

Version 2.1

July 2024

Use Cohesity as 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.

Table of Contents

Introduction to Using Cohesity with Veeam.....	5
Benefits of Using Cohesity as a Veeam Scale-out Backup Repository	6
Long-term Retention with CloudArchive.....	8
Maintain Business Continuity with Disaster Recovery	8
Replicate to the Cloud for Cost-Effective Disaster Recovery & Business Continuity..	9
Use Policy-based Cloud Tier for Reduced TCO	10
Cohesity for VBR Repositories Workflow Overview	11
Optimize VBR Settings for Cohesity.....	13
Increase Concurrent Streams on the Veeam Proxy Server	13
Increase the Number of Streams in the Veeam Registry	14
Set the Transport Mode of the Veeam Proxy Server to 'Network'	14
Summary: Veeam Performance Settings for Cohesity	15
Create Cohesity SMB View for VBR Repositories	16
Optimize SMB View Performance	20
Create SMB Repositories on VBR	21
Create an SMB Scale-out Backup Repository on Your Veeam Server	21
Create an SMB Regular Repository on VBR using an SMB Share	27
Create Cohesity NFS View for VBR Repositories	34
Configure a Repository Server on Veeam to Access Cohesity NFS Export	37
<i>Troubleshoot PerlSoap</i>	37
Create NFS Repositories on VBR	38
Create an NFS Scale-out Backup Repository on Your Veeam Server.....	38
Create an NFS Regular Repository on VBR Using an NFS Mount Point.....	43
Create Cohesity S3 View for SoBR Repositories.....	52
Create S3 Repositories on VBR.....	55
Create an S3 Scale-out Backup Repository on Veeam	55
S3 Object Storage Regular Repository on Veeam	61

Configure Veeam Backup Jobs to Use Cohesity Storage.....	69
Appendix A: Choose an Optimal QoS Policy for Your VBR Repositories	75
QoS Performance Comparison for SMB & NFS VBR Repositories	75
Appendix B: Manage SMB Shares in Veeam.....	77
Appendix C: Protect Your Veeam Repository from Ransomware Attacks.....	81
Appendix D: Verify SmartFiles S3 View Connectivity	82
Your Feedback	83
About the Authors.....	83
Document Version History	83

Figures

Figure 1: Use Cohesity as a VBR Repository	5
Figure 2: Benefits of Using Cohesity as a VBR Repository	6
Figure 3: Leverage Public Cloud Infrastructure for Long-term Data Retention and Archival	8
Figure 4: Cloud Recover to Original Cluster & CloudRetrieve to New Cluster	9
Figure 5: Replicate Backups to Other Cohesity Clusters for Improved Data Resiliency ..	9
Figure 6: Cohesity supports data tiering with a policy threshold approach	10
Figure 7: Configure Cohesity's Solution for VBR	11
Figure 8: Choose Protocol & VBR Repository Type	12
Figure 9: Create SMB SoBR on VBR	22
Figure 10: Create SMB Regular Repository on VBR	27
Figure 11: Create NFS SoBR on VBR.....	39
Figure 12: Create NFS Regular Repository on VBR.....	44
Figure 13: Create S3 SoBR on VBR	56
Figure 14: Create S3 Regular Repository on VBR for SoBR	61
Figure 15: QoS Policy Comparison Chart	76

Tables

Table 1: Features and Benefits of Cohesity with VBR 7

Table 2: Scale-out Backup Repository or Regular Repository for Veeam 55

Table 3: Recommended configuration for Encryption 73

Table 4: QoS Policies and I/O Workload Type 75

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.

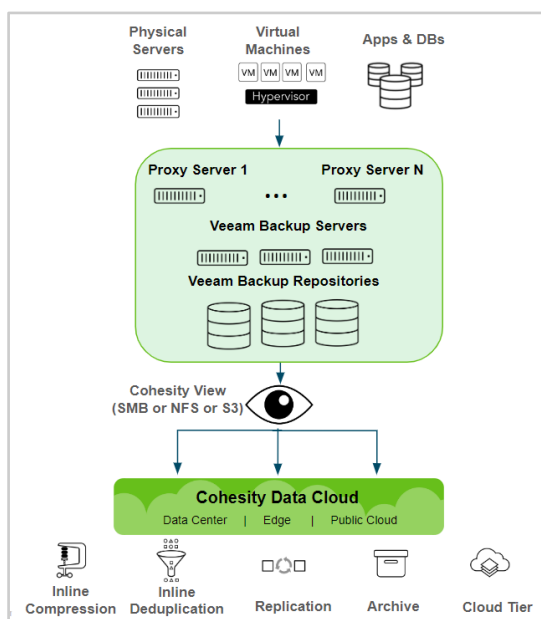
Being storage-agnostic, VBR supports a wide range of repository types that offer various benefits. When Veeam customers use Cohesity as the storage repository for their backups, they benefit immediately from Cohesity's many features:

- **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.

Our solution uses Cohesity SMB, NFS and S3 Views 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 are 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, Cohesity recommends using 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

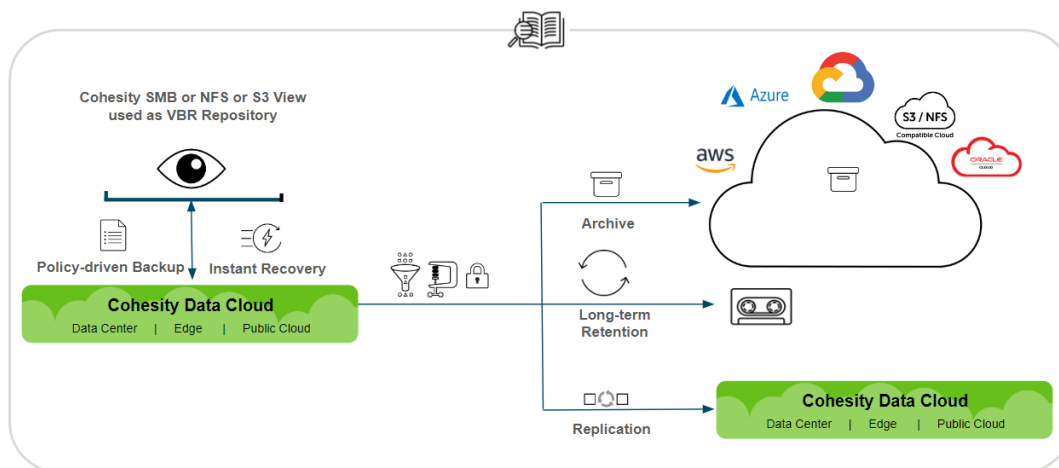


Benefits of Using Cohesity as a Veeam Scale-out Backup Repository

Once you start using Cohesity as an scale-out backup repository (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

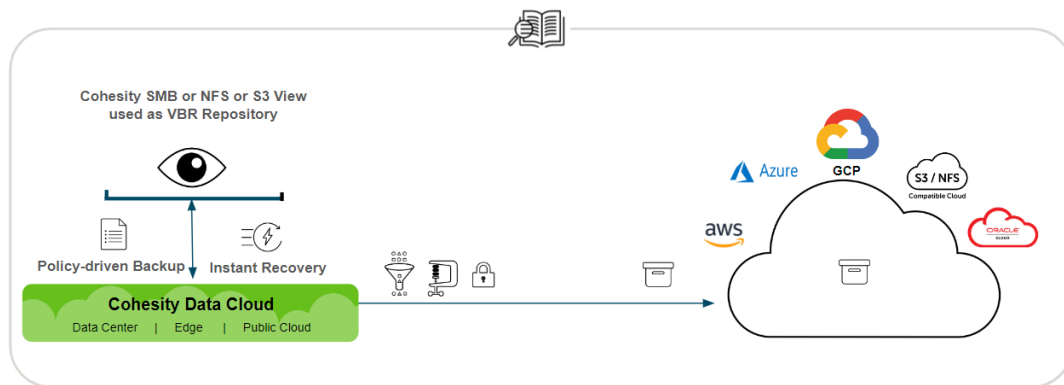
Feature	Benefit
Storage Efficiency	Maximizes storage capacity with Cohesity's advanced data-reduction technologies, global deduplication, and compression.
Web-scale Capacity	Offers a modern web-scale distributed system with limitless scaling of performance and capacity.
Fault Tolerance	Provides continuous 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.

Long-term Retention with CloudArchive

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.

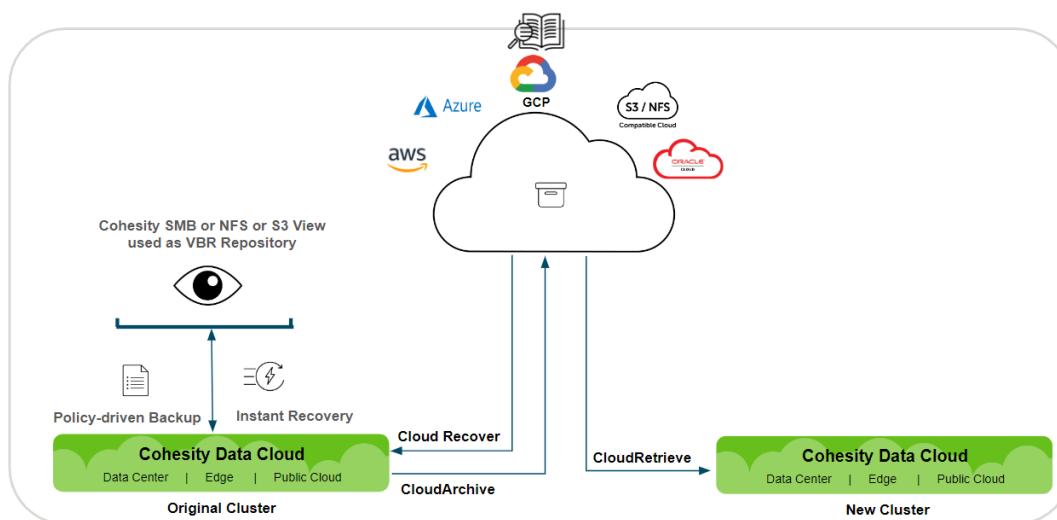
Storage and backup administrators can take advantage of Cohesity CloudArchive to address long-term data retention requirements on Veeam repositories. The archived data is efficiently transferred and stored by sending only deduplicated, compressed, incremental backups, thereby reducing network and storage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



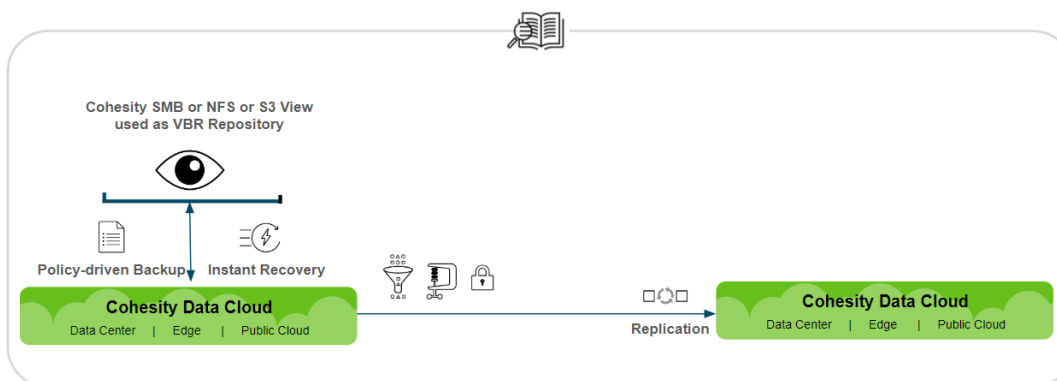
To learn more about CloudArchive, see the CloudArchive guides for [AWS](#), [Azure](#), [GCP](#), [NAS](#), and [S3-Compatible](#) cloud object storage.

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

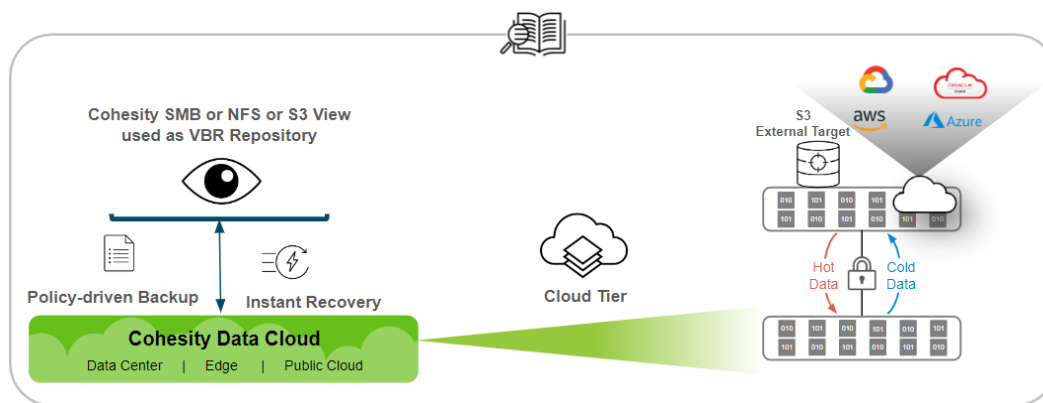


Use Policy-based Cloud Tier for Reduced TCO

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!

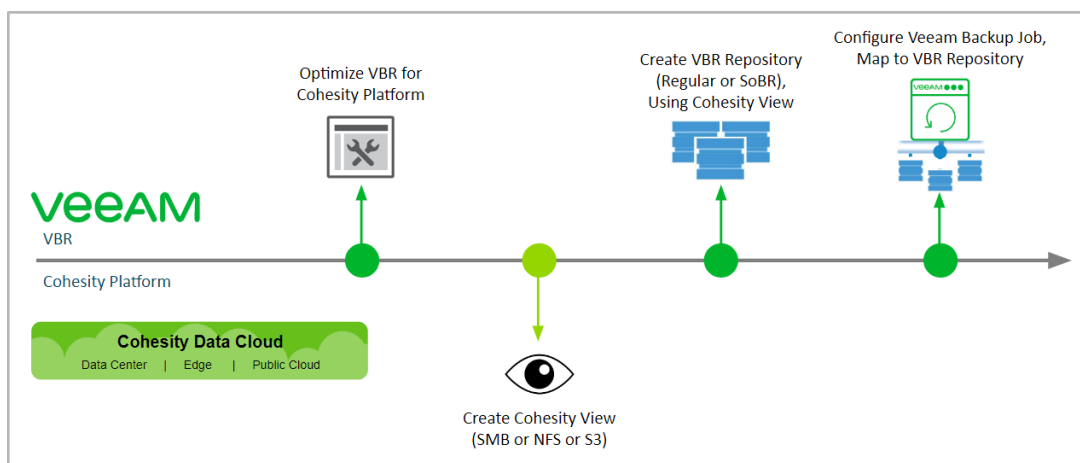
Cohesity for VBR Repositories Workflow Overview

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, NFS or S3.

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

1. [Optimize VBR settings for Cohesity](#).
2. Create a Cohesity [SMB View](#), [NFS View](#) or [S3 View](#).
3. Create a [VBR SMB](#) or [VBR NFS](#) or [VBR S3](#) scale-out or regular repository.
4. Create [SOBR S3](#) Repository.
5. [Configure your Veeam backup jobs](#) to use the repositories that you created.

Figure 7: Configure Cohesity's Solution for VBR



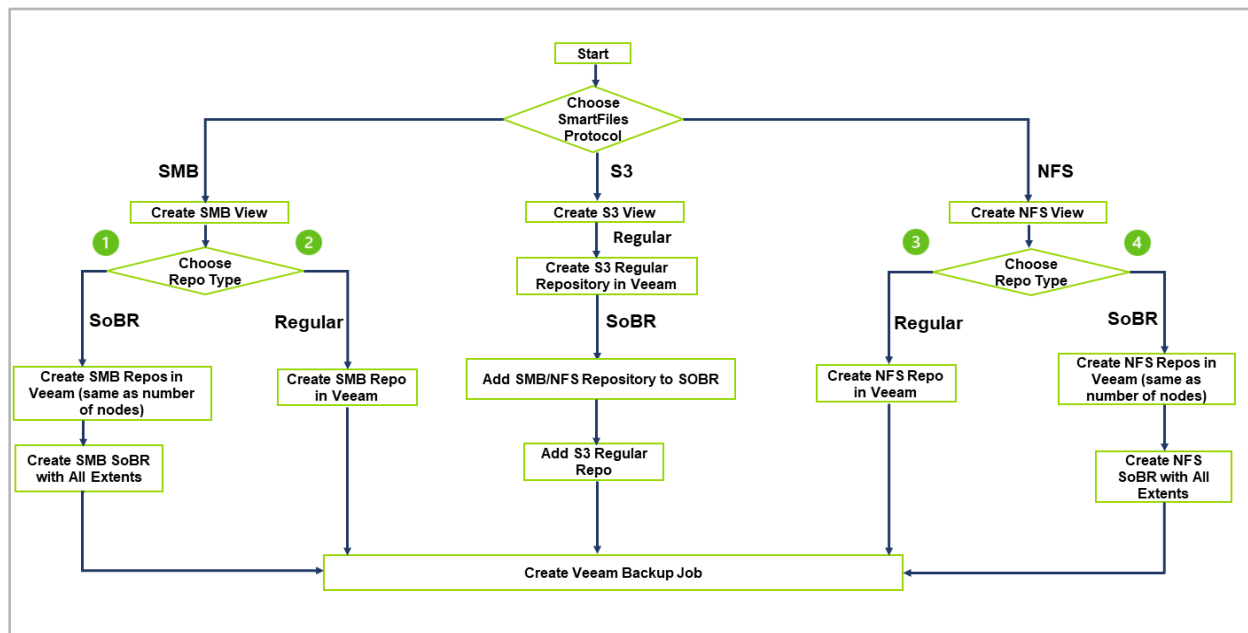
NOTE: For instructions on how to install VBR, see [Installing Veeam Backup & Replication](#).

After you [optimize your VBR settings for Cohesity](#), 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?
- **S3 SOBR:** You can use S3 repository with NFS or SMB VBR 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



- 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](#).
- 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](#).
- S3:** If you decide to use S3, you need to first [Create a Cohesity S3 View](#) and follow up with the SMB or NFS regular repository. You can use S3 Repository as a capacity tier in SOBR with the NFS or SMB repository being a performance tier.
 - [Create a Cohesity SMB View](#) or [Create a Cohesity NFS View](#)
 - [Create an SMB regular repository](#) or [Create an NFS regular repository](#)
 - [Create S3 regular repository](#)
 - [Create S3 SOBR repository](#)

NOTE: If your network gear supports LACP, Cohesity recommends 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 and among the nodes of the cluster. To take advantage of this, you need to configure both the network switches and the Cohesity cluster for LACP.

For instructions, see the [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, Cohesity recommends 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](#)

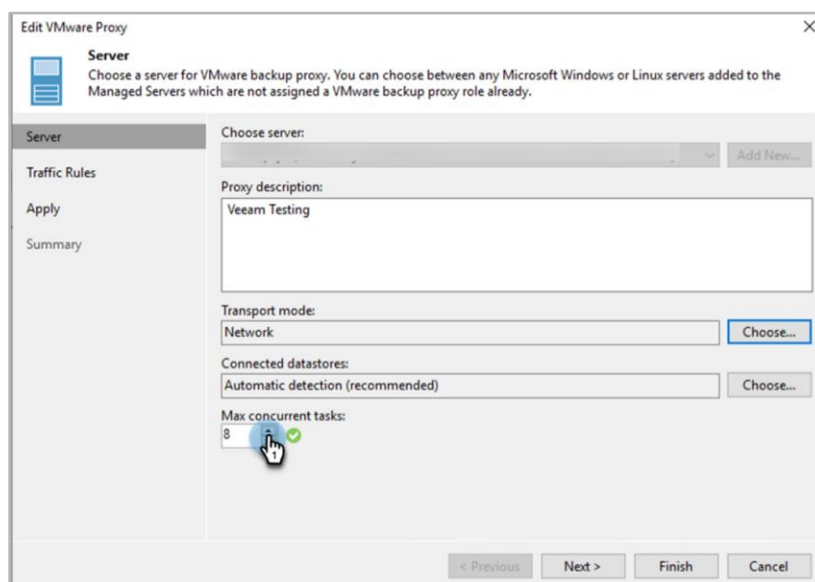
Increase Concurrent Streams on the Veeam Proxy Server

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 8: 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.

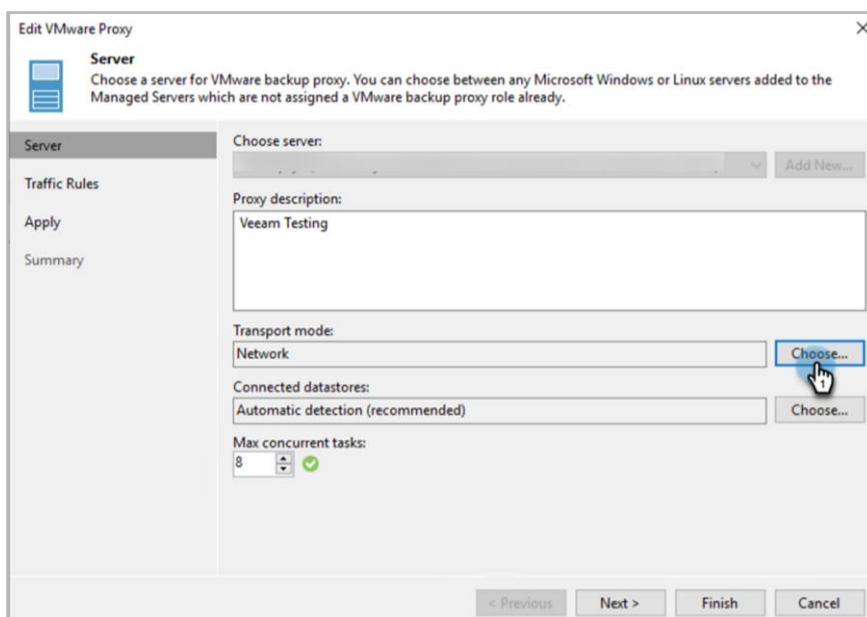
Set the Transport Mode of the Veeam Proxy Server to 'Network'

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, Cohesity recommends you to 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	<ul style="list-style-type: none"> Change the MaxSnapshotsPerDatastore registry value. 	<ul style="list-style-type: none"> This value increases the number of snapshots per datastore on VMware and supports more concurrent sessions.
Proxy Server	<ul style="list-style-type: none"> Select Transport mode Network. Increase the Max Concurrent tasks. 	<ul style="list-style-type: none"> Transport mode Network. Increase the max concurrent tasks to increase the parallelism.
Veeam Repository	<ul style="list-style-type: none"> Uncheck Limit maximum concurrent tasks to. Uncheck Limit read and write data rates to. Check Use per-VM Backup files in the Advanced options. 	<ul style="list-style-type: none"> Remove the limits on concurrent tasks and read/write data rates. <p>For SMB, see Create SMB Repositories on VBR below.</p> <p>For NFS, see Create NFS Repositories on VBR below.</p> <p>For S3, see Create S3 Repositories on VBR below.</p>
Veeam Backup Job	<ul style="list-style-type: none"> 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). 	<ul style="list-style-type: none"> 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, Cohesity recommends 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:

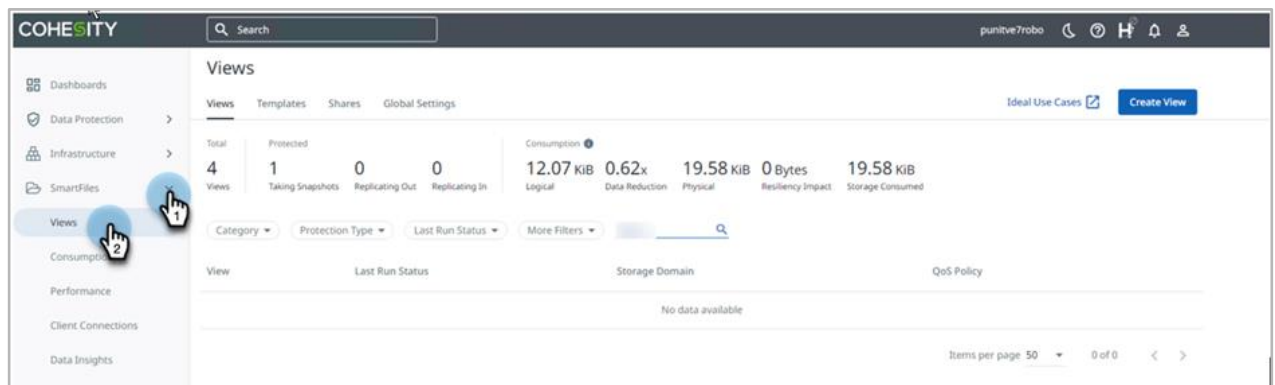
1. Create a Cohesity View, [select the optimal QoS policy](#), set SMB access type and permissions, and add a Share Allowlist.
2. Tune the gflags on your Cohesity cluster to [optimize SMB View performance](#).
3. Create:
 - [An SMB SoBR on Veeam](#).
 - [An SMB regular repository on Veeam](#).
4. [Configure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

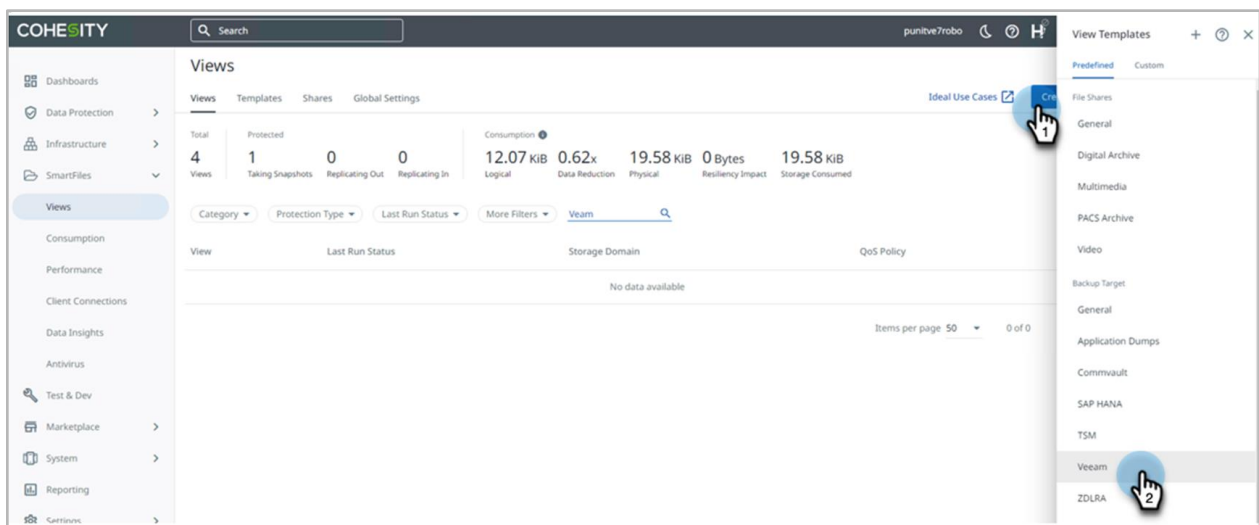
Cohesity recommends enabling inline deduplication and inline compression on the Cohesity Storage Domain in which you create the View. For details, see [Create or Edit Storage Domains](#) in the online Help.

To create an SMB View for VBR:

1. Log in to Cohesity and navigate to **SmartFiles > Views**.



2. On the **Views** page, click the “**Create View**” sign and click on **Veeam** under **Backup Target**.



3. In the **Create 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**.

The 'Create View' form is shown with the following configuration:

- View Name:** VeeamView
- Category:** Backup Target (selected)
- Storage Domain:** DefaultStorageDomain (Recommended) (labeled 1)
- Read/Write Protocol:** SMB (labeled 2)
- Buttons:** Cancel, More Options (labeled 3), Create

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

Create View

View Name
SMB_veeam


Category
☐ File Shares ☒ Backup Target ☐ Object Services

Storage Domain
DefaultStorageDomain (Recommended) ▼

Read/Write Protocol
SMB ▼

Read-Only Protocol (Optional) ▼

Less Options ^

Protection	Off
Case Sensitive File or Folder Names	Off (Cannot be edited once the View is created)
Performance	<div>QoS Policy Backup Target SSD </div> <div><input type="checkbox"/> Pin View to SSD</div>

NOTE: For SMB Views for VBR, Cohesity recommends the *Backup Target SSD* QoS policy. For test results, see [Appendix A: Choose QoS Policy for Your VBR Repositories](#).

5. In the same form, under **Security**, click Edit (✎) on the right, click **Add** under **IP Allowlist**, 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.

Create View

Protection: Off

Case Sensitive File or Folder Names: Off (Cannot be edited once the View is created)

Performance: QoS Policy: Backup Target SSD, Pin View to SSD: Off

Security: IP Allowlist: ☒ Override Global IP Allowlist, ☐ Extend Global IP Allowlist. Subnet Allowlist: Add the subnets (in IP ranges) that have permission for all Views. Add button. Netgroup Allowlist: ☒ Override Global Netgroup Allowlist, ☐ Extend Global Netgroup Allowlist. Netgroup Allowlist: Add the Netgroups that have permission for all Views. Add button.

Dedupe & Compression: Inherited from Storage Domain

Logical Quota: No Logical Quota

File DataLock: Off

File Filtering: File Filtering: Off

SMB Options: Browseable Shares: On, Access Based Enumeration: Off, SMB3 Encryption: Off, Fast Durable Handles: Off, SMB Oplocks: Off, Offline File Caching: Off, NTFS Root Permissions: On, Share Level Permissions: Off

Snapshot Self-Service: SMB Snapshot Directory: On

Antivirus: Off

Audit Logs: Off

Description: -

Create View & Save as Template | Cancel

Create (2)

Add Allowlist

Subnet: [Hand icon]

Type Subnet in CIDR format (IPv4 - 10.0.0.0/24 or IPv6 - FE80:CD00::211E:729C/60).

SMB Permissions: ☒ Read/Write, ☐ Read Only, ☐ Disabled

Description (Optional): [Hand icon]

Cancel | Add (3)

Security

IP Allowlist
☒ Override Global IP Allowlist ☐ Extend Global IP Allowlist

Subnet Allowlist
 Add the subnets (in IP ranges) that have permission for all Views. [Add](#)

Subnet SMB Permissions

10.0.0.0/24	Read/Write	Edit Delete
-------------	------------	---

Items per page 50 1 - 1 of 1 < >

Netgroup Allowlist
☒ Override Global Netgroup Allowlist ☐ Extend Global Netgroup Allowlist

Netgroup Allowlist
 Add the Netgroups that have permission for all Views. [Add](#)

NOTE: If you add more Veeam proxy servers in the future, ensure that you add them 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`

TIP: 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, Cohesity recommends 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, Cohesity recommends 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 an SoBR, SoBR is a logical entity that is a collection of multiple backup repositories. It creates a pool of storage devices. Cohesity recommends 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.

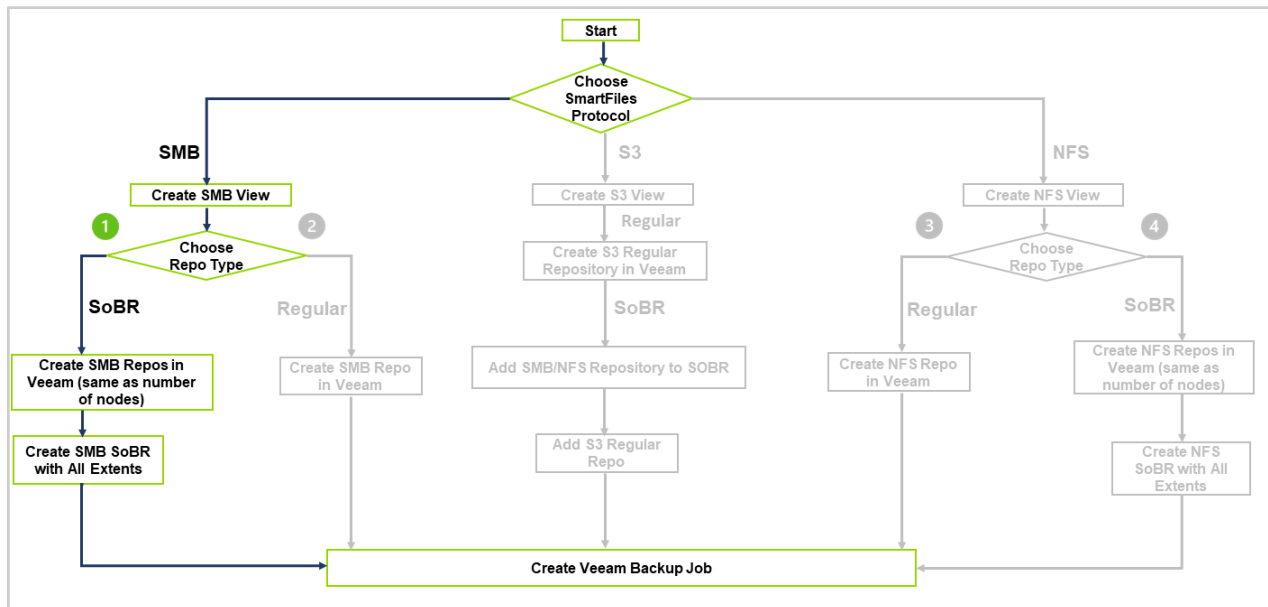
Table 3: Scale-out Backup Repository or Regular Repository for Veeam

VEEAM REPOSITORY	PROTOCOL	ACCESS METHOD	NOTES
Scale-out Backup Repository (SoBR)	SMB, NFS, S3	Access via dedicated VIPs	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Not recommended for Cohesity storage.

NOTE: Creating a 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 9: 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:

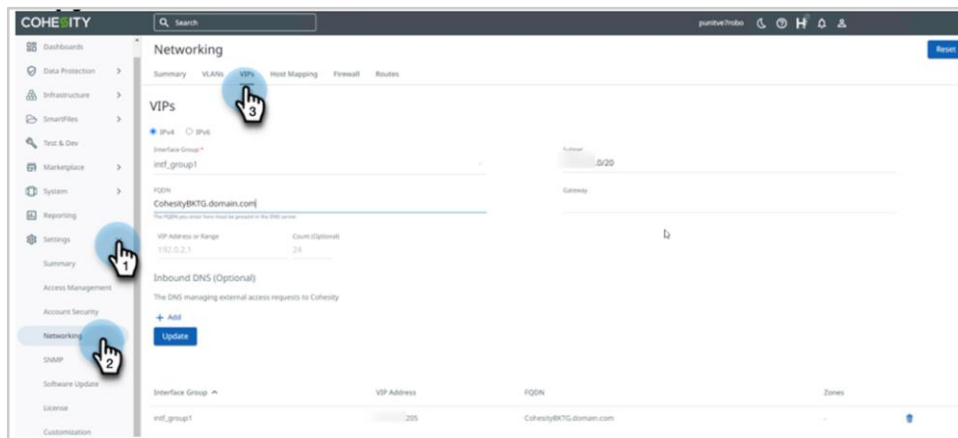
\\<vip01>\Veeamview\Directory1

\\<vip02>\Veeamview\Directory2

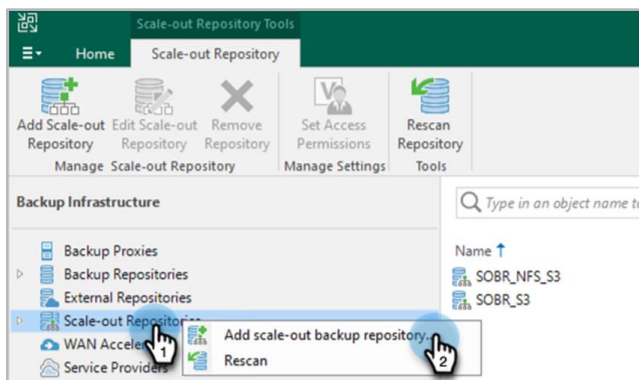
\\<vip03>\Veeamview\Directory3

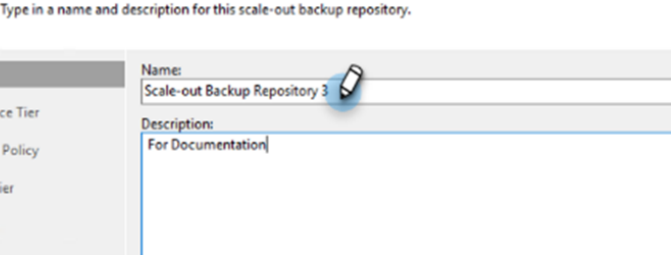
\\<vip04>\Veeamview\Directory4

- To find the VIP of each of your Cohesity nodes, log in to Cohesity, navigate to **Settings > 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.



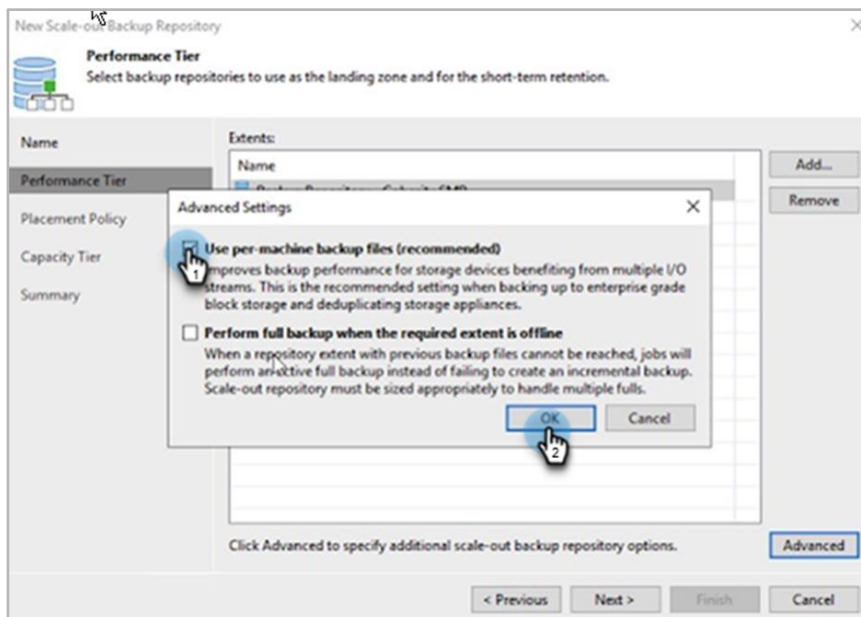
- From the Backup Infrastructure section of the Veeam management console, right-click **Scale-out Repositories** and select **Add scale-out backup repository**.



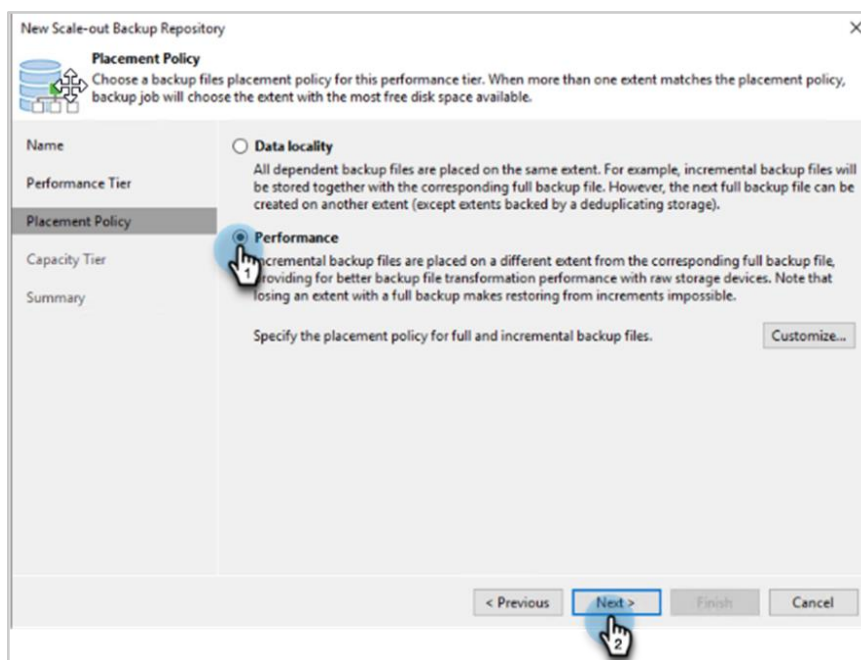
- 
- New Scale-out Backup Repository
- Name**
Type in a name and description for this scale-out backup repository.
- Name**
Scale-out Backup Repository 3
- Description**
For Documentation
- < Previous **Next >** Finish Cancel

-
- The screenshot shows the 'Performance Tier' step of the 'New Scale-out Backup Repository' wizard. The left sidebar contains the following options: Name, Performance Tier (selected), Placement Policy, Capacity Tier, and Summary. The main area is titled 'Extents:' and contains a table with the following data:
- | Name |
|-----------------------------------|
| Backup Repository - Cohesity SMB1 |
| Backup Repository - Cohesity SMB2 |
| Backup Repository - Cohesity SMB3 |
| Backup Repository - Cohesity SMB4 |
- Below the table, there is a button labeled 'Add...' and a button labeled 'Remove'. At the bottom of the wizard, there are buttons for '< Previous', 'Next >', 'Finish', and 'Cancel'. The 'Advanced' button is also visible at the bottom right.

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.

The screenshot shows the 'New Scale-out Backup Repository' wizard, specifically the 'Capacity Tier' step. The left sidebar has tabs for Name, Performance Tier, Placement Policy, Capacity Tier (selected), and Summary. The main area contains the following settings:

- Capacity Tier:** Specify object storage to copy backups to for redundancy and DR purposes. Older backups can be moved to object storage completely to reduce long-term retention costs while preserving the ability to restore directly from offloaded backups.
- ☐ **Extend scale-out backup repository capacity with object storage:**
 - Performance Tier: - Define time windows when uploading to capacity tier is allowed:
- ☐ **Copy backups to object storage as soon as they are created**
Create additional copy of your backups for added redundancy by having all backups copied to the capacity tier as soon as they are created on the performance tier.
- ☒ **Move backups to object storage as they age out of the operational restore window**
Reduce your long-term retention costs by moving older backups to object storage completely while preserving the ability to restore directly from offloaded backups.
Move backup files older than days (your operational restore window) - ☐ **Encrypt data uploaded to object storage**
Password: -

At the bottom, there are four buttons: '< Previous', 'Apply' (highlighted with a mouse cursor), 'Finish', and 'Cancel'.

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

The screenshot shows the 'New Scale-out Backup Repository' wizard, specifically the 'Summary' step. The left sidebar has tabs for Name, Performance Tier, Placement Policy, Capacity Tier, and Summary (selected). The main area contains the following summary:

- Summary:** Review the scale-out backup repository settings, and click Finish to exit the wizard.
- Summary: Scale-out backup repository was created successfully.

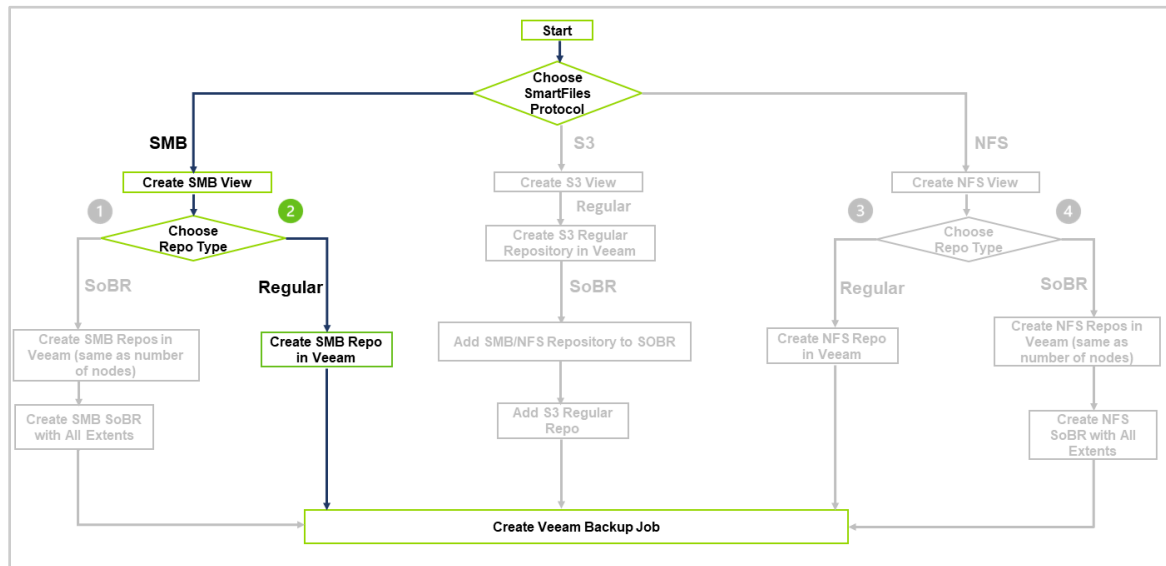
At the bottom, there are four buttons: '< Previous', 'Next >', 'Finish' (highlighted with a mouse cursor), and 'Cancel'.

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

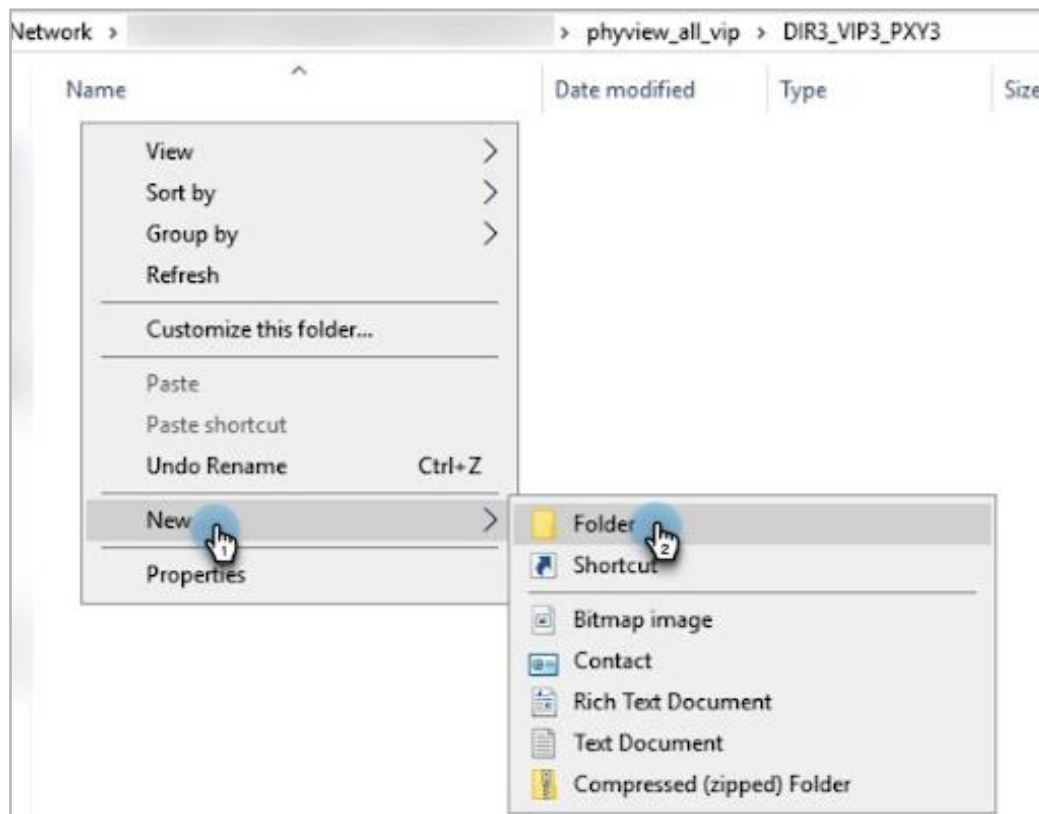
In addition to SoBRs, you can also create a regular repository on VBR using the Cohesity SMB View. In fact, to create an SoBR, you need to start by creating several regular Veeam repositories according to the procedure below. Note that SoBRs deliver much better performance, so Cohesity strongly recommends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

Figure 10: Create SMB Regular Repository on VBR

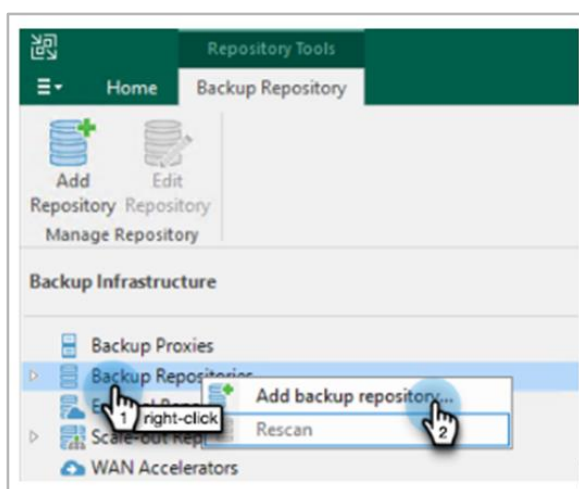


To use a Cohesity SMB share as a single, regular VBR repository:

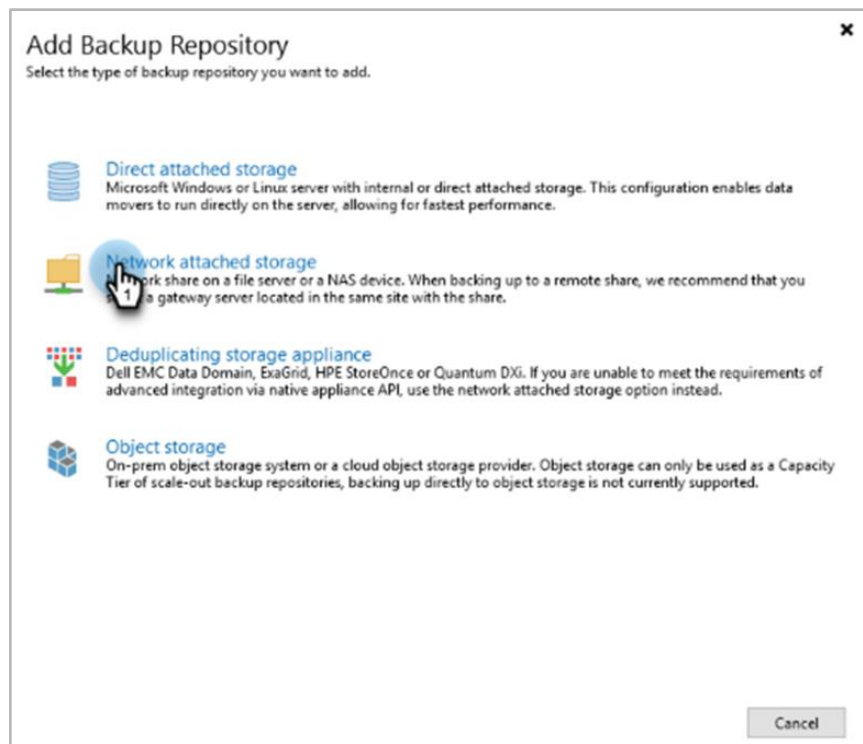
1. First, create a directory in the Cohesity View, which will be used to create a Veeam backup repository; access Cohesity View by using \\<vip>\\Veeamview, enter the credentials to authenticate, and then create new folders in it.



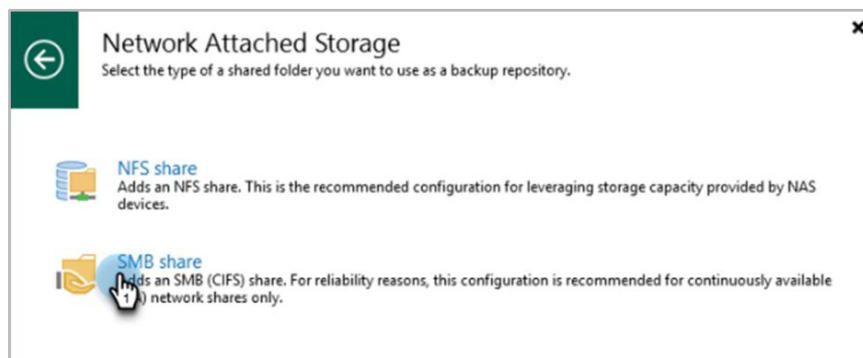
2. From the Backup Infrastructure section of the Veeam management console, right-click **Backup Repositories** and select **Add Backup Repository**.



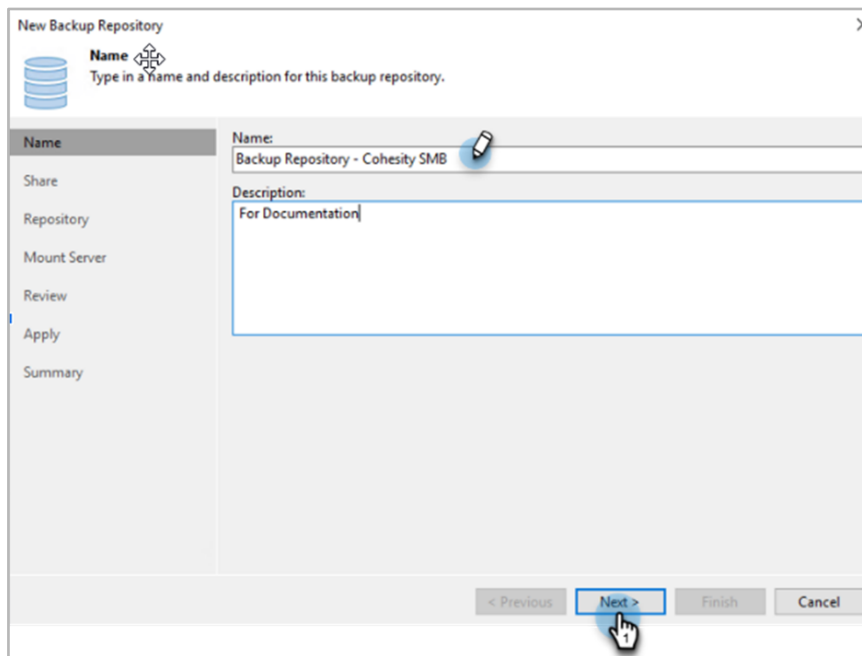
3. In the window that opens, select **Network attached storage**.



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. See Point 1 of [Create an SMB Scale-out Backup Repository on Your Veeam Server](#).

\\<vip01>\Veeamview1\Directory1

\\<vip02>\Veeamview1\Directory2

\\<vip03>\Veeamview1\Directory3

\\<vip04>\Veeamview1\Directory4

The screenshot shows the 'New Backup Repository' wizard in the 'Share' step. The left sidebar has tabs for Name, Share, Repository, Mount Server, Review, Apply, and Summary. The 'Share' tab is selected. The main area contains the following fields and options:

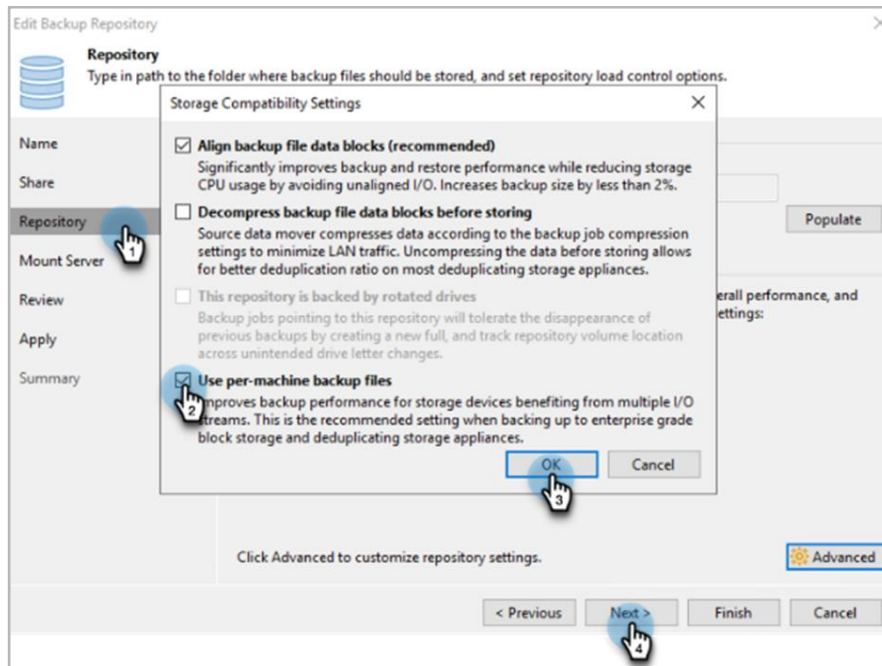
- Shared folder:** A text box containing '\\Cohesity_Cluster_VIP1\ViewName\Directory1' with a 'Browse...' button to its right.
- Use \\server\folder format:** A checkbox that is checked.
- This share requires access credentials:** A checkbox that is checked, with a dropdown menu and an 'Add...' button below it. A link 'Manage accounts' is also present.
- Gateway server:** Two radio buttons: 'Automatic selection' (selected) and 'The following server:'. Below the second radio button is a dropdown menu showing '(Backup server)'.
- Buttons:** At the bottom are '< Previous', 'Next >', 'Finish', and 'Cancel'. A mouse cursor is clicking the 'Next >' button.

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

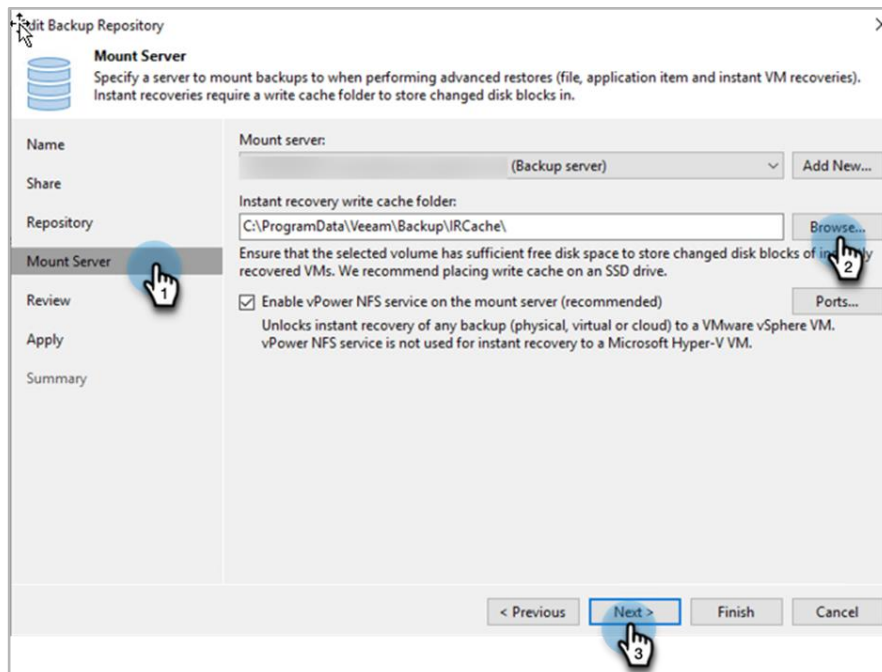
The screenshot shows the 'New Backup Repository' wizard in the 'Repository' step. The left sidebar has tabs for Name, Share, Repository, Mount Server, Review, Apply, and Summary. The 'Repository' tab is selected. The main area contains the following fields and options:

- Location:**
 - Path to folder:** A text box containing '\\ FQDN \\\veeamview'.
 - Capacity:** 84.2 TB
 - Free space:** 33.3 TB
 - A 'Populate' button is to the right of the free space field.
- Load control:**
 - A text box explaining: 'Running too many concurrent tasks against the same repository may reduce overall performance, and cause I/O operations to timeout. Control storage device saturation with the following settings:'
 - Limit maximum concurrent tasks to:** A checkbox that is unchecked. A mouse cursor is clicking this checkbox, with a '1' next to it.
 - Limit read and write data rates to:** A checkbox that is unchecked. A mouse cursor is clicking this checkbox, with a '2' next to it.
 - Each checkbox has a corresponding numeric input field and a unit 'MB/s'.
- Buttons:** At the bottom are '< Previous', 'Next >', 'Finish', and 'Cancel'. A mouse cursor is clicking the 'Next >' button.

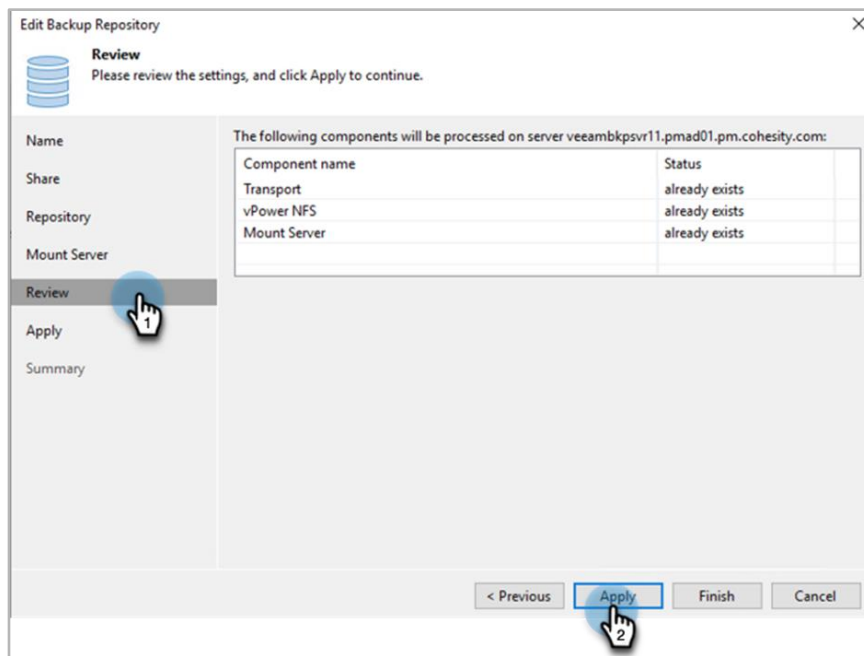
8. Click **Advanced** to open the **Storage Compatibility Settings**. In that window, select **Use per-machine backup files**. This enables more concurrent streams to the Cohesity cluster, increasing the overall throughput. Click **OK** and then click **Next**.



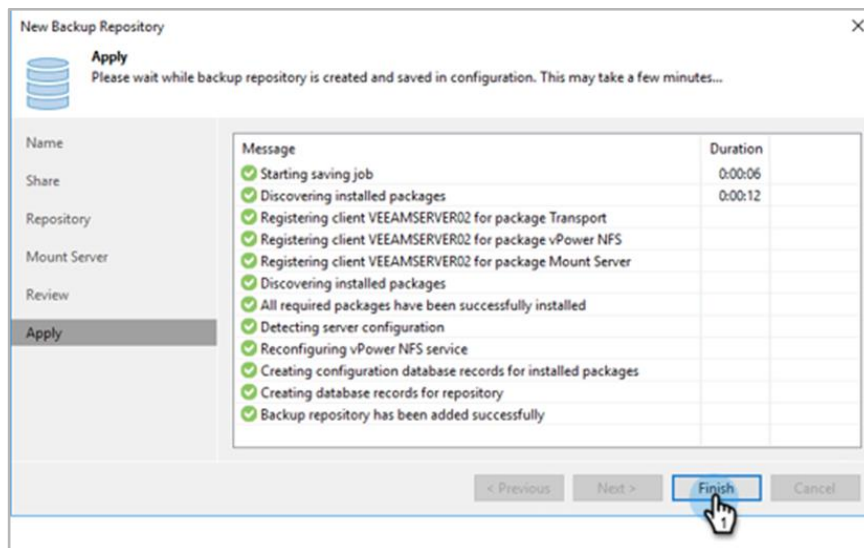
9. Select the **Mount server** and **Instant recovery write cache folder**, which can be used during restore. Click **Next**.



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.

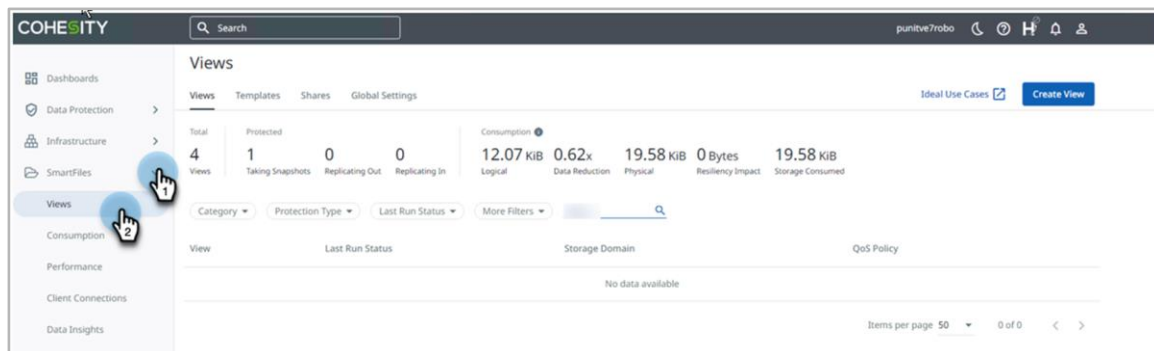
To create an NFS export to store Veeam backups:

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](#).

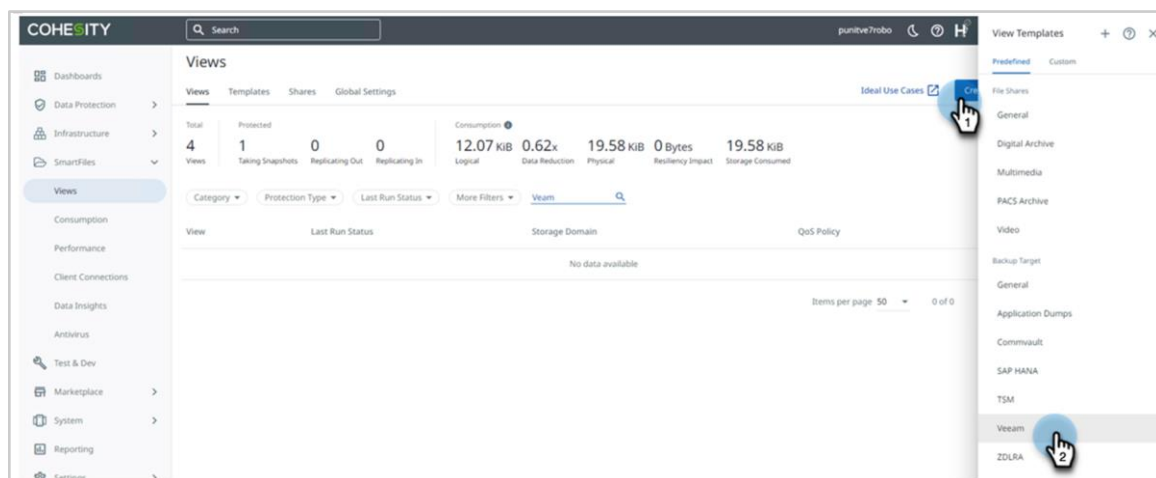
Cohesity recommends enabling inline deduplication and inline compression on the Cohesity Storage Domain in which you will be creating your Cohesity Views. To enable them, or to create a new Storage Domain, see [Create or Edit Storage Domains](#) in the online Help.

To create an NFS View for VBR:

1. Log in to Cohesity and navigate to **SmartFiles > Views**.



2. On the **Views** page, click **“Create View”** and select **Veeam**



3. In the **Create View** form, name the View, choose the **Storage Domain**, and select category as **Backup Target**, Under **Read/Write Protocol**, select **NFS v3**. Click **More Options**.

Create View

View Name
NFS3Veeam

Category
☐ File Shares ☒ Backup Target ☐ Object Services

Storage Domain
DefaultStorageDomain (Recommended)

Read/Write Protocol
NFS v3

Read-Only Protocol (Optional)

Cancel More Options Create

NOTE:

- For Veeam SoBRs, Cohesity recommends using the *Backup Target SSD* QoS policy in the Cohesity NFS View.
- For Veeam regular repositories, Cohesity recommends 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 Allowlist**, click **Override Global IP Whitelist**.

- 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.

Create View

IP Allowlist
☒ Override Global IP Allowlist ☐ Extend Global IP Allowlist

Subnet Allowlist
 Add the subnets (in IP ranges) that have permission for all Views.

Subnet	NFS Permissions	NFS Squash
10.0.0.0/24	Read/Write	None

Items per page: 50 1 - 1 of 1

Root Squash
 User ID (UID): 65534 Group ID (GID): 65534

All Squash
 User ID (UID): 65534 Group ID (GID): 65534

Netgroup Allowlist
☒ Override Global Netgroup Allowlist ☐ Extend Global Netgroup Allowlist

Netgroup Allowlist
 Add the Netgroups that have permission for all Views.

Dedupe & Compression: Inherited from Storage Domain

Logical Quota: No Logical Quota

File DataLock: Off

File Filtering: File Filtering: Off

NFS Options: Discoverable Shares: Off • Root Permissions: On • Security: Unix Authentication

Snapshot Self Service: NFS Snapshot Directory: On

Audit Logs: Off

Description: -

Create Create View & Save as Template Cancel

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

- 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
```

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

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

```
om:/Dir1 /haswlnfs      :/# mount -t nfs -o noatime,vers=3,proto=tcp,rsize=1048576,wsiz
om:/Dir1 /haswlnfs      :/# df -h /haswlnfs
Filesystem              Size  Used Avail Use% Mounted on
cohesity.com:/Dir1     84T   5.1T  79T    7% /haswlnfs
om:/Dir1 /haswlnfs      :/# cd /haswlnfs
om:/Dir1 /haswlnfs      :/# haswlnfs# mkdir Directory1 Directory2 Directory3 Directory4
om:/Dir1 /haswlnfs      :/# haswlnfs# ls -latr | grep Directory
drwxr-xr-x 1 root  root    0 Sep 16 03:26 Directory1
drwxr-xr-x 1 root  root    0 Sep 16 03:26 Directory2
drwxr-xr-x 1 root  root    0 Sep 16 03:26 Directory3
drwxr-xr-x 1 root  root    0 Sep 16 03:26 Directory4
```

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, Cohesity recommends:

- 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.

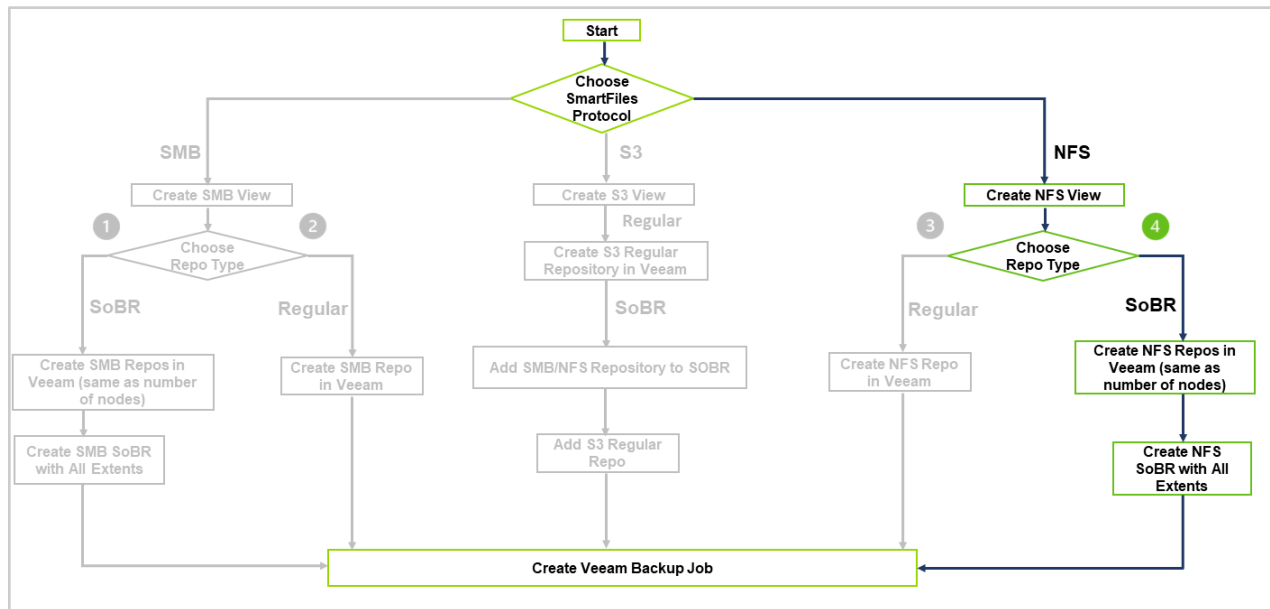
Create an NFS Scale-out Backup Repository on Your Veeam Server

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. Cohesity recommends using a 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 11: 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:

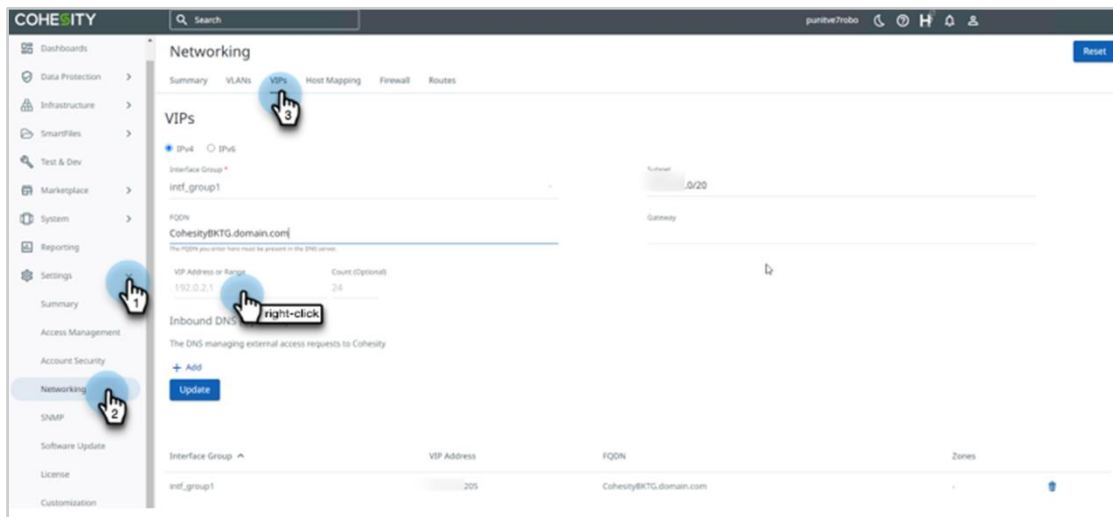
`//<vip01>/NFS4Veeam1/Directory1`

`//<vip02>/NFS4Veeam1/Directory2`

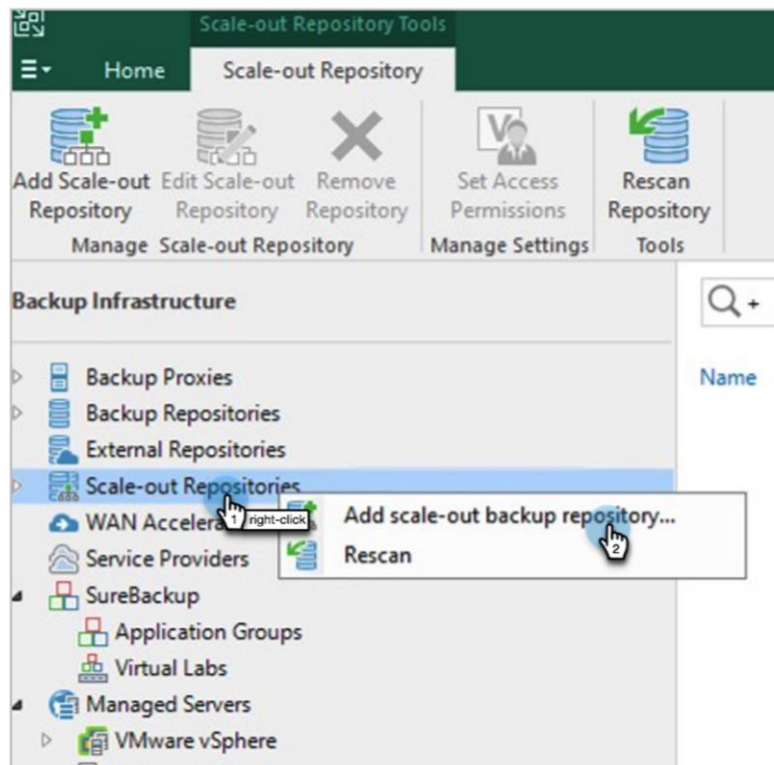
`//<vip03>/NFS4Veeam1/Directory3`

`//<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**.

New Backup Repository

Name
Type in a name and description for this backup repository.

Name:
NFS Scale-out Backup repository

Description:
For Documentation

< Previous **Next >** Finish Cancel

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.

Edit Scale-out Backup Repository

Performance Tier
Select backup repositories to use as the landing zone and for the short-term retention.

Name:
Performance Tier

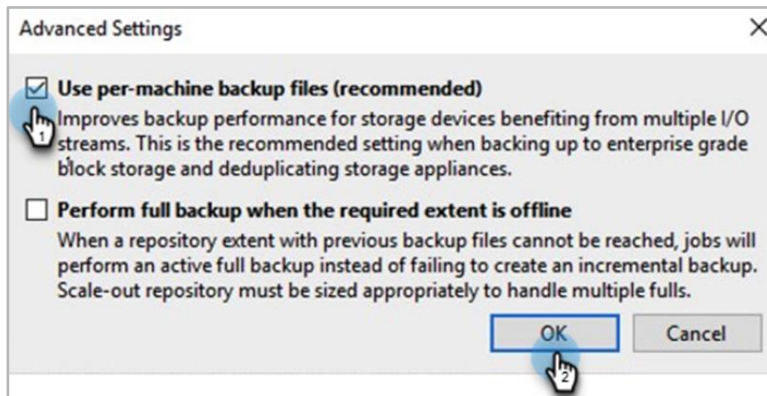
Extents:

Name
Backup Repository - NFS1
Backup Repository - NFS2
Backup Repository - NFS3
Backup Repository - NFS4

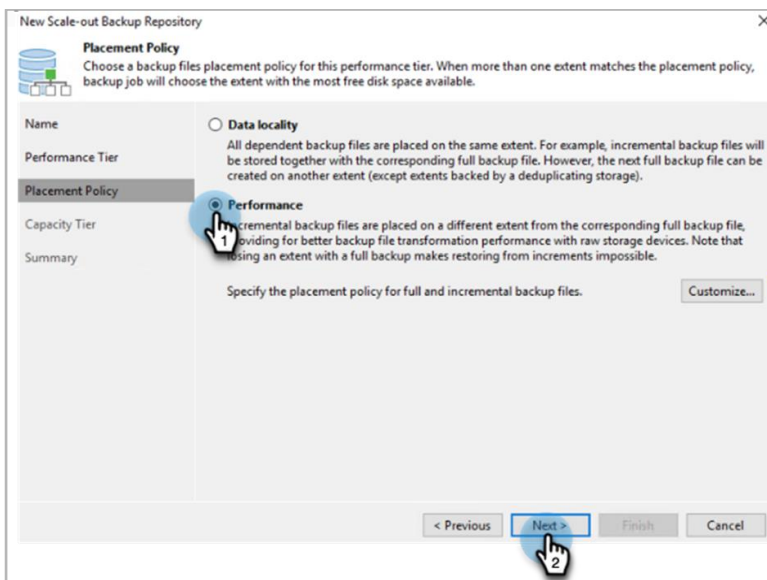
Click Advanced to specify additional scale-out backup repository options.

< Previous **Next >** Finish Cancel

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



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



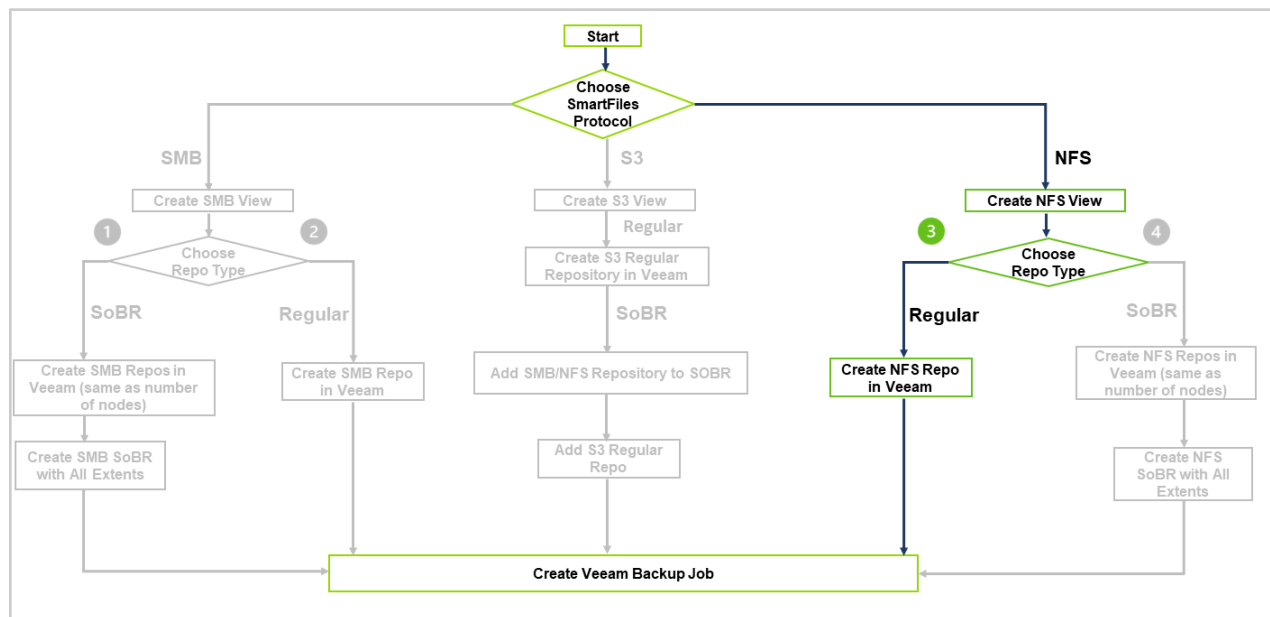
7. Click **Apply** and then **Finish** to complete the NFS SoBR creation.

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

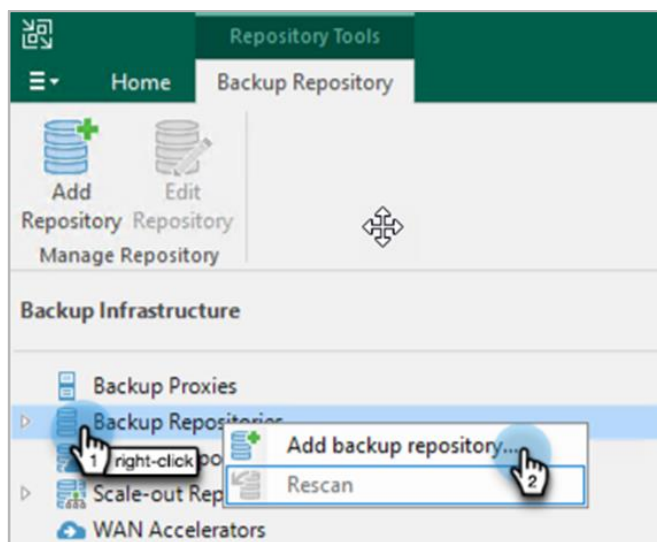
In addition to SoBRs, you can also create a regular repository on VBR using the Cohesity NFS View. In fact, to create an SoBR, you need to start by creating several regular Veeam repositories according to the procedure below. Note, however, that SoBRs deliver much better performance, so Cohesity strongly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

Figure 12: Create NFS Regular Repository on VBR

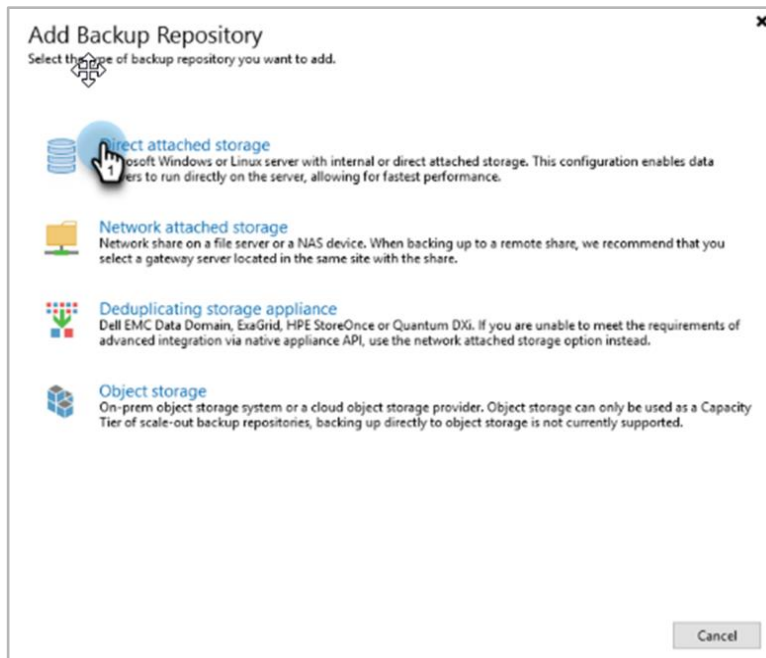


To use a Cohesity NFS mount point as a single, regular VBR repository:

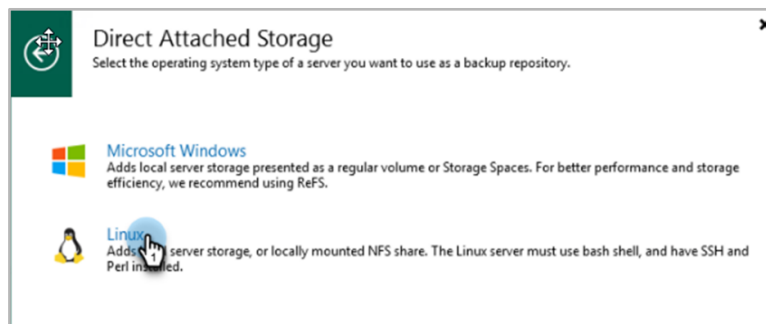
1. From the Veeam management console, right-click **Backup Repositories** and select **Add backup repository**.



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



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



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

New Backup Repository

Name
Type in a name and description for this backup repository.

Name

Server

Repository

Mount Server

Review

Apply

Summary

Name: Backup Repository -NFS1

Description: Created by VEEAMBKPSVR11\Administrator at 4/17/2023 4:59 AM.

< Previous Next > Finish Cancel

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

New Backup Repository

Server
Choose repository server. You can select server from the list of managed servers added to the console.

Name

Server

Repository

Mount Server

Review

Apply

Summary

Repository server:

Add New

Path	Capacity	Free	Populated
------	----------	------	-----------

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

New Linux Server

SSH Connection
Provide credentials for service console connection, and adjust secure shell (SSH) port number using advanced settings if required.

Name

Credentials:

root (RHEL_NFS, last edited: less than a day ago) Add...

Manage accounts

Review

Apply

Summary

Customize advanced connection settings, such as SSH and data mover ports Advanced...

< Previous Next > Finish Cancel

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

New Linux Server

Review
Please review your settings and click Apply to continue.

Name

SSH Connection

Review

Apply

Summary

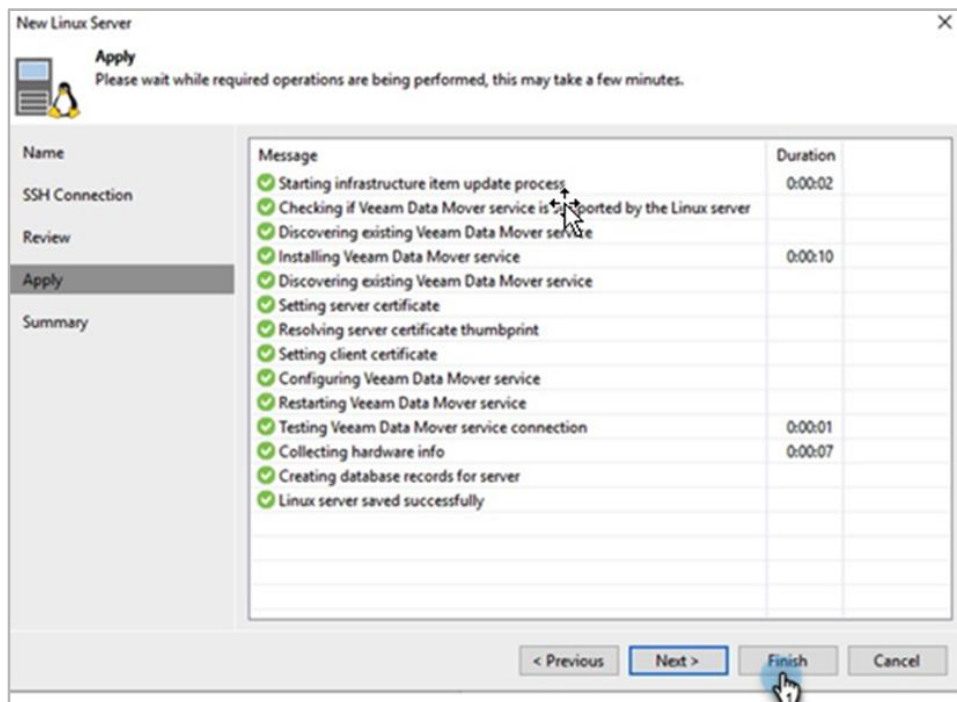
Due to these modifications the following components will be installed or removed on the target host:

Component name	Status
Transport	will be installed

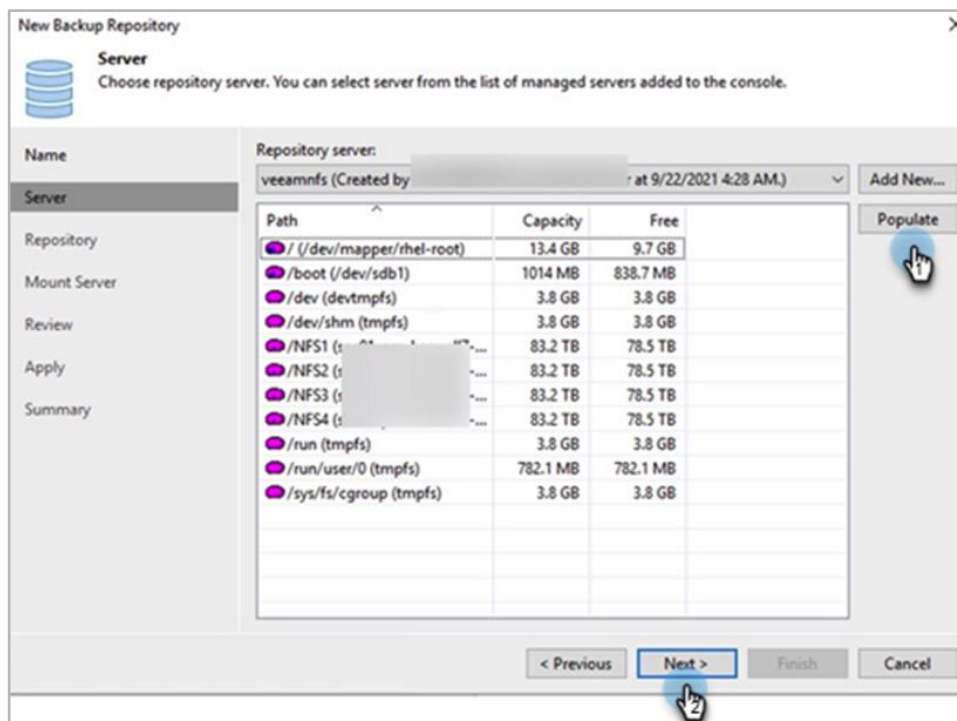
After you click Apply missed components will be installed on the target host.

< Previous Apply Finish Cancel

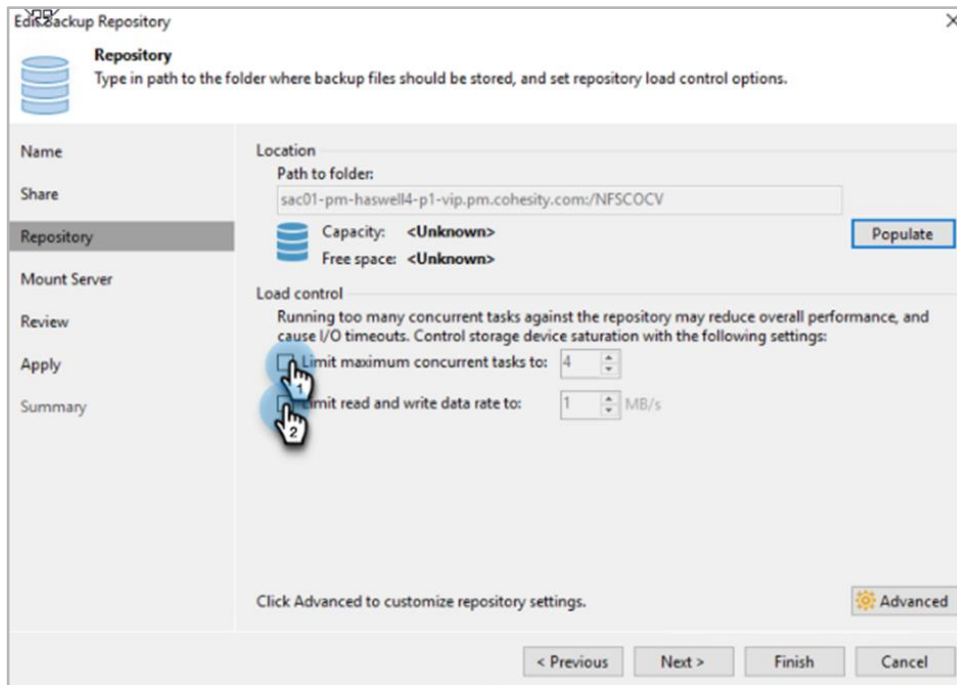
8. Review the Summary and click **Finish**.



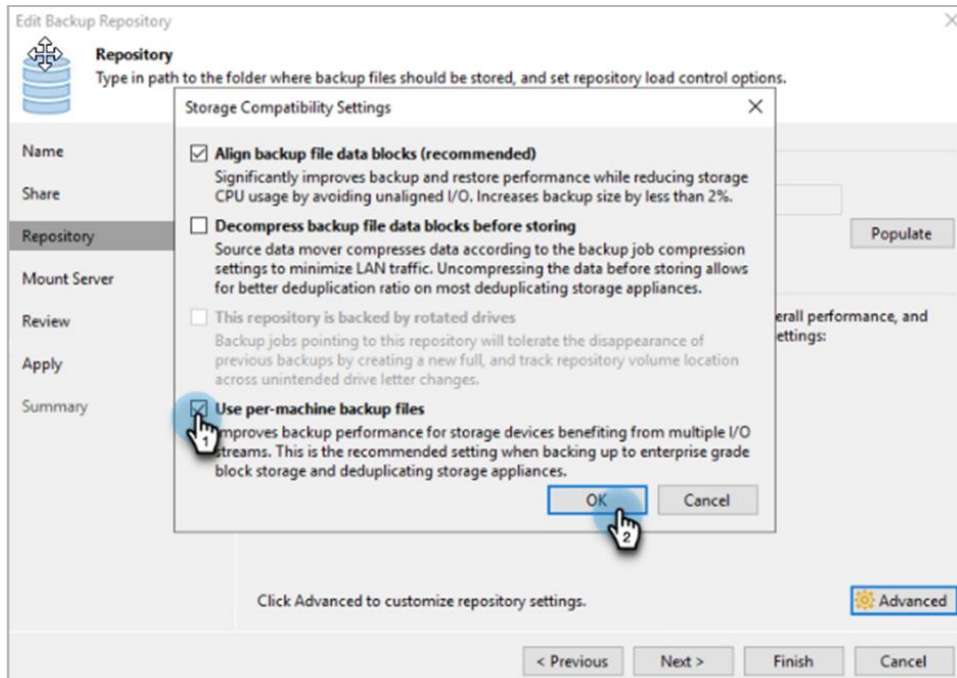
9. Click **Populate** to list all the directories and select the NFS mount point where you mounted the Cohesity NFS export and click **Next**.



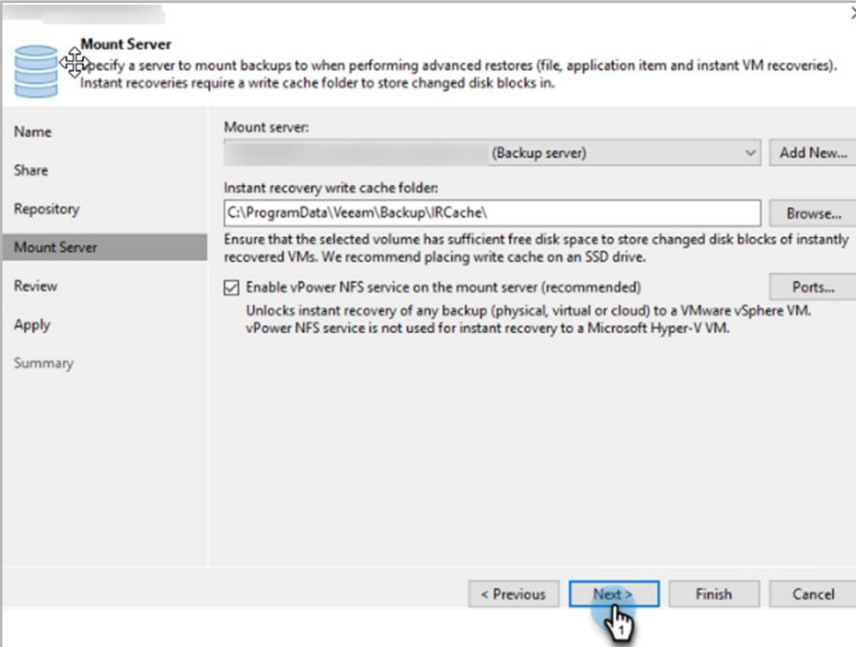
10. Uncheck **Limit maximum concurrent tasks to** and **Limit read and write data rates to**.



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.



The **Mount Server** window is shown with the **Mount Server** tab selected. The window title is "Mount Server" and it includes a sub-header: "Specify a server to mount backups to when performing advanced restores (file, application item and instant VM recoveries). Instant recoveries require a write cache folder to store changed disk blocks in."

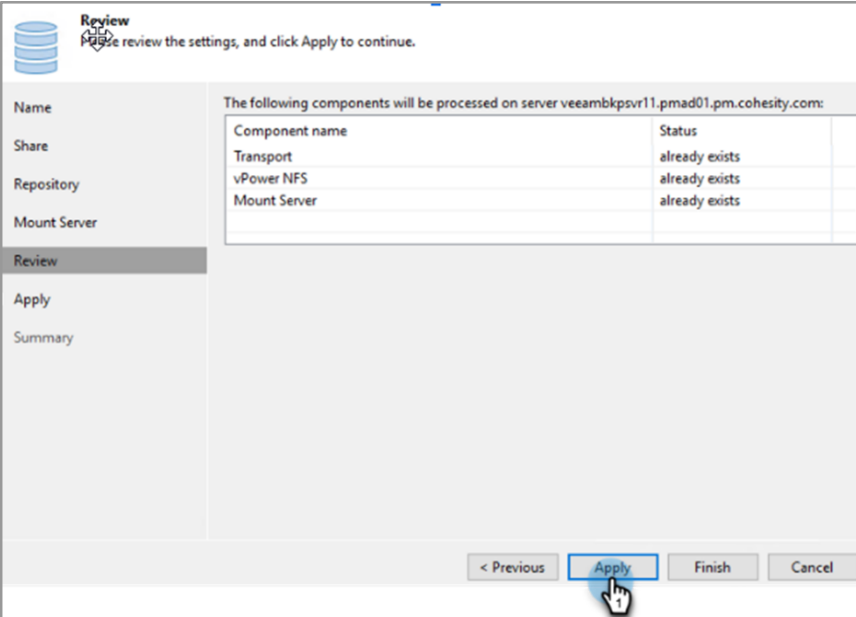
On the left sidebar, the tabs are: Name, Share, Repository, **Mount Server**, Review, Apply, and Summary.

The main configuration area contains the following fields and options:

- Mount server:** A dropdown menu showing "(Backup server)" with an "Add New..." button.
- Instant recovery write cache folder:** A text box containing "C:\ProgramData\Veeam\Backup\IRCache\" with a "Browse..." button.
- A note: "Ensure that the selected volume has sufficient free disk space to store changed disk blocks of instantly recovered VMs. We recommend placing write cache on an SSD drive."
- ☒ **Enable vPower NFS service on the mount server (recommended)** with a "Ports..." button.
- Text below the checkbox: "Unlocks instant recovery of any backup (physical, virtual or cloud) to a VMware vSphere VM. vPower NFS service is not used for instant recovery to a Microsoft Hyper-V VM."

At the bottom, there are four buttons: "< Previous", **Next >** (highlighted with a mouse cursor), "Finish", and "Cancel".

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



The **Review** window is shown with the **Review** tab selected. The window title is "Review" and it includes a sub-header: "Please review the settings, and click Apply to continue."

On the left sidebar, the tabs are: Name, Share, Repository, Mount Server, **Review**, Apply, and Summary.

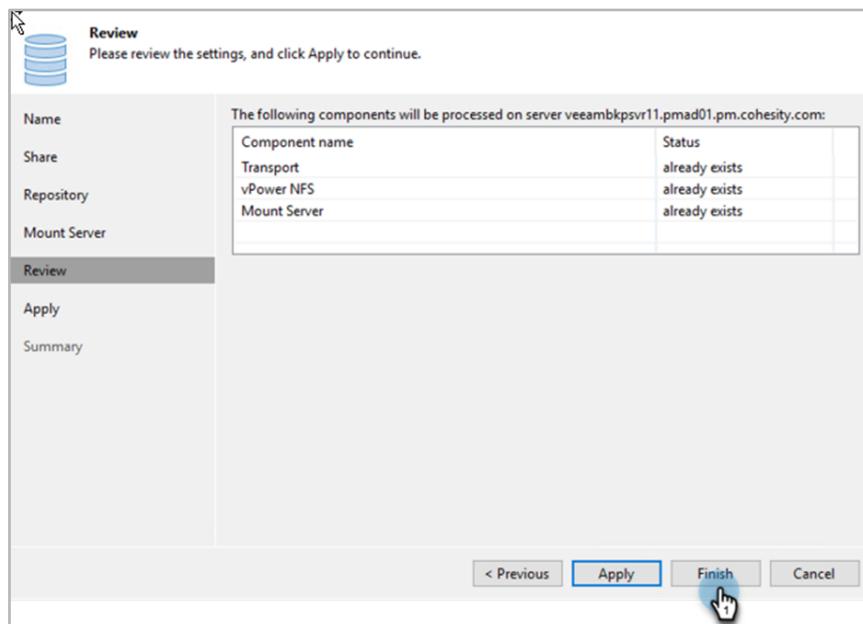
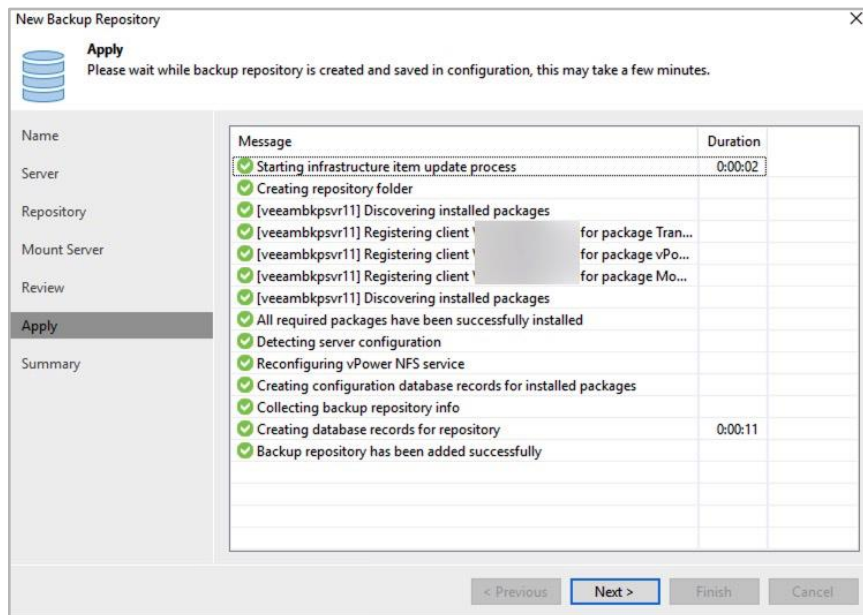
The main review area contains the following text and table:

The following components will be processed on server veeambkpsvr11.pmad01.pm.cohesity.com:

Component name	Status
Transport	already exists
vPower NFS	already exists
Mount Server	already exists

At the bottom, there are four buttons: "< Previous", **Apply** (highlighted with a mouse cursor), "Finish", and "Cancel".

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



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.

Create Cohesity S3 View for SoBR Repositories

To use Cohesity SmartFiles S3 View as part of the SOBR capacity tier repository, you will create a Cohesity View using the category of object services, choose a QoS policy, and configure the View for S3. For this solution, Cohesity recommends having inline deduplication and inline compression enabled on the Storage Domain in which you create the View. For details, see [Create or Edit Storage Domains](#) in the online Help.

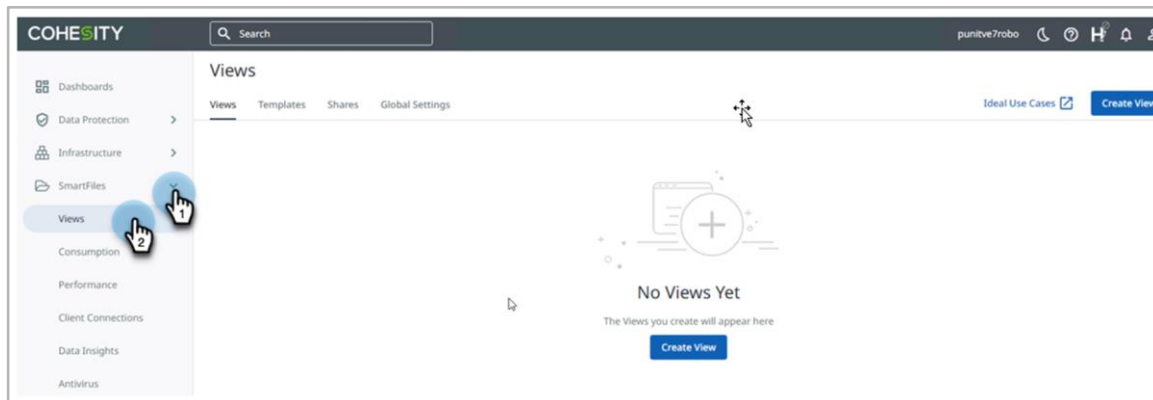
NOTE: Veeam version 11 allows you to leverage the S3 regular repository as a capacity tier. You can configure a Scale-Out Backup Repository using NFS/SMB as a performance tier and S3 as a capacity tier.

To create an S3 View to store Veeam backups:

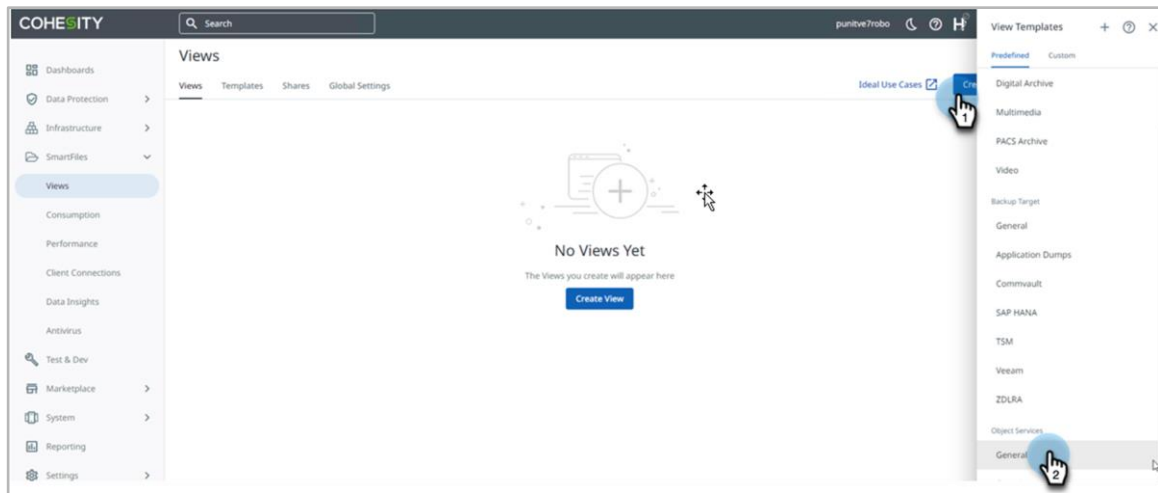
1. Create a Cohesity View, [select the optimal QoS policy](#), select Object Service, set Object key Pattern, and Read/Write protocol as S3.
2. Create:
 - [Create An S3 Scale-out Backup Repository \(SoBR\) on Veeam](#)
 - [Create An S3 Object storage regular repository on Veeam](#)
3. [Configure your Veeam backup jobs to use Cohesity storage.](#)

To create S3 Cohesity View for VBR Repository

1. Log in to Cohesity and navigate to **SmartFiles > Views**.



2. On the **Views** page, click **"Create View"** and click on **General** in Object Services.



3. Name the View in the **Create View** form, choose the **Storage Domain**, and **Category** as **Object Services** is selected by default, and select Cohesity recommended Object Key Pattern **"Object ID"** for Performance and scalability under **Object Key Pattern**. Under **Read/Write Protocol**, select **S3** and Click **More Options**.

NOTE: Cohesity recommends using the **Object ID** as object key pattern for Veeam S3 repository. **Object ID** key partner is available from Cohesity cluster version 7.0 and later.

Create View

View Name
VeeamS3

Category
☐ File Shares ☐ Backup Target ☒ Object Services

Storage Domain
DefaultStorageDomain (Recommended)

Object Keys
Consider the object keys that you are most likely to store in the View, and choose the best pattern for optimal performance.
Note: Object keys cannot be edited after the View is created.

Object Key Pattern
Object ID

Read/Write Protocol
S3

More Options

Create Create View & Save as Template Cancel

4. **(Optional)** You can enable the S3 Object Lock for Immutability if you want to use it with Veeam. S3 Object Lock-enabled bucket will work only with versioned S3 Views. If you want to avoid using the Object Lock, skip the step below.

In the same form, under S3 Object Lock, toggle the button to enable the versioning on the SmartFiles S3 View by default.

Versioning: Enabled

S3 Object Lock: On

Once S3 object lock is enabled, you can't disable object lock or suspend bucket versioning for the bucket.

Default retention: Off

5. In the same form, Under **Performance**, click **Edit** (✎) and select the QoS Policy as Backup Target SSD.
6. Click **Create View** at the bottom of the form. View will be listed in **View** Tab.

Create View

Object Keys

Consider the object keys that you are most likely to store in the View, and choose the best pattern for optimal performance.
Note: Object keys cannot be edited after the View is created.

Object Key Pattern: Object ID

Read/Write Protocol: S3

Less Options ^

Versioning: Disabled

S3 Object Lock: Off

Lifecycle Management Rules: No Lifecycle rules have been added yet

Protection: Off

Case Sensitive File or Folder Names: On (Cannot be edited once the View is created)

Performance: Backup Target SSD | Pin View to SSD: Off

Security: Override Global IP Allowlist: None

Dedupe & Compression: Inherited from Storage Domain

Logical Quota: No Logical Quota

File Filtering: File Filtering: Off

Audit Logs: Off

Description: -

Create Create View & Save as Template Cancel

Refer to the [Appendix D](#) for verify the communication between the Veeam VBR and Cohesity Cluster.

Create S3 Repositories on VBR

When you use a Cohesity SmartFiles S3 object service to create a repository on Veeam Backup & Replication, 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**.

Create an S3 Scale-out Backup Repository on Veeam

Veeam Backup & Replication can be supported using a scale-out backup repository and Cohesity recommends using an SoBR. an SoBR delivers highly improved write performance on Cohesity, as it writes into all nodes in parallel. See Table 4 to understand the benefits of using a scale-out repository.

Table 2: Scale-out Backup Repository or Regular Repository for Veeam

VEEAM REPOSITORY	PROTOCOL	ACCESS METHOD	NOTES
Scale-out Backup Repository	SMB, NFS, S3	Access via dedicated VIPs	<ul style="list-style-type: none"> • 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	S3		<ul style="list-style-type: none"> • Not supported for regular backup Job.

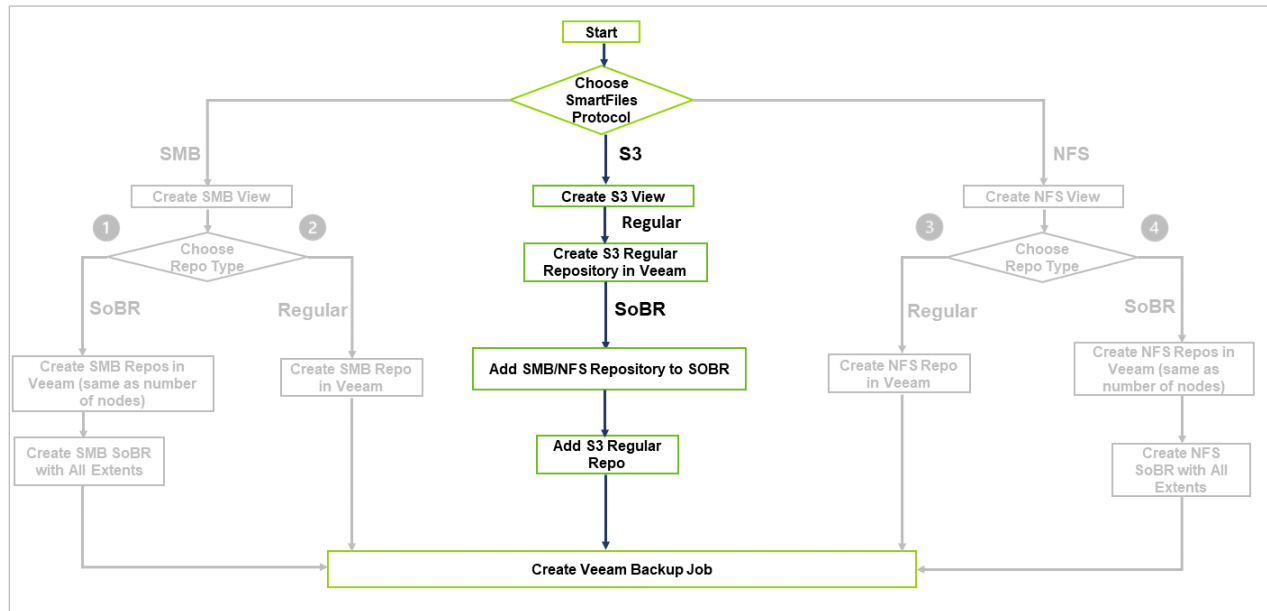
NOTE: Creating an SoBR requires a Veeam Enterprise Plus license.

Consideration for Creating S3 SoBR:

- To access the Cohesity SmartFiles S3 view Ports 443 and 3000 should be open.
- Cohesity S3 Bucket and its data are managed by Veeam Backup & Replication, including governance and data management.
- Veeam recommends using one Bucket per SoBR to achieve the best performance and reduce metadata.
- One Object storage repository cannot be used across multiple Veeam Backup and Replication server for the same purpose. By and large, two Object storage repositories cannot be mapped to the same Cohesity SmartFiles S3 View.

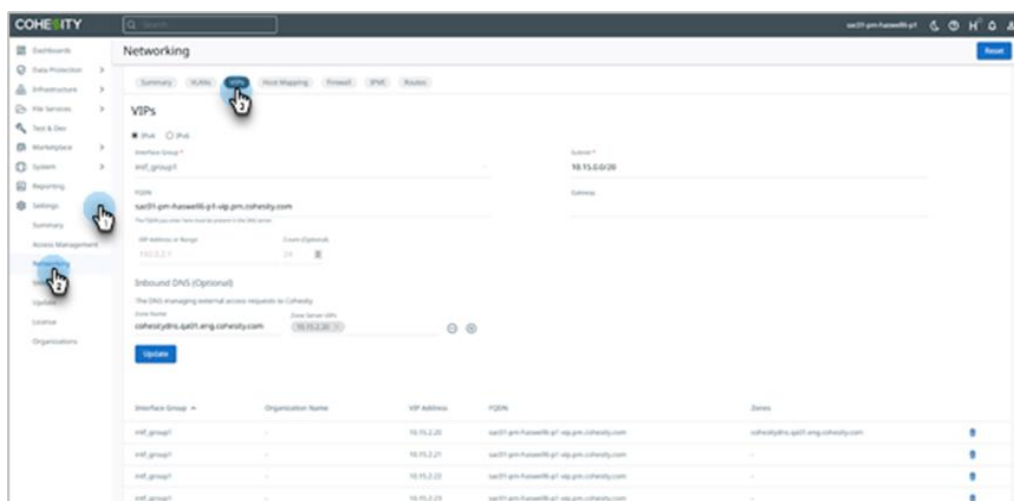
To start creating an S3 SoBR, you will first follow the steps to [create a single, regular S3 Compatible repository for VBR](#) and configure the VBR repository as a capacity tier in SoBR.

Figure 13: Create S3 SoBR on VBR

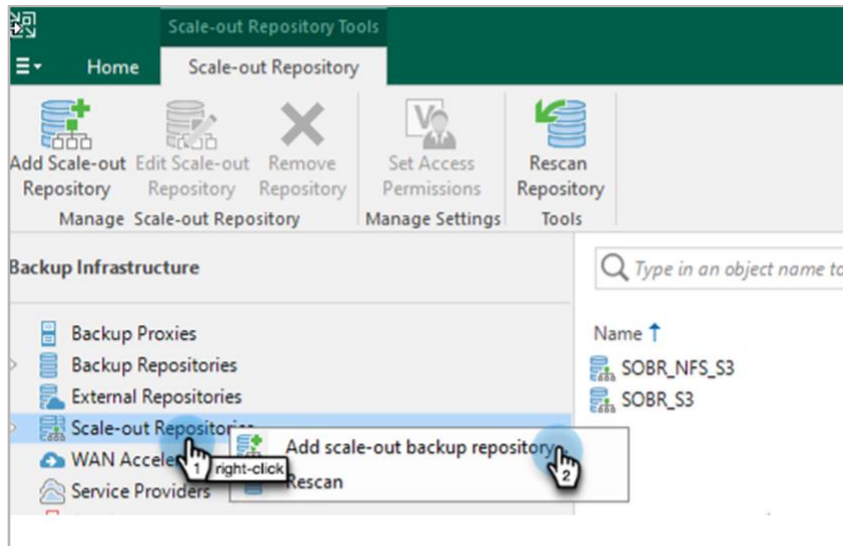


To create an S3 SoBR in the Veeam Management console:

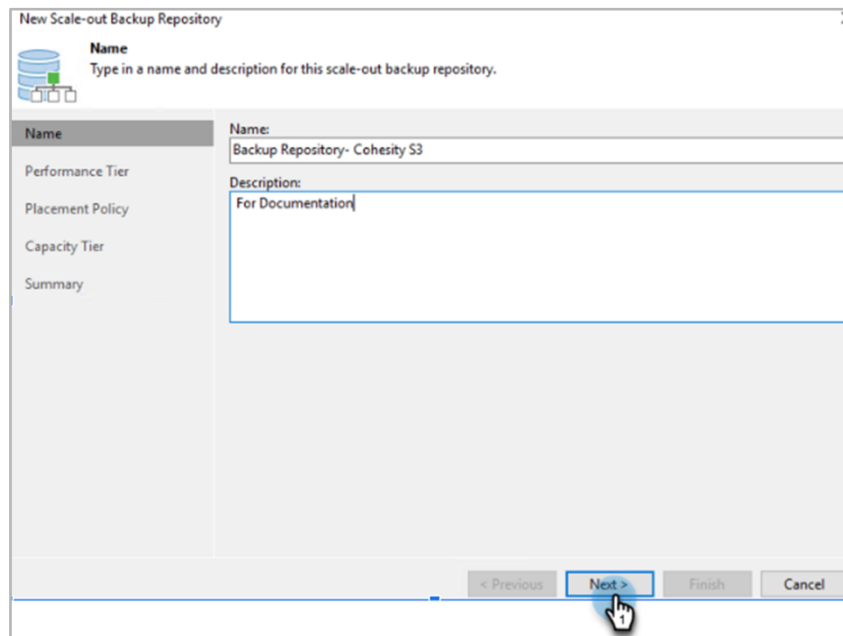
1. Perform the steps in [Create an S3 Regular Repository on VBR](#) to create the SmartFiles S3 repositories as nodes in the Cohesity cluster by accessing the Object service Smartfile S3 View with the FQDN.
 - a. To find the FQDN of each of your Cohesity nodes, log in to Cohesity, navigate to **Settings > Networking** and click the **VIPs** tab. Find the FQDN from the **FQDN** tab and copy it.



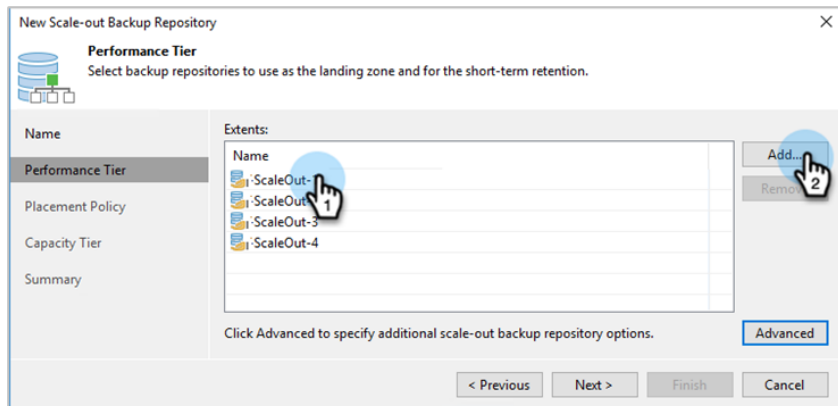
- From the Backup Infrastructure section of the Veeam Management console, right-click **Scale-Out Repositories** and select **Add scale-out backup repository**.



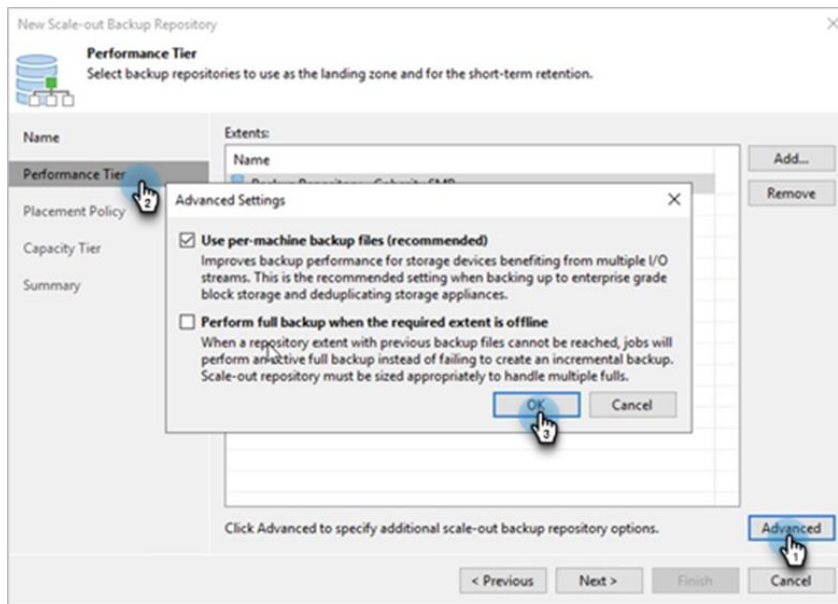
- Name the SoBR and click **Next**.



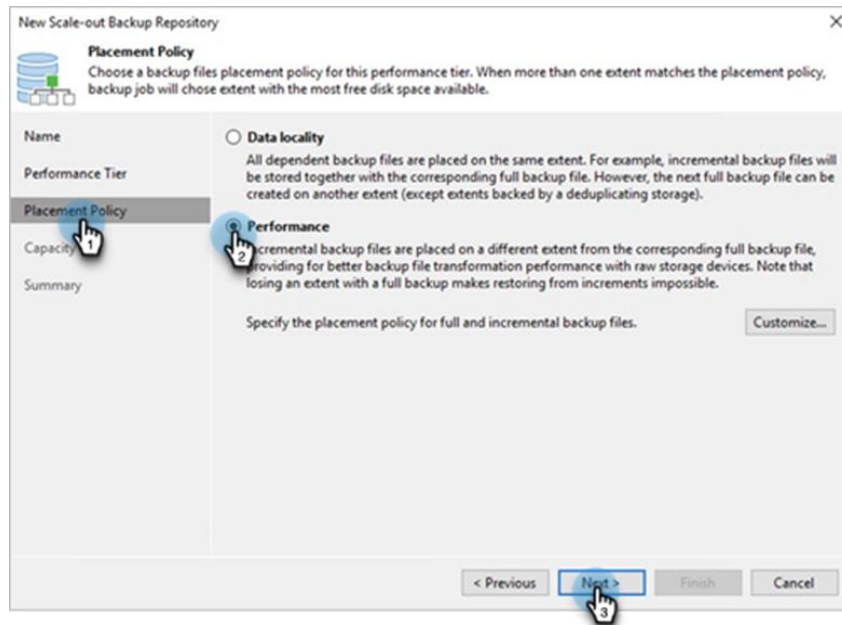
- Under **Performance Tier**, select the SMB/NFS or any Repository you want to use for Performance Tier and add to the SoBR and click **Add**.



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



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



7. Check the Option "**Extend scale-out backup repository capacity with Object storage**" and select the S3 repository Created from Cohesity View in section [S3 Object Storage Regular Repository on Veeam](#).

Select the Following option as per the requirement.

- Copy backups to object storage as soon as they are created.
 - It will Upload the backed-up data post completing the backup job.
- Move back up to object storage as they age out of the operational restore window.
 - You can select the number of days after the backup chain starts off-loading to the Cohesity S3 Bucket.

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

Capacity Tier
Specify object storage to copy backups to for redundancy and DR purposes. Older backups can be moved to object storage completely to reduce long-term retention costs while preserving the ability to restore directly from offloaded backups.

Name: S3VEM

Performance Tier: S3VEM

Placement Policy: S3VEM

Capacity Tier: S3VEM

Summary

☒ Extend scale-out backup repository capacity with object storage:

Define time windows when uploading to capacity tier is allowed: Window...

☐ Copy backups to object storage as soon as they are created
Create additional copy of your backups for added redundancy by having all backups copied to the capacity tier as soon as they are created on the performance tier.

☐ Move backups to object storage as they age out of the operational restore window
Reduce your long-term retention costs by moving older backups to object storage completely while preserving the ability to restore directly from offloaded backups.

Move backup files older than 14 days (your operational restore window) Override...

☐ Encrypt data uploaded to object storage
Password: Add... Manage passwords

< Previous Apply Finish Cancel

8. Click **Finish** to complete the S3 SoBR creation.

Summary
Review the scale-out backup repository settings, and click Finish to exit the wizard.

Name: S3VEM

Performance Tier: S3VEM

Placement Policy: S3VEM

Capacity Tier: S3VEM

Summary

Summary:
Scale-out backup repository was modified successfully.

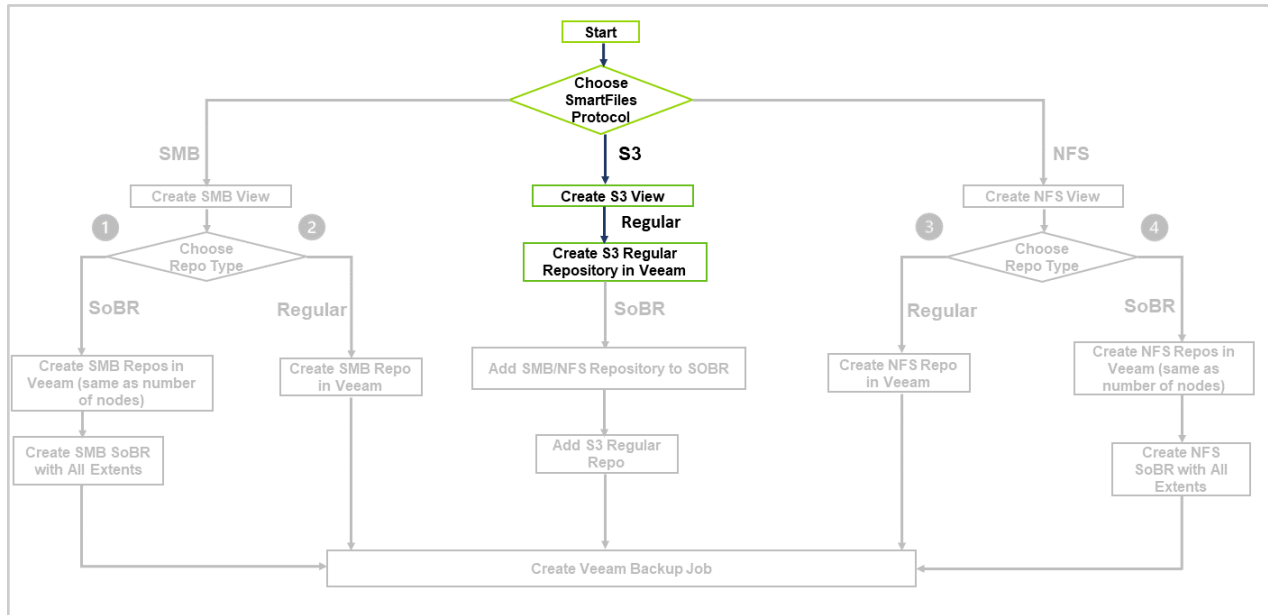
< Previous Next > Finish Cancel

You have successfully created an S3 SoBR. To map this repository in your Veeam backup job, see [Configure Veeam Backup Jobs to Use Cohesity Storage](#) below.

S3 Object Storage Regular Repository on Veeam

In addition to Scale-out Backup Repositories (SoBRs), you can also create a regular repository on VBR using the Cohesity SmartFile S3 View, which will be part of SoBR and act as the capacity tier. To create a SoBR, you need to create regular Veeam repositories according to the procedure below. Note, however, that SoBRs deliver much better performance, so Cohesity strongly recommends using a SoBR and Veeam support S3 bucket as a capacity tier. It will not allow to use the VBR S3 Object repository directly with the backup job individually.

Figure 14: Create S3 Regular Repository on VBR for SoBR



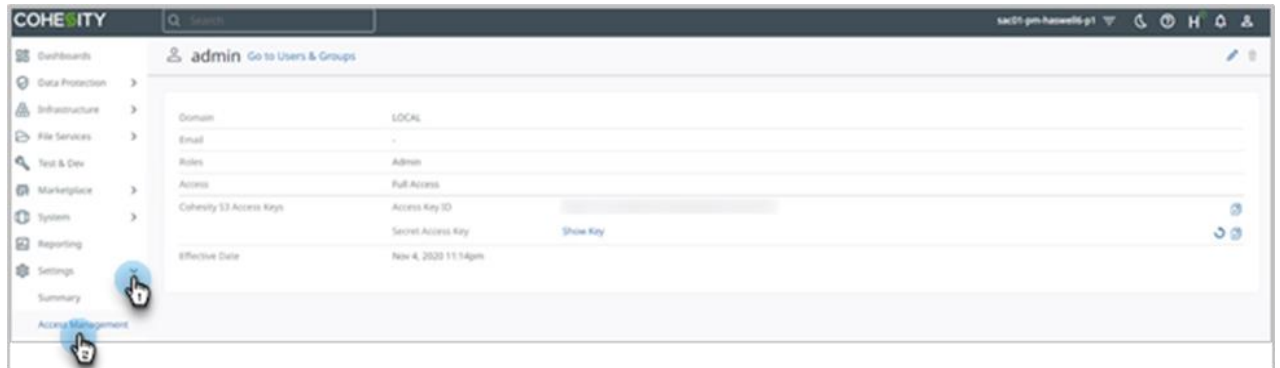
To use a Cohesity SmartFiles S3 Object Service as a regular VBR repository:

To authenticate the SmartFile S3 object service bucket while configuring the Veeam backup repository, configure the SmartFile S3 object service backup repository, and create a cloud credentials account.

The cloud credentials account contains the access key and the secret key used to create the SmartFiles S3 object service View.

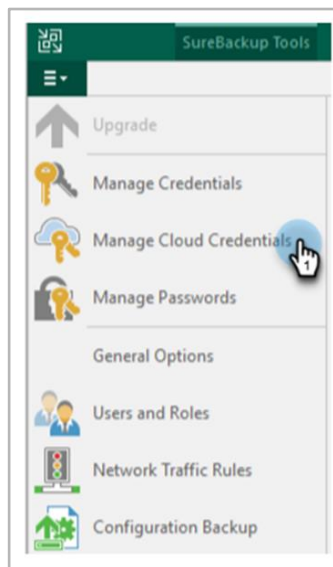
1. An Access and secret key are required to create the cloud credentials available in the Cohesity Cluster UI. Go to the following location and copy the access key and secret key.

Cohesity Cluster UI → Settings→ Access Management → User (which used to create the S3 View)

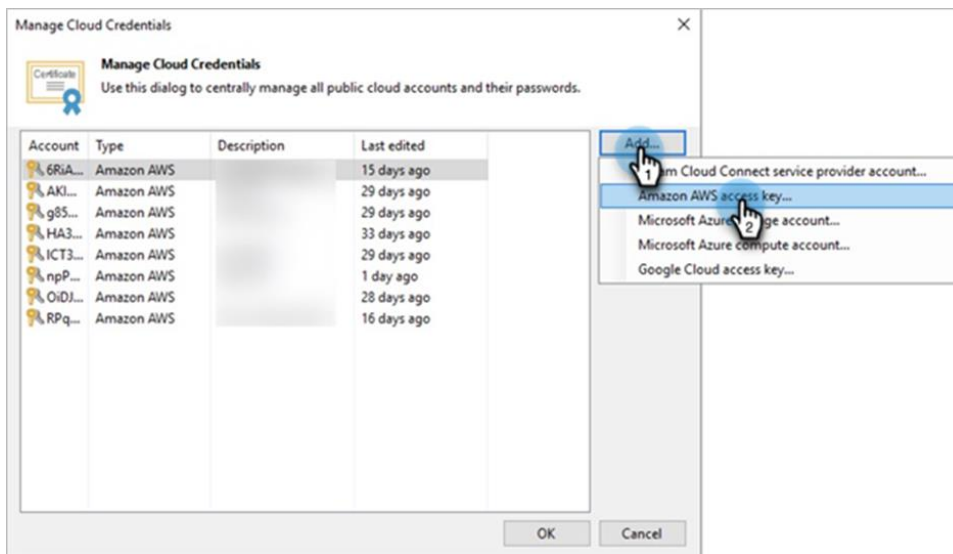


Create Cloud Credentials:

1. Click on the menu bar of the Veeam backup and replication console. Click **Manage Cloud Credentials**.

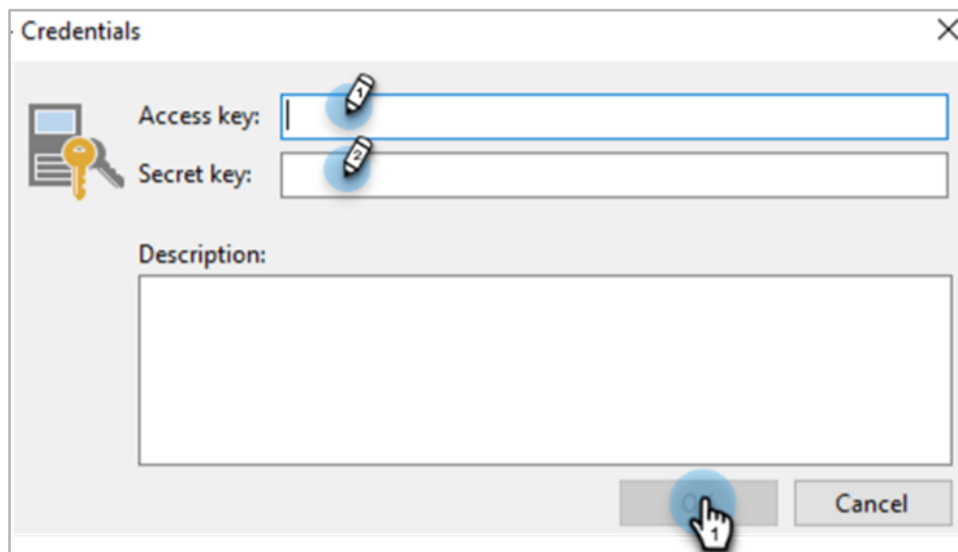


- Click **Add** and then **Amazon AWS access key**.



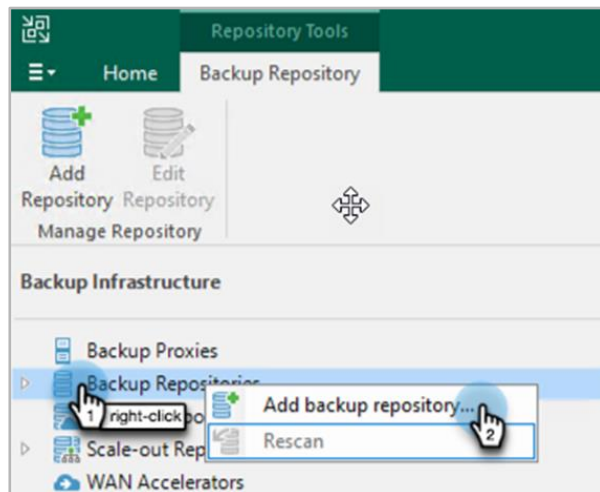
- Enter the **Access key** and **Secret key**, copied from the Cohesity Cluster UI, and click **OK**.
- Go to the Cohesity Cluster UI and copy the access key and secret key.

Cohesity Cluster UI → Settings → Access Management → User (which used to create the S3 View)

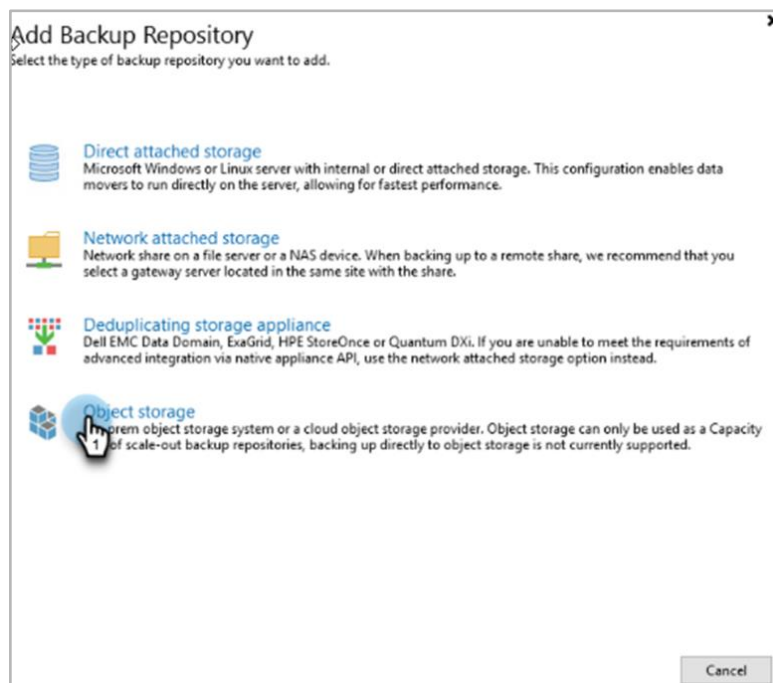


Create S3 Veeam Regular Backup Repository:

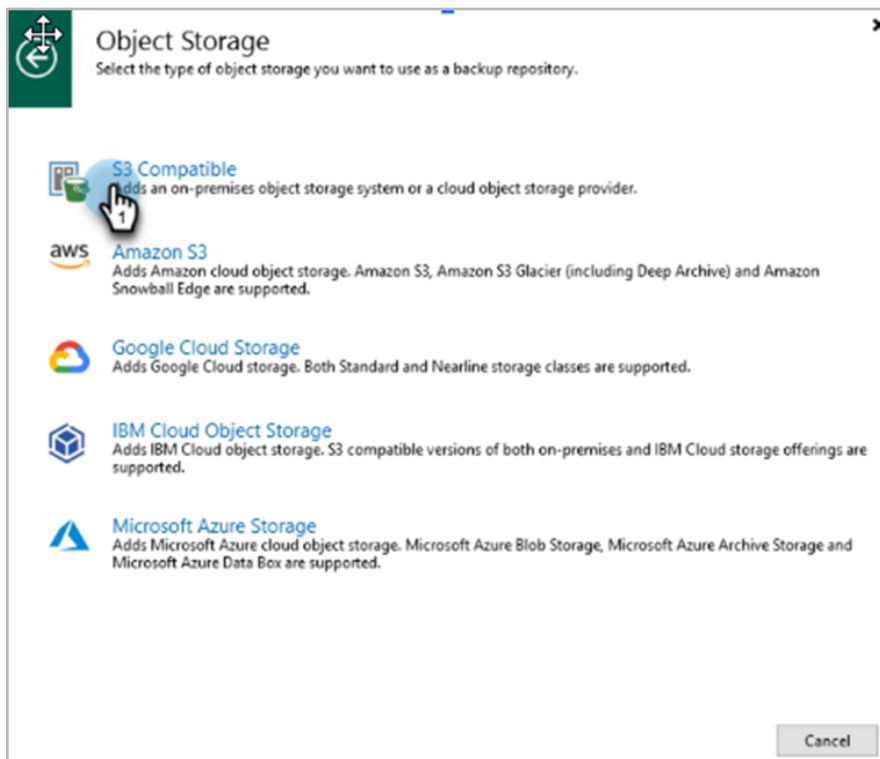
1. From the Backup Infrastructure section of the Veeam Management Console, right-click **Backup Repositories** and select **Add backup repository**.



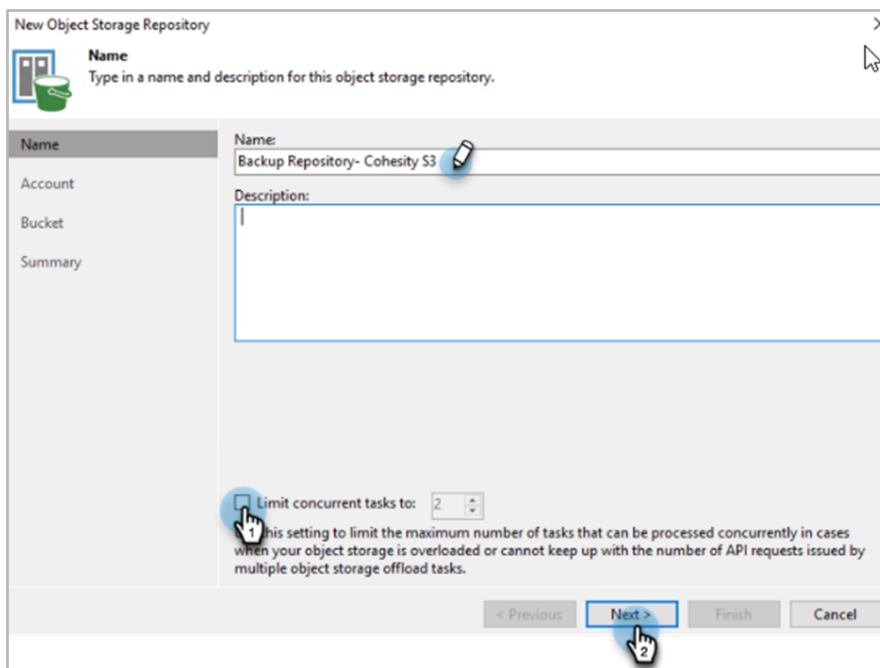
2. In the **Add Backup Repository** window, select **Object storage**.



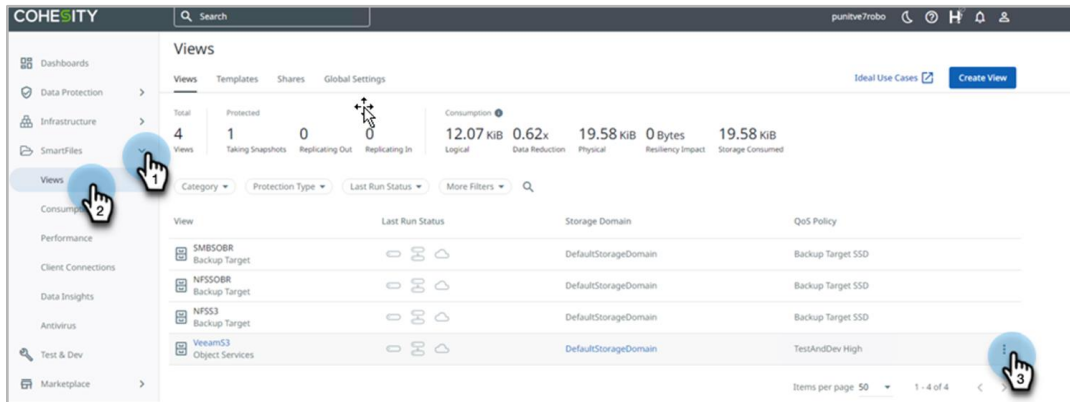
3. Click on **S3 Compatible** storage.



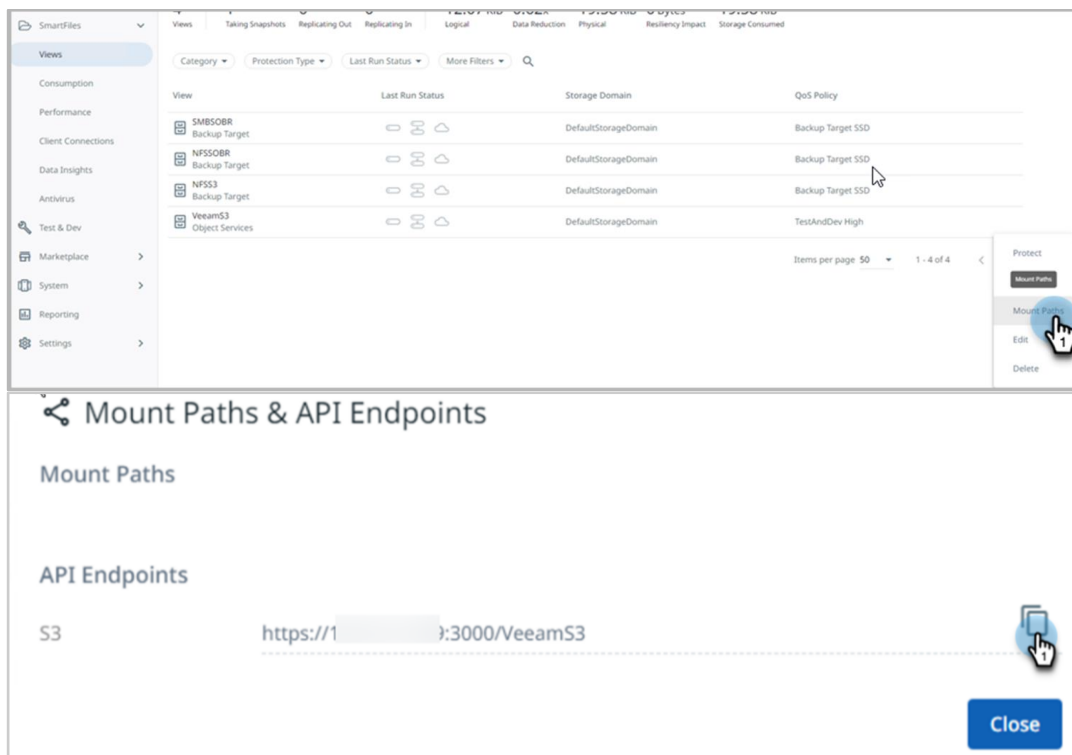
4. Name the repository and then click **Next** to continue. Un-check the option "Limit concurrent tasks to".



- Copy the mount path From the Cohesity Cluster UI. Expand **SmartFiles** and click **Views**. Click the three dots on the right.



- Click **Mount Paths** and copy it.



7. Under **Service Point**, Paste the copied Mount point from the Cohesity cluster UI and use the newly created cloud credentials. Click on next.
- Use the gateway server which has Access to the Object storage service.
 - Veeam Backup & Replication establishes a connection between Source data mover and destination storage repository by using the Gateway server to transfer the data.
 - Gateway server connects between the Backup server and Backup Repositories.
 - Gateway server must have faster Access to the destination storage.
 - For scale-out backup repositories, Veeam backup and Replication uses one gateway server per every extent.

Account
Specify account to use for connecting to S3 compatible storage system.

Name

Account

Bucket

Summary

Service point:

Region: us-east-1

Credentials: last edited: 4 days ago Add...
[Manage cloud accounts](#)

☐ Use the following gateway server:

(Backup server)

Select a gateway server to proxy access to the object storage system. If no gateway server is specified, all scale-out backup repository extents must have direct network access to the storage system.

< Previous Next > Finish Cancel

8. Create one folder in a Bucket and use one Bucket per SOBR. Select the Bucket that has the same name as the Cohesity S3 View. Click **Apply**.
 - a. Limit Object Storage Consumption: Use this option to put a soft limit on the Bucket.
 - b. Make Recent Backup Immutable: To make the backup immutable, you must enable Object Lock on the S3 Views. Check this option only if you want to use the object lock functionality.

New Object Storage Repository

Bucket
Specify object storage system bucket to use.

Name
Account
Bucket
Summary

Bucket: VeeamView **Browse...**

Folder: Backup_1 **Browse...**

☐ Limit object storage consumption to: 10 TB
This is a soft limit to help control your object storage spend. If the specified limit is exceeded, already running backup offload tasks will be allowed to complete, but no new tasks will be started.

☐ Make recent backups immutable for: 30 days
Protects recent backups from modification or deletion by ransomware, malicious insiders and hackers using native object storage capabilities. Object storage must support S3 Object Lock feature.

< Previous **Apply** Finish Cancel

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

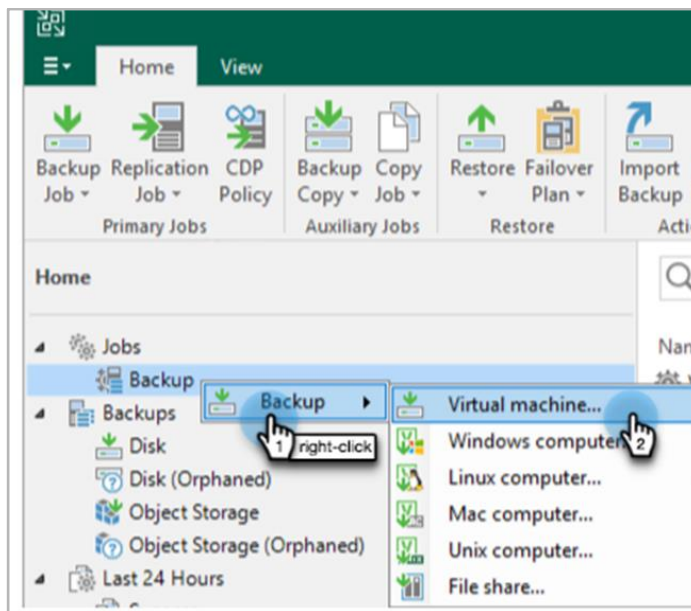
Configure Veeam Backup Jobs to Use Cohesity Storage

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

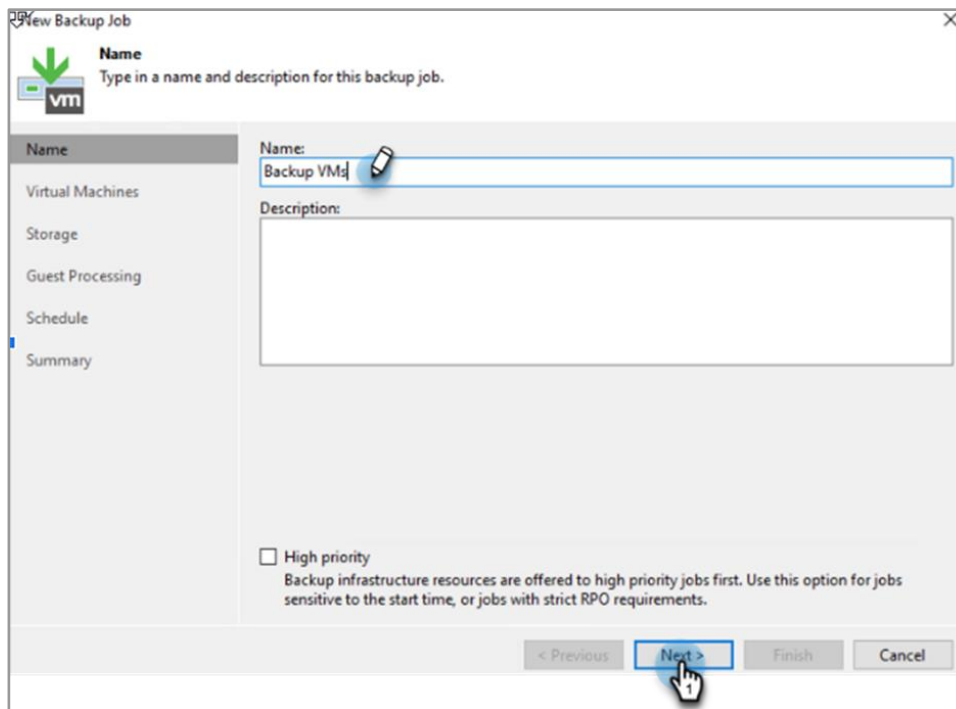
- Create a backup job and select the workloads.
- Select the backup repository.
- Change options in Advanced Settings.

To create and configure a Veeam backup job:

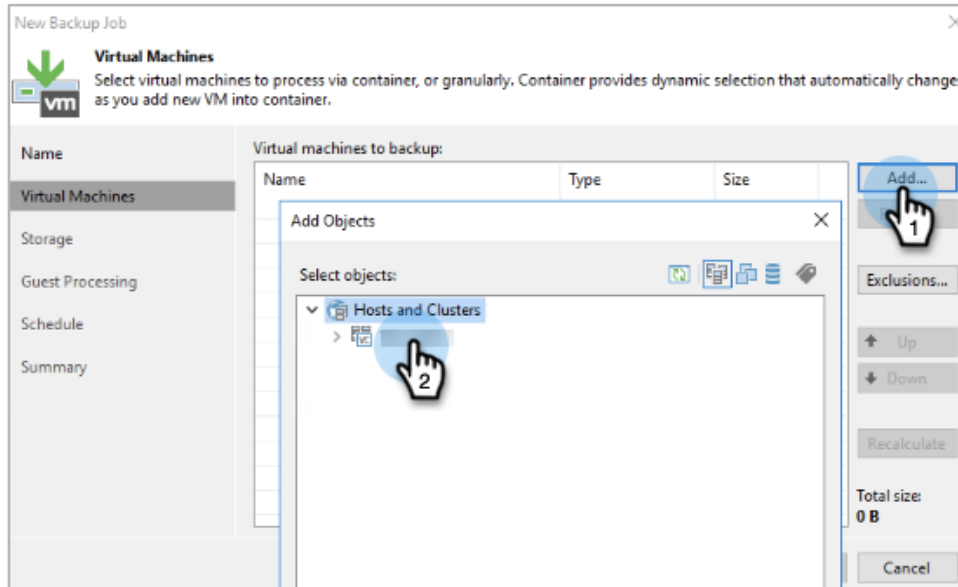
1. From the HOME section of the Veeam management console, right-click **Backup** and select **Virtual machine**.



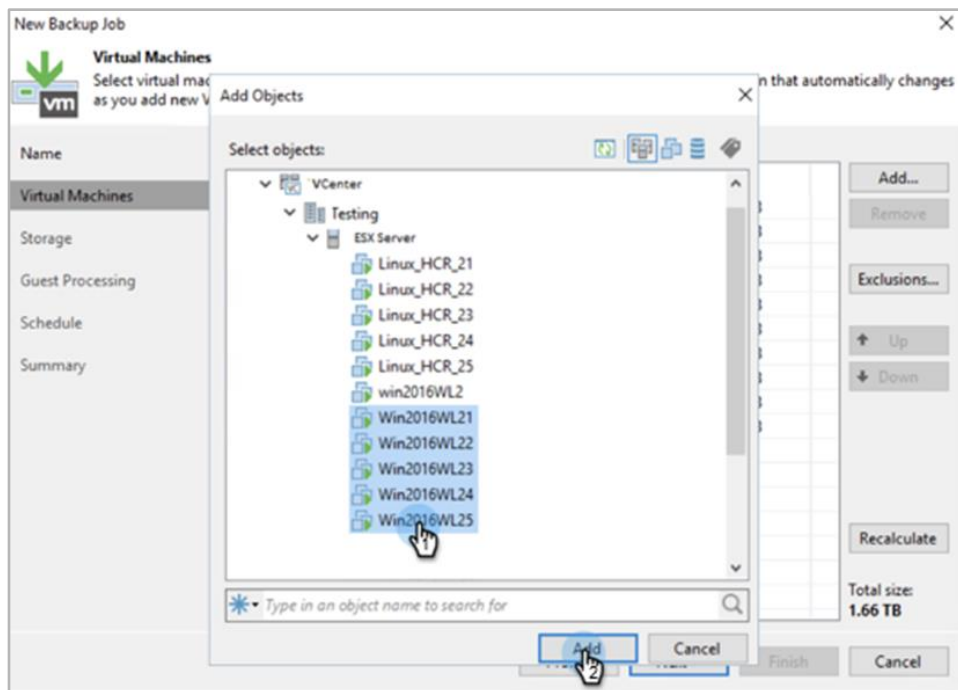
2. **Name** the new backup job and click **Next**.



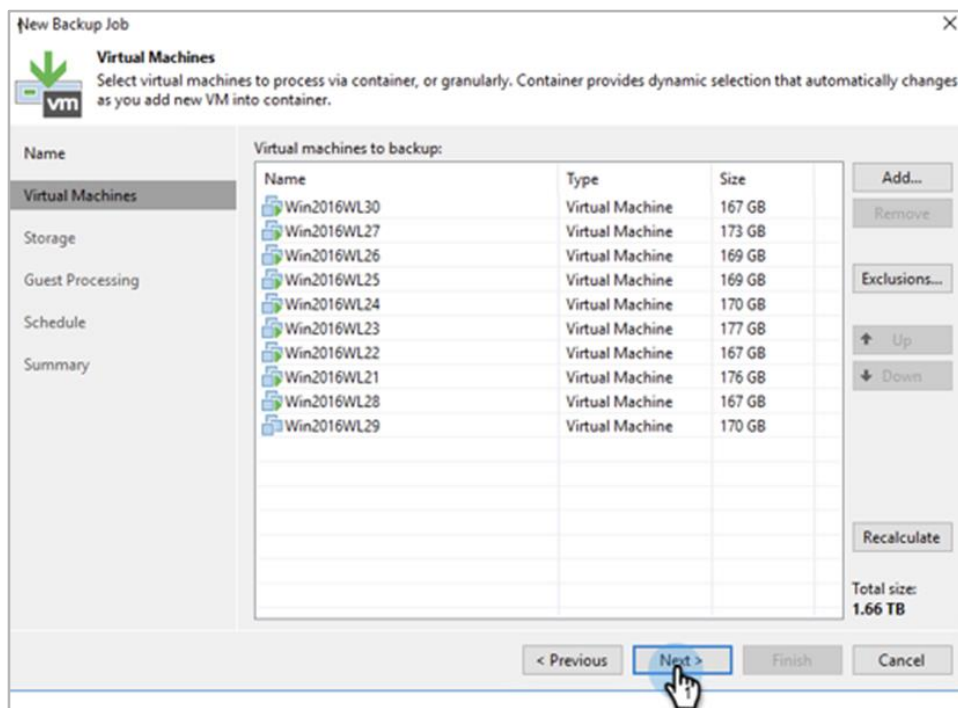
3. Click **Add** and select the ESXi Server that hosts the VMs that you need to back up.



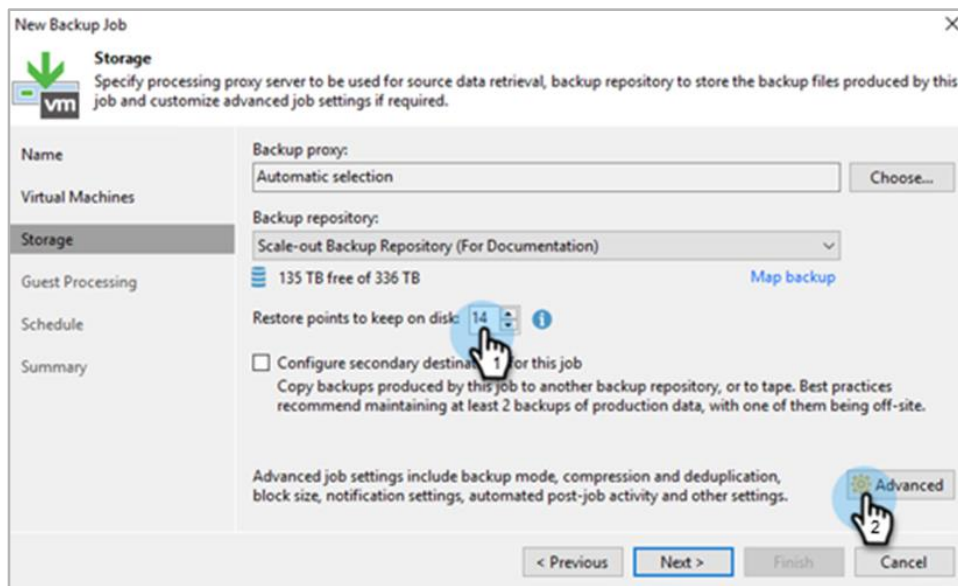
4. Select the VMs you want to back up and click **Add**.



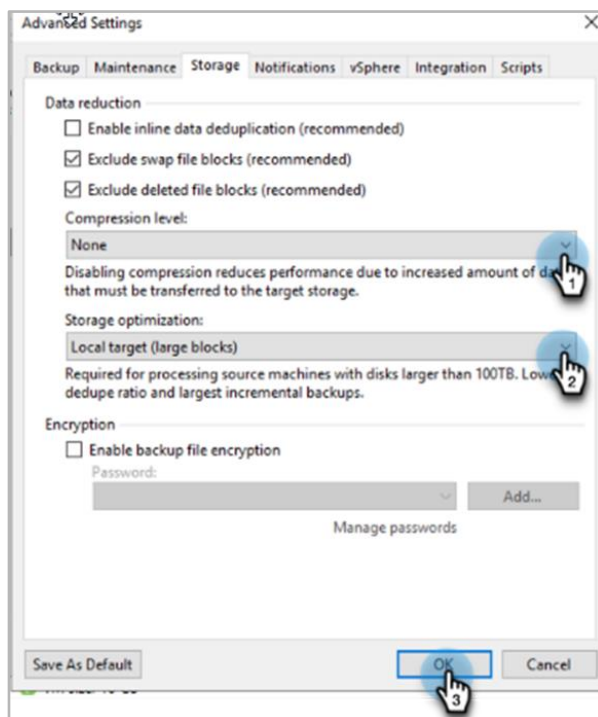
5. Review and verify the virtual machines you want to back up and click **Next**.



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



- 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**.

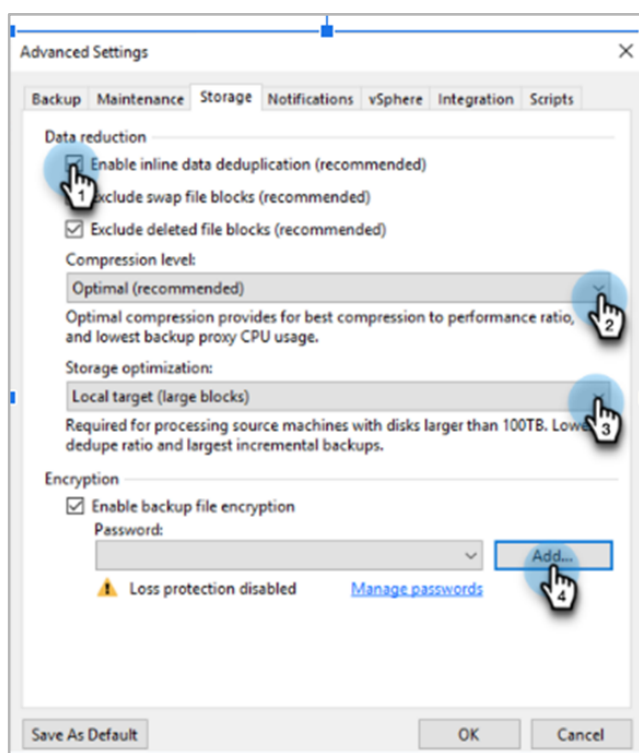


If you want to enable encryption on Veeam, use the following best practice.

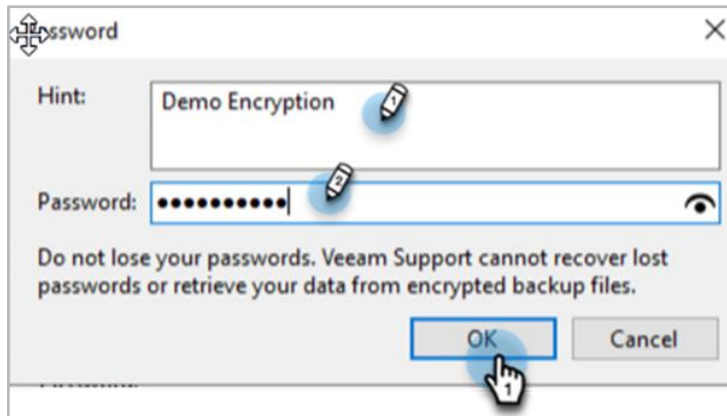
Table 3: Recommended configuration for Encryption

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

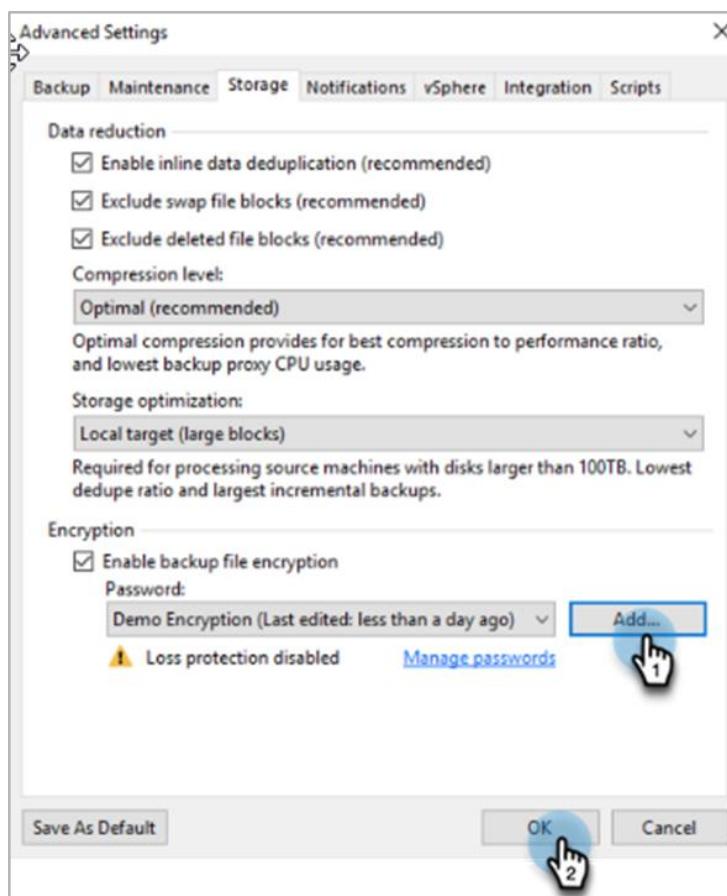
8. In the **Advanced Settings** window, check **Enable inline data deduplication**, as Veeam and Cohesity will perform the inline deduplication and inline compression at both sides. Ensure that the **Compression level** is set to **Optimal**, and that **Storage optimization** is set to **Local Target (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 an 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 4: 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, S3 and Cohesity Views.	High	SSD
		Low	
Backup Target	Sequential reads & write, for backups using Cohesity.	SSD	HDD
		High	
		Low	

Cohesity recommends the following QoS policies for each VBR repository type:

- For SMB, NFS and S3 SoBRs, use *Backup Target SSD*.
- For an NFS regular repository, use *TestAndDev High*.

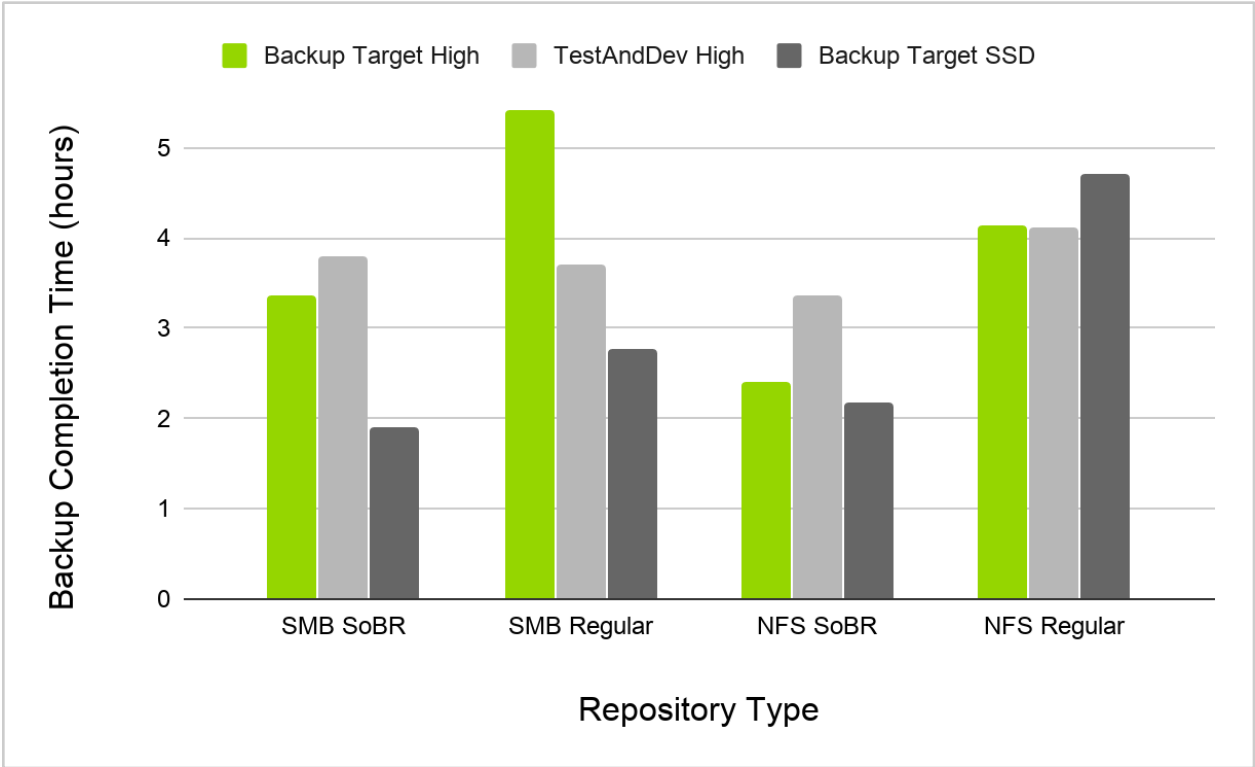
See our performance test results below, in [QoS Performance Comparison for SMB & NFS VBR Repositories](#).

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 15 below illustrates the completion time comparison between QoS policies.

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

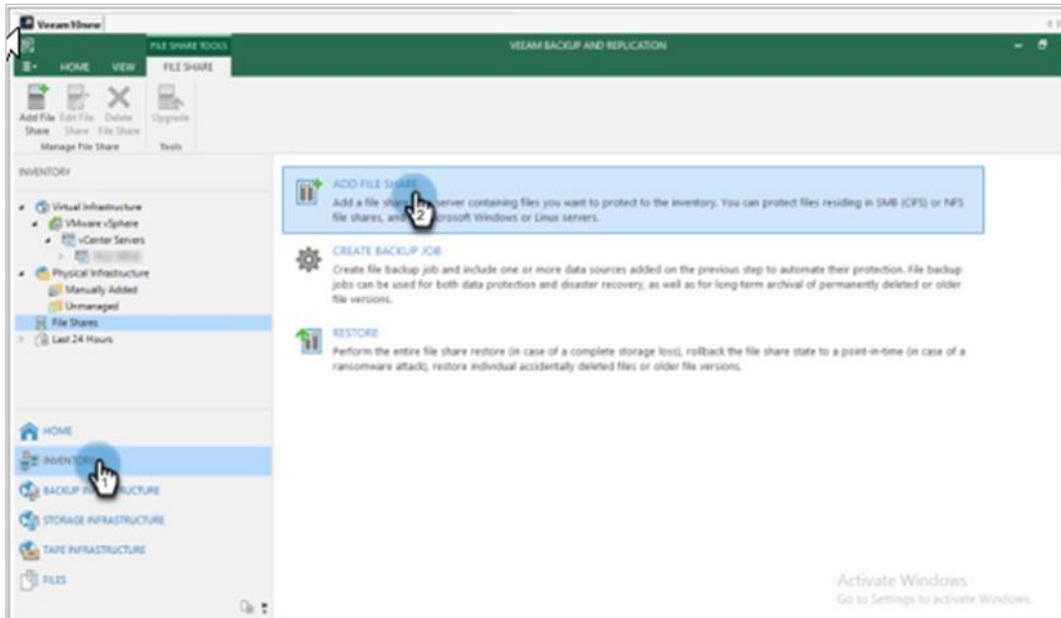
Figure 15: QoS Policy Comparison Chart



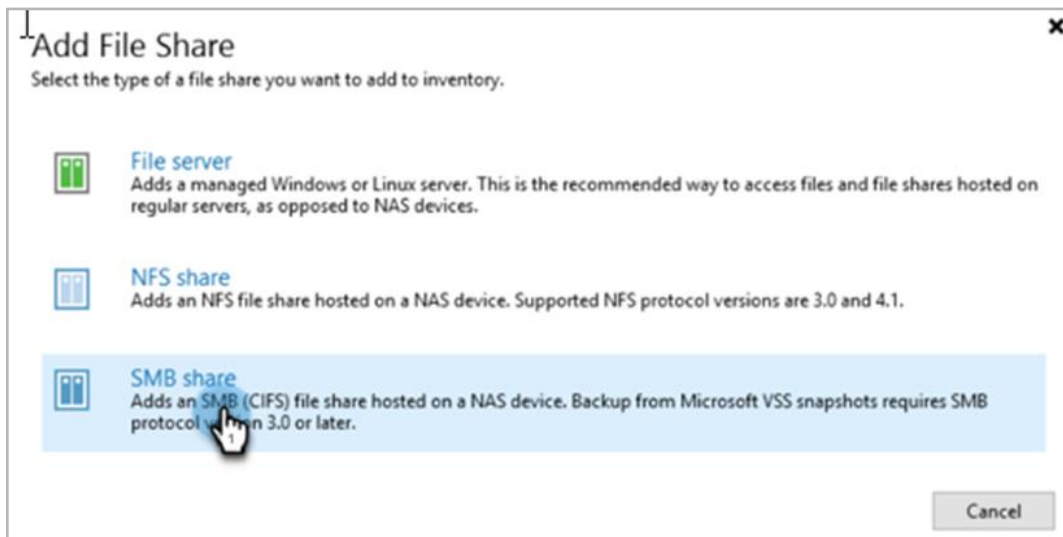
Appendix B: Manage SMB Shares in Veeam

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.

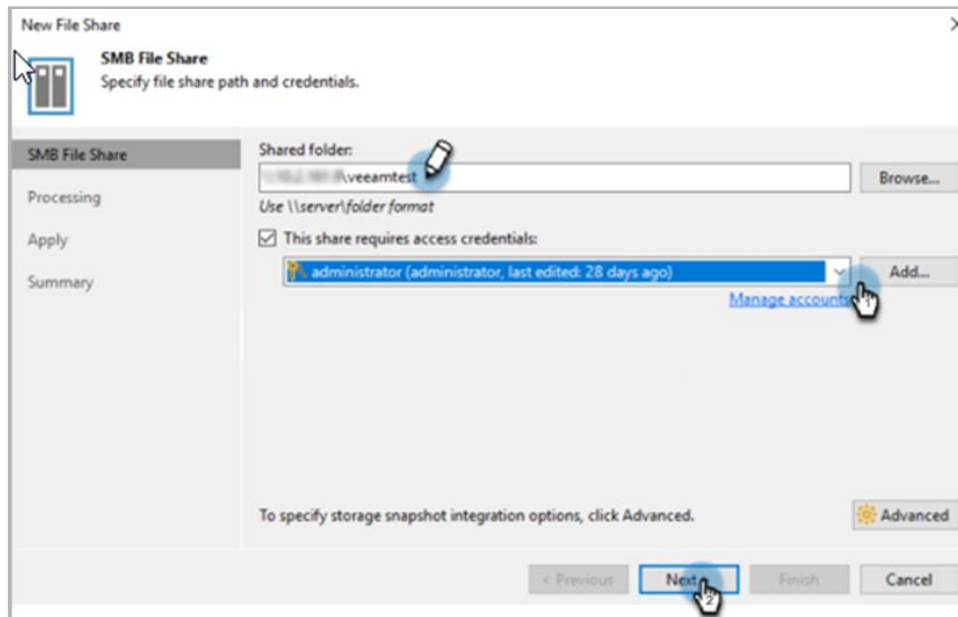
1. In the Veeam console, select **INVENTORY** and choose **ADD FILE SHARE**.



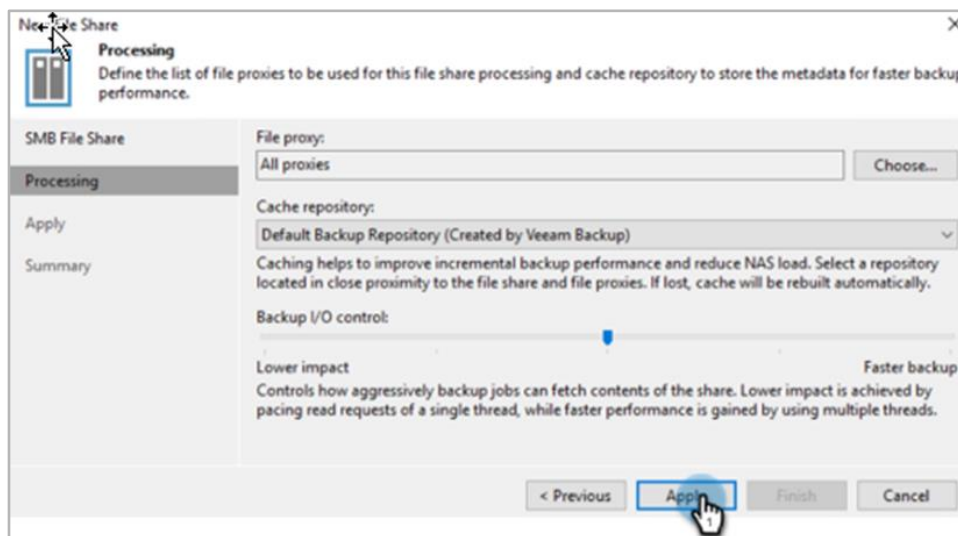
2. In the **Add File Share** page, Select **SMB share**.



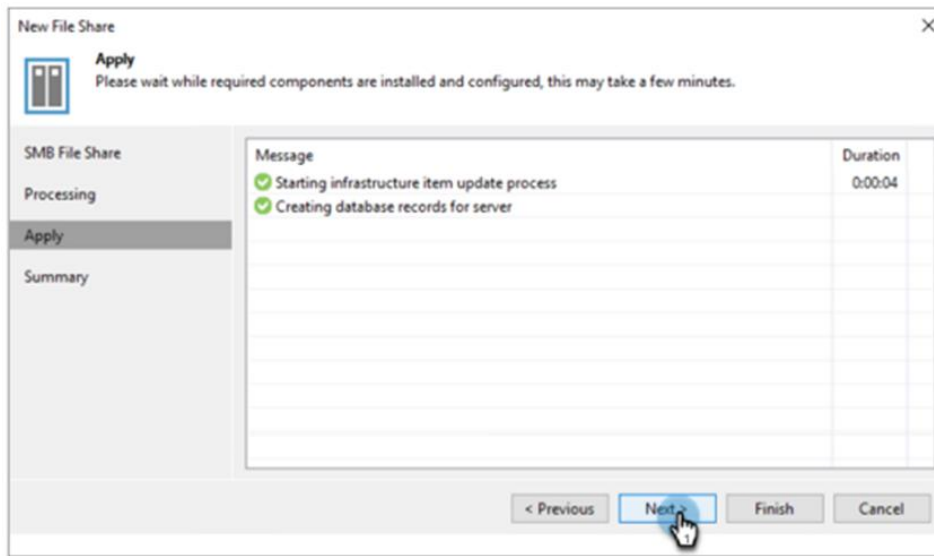
3. Add the path to the SMB share and select the credential. Click **Next**.



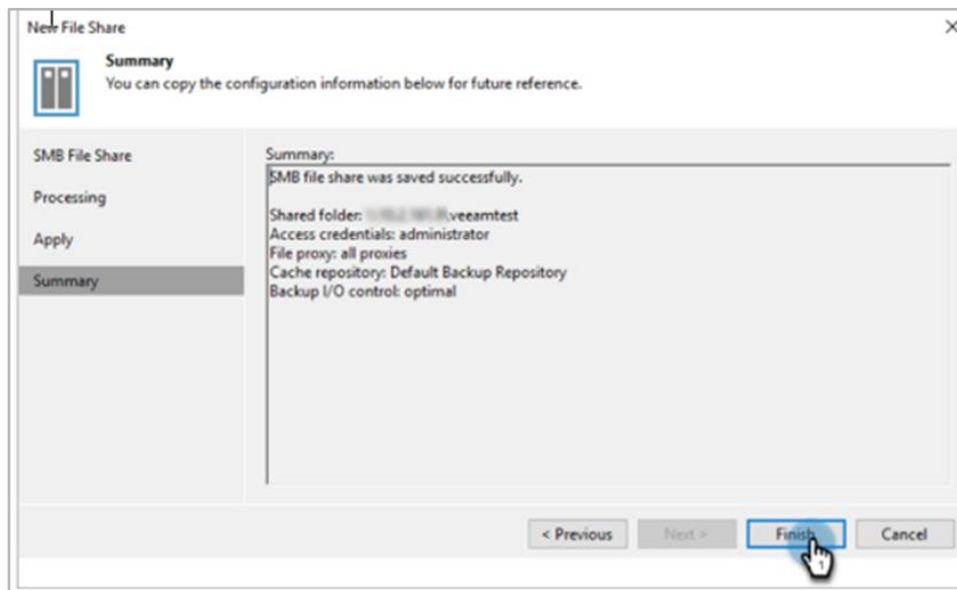
4. Click **Apply** to complete the configuration.



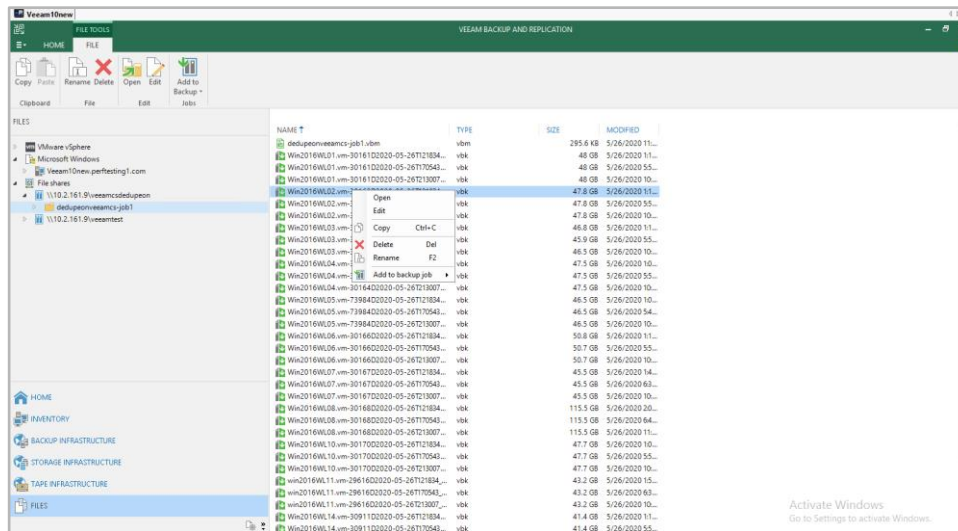
5. Wait for the components to install. Once it is completed, click **Next**.



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. Cohesity recommends 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.

Appendix D: Verify SmartFiles S3 View Connectivity

To verify whether the SmartFiles S3 View is accessible from the Veeam server and the Veeam proxies you use to write the backup to the S3 View, check the connectivity using the following command on telnet from the source machine (Veeam VBR and Proxy server) to port 3000:

```
telnet <Cohesity_Cluster_Vip> 3000
```

Your Feedback

Was this document helpful? [Send us your feedback!](#)

About the Authors

Punit Gupta is a Staff Technical Solution Engineer at Cohesity. In his role, Punit focuses on data protection, physical agents, Service Providers and Cohesity storage as a backup target.

Other major contributors included:

- Adaikkappan Arumugam, Dir, Product Solutions
- Karthick Radhakrishnan, Dir, Technical Solution Engineering.
- Subash Babu, Staff Technology Writer and Editor, Technical Solution Engineering.
- Aparna TA, Technical Writer, Technical Solution Engineering.

Document Version History

VERSION	DATE	DOCUMENT HISTORY
2.1	July 2024	Republishing
2.0	May 2023	SmartFiles S3 Updates
1.5	Dec 2021	Content update
1.4	Sept 2021	Content update
1.3	April 2021	Cohesity 6.6.0 version update
1.2	Aug 2020	Cohesity 6.5.1 version update
1.1	Mar 2020	Update
1.0	Feb 2020	First Release

ABOUT COHESITY

[Cohesity](#) is a leader in AI-powered data security and management. Aided by an extensive ecosystem of partners, Cohesity makes it easier to protect, manage, and get value from data – across the data center, edge, and cloud. Cohesity helps organizations defend against cybersecurity threats with comprehensive data security and management capabilities, including immutable backup snapshots, AI-based threat detection, monitoring for malicious behavior, and rapid recovery at scale. Cohesity solutions are delivered as a service, self-managed, or provided by a Cohesity-powered partner. Cohesity is headquartered in San Jose, CA, and is trusted by the world's largest enterprises, including six of the Fortune 10 and 44 of the Fortune 100.

Visit our [website](#) and [blog](#), follow us on [Twitter](#) and [LinkedIn](#) and like us on [Facebook](#).

© 2024 Cohesity, Inc. All rights reserved.

Cohesity, the Cohesity logo, SnapTree, SpanFS, DataPlatform, DataProtect, Helios, the Helios logo, DataGovern, SiteContinuity, DataHawk, and other Cohesity marks are trademarks or registered trademarks of Cohesity, Inc. in the US and/or internationally. Other company and product names may be trademarks of the respective companies with which they are associated. This material (a) is intended to provide you information about Cohesity and our business and products; (b) was believed to be true and accurate at the time it was written, but is subject to change without notice; and (c) is provided on an "AS IS" basis. Cohesity disclaims all express or implied conditions, representations, warranties of any kind.