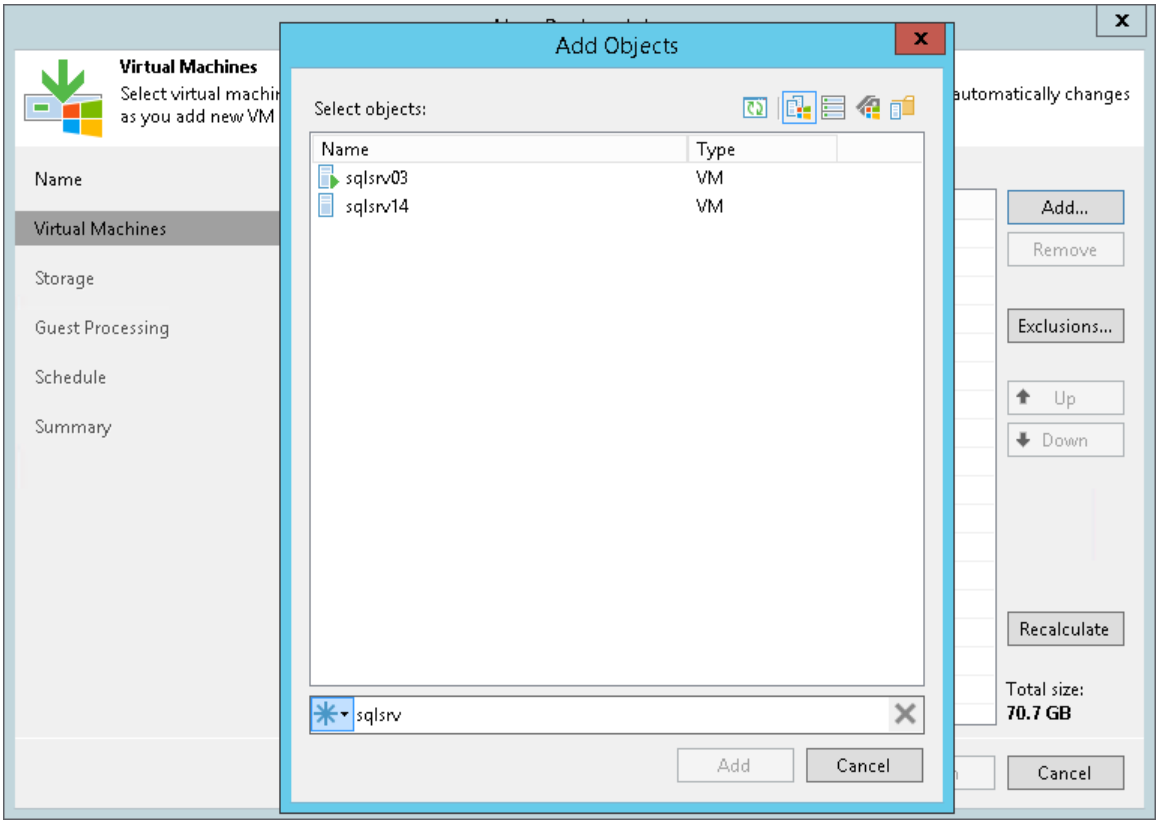


2. At the **Name** step of the wizard, specify a name and description for the backup job.



3. At the **Virtual Machines** step of the wizard, click **Add**. From the list, select VMs that you want to back up.

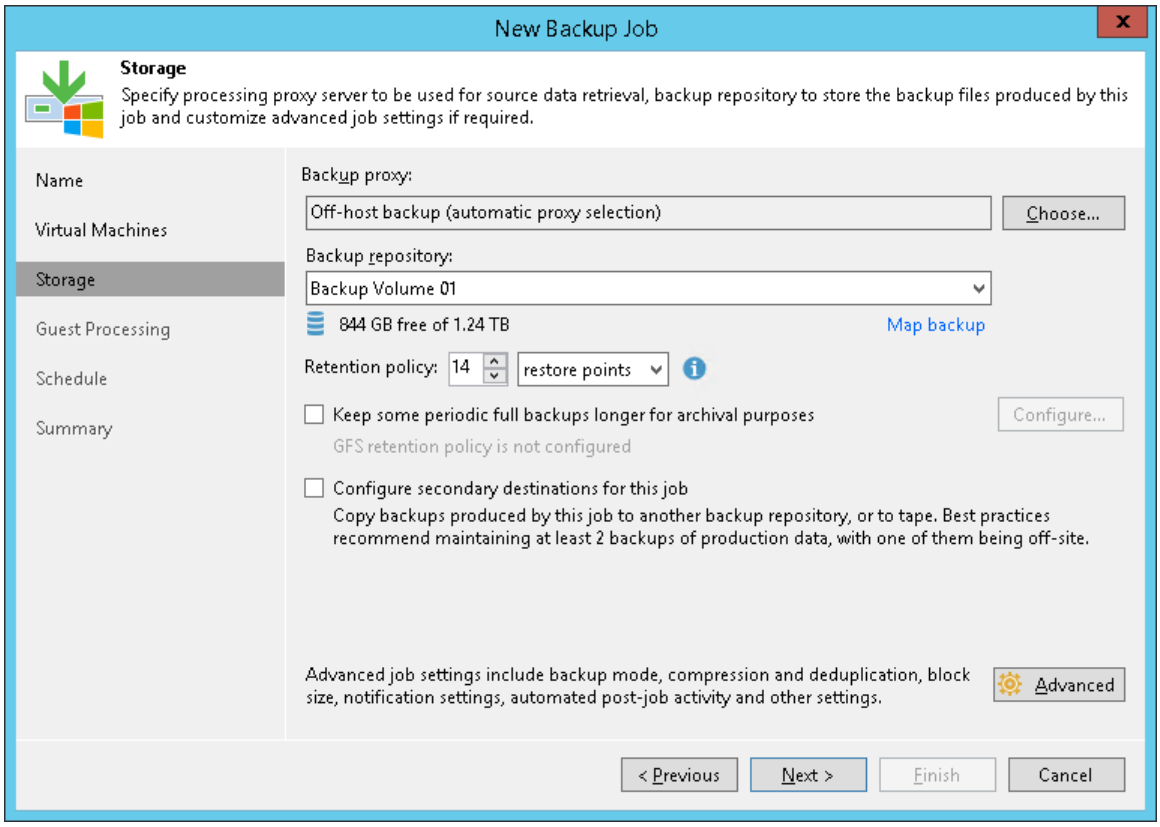
   You can also back up VM containers: Hyper-V hosts, clusters, SCVMM and so on. If you add a new VM to the container after the backup job is created, Veeam Backup & Replication automatically updates the job to include the new VM.



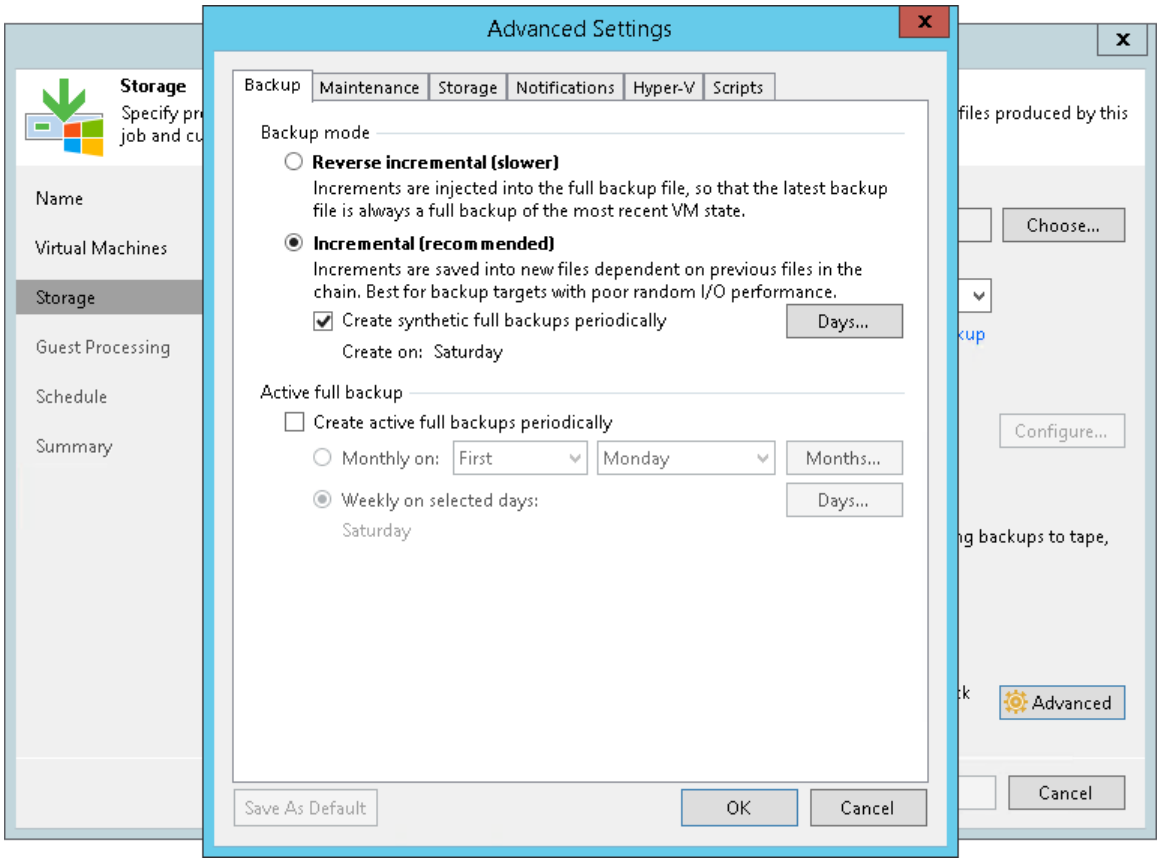
4. At the **Storage** step of the wizard, do the following:

   - From the **Backup repository** list, select the backup repository that you configured in the Configure Backup Repository section.
   - In the **Restore points to keep on disk**, define the number of restore points to keep.

     When the number of restore points exceeds the allowed value, Veeam Backup & Replication automatically removes the earliest restore point from the backup chain. For more information, see Retention Policy in the Veeam Backup & Replication User Guide.



- Click the **Advanced** button and, in the **Backup** tab, specify the backup method or leave the default settings. For details, see Backup Methods.



5. At the **Guest Processing** step of the wizard, leave the default settings.

   The settings of this step are detailed in the Creating Application-Aware Backup Job section.

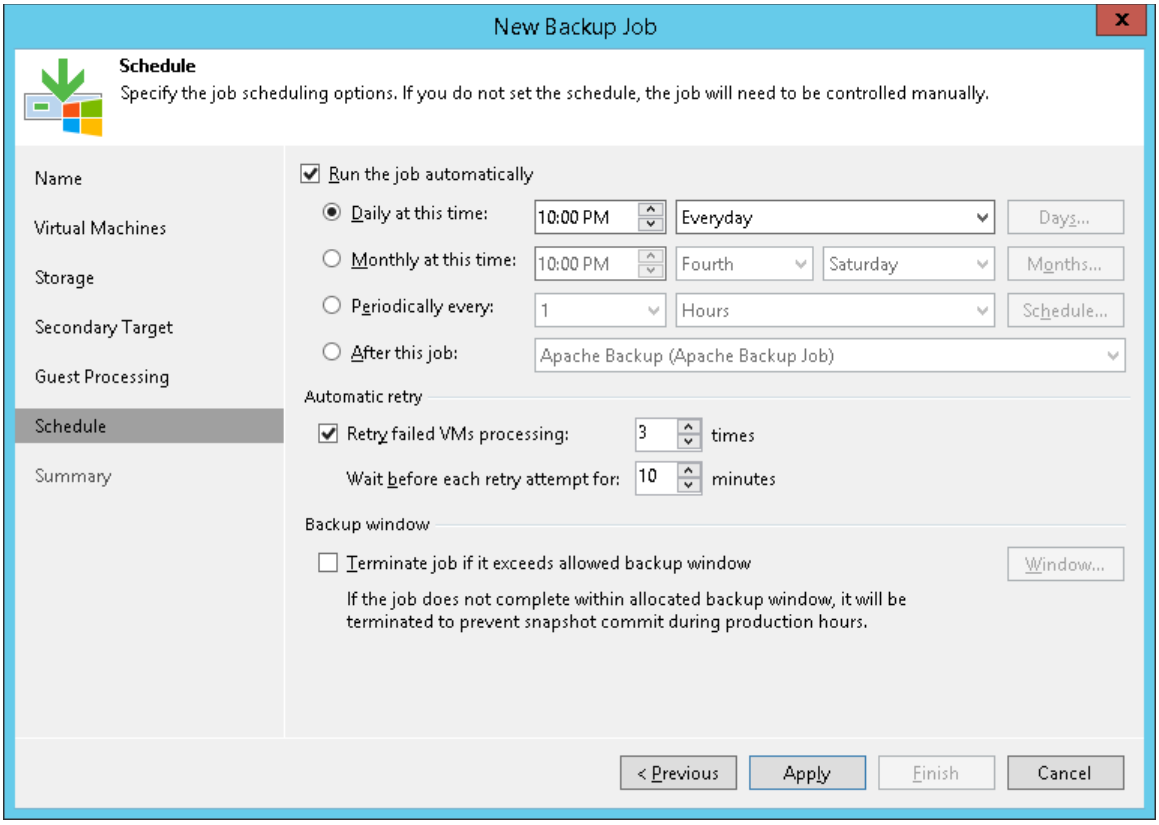
6. At the **Schedule** step of the wizard, do the following:

   a. Select the **Run the job automatically** check box. If you do not select this check box, you will have to launch the job manually. For details, see Start Backup Job Manually.

   b. Select the schedule type: daily, monthly or periodically.

   c. Make sure the **Retry failed VM processing** check box is selected.

d. Click **Apply**.



7. At the **Summary** step of the wizard, select the **Run the job when I click Finish** check box and click the **Finish** button.
8. In the inventory pane of the **Home** view, expand the **Last 24 Hours** node to see the created job.

Reference

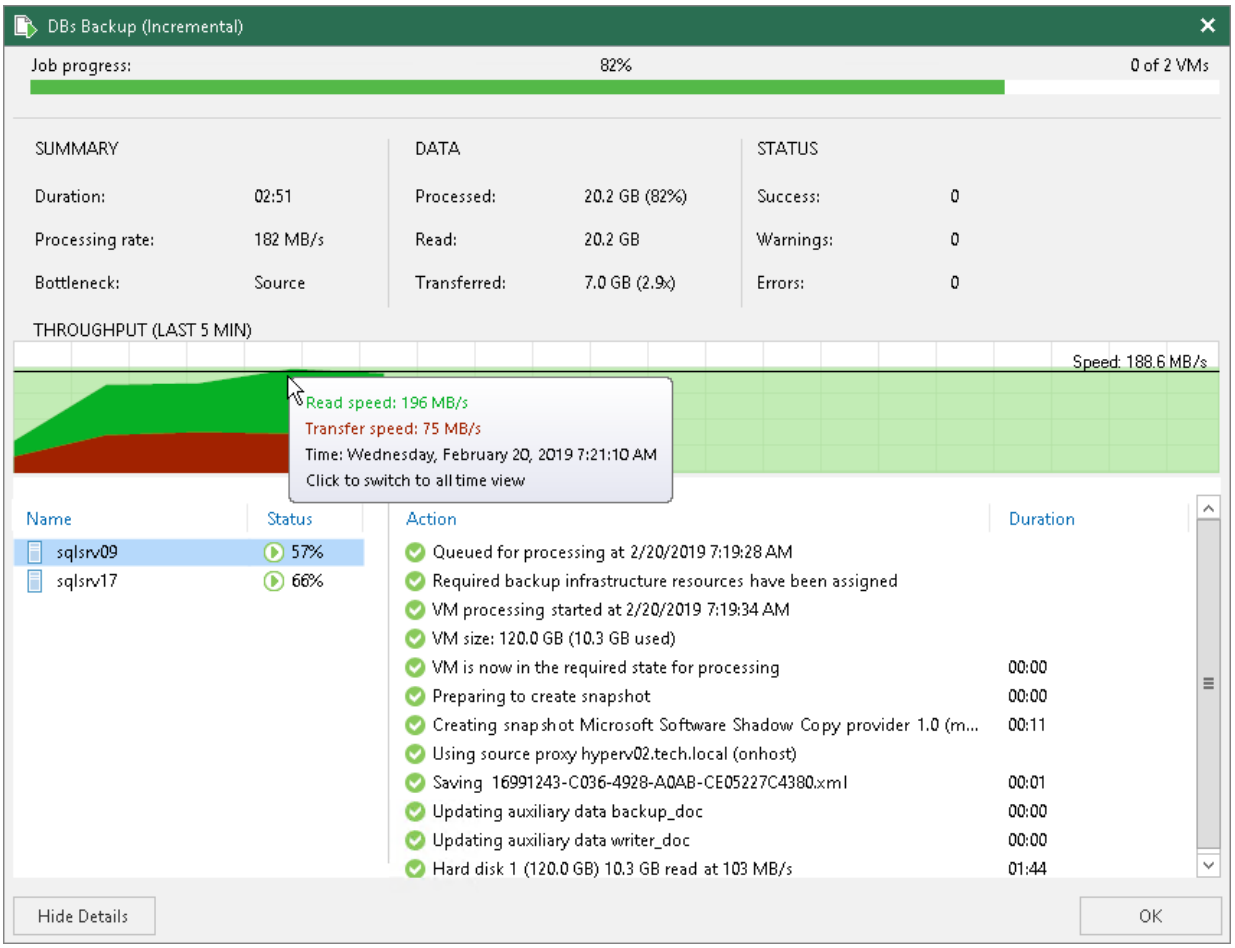
For more information on backup creation, see Creating Backup Jobs in the Veeam Backup & Replication User Guide.

Monitoring Job Performance in Real Time

When the job is running, you can view job statistics in real time. Statistics include job progress, duration, processing rate, performance bottlenecks, the amount of read and transferred data, and other details of the job performance.

To view the job statistics, do the following:

1. In the inventory pane of the **Home** view, select the **Jobs** node.
2. In the working area, right-click a running job and click **Statistics**.
3. In the opened window, select a VM to view its statistics.



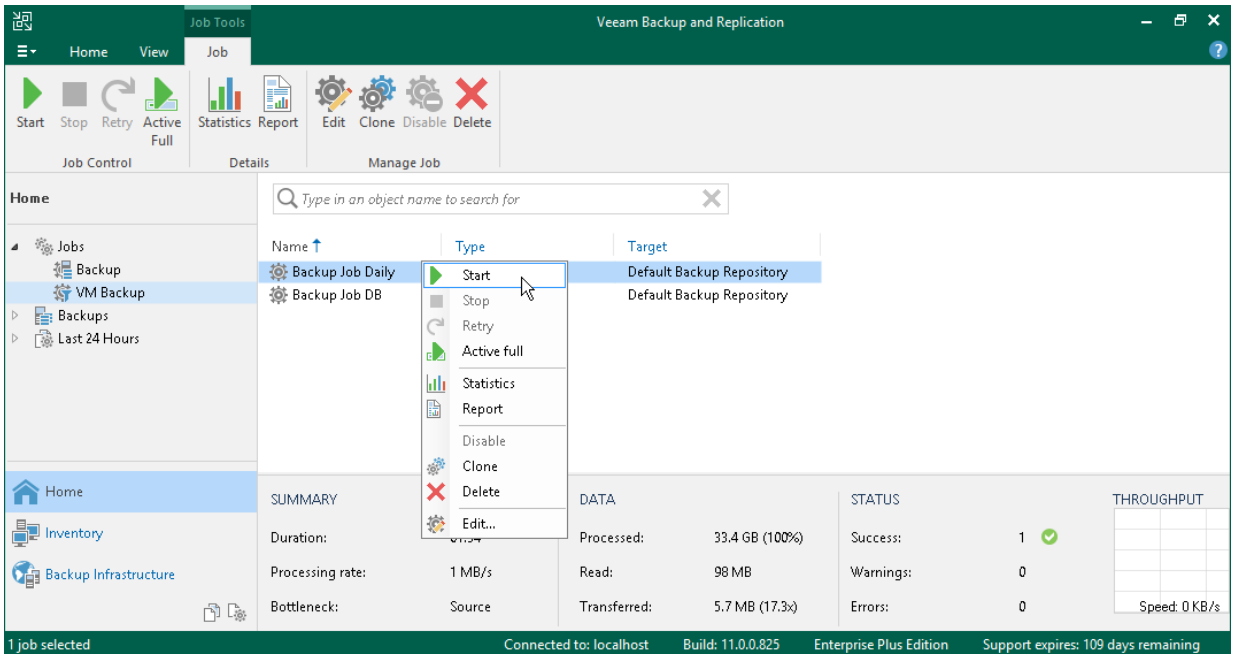
Note that the job must complete with the *Success* or *Warning* status. If the job completes with the *Failed* status, Veeam Backup & Replication does not create the backup file is not able to perform restore operations.

You can configure email notifications to get job results. For details, see Configuring Global Email Notification Settings in the Veeam Backup & Replication User Guide.

Start Backup Job Manually

If you do not schedule a backup job, you must start it manually. To start the job, do the following:

1. Open the **Home** view.
2. In the inventory pane, select the **Jobs** node.
3. In the working area, right-click the job and select **Start**. Wait for the job to complete. Note that the job must complete with the *Success* or *Warning* status.

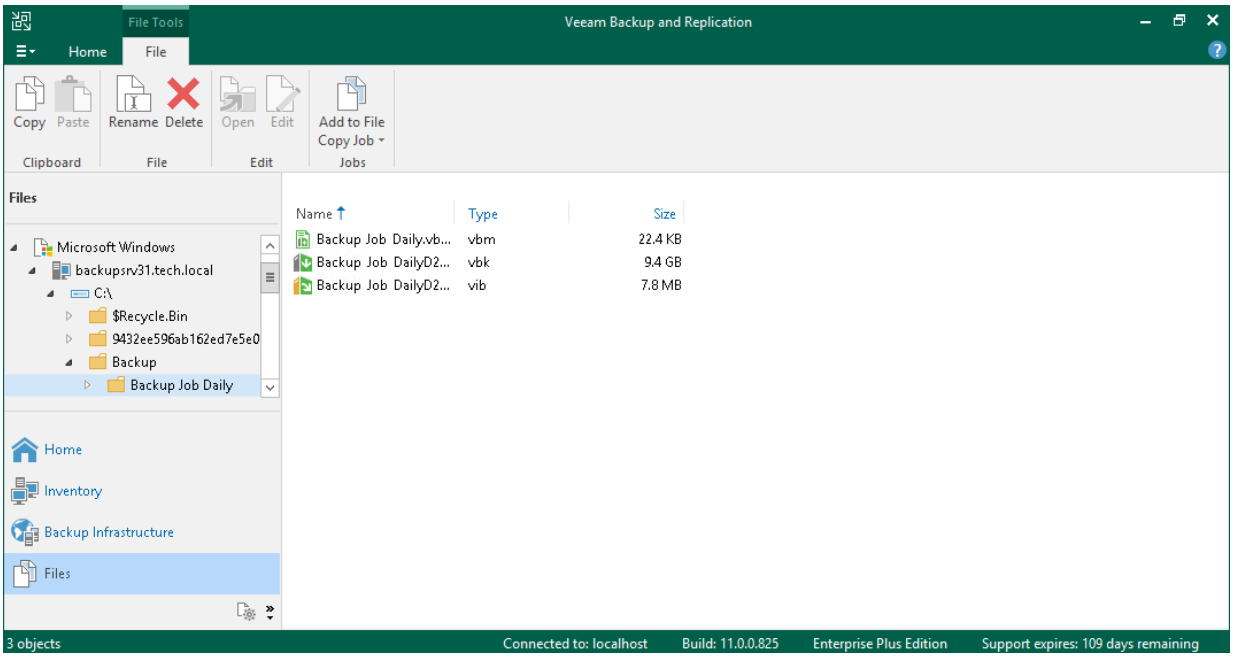


Locating Backup Files

When a backup job finishes, Veeam Backup & Replication saves backup files in the backup repository that you specified as a backup target.

To locate backup files using the Veeam Backup & Replication console, do the following:

1. Open the **Files** view.
2. In the inventory pane, expand the backup repository file tree and open the **Backup** folder.
3. In the **Backup** folder, find the subfolder with the backup job name and open it. It must contain a .VBK and .VBM files. If the job was run several times, the subfolder also contains .VIB or .VRB files.



Creating Application-Aware Backup Job

Application-aware processing allows you to create transactionally consistent backups. These backups allow you to further restore application items: emails for mail agents, tables for DB servers, accounts for domain controllers.

Veeam Backup & Replication can create transactionally consistent backups of VMs that run the following applications:

- Microsoft Exchange
- Active Directory
- SharePoint
- SQL Server
- Oracle Database

In this section, you will learn how to create the application-aware backup job for a Microsoft SQL Server.

> **IMPORTANT!**
>
> Application-aware processing is supported only for VSS-aware applications and applications listed above. If an application that you want to back up is not supported, you can use Microsoft Hyper-V guest quiescence with pre-freeze and post-thaw scripts. For more information, see Microsoft Hyper-V Guest Quiescence and Pre-Freeze and Post-Thaw Scripts in the Veeam Backup & Replication User Guide.

Before You Begin

Make sure that the version of your Microsoft SQL Server is supported. For details, see the System Requirements section in the Veeam Backup & Replication User Guide.

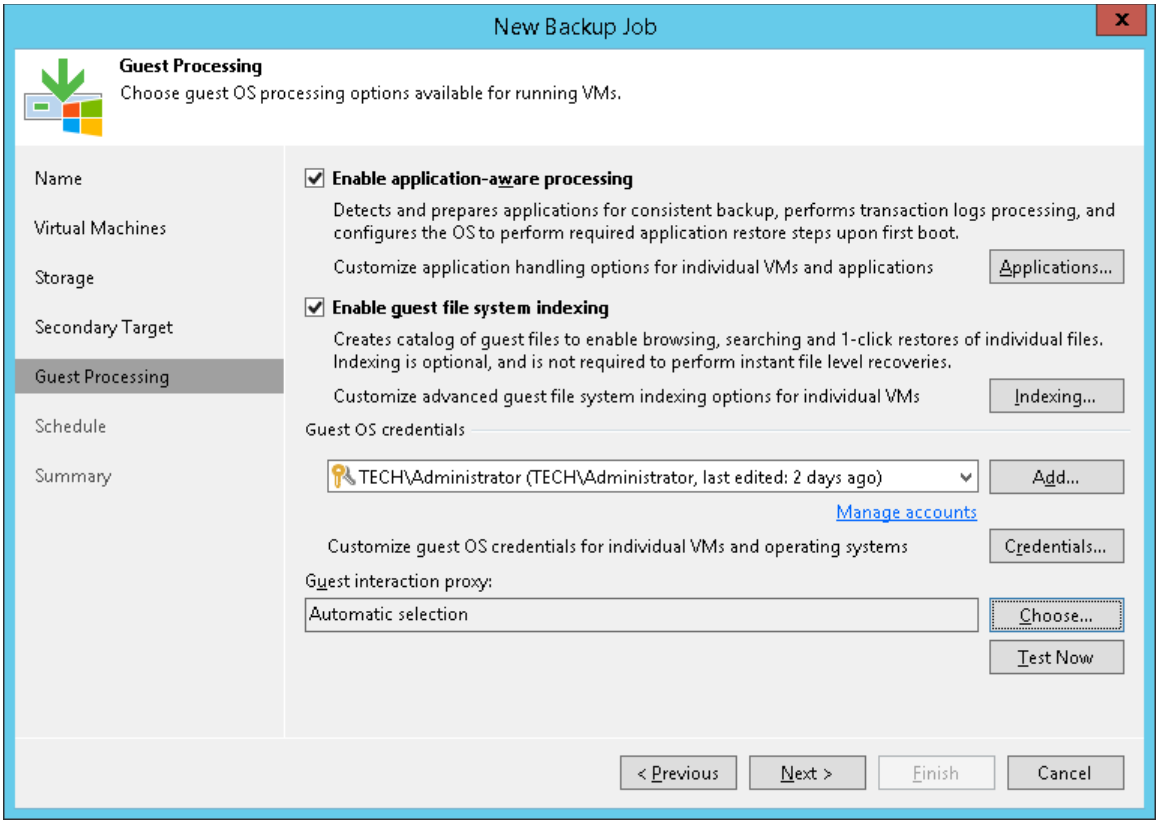
Creating Application-Aware Backup

To create the application-aware backup job for the Microsoft SQL Server, do the following:

1. In the inventory pane of the **Home** view, right-click **Jobs** and select **Backup** > **Virtual Machine** > **Microsoft Hyper-V** to launch the **New Backup Job** wizard.
2. At the **Name** step of the wizard, specify a name and description for the backup job.
3. At the **Virtual Machines** step of the wizard, select the VM.
4. At the **Storage** step of the wizard, select a backup repository or keep the default settings.
5. At the **Guest Processing** step of the wizard, do the following:
   - Select the **Enable application-aware processing** check box.
   - Select the **Enable guest file system indexing** check box.

     VM guest OS file indexing allows you to search for VM guest OS files inside VM backups and perform 1-click restore in Veeam Backup Enterprise Manager. For details, see VM Guest OS File Indexing in the Veeam Backup & Replication User Guide.

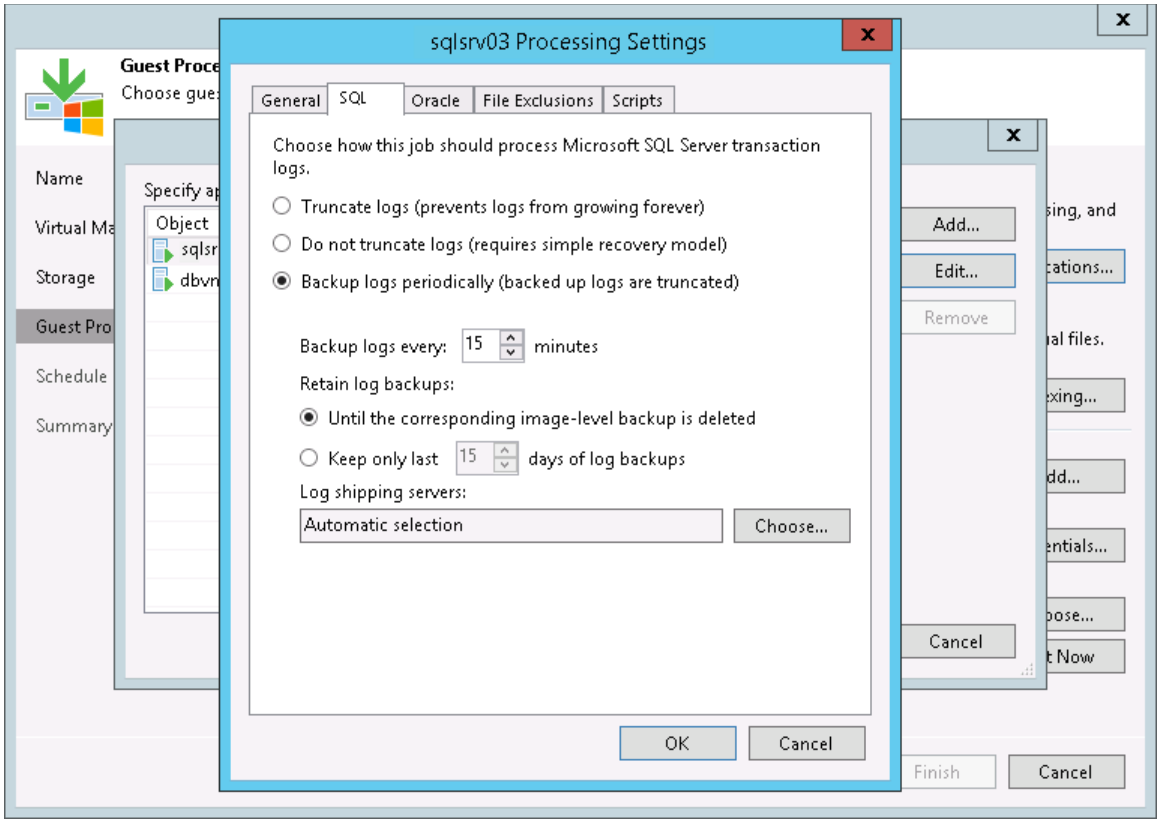
- In the **Guest OS credentials** section, specify credentials of a user account to connect to the VM guest OS. The user account must have Administrator permissions on the Microsoft SQL Server.
- Click the **Applications** button at the top of the window.



6. In the opened window, select the Microsoft SQL Server from the list and click **Edit**.
7. In the **Processing Settings** windows, do the following:
   - In the **Transaction logs** section of the **General** tab, check that the **Process transaction logs with this job** option is selected.

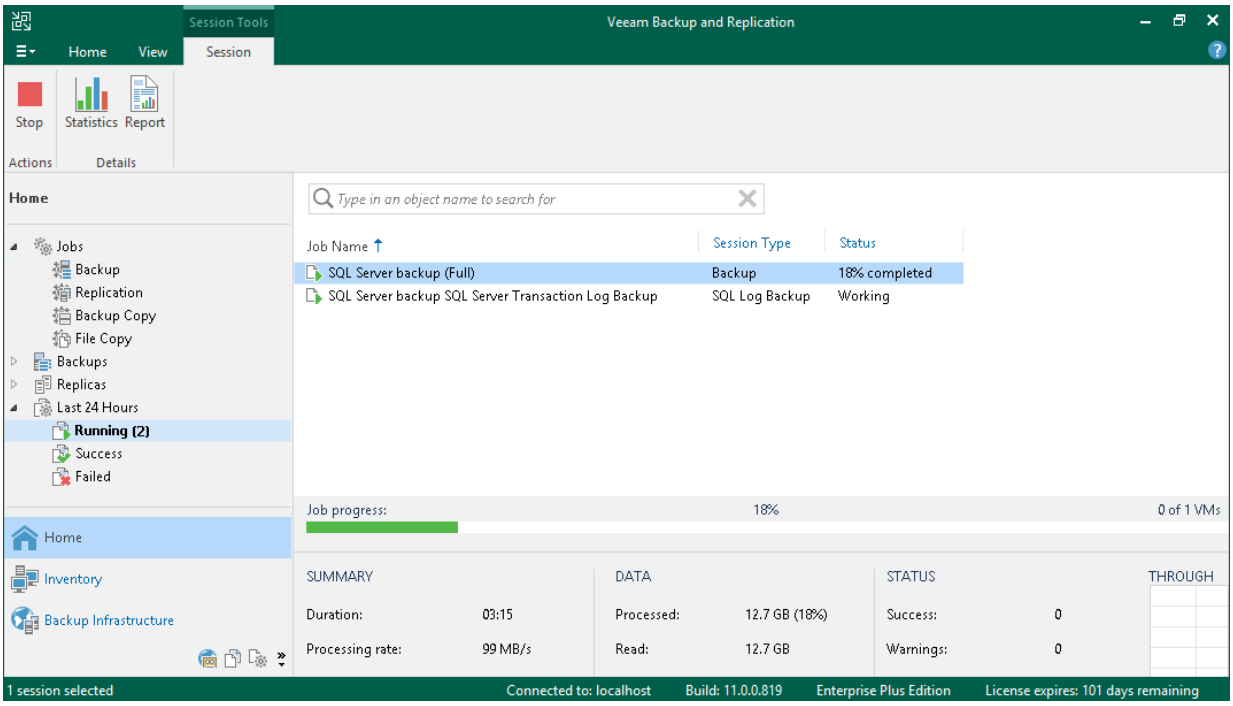
- On the **SQL** tab, select **Backup log periodically** option.

  Veeam Backup & Replication will create an auxiliary job that runs continuously and ships database transaction logs. Transaction logs are shipped to the backup repository and saved in .VLB files next to other backup job files. Thus, you have a chain of restore points and a set of transaction logs that cover intervals between these restore points.



8. At the **Schedule** step of the wizard, define scheduling settings for the job.
9. At the **Summary** step of the wizard, select the **Run the job when I click Finish** check box and click the **Finish** button.

10. In the inventory pane of the **Home** view, expand the **Last 24 Hours** node to see the created jobs. You must see two jobs: one that processes the Microsoft SQL Server and the other one that ships transaction logs.



Reference

For more information on application-aware backups, see the Application-Aware Processing section in the Veeam Backup & Replication User Guide.

Data Recovery

Veeam Backup & Replication allows you to restore the following instances:

- Entire VM
- Guest OS files
- VM files
- Application items

Restoring Entire VM

If a VM fails, you can restore it from a backup file. You can restore a single VM or multiple VMs to the original or new location.

In this section, you will learn how to restore a VM to the original location. For more information on how to restore the VM to another location, see Restoring Entire VM in the Veeam Backup & Replication User Guide.

Before You Begin

Before you restore a VM from a backup, consider the following:

- You can restore the VM from a backup that has at least one successfully created restore point.

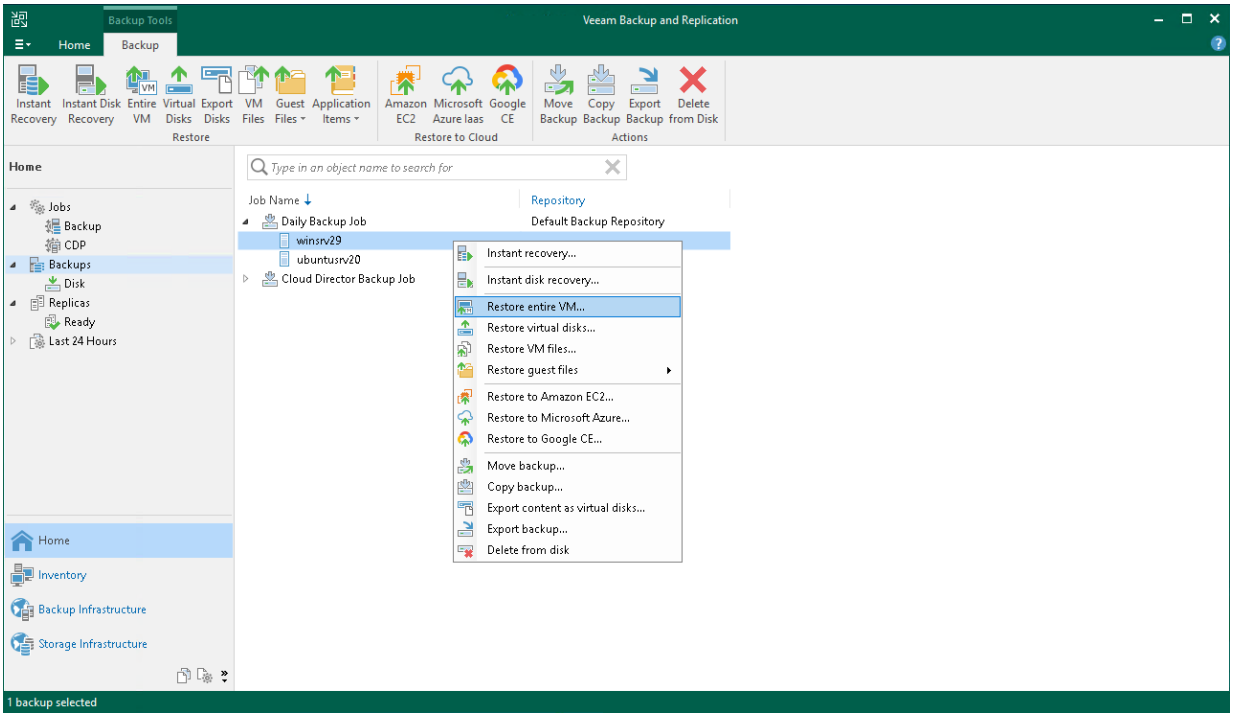
  To check whether restore points are created, open the inventory pane of the **Home** view and select the **Backups** node. Then, expand the backup job and verify that there is at least one restore point available for the VM.

- When you restore the VM to its original location, and the original VM is still running, Veeam Backup & Replication powers off the original VM and deletes it before the restore.

Restoring Entire VM

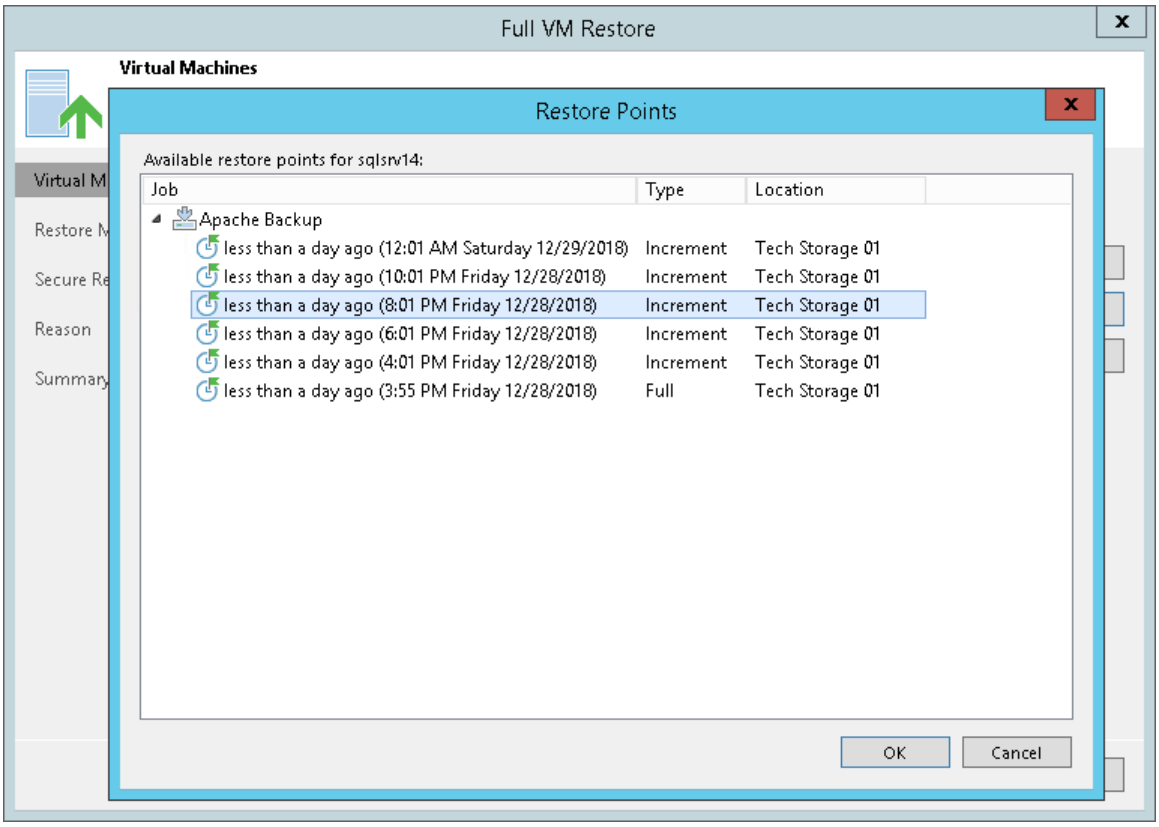
To restore an entire VM to its original location, do the following.

1. Open the **Home** view.
2. In the inventory pane, select the **Backups** > **Disk** node. Expand the backup job in the working area, right-click a VM in a backup job and select **Restore entire VM** to launch the **Full VM Restore** wizard.



3. At the **Virtual Machines** step of the wizard, select the VM from the list, click the **Point** button and choose a restore point.

   If you select an incremental restore point, Veeam Backup & Replication automatically restores data blocks from the full backup file and the chain of incremental backup files.



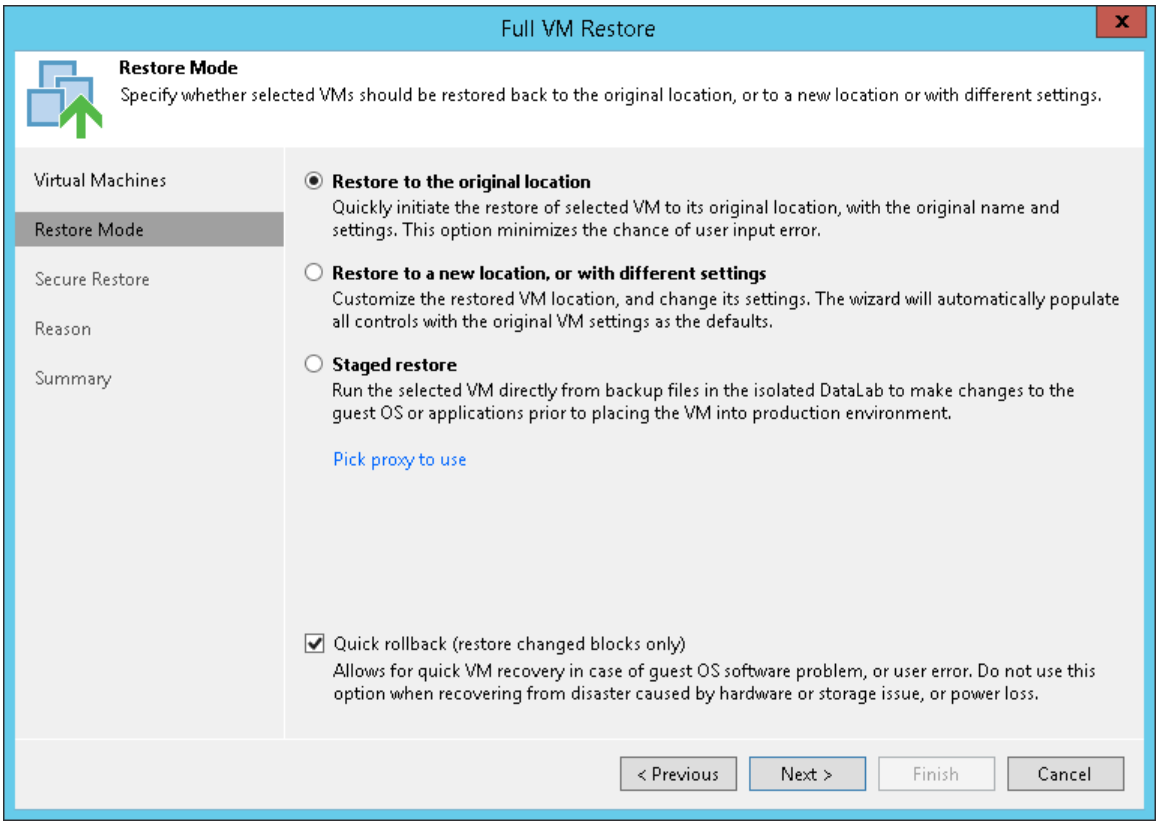
4. At the **Restore mode** step of the wizard, do the following:

   - Select the **Restore to the original location** option.
   - Select the **Quick rollback** check box.

     Veeam Backup & Replication will get data blocks that are necessary to revert the VM to an earlier point in time and will restore only these data blocks from the backup. Quick rollback significantly reduces the restore time.

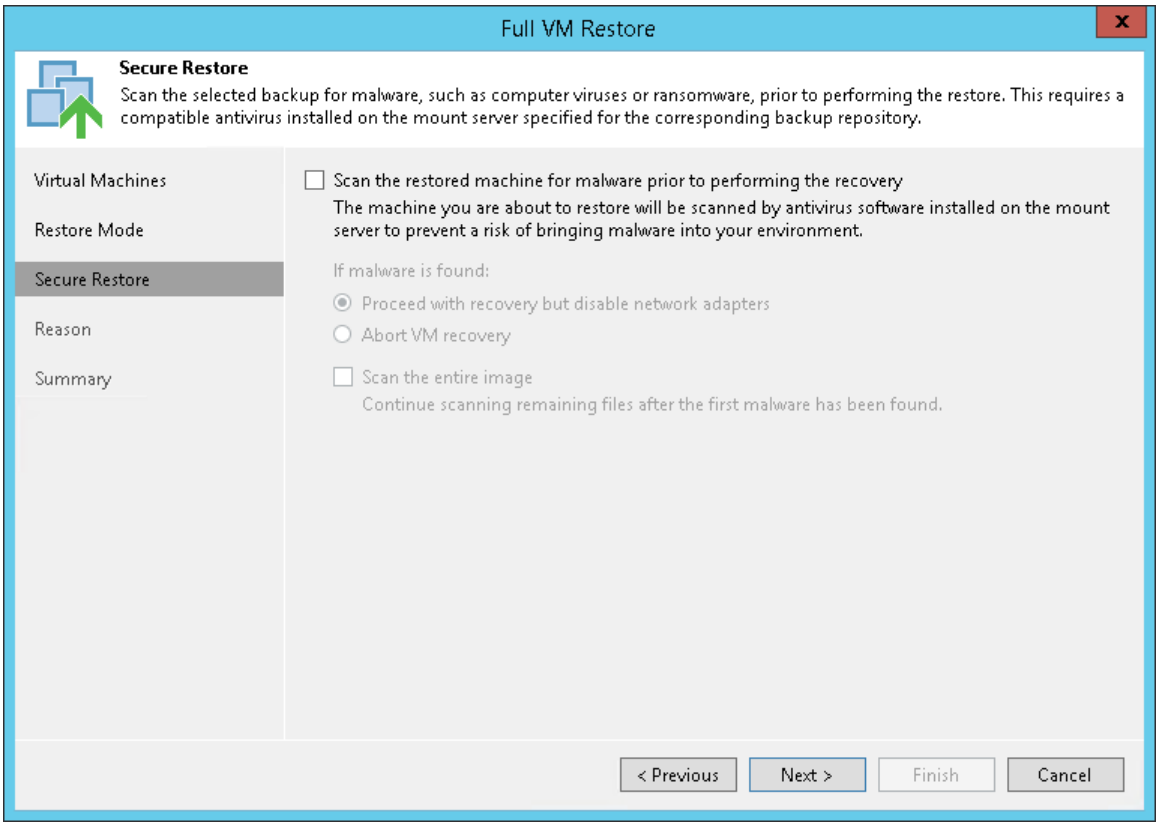
IMPORTANT!

Do not enable the **Quick rollback** option if the problem occurred at the VM hardware level, storage level or due to a power loss.



5. At the **Secure Restore** step of the wizard, enable scanning of the machine or leave the default settings.

   If secure restore is enabled, Veeam Backup & Replication uses antivirus software to scan machine data before restoring the machine to the production environment. For details, see Secure Restore in the Veeam Backup & Replication User Guide.



6. At the **Reason** step of the wizard, specify the reason for restoring the VM.
7. At the **Summary** step of the wizard, select the **Power on VM after restoring** check box and click **Finish**.

Restoring VM Files

Veeam Backup & Replication can help you restore VM files: XML, VMCX, VMRS, VMGS, VHD and VHDX. For example, your VM configuration file is missing and you need to restore it. Instead of restoring the entire VM image, you can restore a single VM file.

You can restore VM files to the latest state or any valid point in time. You can also restore them to the original or new location.

Before You Begin

Before you restore VM files from a backup, consider the following:

- You can restore VM files a backup that has at least one successfully created restore point.

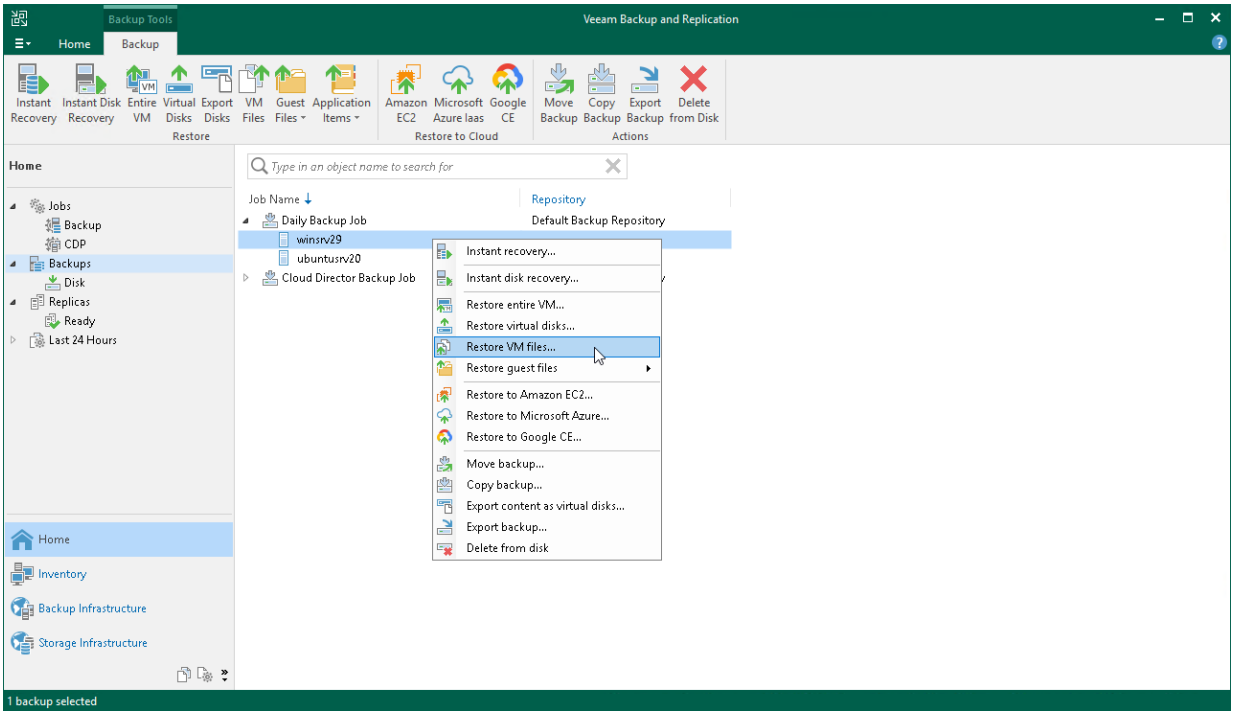
  To check whether restore points are created, open the inventory pane of the **Home** view and select the **Backups** node. Then, expand the backup job and verify that there is at least one restore point available for the VM.

- The server on which you plan to save the restored VM files must be added to the backup infrastructure.

Restoring VM Files

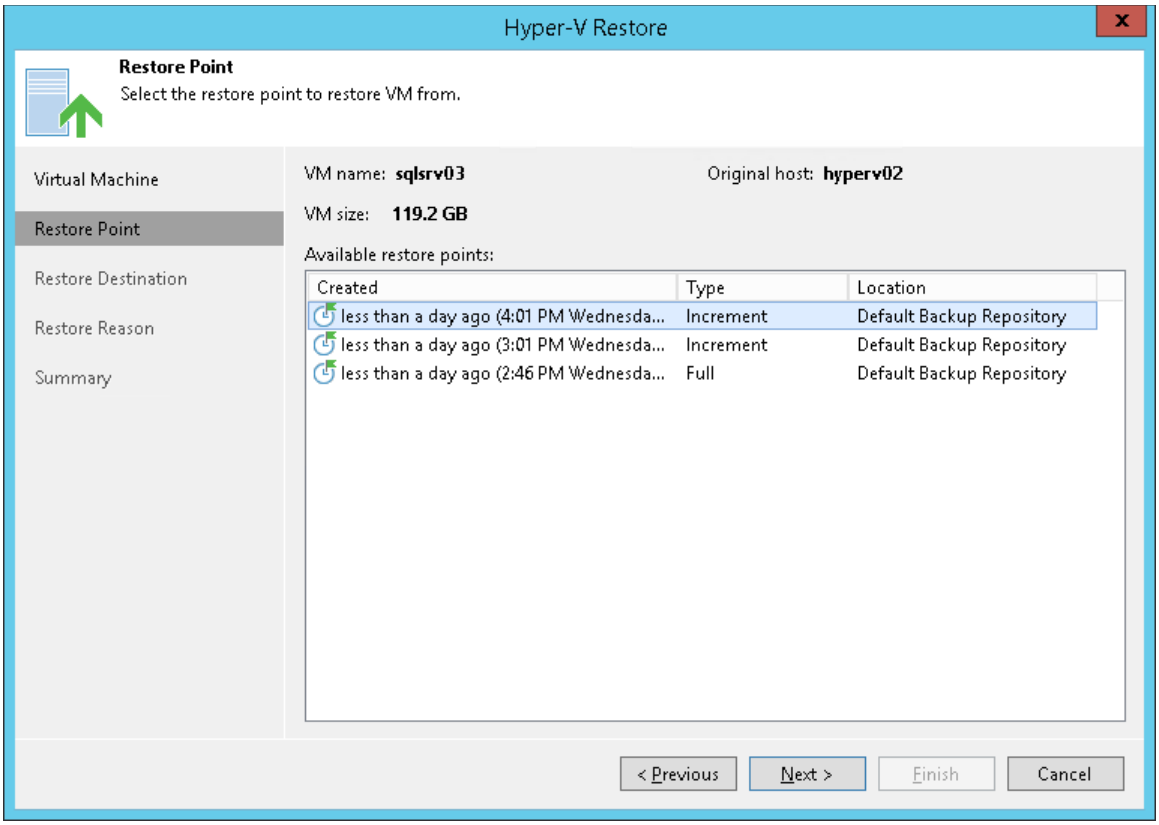
To recover VM files, do the following.

1. Open the **Home** view.
2. In the inventory pane, select the **Backups** > **Disk** node. Expand a backup job in the working area, right-click a VM and choose **Restore VM files** to launch the **Hyper-V Restore** wizard.



3. At the **Restore Point** step of the wizard, select a restore point.

   If you select an incremental restore point, Veeam Backup & Replication automatically restores data blocks from the full backup file and the chain of incremental backup files.

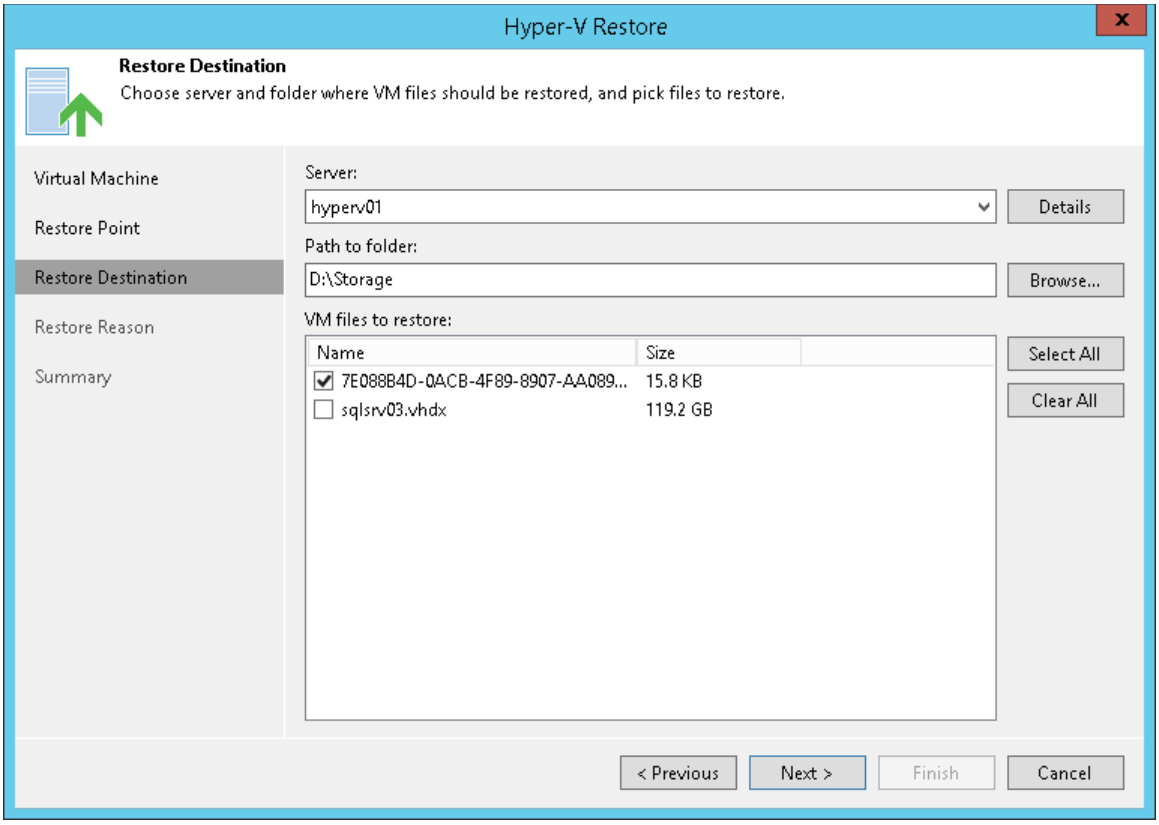


4. At the **Restore Destination** step of the wizard, do the following:

   a. In the **Server** list, select the server to which you want to restore VM files.

   b. In the **Path to folder** field, specify the path to the folder where you want to restore files.

c. In the **VM files to restore** section, select the required files.



5. At the **Reason** step of the wizard, specify the reason for restoring files.
6. At the **Summary** step of the wizard, click **Finish** to restore the VM files.

Reference

For more information on restoring VM files, see VM Files Restore in the Veeam Backup & Replication User Guide.

Restoring Guest OS Files

Veeam Backup & Replication allows you to recover individual guest OS files and folders. You can restore files and folders directly from a backup. This makes the restore process fast and does not require additional storage resources.

Veeam Backup & Replication supports recovering files for the following file systems:

- Microsoft Windows file systems (FAT, NTFS and ReFS)
- File systems of Linux-based OSes
- Other file systems

  In this guide, we omit restoring files from other file systems. This is an advanced scenario that requires additional actions. For details, see the Restore from Other File Systems section in the Veeam Backup & Replication User Guide.

Restoring VM Guest OS Files (FAT, NTFS, ReFS)

You can restore individual files from the backup of a Microsoft Windows VM. For this purpose, Veeam Backup & Replication provides the **File-Level Restore** wizard.

Before You Begin

Consider the following:

- You can restore guest OS files from a backup that has at least one successfully created restore point.

  To check whether restore points are created, open the inventory pane of the **Home** view and select the **Backups** node. Then, expand the backup job and verify that there is at least one restore point available for the VM.

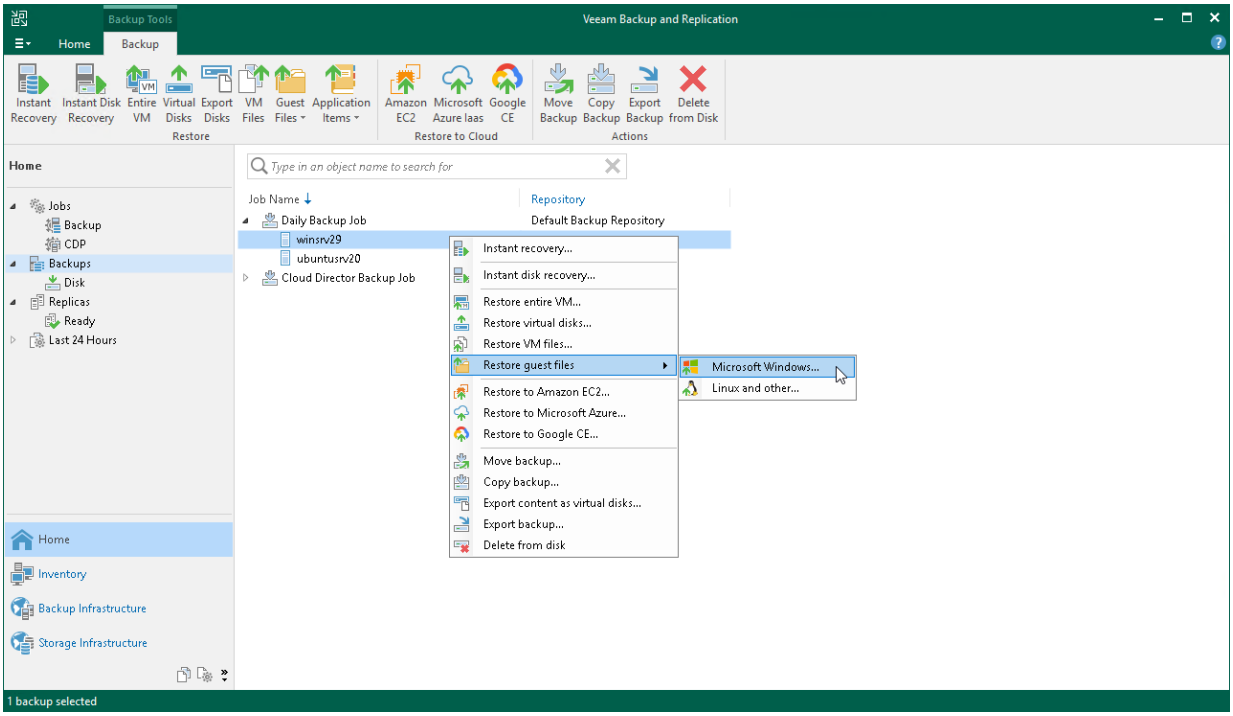
- You cannot restore files from a backup created in the reverse incremental mode if the backup job is being performed. If the backup is created in the incremental backup mode and the backup job is being performed, you can restore files from any available restore point.

- You cannot restore VM guest OS files from a running replica or if the replication job with the necessary VM is being performed.

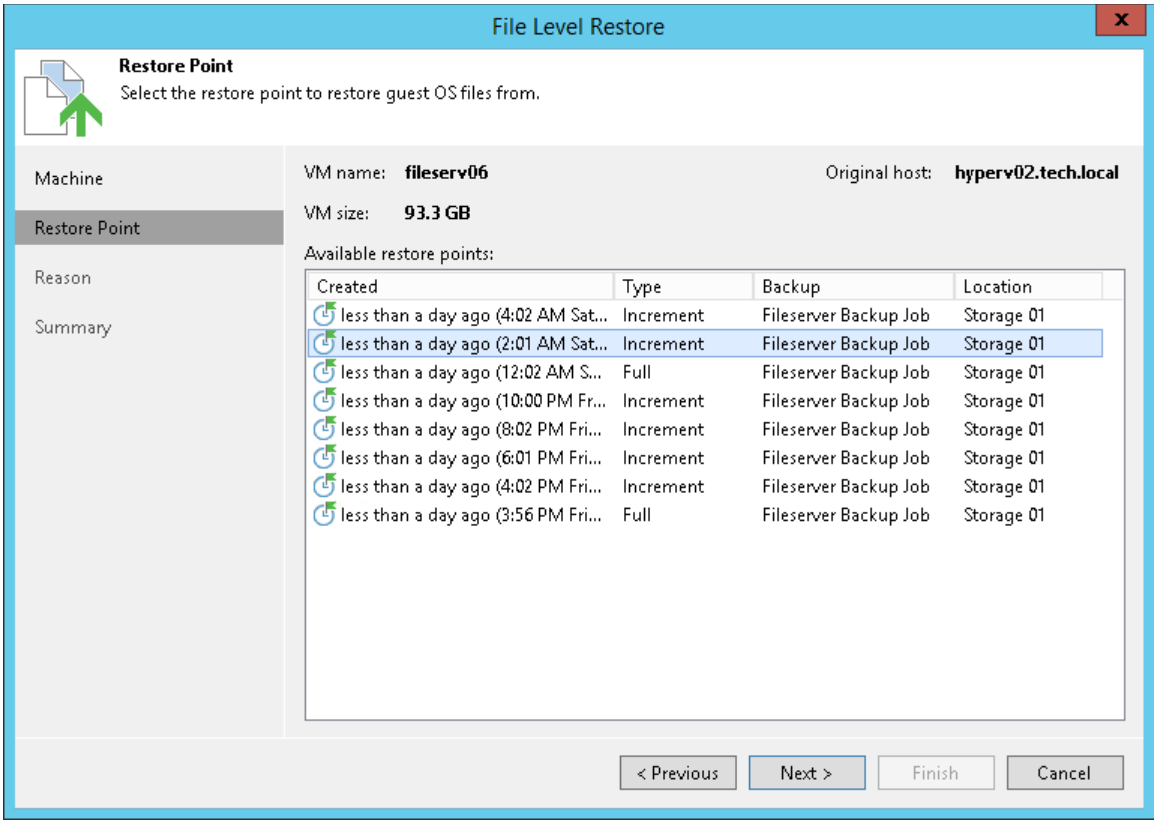
Restoring Guest OS Files

To restore guest OS files from a Microsoft Windows VM:

1. Open the **Home** view.
2. In the inventory pane, select the **Backups** > **Disk** node. Expand a backup job in the working area, right-click a VM and choose **Restore guest files** > **Microsoft Windows** to launch the **File Level Restore** wizard.



3. At the **Restore Point** step of the wizard, select the necessary restore point.



4. At the **Reason** step of the wizard, specify the reason for restoring VM guest OS files.
5. At the last step of the wizard, click **Finish**.
6. Veeam Backup & Replication will display the **Backup Browser** window with the file system tree of the VM. Right-click the necessary file or folder, select **Copy To**.
7. In the opened window, specify the location to which you want to restore files or folders. This location is a network shared folder or folder on the backup server.

Reference

For more information on restoring guest OS files, see Restore from FAT, NTFS or ReFS in the Veeam Backup & Replication User Guide.

Restoring VM Guest OS Files (Linux, Unix, etc)

You can restore individual files and folders from file systems of Linux-based OSes. For this purpose, Veeam Backup & Replication provides the multi-OS **File-Level Restore** wizard. The multi-OS restore wizard allows you to restore guest OS files for such OSes as Linux, Unix, BSD, macOS and others.

To restore files from VM guest OS, Veeam Backup & Replication uses a helper appliance. The helper appliance is a helper VM running a stripped-down Linux kernel that has a minimal set of components. When you perform file-level restore, Veeam Backup & Replication automatically starts the appliance and mounts VM disks to the helper appliance as virtual hard drives. Virtual disks are mounted directly from backup files, without prior extraction of the backup content. This makes the restore process much faster.

Before You Begin

Consider the following:

- Check the supported file systems. For details, see the File-Level Restore section in the Veeam Backup & Replication User Guide.
- You can restore guest OS files from a backup that has at least one successfully created restore point.

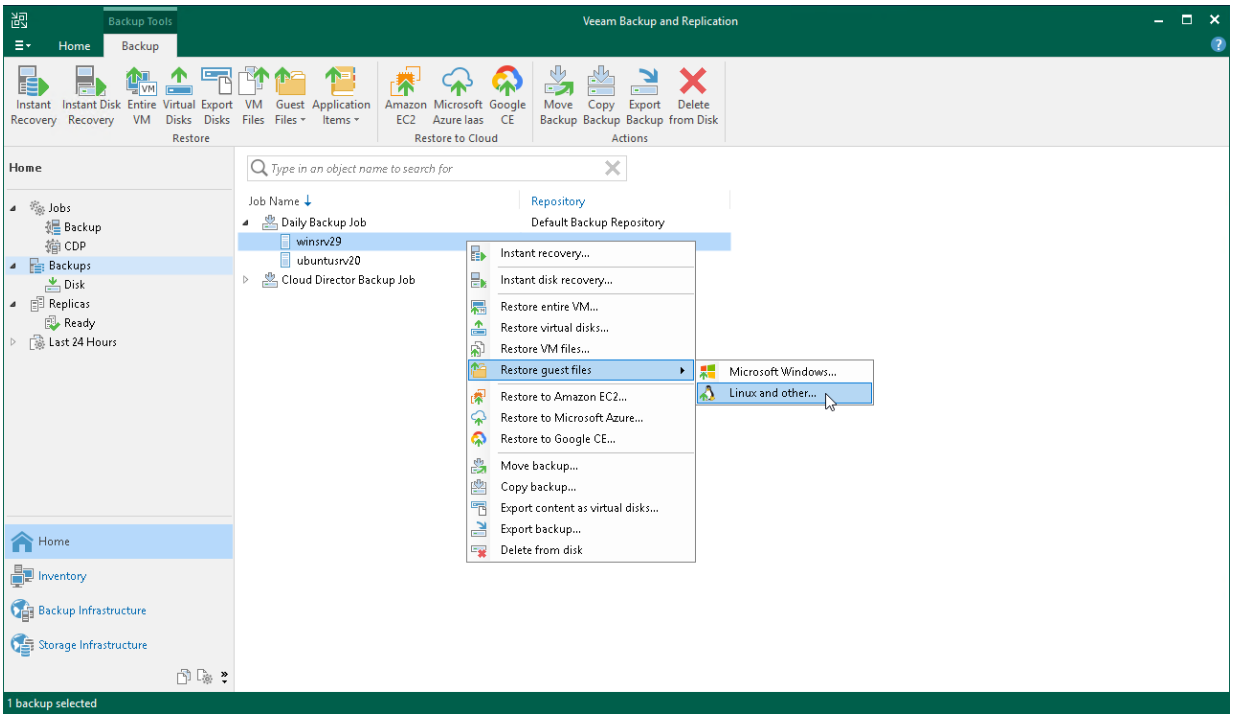
  To check whether restore points are created, open the inventory pane of the **Home** view and select the **Backups** node. Then, expand the backup job and verify that there is at least one restore point available for the VM.
- You cannot restore files from reverse incremental backups.
- You cannot restore files from a VM being currently backed up or replicated.

Restoring Guest OS Files

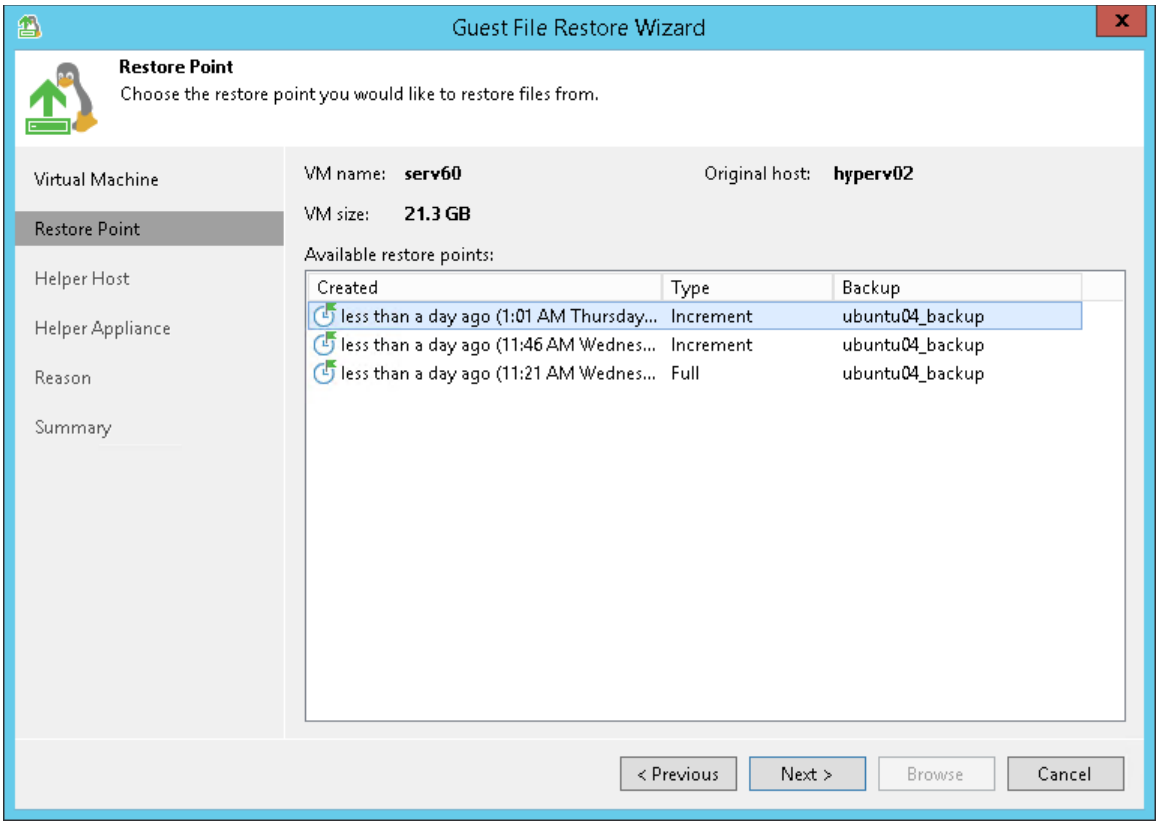
To restore guest OS files from a Linux-based VM, do the following.

1. Open the **Home** view.

2. In the inventory pane, select the **Backups** > **Disk** node. Expand a backup job in the working area, right-click a VM and select **Restore guest files** > **Linux and other** to launch the **Guest File Restore** wizard.

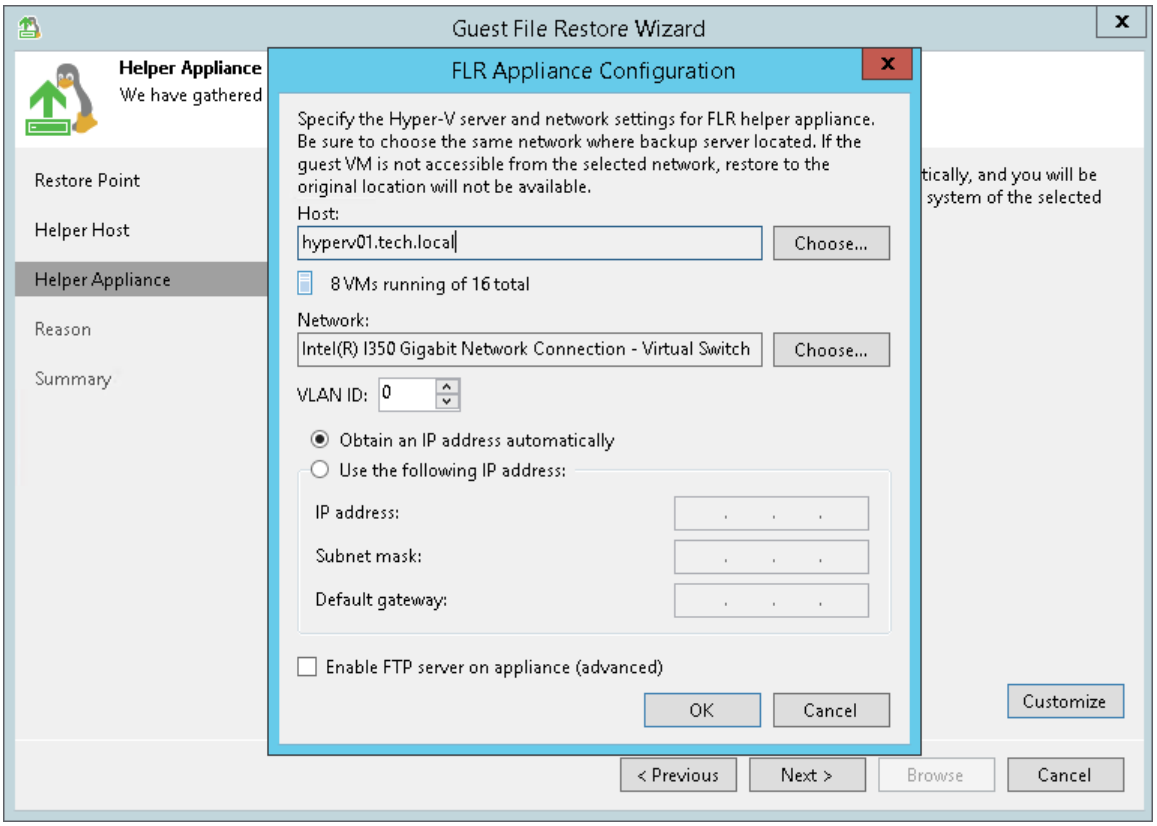


3. At the **Restore Point** step of the wizard, select a restore point.



4. At the **Helper Host** leave the default settings.

5. At the **Helper Appliance** step of the wizard, click **Customize** to specify settings for the helper appliance. Select the Hyper-V host and network on which the helper appliance will run.



6. At the **Reason** step of the wizard, specify the reason for restoring.
7. At the last step of the wizard, click **Finish**. Note that the helper appliance can boot about 20 seconds.
8. Veeam Backup & Replication will display the **Backup Browser** with the file system tree of the VM. Right-click a file or folder, select **Copy To**.
9. In the **Select Destination** window, do the following:
   a. In the **Server** field, select the server to which you want to restore files.
   b. In the **Path to folder** field, specify a destination folder.
10. Click **Restore**.

Reference

For more information on restoring guest OS files, see Restore from Linux, Unix and Other File Systems in the Veeam Backup & Replication User Guide.

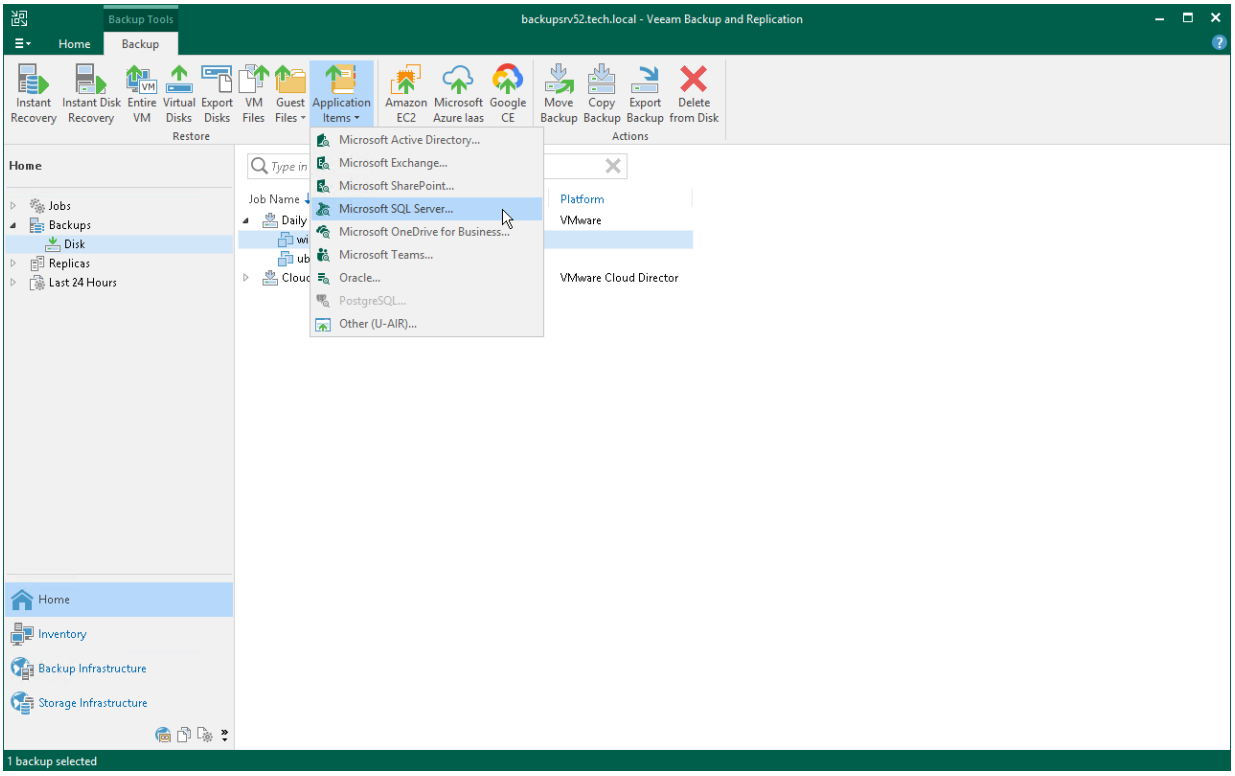
Restoring Application Items

If you have an application-aware backup, you can restore application items for Microsoft SQL Server, Microsoft Active Directory, Microsoft Exchange, Microsoft SharePoint, and Oracle Database. To restore application items, Veeam Backup & Replication uses special built-in tools — Veeam Explorers.

Veeam Explorers mount the file system of the backed up VM, detect available applications and display their content in the convenient interface. You can then browse for necessary application items and restore them to the original or new location. For details, see Veeam Backup Explorers User Guide.

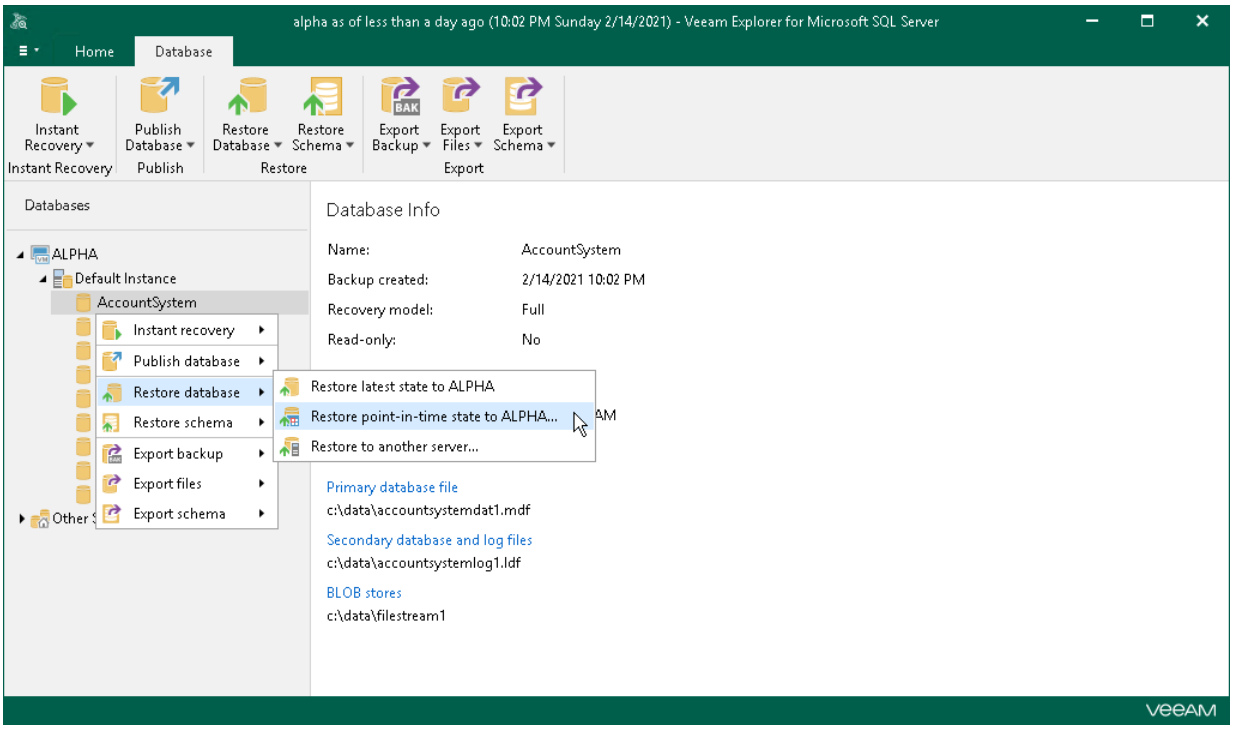
In this section, you will learn how to restore application items for the Microsoft SQL Server. For this purpose, you will use the backup created in the Creating Application-Aware Backup Job section.

1. In the inventory pane of the **Home** view, click the **Backups** node.
2. In the working area, expand the backup job that processes the VM with Microsoft SQL Server. Select the VM and click **Restore application items** > **Microsoft SQL Server databases** on the ribbon to open the **Microsoft SQL Server Database Restore** wizard.



3. At the **Restore Point** step of the wizard, select the required restore point.
4. At the **Reason** step of the wizard, specify the reason for restoring.
5. At the last step of the wizard, click **Finish** to start the recovery process.
6. Veeam Backup & Replication will display the **Veeam Explorer for Microsoft SQL Server** window with available databases.

7. In the **Databases** pane of the window, right-click a database and select **Restore point-in-time state to <Microsoft SQL Server\Instance Name>**.

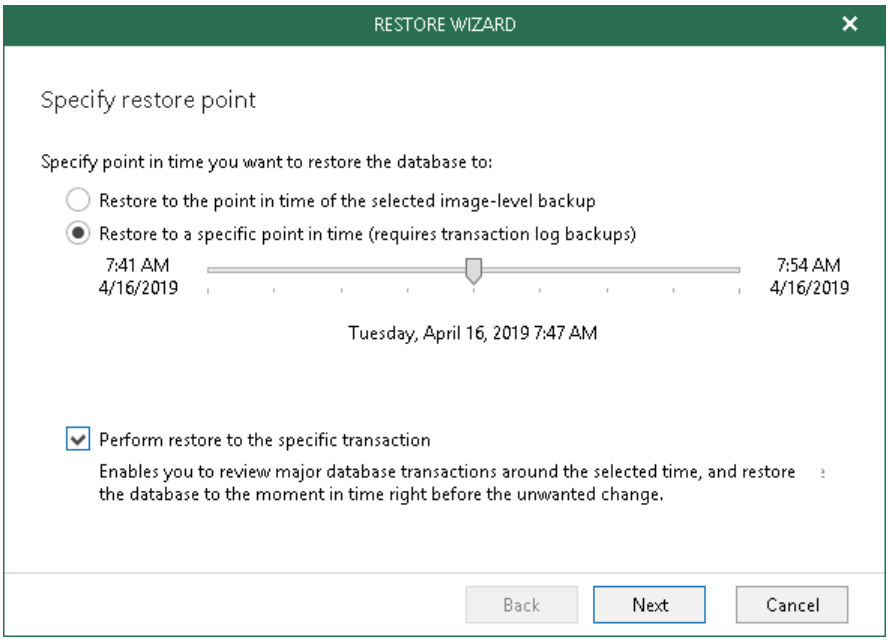


8. At the **Specify restore point** step of the wizard:

   a. Select the **Restore to a specific point in time option**.

   b. Use the slider to define the exact point in time to which you want to restore the database.

   c. Select the **Perform restore to the specific transaction** check box and click **Next**.



9. At the **Fine-tune the restore point** step of the wizard, select the transaction to which you want to restore the database and click **Restore**.

   Veeam Backup & Replication will start restoring the database to the selected transaction. When the restore process is complete, Veeam Explorer for Microsoft SQL Server will display a popup message with the results of the restore operation.

Reference

For more information on restoring application items, see Application Items Restore in the Veeam Backup & Replication User Guide.

Backup Copy

Backup copy allows you to create several instances of the same backup data in different locations. This is the mechanism that Veeam Backup & Replication provides to help you follow the the 3-2-1 rule:

- 3: You must have at least three copies of your data: the original production data and two backups.
- 2: You must use at least two different types of media to store copies of your data, for example, local disk and cloud.
- 1: You must keep at least one backup offsite (for example, in the cloud or in a remote site).

In Veeam Backup & Replication, backup copy is a job-driven process. When the backup copying job starts, Veeam Backup & Replication accesses backup files on the source backup repository, retrieves data blocks for a specific machine from the backup file, copies them to the target backup repository, and composes copied blocks into a backup file on the target backup repository. This backup file has the same format as the primary backup file.

Before You Begin

Before you create a backup copy job, consider the following:

- The source and target backup repositories that take part in the backup copy process must be added to the backup infrastructure.
- You must have a backup that has been successfully run at least once.

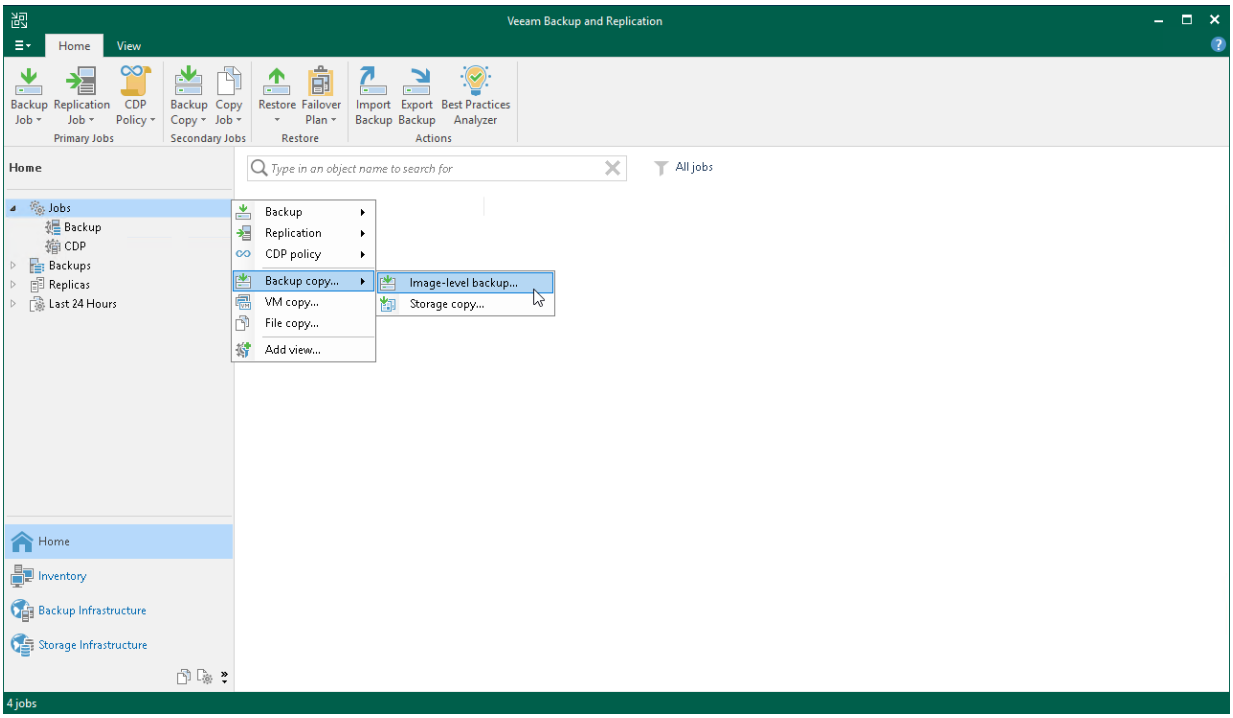
  To check whether restore points are created, open the inventory pane of the **Home** view and select the **Backups** node. Then, expand the backup job and verify that there is at least one restore point available.

Creating Backup Copy Job

To create a backup copy job, do the following:

1. Open the **Home** view.

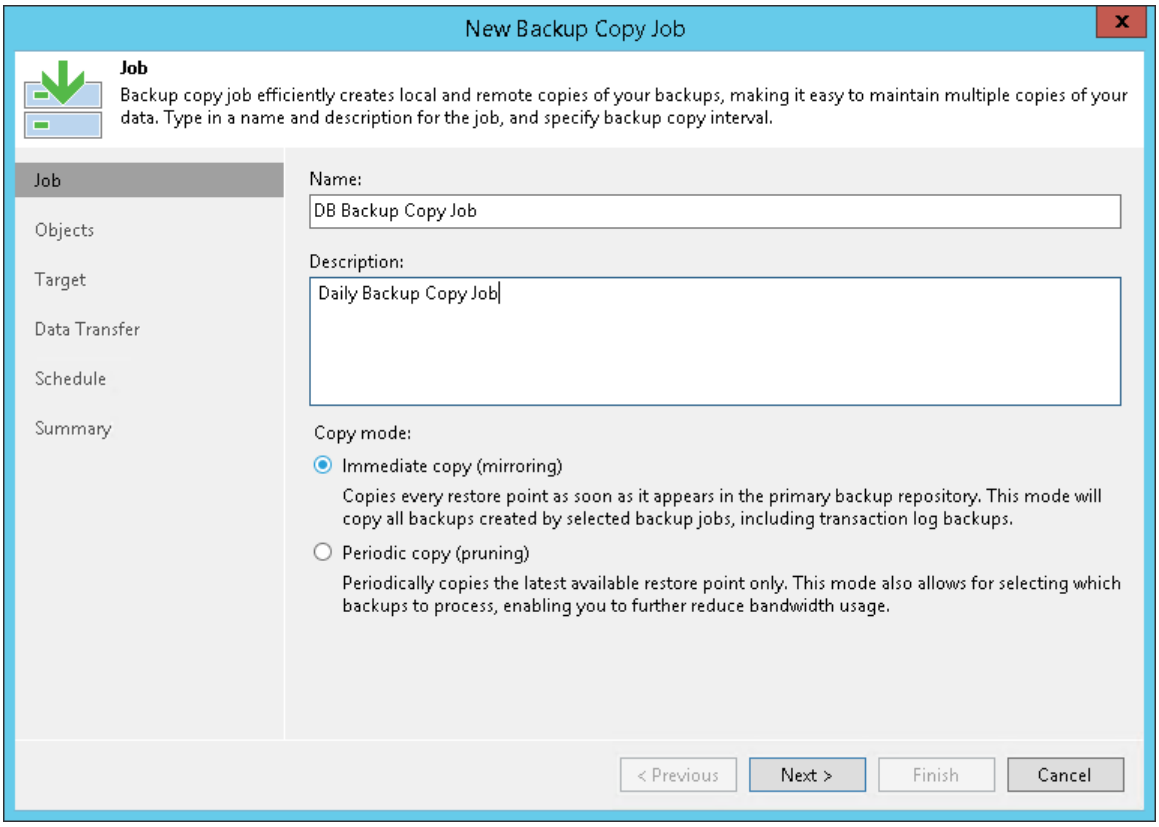
2. In the inventory pane, right-click **Jobs** and select **Backup Copy** > **Image-level backup** to launch the **New Backup Copy Job** wizard.



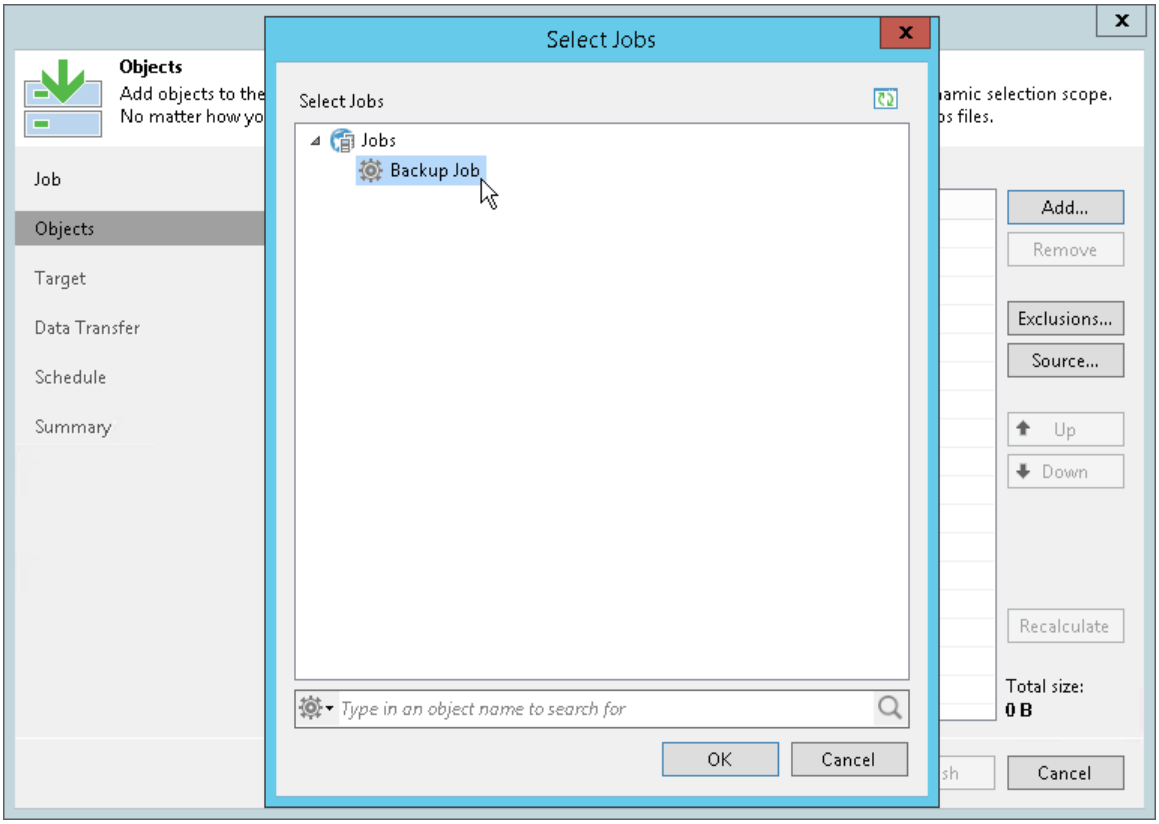
3. At the **Job** step of the wizard, do the following:
   - Specify a name and description for the backup copy job.

- In the **Copy mode** field, check that the **Immediate copy** is selected.

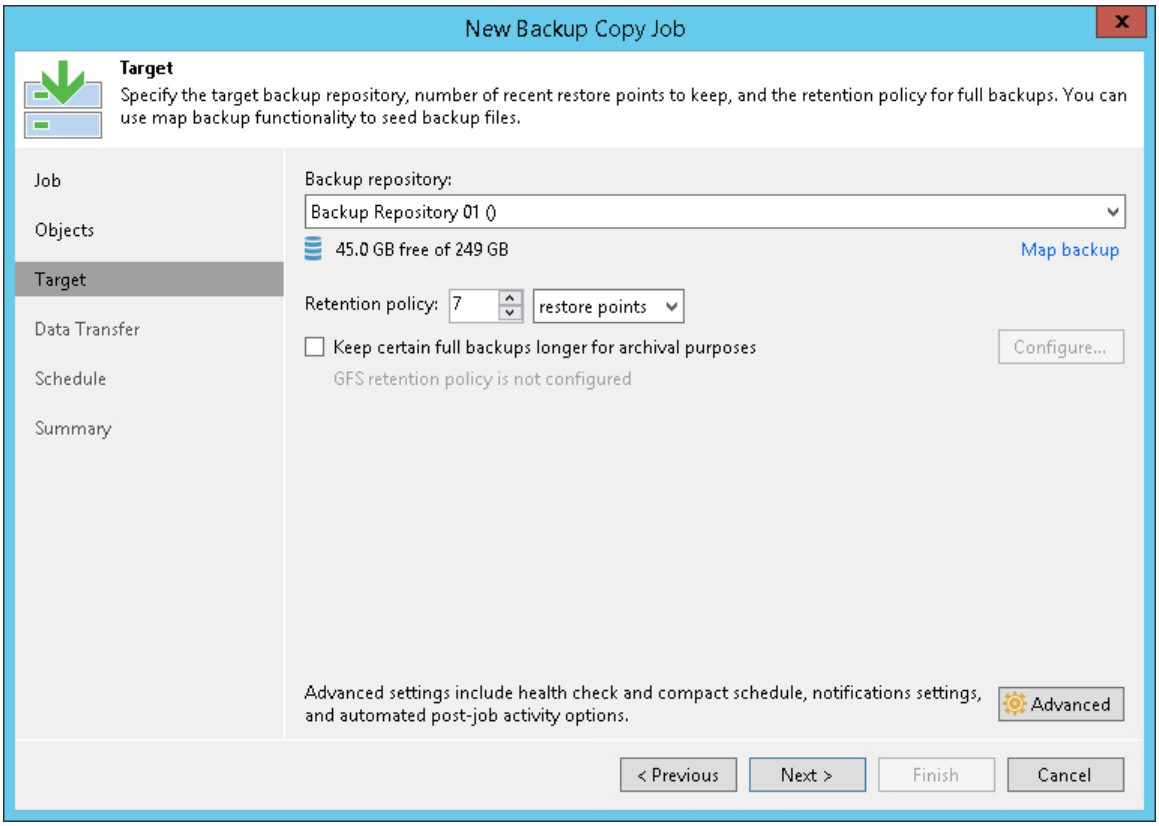
  In the immediate copy mode, Veeam Backup & Replication copies new data as soon as it appears on the source repository. For more information, see Backup Copy Modes in the Veeam Backup & Replication User Guide.



4. At the **Objects** step of the wizard, click **Add** and select backup jobs that you want to copy.



5. At the **Target** step of the wizard, select the backup repository where you want to store the backup copy. For other settings, keep the default values.



6. At the **Data Transfer** step of the wizard, keep the default settings.
7. At the **Schedule** step of the wizard, define the period of time when the backup copy job is allowed to transport data over the network.
8. At the last step of the wizard, select the **Enable the job when I click Finish** check box and click **Finish**. The job will start running in the continuous mode.

Reference

For more information on the backup copy, see the Backup Copy section in the Veeam Backup & Replication User Guide.

VM Replication

When you replicate a VM, Veeam Backup & Replication creates the exact copy of the VM in the native Microsoft Hyper-V format on a spare Hyper-V host and keeps this copy synchronized with the original VM.

Replication provides the best recovery time objective (RTO) values. You actually have the copy of a VM in the ready-to-start state. That is why replication is recommended for VMs running most critical applications.

Replication is a job-driven process. During the first run of a replication job, Veeam Backup & Replication copies data of the original VM running on the source host and creates its full replica on the target host. During next job runs, Veeam Backup & Replication copies only those data blocks that have changed since the last replication job session. Veeam Backup & Replication writes these changes to restore points, so that you can further publish this replica in the required state.

Veeam Backup & Replication supports several replication scenarios. Depending on the location of the host where you plan to store replicas, you can choose the following scenarios:

- Onsite replication

  The target host is located in the same site as the source host.

- Offsite replication

  The target host is located on another site.

In this section, you will learn how to work with onsite replicas. For more information on offsite replication, see Replication Scenarios in the Veeam Backup & Replication User Guide.

Reference

For more information on replication, see Replication in the Veeam Backup & Replication User Guide.

Creating Replication Job

Before You Begin

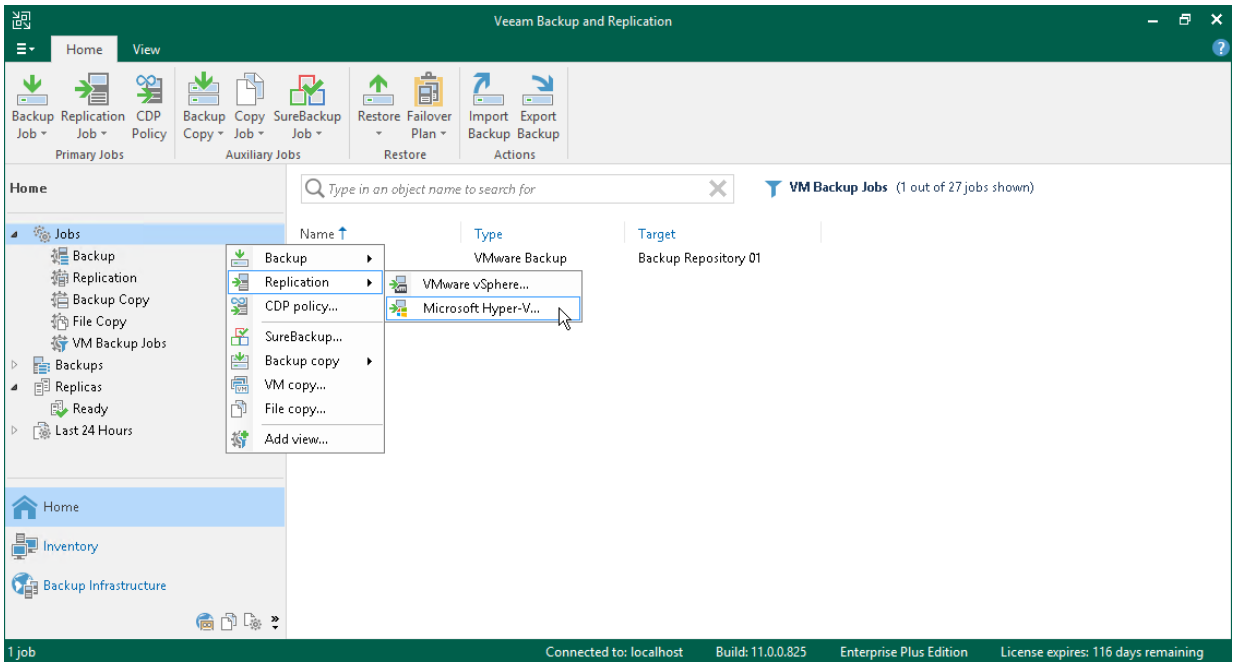
Before you replicate a VM, consider the following:

- You must add all components needed for the replication process to the backup infrastructure. These components are source and target Microsoft Hyper-V hosts, backup proxy and backup repository.
- You cannot replicate VMs with shared VHDX and VHDS disks.

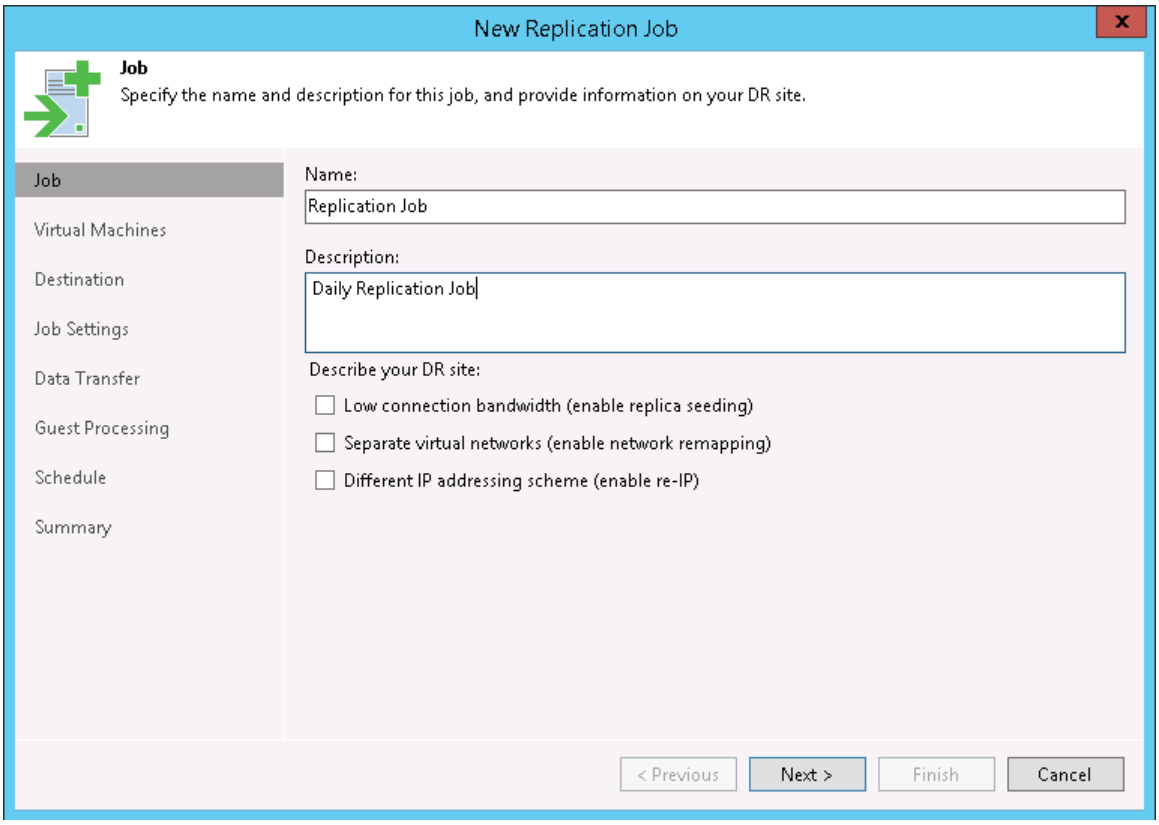
Creating Replication Job

To replicate a VM, do the following:

1. Open the **Home** view.
2. In the inventory pane of the **Home** view, right-click the **Jobs** node and select **Replication** > **Virtual machine** > **Microsoft Hyper-V** to launch the **New Replication Job** wizard.

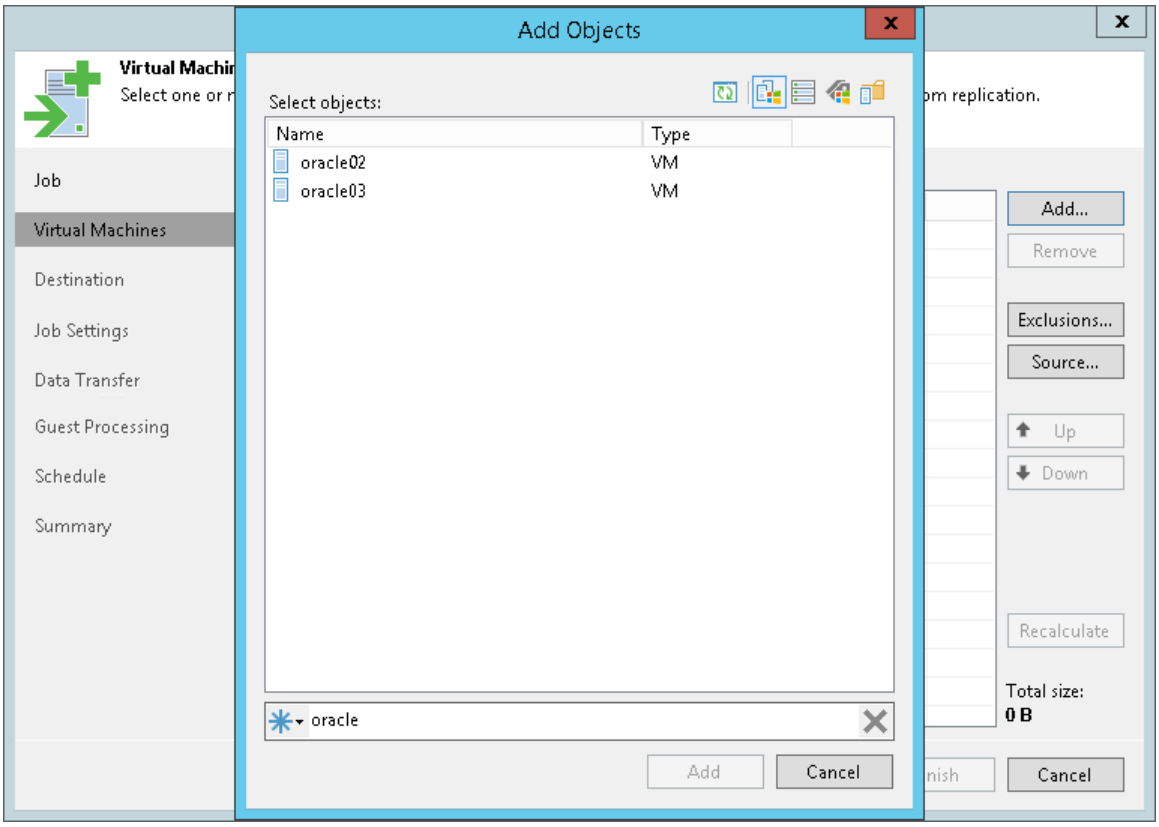


3. At the **Name** step of the wizard, specify a name and description for the replication job. For other settings, leave the default values.



4. At the **Virtual Machines** step of the wizard, click **Add**. From the list, select VMs that you want to replicate.

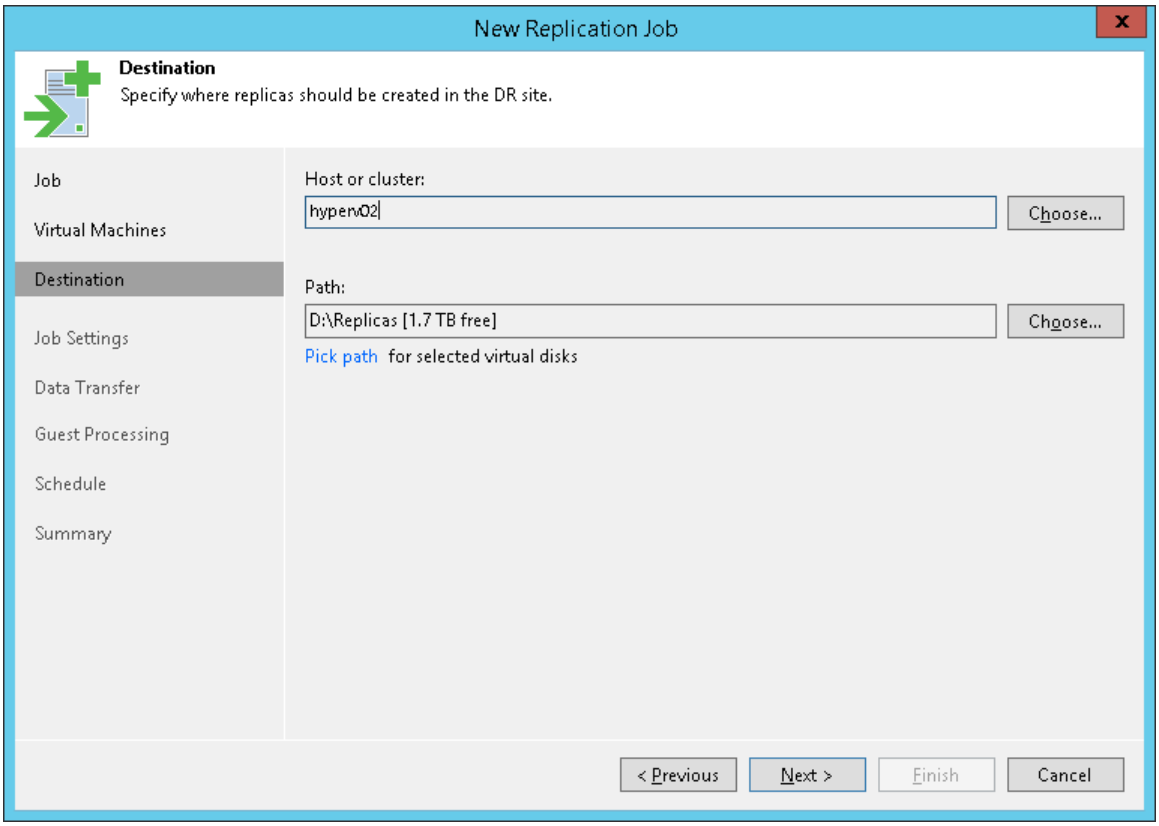
   You can also replicate VM containers: Hyper-V hosts, clusters, SCVMM and so on. If you add a new VM to the container after the replication job is created, Veeam Backup & Replication automatically updates the job to include the new VM.



5. At the **Destination** step of the wizard, do the following:

   - Click **Choose** next to the **Host or cluster** field and select a host on which the VM replica must be registered.

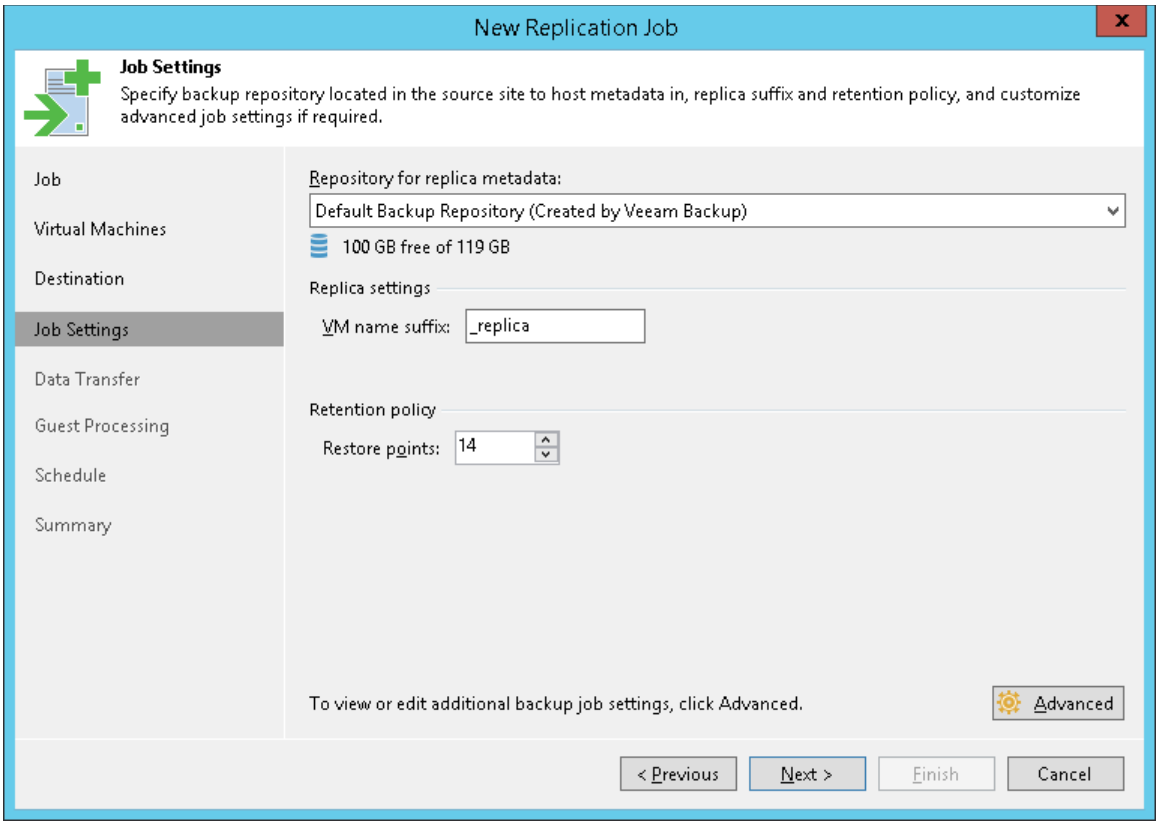
- Click **Choose** next to the **Path** field and specify a path to a location where VM replica files should be stored.



6. At the **Job Settings** step of the wizard, do the following:
   - In the **Repository for replica metadata** list, select the backup repository where you want to store the metadata file.
   - In the **Replica name suffix** field, specify the suffix that will be appended to the name of the original VM.

- In the **Restore points to keep** field, define the number of restore points to keep.

  When this number is exceeded, the earliest restore point is removed. Due to Microsoft Hyper-V restrictions, the maximum number of restore points for snapshot replicas is limited to 47.

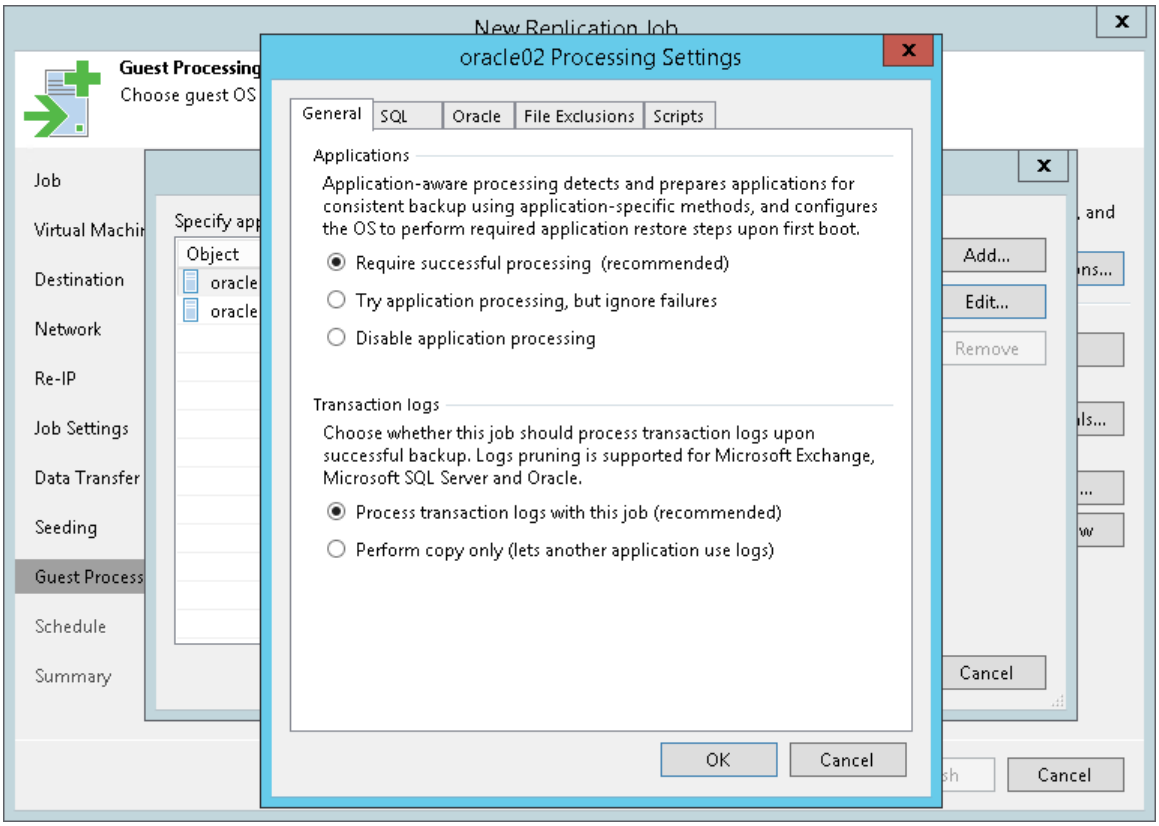


7. At the **Data Transfer** step of the wizard, leave the default settings.
8. At the **Guest Processing** step of the wizard, leave the default settings if you do not need transactionally consistent replicas. Otherwise, select the **Enable application-aware processing** check box and specify credentials of a user account to connect to the VM guest OS. The user account must have Administrator permissions.

   To specify advanced options for VSS processing, click **Applications**. Select a VM in the list and click **Edit**. In the opened window on the **General** tab, do the following:

   - In the **Applications** section, select **Try application processing, but ignore failures** to continue the replication job even if VSS errors occur. If VSS processing fails, the created replica will not be transactionally consistent but crash consistent.

- In the **Transaction logs** section, check that the **Process transaction logs with this job** option is selected.



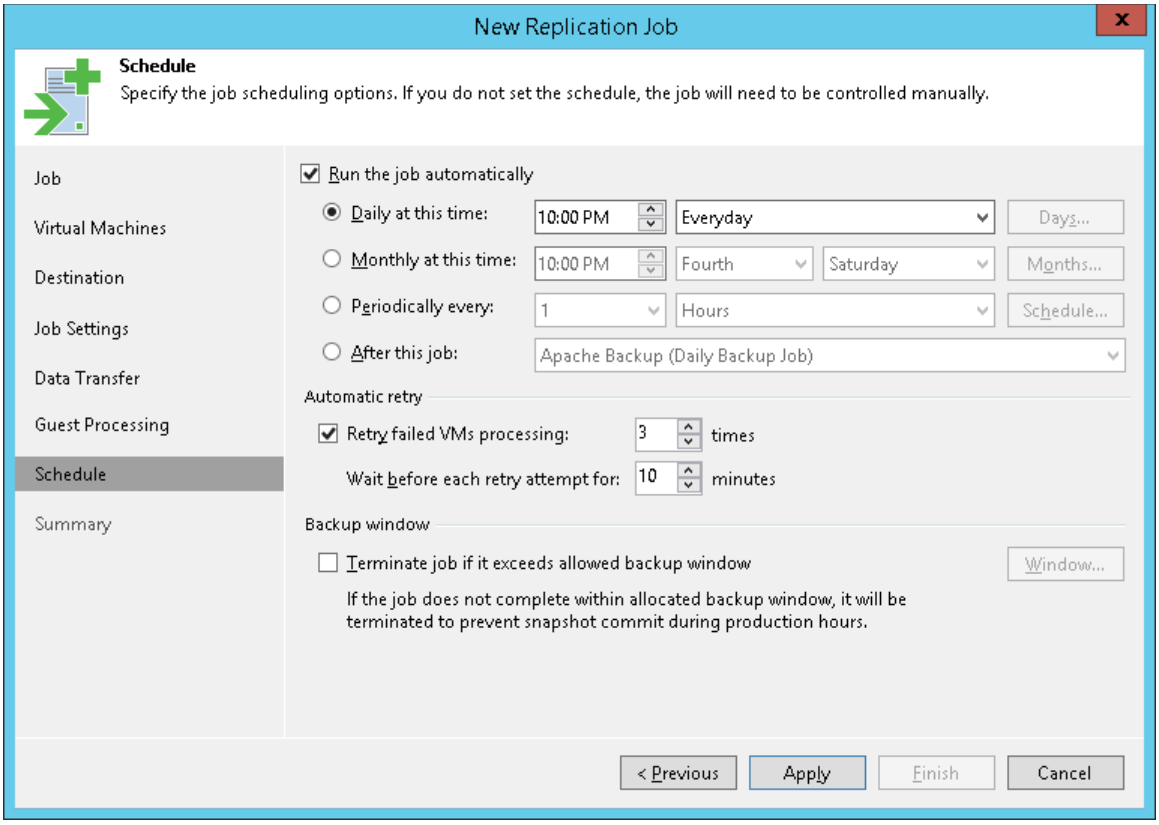
9. At the **Schedule** step of the wizard, do the following:

   a. Select the **Run the job automatically** check box. If you do not select this check box, you will have to launch the job manually. For details, see Start Replication Job Manually.

   b. Select the schedule type: daily, monthly or periodically.

      In the **Periodically every** field, you can select **Continiously** to run the job in a non-stop manner. A new session of the job will start as soon as the previous job session completes.

c. Make sure the **Retry failed VM processing** check box is selected.



10. At the **Summary** step of the wizard, select the **Run the job when I click Finish** check box and click the **Finish** button.
11. In the inventory pane of the **Home** view, expand the **Last 24 Hours** node to see the created job.
12. Open **Hyper-V Manager** and make sure that the replica appeared on the target host.

Reference

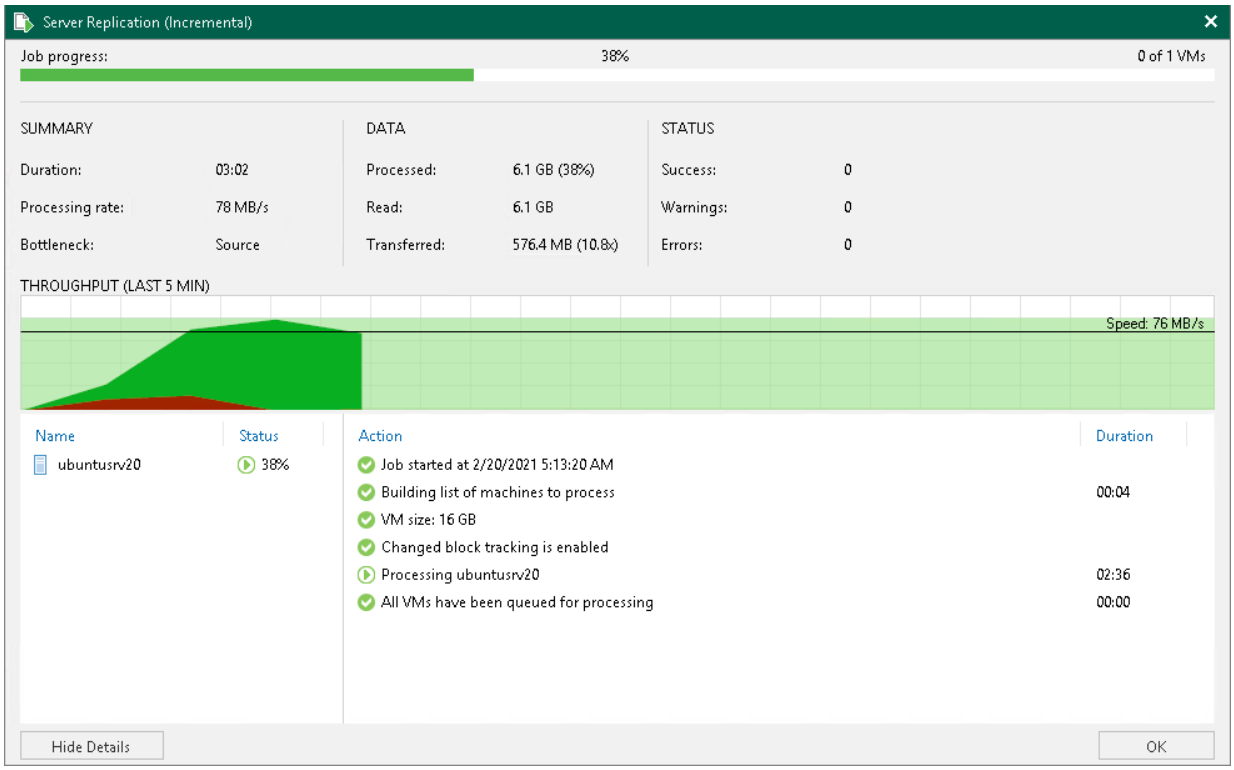
For more information on replica creation, see Creating Replication Jobs in the Veeam Backup & Replication User Guide.

Monitoring Job Performance in Real Time

When the job is running, you can view job statistics in real time. Statistics include job progress, duration, processing rate, performance bottlenecks, the amount of read and transferred data, and other details of the job performance.

To view the job statistics, do the following:

1. In the inventory pane of the **Home** view, select the **Jobs** > **Replication** node.
2. In the working area, right-click a job and click **Statistics**.
3. In the opened window, select a VM to view its statistics.



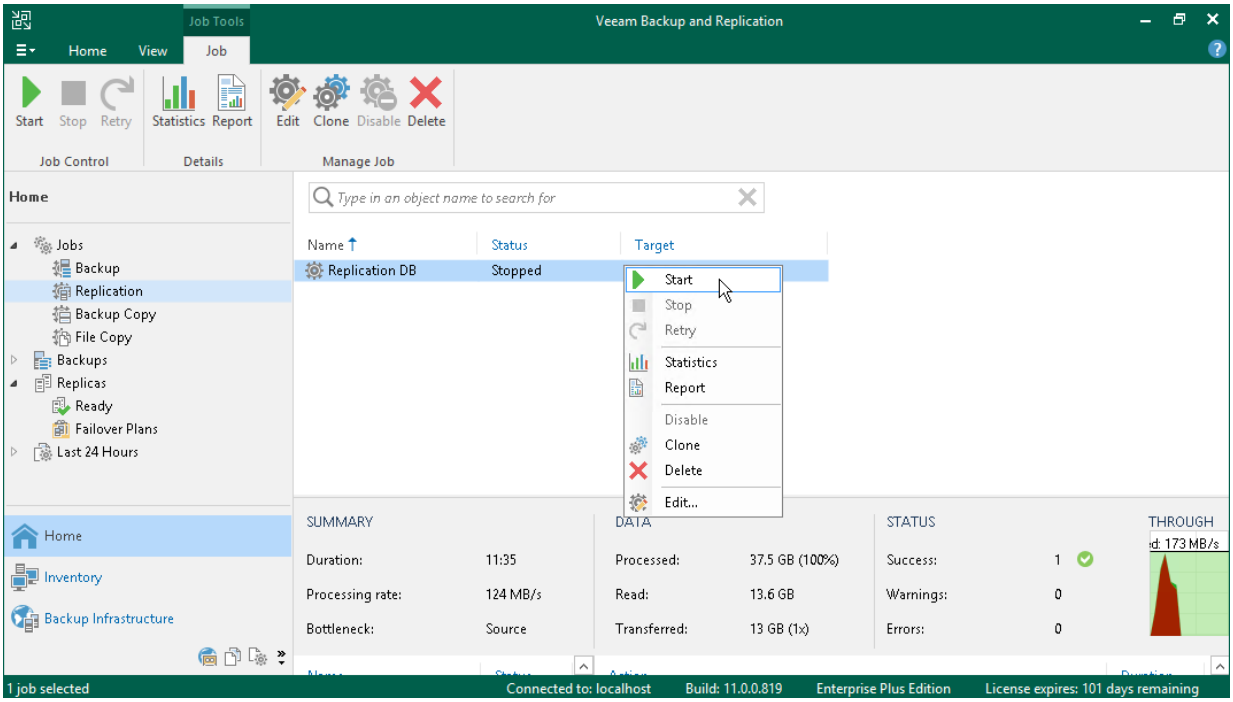
Note that the job must complete with the *Success* or *Warning* status. If the job completes with the *Failed* status, Veeam Backup & Replication does not create a replica and is not able to perform failover and failback operations.

You can configure email notifications to get job results. For details, see Configuring Global Email Notification Settings in the Veeam Backup & Replication User Guide.

Start Replication Job Manually

If you do not schedule a replication job, you must start it manually. To start the job, do the following:

1. Open the **Home** view.
2. In the inventory pane, select **Jobs** > **Replication**.
3. In the working area, right-click the job and select **Start**. Wait for the job to complete. Note that the job must complete with the *Success* or *Warning* status.
4. Open **Hyper-V Manager** and make sure that a VM replica is created.



Replica Failover and Failback

If the original VM in the production site becomes unavailable, you can quickly restore services by failing over to its replica. When you perform failover, the VM replica takes the role of the original VM. All processes shift from the original VM on the production host to the VM replica on the secondary host. You can fail over to the latest state of a replica or to any of its restore points.

When you fail over to the VM replica, Veeam Backup & Replication changes the replica state from *Normal* to *Failover*.

Failover is an intermediate step that needs to be finalized. Depending on a disaster recovery scenario, you can do one of the following:

- **Undo failover**

  When you undo failover, you switch back to the original VM and discard all changes made to the VM replica while it was running. The state of the VM replica gets back to *Normal*. You can use the undo failover scenario if you have failed over to the VM replica for testing and troubleshooting purposes and you do not need the changes made to the VM replica.

- **Perform failback**

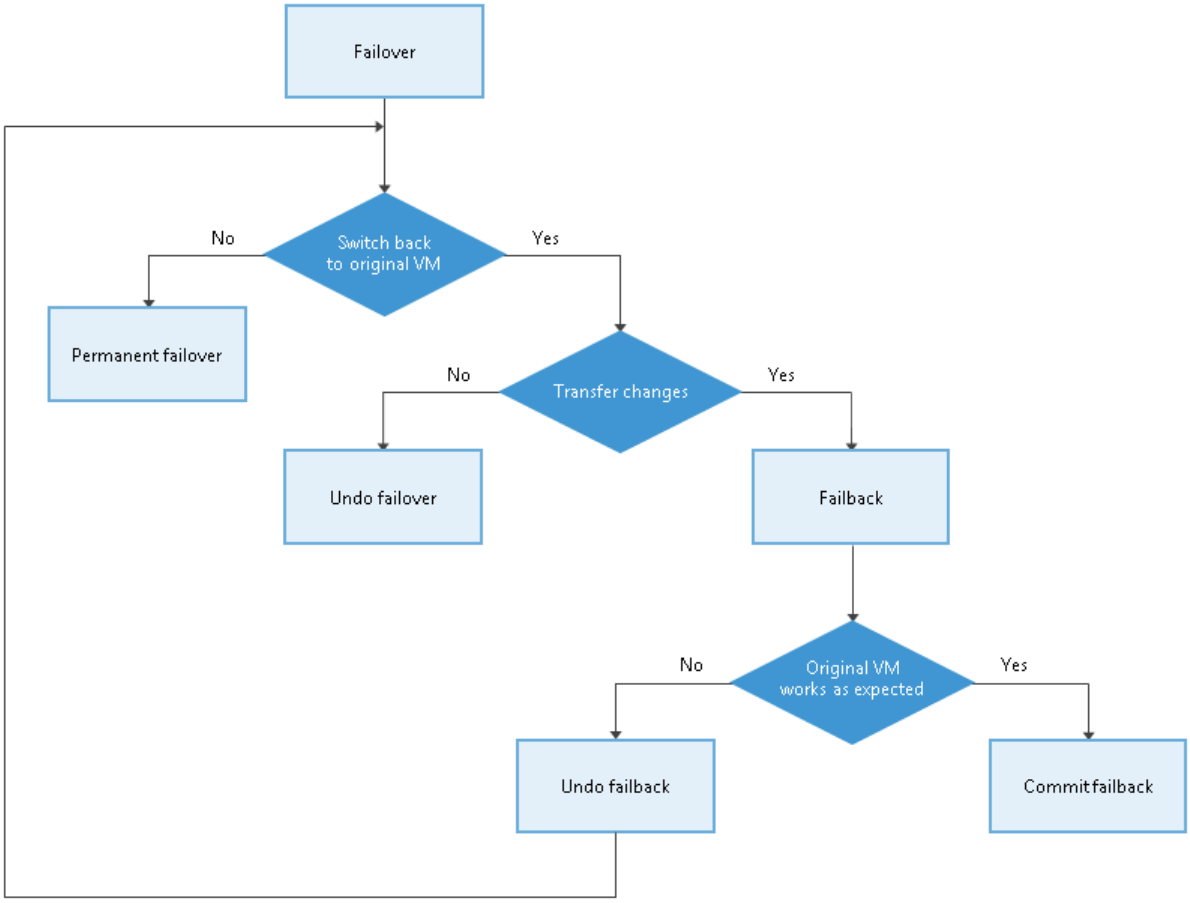
  When you perform failback, you switch back to the original VM and transfer all changes that took place while the VM replica was running to the original VM. If the source host is not available, you can restore the original VM to a new location and switch back to it.

  When you perform failback, changes are only transferred but not published. You must test whether the original VM works with these changes. Depending on the test results, you can do the following:

  - **Commit failback**. When you commit failback, you confirm that the original VM works as expected and you want to get back to it. The state of the VM replica gets back to *Normal*.
  - **Undo failback**. If the original VM is not working as expected, you can undo failback and get back to the VM replica. In this case, the state of the VM replica returns to *Failover*.

- **Perform permanent failover**

  When you perform failover, you permanently switch from the original VM to a VM replica and use this replica as the original VM. This scenario is acceptable if the original VM and VM replica are located in the same site and are nearly equal in terms of resources.



Veeam Backup & Replication supports failover and failback operations for several VMs simultaneously. In case one or several hosts fail, you can use batch processing to restore operations with minimum downtime.

Performing Replica Failover

Before You Begin

Before you perform failover, consider the following:

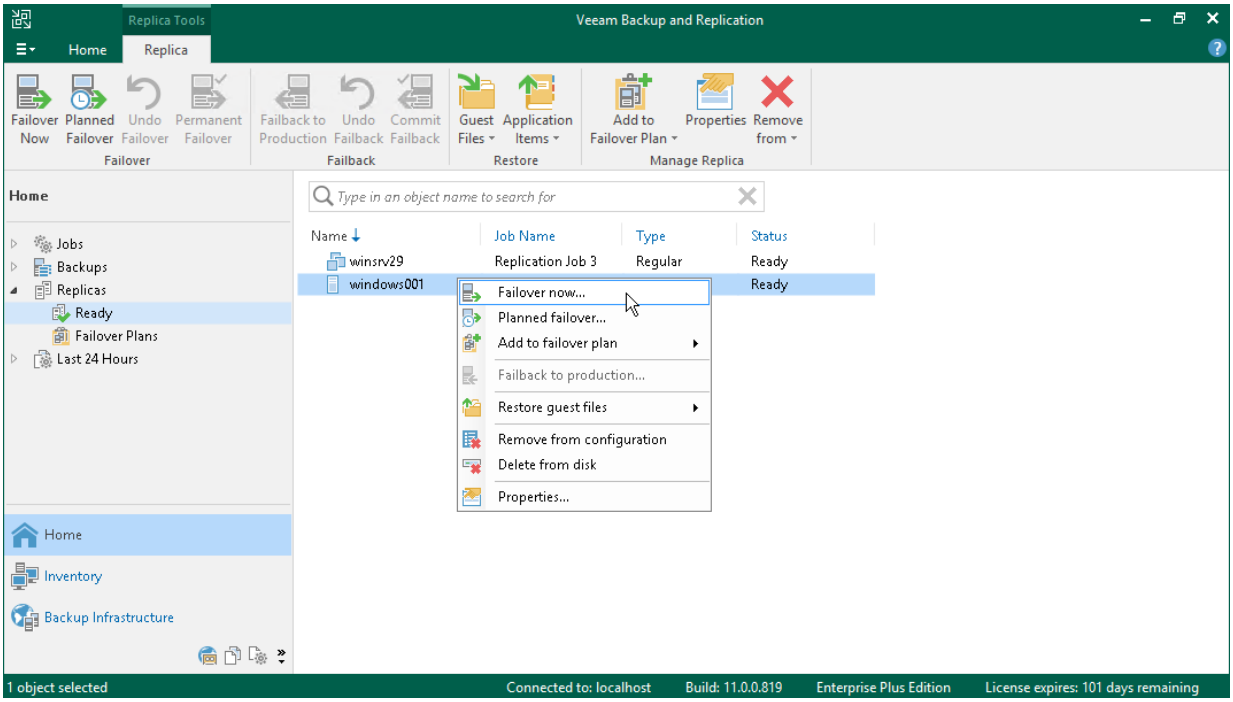
- For original VMs and replica VMs located in the same network. If you plan to perform replica failover while the original VM is running, consider temporarily disconnecting the original VM from the network to avoid IP addresses and/or machine names conflicts.
- To successfully fail over to a VM replica, make sure that this replica has at least one successfully created restore point.

  To check whether restore points are created, open the inventory pane of the **Home** view and select the **Replicas** node. Then, select the VM and verify that there is at least one restore point available for the VM.

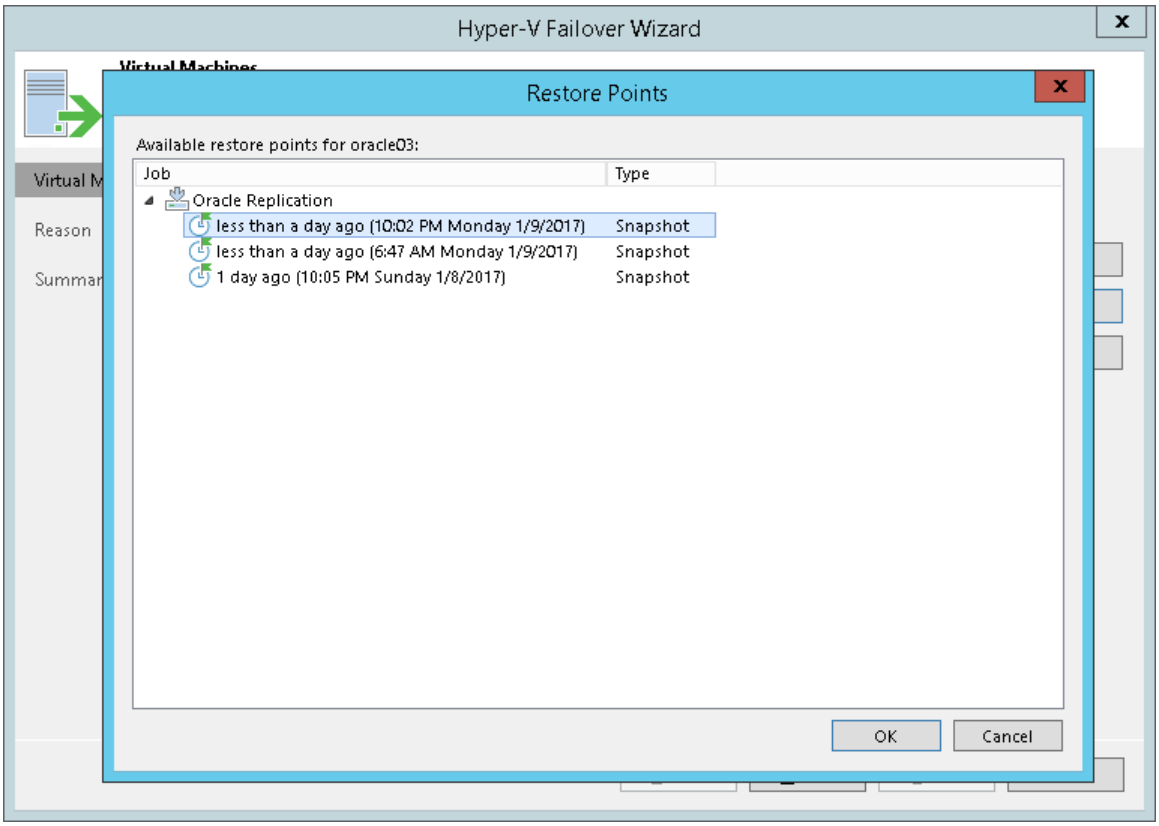
Performing Failover

To fail over to a VM replica, do the following.

1. In the inventory pane of the **Home** view, select the **Replicas** node.
2. Right-click the replicated VM and select **Failover Now** to launch the **Hyper-V Failover Wizard**.



3. At the **Virtual Machines** step of the wizard, select the VM from the list, click **Point** and choose the restore point to which you want to fail over.



4. At the **Reason** step of the wizard, specify the reason for failover.
5. At the **Summary** step of the wizard, click **Finish** to fail over to the VM replica.

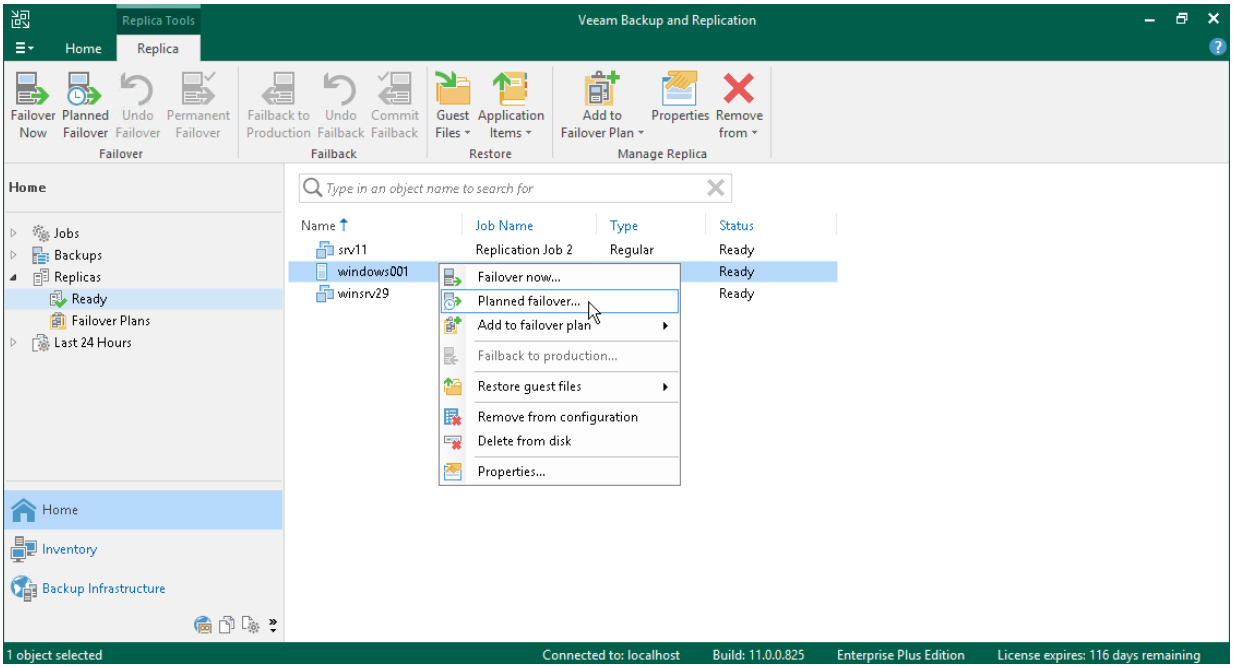
Reference

For more information on failover, see the Replica Failover section in the Veeam Backup & Replication User Guide.

Performing Permanent Failover

To perform permanent failover, do the following:

1. In the inventory pane of the **Home** view, click the **Replicas** node.
2. In the working area, right-click the VM replica and select **Permanent Failover**.
3. In the opened window, click **Yes** to confirm the operation.



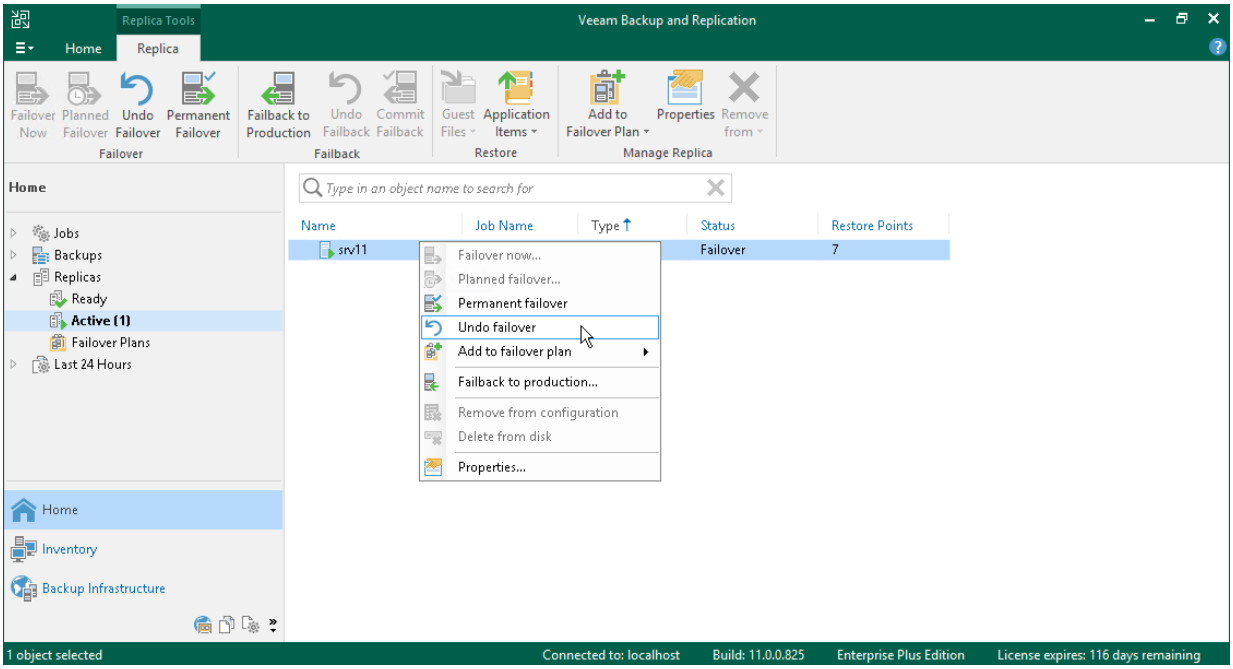
Reference

For more information on permanent failover, see the Permanent Failover section in the Veeam Backup & Replication User Guide.

Undoing Failover

To undo failover, do the following:

1. In the inventory pane of the **Home** view, select the **Replicas** node.
2. In the working area, right-click the VM replica and select **Undo Failover**.
3. In the opened window, click **Yes** to confirm the operation.



Reference

For more information on undoing failover, see the Undo Failover section in the Veeam Backup & Replication User Guide.

Performing Failback

You can fail back to a VM in the original or new location. In this section, you will learn how to fail back to the original VM on the source host. For more information on how to do this on another host, see the Performing Failback section in the Veeam Backup & Replication User Guide.

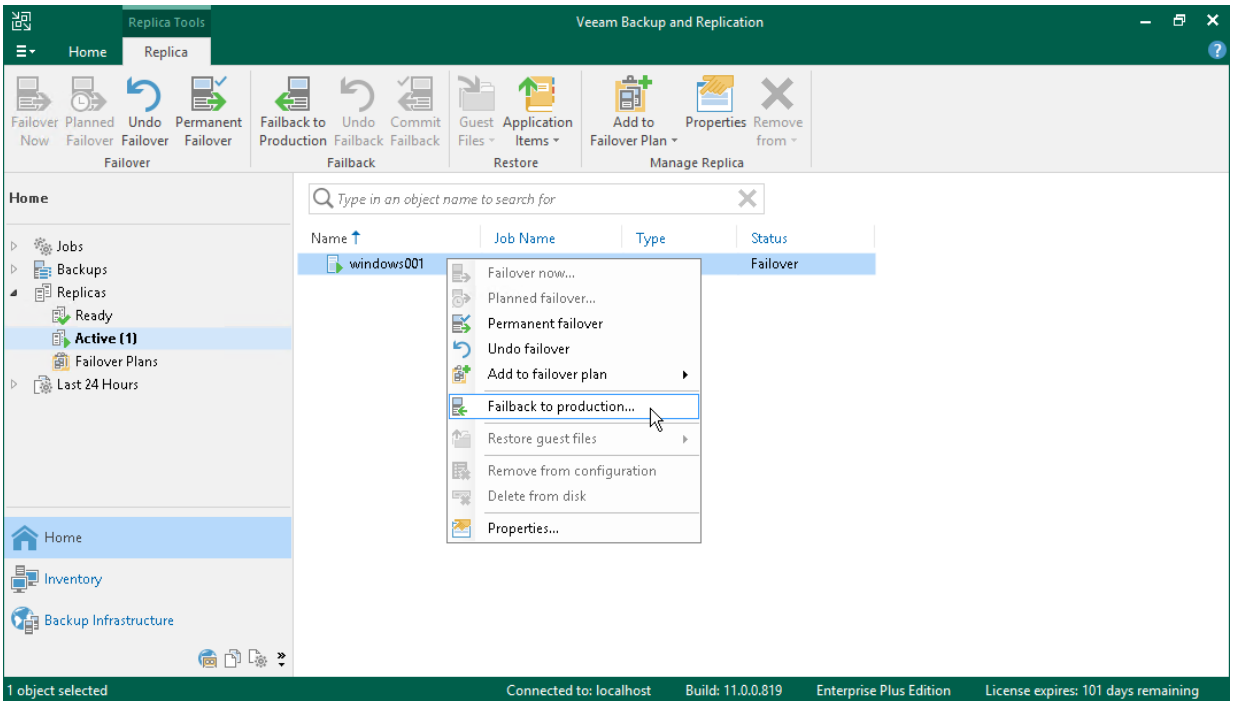
Before You Begin

Make sure that the VM replica for which you want to perform failback is in the *Failover* state. The replica gets into this state after you perform replica failover.

Performing Failback

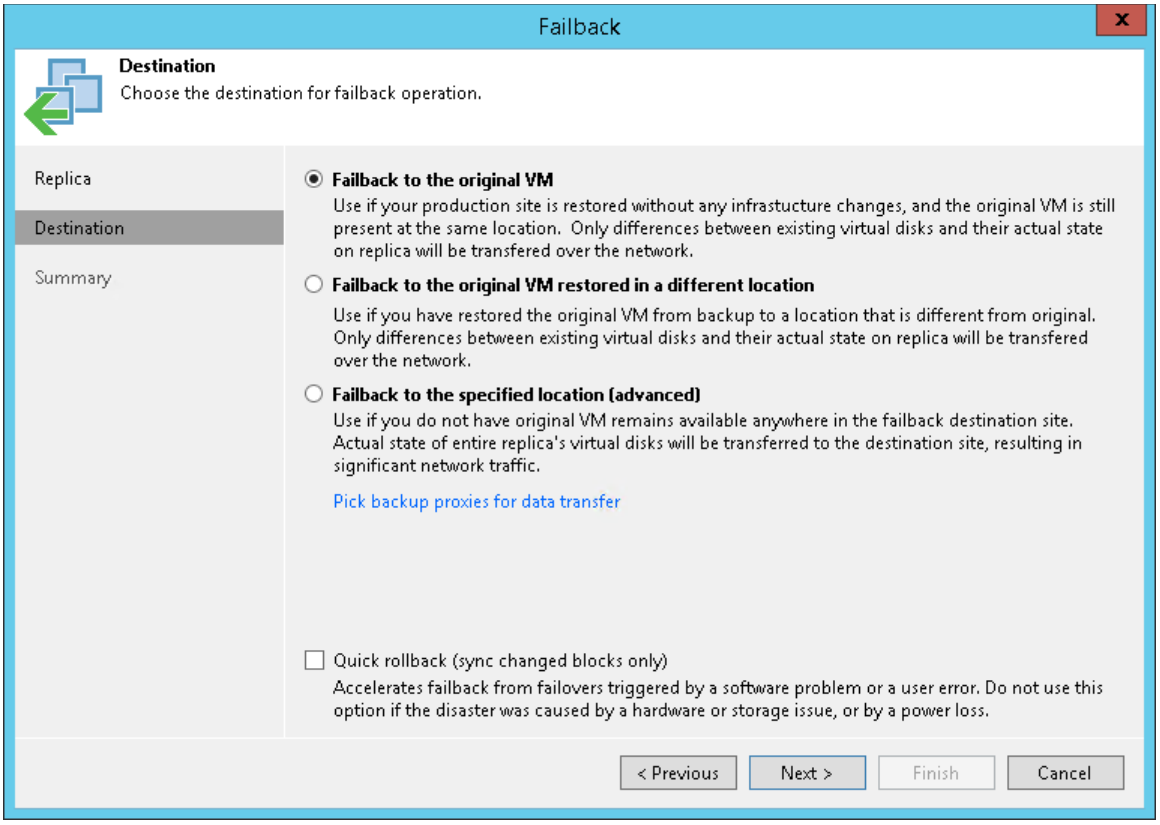
To fail back from VM replica to the original VM on the source host, do the following:

1. In the inventory pane of the **Home** view, select the **Replicas** node.
2. In the working area, right-click the VM replica and select **Failback to production** to launch the **Failback Wizard**.



3. At the **Replicas** step of the wizard, click **Next**.

4. At the **Destination** step of the wizard, select **Failback to the original VM**.



5. At the **Summary** step of the wizard, select the **Power on VM after restoring** check box and click **Finish**.

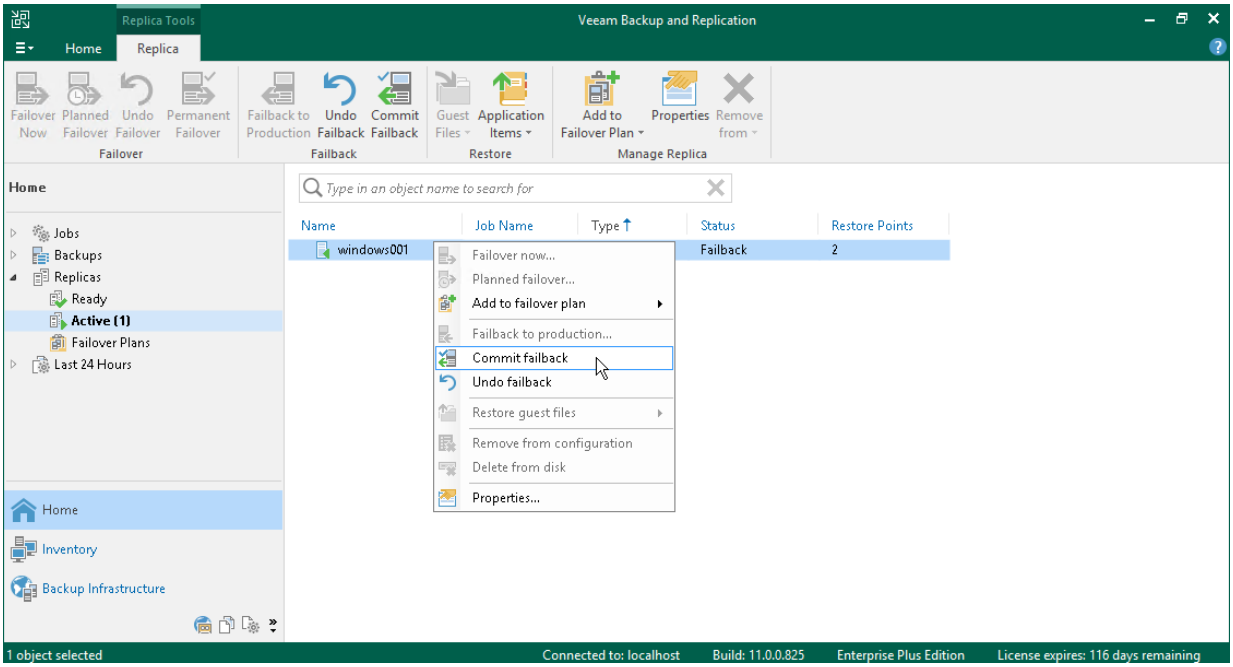
Reference

For more information on failback, see the Replica Failback section in the Veeam Backup & Replication User Guide.

Committing Failback

To commit a failback, do the following:

1. In the inventory pane of the **Home** view, select the **Replicas** node.
2. In the working area, right-click the VM replica and select **Commit Failback**.
3. In the opened window, click **Yes** to confirm the operation.



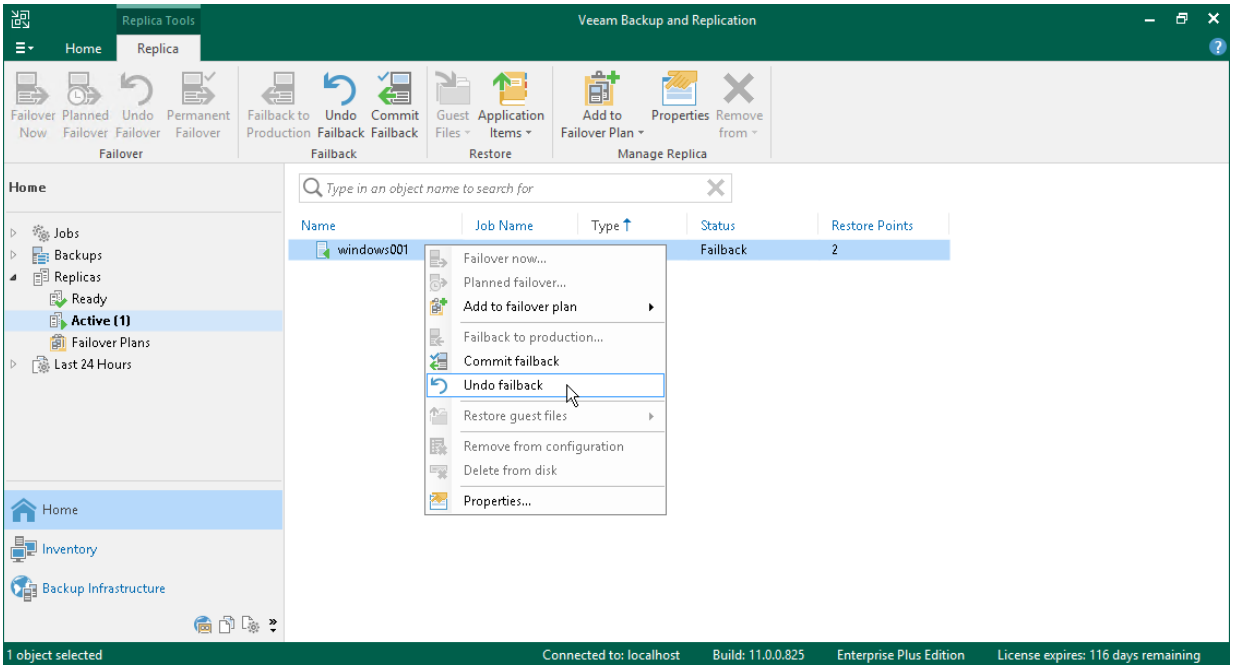
Reference

For more information on committing failback, see the Commit Failback section in the Veeam Backup & Replication User Guide.

Undoing Failback

To undo a failback, do the following:

1. In the inventory pane of the **Home** view, select the **Replicas** node.
2. In the working area, right-click the VM replica and select **Undo Failback**.
3. In the opened window, click **Yes** to confirm the operation.



Reference

For more information on undoing failback, see the Undo Failback section in the Veeam Backup & Replication User Guide.

Enterprise Manager

If you have a geographically dispersed virtual environment with multiple Veeam Backup & Replication servers, you can use Veeam Backup Enterprise Manager. Veeam Backup Enterprise Manager is a solution that helps manage multiple backup servers from a single web UI.

You can use Veeam Backup Enterprise Manager to perform the following tasks:

- Manage jobs configured on different backup servers from a single web console
- Edit and clone jobs
- Monitor the state of jobs
- Generate reports on jobs and backup servers
- Search for guest OS files in all backups and restore these files in one click

For the full list of the Veeam Backup Enterprise Manager capabilities, see About Veeam Backup Enterprise Manager in the Enterprise Manager User Guide.

> **NOTE:**
>
> Veeam Backup Enterprise Manager is not shipped with the Community edition. For more information, see Editions Comparison.

Installing Veeam Backup Enterprise Manager

Before You Begin

Consider the following:

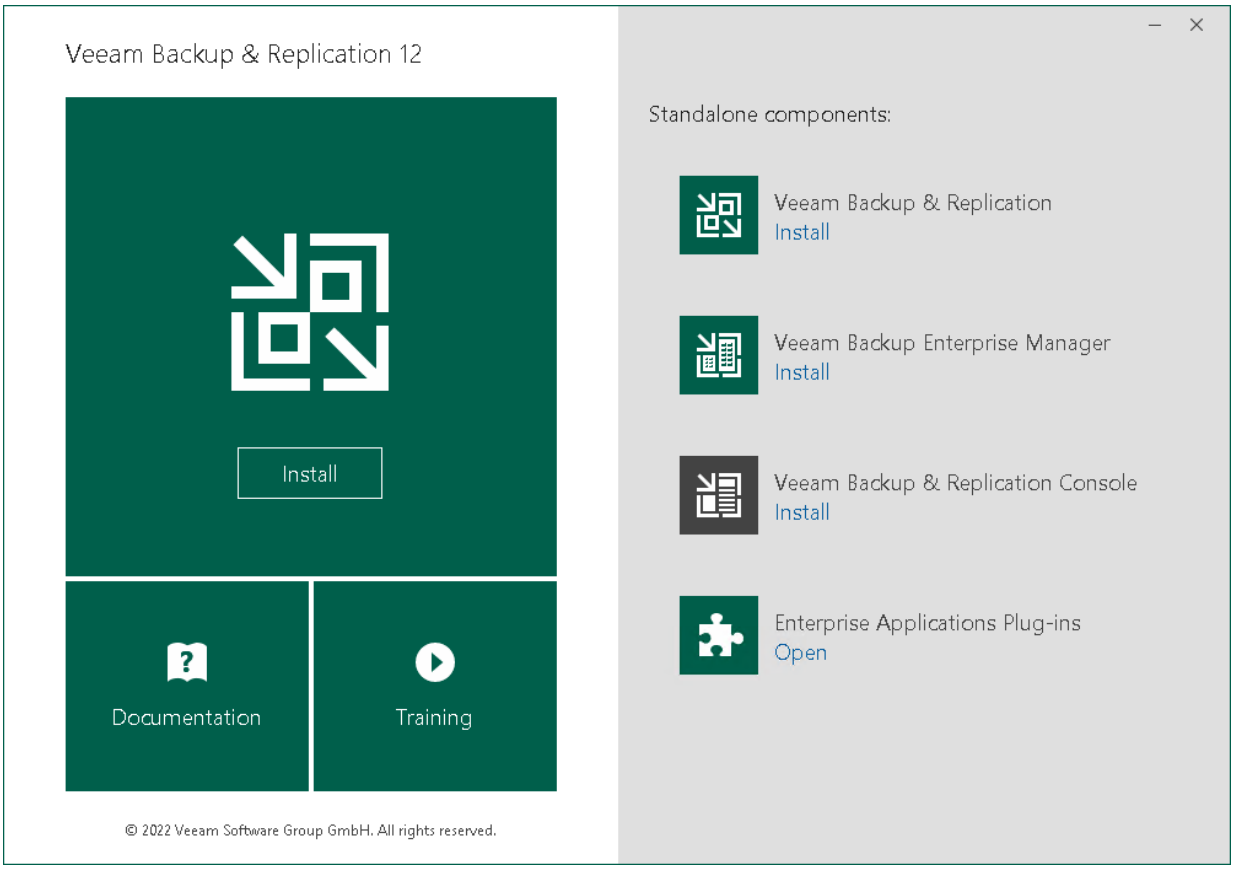
- The machine on which you plan to install Veeam Backup Enterprise Manager must meet the system requirements. For details, see System Requirements in the Enterprise Manager User Guide.
- It is recommended to install the same product version on the Veeam Backup Enterprise Manager server and Veeam Backup & Replication backup servers.
- If you plan to install Veeam Backup Enterprise Manager on the same machine where the backup server runs, you must disable all backup and replication jobs and close the Veeam Backup & Replication console.
- Make sure that all necessary ports are opened. For details, see Used Ports in the Enterprise Manager User Guide.

Installing Enterprise Manager

To install Veeam Backup Enterprise Manager, perform the following:

1. Download the latest version of Veeam Backup & Replication installation image from the Download Veeam products page.
2. Mount the installation image to the machine on which you plan to installVeeam Backup Enterprise Manager or burn the image file to a flash drive or other removable storage device.
3. Run the `Setup.exe` file from the image or disk to open the splash screen.

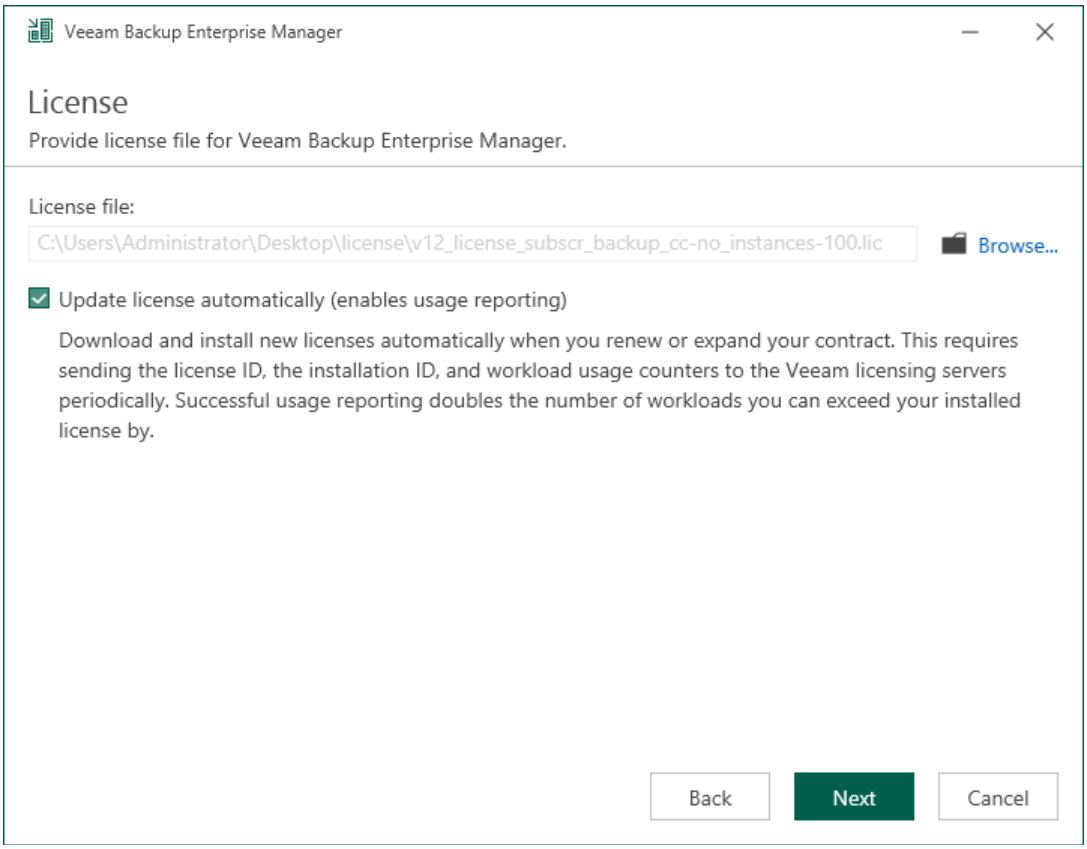
4. On the splash screen, click the **Veeam Backup Enterprise Manager** tile in the **Standalone components** section to launch the **Veeam Backup Enterprise Manager Setup** wizard.



5. At the **License Agreement** step of the wizard, read the license agreements and select check boxes to accept the terms.

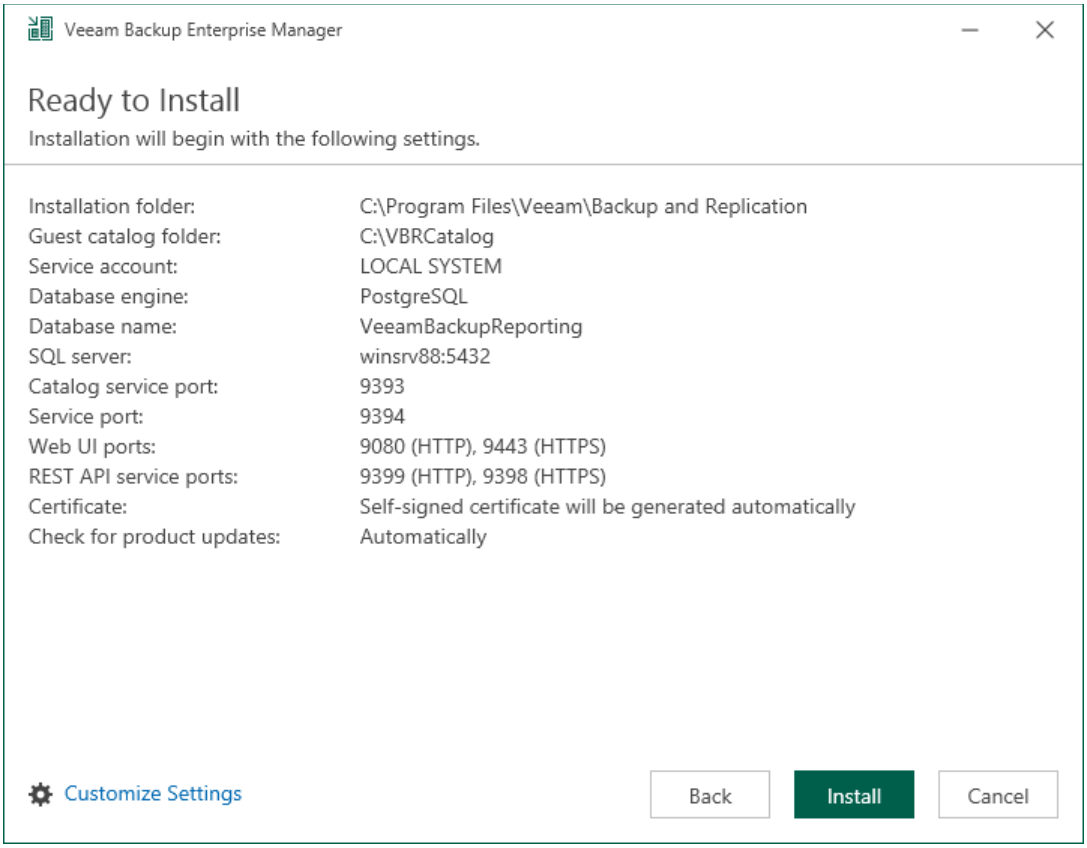
6. At the **Provide License** step of the wizard, specify the path to the license key.

   If you install Veeam Backup Enterprise Manager on the backup server, you can proceed without providing a license file. In this case, Veeam Backup Enterprise Manager will use the license that is already installed on the backup server.



7. At the **System Configuration Check** step of the wizard, install missing software components and enable missing features, if any.

8. At the **Ready to Install** step of the wizard, click **Install** to begin installation.



9. When the installation process completes, click **Finish** to close the wizard.

Adding Backup Servers

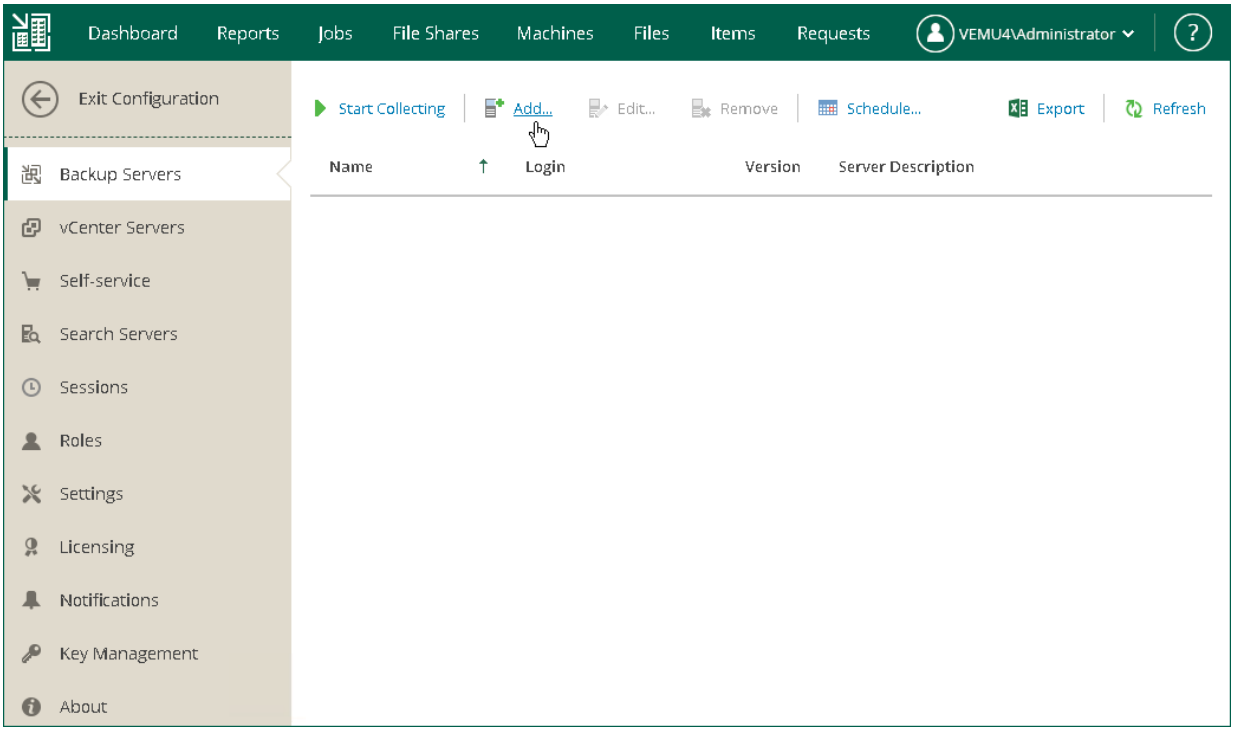
To manage backup servers from a single web console, you must add them to Veeam Backup Enterprise Manager.

To add a backup server to Veeam Backup Enterprise Manager, do the following:

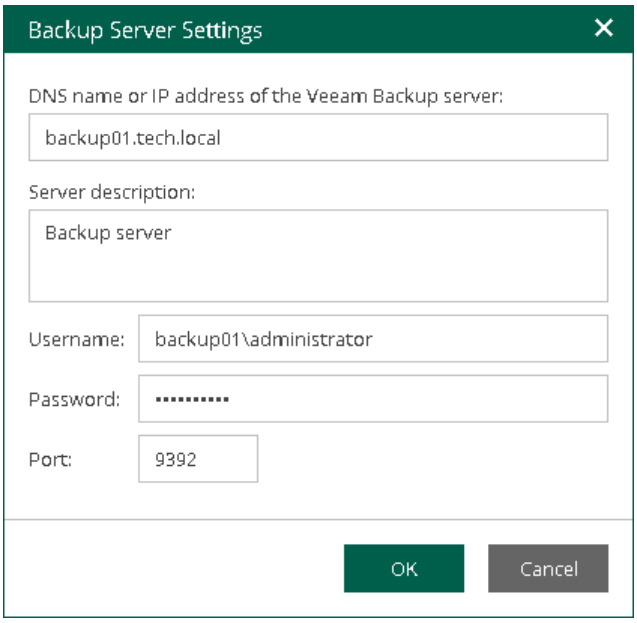
1. From the Microsoft Windows **Start** menu, select **Programs** > **Veeam** > **Veeam Backup Enterprise Manager to launch** Veeam Backup Enterprise Manager.

   To access Veeam Backup Enterprise Manager remotely, use the following address: `https://enterprise_manager_server_address:9443`

2. In the **Username** and **Password** fields, specify credentials of the user with local Administrator rights or the user who installed Veeam Backup Enterprise Manager.
3. Click **Login**.
4. At the top right corner of the opened window, click **Configuration** to open the **Configuration** view.
5. Select the **Backup Servers** tab. In the working area, click **Add** to open the **Backup Server Settings** window.



6. In the opened window, specify the DNS name or IP address of the backup server you want to add. Provide the name and password of the user account with local Administrator rights on the added backup server.



7. Click **OK**.

   Veeam Backup Enterprise Manager will start collecting data about all backup and replication jobs on the added backup server.

Reference

For more information on adding backup servers, see Managing Veeam Backup Servers in the Enterprise Manager User Guide.

Managing Jobs

Veeam Backup Enterprise Manager allows you to manage jobs that were configured on backup servers: start, stop, retry, edit and clone jobs.

In this section, you will learn how to clone and then edit jobs. When you clone a job, you create its exact copy. Configuration details of the created job copy are written to the same Microsoft SQL database where details of the original job are stored. You can work with the created job both in Veeam Backup Enterprise Manager and in the Veeam Backup & Replication console on the backup server.

Before You Begin

Consider the following:

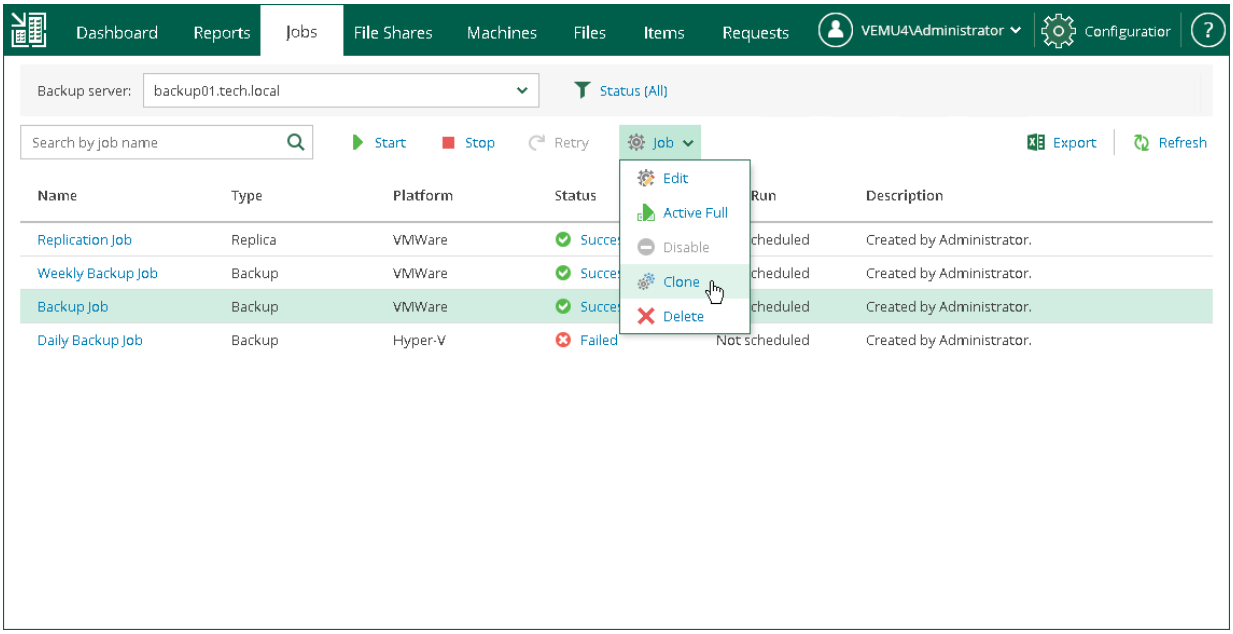
- Make sure that you have successfully connected backup servers to Veeam Backup Enterprise Manager and collected data from them. For details, see Adding Veeam Backup Server.
- You have created jobs on the backup server.

Cloning and Editing Job

To clone a job, perform the following.

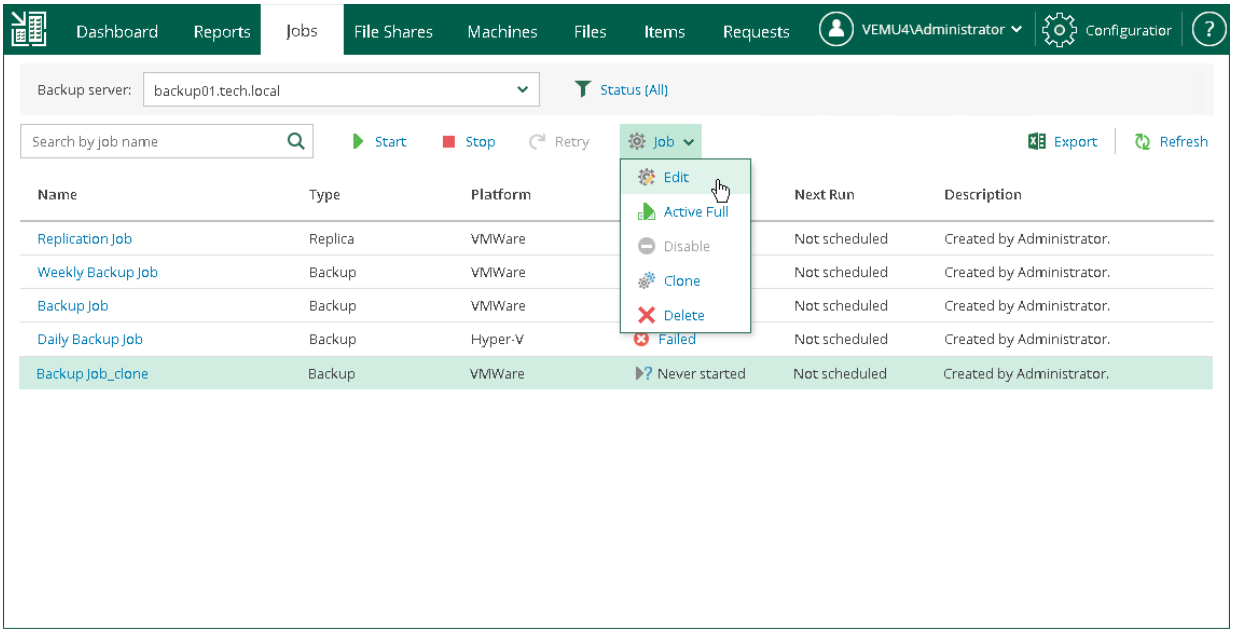
1. In Veeam Backup Enterprise Manager, click the **Jobs** tab.
2. Select the required job from the list, click **Job** at the top of the working area and click **Clone**.

   The cloned job has the same name as the original job plus the `_cloned` suffix.

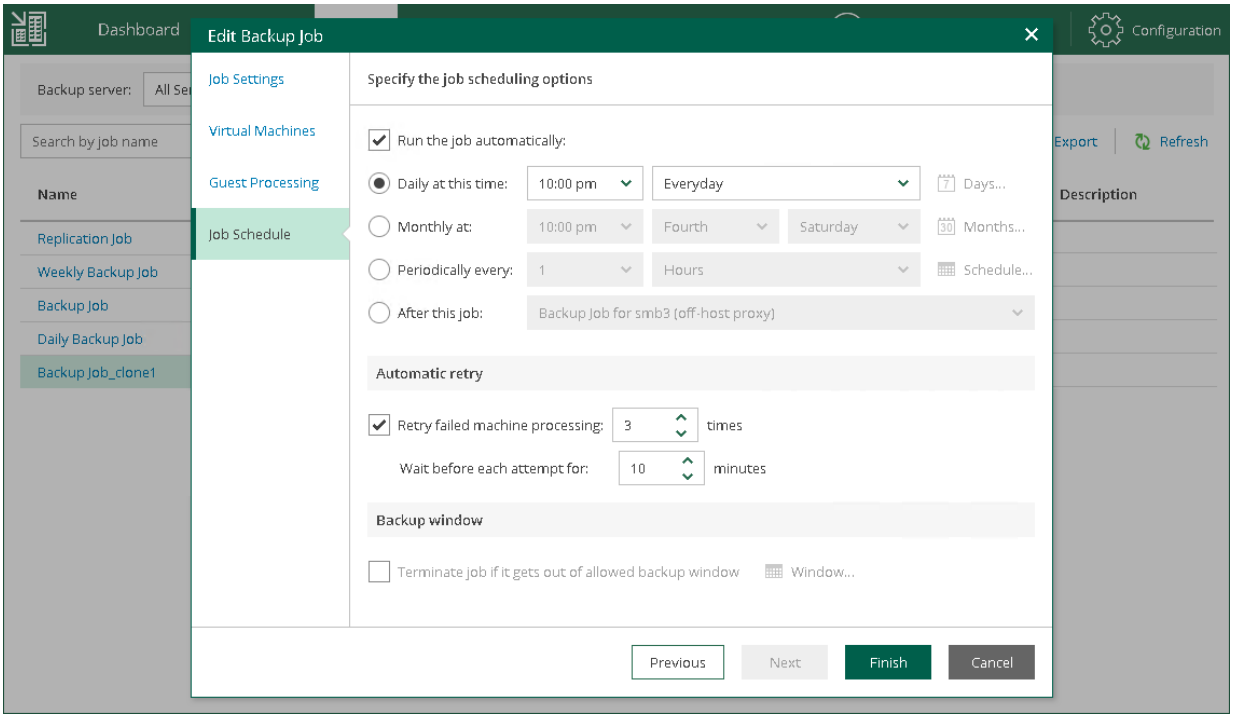


3. Select the cloned job from the list.

4. At the top of the working area, click **Job** and select **Edit**.



5. Follow the steps of the wizard and edit the job settings as required.



6. At the last step of the wizard, click **Finish**.

Reference

For more information on managing jobs, see Managing Backup Jobs in Veeam Enterprise Manager in the Enterprise Manager User Guide.

Performing 1-Click File Restore

Veeam Backup Enterprise Manager allows you to search through Microsoft Windows and Linux guest files in backed up VMs. Once you find the required file, you can immediately restore it using 1-Click file restore capability. The file can be restored to its original location or saved to a local machine.

Before You Begin

Consider the following:

- The Enterprise or Enterprise Plus license is installed on the Veeam Backup Enterprise Manager server.
- Make sure that you have successfully connected backup servers to Veeam Backup Enterprise Manager and collected data from them. For details, see Adding Veeam Backup Server.
- You can search files on machines that have at least one successfully created backup with guest file indexing enabled. For details, see Creating Application-Aware Backup Job.

Performing 1-Click Restore

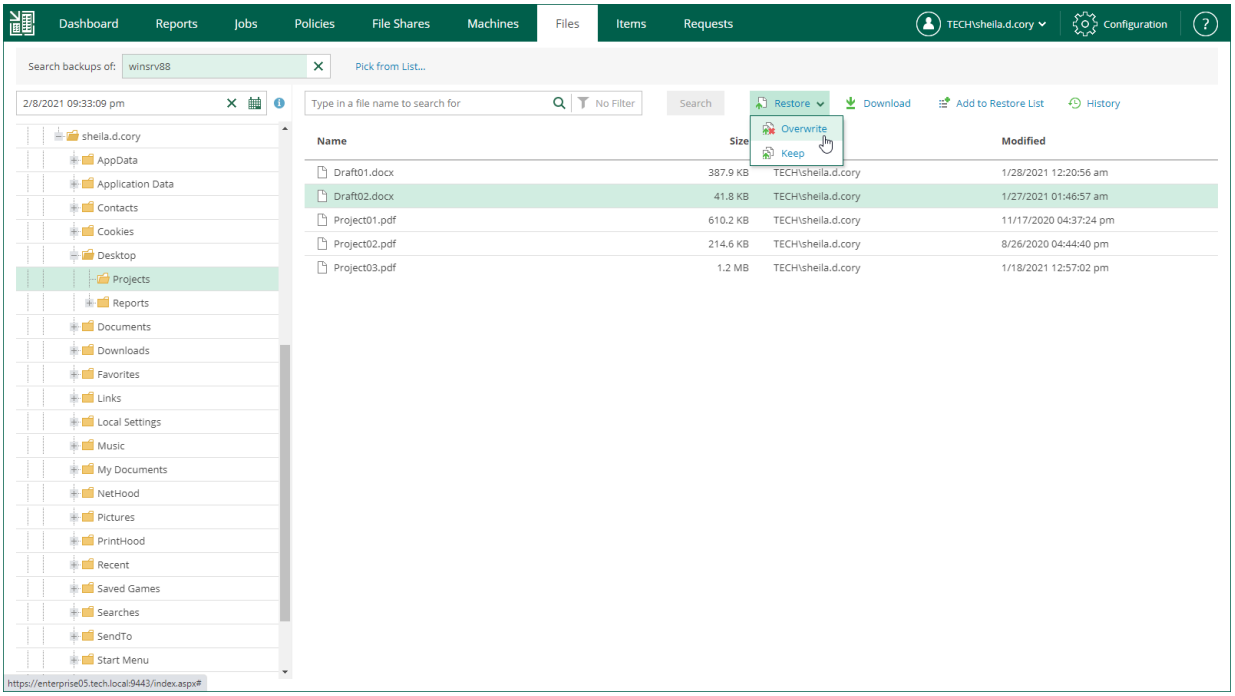
To restore a guest OS file, perform the following:

1. In the main view of Veeam Backup Enterprise Manager, click the **Files** tab.
2. In the **Type in machine name** field, specify the name of the backed up VM whose file system you want to browse.
3. In the field with the calendar icon, enter or choose a date and time of a restore point from which you want to restore files.
4. Click the **Mount** link and wait for Veeam Backup & Replication to mount the content of the backup file to the backup server.

   After the backup is mounted, you can browse the guest OS files.
5. Select the necessary file from the list.

6. At the top of the working area, click **Restore** > **Keep**.

   The original and restored files will be kept. The restored file will have the *Restored* prefix.



7. Click **Yes** to confirm the operation.

Reference

For more information on 1-click file restore, see Performing 1-Click File Restore in the Enterprise Manager User Guide.

Performing Self-Restore of VM Guest OS Files

Self-restore allows you to delegate guest OS file restore from backup administrators to users with local Administrator privileges on VMs. Users do not have to wait for backup administrators to recover deleted or modified files and folders.

For self-restore, Veeam Backup Enterprise Manager provides the Self Service File Restore portal. When users log on to the portal, they see only those VMs where they are members of local Administrators group. Other VMs are not visible to the users.

Before You Begin

Consider the following:

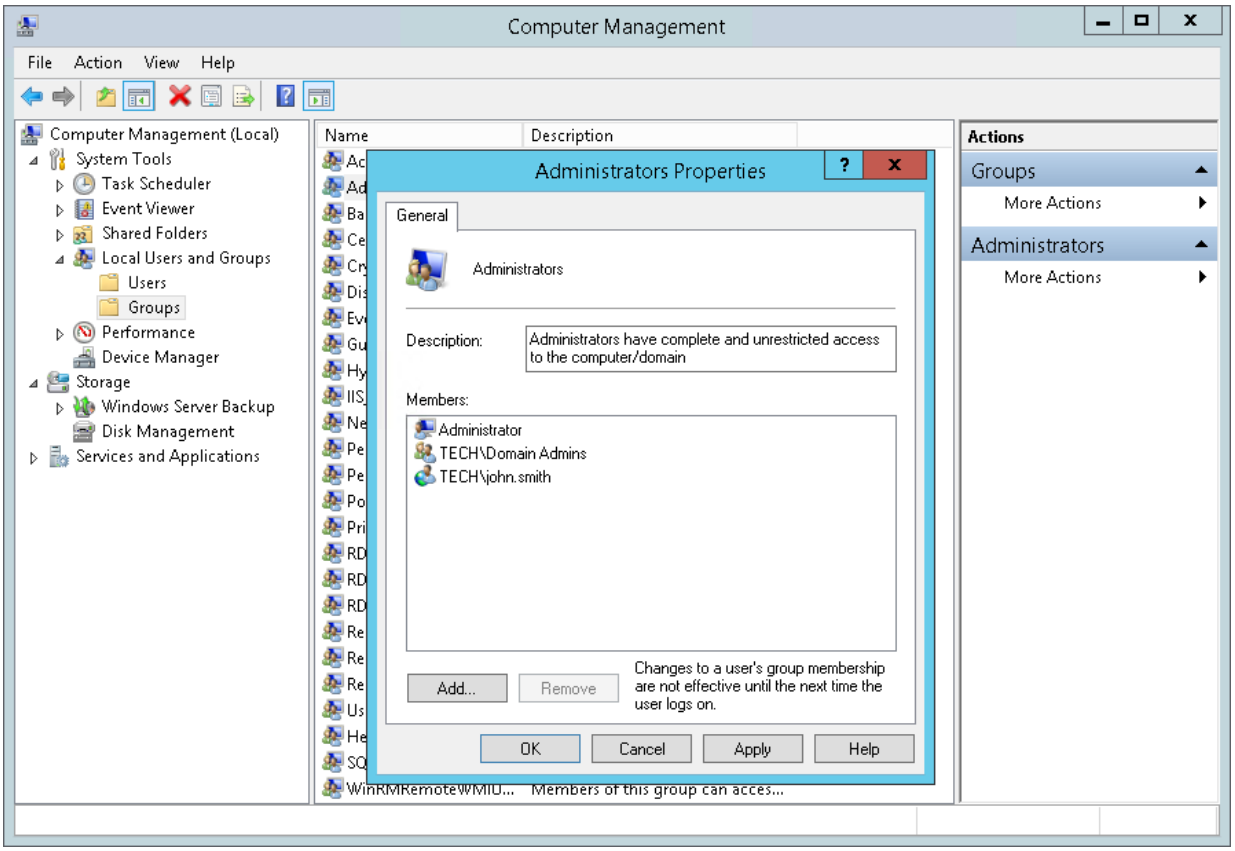
- The Enterprise Plus license is installed on the Veeam Backup Enterprise Manager server. You can use a valid trial license or paid license.
- The user account under which you plan to perform self-service restore belongs to a trusted domain or the same domain as the Veeam Backup Enterprise Manager server. Users from untrusted domains cannot use the self-restore capability.
- The user must be a member of local Administrators group on the VM whose guest OS files you plan to restore.

  The user has access to restore points created after this user gets local Administrator privileges.
- You have successfully connected backup servers to Veeam Backup Enterprise Manager and collected data from them. For details, see Adding Veeam Backup Server.
- You have at least one successfully created backup with guest file indexing enabled. For details, see Creating Application-Aware Backup Job.

Performing Self-Restore

To restore VM guest OS files using the Veeam Self-Service File Restore portal:

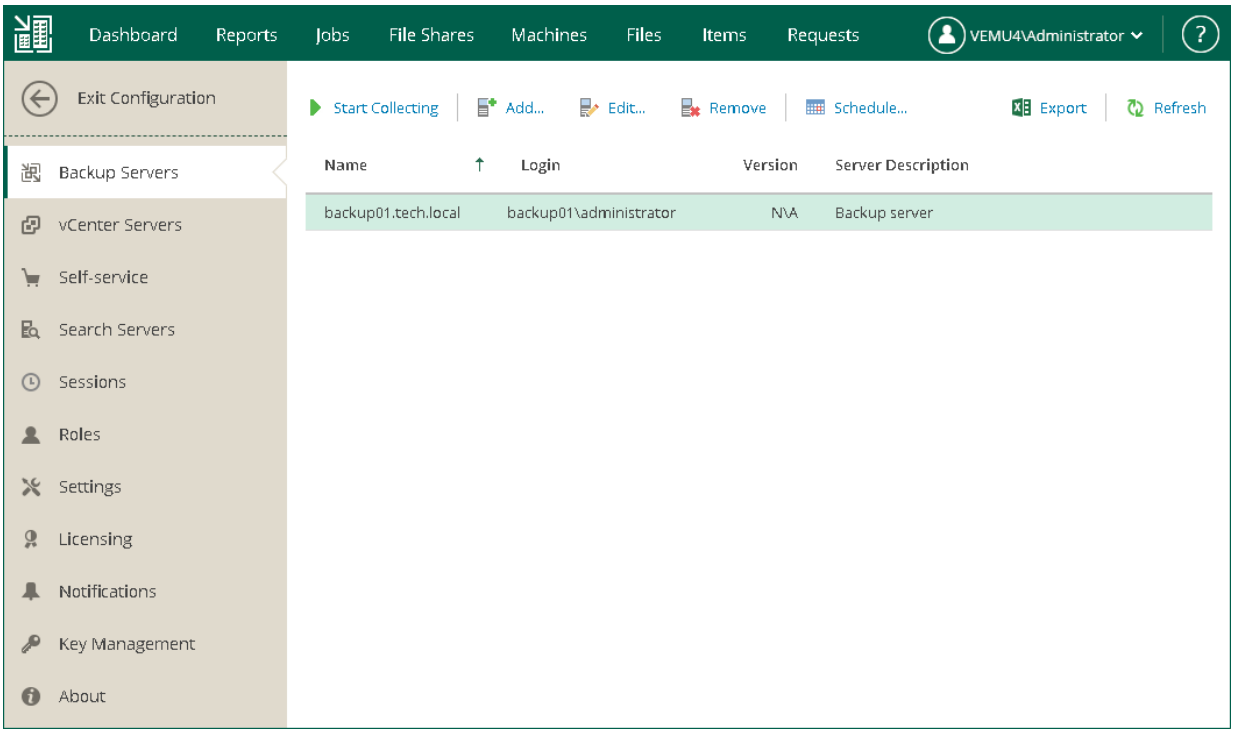
1. Log in to the VM whose guest OS files you plan to restore. Make sure that the user account under which you plan to perform self-service restore is added to the local Administrators group on this VM.



2. Log in to Veeam Backup Enterprise Manager using the user account under which you installed the program.
3. Open the **Jobs** tab and run the job with guest file indexing enabled. You can run the job several times to produce several restore points.
4. At the top right corner, click **Configuration** to open the **Configuration** view.

5. Select the **Backup Servers** tab. In the working area, click **Start Collecting**.

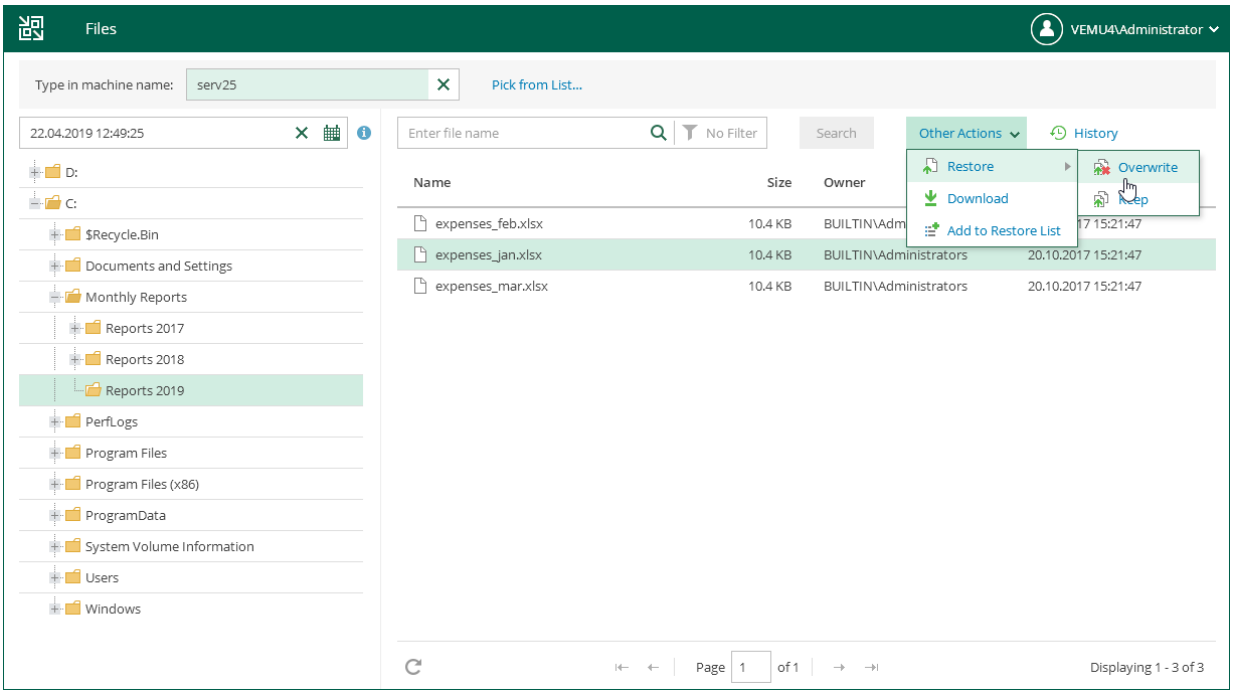
   Veeam Backup Enterprise Manager will collect data about jobs from the backup server. To check whether collecting data finished, click the **Sessions** tab. Make sure that the data collection session has completed with the *Success* status.



6. On another machine, open a browser and use the following address to access Veeam Self-Service File Restore portal remotely: `https://enterprise_manager_server_IP_address:9443/selfrestore`
7. Log in to the portal. Specify the user account with local Administrators privileges on the machine for which you plan to restore files. See the first step.
8. The portal will display only one tab — **Files.** At the top of the working area, click the **pick different machine** link. Select the required VM.
9. Click the field with the calendar icon and choose the restore point from which you want to restore data.
10. At the top of the working area, click **Mount**.

11. Find the necessary file or folder, select it. At the top-right corner, click **Other Actions** > **Restore** > **Overwrite**.

    The original file will be overwritten.



Reference

For more information on self restore, see Using Self-Service File Restore Portal to Restore Machine Guest Files in the Enterprise Manager User Guide.

Backing Up Physical Machines

To back up physical machines, Veeam Backup & Replication uses Veeam Agents: Veeam Agent for Microsoft Windows and Veeam Agent for Linux.

You do not need to install, set up and operate Veeam Agent on every machine whose data you want to protect. Instead, you can perform the whole set of deployment, administration, data protection and disaster recovery tasks on computers remotely from the Veeam Backup & Replication console.

How to back up physical machines

To back up physical machines using Veeam Backup & Replication, you must do the following:

1. Create a protection group

   When you create a protection group, you add individual machines or Active Directory containers to the protection group. Veeam Backup & Replication automatically installs agents and other required components on the machines included in the protection group.

2. Create an Agent backup job

   In the Veeam Backup & Replication console, create an agent job that will back up machines included in the protection group.

Reference

For more information on agents, see the following topics:

- Licensing Requirements
- Veeam Agent Management User Guide
- Veeam Agent for Linux 3.0 User Guide
- Veeam Agent for Microsoft Windows User Guide

Creating Protection Group

In Veeam Backup & Replication, protection groups are logical containers that pool protected computers of a specific type into groups. For example, you can create a protection group for computers of the same type (laptops, workstations or servers) or computers running the same OS type to simplify their management.

You can add individual machines or Active Directory objects that include several machines to the protection group. In this section. you will learn how to create the protection group with Active Directory objects.

> **TIP:**
>
> If you plan to manage only a small number of computers, you can add the necessary computers directly to a Veeam Agent backup job. Veeam Backup & Replication will automatically add such computers to the **Manually Added** protection group. For details, see Protection Groups in the Veeam Agent Management Guide.

Before You Begin

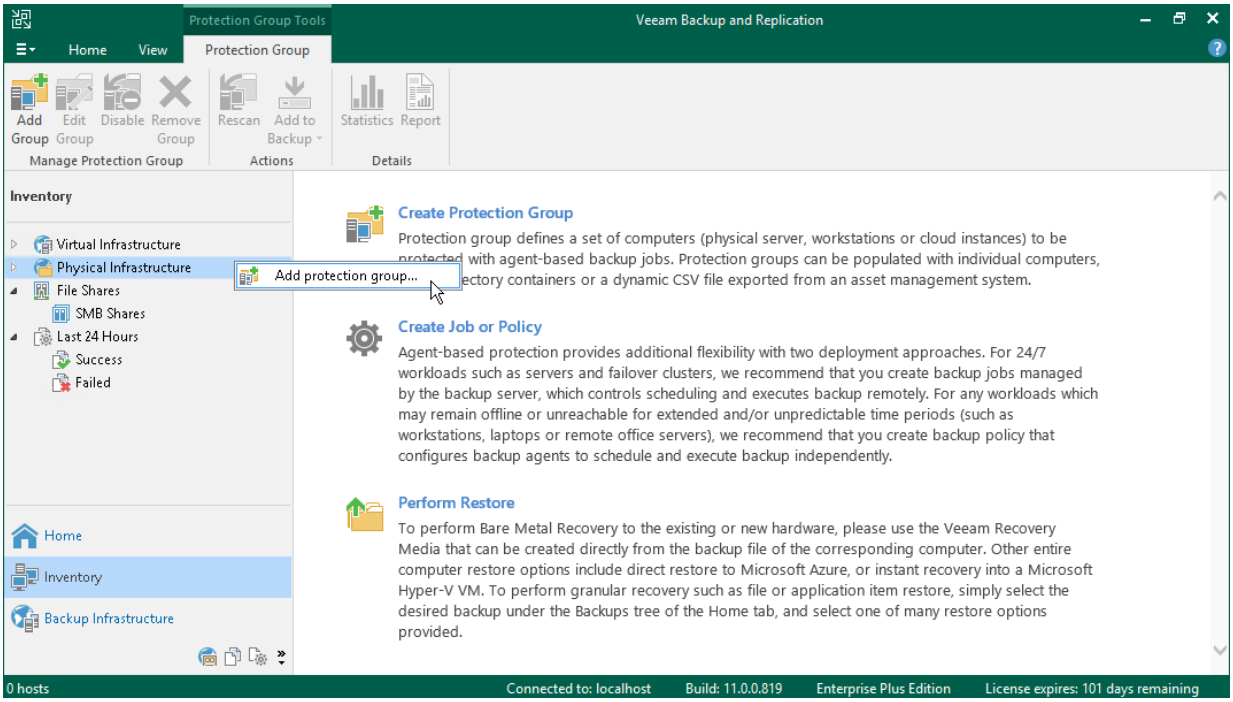
Consider the following:

- Make sure that all computers added to the protection group are powered on and can be accessed over the network.
- If you add an Active Directory container to a protection group, it is not recommended to add a computer that exists in this container to another protection group.

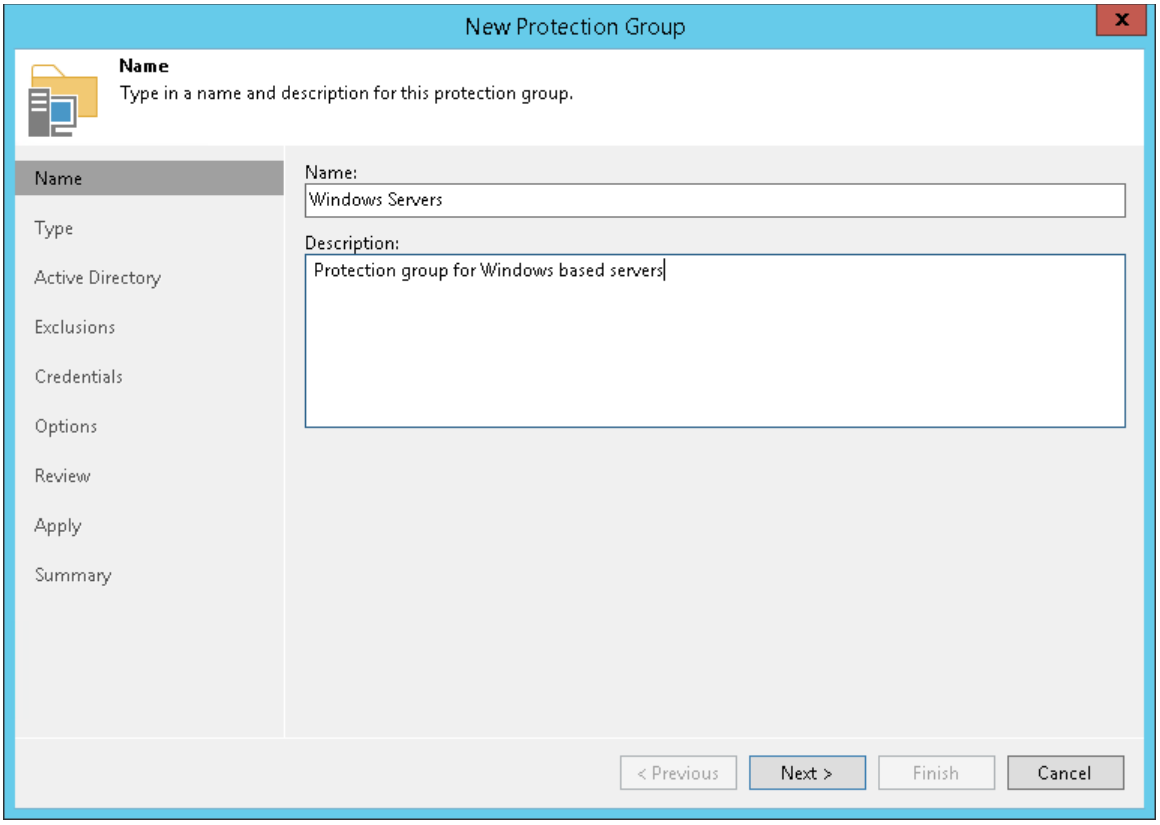
Creating Protection Group

To create a protection group, do the following:

1. In the inventory pane of the **Inventory** view, right-click the **Physical & Cloud Infrastructure** node and select **Add protection group** to launch the **New Protection Group** wizard.



2. At the **Name** step of the wizard, specify a name and description for the protection group.



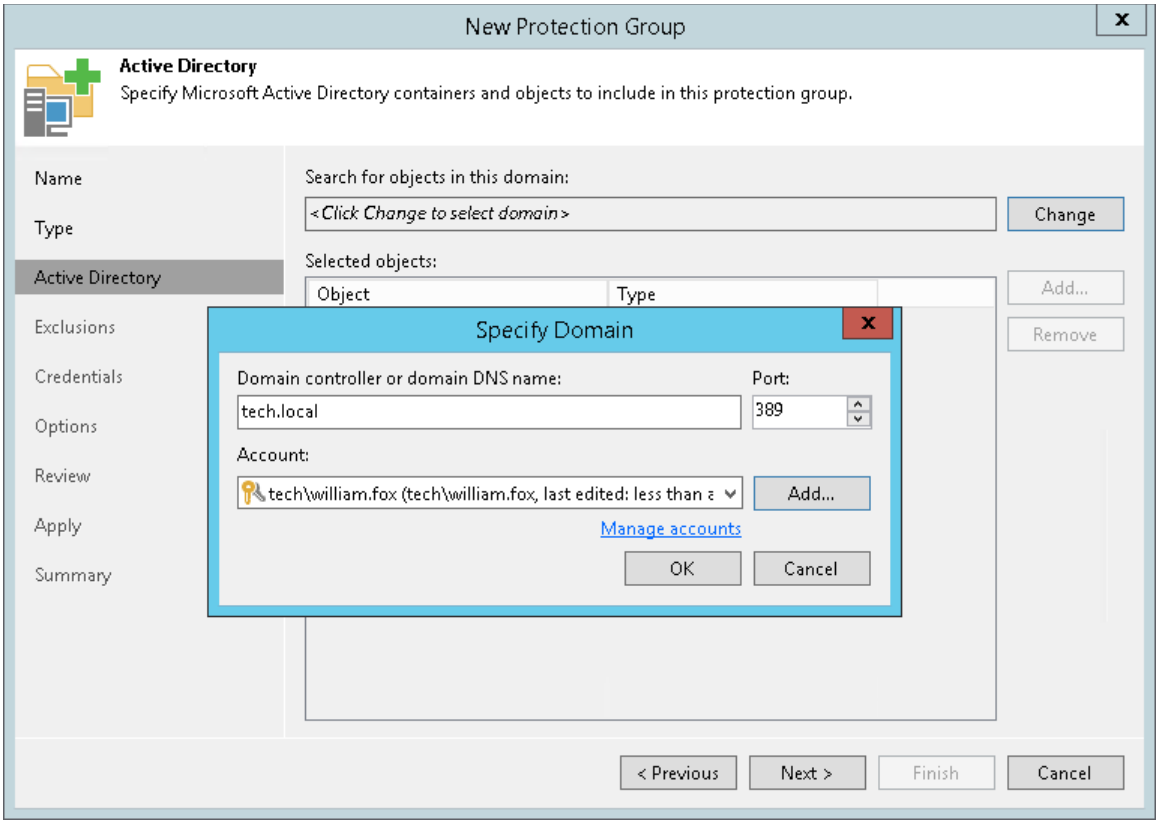
3. At the **Type** step of the wizard, select **Microsoft Active Directory objects**.

   Active Directory objects can be the following: entire domain, container, organization unit, group, computer or cluster. Protection groups that include Active Directory objects are dynamic. Veeam Backup & Replication discovers these computers and deploy Veeam Agent on them during the next rescan session.

4. At the **Active Directory** step of the wizard, click **Change** near the **Search for objects in this domain field**. In the opened window, do the following:

   - In the **Domain controller or domain DNS name** field, type a name of the domain controller or domain whose objects you want to include in the protection group.
   - In the **Port** field, leave the default value.
   - Near the **Account** field, click **Add** and specify user credentials. This user must ba a member of the *DOMAIN|Administrators* group. Click **OK**.

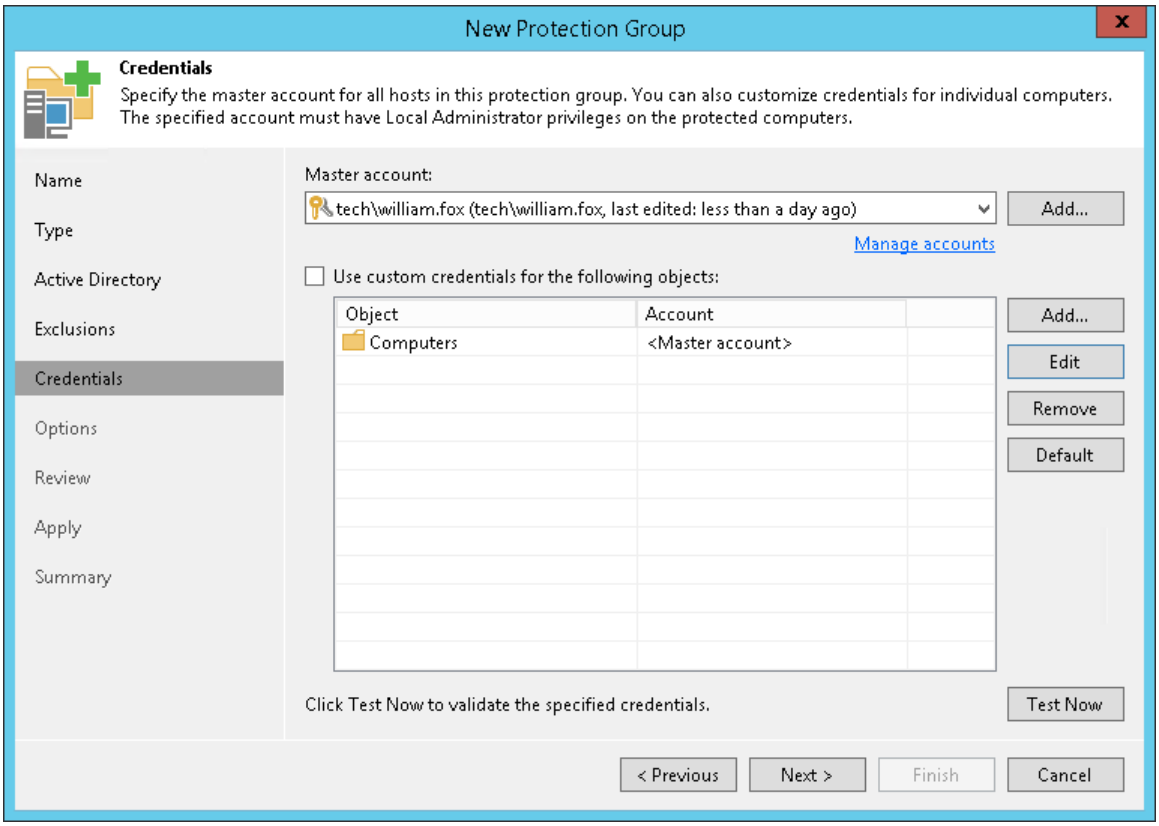
- Click **OK**.



5. Click **Add** near the **Selected objects** field. In the **Add Objects** window, select the necessary Active Directory object and click **OK**.
6. At the **Exclusions** step of the wizard, leave the default settings.
7. At the **Credentials** step of the wizard, specify credentials to connect to computers included in the protection group.

   If you want to use the same credentials for all computers in the protection group, select the necessary user account from the **Master account** list. The account must have administrative permissions on all computers that you have added to the protection group.

You can also specify credentials for individual computes. For details, see Specify Credentials in the Veeam Agent Management Guide.



8. At the **Options** step of the wizard, leave the default settings.
9. At the **Review** step of the wizard, review the components that will be installed. Click **Apply**.
10. At the **Apply** step of the wizard, Veeam Backup & Replication creates the configured protection group. Wait for the operation to complete and click **Next**.
11. At the **Summary** step of the wizard, select the **Run discovery when I click Finish** check box and click **Finish**.

Reference

For more information on creating protection groups, see Creating Protection Groups in the Veeam Agent Management Guide.

Creating Veeam Agent Backup Job

To back up physical machines, you must configure a Veeam Agent backup job in the Veeam Backup & Replication console. In Veeam Backup & Replication, you can create Veeam Agent backup jobs of the following types:

- **Backup job**

  The backup job runs on the backup server, like VM backup jobs. The backup job is intended for computers that are connected to the backup server. This connection must not be interrupted.

- **Backup policy**

  The backup policy describes configuration of individual Veeam Agent backup jobs that run on protected computers. The backup policy is intended for computers that are connected to the backup server. The connection may be interrupted for short periods of time. For example, when you move your laptop from one location to another. Veeam Backup & Replication uses the backup policy as a template and applies settings from the backup policy to Veeam Agents that run on computers specified in the backup policy.

  In this guide, we do not detail backup policy. For more information, see Creating Veeam Agent Backup Policy.

Veeam Backup & Replication lets you create backup jobs for Microsoft Windows and Linux computers. In this section, you will learn how to create a Veeam Agent backup job for Microsoft Windows computes. For details on how to create back jobs for Linux computes, see Creating Agent Backup Job for Linux Computers in the Veeam Agent Management Guide.

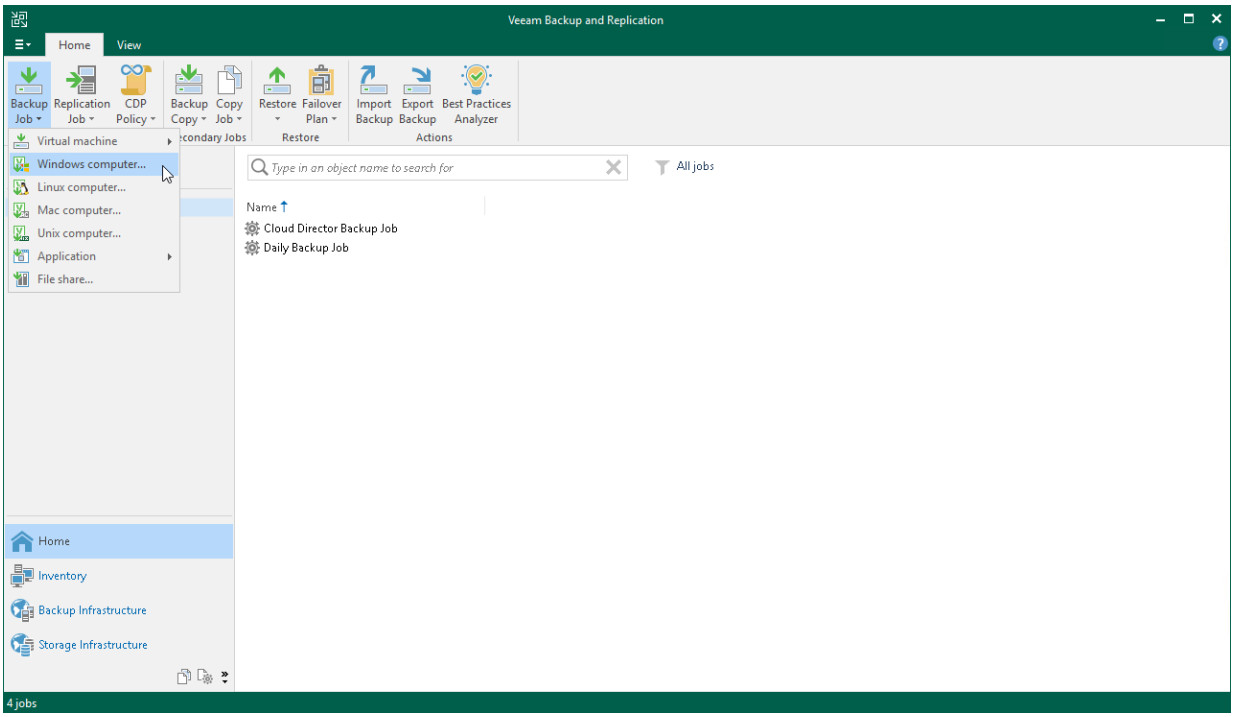
Before You Begin

Consider the following:

- You must have at least one protection group. For details, see Creating Protection Group.
- You can create Veeam Agent backups on a Veeam backup repository only. Other types of target locations are not supported.
- Veeam Agent for Microsoft Windows does not back up data to which symbolic links are targeted. It only backs up the path information that the symbolic links contain. After restore, identical symbolic links are created in the restore destination.

Creating Veeam Agent Backup Job

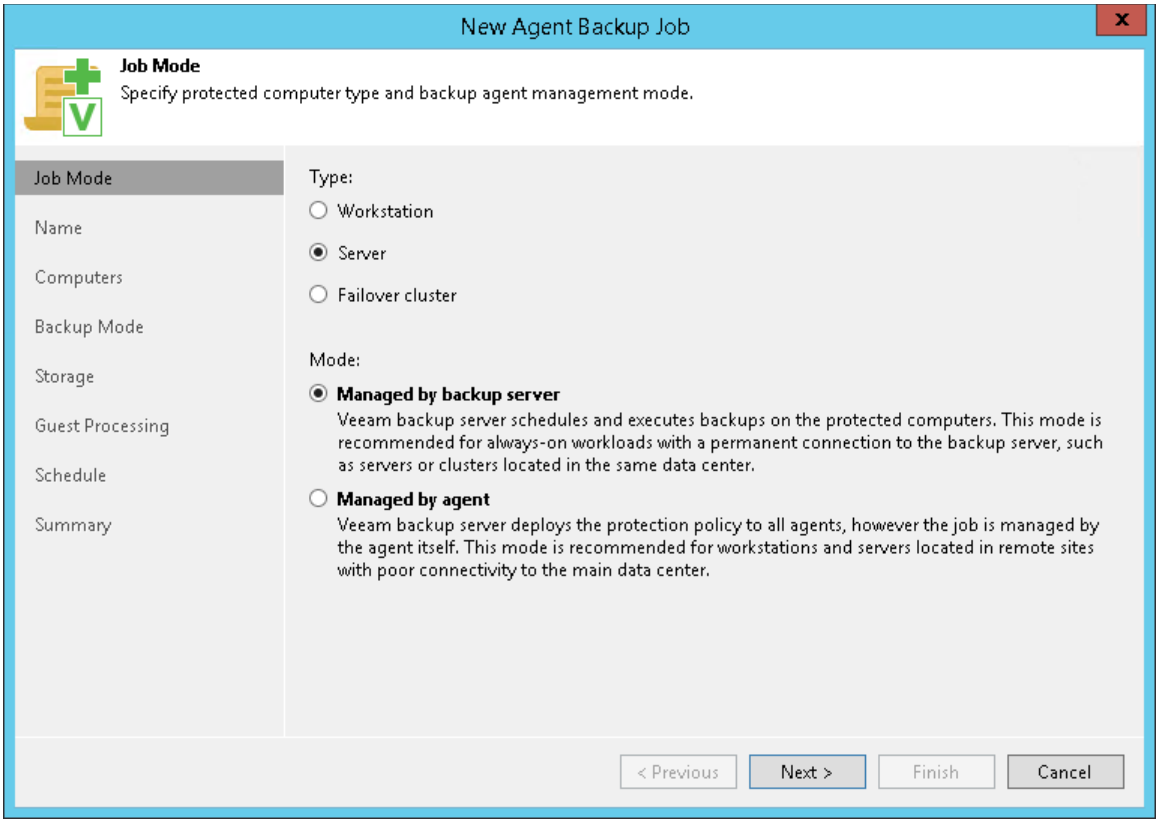
1. On the **Home** tab, click **Backup Job** > **Windows computer** to open the **New Agent Backup Job** wizard.



2. At the **Job Mode** step of the wizard, specify protection settings for the backup job:
   - In the **Type** list, select **Server** to add to the backup job standalone servers that have permanent connection to the backup server.

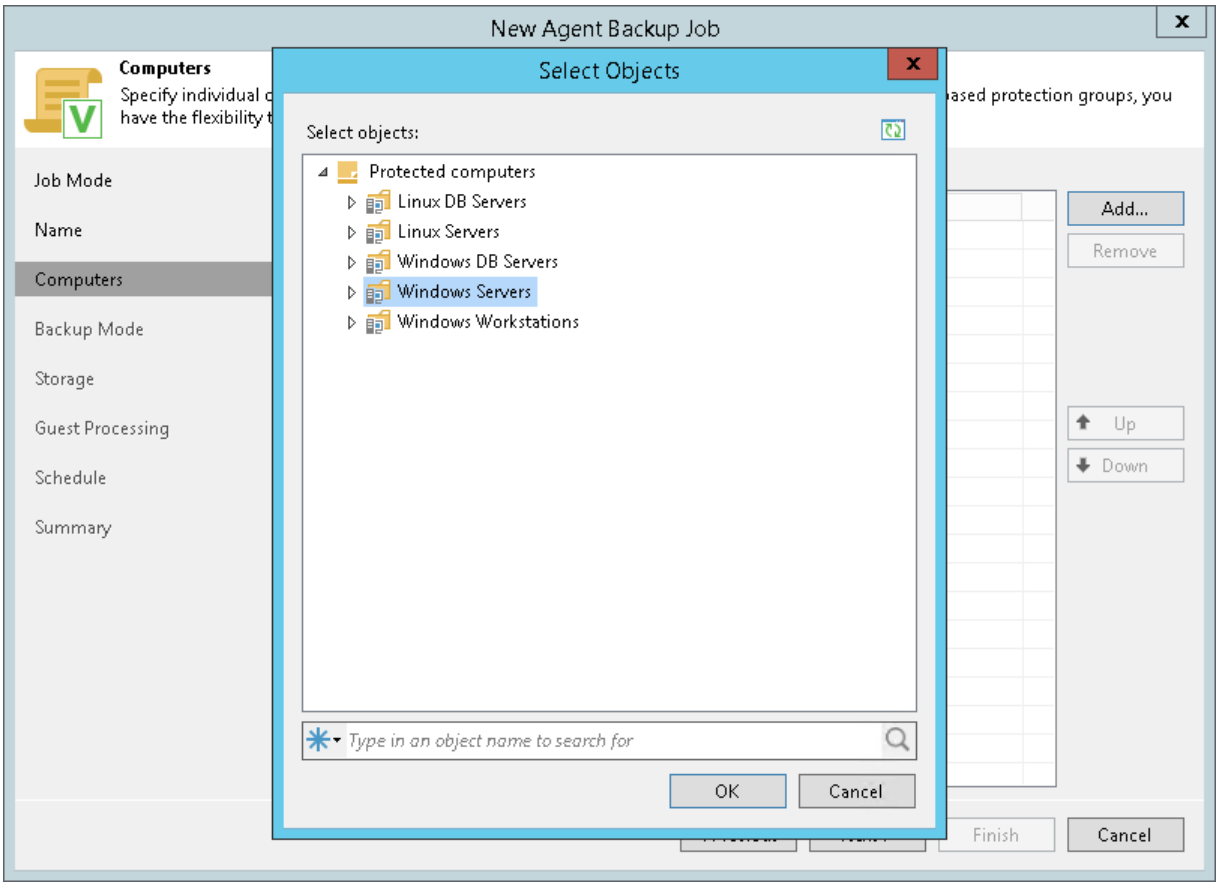
- In the **Mode** list, select **Managed by backup server**.

  When you create a Veeam Agent backup job managed by the backup server, Veeam Backup & Replication saves the job settings in its database. Veeam Backup & Replication performs all management tasks for the Veeam Agent backup job: starts a job upon the defined schedule, allocates backup infrastructure resources and so on.



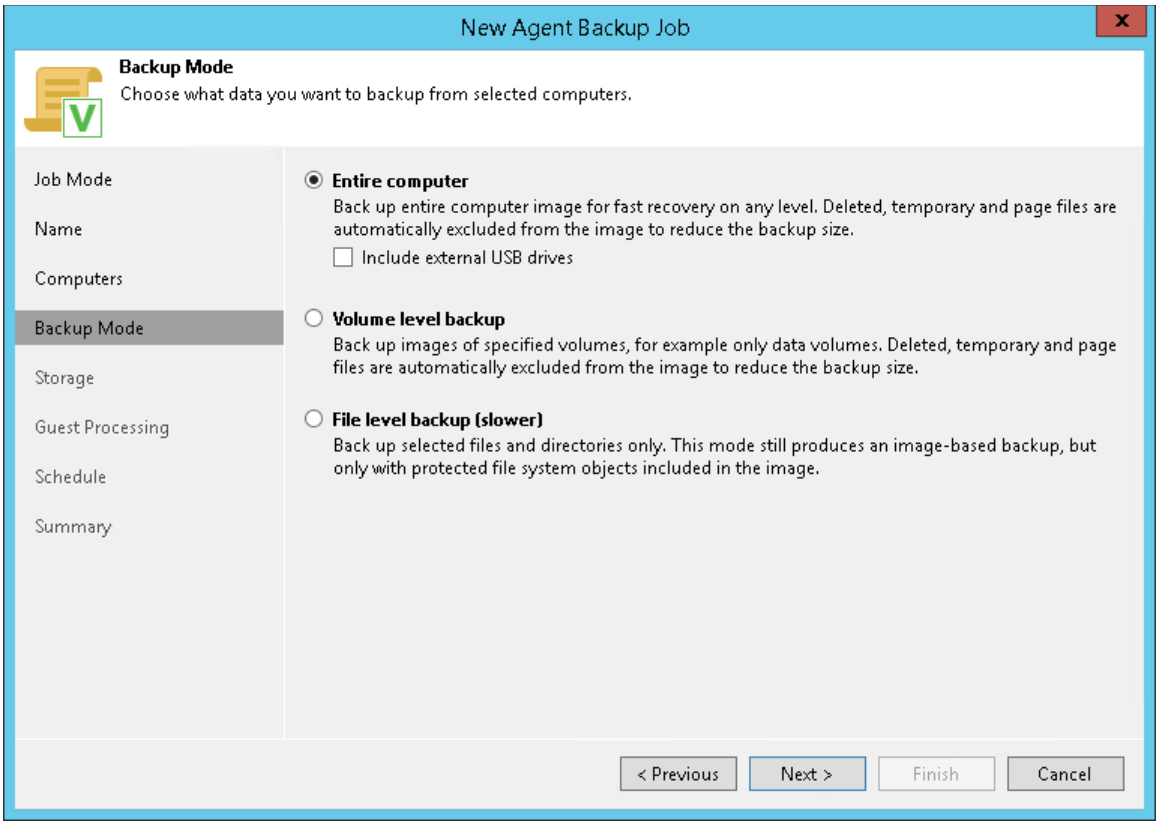
3. At the **Name** step of the wizard, specify a name and description for the backup job.

4. At the **Computers** step of the wizard, click **Add** and select one or several protection groups and/or computers in the list. Click **OK**.



5. At the **Backup Mode** step of the wizard, select **Entire computer**.

   When you restore data from such a backup, you are able to recover the entire computer image as well as data on specific computer volumes: files, folders and application data.



6. At the **Storage** step of the wizard, select the backup repository where you want to store your backups. For other settings, leave the default values.
7. At the **Guest Processing** step of the wizard, leave the default settings.
8. At the **Schedule** step of the wizard, define scheduling settings for the job.
9. At the **Summary** step of the wizard, select the **Run the job when I click Finish** check box and click the **Finish** button.
10. In the inventory pane of the **Home** view, expand the **Last 24 Hours** node to see the created job.

Reference

For more information on creating Veeam Agent backup jobs for Microsoft Windows computers, see Creating Agent Backup Job for Windows Computers in the Veeam Agent Management Guide.

Restoring Data of Physical Machines

Veeam Backup & Replication allows you to restore data of physical machines. You can perform the following data restore tasks with Veeam Agent backups:

- Restoring Veeam Agent Backup to vSphere VM
- Restoring Veeam Agent Backup to Hyper-V VM
- Restoring to Microsoft Azure
- Restoring to Amazon EC2
- Restoring to Google Cloud Platform
- Restoring Volumes
- Restoring Files and Folders
- Restoring Application Items

In this section, you will learn how to restore computer files and folders. For more information on other restore processes, follow the links in the list.

Restoring Files and Folders

The procedure of file-level restore from a Veeam Agent backup is similar to the same procedure for a VM backup. The difference is that you select a Veeam Agent backup instead of a VM backup in the **File Level Restore** wizard. To learn more, see Restoring VM Files.