COHESITY

Version 1.4

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Use Cohesity for Your Veeam Backup Repository

Leverage Cohesity's Web-scale Architecture for Veeam Repositories

ABSTRACT

Cohesity's web-scale architecture provides the ideal platform to use as a repository for Veeam Backup & Replication (VBR). This guide helps you implement VBR using Cohesity as a globally deduplicated and compressed web-scale storage target.

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Introduction to Using Cohesity with Veeam

Veeam Backup & Replication (VBR) is a premiere software application for backup and recovery of virtualized environments. VBR provides a software-based solution that allows you to use your compute and storage resources to run the backup and recovery application and store data.

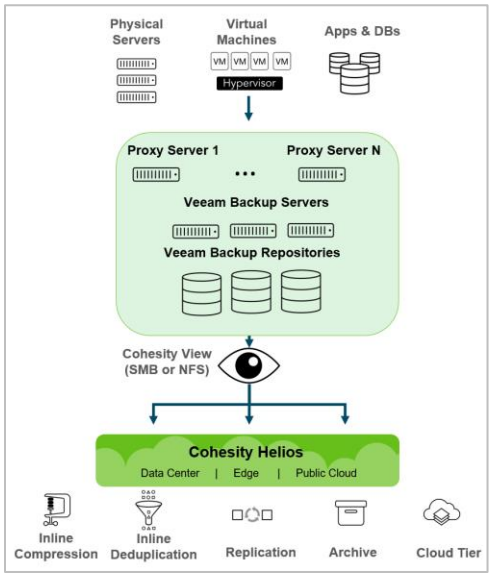
Being storage-agnostic, VBR supports a wide range of repository types that offer various benefits. When Veeam customers use Cohesity as the storage repository for their backups, they benefit immediately from Cohesity's many features:

- **Web-scale**. Capacity grows with your business.
- **Performance**. Improved backup and restore times.
- **Storage efficiency**. Extremely high storage efficiency with global, variable-length deduplication and compression.
- **Security**. Your data is always secure, encrypted both at rest and in flight.
- **Resilience**. Highly resilient, fault-tolerant architecture.

In our solution, Cohesity SMB and NFS Views are used as a scale-out backup repository (SoBR) for VBR. Combining VBR with Cohesity provides a comprehensive, highly scalable, and flexible backup solution that fits the data protection needs of any size organization.

You can deploy VBR using either a simple repository or an SoBR. If you're backing up several different physical and virtualized workloads in parallel, you can use Cohesity as a single repository for multiple backup jobs. However, to take full advantage of Cohesity's web-scale architecture, we recommend you use SoBRs for increased throughput and reduced backup & restore windows. SoBRs are also an extremely effective way for organizations of all sizes to extend repositories when they run out of space. Instead of facing the long and cumbersome relocation of backups, users can add new repositories (known as 'extents') to the existing SoBR as they grow.

Figure 1: Use Cohesity as a VBR Repository

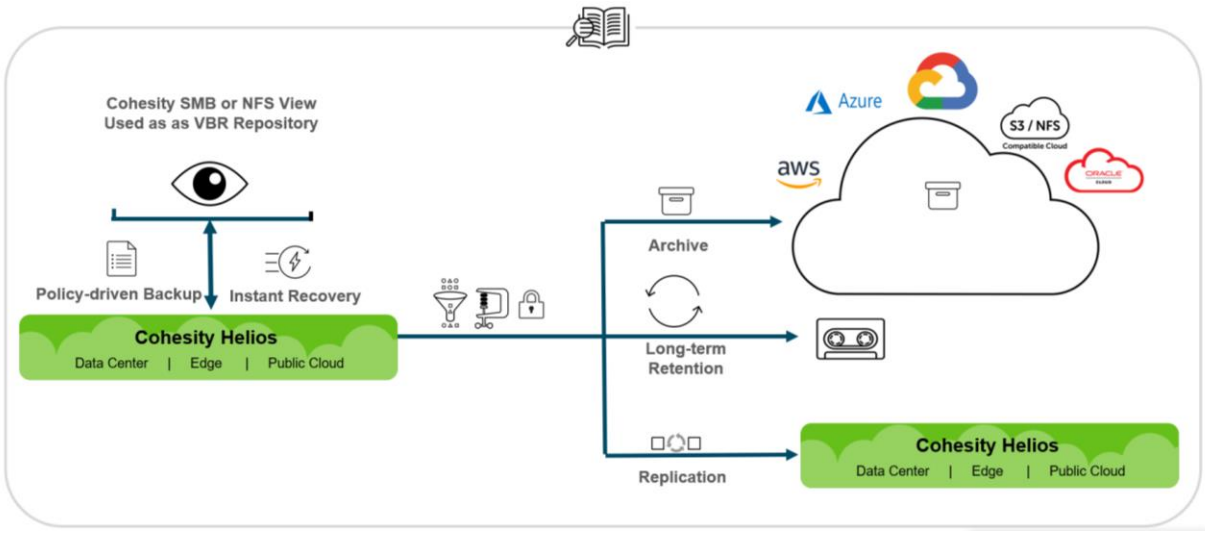


Benefits of Cohesity as a Veeam Scale-out Backup Repository

Once you start using Cohesity as an SoBR in Veeam, you can immediately take advantage of Cohesity's powerful features, including:

- Inline deduplication and compression.
- Single namespace.
- CloudArchive and Replicate your data for long-term retention and disaster recovery.
- Use Cloud Tier to reduce TCO.

Figure 2: Benefits of Using Cohesity as a VBR Repository



These features make Cohesity an excellent choice as a VBR SoBR. A scale-out approach increases parallelism among backup tasks and processes, reduces the time it takes to run backups, and allows you to configure as many Veeam extents as you have nodes in the Cohesity cluster.

What's more, once you start using this solution, you will benefit from a host of other Cohesity features, including:

Table 1: Features and Benefits of Cohesity with VBR

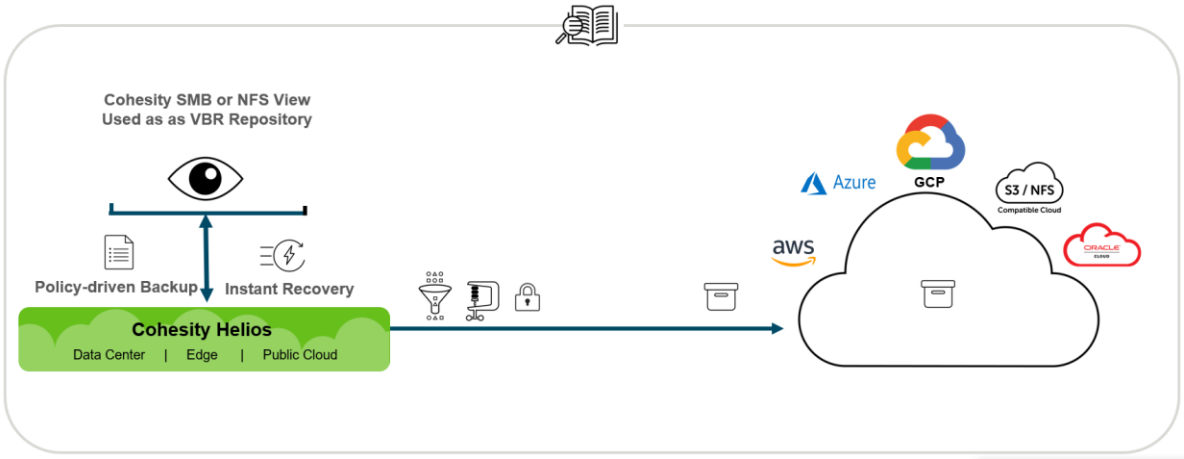
FEATURE	BENEFIT
Storage Efficiency	Maximizes storage capacity with Cohesity's advanced data-reduction technologies, global deduplication, and compression.
Web-scale Capacity	Offers modern web-scale distributed system with limitless scaling of performance and capacity.
Fault Tolerance	Provides continuous availability architecture with a minimum replication factor of 2 for stored data. Any node can fail and the system continues to function.
Simplicity	Simplifies deploying a global storage target to a few clicks.
CloudArchive	Use CloudArchive for long-term retention and disaster recovery.
Disaster Recovery	Replicate to the cloud for cost-effective disaster recovery and business continuity.
Cloud Tier	Use automated, policy-based tiering to lower-cost storage for reduced TCO.

Use CloudArchive for Long-term Retention

When you use Cohesity as your Veeam repository, you can immediately take advantage of the following additional Cohesity solutions for disaster recovery and business continuity:

- CloudArchive
- Cloud Recover and CloudRetrieve
- Cloud Replicate

Figure 3: Leverage Public Cloud Infrastructure for Long-term Data Retention and Archival



Cohesity CloudArchive provides a policy-based method to archive to public clouds (AWS, Azure, and GCP) to any S3-compatible storage, tape, and to any NFS mount point. Cohesity CloudArchive offers a complete, self-contained copy of your backup, containing backup data, backup metadata, indexing data, and deduplication fingerprints.

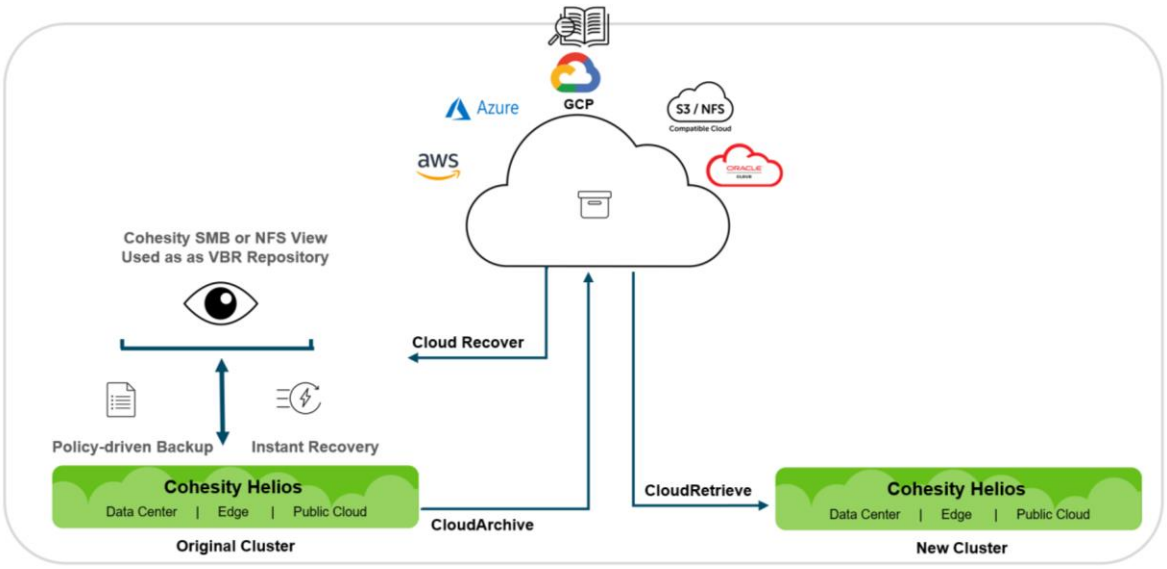
Storage and backup administrators can take advantage of Cohesity CloudArchive to address long-term data retention requirements on Veeam Repositories. The archived data is efficiently transferred and stored by sending only deduplicated, compressed, incremental backups, thereby reducing network and storage utilization.

Maintain Business Continuity with Disaster Recovery

Once the Veeam repositories are archived, storage and backup administrators can also take advantage of the Cloud Recover and CloudRetrieve features to retrieve or recover their data from the public cloud:

- **Cloud Recover to source cluster**: Recover entire objects to your original cluster.
- **CloudRetrieve to new cluster**: Retrieve your previously archived data onto an entirely new cluster, as a cost-effective alternative for disaster recovery, geo-redundancy, and business continuity.

Figure 4: Cloud Recover to Original Cluster & CloudRetrieve to New Cluster



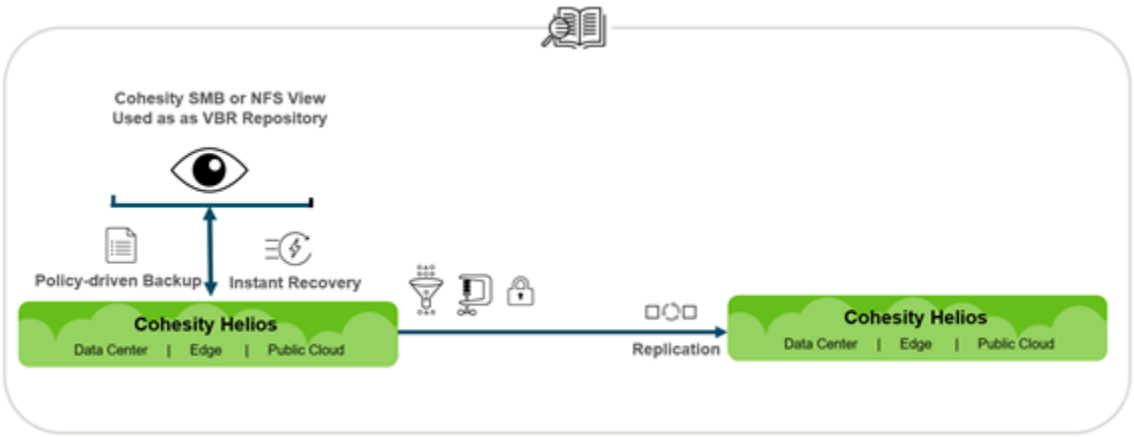
To learn more about CloudArchive, see the CloudArchive guides for AWS, Azure, GCP, NAS, and S3-Compatible cloud object storage.

Replicate to the Cloud for Cost-Effective Disaster Recovery & Business Continuity

Storage/Backup administrators can take advantage of Cohesity replication for Veeam's repositories to another Cohesity cluster. Cohesity provides a policy-based data replication solution from the core to the cloud to the edge, from one cluster to another cluster in your DR site.

Cohesity always performs source-side deduplication and compression first and sends only the changed data over the network as part of replication. If the primary site becomes unavailable, application and backup admins can fall over to the DR site for backup and recovery of their data. Storage/Backup administrators can recover the Veeam repository data from Cohesity destination cluster node.

Figure 5: Replicate Backups to Other Cohesity Clusters for Improved Data Resiliency

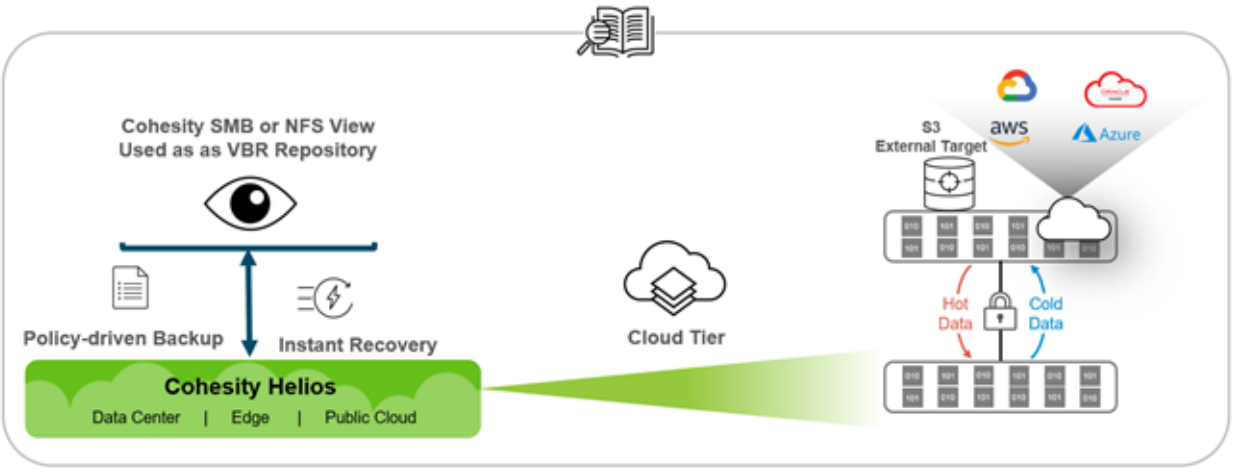


Use Policy-based Cloud Tier for Reduced TCO

The performance, availability, and cost requirements of storing and accessing your data can change based on your business needs. Cohesity Cloud Tier allows you to move Veeam repository data to lower-cost storage for infrequently accessed data, reducing operating expenses and helping you meet compliance and access frequency requirements. Cohesity can automatically move Veeam's repositories between different tiers.

Veeam repository data can be down-tiered to external targets such as public cloud infrastructure providers (AWS, Azure, Google Cloud Platform) or any S3-compatible external target, with a policy threshold approach. Hot data in external targets can be up-tiered back to the Cohesity cluster.

Figure 6: Cohesity Supports Data Tiering with a Policy Threshold Approach



Cohesity supports data tiering from HDDs to public cloud infrastructure. Tiering is based on policy and includes the following thresholds:

- Storage Utilization
- Age of Data

When these configured thresholds are breached, data is tiered to the cloud. When tiered data becomes hot data, data is seamlessly tiered from cloud to the physical cluster without user intervention.

Following the paradigm upheld throughout by Cohesity, all tiered data is compressed, deduplicated, and encrypted.

For more, see the *Cohesity Cloud Tier Architecture Reference*.

To leverage all the benefits of using Cohesity as your VBR repository, get started in the next chapter!

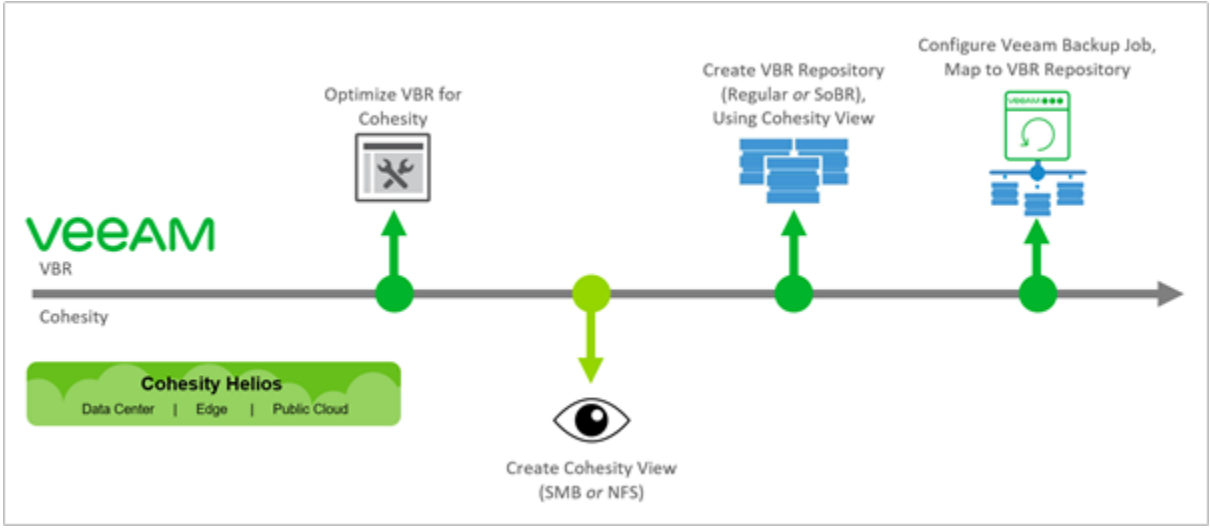
Cohesity for VBR Repositories Workflow Overview

To protect data using Veeam, you need to configure a Veeam backup job, associate a repository where the data will be stored to that Veeam backup job, and optimize the settings at the backup job and repository level. To create a repository in VBR, you require an underlying storage location. Cohesity provides this required storage in a web-scale, globally deduplicated, and compressed format by providing a Cohesity View via SMB or NFS.

To use a Cohesity View as a repository for VBR, you need to perform a few tasks:

1. Optimize VBR settings for Cohesity Platform.
2. Create a Cohesity SMB View or NFS View.
3. Create a VBR SMB or VBR NFS scale-out or regular repository.
4. Configure your Veeam backup jobs to use the repositories that you created.

Figure 7: Configure Cohesity's Solution for VBR



NOTE: For instructions on how to install VBR, see Installing Veeam Backup & Replication.

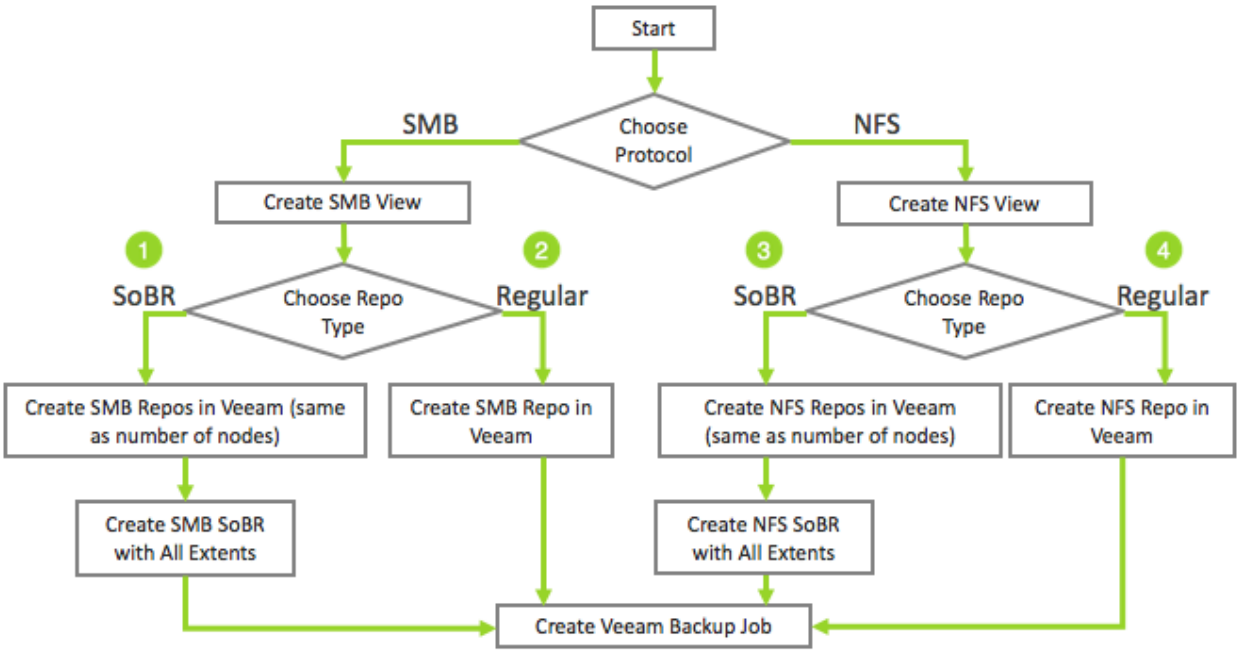
After you optimize your VBR settings for Cohesity Platform, you will have to make two choices:

Protocol. Will you be using SMB or NFS to connect VBR to Cohesity?

VBR Repository Type. Will you be creating an SoBR or a single, regular repository?

Use the decision tree in Figure 8 below to find the steps that apply to your environment.

Figure 8: Choose Protocol & VBR Repository Type



1. **SMB**: If you decide to use SMB, you will first create a Cohesity SMB View. After that, you can choose which type of VBR repository to create for SMB:
   - Create an SMB SoBR. (*Recommended*)
   - Create an SMB regular repository.
2. **NFS**: If you decide to use NFS, you will first create a Cohesity NFS View. After that, you can choose which type of VBR repository to create for NFS:
   - Create an NFS SoBR. (*Recommended*)
   - Create an NFS regular repository.

NOTE: If your network gear supports LACP, we recommend that you configure your Cohesity network data ports to use it. Although not required, it can provide additional network throughput to and from the Cohesity cluster, as well as among the nodes of the cluster. To take advantage of this, both the network switches as well as the Cohesity cluster need to be configured for LACP. For instructions, see the Cohesity Platform Networking Quick Start Guide.

Optimize VBR Settings for Cohesity

There are several Veeam settings designed to throttle performance. In this solution, you can raise those limits and set the Transport mode to improve performance still further.

Cohesity can perform data deduplication globally. This feature, coupled with specific parameters in the VBR Repository and Job settings, can be fully optimized to take advantage of the distributed nature of Cohesity. Even though VBR software can provide deduplication services as well, it is best that the resource-intensive tasks of inline deduplication be off-loaded to Cohesity. Therefore, we recommend enabling deduplication and compression on Cohesity, and turning them off on Veeam. This allows data across all Veeam jobs to be deduplicated against each other, resulting in fewer blocks written to disk.

To optimize Veeam for Cohesity:

- Increase concurrent streams on the Veeam proxy server
- Increase the number of streams in the Veeam registry
- Set the Transport Mode of the Veeam proxy server to Network

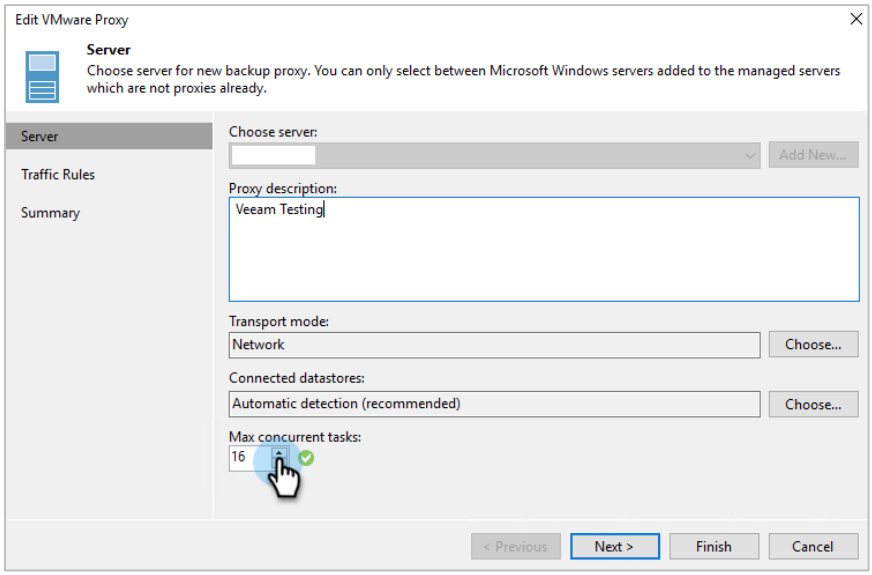
Increase Concurrent Streams on the Veeam Proxy Server

To get maximum write performance from Veeam, add adequate number of Veeam proxy servers according to the workloads and increase concurrent streams allowed on the Veeam proxy server.

To allow more concurrent streams of data to each node in your Cohesity cluster, configure the Veeam proxy server to increase the number of **Max concurrent tasks** to 12 or 16.

To change the number of **Max concurrent tasks** on the Veeam proxy server, log in to Veeam and select **Backup Infrastructure > Backup Proxies >** Select **Proxy Server >** Right-click **Proxy** > Select **Properties**.

Figure 9: Increase Max Concurrent Streams on Your Veeam Proxy Server



Increase the Number of Streams in the Veeam Registry

You can increase the number of streams by adding registry entries on the Veeam proxy server. However, make sure that the system contains enough vCPU/CPU and memory. Otherwise, Veeam might throw an error like '*Proxyserver has insufficient CPU resources*.' According to our test results, each disk in a VM in the backup job required 1 vCPU/1 Core and 2GB memory, as per Veeam guidelines.

To edit the registry key value:

1. Locate **HKEY_LOCAL_MACHINE\SOFTWARE\Veeam\Veeam Backup and Replication**.
2. Add a REG_DWORD with the name **MaxSnapshotsPerDatastore** and a value greater than 4.

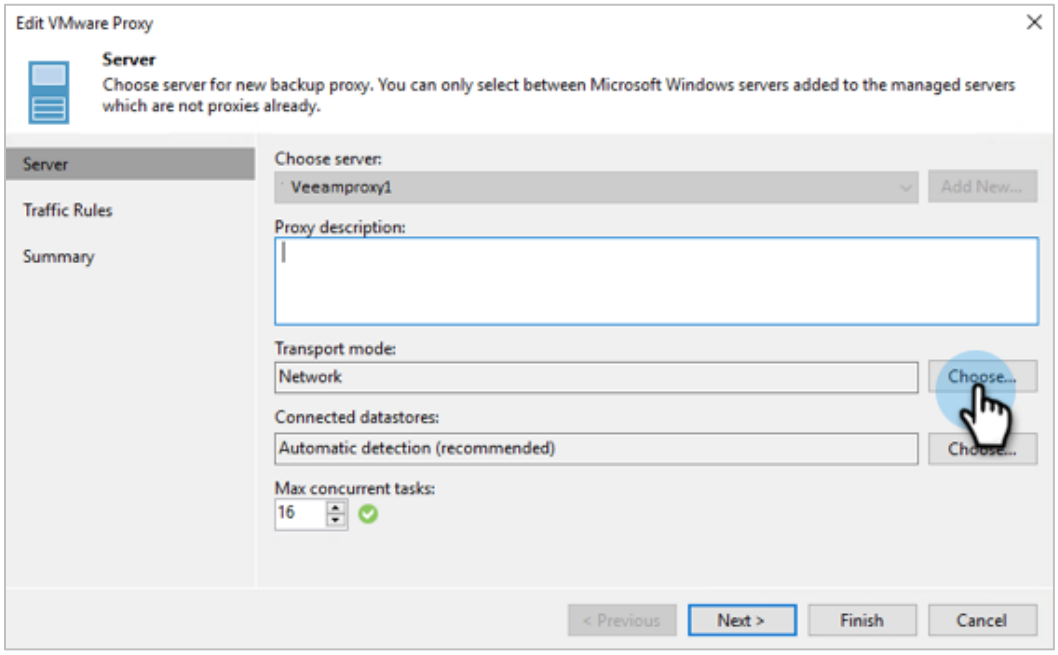
Set the Transport Mode of the Veeam Proxy Server to 'Network'

Network Block Device (NBD) mode delivers better performance than hot-add when a 10Gbps Ethernet Network is configured on your Veeam and proxy servers. Using NBD, the ESX/ESXi host reads data from storage and sends it across the network to the backup server. You can set the Transport Mode in your proxy server configuration.

IMPORTANT: Make sure all Veeam servers and proxy servers have 10 Gbps interfaces. If one of them does not, we recommend you do not include that server in this solution.

To set the Transport mode of the proxy server:

1. From the Veeam management console, select the configured proxy server and right-click **Backup Infrastructure** to select **Backup Proxies > Select Proxy Server**.
2. Under **Transport mode**, click **Choose** and select **Network**.



Summary: Veeam Performance Settings for Cohesity

To review all the Veeam settings that you tuned in the previous sections, as well as your optimal Veeam repository and backup job settings in the upcoming sections, see Table 2 below.

Table 2: Veeam Performance Settings for Cohesity

TUNING PARAMETERS	SETTINGS	RECOMMENDATIONS
Veeam Registry	• Change the **MaxSnapshotsPerDatastore** registry value.	• This value increases the number of snapshots per datastore on VMware and supports more concurrent sessions.
Proxy Server	• Select Transport Mode Network. • Increase the Max Concurrent tasks.	• We recommend increasing the max concurrent tasks to increase the parallelism. • We recommend Transport Mode Network.
Veeam Repository	• Uncheck **Limit maximum concurrent tasks to**. • Uncheck **Limit read and write data rates to**. • Check **Use per-VM Backup files** in the **Advanced** options.	• Remove the limits on concurrent tasks and read/write data rates. • For SMB, see Create SMB Repositories on VBR below. • For NFS, see Create NFS Repositories on VBR below.
Veeam Backup Job	• Uncheck **Enable** inline **data deduplication**. • Check **Exclude swap file blocks**. • Check **Exclude deleted file Blocks**. • For **Compression level**, select **None**. • Select **Local target (Large Blocks)**.	• Disable inline data deduplication and compression on Veeam. • Select Large Blocks to get better performance on Cohesity.

Create Cohesity SMB View for VBR Repositories

To use Cohesity storage as a VBR repository via SMB, you must create a Cohesity View, choose a QoS policy, and configure the View for SMB. For this solution, we recommend having inline deduplication and inline compression enabled on the Storage Domain where you create the View.

To create an SMB share to store Veeam backups:

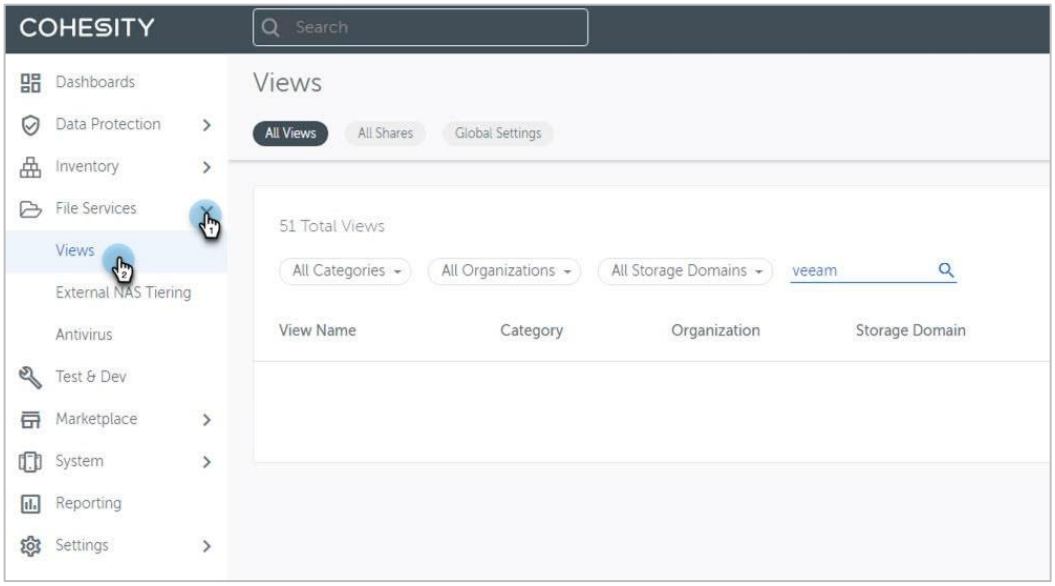
1. Create a Cohesity View, select the optimal QoS policy, set SMB access type and permissions, and add a Share Allowlist.
2. Tune the gflags on your Cohesity cluster to optimize SMB View performance.
3. Create:
   - An SMB SoBR on Veeam.
   - An SMB regular repository on Veeam.
4. Configure your Veeam backup jobs to use Cohesity storage.

IMPORTANT: Before you create your View, ensure that Cohesity is joined into Active Directory. For instructions on doing so, see Join Active Directory in the online Help.

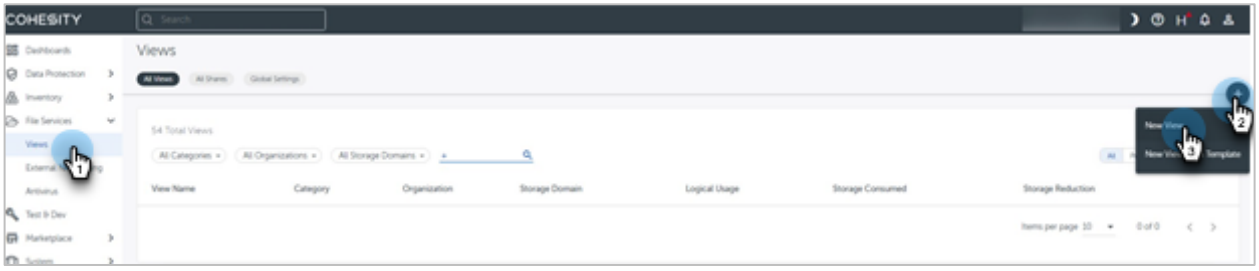
We recommend enabling inline deduplication and inline compression on the Cohesity Storage Domain in which you create the View. For details, see Create or Edit Storage Domains in the online Help.

To create an SMB View for VBR:

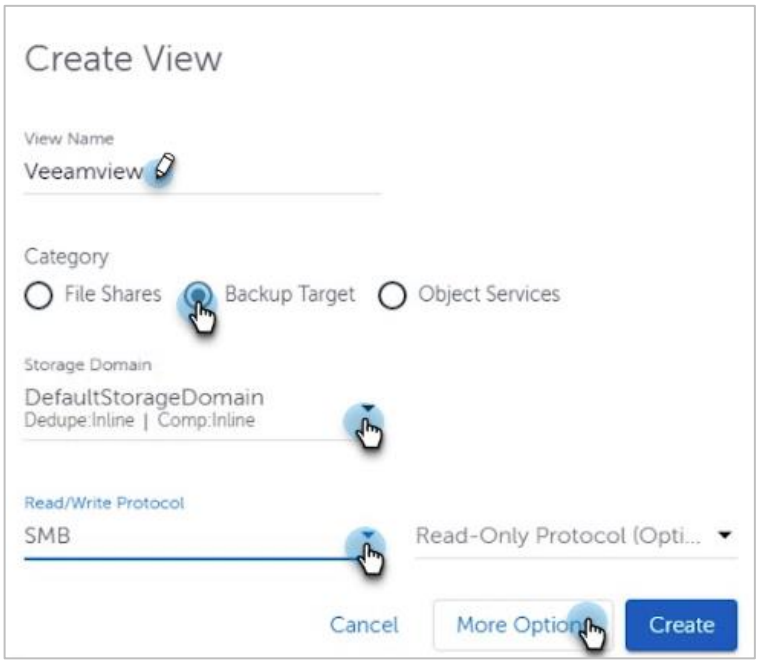
1. Log in to Cohesity and navigate to **File Services** > **Views**.



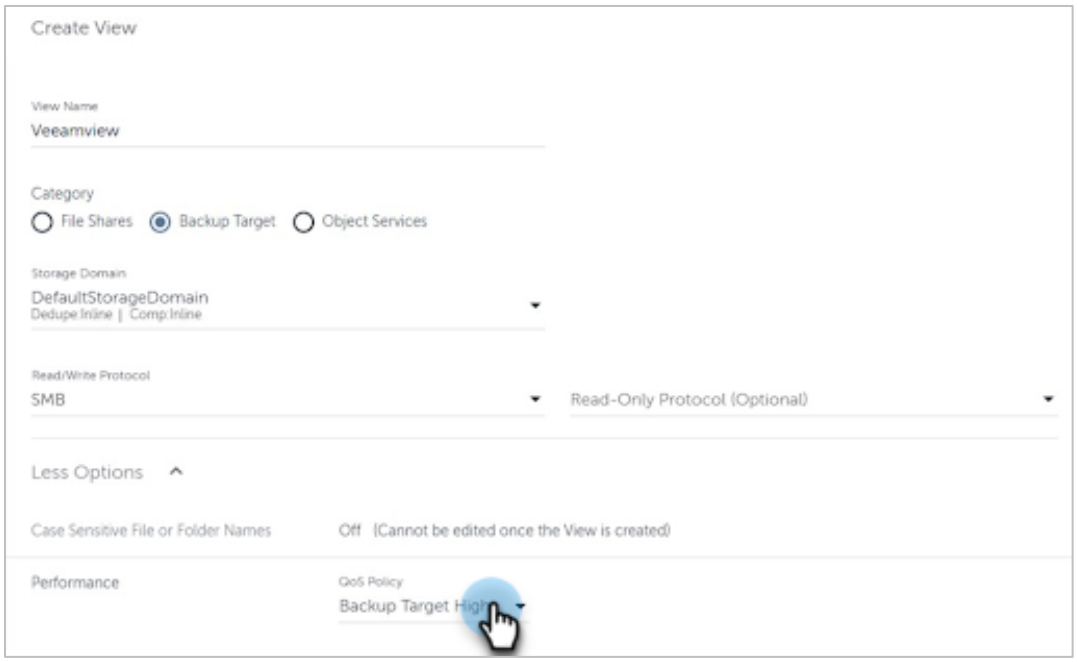
2. On the **Views** page, click the **"+"** sign and click **New View**.



3. In the **New View** form, name the View, choose the **Storage Domain**, select category as **Backup Target,** under **Read/Write Protocol**, select **SMB only**, and click **More Options**.

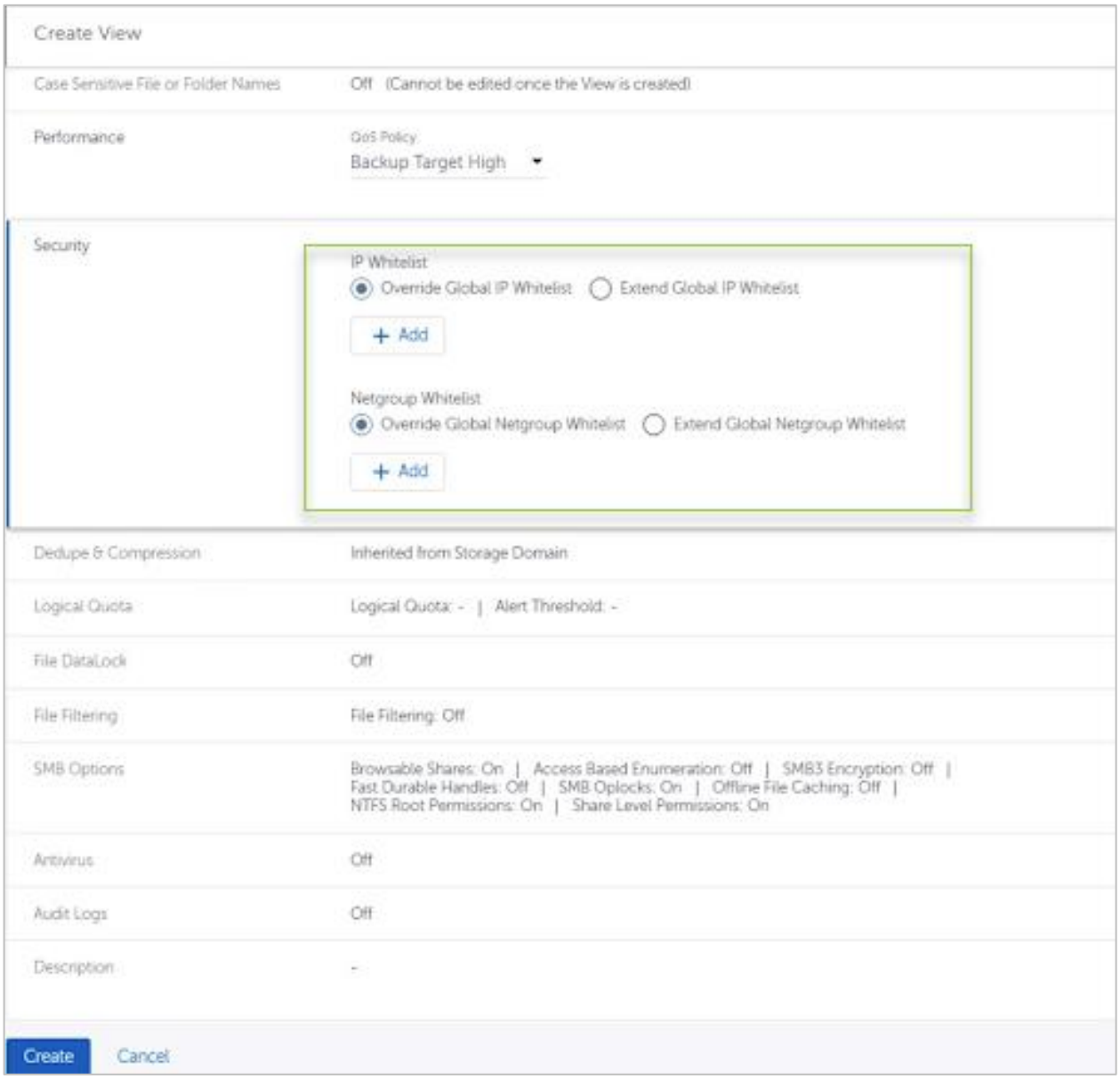


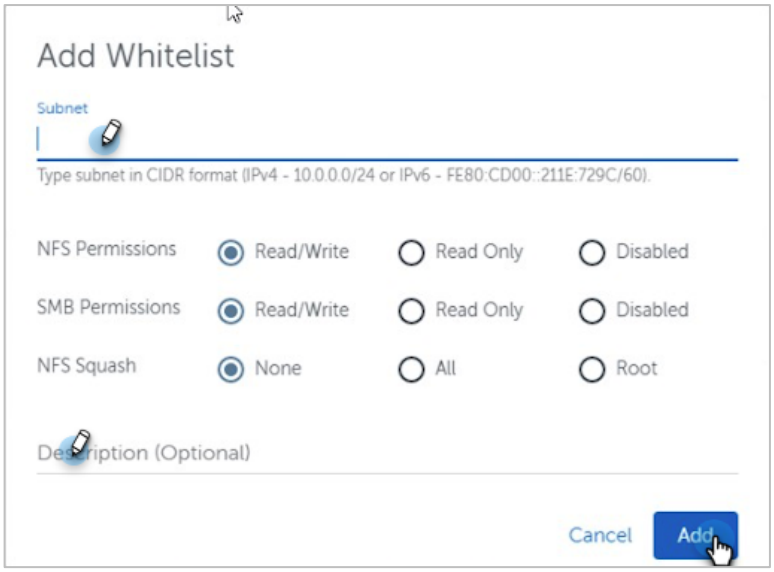
4. Under **Performance,** click **Edit (**) on the right and select the QOS policy.

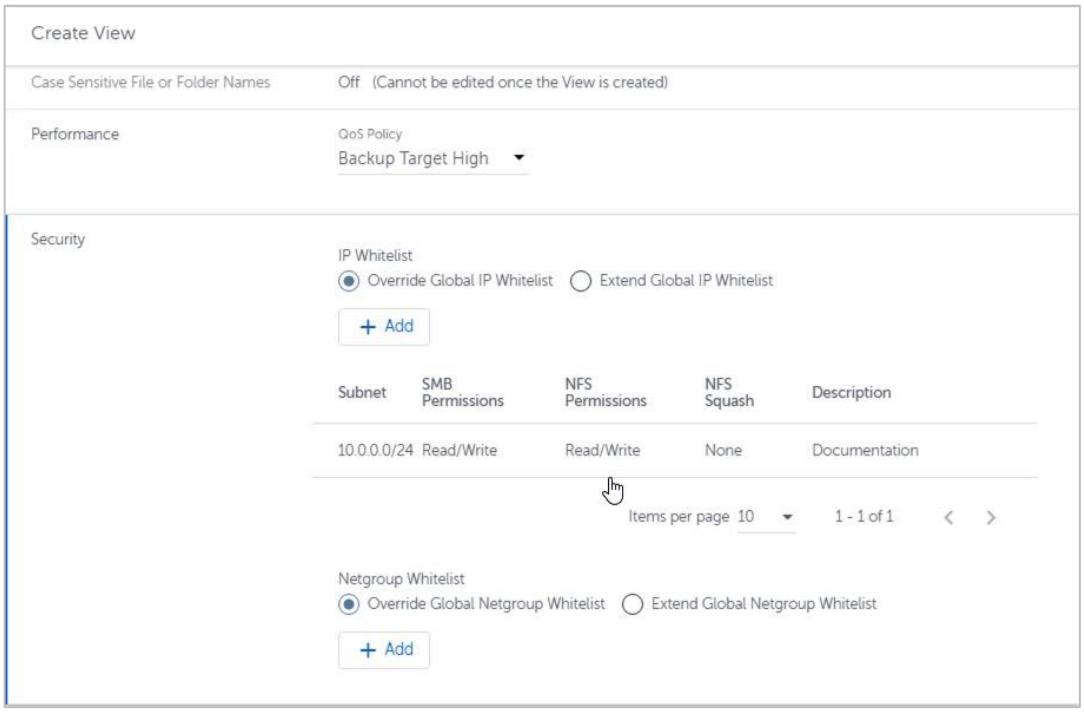


NOTE: For SMB Views for VBR, we recommend the *Backup Target SSD* QoS policy. For test results, see Appendix A: Choose Optimal QoS Policy for Your VBR Repositories.

5. In the same form, under **Security**, click Edit( ) on the right, click **Add** under **IP Whitelist,** and enter the **Subnet IP**, **Subnet Mask**, and a **Description** for *each* of your VBR servers and Veeam proxy servers. Click **Add**. Finally, click **Create** at the bottom of the form.







NOTE: If you add more Veeam proxy servers in the future, ensure that they are added to the Share Allowlist in this View.

Now that you have created the Cohesity SMB View, verify that the SMB share (which has the same name as the View) is accessible by the VBR server and proxies using the ***<vip>****<Viewname>*** format.

For better performance, create multiple directories in the Cohesity View equivalent to the number of nodes in the cluster. Proceed to Create SMB Repositories on VBR to create an SMB repository.

Example:

\\<*vip1*>\<*Viewname1*>*Directory1*

\\<vip2>\<Viewname1>\Directory2

\\<*vip3*>\<*Viewname1*>*Directory3*

NOTE: Should you encounter access issues, which appear most commonly as '*Access Denied*' and '*Can't open for writing*' error messages in VBR, the most likely cause is an issue with the IP Allowlist or Active Directory permissions. To troubleshoot these issues, use Cohesity filer audit logging on the Cohesity View, which will indicate the cause.

For instructions, see Enable File Services Audit Logs in the online Help.

Optimize SMB View Performance

Gflags are tunable parameters used to customize and optimize performance for different operating environments. For optimal SMB performance, we recommend modifying these gflags while setting up Cohesity as a target repository for VBR.

See Recommended settings when using Cohesity as a filer for more detail. Contact Cohesity Support to help you change the gflag settings.

Now that you have created your Cohesity SMB View for VBR, you are ready to create an SMB SoBR or regular repository on VBR.

Create SMB Repositories on VBR

When you use a Cohesity SMB share to create an SMB repository on VBR, you will need to tune the following repository options for optimal throughput:

- Remove the load-control limits for concurrent tasks and read/write rates.
- For storage compatibility settings, select **Use per-VM backup files**.

IMPORTANT: When configuring Cohesity as an SoBR for Veeam, we recommend using the same number of Veeam extents as the nodes you have in the Cohesity cluster.

Create an SMB Scale-out Backup Repository on Your Veeam Server

While VBR can be supported using either a regular (single) or SoBR, SoBR is a logical entity that is a collection of multiple backup repositories. It creates a pool of storage devices. We recommend using a SoBR because SoBR delivers highly improved write performance on Cohesity, as it writes into all nodes in parallel. See Table 3 to understand the benefits of using a scale-out repository.

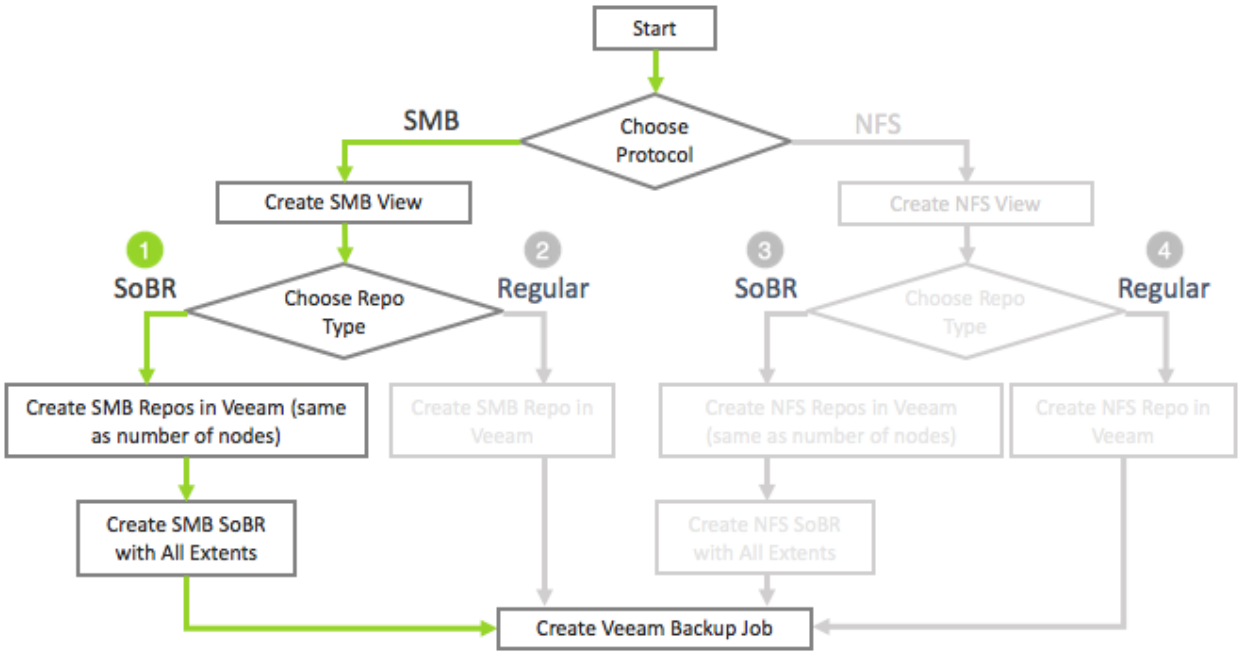
Table 3: Scale-out Backup Repository or Regular Repository for Veeam

VEEAM REPOSITORY	PROTOCOL	ACCESS METHOD	NOTES
Scale-out Backup Repository (SoBR)	SMB, NFS	Access via dedicated VIPs	Scale-out increases parallelism among backup jobs, and thus reduces the backup window. Allows the user to configure as many Veeam extents as the number of nodes in the Cohesity cluster. Best suited for Cohesity storage.
Regular (Single) Repository	SMB, NFS	Access via FQDN	Not recommended for Cohesity storage.

NOTE: Creating an SoBR requires a Veeam Enterprise Plus license.

To start creating an SMB SoBR, you will first follow the steps to create a single, regular SMB repository for VBR and then repeat those steps to create as many SMB repositories as the number of nodes in the Cohesity cluster. While creating each repository, access the Cohesity SMB share via dedicated Cohesity VIPs instead of FQDN. For example, if you have four nodes, then you set four VIPs and you should create one SMB View and access the same View using each node's unique VIP by creating the dedicated directory for each repository.

Figure 10: Create SMB SoBR on VBR



To create an SMB SoBR in the Veeam management console:

1. Repeat the steps in Create an SMB Regular Repository on VBR using an SMB Share to create the same number of SMB repositories as nodes in the Cohesity cluster by accessing the View name using the dedicated VIP address for each directory in SMB share of a View. As Veeam recommend that each VIP or IP should access a unique directory structure

   For example, if you have a four-node cluster and then create one view, 'veeamview', and create four directories in the View by accessing the SMB share. You create four SMB regular repositories using a unique VIP address with the number of directories in the SMB share. The pattern should be as follows:

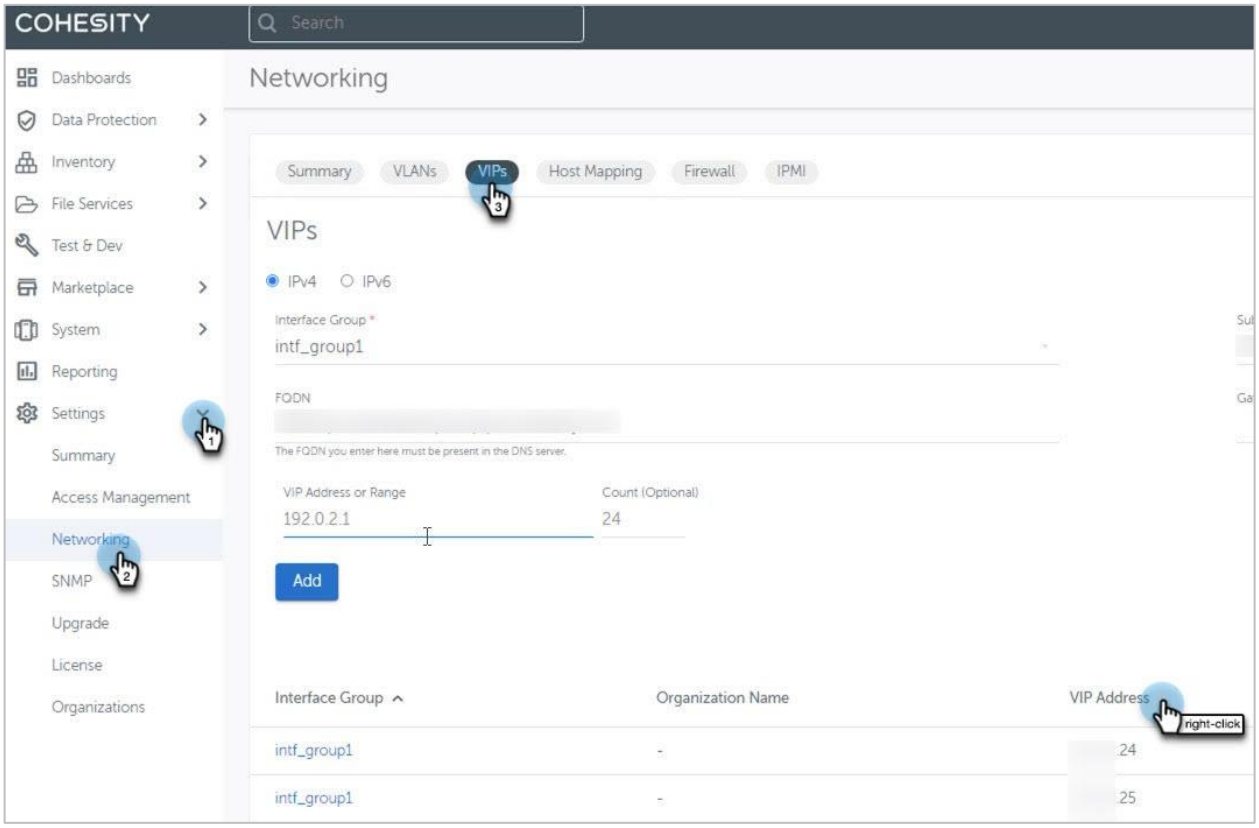
   <vip01>\Veeamview\Directory1

   <vip02>\Veeamview\Directory2

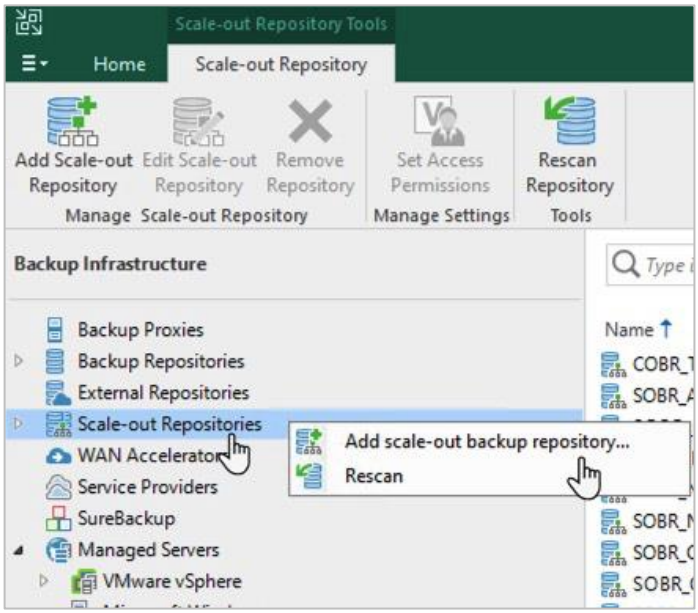
   <vip03>\Veeamview\Directory3

   <vip04>\Veeamview\Directory4

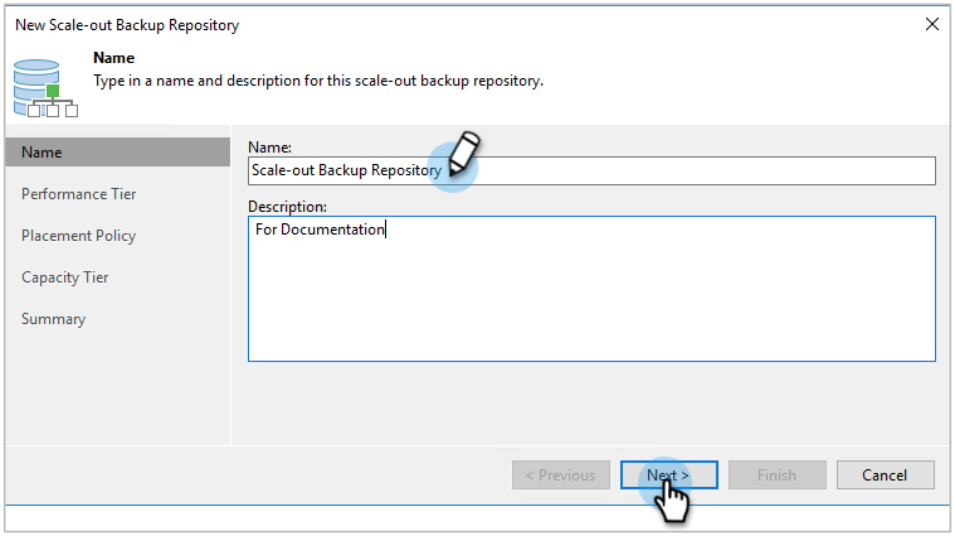
2. To find the VIP of each of your Cohesity nodes, log in to Cohesity, navigate to **Settings > Cluster > Networking** and click the **VIPs** tab. Find the IP address of each node next to **Interface Group ID** and right-click **>** Copy it from there.



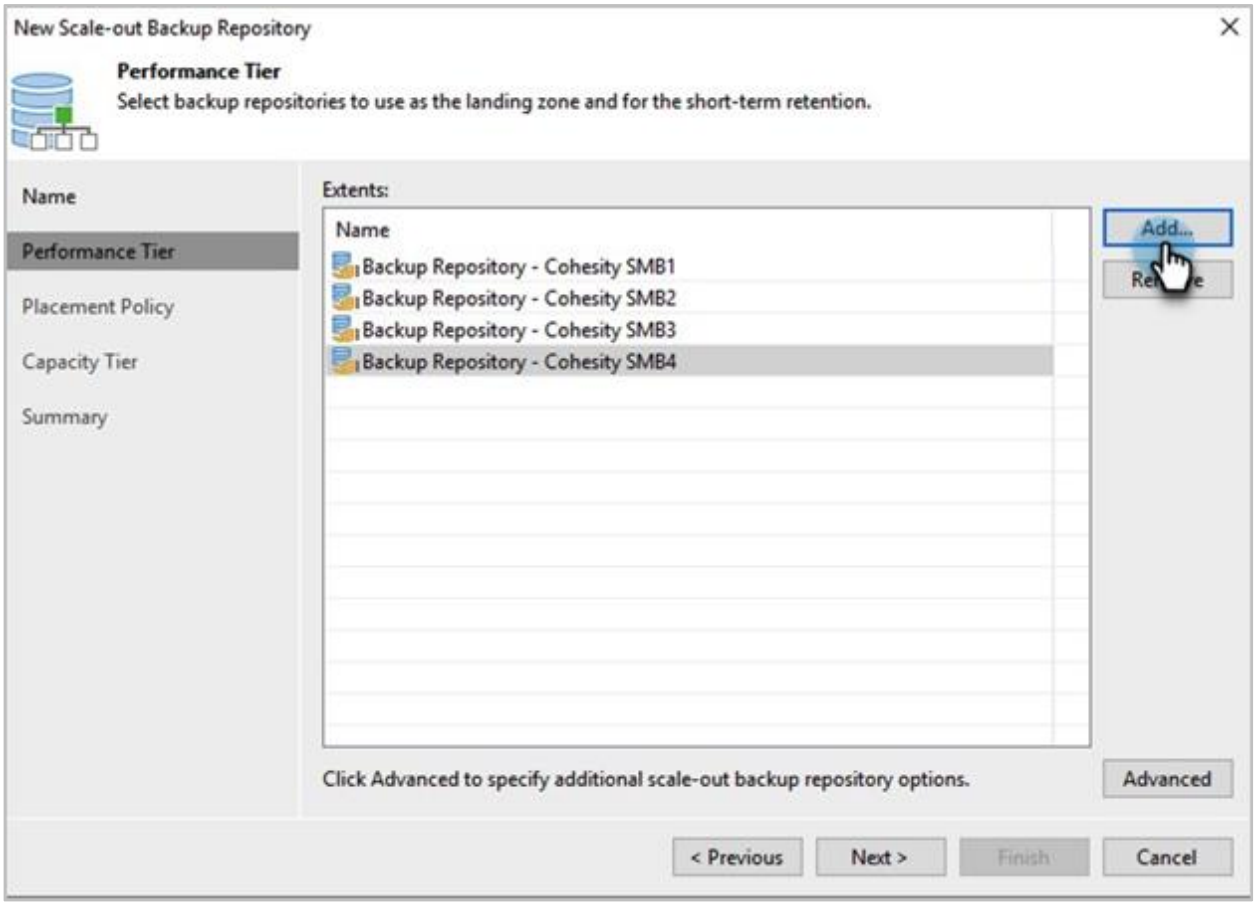
3. From the Backup Infrastructure section of the Veeam management console, right-click **Scale-out Repositories** and select **Add scale-out backup repository**.



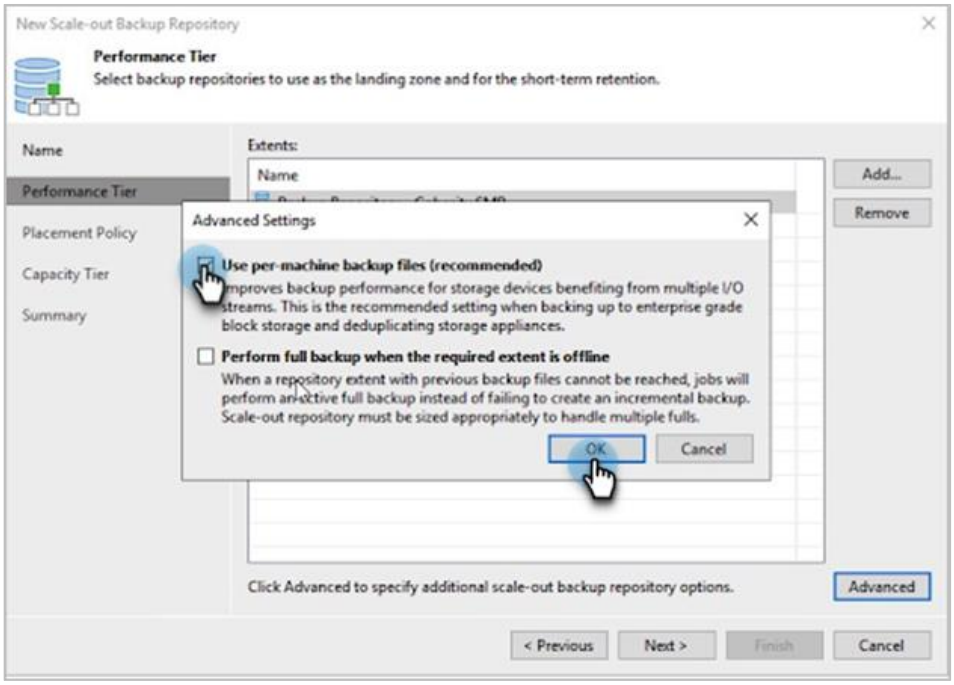
4. Name the SoBR and click **Next**.



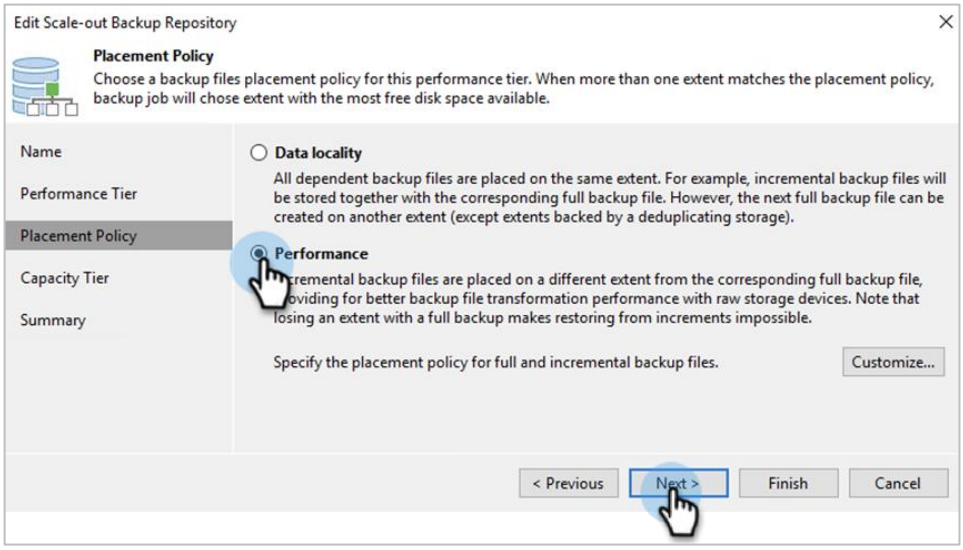
5. Under **Performance Tier**, select the SMB extents you wish to add, which was created as an SMB backup repository. If you have created 4 Smb-backup repositories, then add all four to the SoBR and click **Add**.



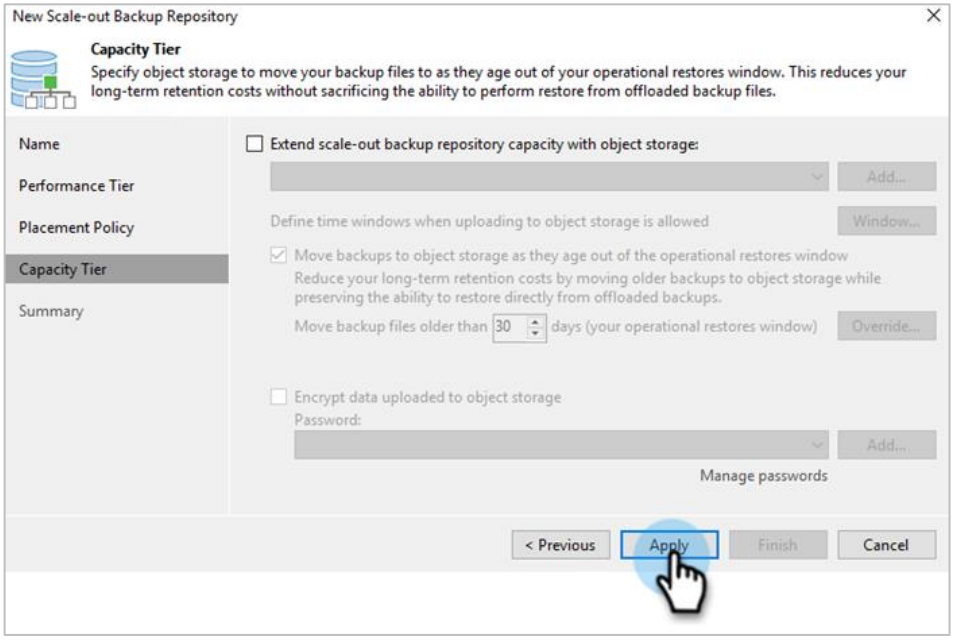
6. Click **Advanced** and select the **Use per-machine backup files** option. Then click **OK**.



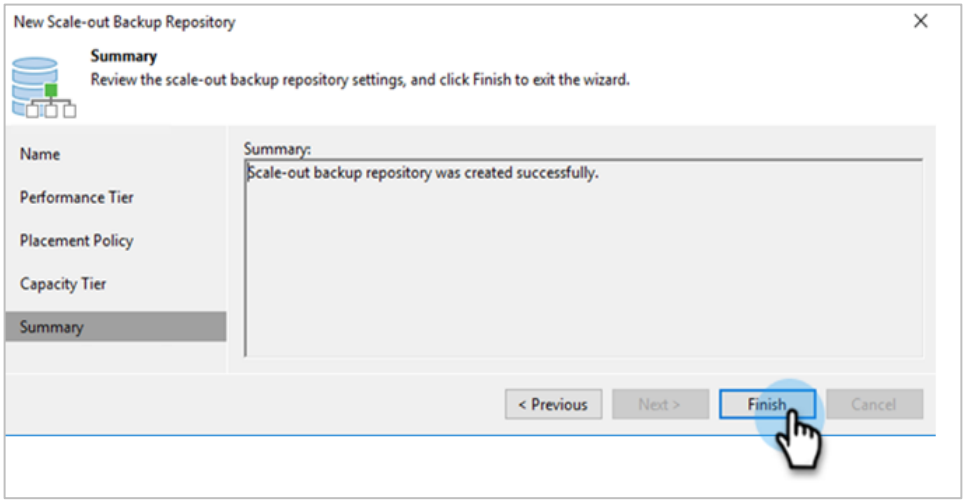
7. Under **Placement Policy**, select **Performance** and click **Next**.



8. Click **Apply** to save these settings and continue.



9. Click **Finish** to complete the SMB SoBR creation.

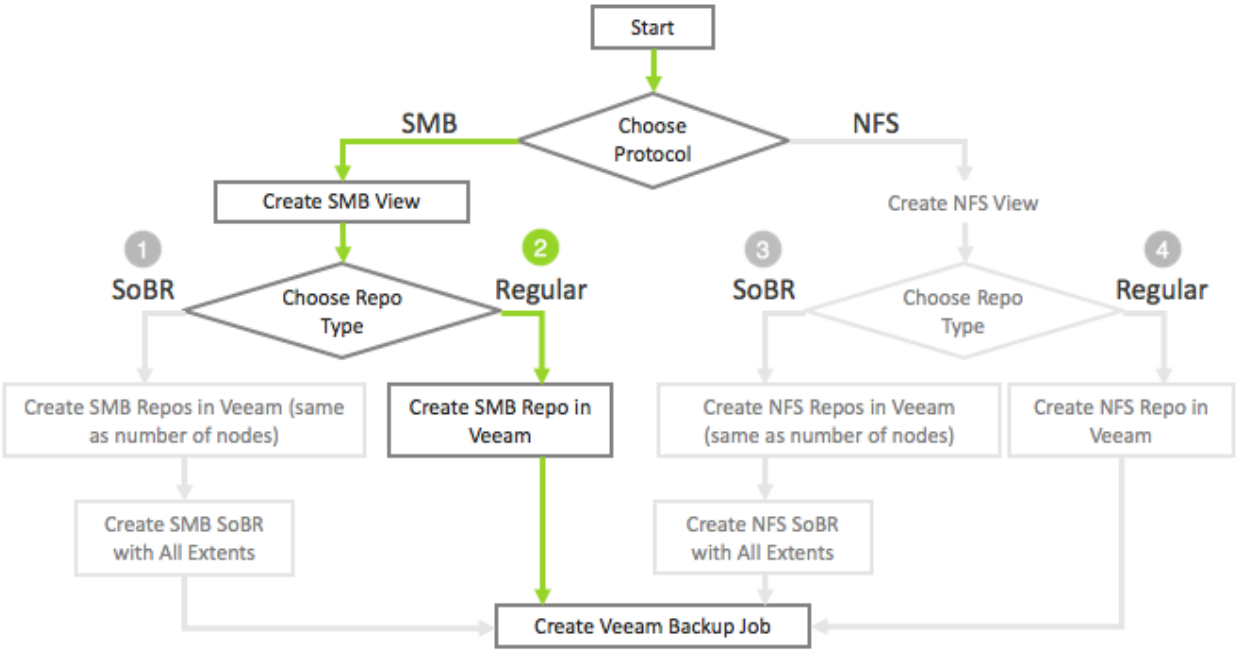


You have successfully created an SMB SoBR. To map this repository in your Veeam backup job, see Configure Veeam Backup Jobs to Use Cohesity Storage below.

Create an SMB Regular Repository on VBR using an SMB Share

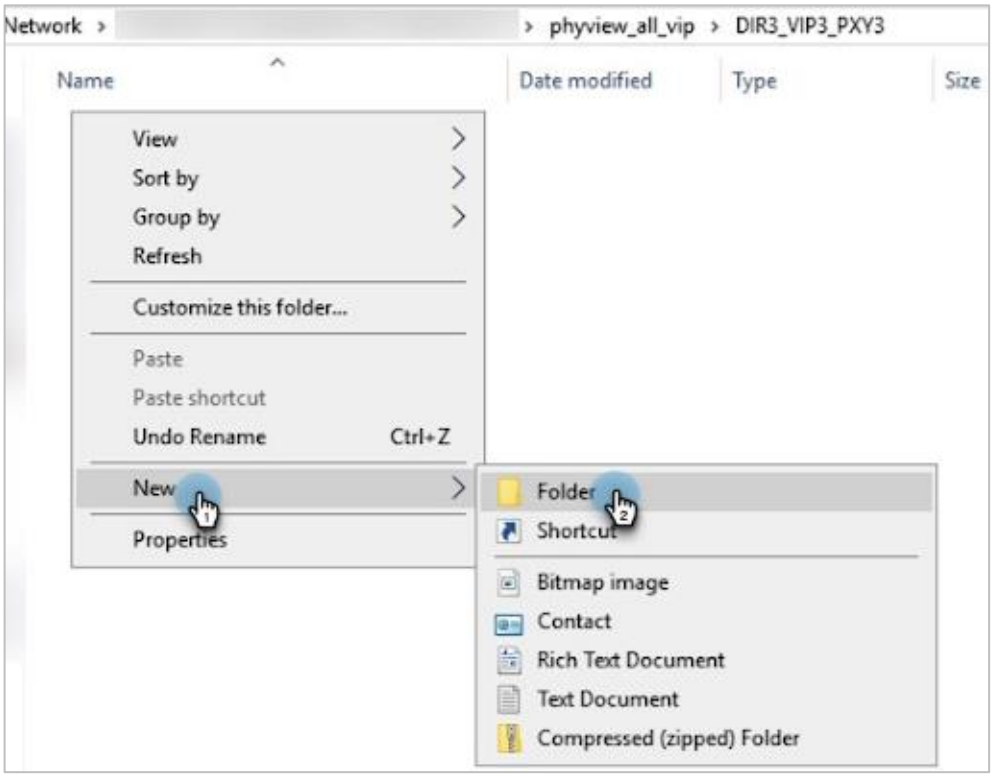
In addition to SoBRs, you can also create a regular repository on VBR using the Cohesity SMB View. In fact, to create an SoBR, you need to start by creating several regular Veeam repositories according to the procedure below. Note that SoBRs deliver much better performance, so we strongly recommend using an SoBR over a single regular repository.

Figure 11: Create SMB Regular Repository on VBR

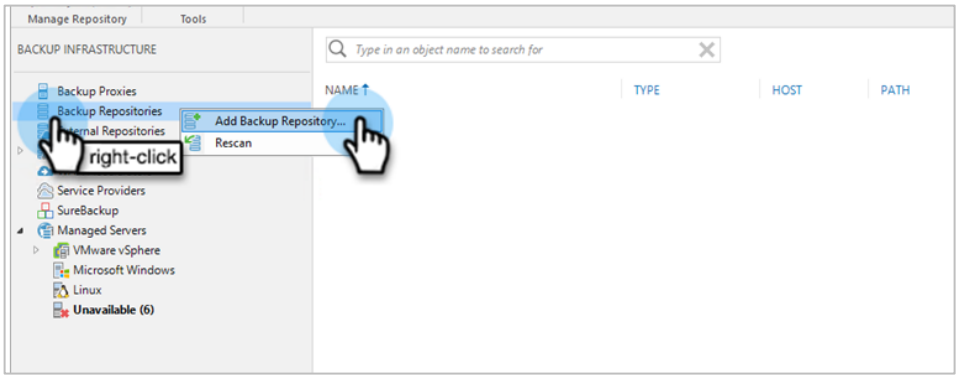


To use a Cohesity SMB share as a single, regular VBR repository:

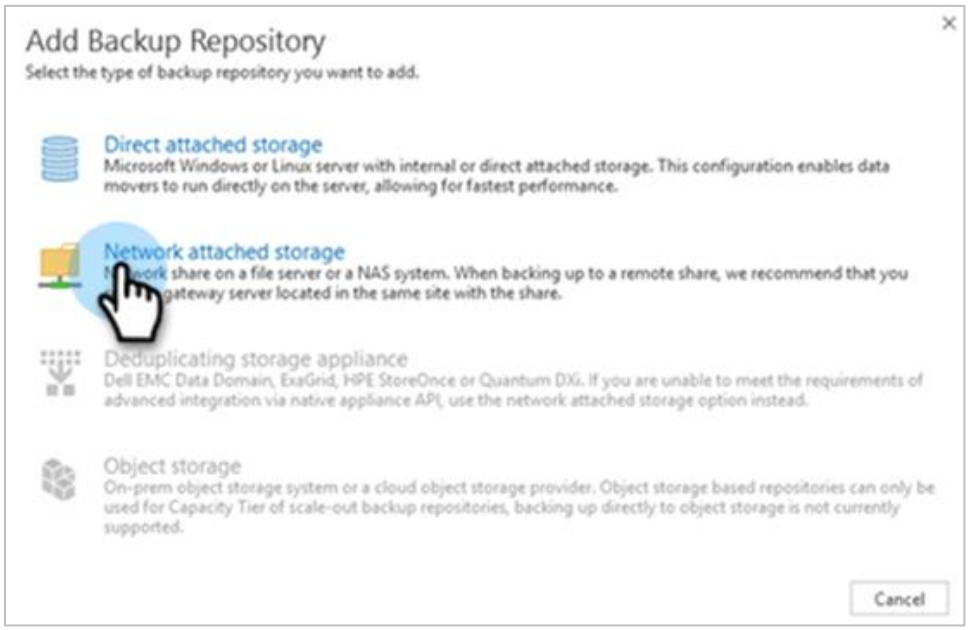
1. First, create a directory in the Cohesity View, which will be used to create a Veeam backup repository; access Cohesity View by using \\<vip>\Veeamview, enter the credentials to authenticate, and then create new folders in it.



2. From the Backup Infrastructure section of the Veeam management console, right-click **Backup Repositories** and select **Add Backup Repository**.

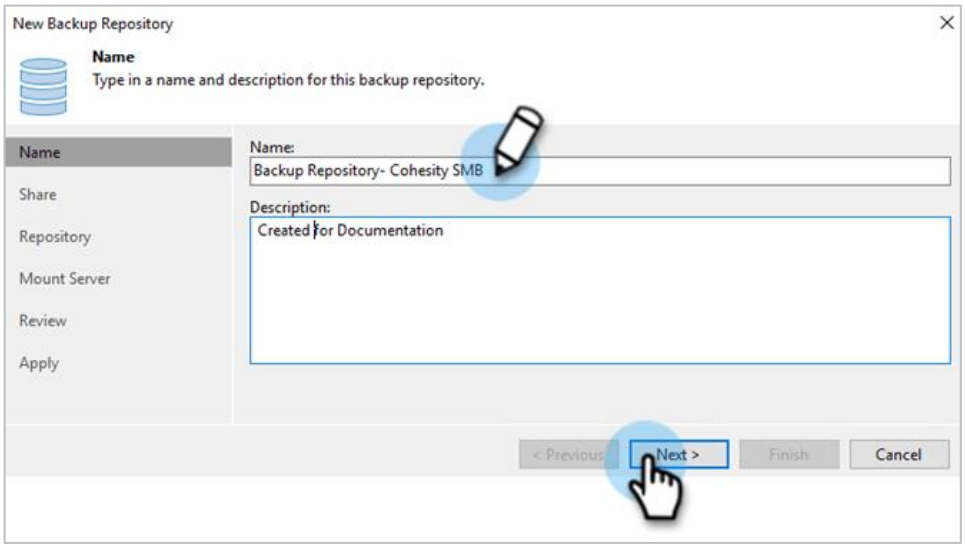


3. In the window that opens, select **Network attached storage**.



4. Click **SMB share** option.

5. Name the repository and then click **Next** to continue.



6. Under **Shared Folder**, type the access path in the format "**\\<VIP>\Viewname\Directory**" and click **Next**.

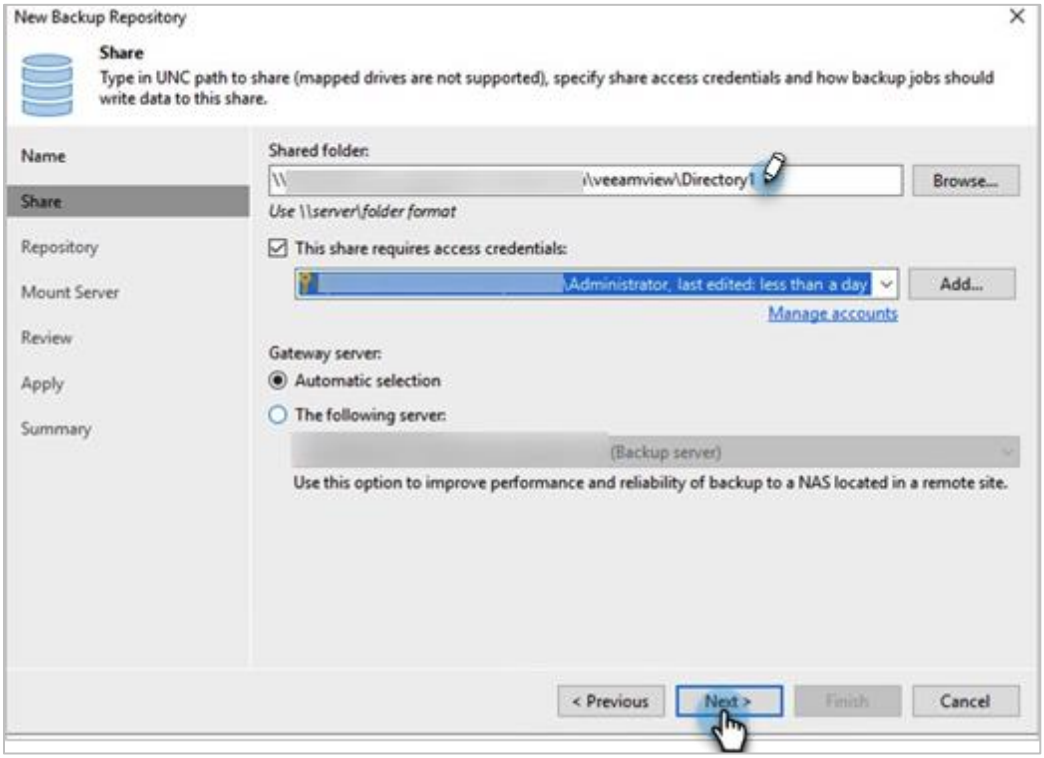
NOTE: If you plan to create multiple backup repositories, make sure you follow the following Pattern. Refer Point 1 of Create an SMB Scale-out Backup Repository on Your Veeam Server.

<vip01>\Veeamview1\Directory1

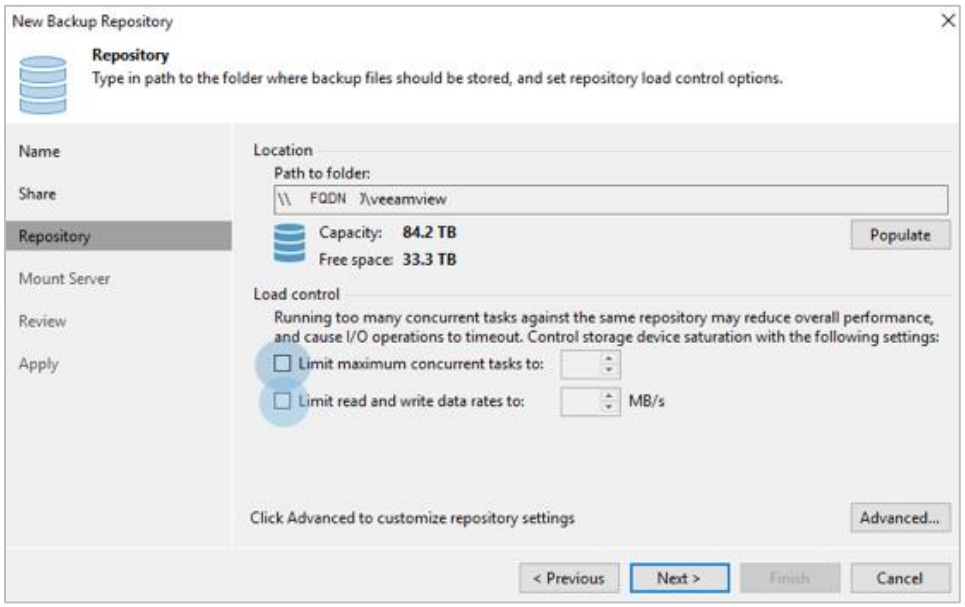
<vip02>\Veeamview1\Directory2

<vip03>\Veeamview1\Directory3

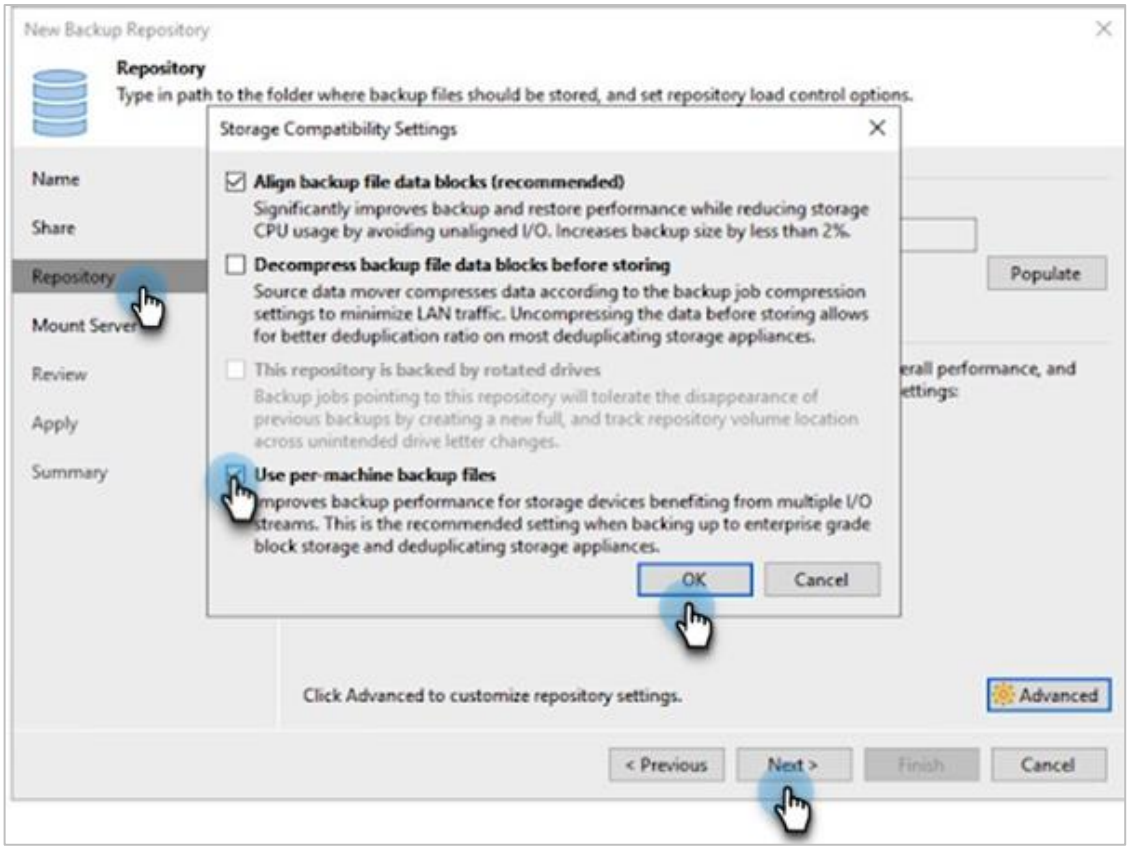
<vip04>\Veeamview 1\Directory4



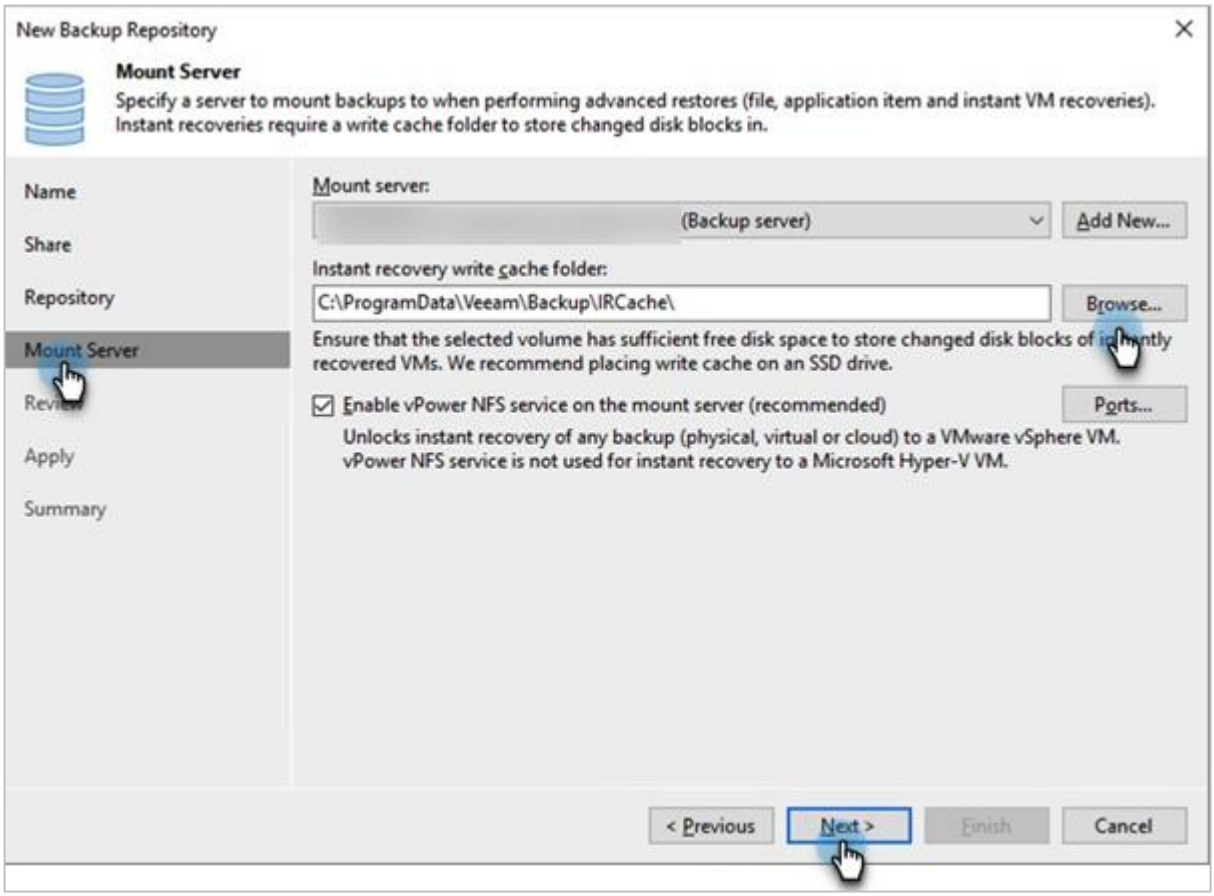
7. Uncheck **Limit maximum concurrent connection tasks to** and **Limit read and write data rates to**.



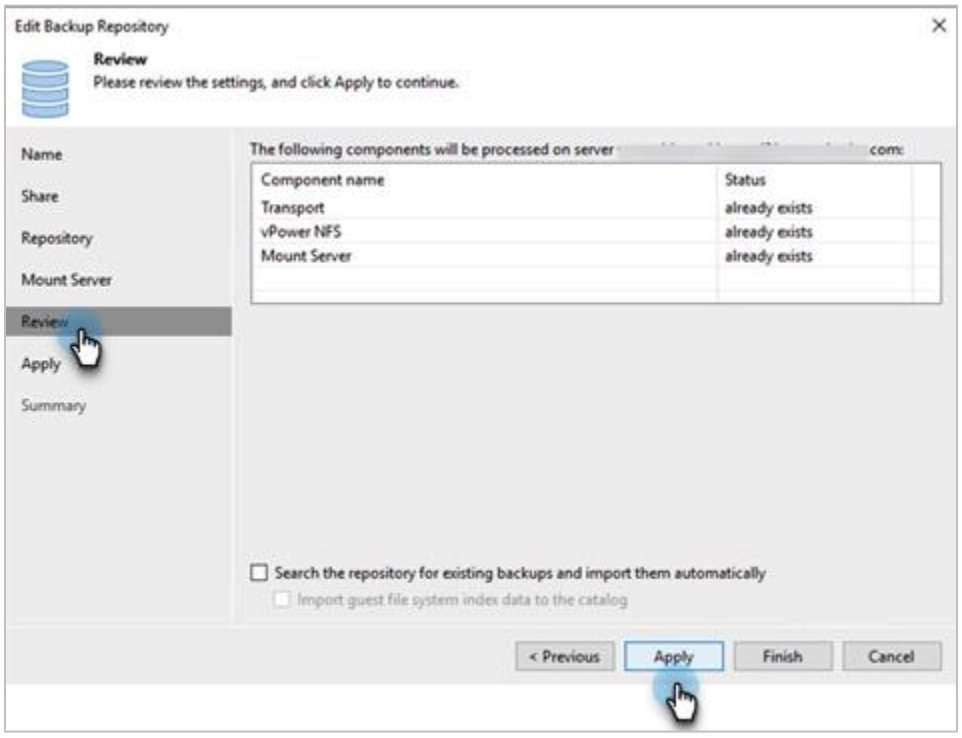
8. Click **Advanced** to open the **Storage Compatibility Settings**. In that window, select **Use per-machine backup files**. This enables more concurrent streams to the Cohesity cluster, increasing the overall throughput. Click **OK** and then click **Next**.



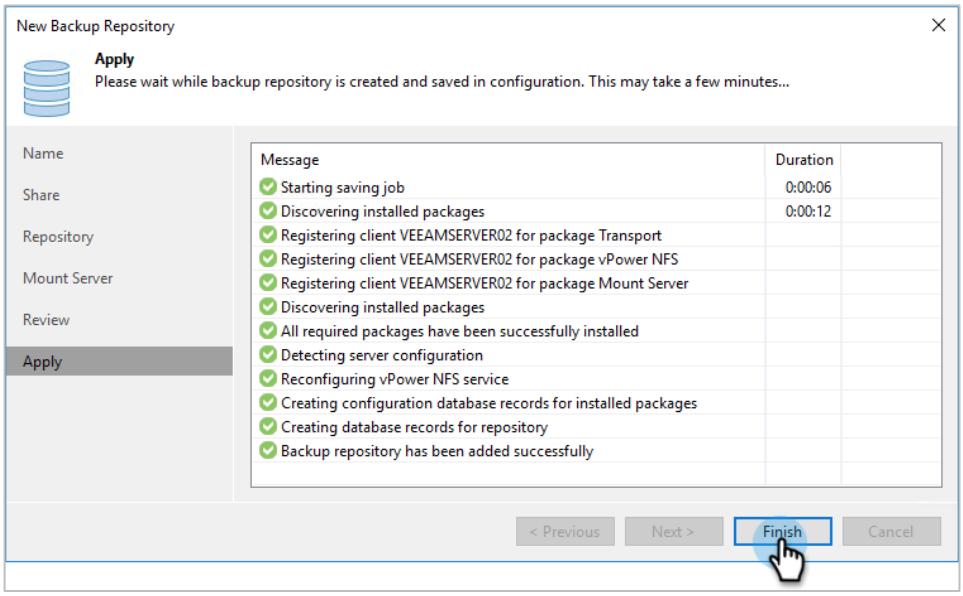
9. Select the **Mount server** and **Instant recovery write cache folder,** which can be used during restore. Click **Next**.



10. Review the repository settings and click **Apply**.



11. Click **Finish** to complete the SMB regular repository creation.



You have successfully created a regular VBR repository using an SMB share from Cohesity. To map this repository in your Veeam backup job, see Configure Veeam Backup Jobs to Use Repositories on Cohesity below.

Create Cohesity NFS View for VBR Repositories

Cohesity and VBR also support the NFS protocol. NFS repositories are a good choice for data centers that run primarily on Linux or UNIX.

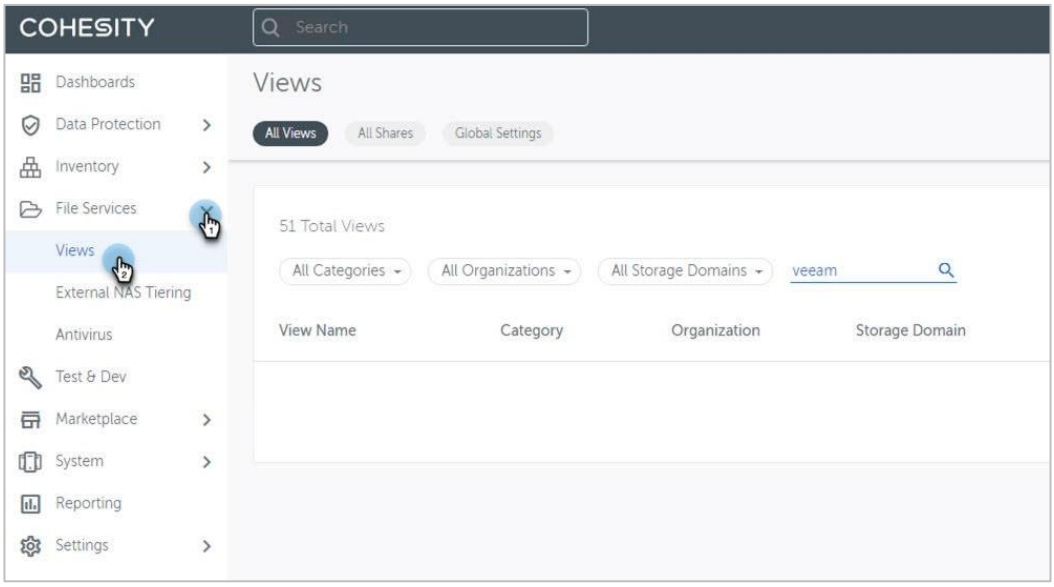
To create an NFS export to store Veeam backups:

1. Create an NFS export on Cohesity, configure a repository server on Veeam, select the optimal QoS policy, and add IP into Allowlist.
2. Create:
   - An NFS SoBR on Veeam.
   - An NFS regular repository on Veeam.
3. Configure your Veeam backup jobs to use Cohesity storage.

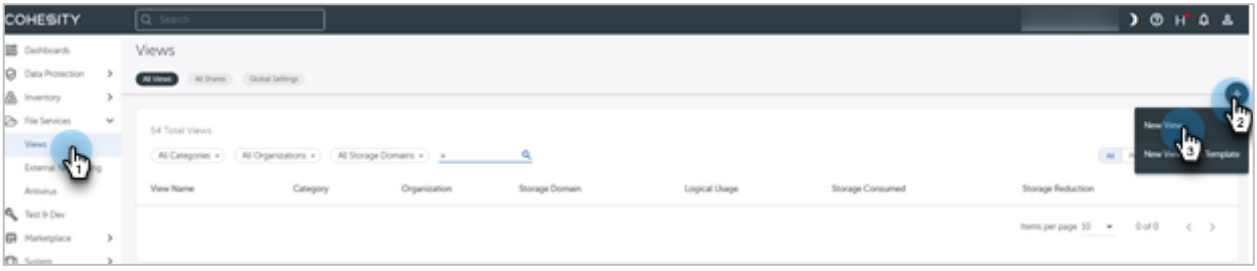
We recommend enabling inline deduplication and inline compression on the Cohesity Storage Domain in which you will be creating your Cohesity Views. To enable them, or to create a new Storage Domain, see Create or Edit Storage Domains in the online Help.

To create an NFS View for VBR:

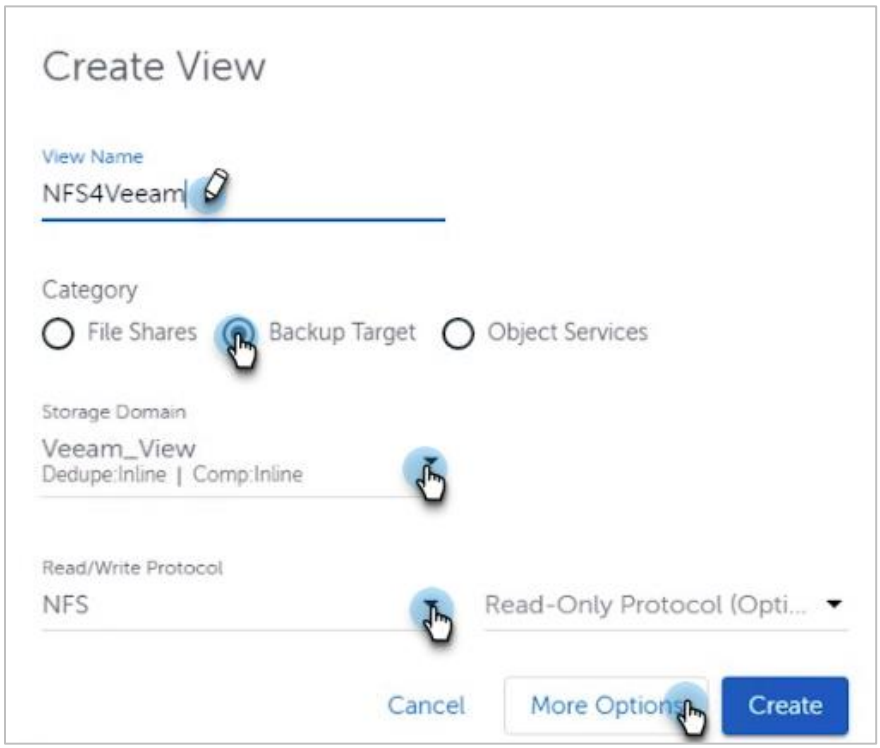
1. Log in to Cohesity and navigate to **Files Services > Views**.



2. On the **Views** page, click “+” and select **New View**.



3. In the **New View** form, name the View, choose the **Storage Domain**, and select category as **Backup Target,** Under **Read/Write Protocol**, select **NFS**. Click **More Options**.



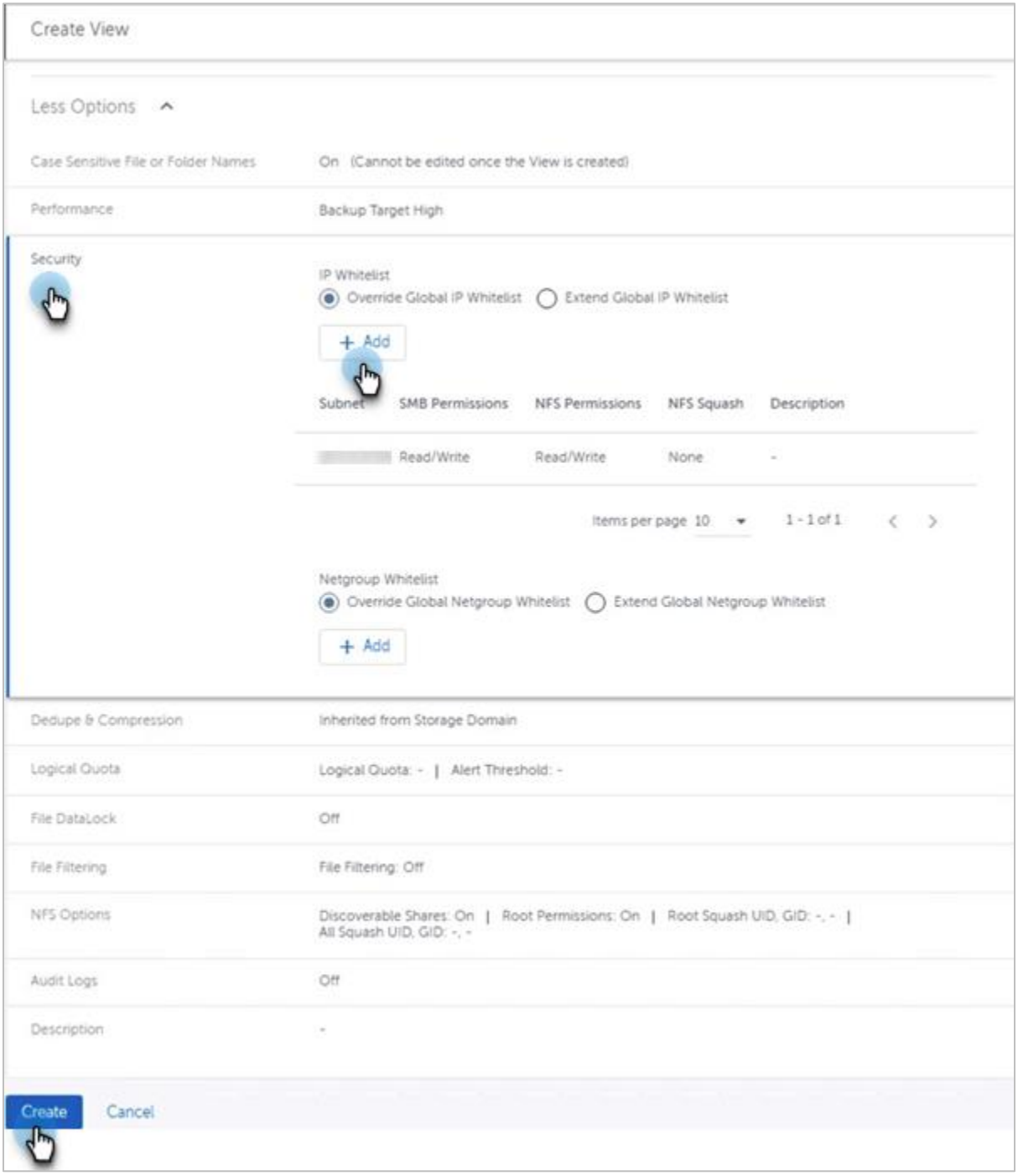
NOTE:

- For Veeam SoBRs, we recommend using the *Backup Target SSD* QoS policy in the Cohesity NFS View.
- For Veeam regular repositories, we recommend using the *TestAndDev High* QoS policy in the Cohesity NFS View.

For details, see Appendix A: Choose Optimal QoS Policy for Your VBR Repositories.

4. In the same form, under **Security,** click **Edit** ( ).
5. Under **IP Whitelist**, click **Override Global IP Whitelist.**

6. Click **Add** and enter the **Subnet IP**, **Subnet Mask**, and a **Description** for *each* of your VBR servers and Veeam proxy servers and click **Add**. Finally, click **Create** at the bottom of the form.



NOTE: If you add more Veeam proxy servers in the future, ensure that you add them to the share IP Whitelist in this View.

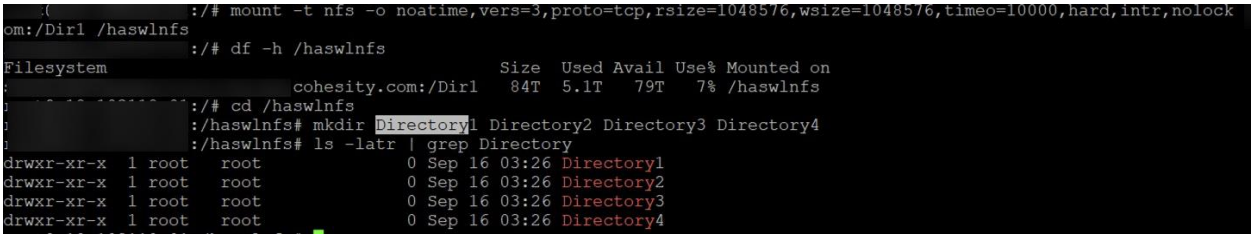
7. For better performance, create multiple directories in the Cohesity View equivalent to the number of nodes in the cluster. Proceed to Create an NFS Regular Repository on VBR Using an NFS Mount Point to create an NFS repository. The pattern should be as follows:

```
VIP1:/NFS1/Dir1
VIP2:/NFS1/Dir2
VIP3:/NFS1/Dir3
VIP4:/NFS1/Dir4
```

8. To mount the NFS view and create a directory in it, use the following process:

```
mount -t nfs -o
noatime,vers=3,proto=tcp,rsize=1048576,wsize=1048576,timeo=10000,hard,intr,
nolock coh01.cohesity.com:/NFS1 /home/cohesity_user1/nfsdir
```

Navigate to the Mounted NFS Export and use the 'mkdir' command to create the directory.



Configure a Repository Server on Veeam to Access Cohesity NFS Export

To create a Veeam NFS repository, use a Linux server to mount the Cohesity NFS export. Once the Cohesity NFS exports are mounted on the Linux server, VBR will be able to explore the NFS mounts.

For optimal throughput to Cohesity storage, we recommend you use multiple repository servers. Also, ensure that all your Linux servers meet Veeam's backup repository server system requirements and their Linux OS package requirements.

To mount the NFS export and configure the Veeam repository server as an NFS repository, see How to connect a Linux NFS client to a Cohesity NFS export in the Cohesity Support portal.

For example:

```
mount -t nfs -o
noatime,vers=3,proto=tcp,rsize=1048576,wsize=1048576,timeo=10000,hard,intr,nol
ock coh01.cohesity.com:/NFS1 /home/cohesity_user1/nfsdir
```

NOTE You must include the `nolock` option (as shown in the example above) when you mount the Cohesity NFS export to the Linux server, to avoid the issue described in Veeam KB 1741.

Troubleshoot PerlSoap

The Linux server process might fail with the error message, '*Unable to find perlsoap protocol*.' Ensure that your Linux server is installed with `rpcbind`, `nfs-common`, and `Perl.Data.Dumper` packages before configuring a repository server, as these are mandatory packages for the repository server.

Create NFS Repositories on VBR

When you use a Cohesity NFS export to create an NFS repository on VBR, you will need to tune the following repository options for optimal throughput:

- Remove the load-control limits for concurrent tasks and read/write rates.
- For storage compatibility settings, select **Use per-VM backup files**.

IMPORTANT: When configuring Cohesity as an SoBR for Veeam, we recommend:

- Using the same number of Veeam extents as you have nodes in the Cohesity cluster.
- A minimum configuration of at least four nodes in the Cohesity cluster.

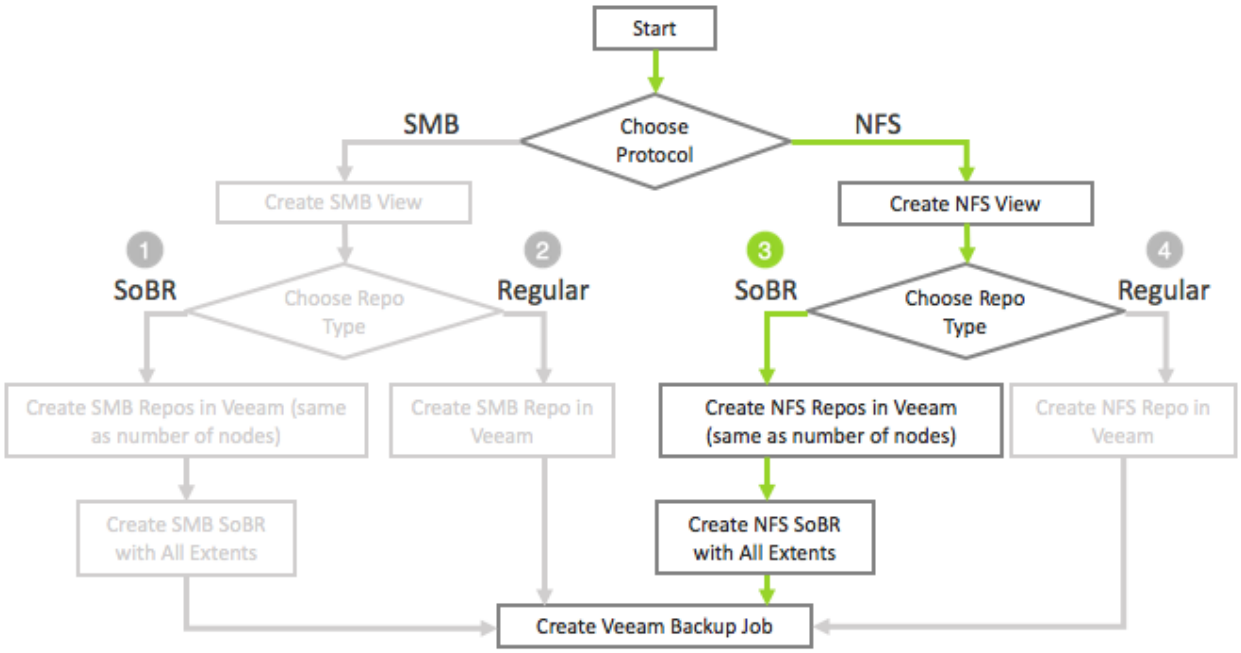
Create an NFS Scale-out Backup Repository on Your Veeam Server

Though Veeam Backup & Replication (VBR) can be supported using either a regular (single) or an SoBR, SoBR is a logical entity that is a collection of multiple backup repositories. It is creating a pool of storage devices. We recommend using an SoBR. An NFS SoBR delivers highly improved write performance on Cohesity, as it writes into all nodes in parallel. For more detail about the benefits of using an SoBR, see Table 3 above.

NOTE: Creating an SoBR requires a Veeam Enterprise Plus license.

To start creating an NFS SoBR, you will first follow the steps to create a single, regular NFS repository for VBR and then repeat those steps to create as many NFS repositories as the number of nodes in the Cohesity cluster. While creating each repository, access the Cohesity NFS export via dedicated Cohesity VIPs instead of FQDN. For example, if you have four nodes and they each have a VIP, then you should create one NFS View and access the same View using each node's unique VIP by creating a dedicated directory for each repository.

Figure 12: Create NFS SoBR on VBR



To create an NFS SoBR in the Veeam management console:

1. Repeat the steps in Create an NFS Regular Repository on VBR Using an NFS Mount Point to create the same number of NFS repositories as nodes in the Cohesity cluster by accessing the share name using the VIP address of each node.

   For example, if you have a four-node cluster, then create one NFS View and four directories, you create four NFS regular repositories using VIP address with the viewname and directories name as follows:

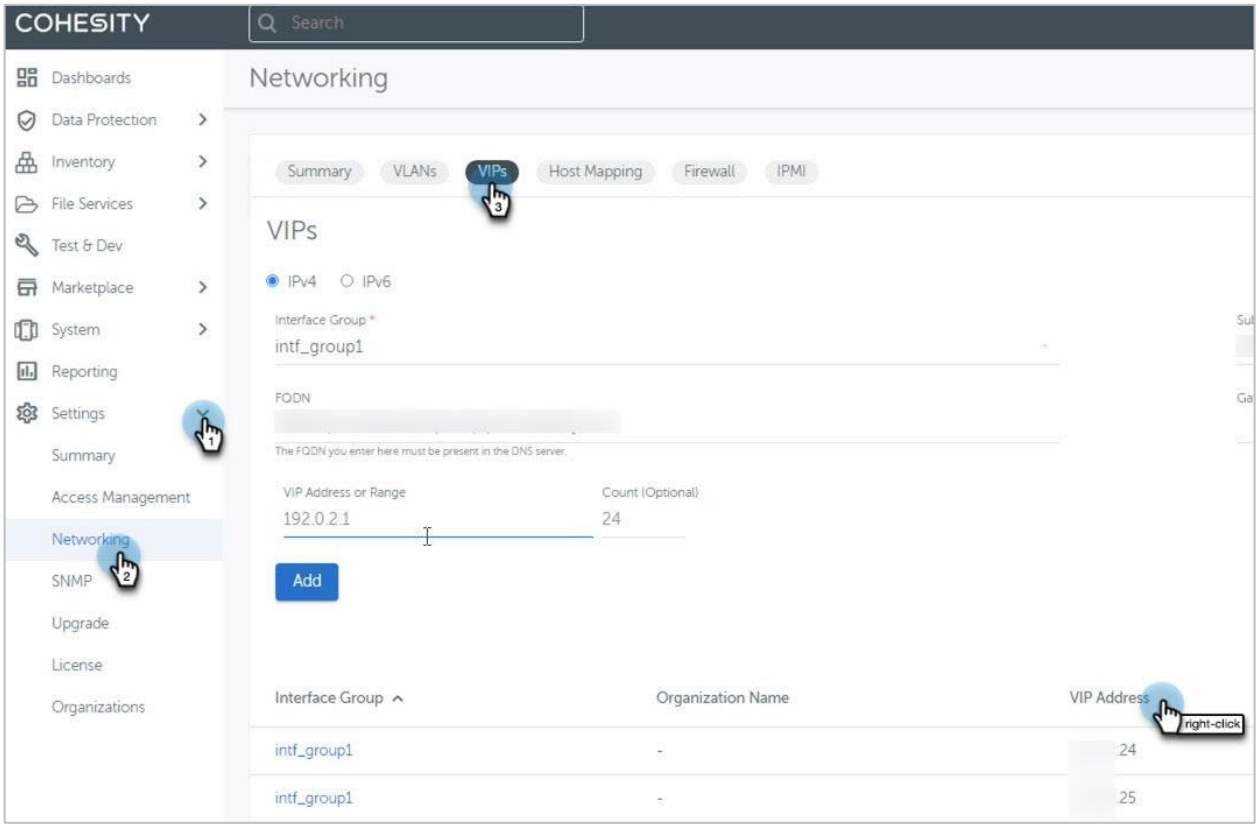
   //***<vip01>***/NFS4Veeam1/Directory1

   //***<vip02>***/NFS4Veeam1/Directory2

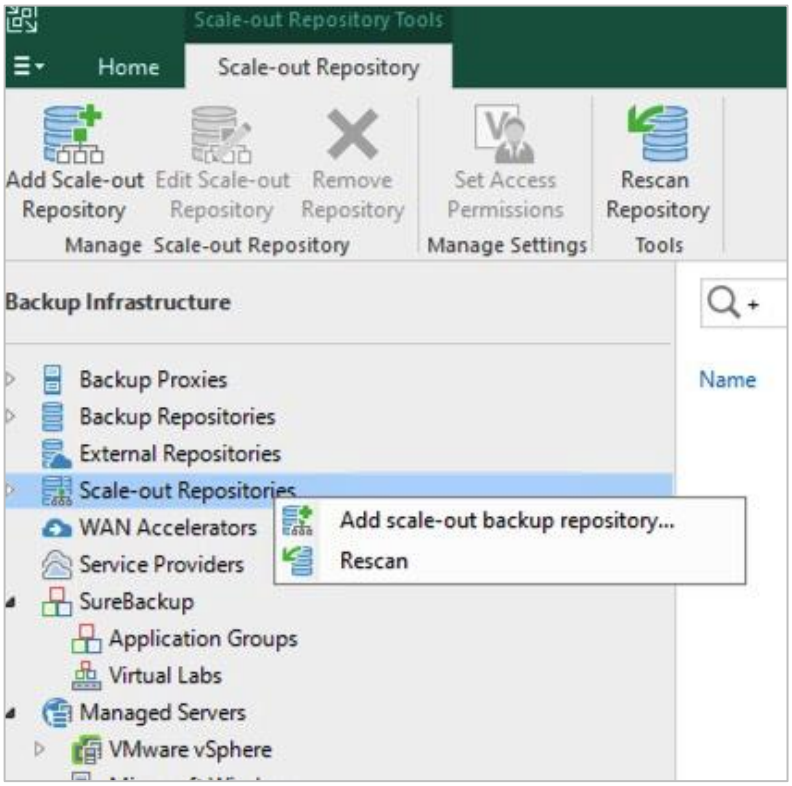
   //***<vip03>***/NFS4Veeam1/Directory3

   //***<vip04>***/NFS4Veeam1/Directory4

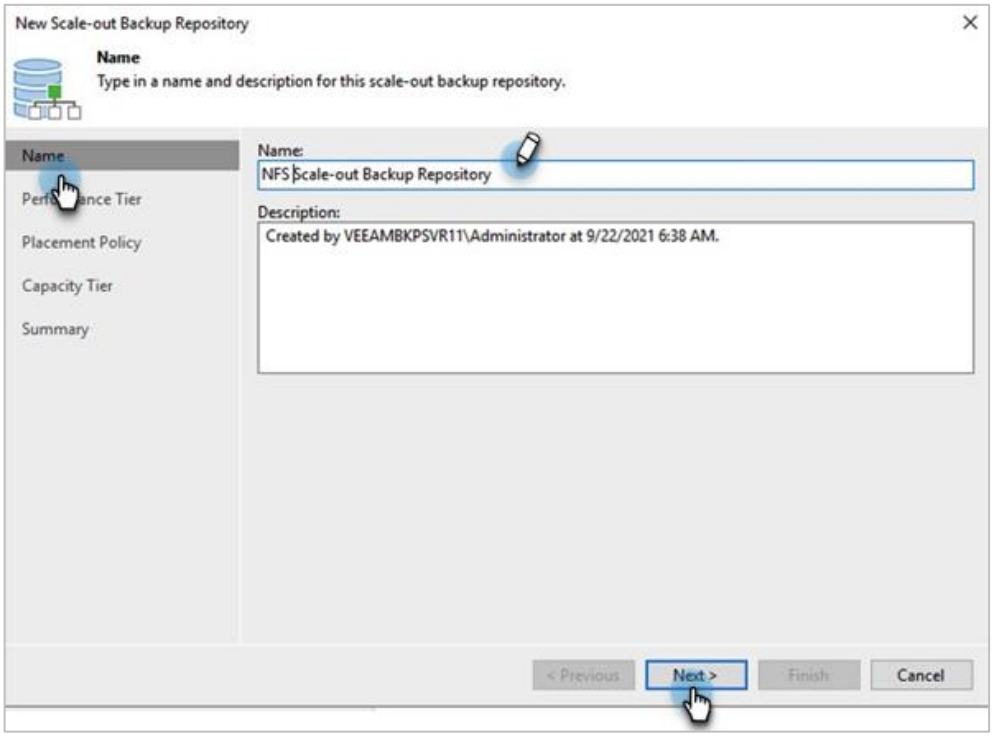
a) To find the VIP of each of your Cohesity nodes, log in to Cohesity, navigate to **Setting > Networking,** and click the **VIPs** tab. Find the IP address of each node next to **Interface Group ID** and right-click **>** Copy it from there.



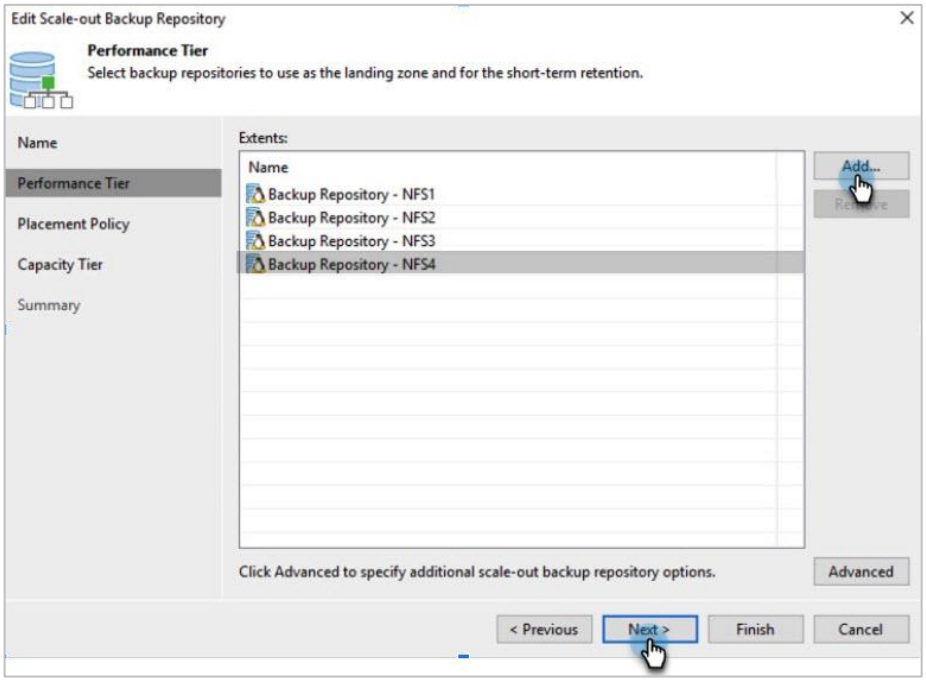
2. From the Backup Infrastructure section of the Veeam management console, right-click **Scale-out Repositories** and select **Add scale-out backup repository**.



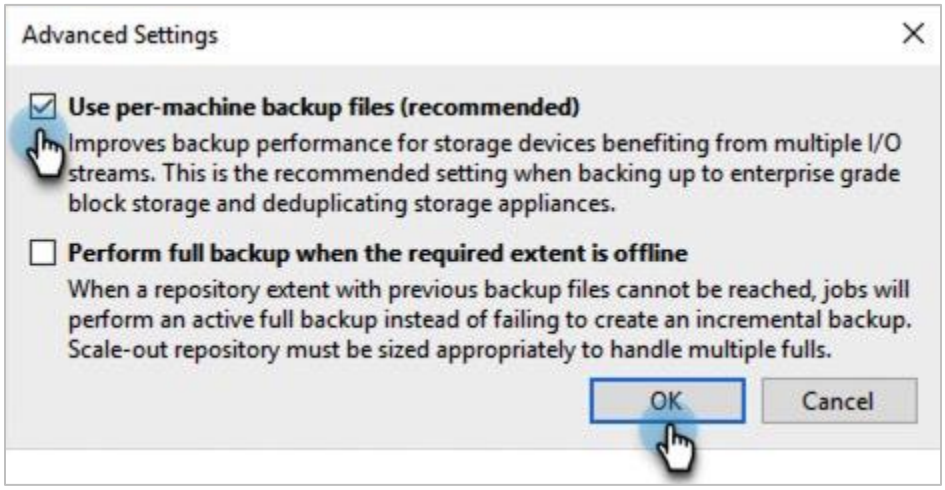
3. Name the SoBR and click **Next**.



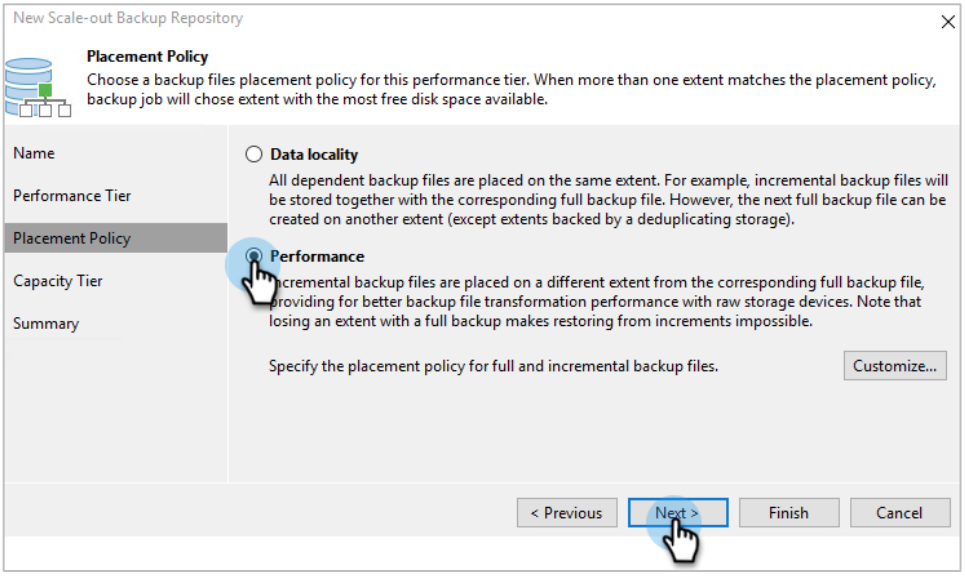
4. Under **Performance Tier**, select the NFS extents you wish to add to the SoBR which was created as an NFS backup repository. If you have created 4 NFS backup repositories, then add all four to the SoBR and Click **Next** to continue.



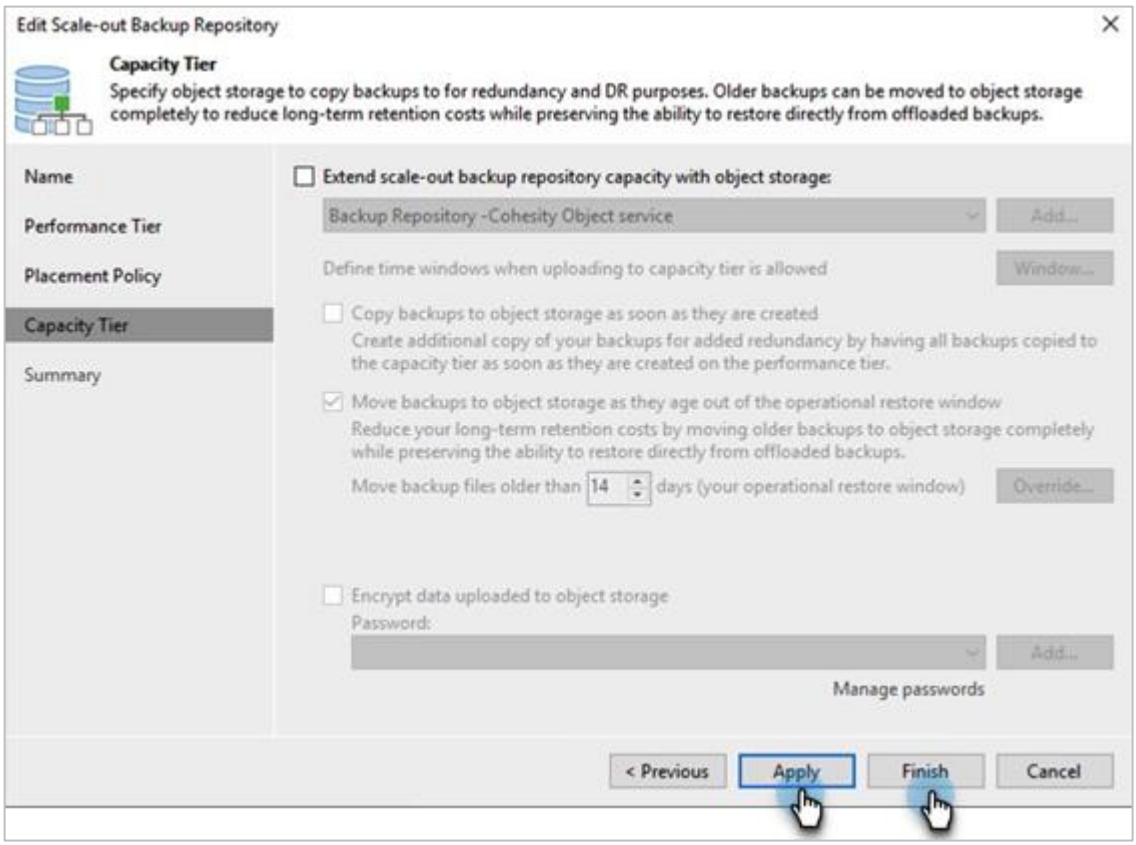
5. Click **Advanced** and select **Use per-Machine backup Files**. Click **OK**.



6. Under **Placement Policy**, select **Performance** and click **Next**.



7. Click **Apply** and then **Finish** to complete the NFS SoBR creation.

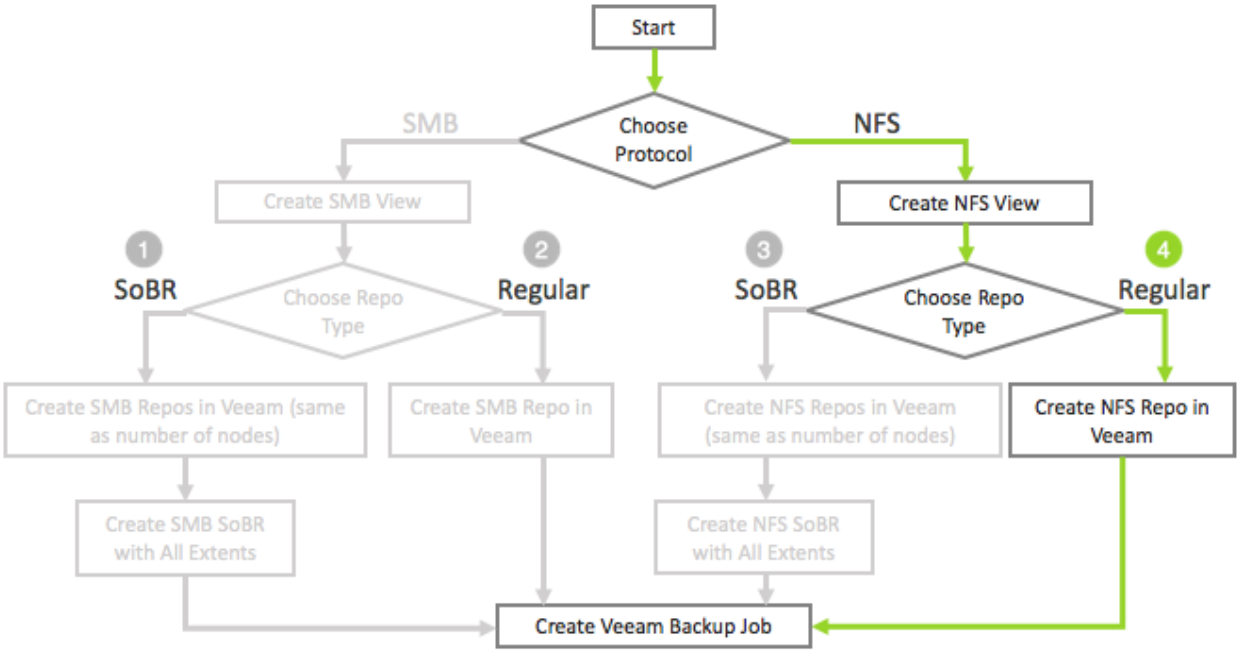


You have successfully created an NFS SoBR. To map this repository in your Veeam backup job, see Configure Veeam Backup Jobs to Use Cohesity Storage below.

Create an NFS Regular Repository on VBR Using an NFS Mount Point

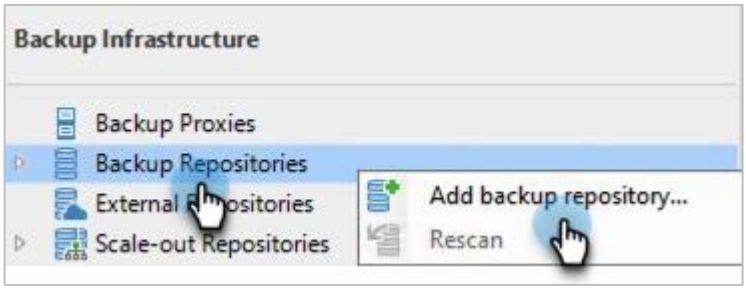
In addition to SoBRs, you can also create a regular repository on VBR using the Cohesity NFS View. In fact, to create an SoBR, you need to start by creating several regular Veeam repositories according to the procedure below. Note, however, that SoBRs deliver much better performance, so we strongly recommend using an SoBR over a single regular repository.

Figure 13: Create NFS Regular Repository on VBR

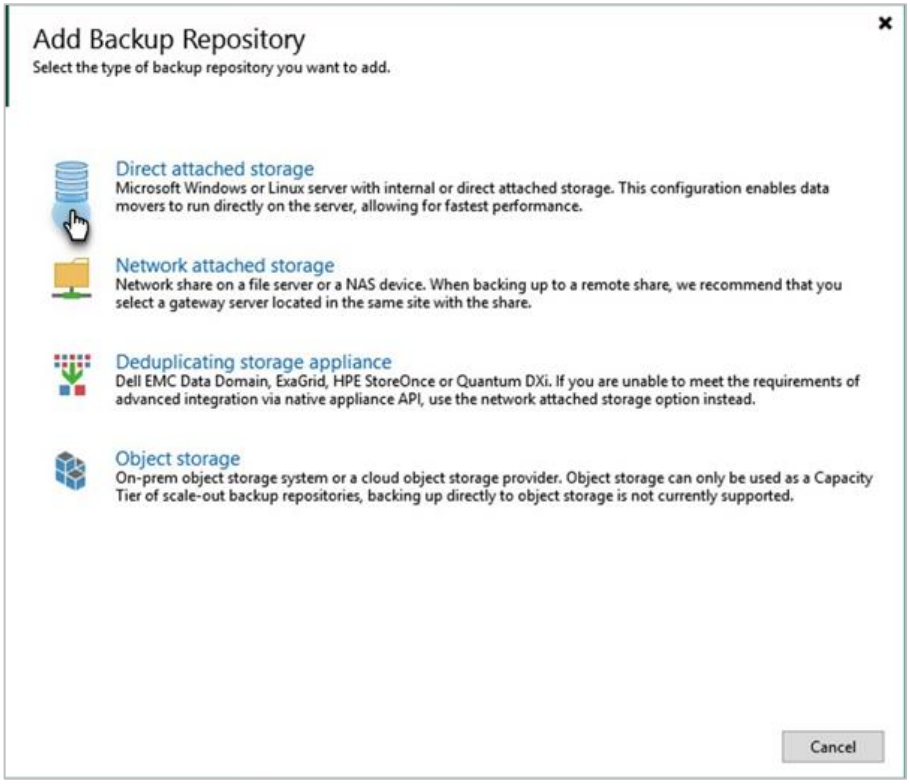


To use a Cohesity NFS mount point as a single, regular VBR repository:

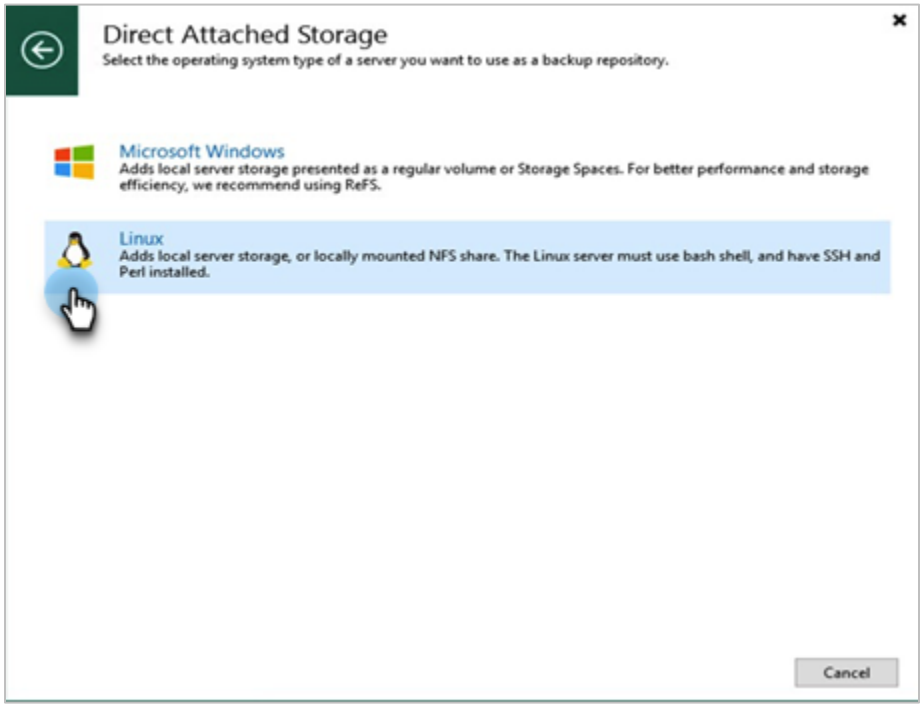
1. From the Veeam management console, right-click **Backup Repositories** and select **Add backup repository.**



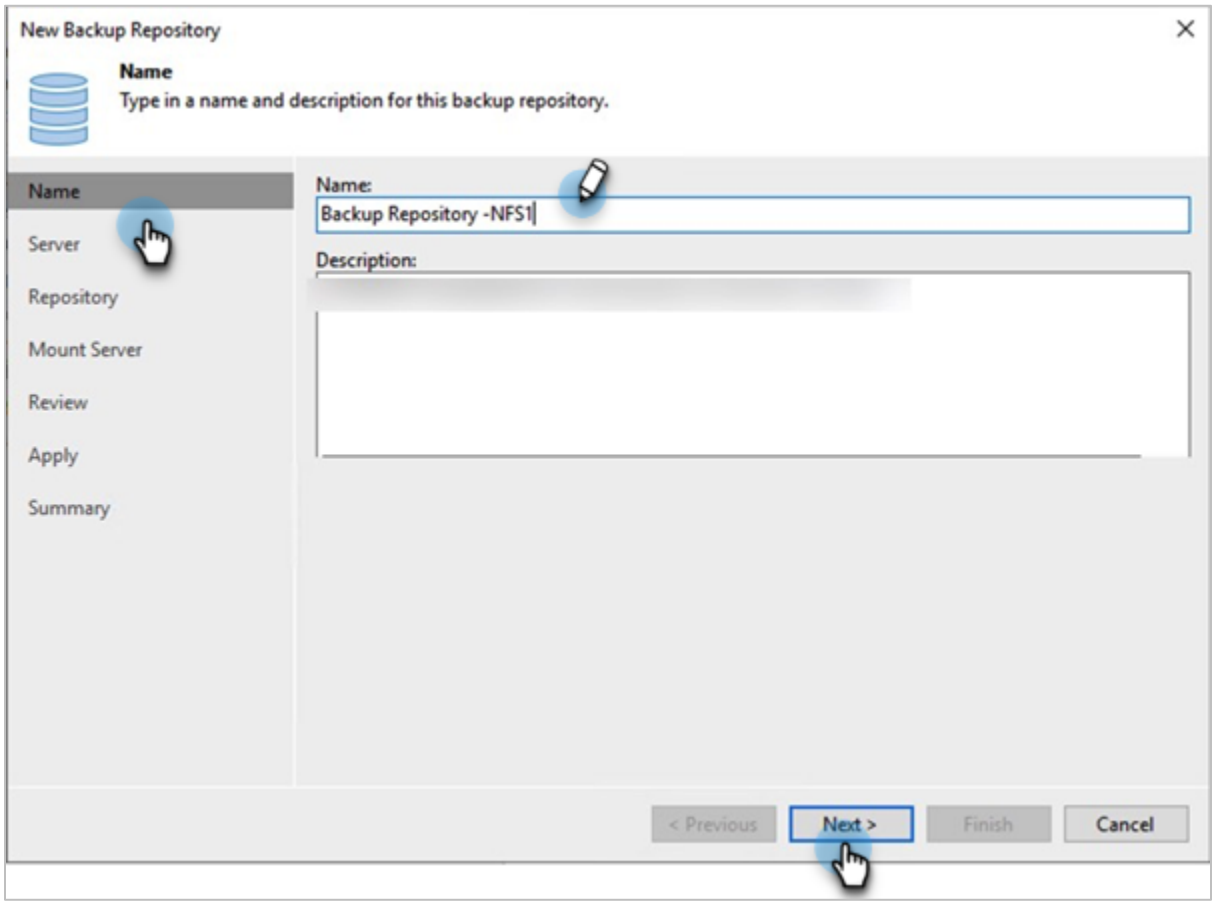
2. In the window that opens, select **Direct attached storage**.



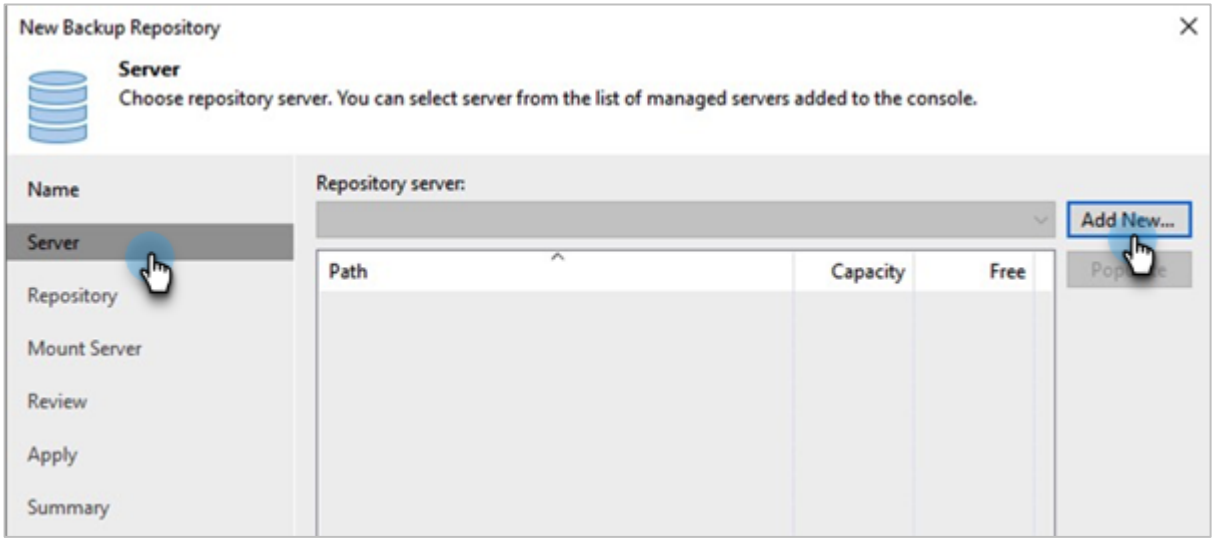
3. Select **Linux** as the operating system.



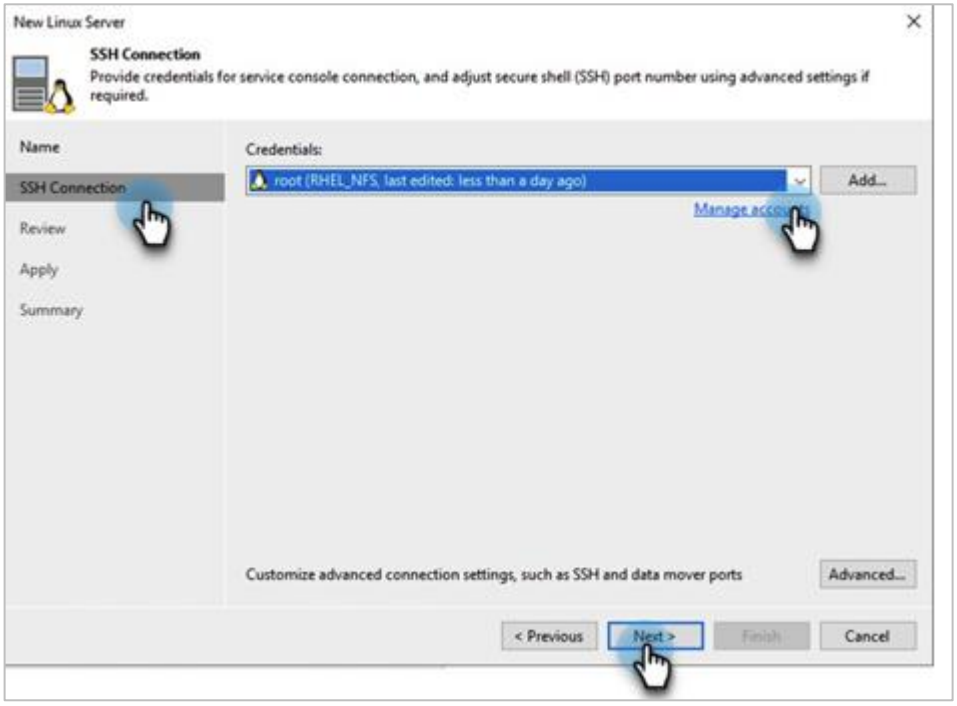
4. Name the repository and click **Next**.



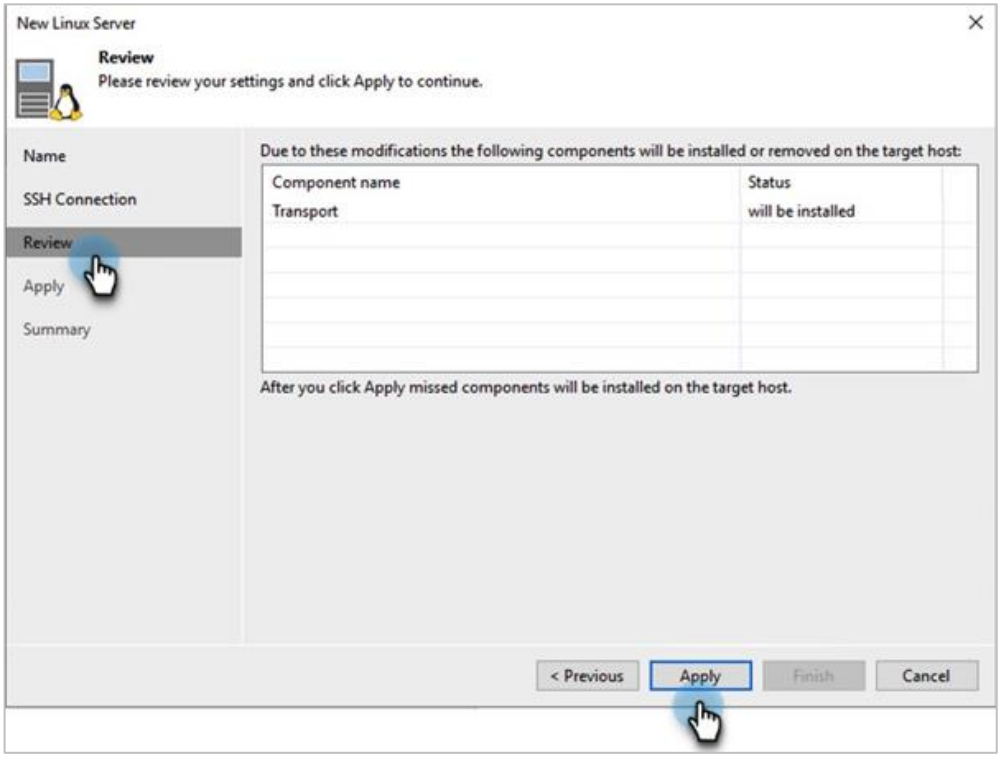
5. Under **Server**, click **Add New** to add the new Linux host.



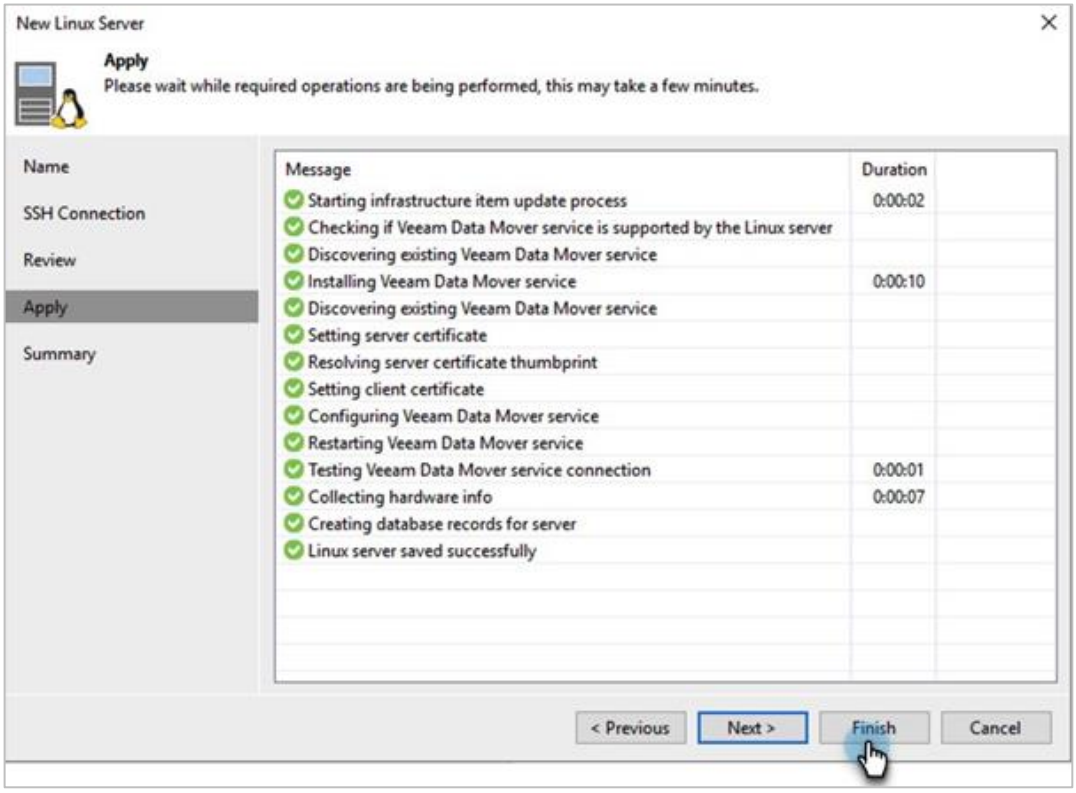
6. Authenticate the Linux Server via root password or SSH key and click **Next.**



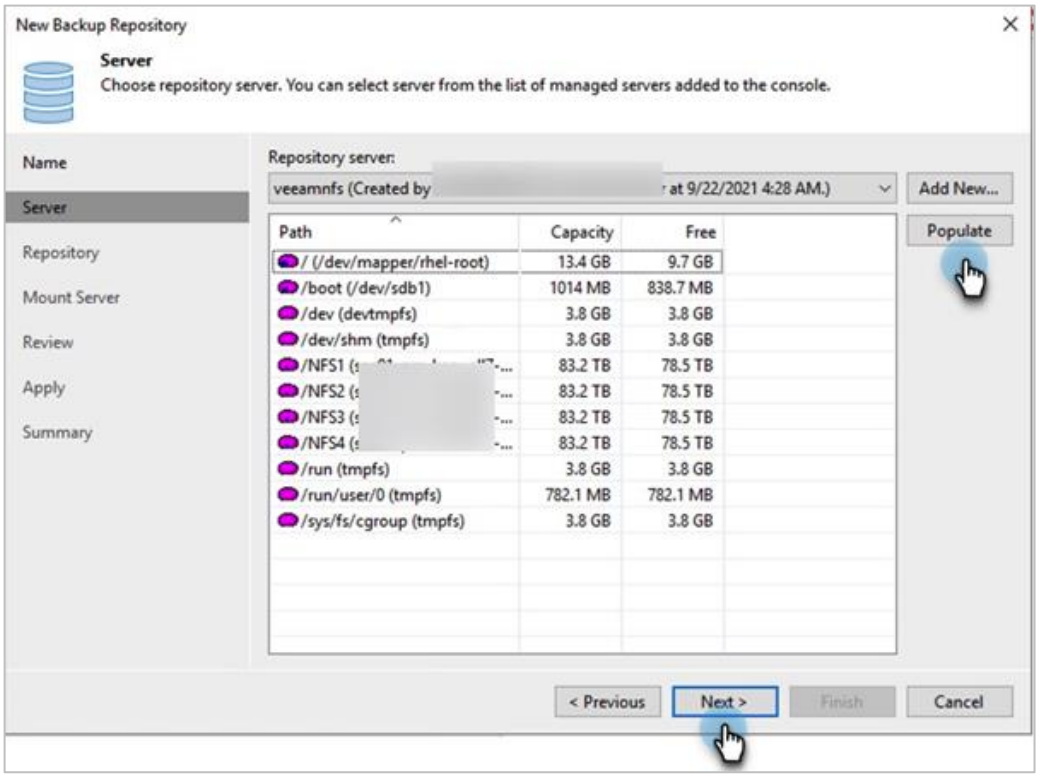
7. Review the component and click **Apply**.



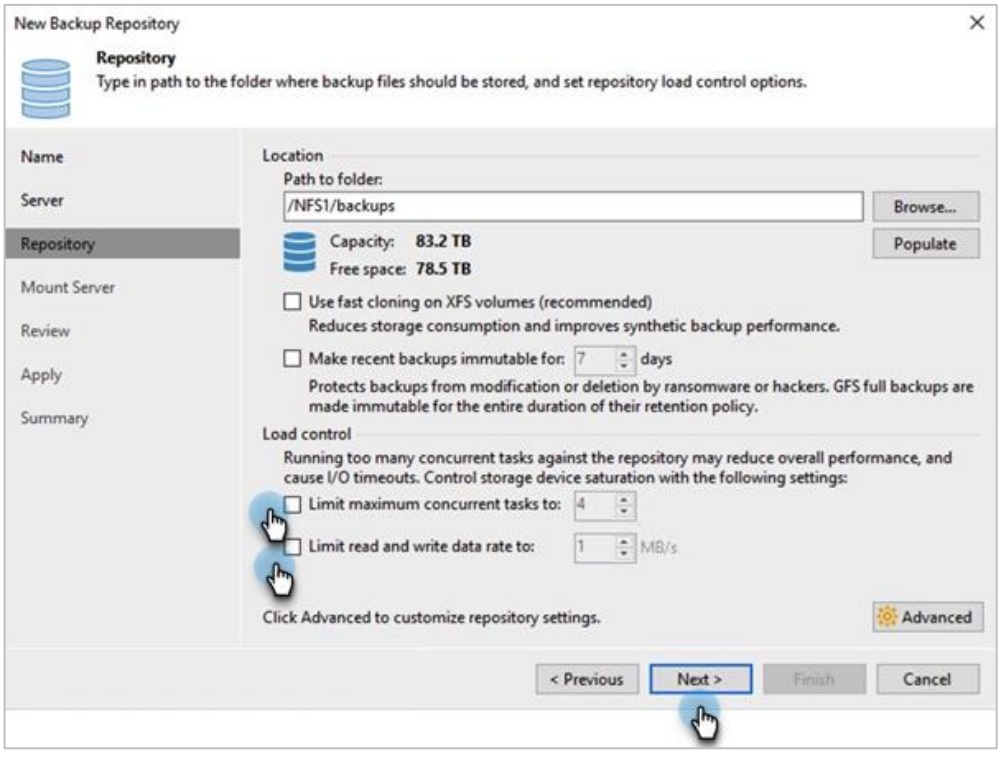
8. Review the Summary and click **Finish**.



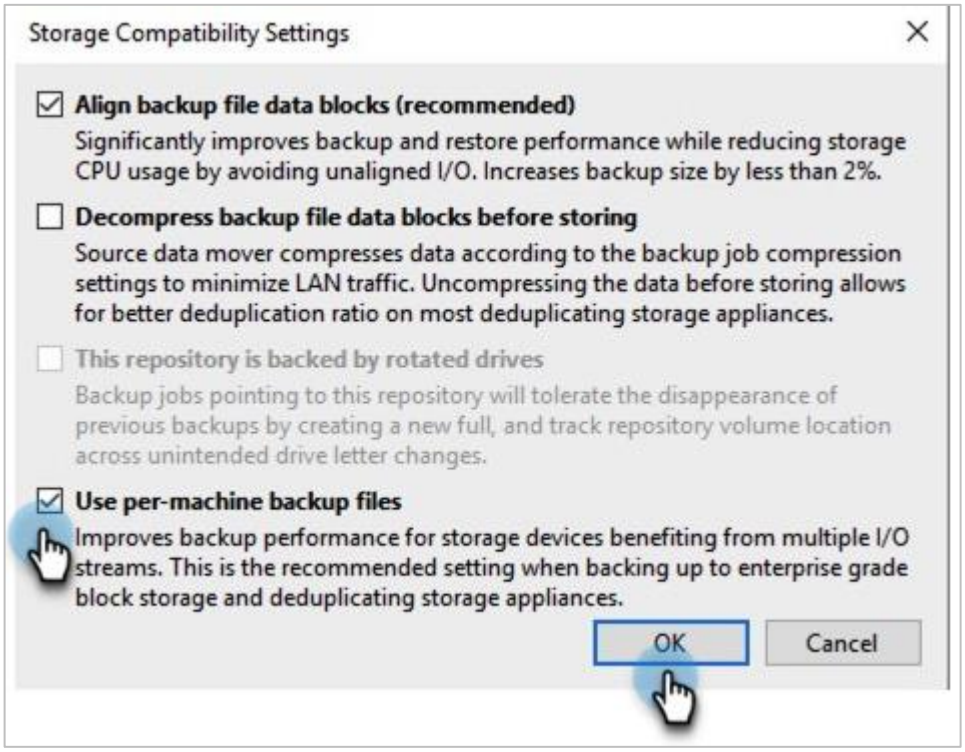
9. Click **Populate** to list all the directories and select the NFS mount point where you mounted the Cohesity NFS export and click **Next**.



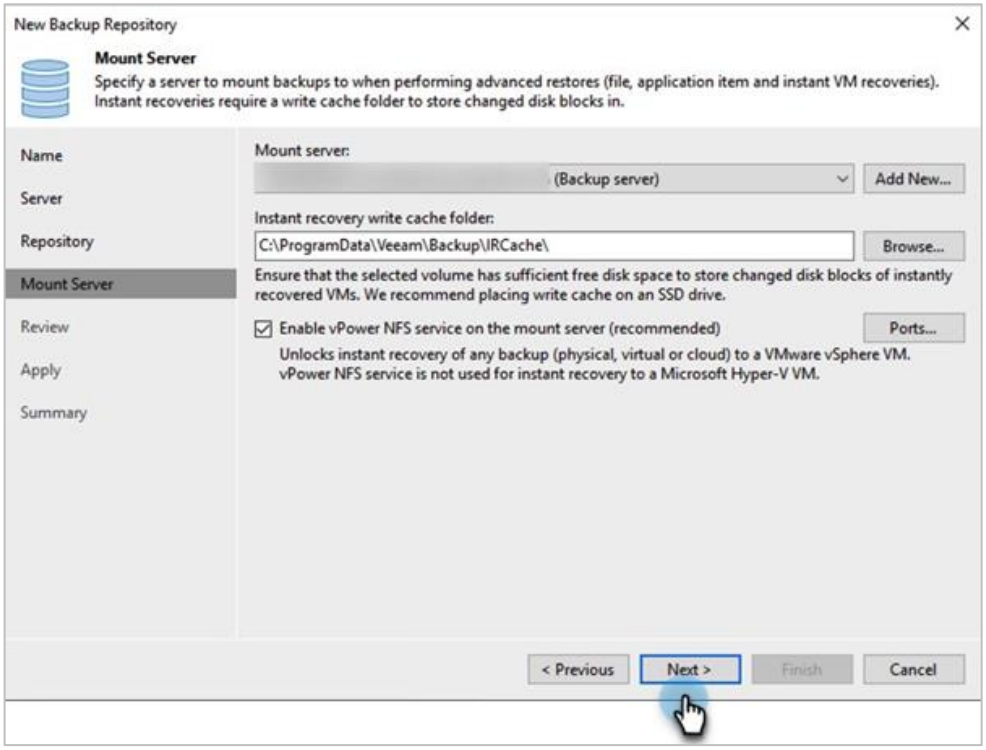
10. Uncheck **Limit maximum concurrent tasks to** and **Limit read and write data rates to**.



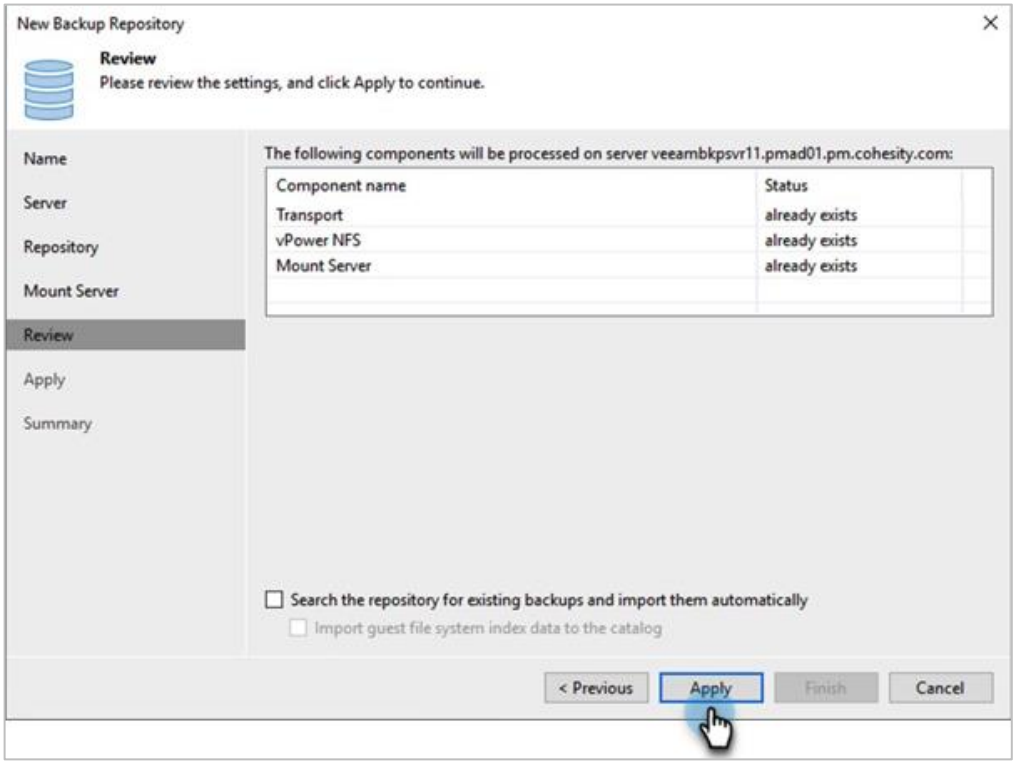
11. Click **Advanced** to open the **Storage Compatibility Settings**. In that window, verify that only the **Use per-machine backup files** option is selected. This enables more concurrent streams to the Cohesity cluster, increasing the overall throughput. Finally, click **OK** to continue.



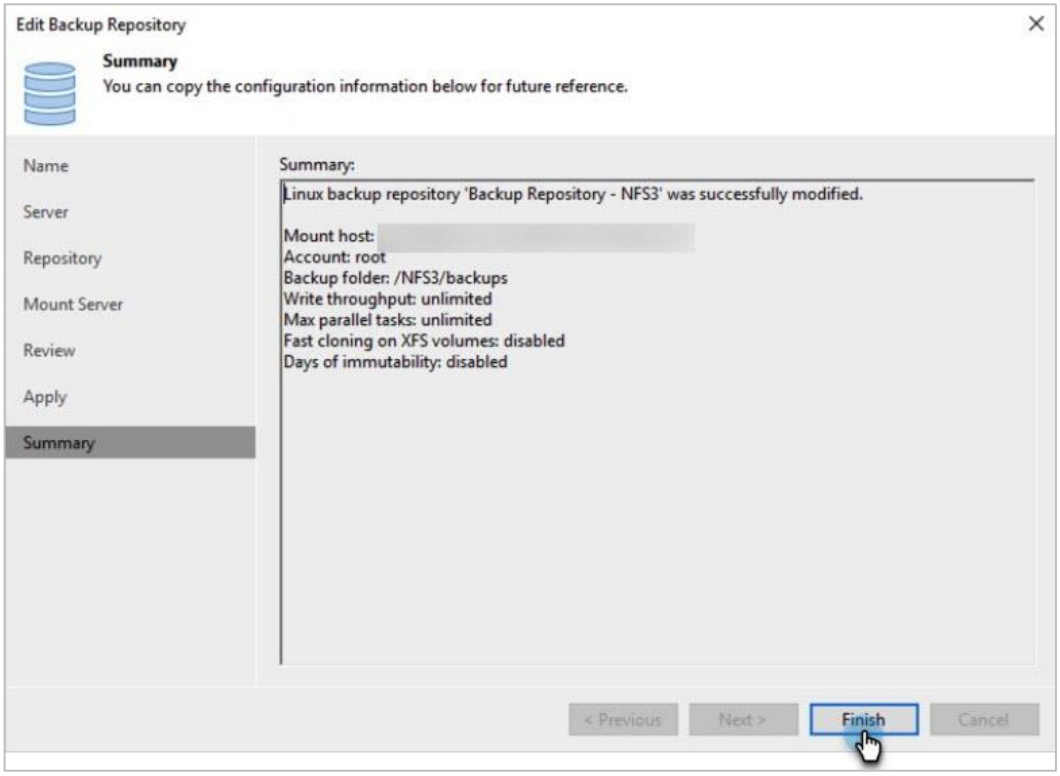
12. Click **Next** to continue.



13. Review the repository settings and click **Apply** to complete the NFS regular repository creation.



14. Click **Finish** to complete NFS regular repository creation.



15. Repeat the same step for each NFS View and create its respective NFS repository.

NOTE: If you plan to create multiple backup repositories, make sure you follow the following Pattern. Refer Point 1 of Create an NFS Scale-out Backup Repository on Your Veeam Server.

VIP1:/NFS1/Dir1
VIP2:/NFS1/Dir2
VIP3:/NFS1/Dir3
VIP4:/NFS1/Dir4

You have successfully created a regular VBR repository using an NFS export from Cohesity. To map this repository in your Veeam backup job, see Configure Veeam Backup Jobs to Use Cohesity Storage below.

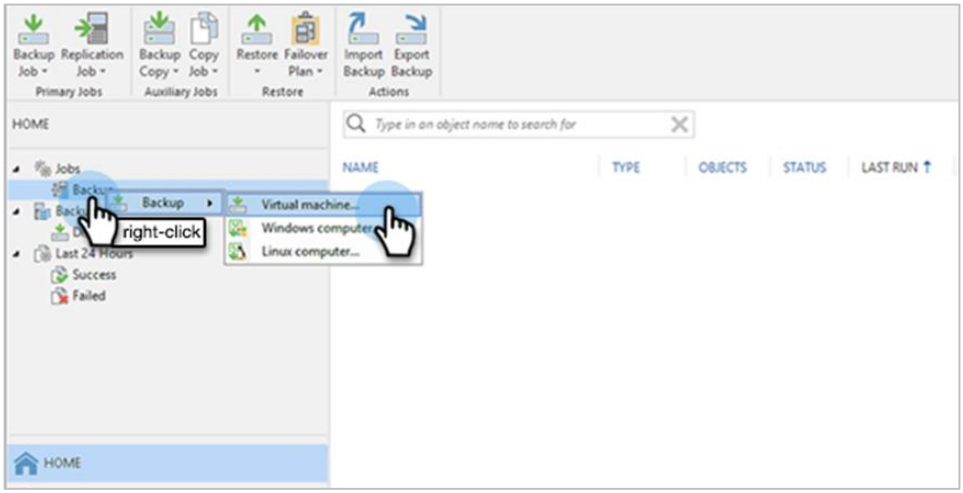
Configure Veeam Backup Jobs to Use Cohesity Storage

Now that you have created the Cohesity View and the VBR repository (SoBR or regular) that connects to the Cohesity View, you're ready to use that repository in a Veeam backup job. Configuring a backup job on Veeam involves the following tasks:

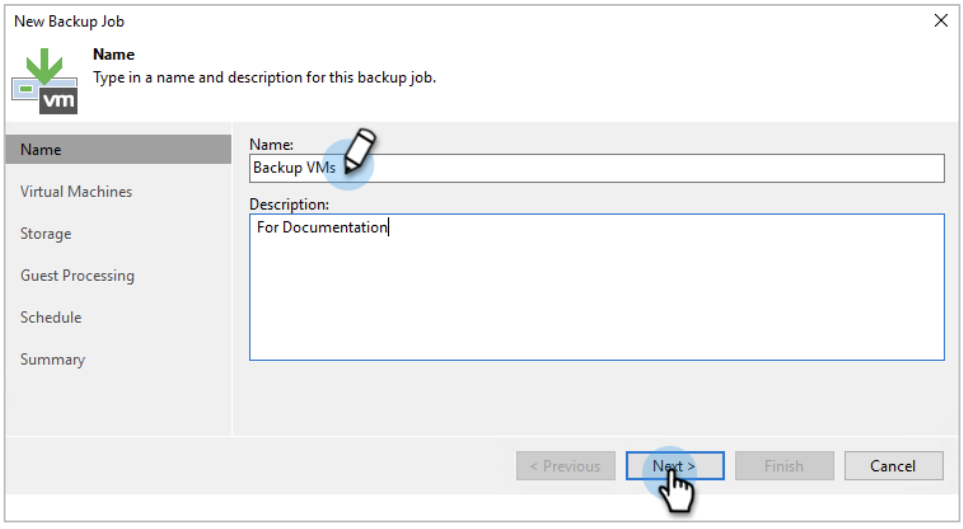
- Create a backup job and select the workloads.
- Select the backup repository.
- Change options in Advanced Settings.

To create and configure a Veeam backup job:

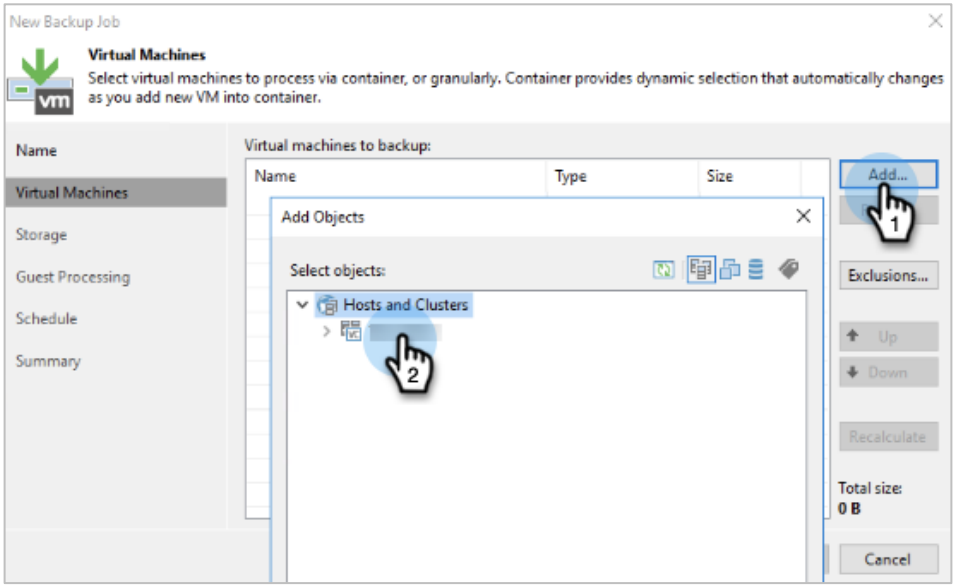
1. From the HOME section of the Veeam management console, right-click **Backup** and select **Virtual machine**.



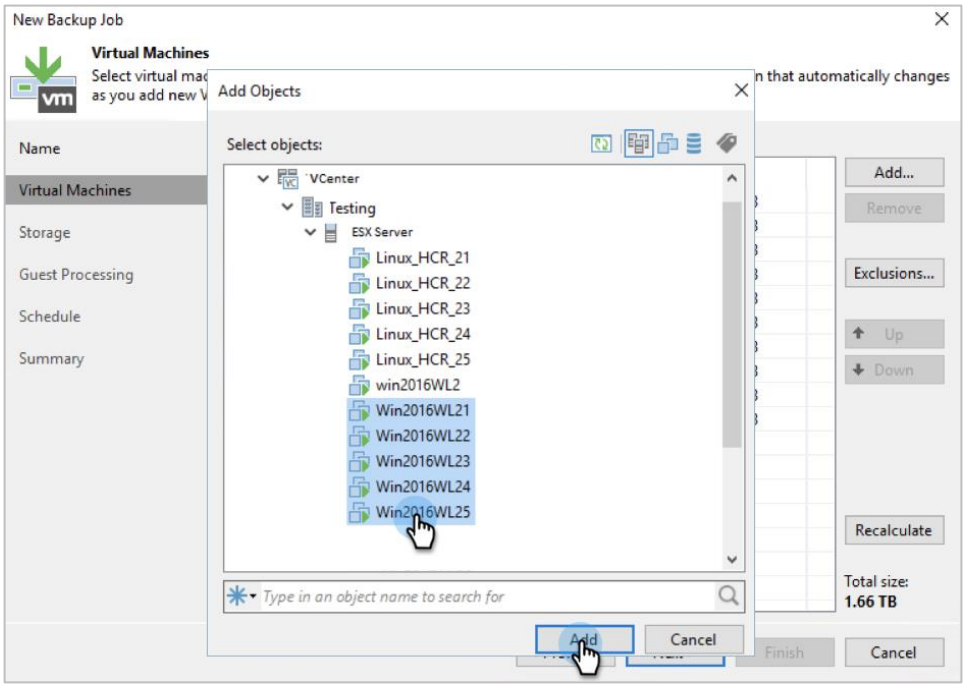
2. Name the new backup job and click **Next**.



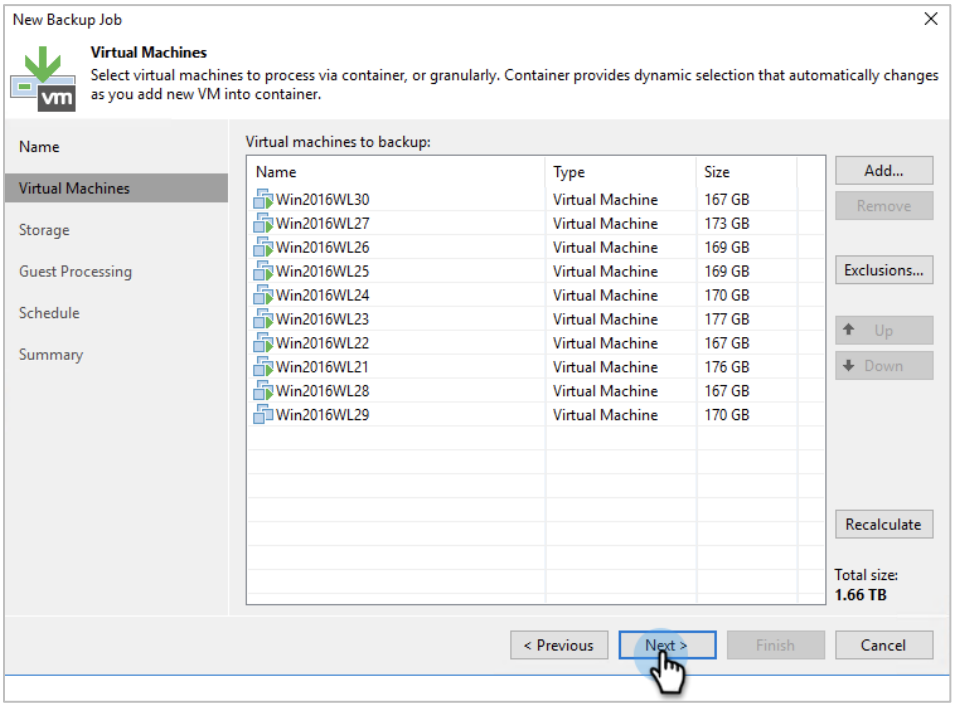
3. Click **Add** and select the ESXi Server that hosts the VMs you need to back up.



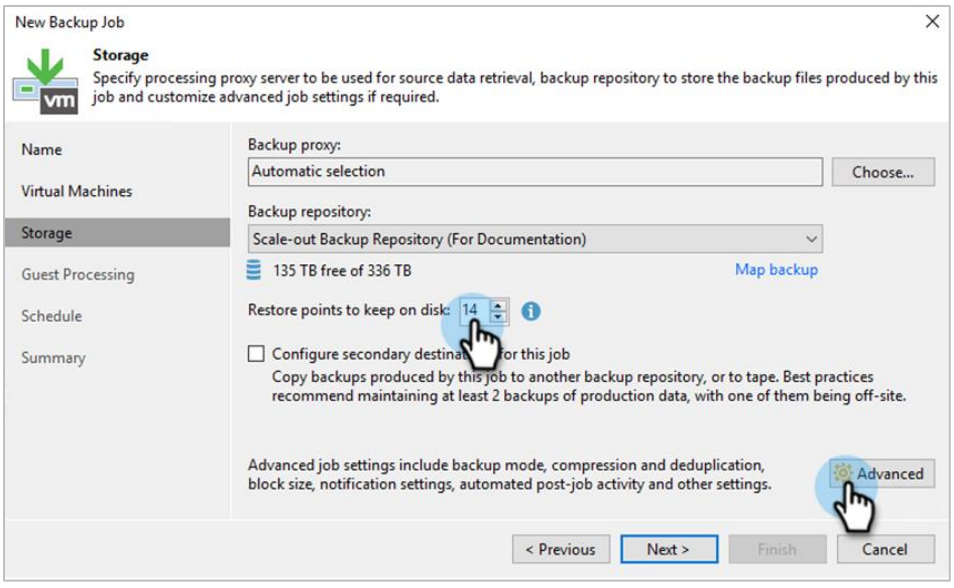
4. Select the VMs you want to back up and click **Add**.



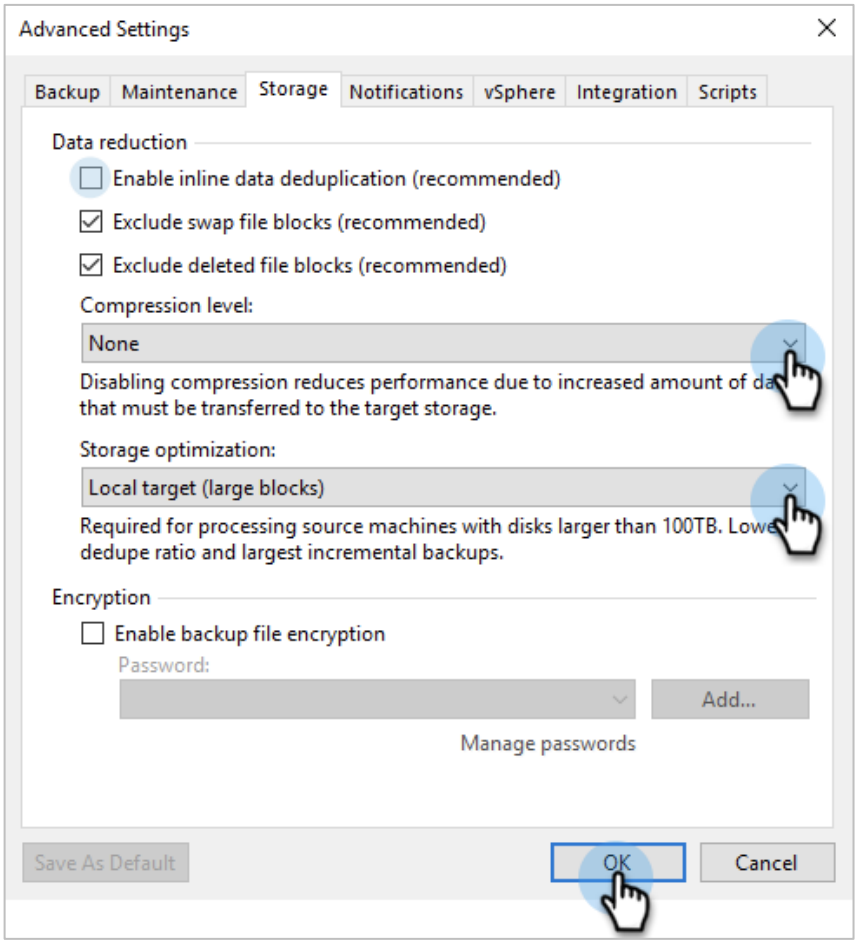
5. Review and verify the virtual machines you want to back up and click **Next**.



6. Under **Storage**, specify the number of **Restore points to keep on disk** and click **Advanced**.



7. In the **Advanced Settings** dialog, uncheck **Enable inline data deduplication**, as Cohesity will perform the inline deduplication and inline compression from the storage side. Ensure that the **Compression level** is set to **None**, and that **Storage optimization** is set to **Local Target (large blocks),** to achieve the best performance from Cohesity. Click **OK**.

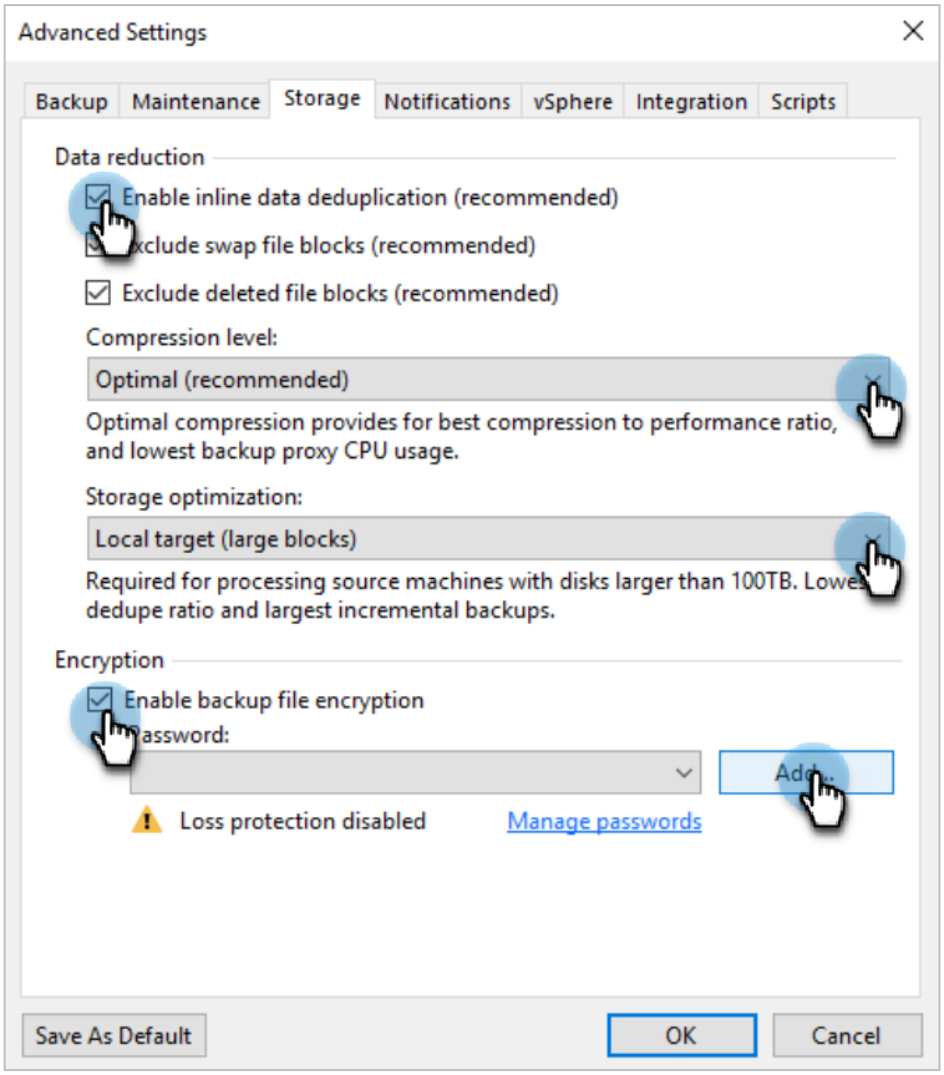


If you want to enable encryption on Veeam, use the following best practice.

Table 4: Recommended Configuration for Encryption

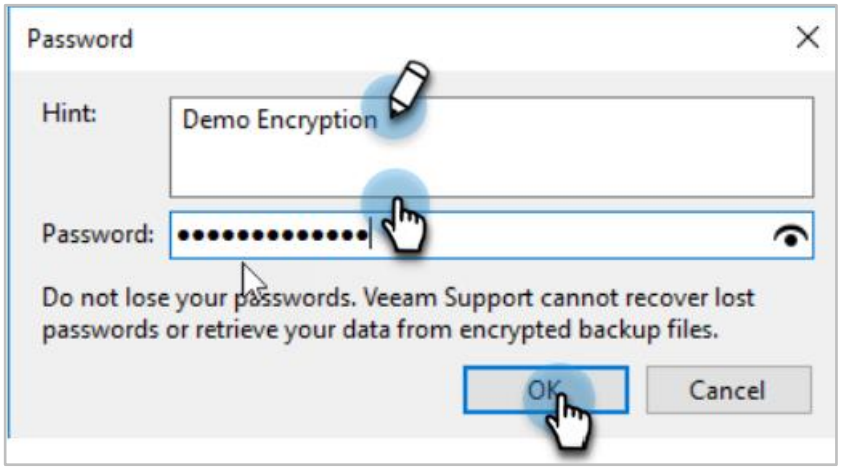
VEEAM ENCRYPTION	VEEAM		COHESITY	
	DEDUP	COMPRESSION	DEDUP	COMPRESSION
ON	ON	Optimal	ON	
OFF	OFF	None		

8. In the **Advanced Settings** window, check **Enable inline data deduplication**, as Veeam and Cohesity will perform the inline deduplication and inline compression at both sides. Ensure that the **Compression level** is set to **Optimal**, and that **Storage optimization** is set to **Local Target (large blocks),** check **Enable backup file encryption**, and click **Add** to set password.

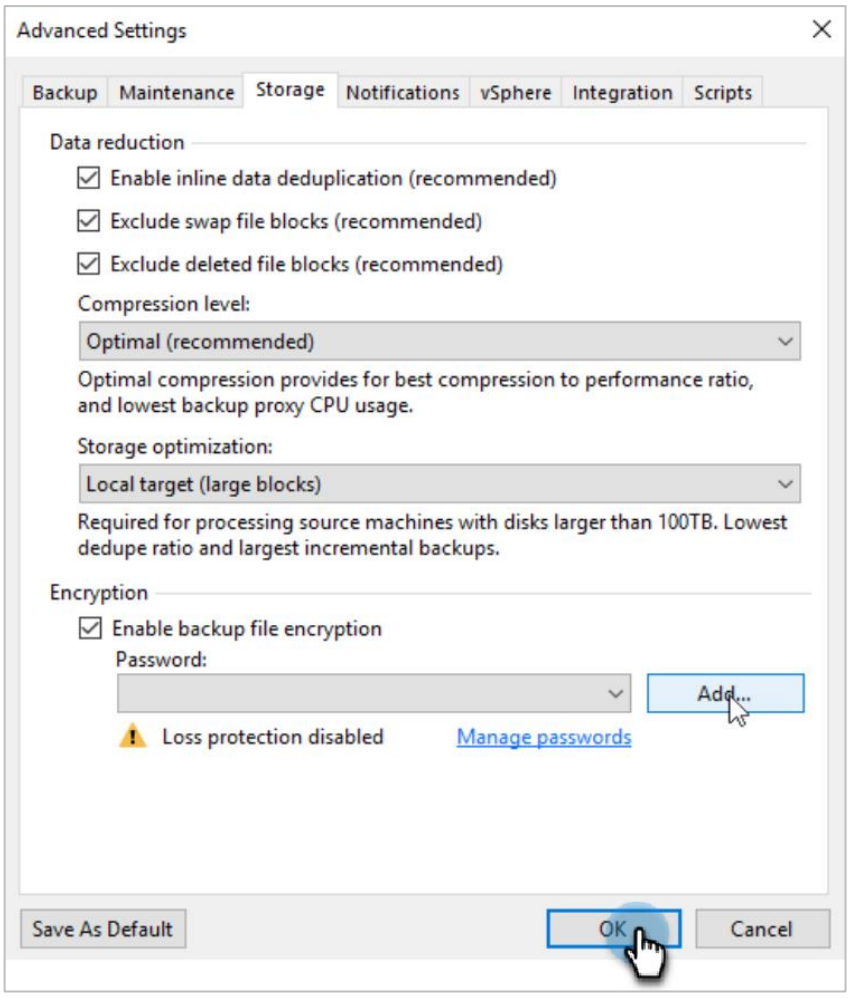


9. Set the hint and password for encryption and click **OK**.

   Preserve the password carefully.



10. Once the password is set for encryption, click **OK** to finish scheduling the backup time and backup job creation using the wizard.



Appendix A: Choose Optimal QoS Policy for Your VBR Repositories

Each Cohesity View is assigned a Quality of Service (QoS) policy that determines the priority of I/O (when contention occurs) and to which storage media it is written. There are two basic QoS principles, TestAndDev and Backup Target, each of which has variants by priority and storage media type.

Table 5: QoS Policies and I/O Workload Type

QOS POLICY	OPTIMIZED FOR I/O WORKLOAD TYPE	PRIORITY	STORAGE MEDIA
TestAndDev	Random reads & writes, for NFS, SMB, and Cohesity Views.	High	SSD
		Low	
Backup Target	Sequential reads & write, for backups using Cohesity.	SSD	HDD
		High	

We recommend the following QoS policies for each VBR repository type:

- For SMB and NFS SoBRs, use *Backup Target SSD*.
- For an NFS regular repository, use *TestAndDev High*.

See our performance test results below, in QoS Performance Comparison for SMB & NFS VBR Repositories.

QoS Performance Comparison for SMB & NFS VBR Repositories

For our performance comparison, we backed up the same amount of data through SMB and NFS on Cohesity Views, each with different QoS policies assigned, such as *Backup Target High*, *TestAndDev High*, and *Backup Target SSD*, using both a single stream and multiple streams, and captured the completion time results. Figure 14 below illustrates the completion time comparison between QoS policies.

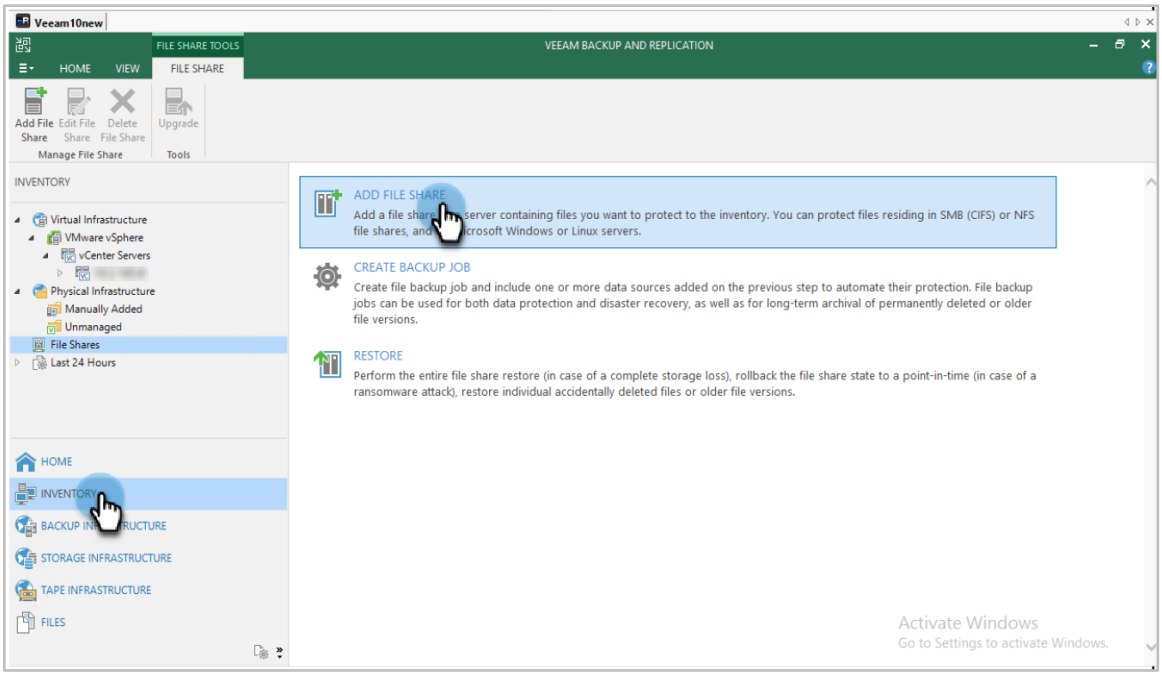
Our results found that *Backup Target SSD* offers the best performance when using the Cohesity View as an SoBR. If you choose to use a regular NFS repository, the best QoS policy is *TestAndDev High*.

Figure 14: QoS Policy Comparison Chart

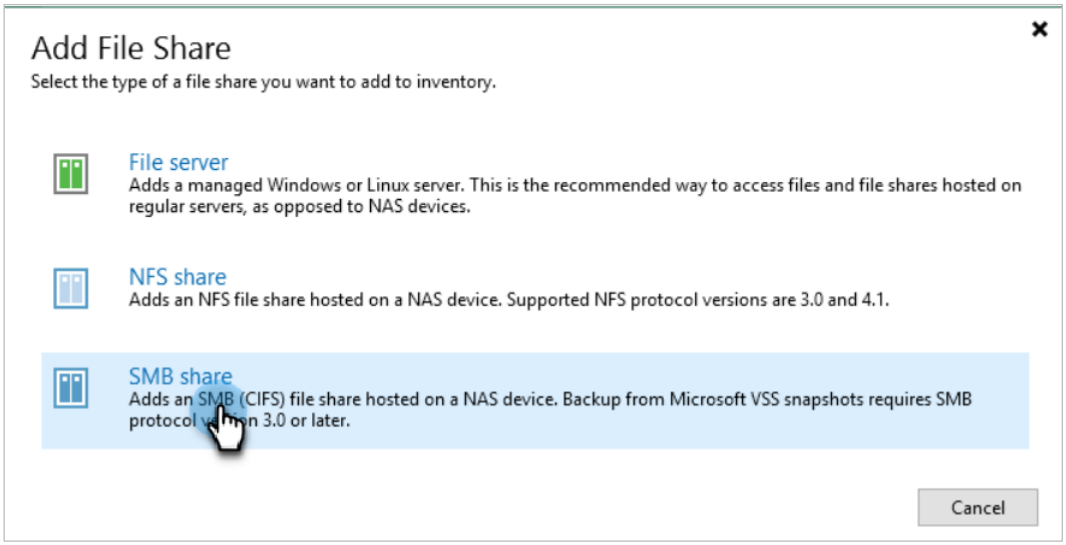
Appendix B: Manage SMB Shares in Veeam

Veeam's inventory feature allows adding SMB shares for backup, restore, and data management. You can leverage this feature to clean up failed backup files manually on the mapped repository.

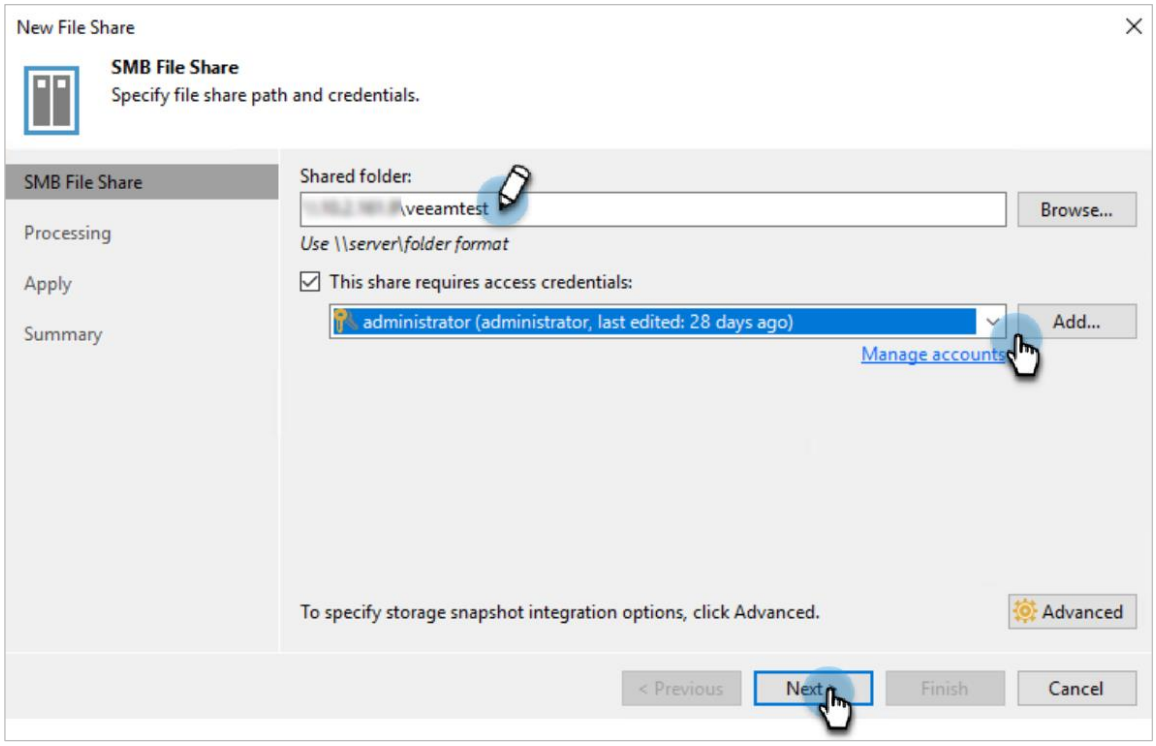
1. In the Veeam console, select **INVENTORY** and choose **ADD FILE SHARE.**



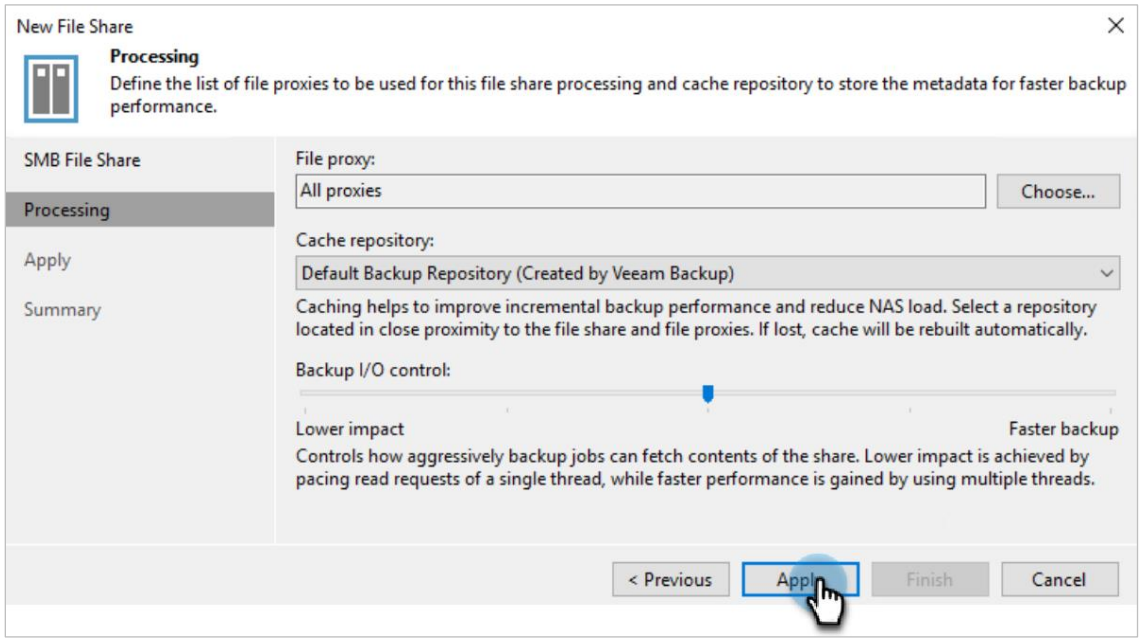
2. In the **Add File Share** page, Select **SMB share.**



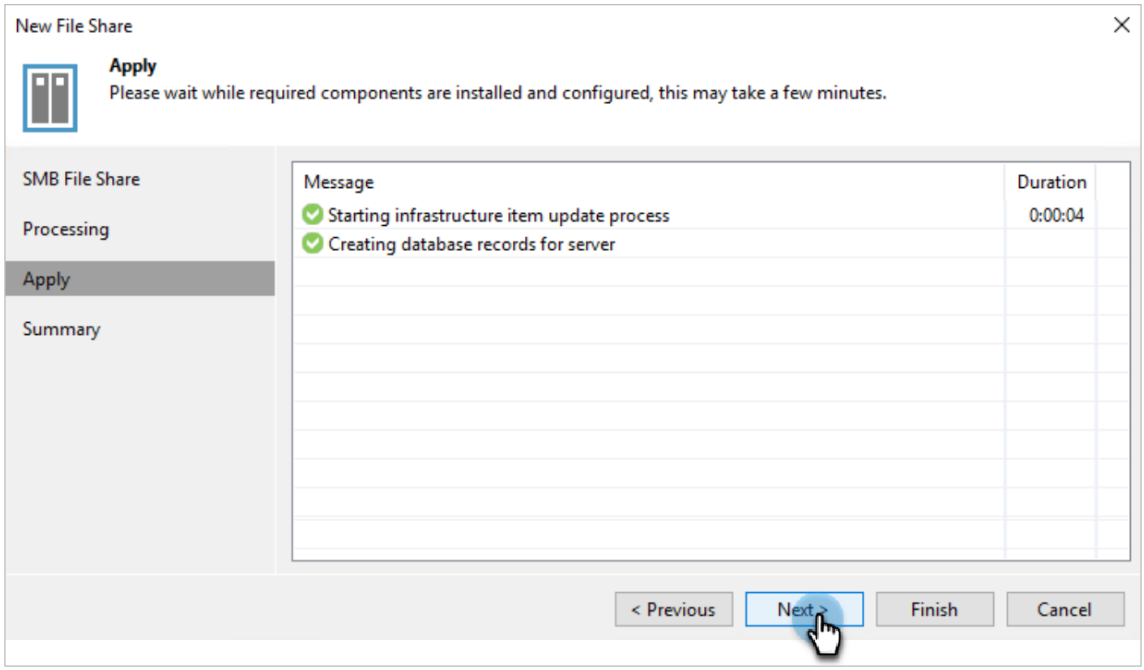
3. Add the path to the SMB share and select the credential. Click **Next**.



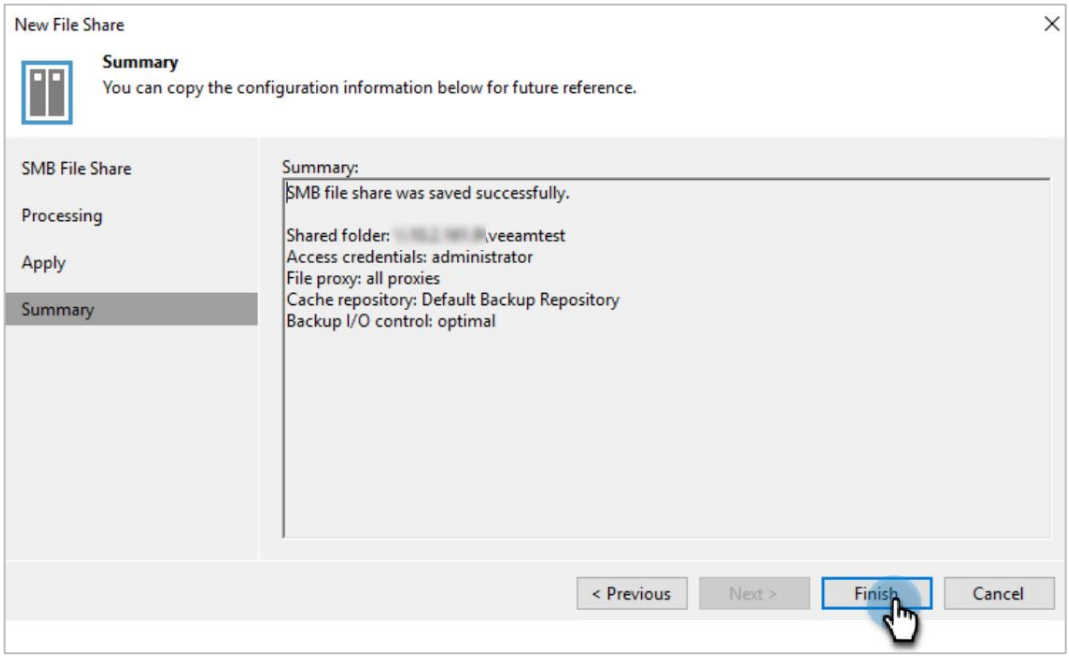
4. Click **Apply** to complete the configuration.



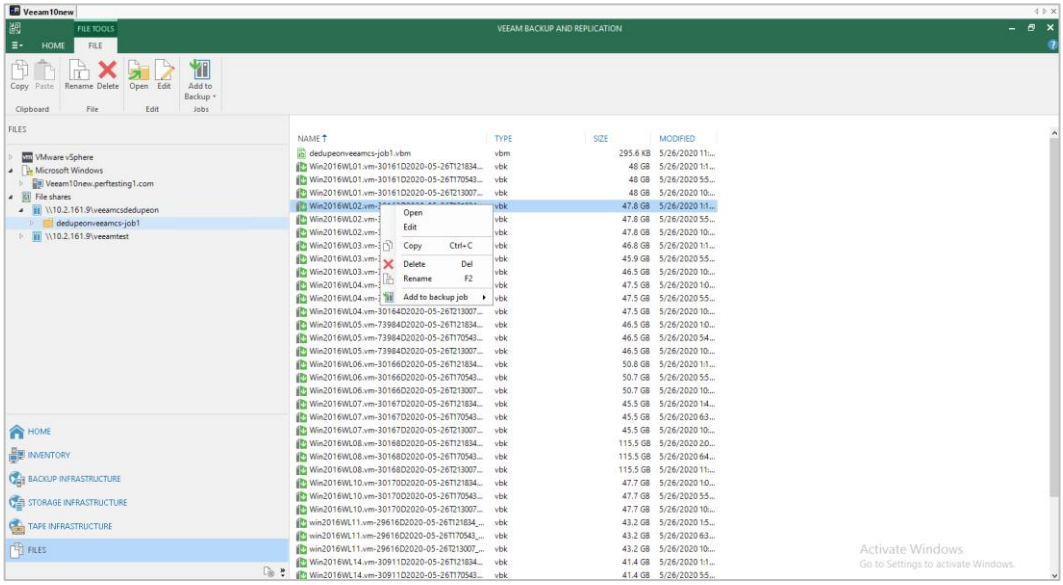
5. Wait for the components to install. Once it is completed, click **Next.**



6. Click **Finish** to complete.



7. In the Veeam console, select the SMB shares in which you want to manage the files**.**



Doing this enables you to view and manage all the SMB shares in a single Veeam console and eliminate the need to go to Windows Explorer to perform the same tasks.

Appendix C: Protect Your Veeam Repository from Ransomware Attacks

Protection from ransomware attacks is a major concern when it comes to enterprise data retention and security. We recommend the following best practices to keep your Veeam backup repositories safe from ransomware and keep your data integrity intact.

- Keep the original backup data in an immutable state, and avoid mounting the gold copy of the data by an external system.
- Make sure to enable multi-factor authentication (MFA) and write once read many (WORM) capabilities for the snapshots.
- To detect attacks in real-time, continuously monitor the data and the solution, and analyze files and audit logs to detect abnormal or even smaller change rates. Note that relying exclusively on backup data-ingest change rates to detect such behaviors is insufficient.

Your Feedback

Was this document helpful? Send us your feedback!

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1.3	April 2021	Cohesity 6.6.0 version update
1.4	Oct 2021	Content update

ABOUT COHESITY

Cohesity radically simplifies data management. We make it easy to protect, manage, and derive value from data -- across the data center, edge, and cloud. We offer a full suite of services consolidated on one multicloud data platform: backup and recovery, disaster recovery, file and object services, dev/test, and data compliance, security, and analytics -- reducing complexity and eliminating mass data fragmentation. Cohesity can be delivered as a service, self-managed, or provided by a Cohesity-powered partner.

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