Deployment and Configuration

Implementing the Dell PowerMax Veeam Plug-in for Veeam Backup & Replication

Snapshot storage integration for backup and recovery with Dell PowerMax in a VMware Infrastructure.

Abstract

This white paper discusses how to implement and operate the PowerMax Veeam® Plug-in for Veeam Backup & Replication™ in a VMware infrastructure. It covers the most common customer use cases.

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Dell PowerMax Engineering

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Revisions

Date	Description
August 2021	Initial release
June 2024	V1.1.6 support for REST 10
November 2024	Added note on XCOPY conflict

Acknowledgments

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Introduction

This paper will detail how to use the PowerMax Veeam Plug-in for Veeam Backup & Replication software version 1.1.6. Veeam Backup & Replication is a data protection and disaster recovery (DR) solution developed for virtual, physical and cloud environments. The PowerMax Plug-in[1] provides direct integration with Veeam Software by taking advantage of the local replication array technology known as TimeFinder. Specifically, the PowerMax Plug-in makes REST API calls to take SnapVX crash-consistent copies of datastores for the purposes of backup and recovery.

This paper will not replicate Veeam documentation, but it will focus on the storage array integration for backups on PowerMax. Some topics will still be covered for completeness, however, like application consistency in backups. In addition, Veeam offers virtual machine (VM) replication, but that capability is a host-based solution and is no way related to Dell SRDF and will not be covered. The Veeam documentation, in particular the “User Guide for VMware vSphere”, should be consulted for information on these advanced topics.

Note: The PowerMax Plug-in supports VMware environments and the Veeam Agent for Microsoft Windows (physical Windows server). It does not support Microsoft Hyper-V environments.

[1] The remainder of the document will abbreviate the official name “PowerMax Plug-in with Veeam Backup & Replication” to “PowerMax Plug-in”.

1 Veeam Backup & Replication

The following sections walk through the installation and configuration of the Veeam software followed by the PowerMax Plug-in installation as it is a separate download. Note that while the PowerMax Plug-in does not require a license, Veeam itself does.

1.1 Installation

Install Veeam Backup & Replication version 12.x software. While Dell recommends following the Veeam installation guide included in the Veeam reference section, an example is provided here for completeness. This particular installation version 12.1.

1.2 Veeam software setup

Veeam's software is provided as an ISO. Veeam runs on Windows (see the user guide for supported versions) in either a physical or virtual environment. In the following setup, Windows Server 2022 is employed. Be aware that this is only an example, and depending on a user's particular situation and environment, their screens may not appear in the exact order shown below, or even at all.

Here, the ISO is mounted from a content library in vCenter. The version is noted in Figure 1.

Figure 1. Veeam Backup & Replication software version

Begin by executing Setup.exe in the root directory shown in Figure 2.

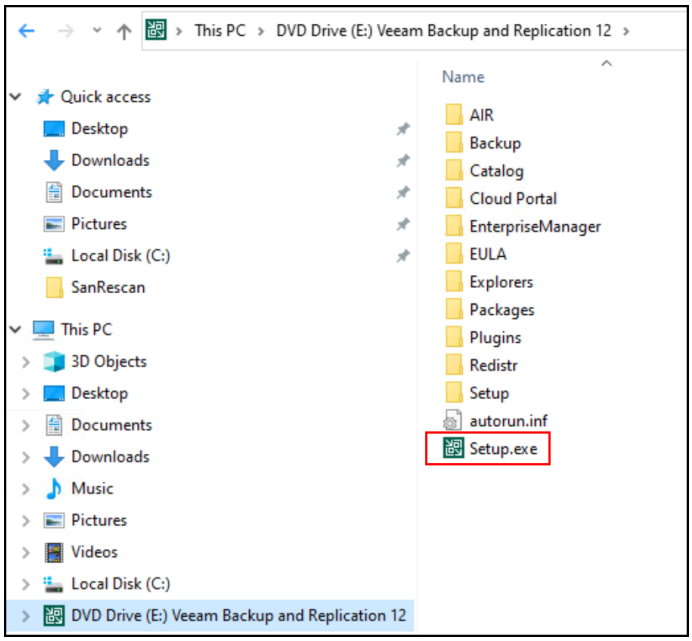


Figure 2. Veeam Backup & Replication setup

The user is presented with a number of software options for installation. Here, in Figure 3, select **Install Veeam Backup & Replication**.

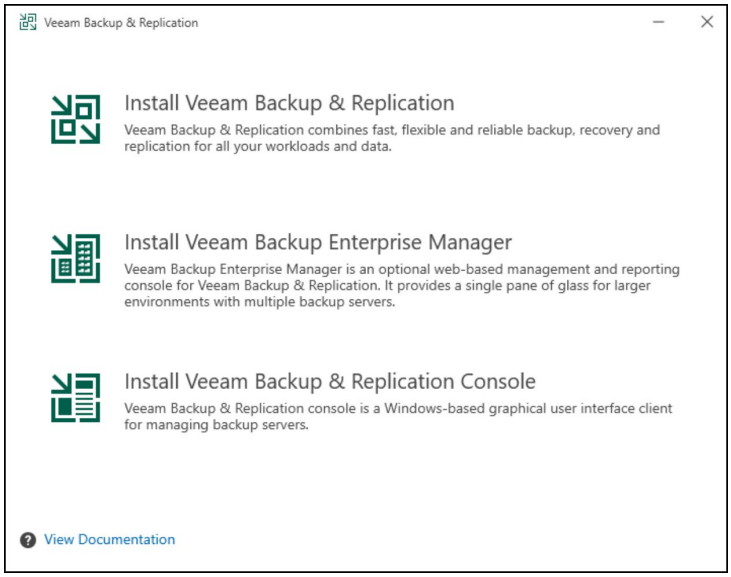


Figure 3. Veeam Backup & Replication wizard: Step 1

Accept the Veeam license agreement in Figure 4 and then supply the license file for Veeam in Figure 5.

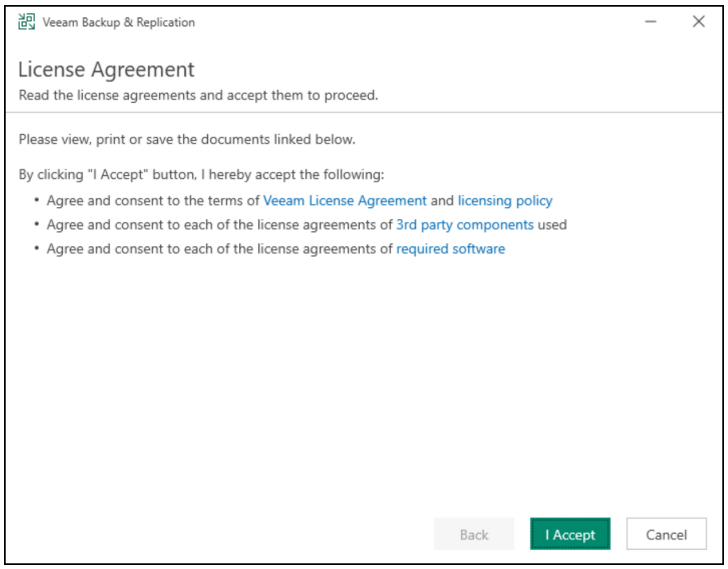


Figure 4. Veeam Backup & Replication wizard: Step 2

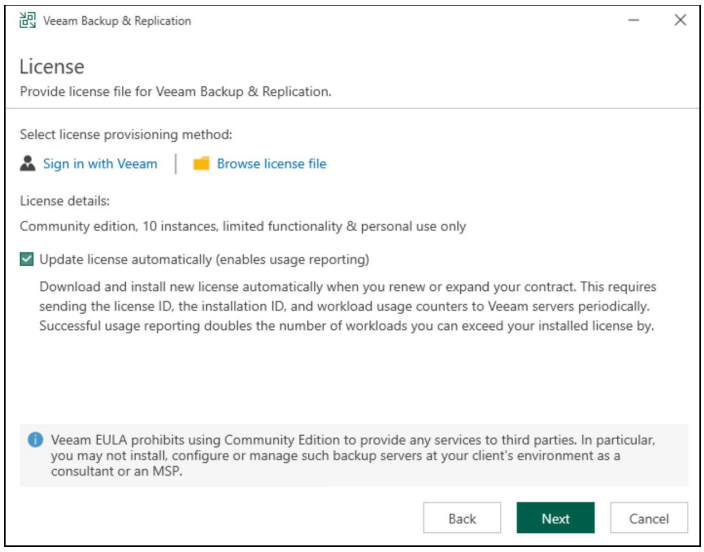


Figure 5. Veeam Backup & Replication wizard: Step 3

In the background, Veeam will now check prerequisites. If these prerequisites are satisfied, the screen shown in Figure 6 will appear; otherwise resolve the missing features before continuing.

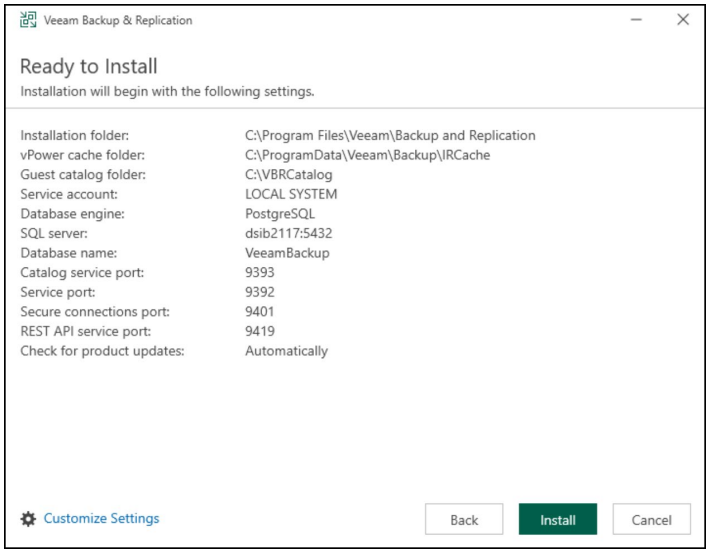


Figure 6. Veeam Backup & Replication wizard: Step 4

Veeam will install the necessary software and display Figure 7 when complete.

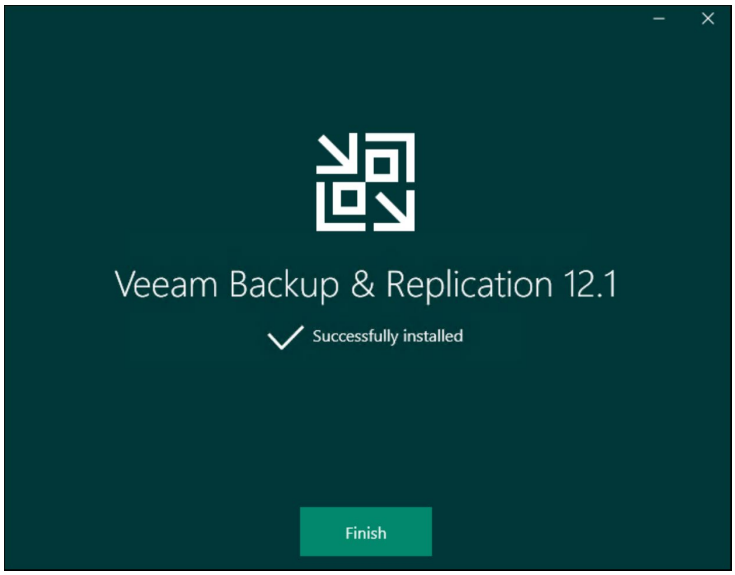


Figure 7. Veeam Backup & Replication wizard: Complete

To access the console, find the icon on the desktop and double-click. The fields shown in Figure 8 should self-fill, including the checkbox entitled “Use Windows session authentication.” Select **Connect.** Figure 9 shows the result.

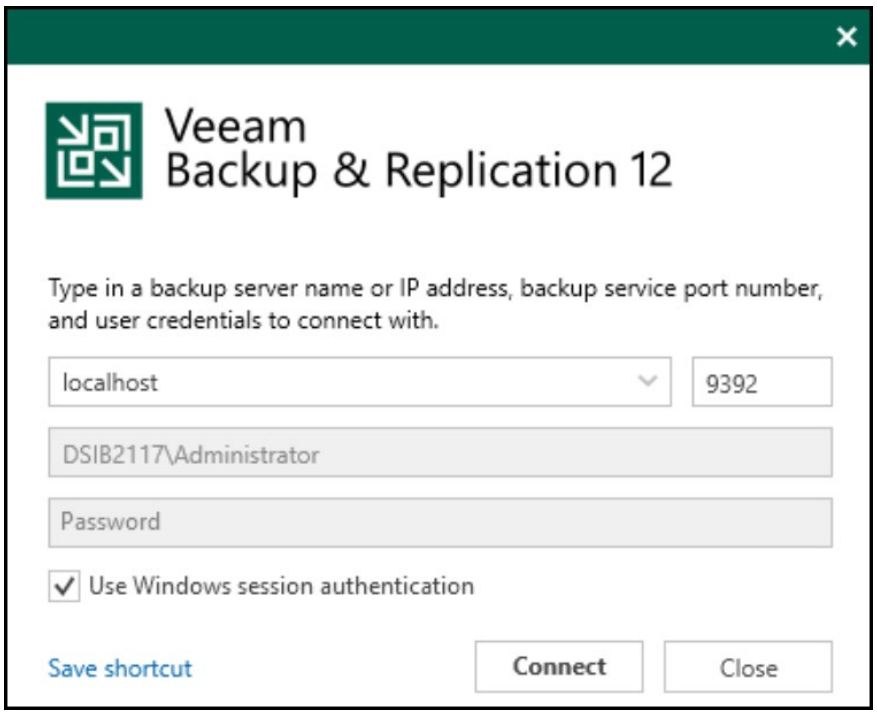


Figure 8. Veeam console login

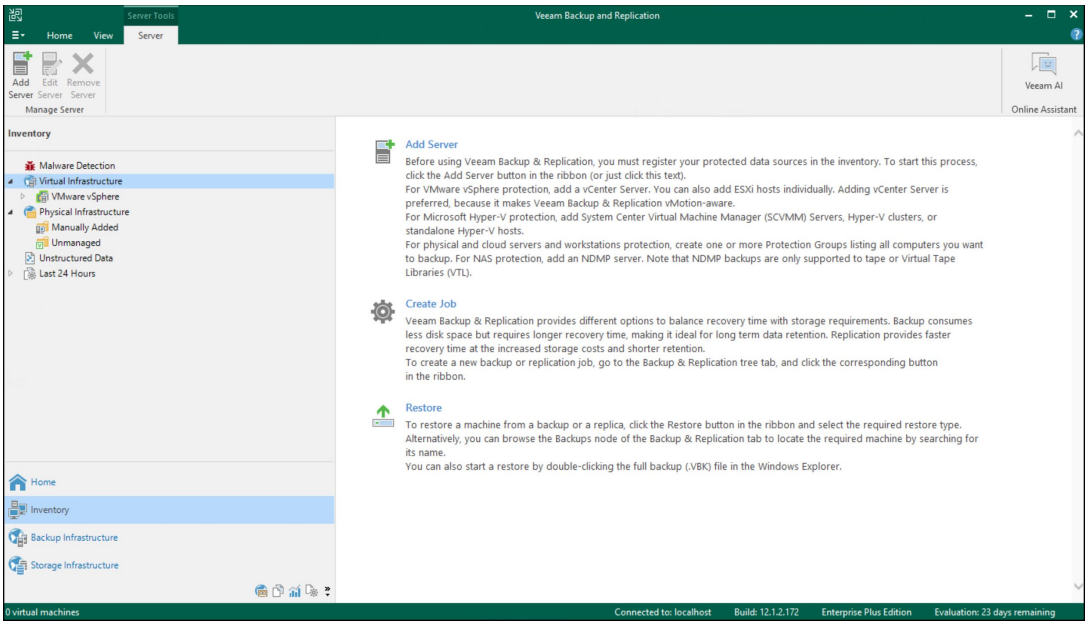


Figure 9. Veeam console

Next, install the PowerMax Plug-in.

1.3 PowerMax Plug-in software setup

After the installation of the Veeam Backup & Replication software, download the Dell PowerMax Plug-in for Veeam Backup & Replication from Veeam's website at https://www.veeam.com/data-center-availability-suite-download.html and under the **Storage Plug-ins** tab. The PowerMax Plug-in is delivered as a ZIP file. Unzip the single EXE file on the same host as the Veeam software. Double-click on the EXE file to begin the installation.

The InstallShield Wizard is straightforward and requires little input. Hit **Next** as shown in Figure 10.

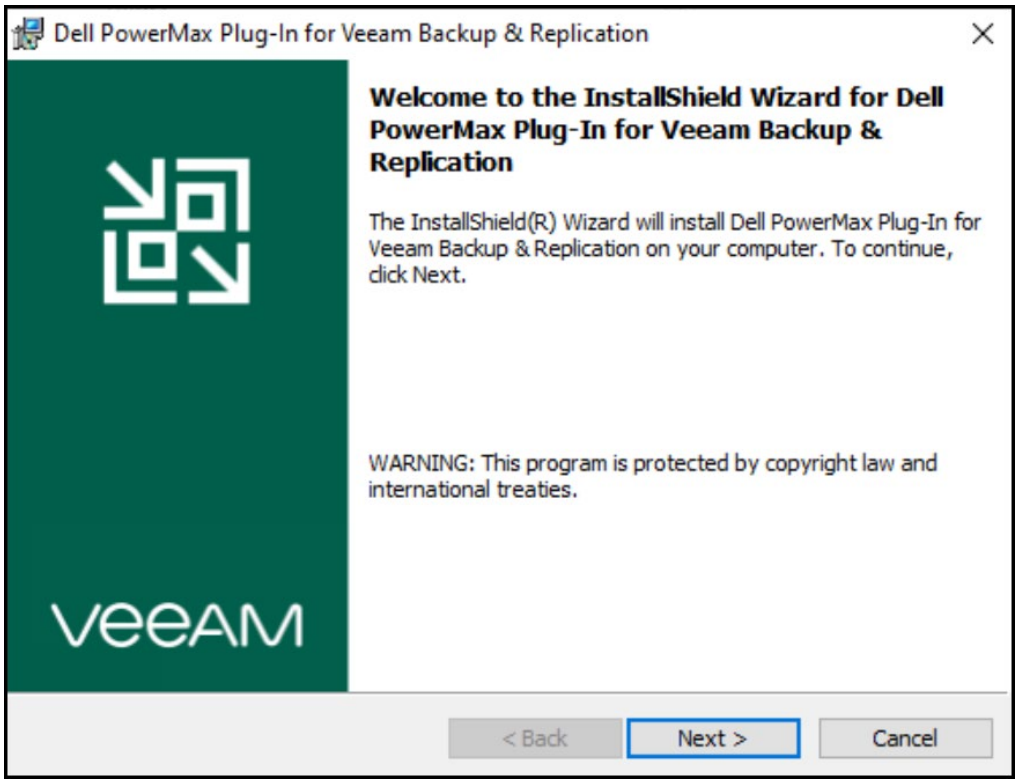


Figure 10. PowerMax Plug-in setup wizard: Step 1

The following screen is the generic license for the storage Plug-ins. Change the radio button to accept the license and then click Next as shown in Figure 11.

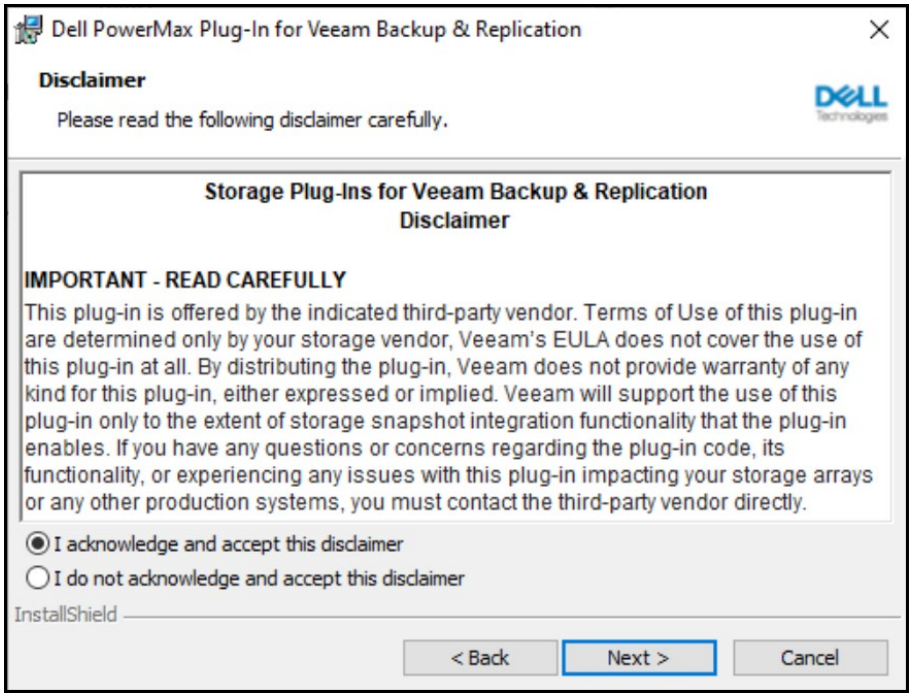


Figure 11. PowerMax Plug-in setup wizard: Step 2

The Plug-in is now ready for installation. Hit **Install** as shown in Figure 12.

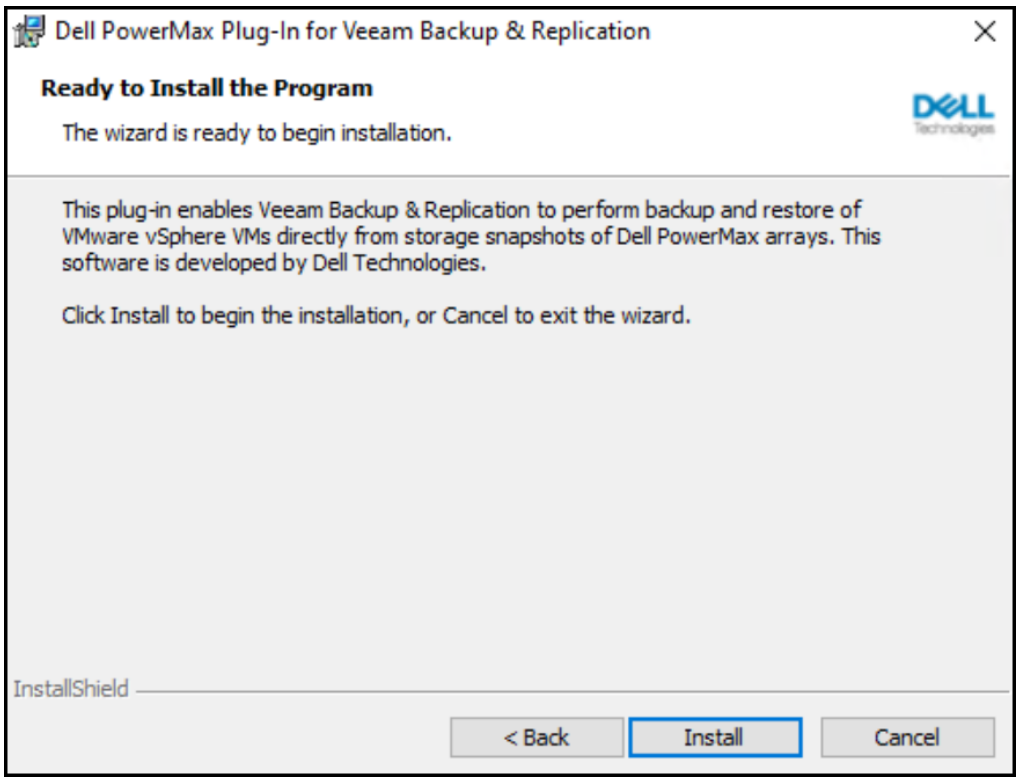


Figure 12. PowerMax Plug-in setup wizard: Step 3

As the program copies over some DLLs into the Windows directory **…\Plugins\Storage\Dell PowerMax**, it will complete quickly and present the final screen as shown in Figure 13.

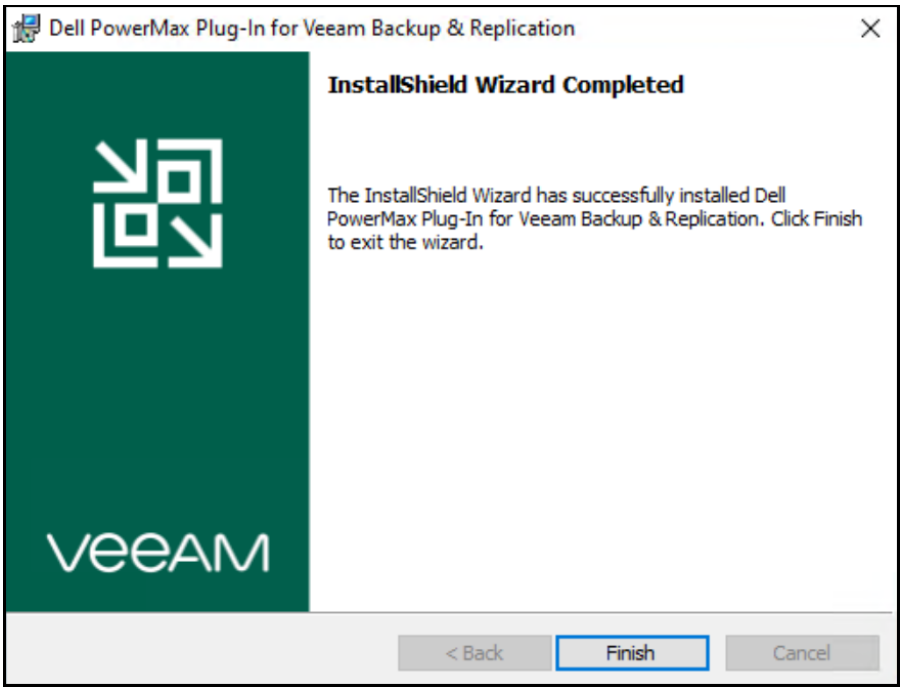


Figure 13. PowerMax Plug-in setup wizard: Step 4

1.4 Upgrades

New versions of the PowerMax Plug-will be posted to the Veeam website as they are developed. The setup program will automatically upgrade this software.

When upgrading from version 1.0.x of the PowerMax Plug-in to 1.1.x, there is an important change in functionality which may impact some customers. As part of the configuration instructions, users are required to create a masking view for any proxies or ESXi hosts (from registered vCenters) with a storage group name prefixed with "VEEAM_". The 1.0.x version of the PowerMax Plug-in is case insensitive, just like Unisphere, so capital letters are not required. Version 1.1.x of the PowerMax Plug-in, however, IS case sensitive (Unisphere is still case insensitive). Therefore, if there are any Veeam storage groups that do not use capitalized letters for the prefix (VEEAM_), they must be updated prior to the upgrade, otherwise Veeam operations using these groups will fail. This is a two-step process because while you can rename a storage group online either in Unisphere or CLI, neither the UI nor CLI will permit simply changing lower case to upper case as it views them the same (case insensitive). Instead, rename the group to a temporary name, then change it back to “VEEAM_", using all capital letters.

2 Adding VMware vCenter

Begin configuring Veeam by adding the vCenters that will be involved in backup and restore. First, navigate to the **INVENTORY** screen in the Veeam console. Highlight **Virtual Infrastructure** in the left-hand panel and select **Add Server** as shown in Step 1.

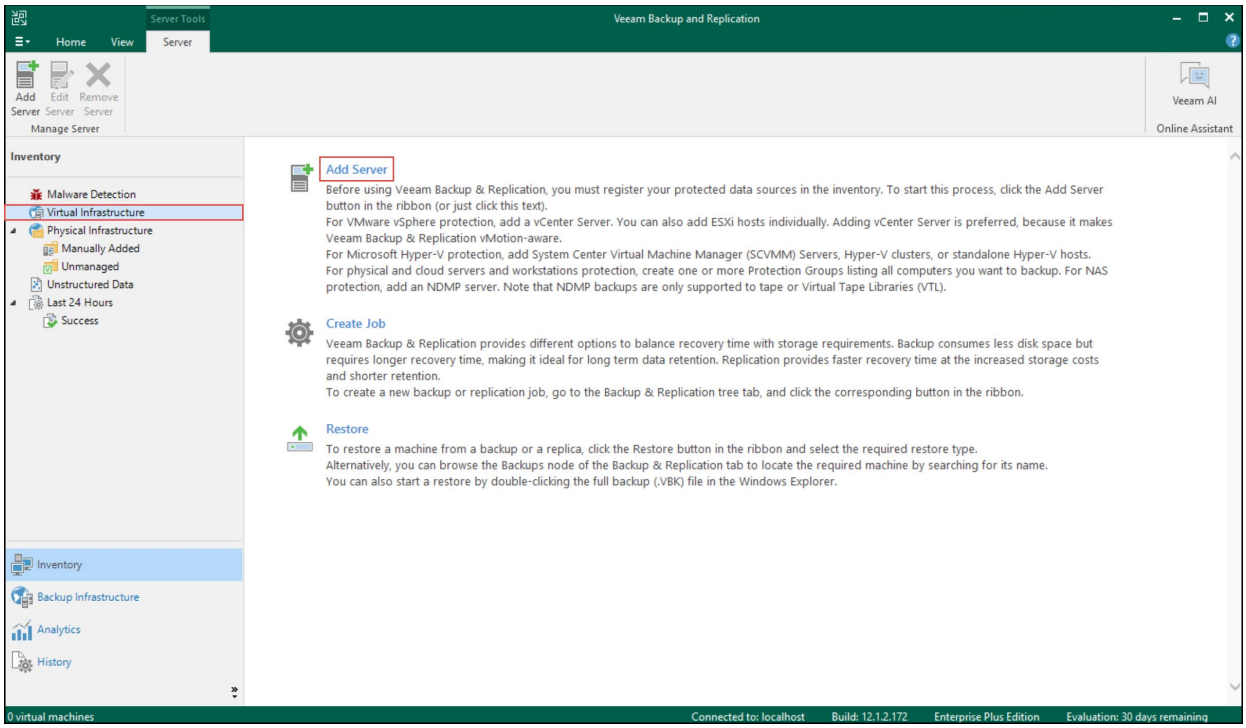


Figure 14. Adding vCenter in Veeam Console: Step 1

Next in Figure 15, select **VMware vSphere** as shown in Step 2. Note that the other listed servers are not integrated with the PowerMax Plug-in.

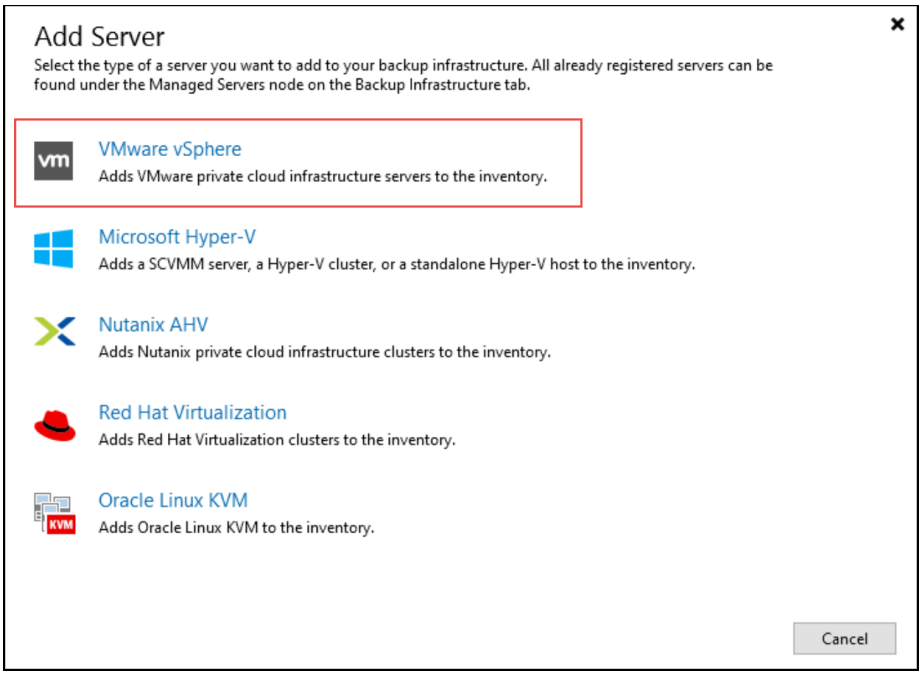


Figure 15. Adding vCenter in Veeam Console: Step 2

There are two options for vSphere, either the vCenter (vSphere) or Cloud Director as shown in Figure 16. The environment described in this paper uses only vCenters so that is selected in Step 3.

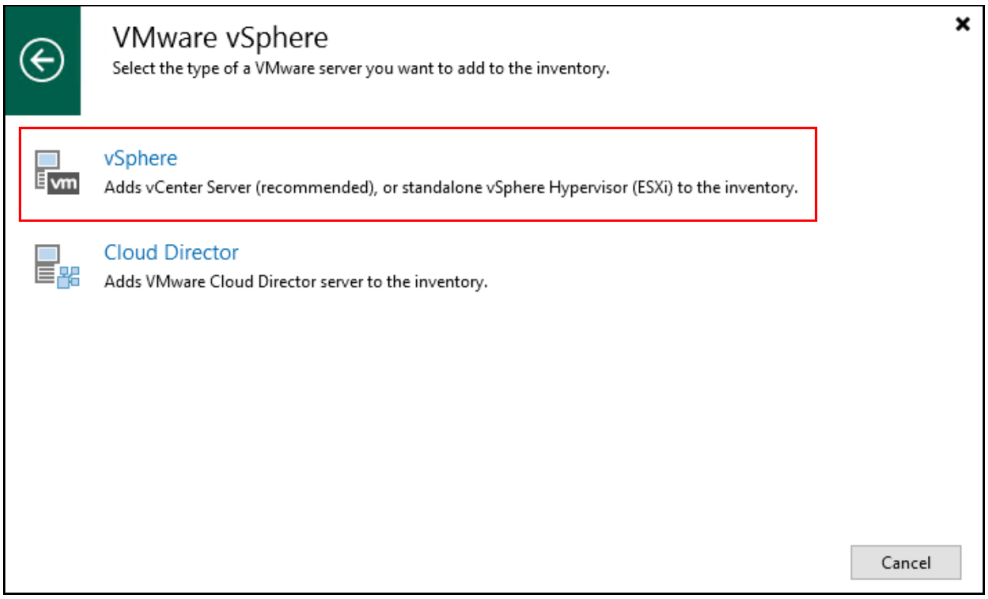


Figure 16. Adding vCenter in Veeam Console: Step 3

In Step 4, with either the IP or the FQDN, enter the vCenter. Veeam will automatically populate the description with **Created by <user> at <date/timestamp>**. Adjust the description if desired as shown in Figure 17.

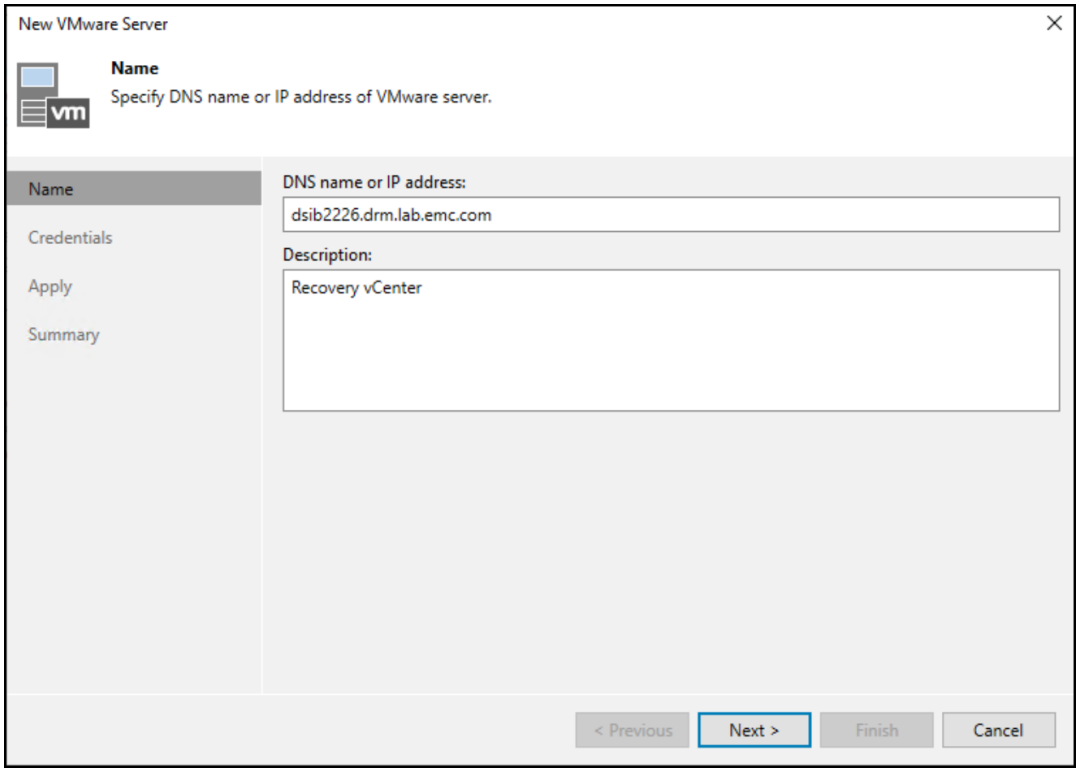


Figure 17. Adding vCenter in Veeam Console: Step 4

Step 5 in Figure 18 covers adding the credentials for vCenter. Select **Add** to specify the credentials according to how vCenter is configured for authentication. The pop-up dialog in uses the administrator user for the vCenter. Once again, the description can be adjusted as desired. Select **Apply**.

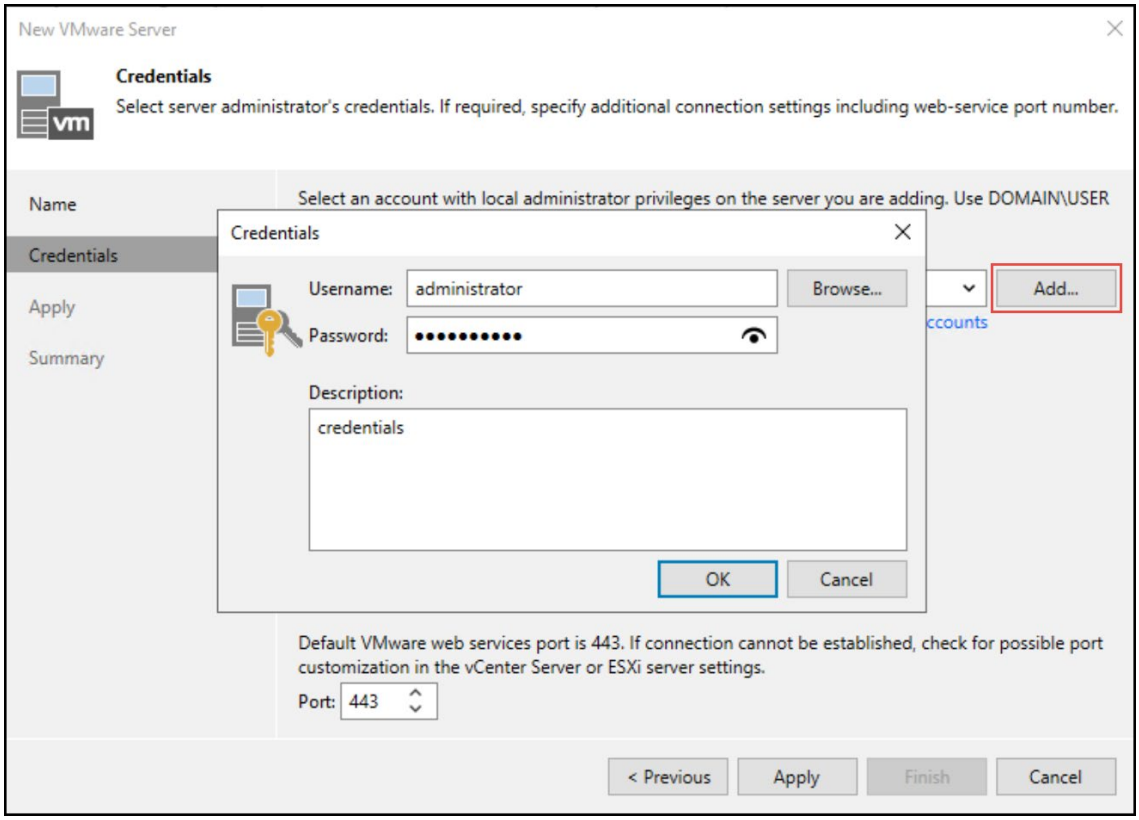


Figure 18. Adding vCenter in Veeam Console: Step 5

Veeam will attempt to validate the credentials against vCenter in Step 6 as shown in Figure 19. A certificate warning may appear depending on the environment. In this lab, the certificate is untrusted and must be accepted to continue.

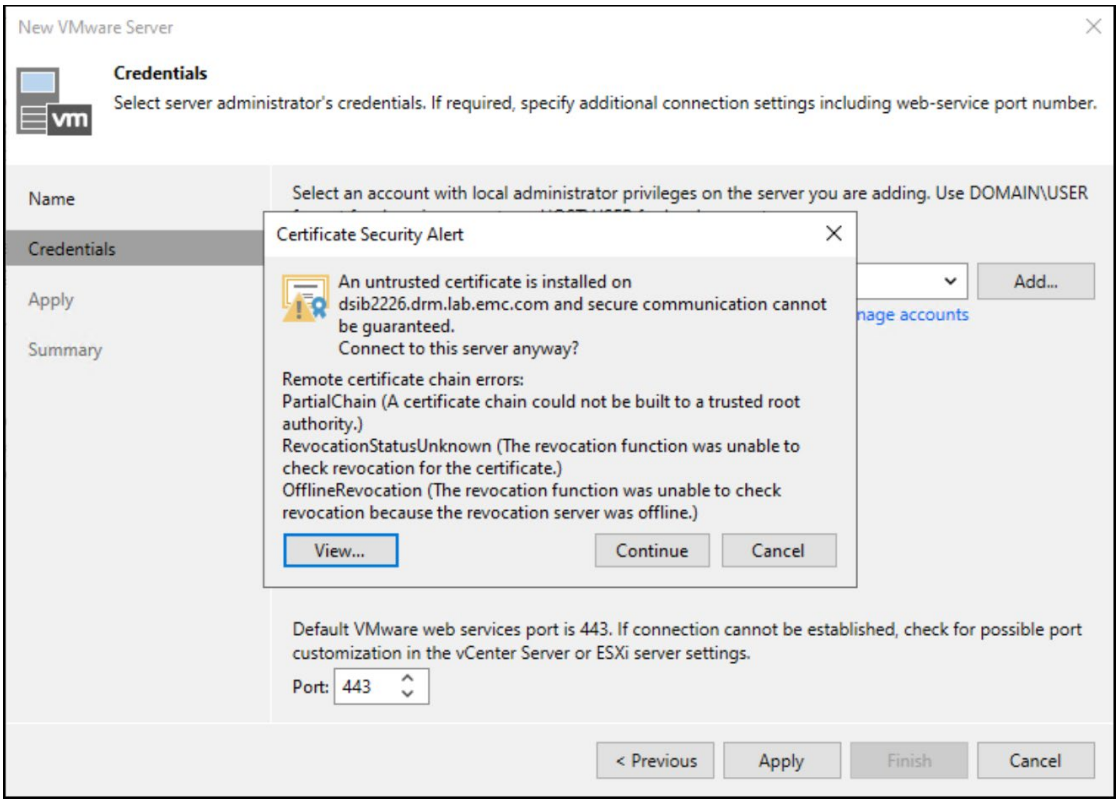


Figure 19. Adding vCenter in Veeam Console: Step 6

In step 7 in Figure 20, Veeam collect information about the environment before providing the summary.

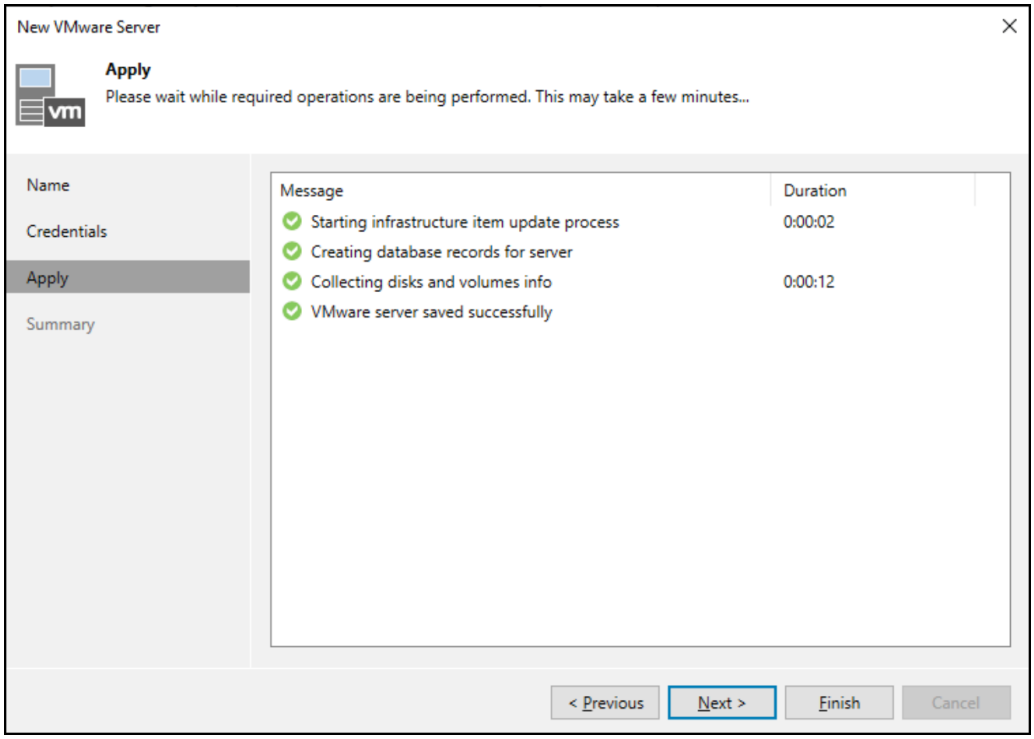


Figure 20. Adding vCenter in Veeam Console: Step 7

Select **Finish** to complete adding the vCenter in Figure 21. Adding vCenter in Veeam Console: Summary. Repeat the wizard for any additional vCenters that need to be added to Veeam for backup and recovery purposes.

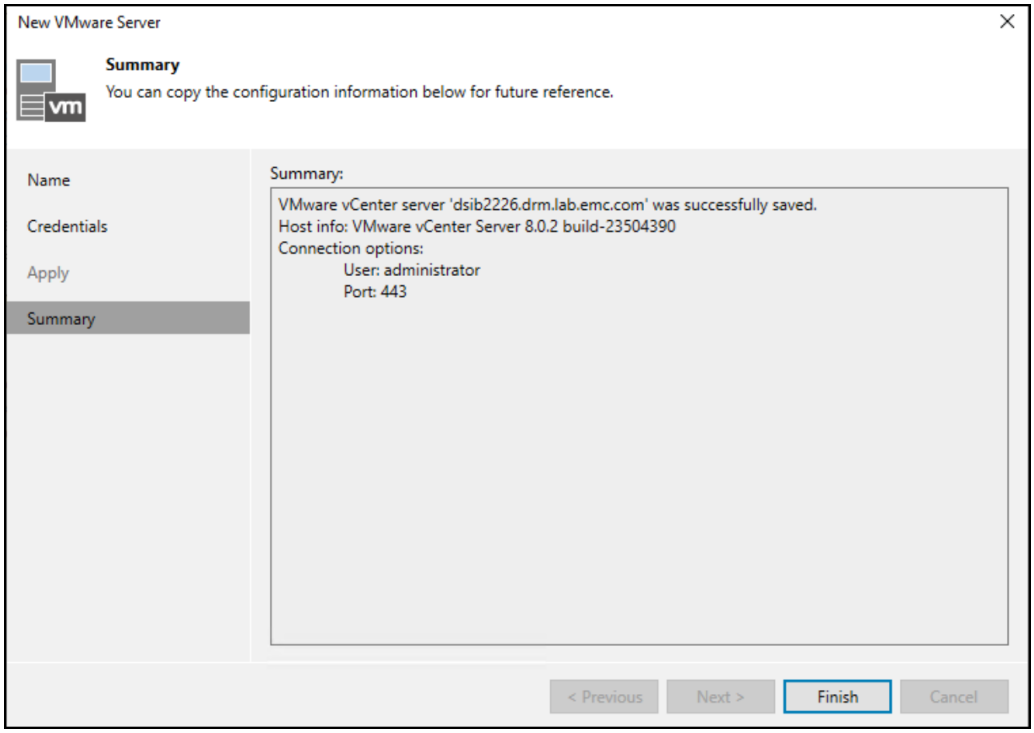


Figure 21. Adding vCenter in Veeam Console: Summary

2.1 Viewing VMs

Much like in vSphere Client, Veeam will show all the VMs in vCenter arranged in a hierarchy. Figure 22 shows the VMs at the cluster level and provides some general information about each one. From this view, the user executes activities like backups and restores.

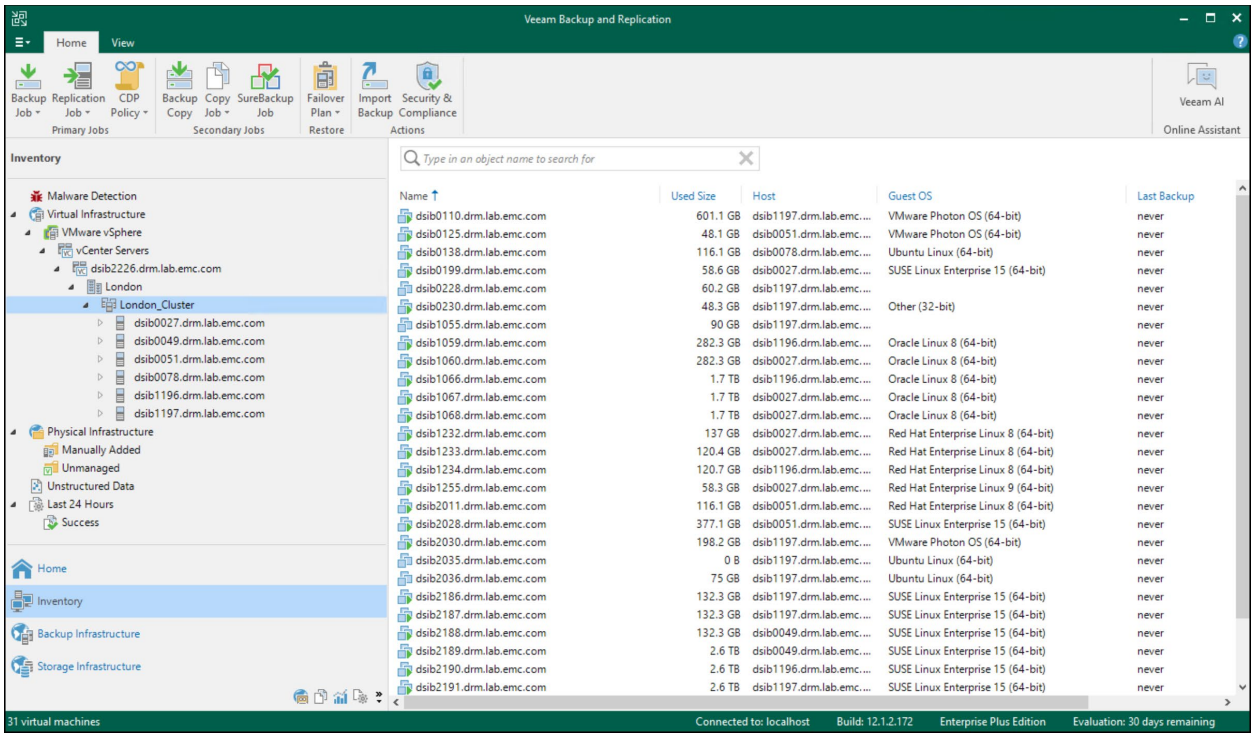


Figure 22. vCenter hierarchy in Veeam

2.2 Viewing history

To view running or completed jobs, access the **History** panel as shown in Figure 23. The system jobs will be the host and storage discovery while other jobs are broken into backup or storage snapshot jobs. The latter refers to manual snapshots that were taken against a device.

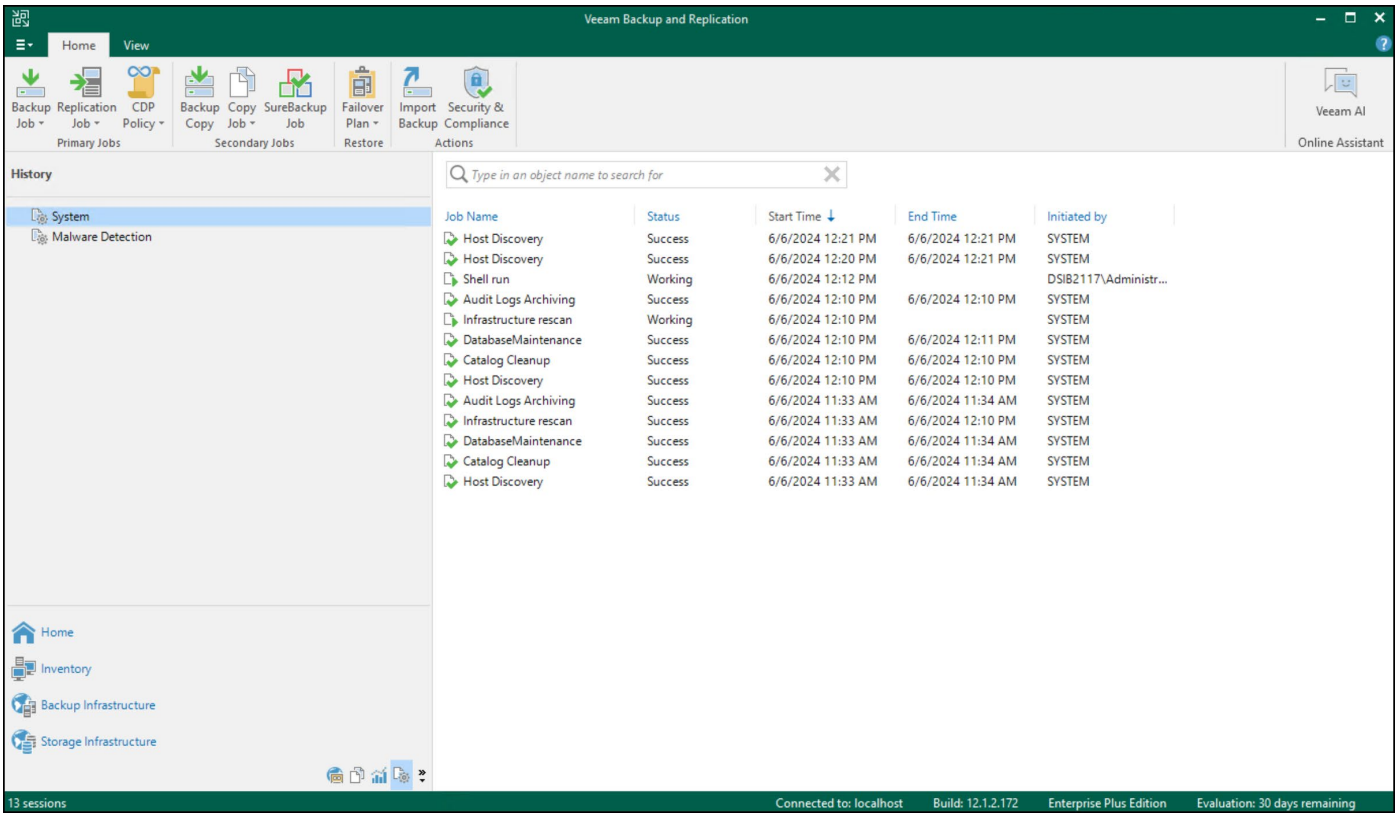


Figure 23. History panel

3 PowerMax Plug-in configuration

The PowerMax Plug-in is built on the Veeam Backup & Replication software. Therefore, the PowerMax Plug-in relies on prerequisites for the Veeam Backup & Replication software which include, but are not limited to, VMware platform, ESXi host version, and vCenter version. The PowerMax Plug-in itself also has a number of prerequisites which must be satisfied. These prerequisites are enumerated below.

3.1 PowerMax Plug-in prerequisites

The following sections cover the necessary perquisites to use the PowerMax Plug-in.

Note: Any restrictions described herein are specific to the proper functioning of the PowerMax Plug-in and are not meant to apply to a generic PowerMax environment.

3.1.1 Unisphere for PowerMax (REST API)

Unisphere for PowerMax version 10.0.1.0 is the minimum version necessary to use the PowerMax Plug-in. A user with storage administrator privilege in Unisphere (e.g., smc), is required.

The PowerMax Plug-in will prevent the user from adding a Unisphere instance that does not meet the minimum version requirements. An example of the error is seen in Figure 24.

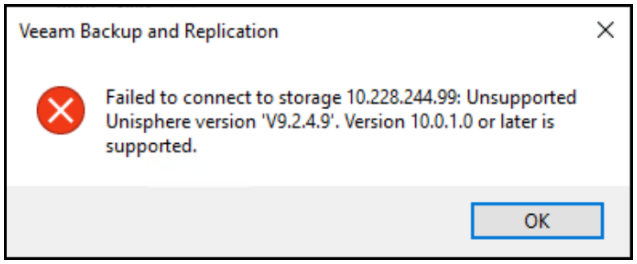


Figure 24. Incorrect Unisphere version error message

Additional details about this error can be found in Appendix A.

3.1.2 TimeFinder

The TimeFinder software that provides local replication on the array must be licensed.

3.1.3 NTP server

In order to avoid timestamp skew when querying the snapshots through different management hosts (e.g., Veeam, Unisphere for PowerMax, etc.), ensure that all hosts are synchronized to an NTP server. If using embedded management for Unisphere for PowerMax, it is preconfigured for NTP.

For example, the following screenshot contains the timestamp of a storage group as seen by two different Unisphere for PowerMax implementations for the same array. Note the significant time skew in Figure 25.

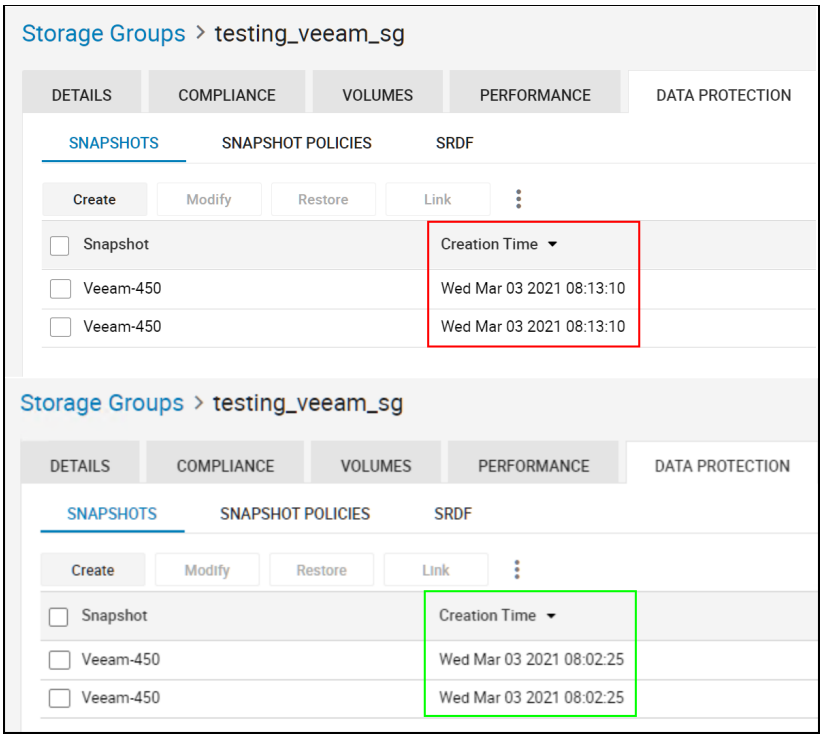


Figure 25. Time skew in multiple Unisphere instances

The clocks must be synchronized for proper operation.

3.2 Arrays and PowerMaxOS

A minimum of PowerMaxOS code level 5978.711.711 is required. When using earlier versions of PowerMaxOS like 5978.711.711, the user must install an external instance of Unisphere for PowerMax at the proper version as the embedded version will be unsupported.

4 Export hosts

An export host refers to the server to which you export data while running a Veeam task, though it is not the same as the proxy server which facilitates a backup from the Dell PowerMax. A customer might use an export host when restoring a VM from a backup. Veeam would present the backup device(s) to the export host (e.g., ESXi host) and perform VMware activities such as resignaturing.

In order to present the PowerMax snapshots (i.e., linked targets) to export hosts, a masking view must exist for each host. This masking view will consist of the zoned ports (i.e., host initiator to a PowerMax front-end port), a storage group prefixed with “VEEAM_” and containing a small device (required for the masking view), and a host initiator group. This process is done externally to the PowerMax Plug-in to ensure that the storage administrator is able to control zoning and mapping. The following sections will detail how to create this masking view.

Note: As detailed below, one masking view per export host is required. Dell does NOT support sharing a storage group among multiple masking views, nor does it support using a host (i.e., parent) initiator group, though an individual host may still be part of a host group. This means it is NOT possible to have a “cluster-wide” masking view. For example, if a customer has a vCenter with 16 hosts and wants to have the ability to export snapshots to any of those hosts, they must create 16 masking views, one for each host.

Note: There is no support for NVMeoF.

4.1 Fibre Channel exports

For each Fibre Channel export host, complete the following steps, if required:

1. Zone the export host(s) to the PowerMax array front-end ports. These could be proxy hosts or hosts to which the restored snapshots will be exported. There is no requirement that all initiators be zoned.
2. Create a host (i.e., initiator group) on the PowerMax for each export host(s) that contain the port WWNs that belong to the adapters that are zoned. The initiator group should only contain initiators from a single host.
3. Create a port group on PowerMax that comprises the zoned ports from Step 1.
4. Create a storage group with the starting prefix “**VEEAM_**”. Note that while Unisphere is not case sensitive, the Plug-in is case sensitive. It is essentially to use all CAPS for the prefix or the Plug-in will not function. The group must contain at least one device or Step 5 will fail. A single, small, three-cylinder device is sufficient. The group must be assigned an **SRP** of **None,** which will also set the service level to **None.**
5. Create a masking view on the PowerMax with the host group, port group and the new storage group that was created in the Steps above. There must be one masking view created for each export host. Do NOT use the same storage group in more than one masking view.

4.2 iSCSI exports

For each iSCSI export host, complete the following steps, if required:

1. Create a host (i.e., initiator group) on the PowerMax for each export host(s) which contains the IQN. The initiator group should only contain initiators from a single host.
2. Create a port group on PowerMax that includes the iSCSI ports that are going to be used.
3. Create a storage group with the starting prefix "**VEEAM_**". Note that while Unisphere is not case sensitive, the Plug-in is case sensitive. It is essentially to use all CAPS for the prefix or the Plug-in will not function. The group must contain at least one device or Step 5 will fail. A single, small, three-cylinder device is sufficient. The group must be assigned an **SRP** of **None,** which will also set the service level to **None.**
4. Create a masking view on PowerMax with the host group, port group and the new storage group that was created in the Steps above. There must be one masking view created for each export host. Do NOT use the same storage group in more than one masking view.

4.3 Unisphere for PowerMax

The following section walks through adding the required components for the PowerMax Plug-in via Unisphere for PowerMax for a Fibre Channel and iSCSI host. Two wizards are used in this process:

Host wizard
Storage provisioning wizard

It is also possible to use Solutions Enabler or a REST API to create the necessary objects.

4.3.1 Host wizard

In the following example, host **dsib1189** is identified as the export host. Begin by logging into Unisphere for PowerMax at: **https://<IP_or_FQDN>:8443**. The default login is **smc/smc**. Once logged in, click on the array, which in this case 000120001473 as shown in Figure 26.

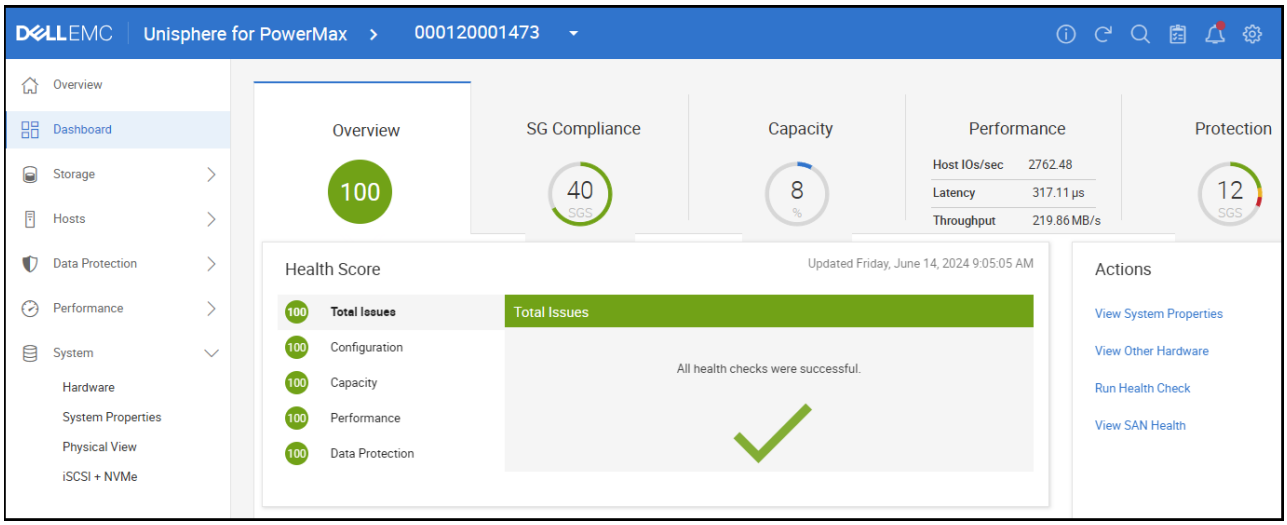


Figure 26. Unisphere for PowerMax home

From the left-hand menu, expand the **Hosts** menu and select **Hosts**. Then select the **Create** button to start the wizard in Figure 27.

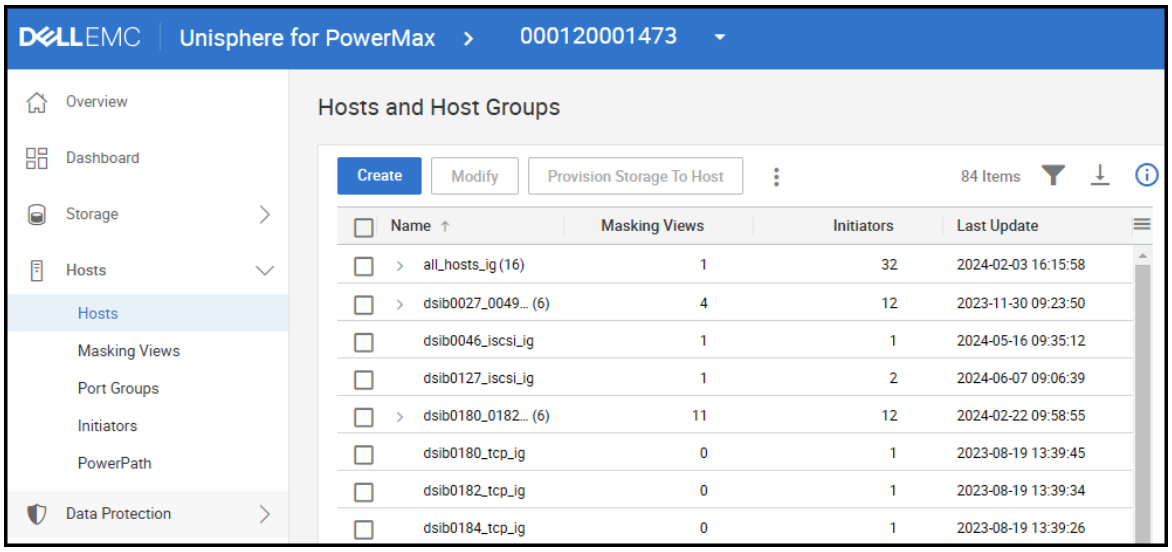


Figure 27. Host wizard

In the next screen, for Fibre Channel supply a host name (e.g., dsib1189_ig). The radio button defaults to Fibre Channel so leave it as is. Select the HBA initiators from the left-hand panel and move them over to the right. Then select **Run Now** in Figure 28.

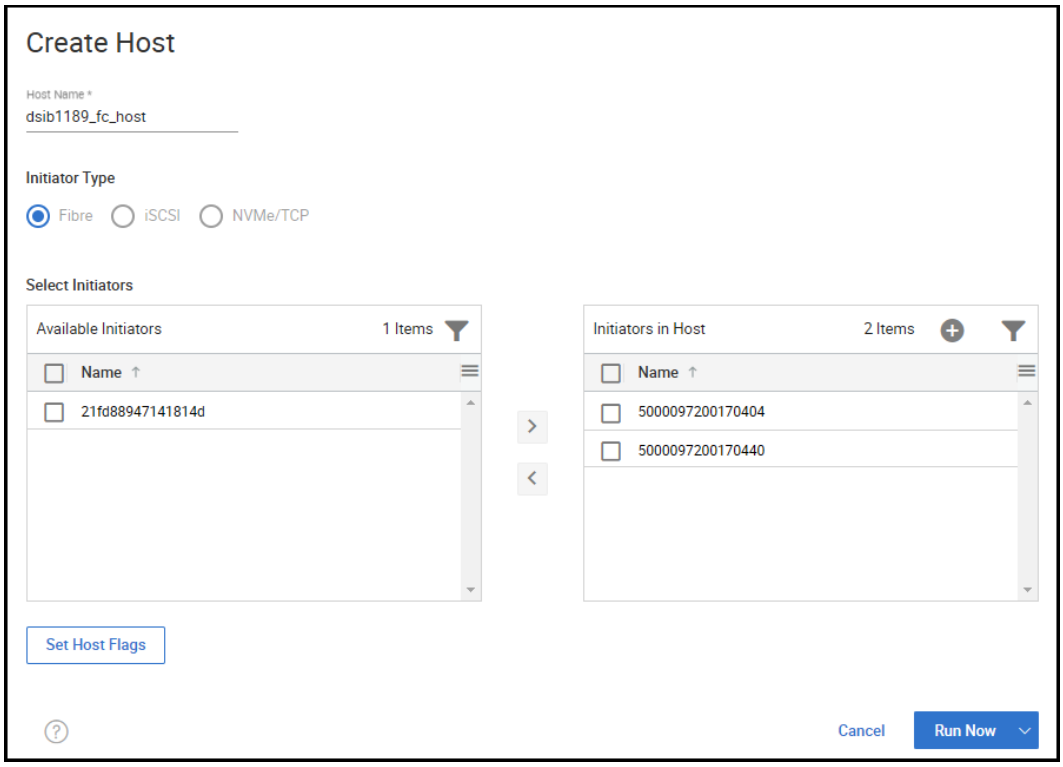


Figure 28. Add Fibre Channel initiators

For iSCSI, supply a host name (e.g., dsib1189_iscsi_ig), select the iSCSI radio button under “initiator type”, select the plus button to manually enter the initiator name or simply move an existing initiator from the left-hand panel to the right. Then click **Run Now**, as shown in Figure 29.

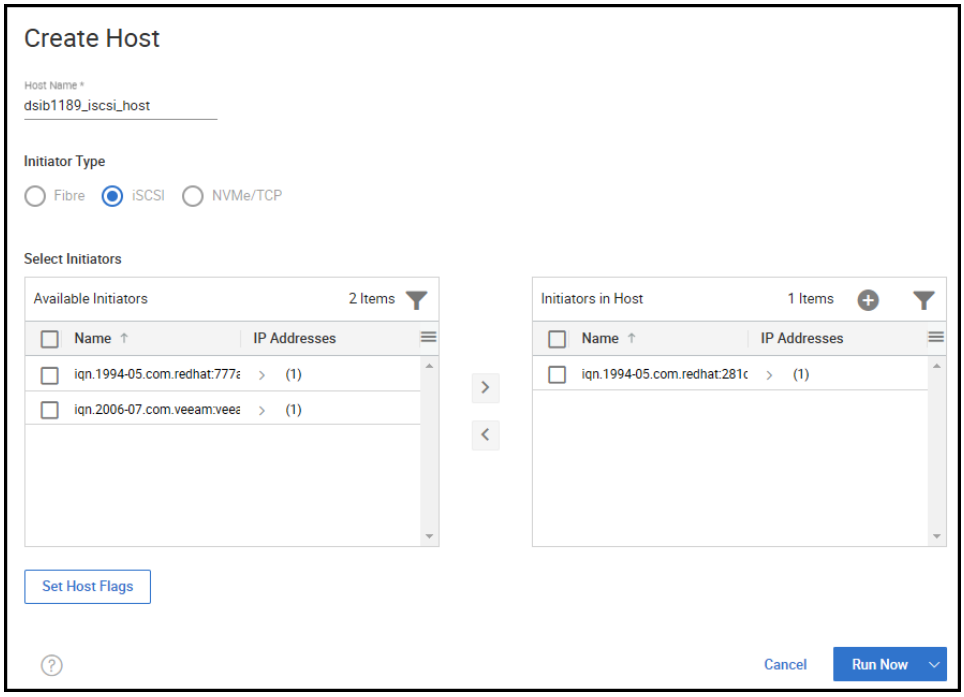


Figure 29. Add iSCSI initiators

With the Fibre Channel or iSCSI host added, run the masking view wizard which includes creating the port group and storage group.

4.3.2 Storage provisioning wizard

In the same **Hosts** screen from Figure 27, check the box next to the newly created host and select **Provision Storage To Host** as shown in Figure 30.

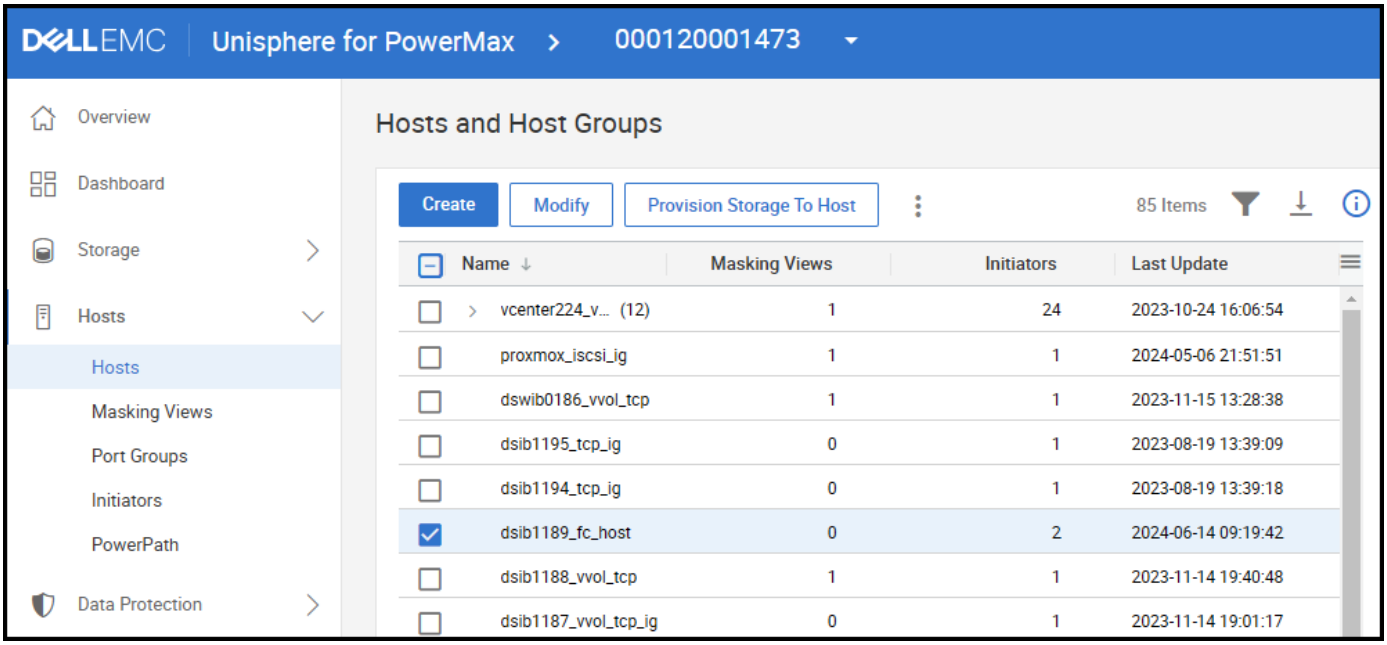


Figure 30. Provision storage to host wizard: Step 1

In the first screen of the wizard, type in a name for the storage group. Recall that this name must start with "**VEEAM_**" (must be UPPERCASE). Use the drop-down to select **None** for **Storage Resource Pool**. A warning will appear indicating that without an SRP, data reduction is disabled. Select **OK**.

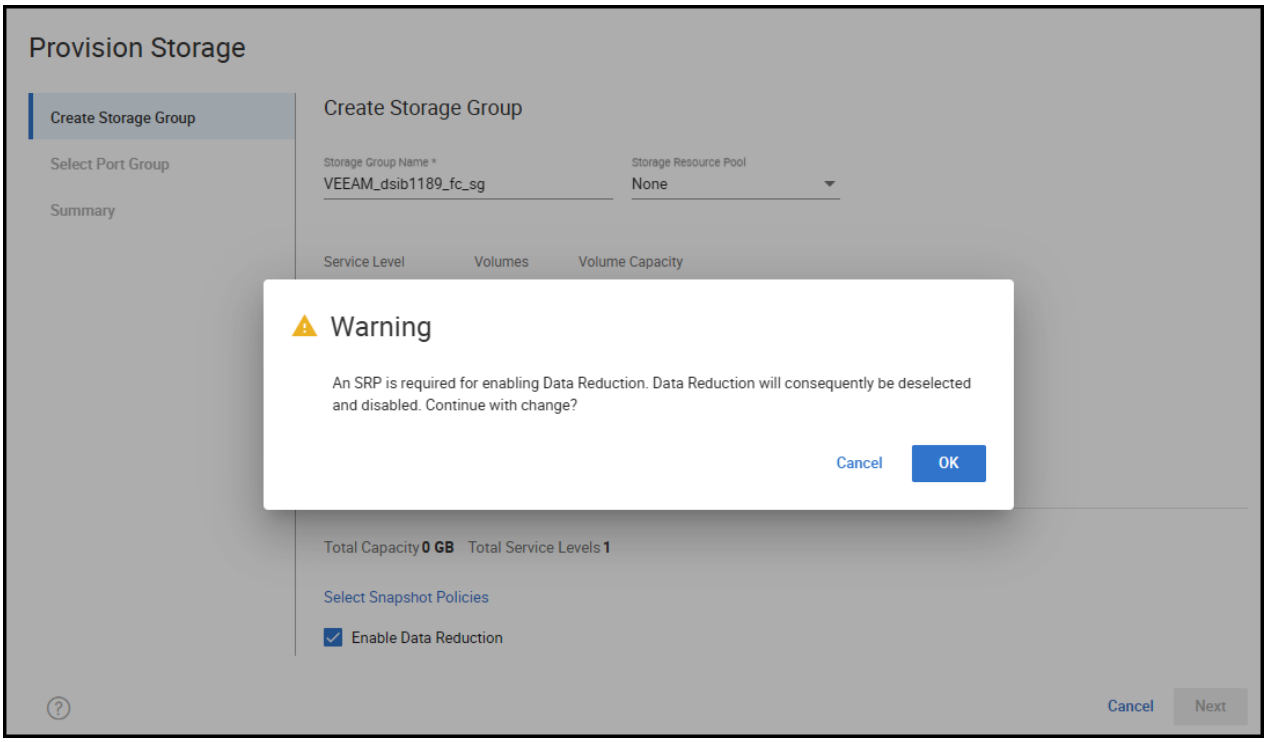


Figure 31. Provision storage to host wizard: Step 2

When the screen returns, enter in **1** for the number of volumes and **3 CYL** for the volume capacity and then **Next**, as shown in Figure 32.[2]

[2] A three-cylinder device is used because the storage group requires at least one device for the masking view. The size is arbitrary, however, as any size can be used. It is not possible to create a masking view with an empty storage group.

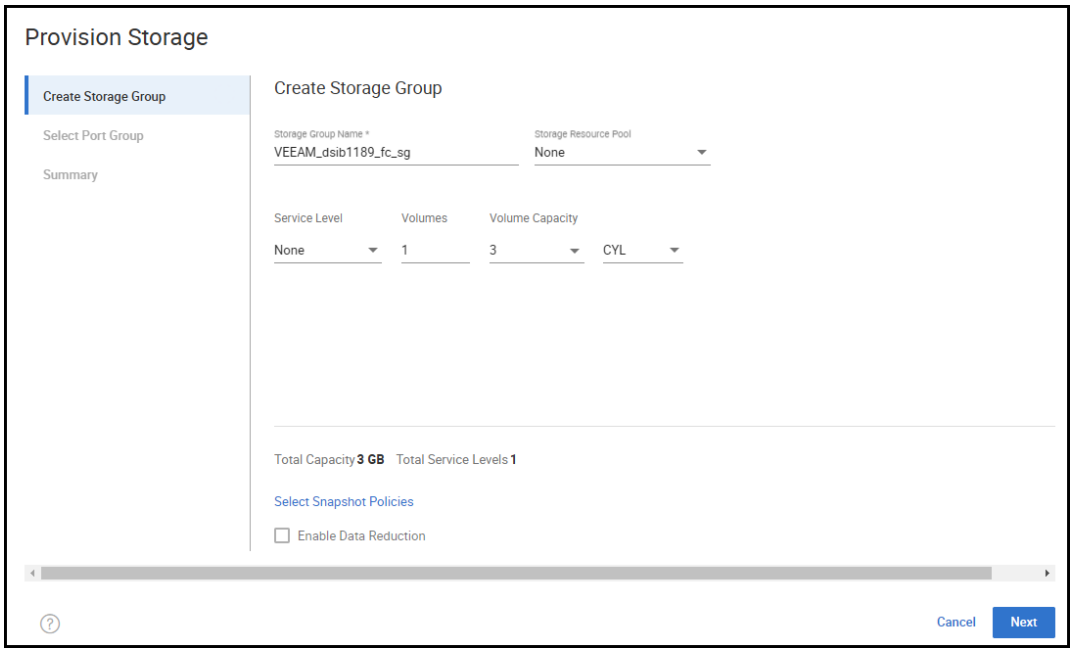


Figure 32. Provision storage to host wizard: Step 3

In the next screen, create a new port group or use an existing one for the masking view. Do this by providing a name and selecting the desired ports. Select **Next** as shown in Figure 33.

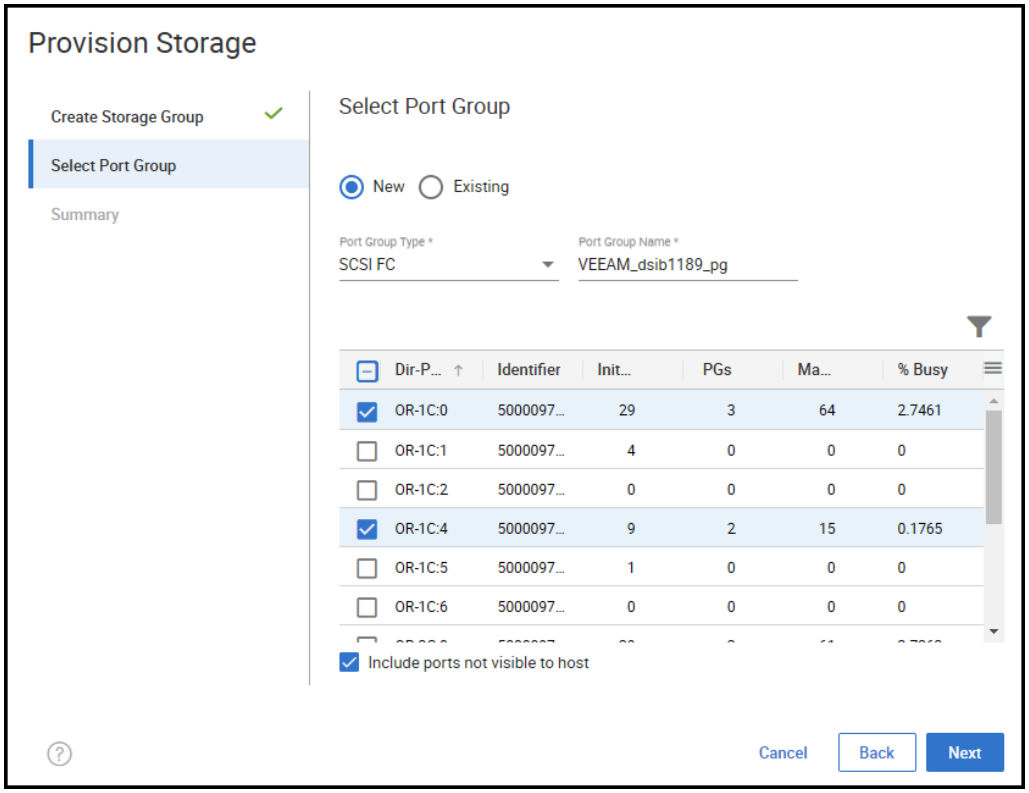


Figure 33. Provision storage to host wizard: Step 4

In the final screen, provide a masking view name and complete the wizard in Figure 34.

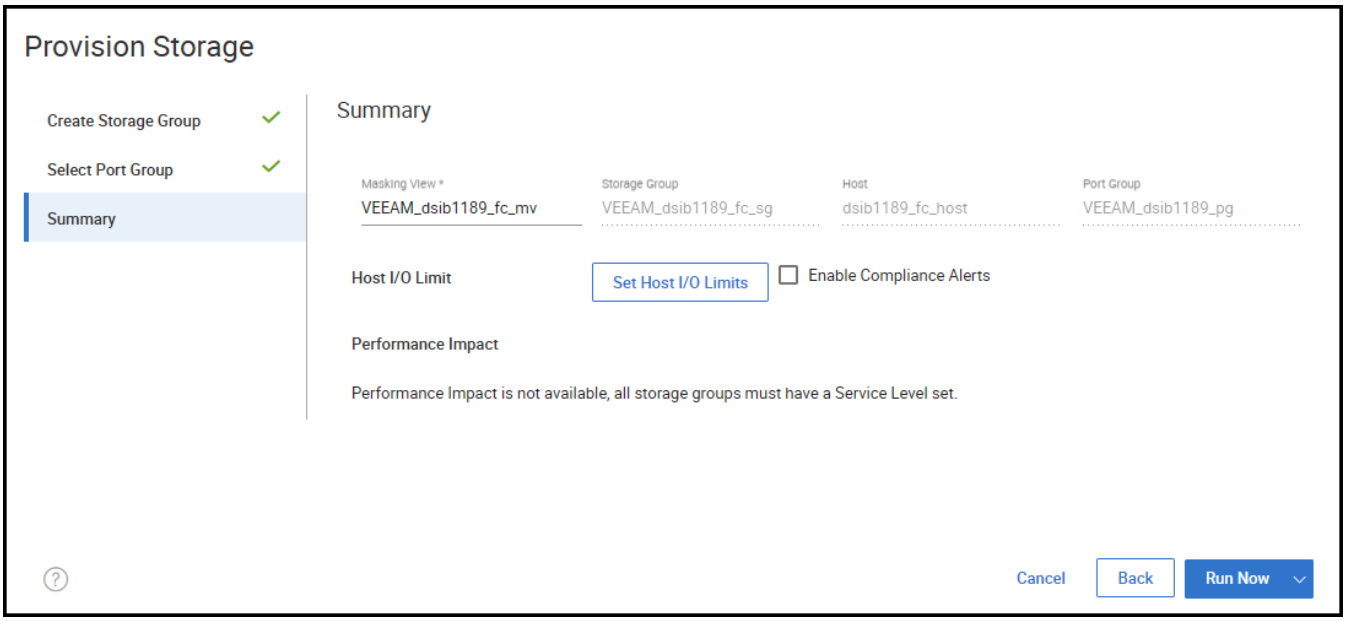


Figure 34. Provision storage to host wizard: Step 5

The export host is now ready.

4.4 Restrictions

Both PowerMax and Veeam have a number of restrictions that apply to the PowerMax Plug-in. Veeam's restrictions are fully documented in their user guide. A few of the more common restrictions for both Veeam and PowerMax are noted below:

- The PowerMax Plug-in does not support adding two Unisphere servers that have the same array(s) set as "local". Doing so will cause issues with discovery and can lead to undesirable results.
- Veeam does not support VMware Virtual Volumes (vVols) with the PowerMax Plug-in.
- Veeam does not support backing up Raw Device Mappings (RDMs) with the PowerMax Plug-in[3]
- There is no support for NVMeoF on PowerMax.
- There is no support for NFS on PowerMax.

4.5 Known Issues

The following are known issues with the PowerMax Plug-in:

- There can be only one storage group prefixed '**VEEAM_**' (must be UPPERCASE) presented to each export host in a masking view. If the PowerMax Plug-in finds more than one masking view with a storage group prefixed '**VEEAM_**' presented to the same export host, the job will fail.
- The PowerMax Plug-in does not support the use of parent/child storage groups for exports. Export operations are done at the host level, not the cluster level.
- A storage group may not be shared across multiple export hosts/masking views. This will lead to failures when attempting to restore a set of VMs from the same snapshot to more than one export host.

[3] VMs with RDMs can still be backed up because Veeam simply skips the RDMs. See the section Backup and restore for more detail.

- The PowerMax Plug-in does not support the use of SRPs/service levels with export host storage groups.
- A set of host initiators may not be divided between two different initiator groups. While the PowerMax Plug-in does not require all host initiators to be present in an initiator group, they cannot be split into multiple initiator groups to be used in different masking views or host groups.
- While it is possible to use both iSCSI and Fibre Channel on the same export host, the only way to control which one Veeam will use is to designate one or the other when setting up the storage the Proxies section.

5 Proxies

Veeam will automatically create a file Proxy and VMware Proxy during the installation. These are shown in Figure 35. VMware Backup Proxy is sufficient to create production VM backups and restores, but if desired the additional proxies (i.e., hosts) can be added. For example, when taking a manual snapshot Veeam will attempt to scan it for existing VMs. In order to do this, Veeam must be able to export the snapshot from PowerMax to a backup proxy which either has iSCSI or Fibre Channel connectivity to the storage. This is covered in some detail below.

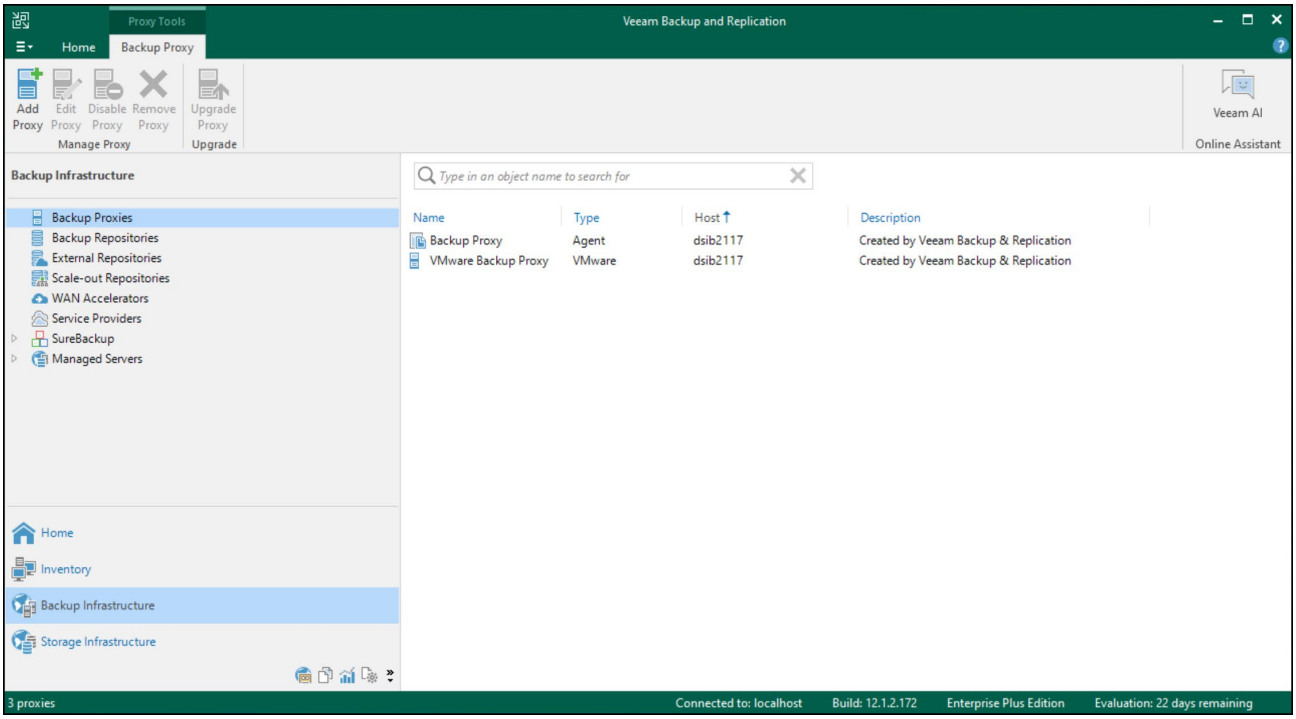


Figure 35. Backup proxies

5.1 Host setup for use as proxy

If there is a need to back up a VM to disk with the PowerMax Plug-in, or to scan manual snapshots for VMs to be used in backup and restore, an additional physical or virtual host must be set up. This host will need to access the PowerMax array through Fibre Channel or iSCSI. When using a VM, the most common setup is direct iSCSI from the Guest OS. This is the example shown below. Note that even if the user is familiar with setting this up, there is a Veeam requirement that must be followed, so please review this section.

In this example, the VM host **dsib0127.drm.lab.emc.com** has iSCSI access to array 000120001473 through the Microsoft software initiator. It also has a direct iSCSI connection to PowerMax array 000120001473 within the GuestOS on the VM. It uses the Microsoft software iSCSI adapter, so there is a single initiator, though it is mapped through four ports on the array. The initiator group is shown in Figure 36.

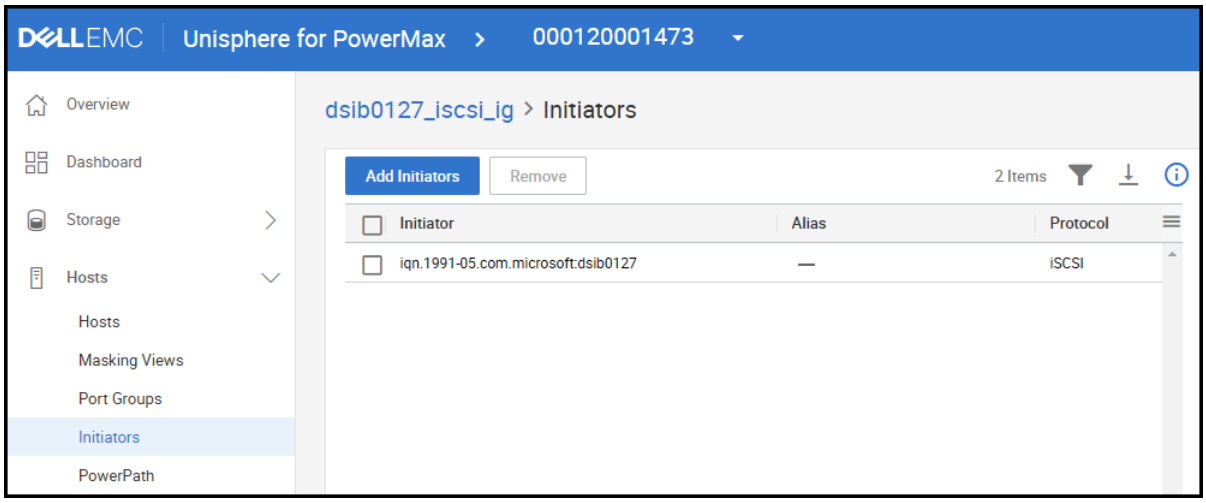


Figure 36. Initiator group for backup proxy dsib0127.lss.emc.com

A single storage group was created with a small device, **VEEAM_dsib0127_sg**, per the requirement for export hosts in iSCSI exports. This and the initiator group, along with the iSCSI ports, were bundled into a single masking view as shown in Figure 37.

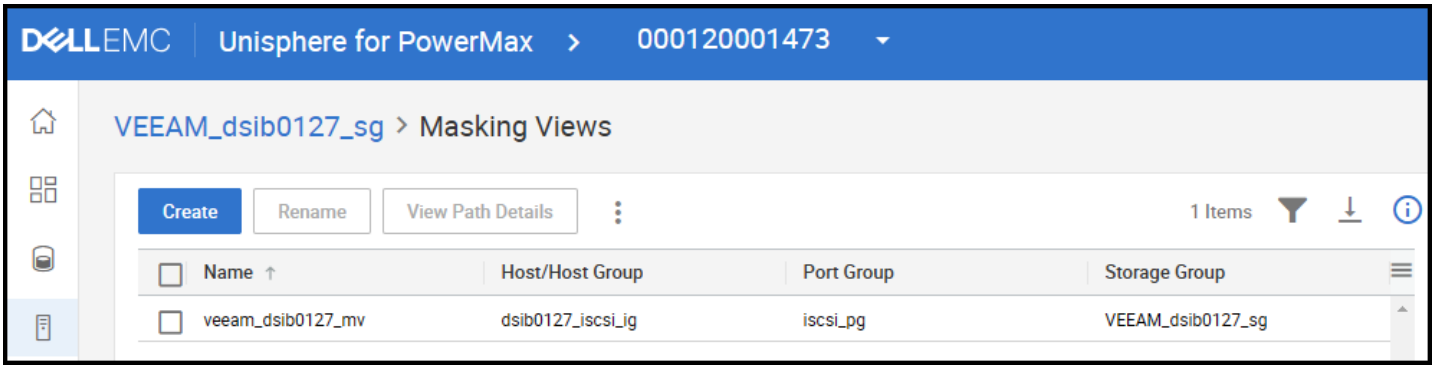


Figure 37. Masking view for backup proxy dsib0127.drm.lab.emc.com

5.1.1 Veeam iSCSI/Fibre Channel initiator

When using the server as a backup proxy for disk backups, the single Microsoft initiator is sufficient. However, this initiator is not sufficient for manual snapshots. When taking manual snapshots, Veeam will attempt to record any VMs on the source device. To do this, the PowerMax Plug-in links the manual snapshot to a target device and presents it to the backup proxy to be read by Veeam. When it does this, Veeam queries for its own initiator in the initiator group. This is a proprietary initiator that Veeam names and is in addition to the iSCSI or Fibre Channel initiators in the group. Unfortunately, the only way to determine the initiator name is to run a manual snapshot and review the log file from the failure to mount to the backup proxy. In the following example shown in Figure 38, a manual snapshot was taken of device 124 on PowerMax 000120001473 when the initiator group of host dsib0127.drm.lab.emc.com only contained the Microsoft initiator.

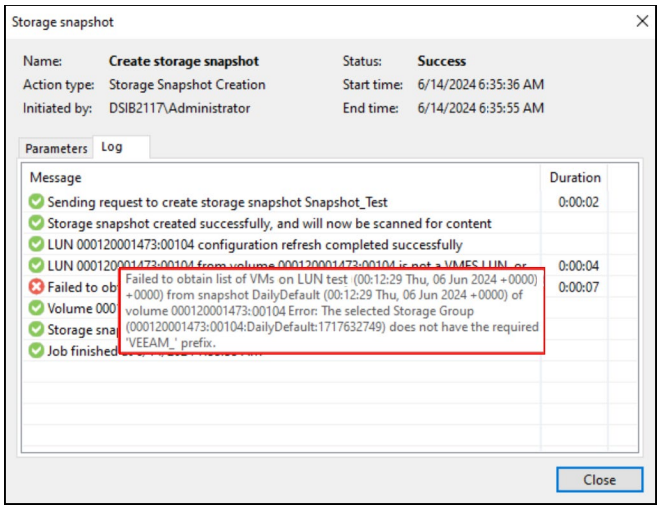


Figure 38. Manual snapshot before Veeam initiator added

This job fails because Veeam was unable to find its initiator in a masking view containing a storage group prefixed with **VEEAM_**. Unfortunately, Veeam does not include the initiator in the error message. Reviewing the log file **Util.SanRescan.All.log** on the Veeam server located in the directory **C:\ProgramData\Veeam\Backup\SanRescan**, reveals the following for **LUN 00104** as shown in Figure 39:

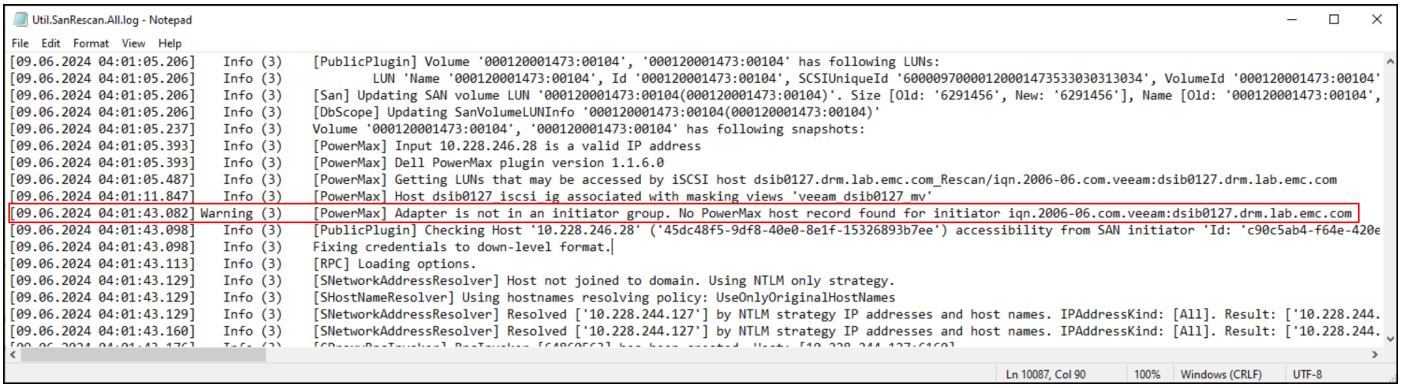


Figure 39. Log file before Veeam initiator was added

Veeam is looking for **iqn.2006-06.com.veeam:dsib0127.drm.lab.emc.com** since this is an iSCSI host. Add this initiator to the initiator group in Figure 40.

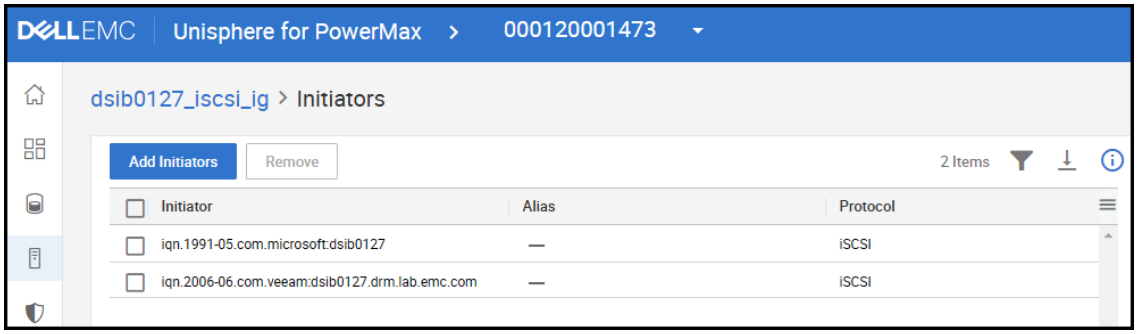


Figure 40. Initiator group with Veeam initiator

Now rerun the manual snapshot for device 00104. With the Veeam initiator present it now succeeds as shown in Figure 41.

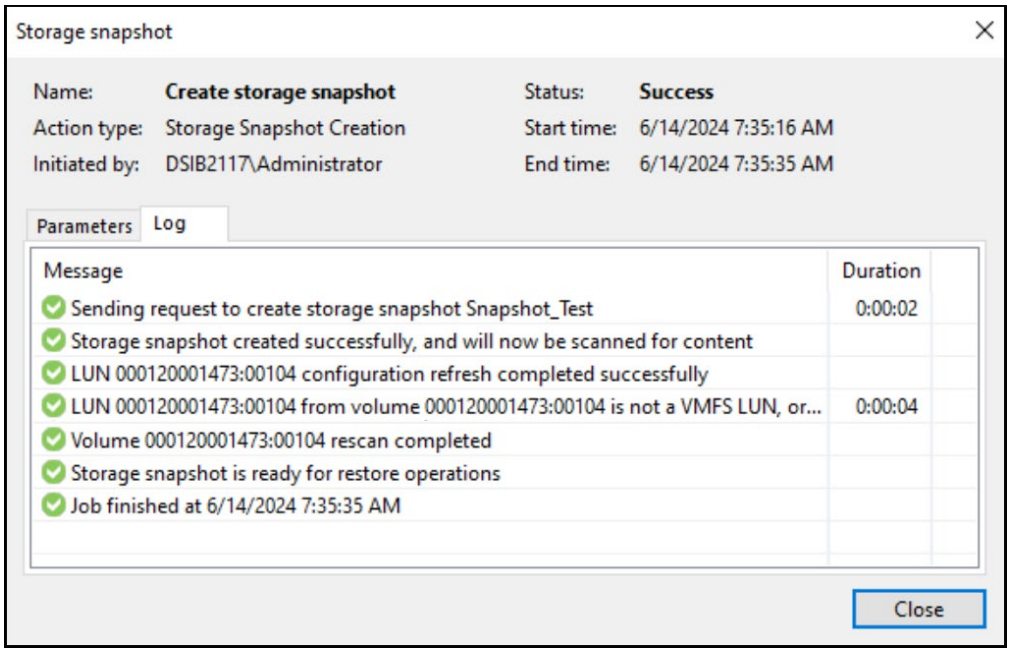


Figure 41. Manual snapshot after Veeam initiator was added

Reviewing the new log file after the successful job, note the initiator is now found in Figure 42.

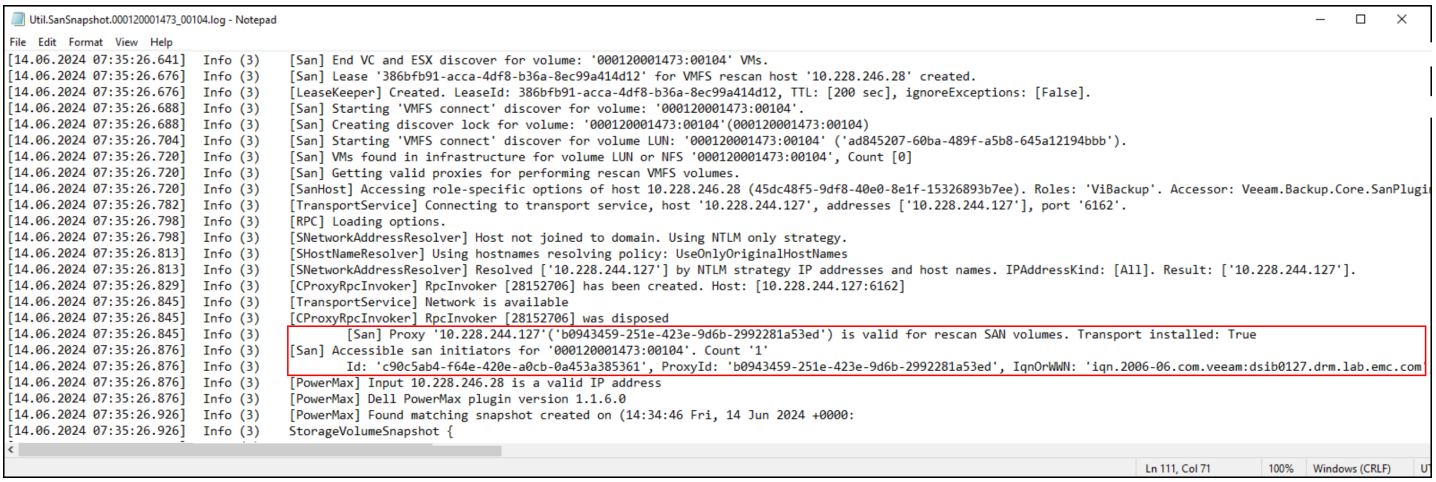


Figure 42. Log file after Veeam initiator was added

5.2 Backup proxy

In order to mount snapshots so they can be scanned for VMs during storage discovery or backups made to disk, a backup proxy with direct access to the array is required. This backup proxy can be a physical or virtual host, but the main requirement is that it has direct access to the array through Fibre Channel or iSCSI, in the same way ESXi hosts do. When the backup to disk is initiated, the PowerMax Plug-in is called to create a snapshot of the source device(s), create a snapshot of the source device(s), target devices and the link between them. These target devices are then placed in the "**VEEAM_"** storage group that was previously

configured[4] for the proxy host in question. This presents the target devices to the backup proxy where they can be read by Veeam for the disk backup. Note that Veeam is able to read the device on the host directly, without the aid of a vCenter or ESXi host. This proprietary method avoids having to mount the target devices as datastores.

As mentioned previously, Veeam creates a VMware backup and file proxy automatically on the Veeam software server. It may be possible to use the default VMware backup it creates if that host is attached to PowerMax through Fibre Channel or iSCSI; however, Dell recommends creating a separate backup proxy for disk backups facilitated with a snapshot.

In the following example, a VM is used which has iSCSI access to one of the PowerMax arrays. Be sure that the initiator group contains the Veeam IQN as explained in the section Host setup for use as proxy.

Like the backup repository, start the wizard from the **Backup Infrastructure** screen. Right-click on the **Backup proxies** in the left-hand panel and select **Add VMware backup proxy…** as shown in Figure 43.

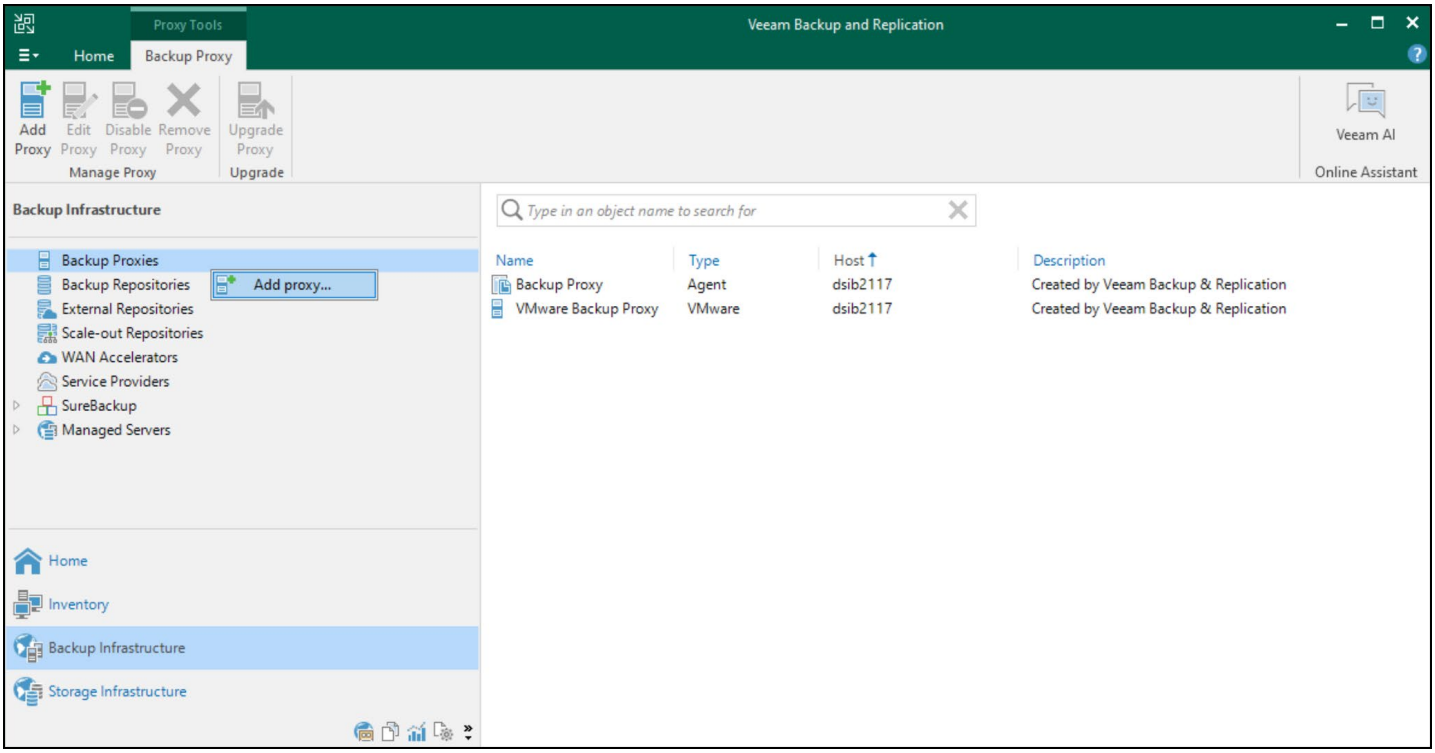


Figure 43. Add backup proxy – Step 1

Select **VMware backup proxy** in Figure 44.

[4] See Export hosts for instructions on creating the necessary storage group and masking view for the backup proxy. The procedure is the same as for an ESXi host.

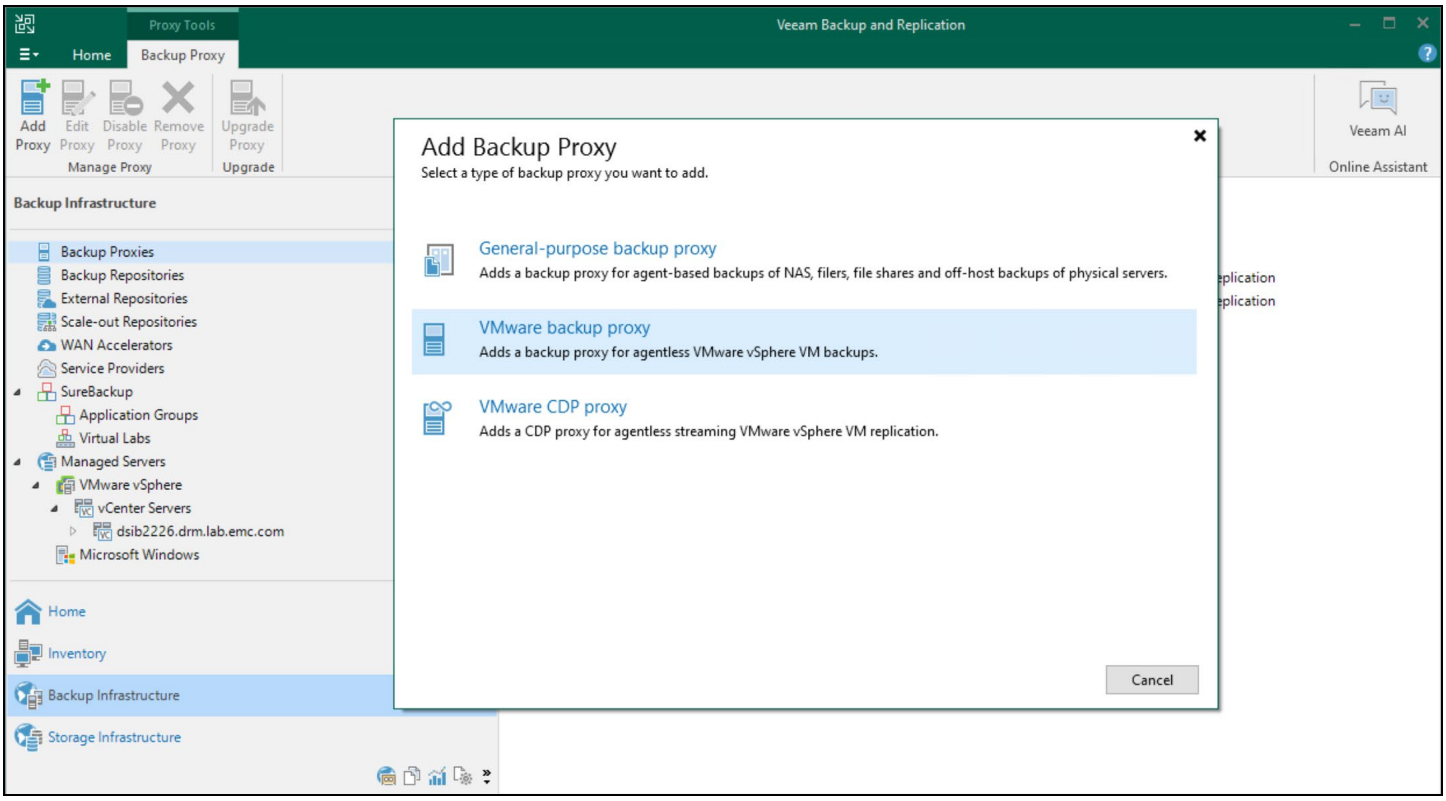


Figure 44. Add VMware backup proxy – Step 2

In Step 3, select **Add New…** next to the **Choose server** field in Figure 45.

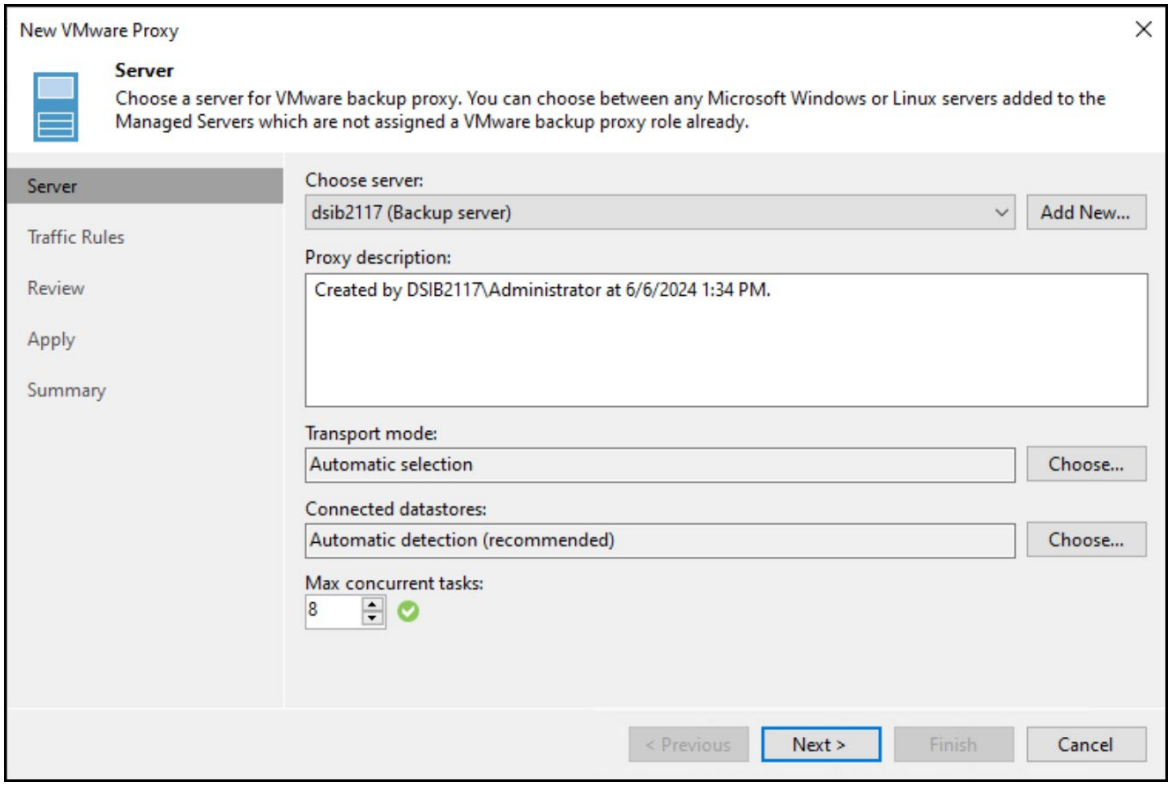


Figure 45. Veeam backup server – Step 3

In Step 4, select the operating system of the host that's being added, as shown in Figure 46. Note that Veeam does not require the user to designate that the server is physical or virtual, only that the OS is pertinent. This example uses Microsoft Windows.

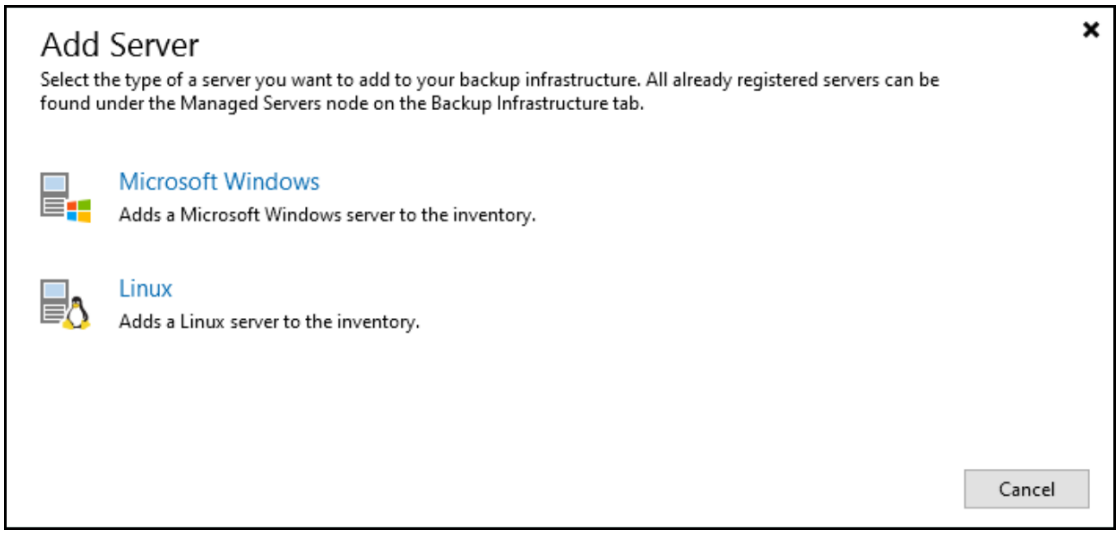


Figure 46. Add backup proxy: Step 4

Supply a DNS or IP in Step 5 as shown in Figure 47.

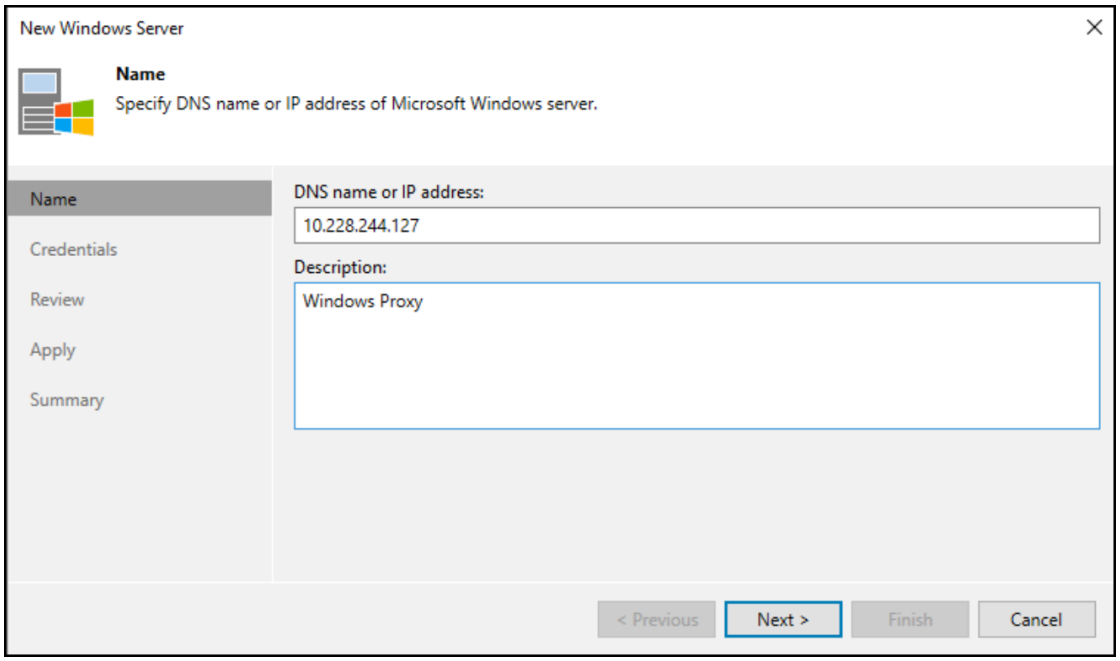


Figure 47. Add backup proxy: Step 5

For credentials, this environment does not use a domain. So, choose **Add** in Step 6 and then supply the local administrator credentials as shown in Figure 48.

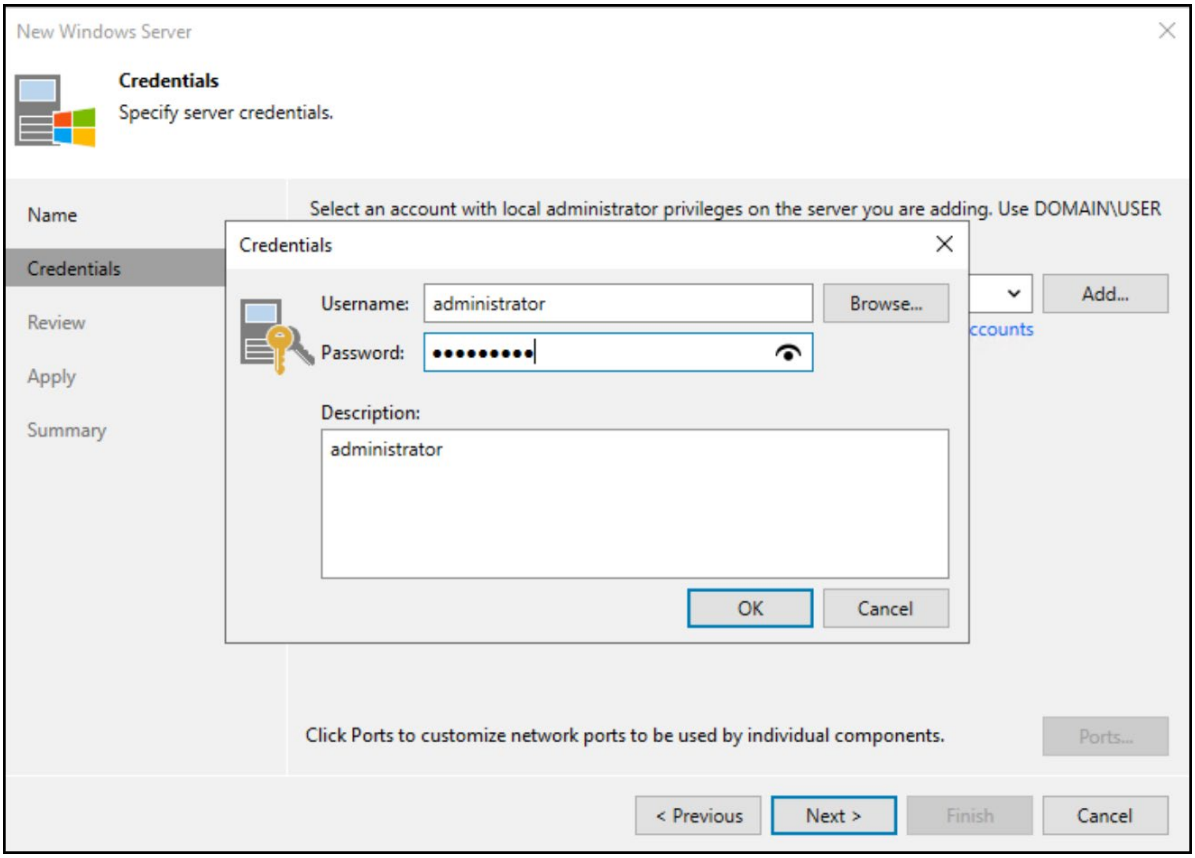


Figure 48. Add backup proxy: Steps 6

Veeam will automatically determine the necessary components in Step 7 which then are applied as shown in Figure 49.

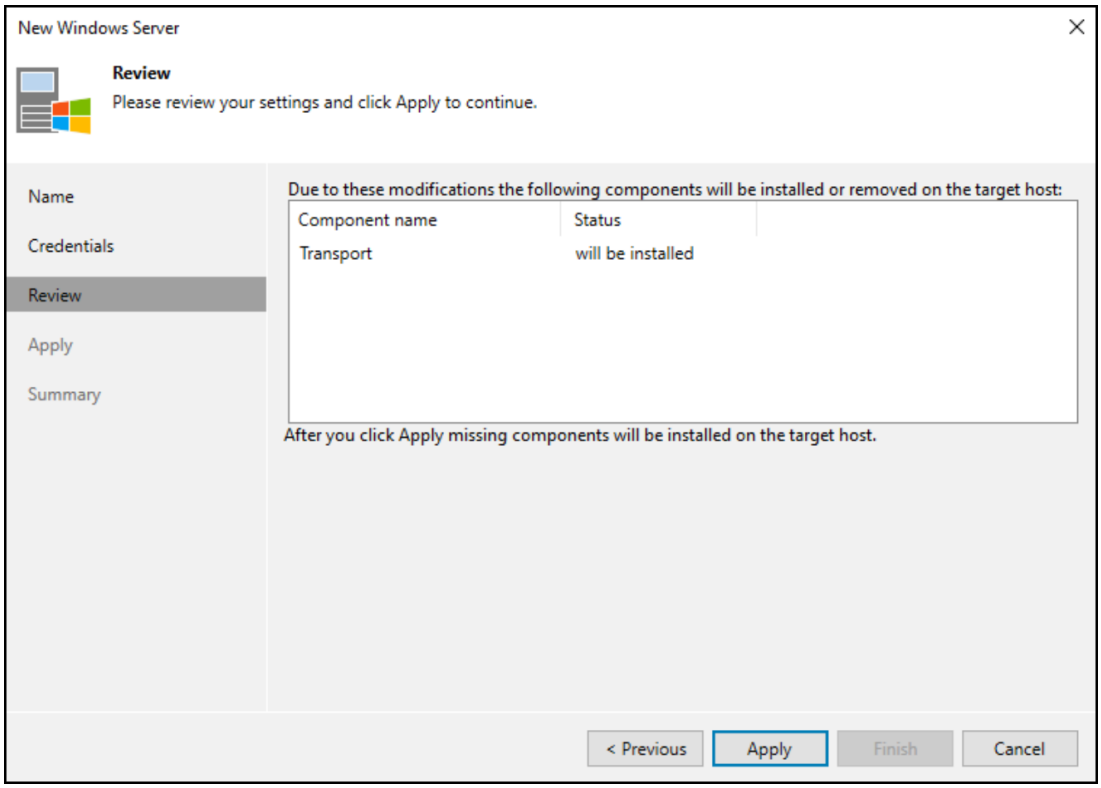


Figure 49. Add backup proxy: Step 6

Veeam outputs the result of the component installation(s) in Step 7 as shown in Figure 50, before providing a summary in Figure 51.

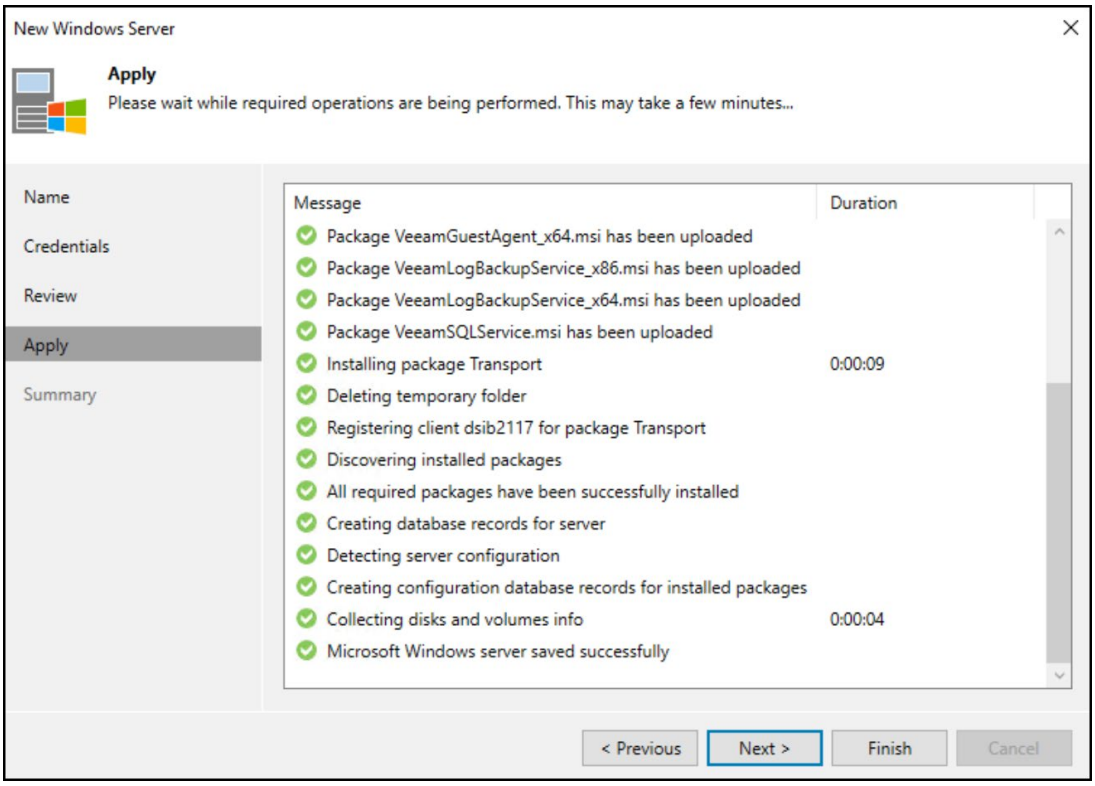


Figure 50. Add backup proxy: Step 7

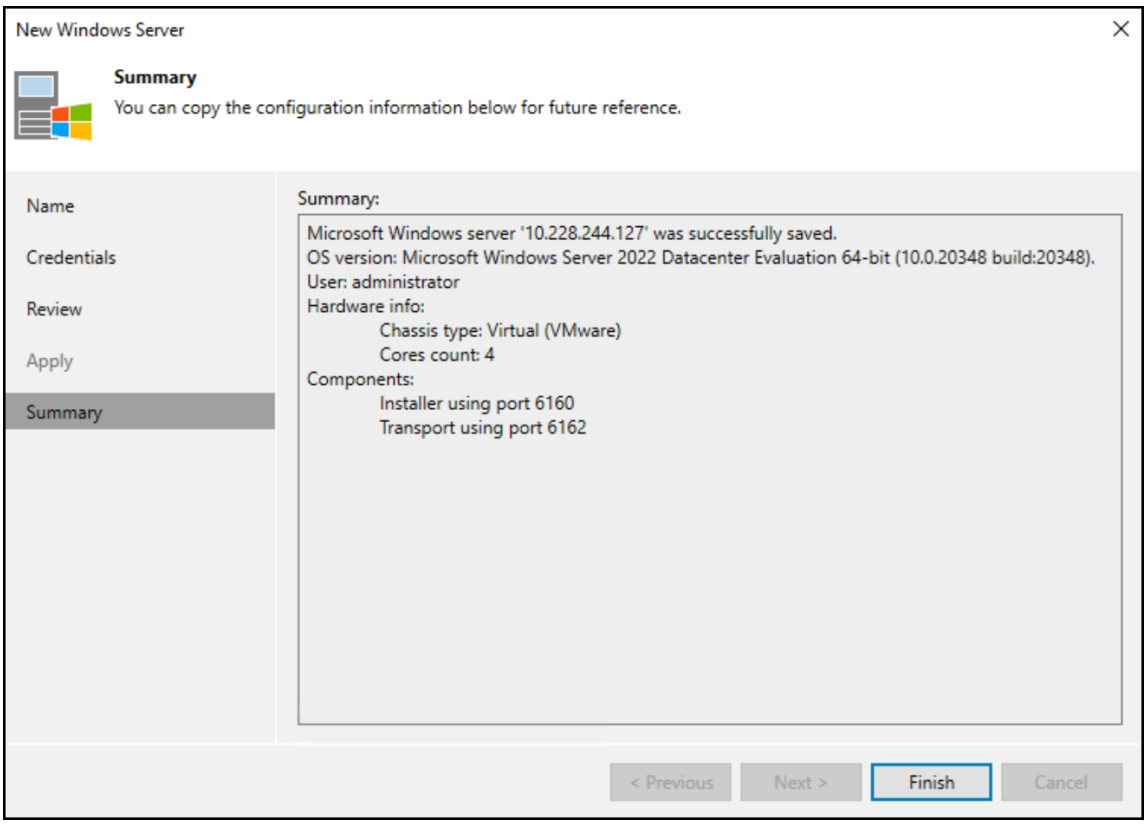


Figure 51. Add backup proxy: Summary

6 Adding PowerMax storage in Veeam

The PowerMax Plug-in executes commands through the REST API provided by Unisphere. Adding new PowerMax storage, therefore, involves providing the IP address of Unisphere and storage administrator credentials. The following walks through the wizard.

Note: The terms “volumes” and “devices” will be used interchangeably when discussing storage with Veeam. They both refer to a thin device on the PowerMax array.

Begin by opening up the Veeam Console. Navigate to **Storage Infrastructure** option in the left-hand panel. Then select **Add Storage** on the right-hand side as shown in Figure 52.

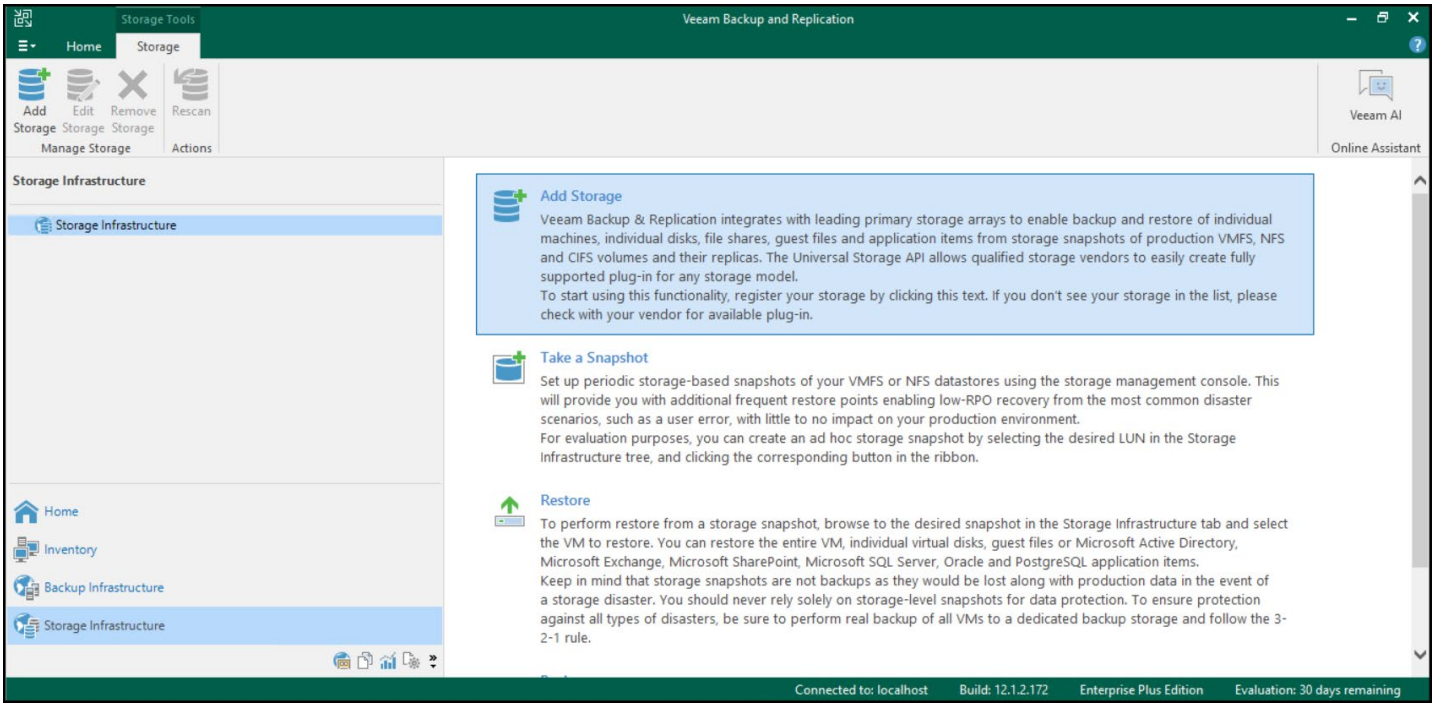


Figure 52. Adding PowerMax storage: Step 1

The different Plug-ins are displayed in the next screen as shown in Figure 53. Select **Dell Technologies**.

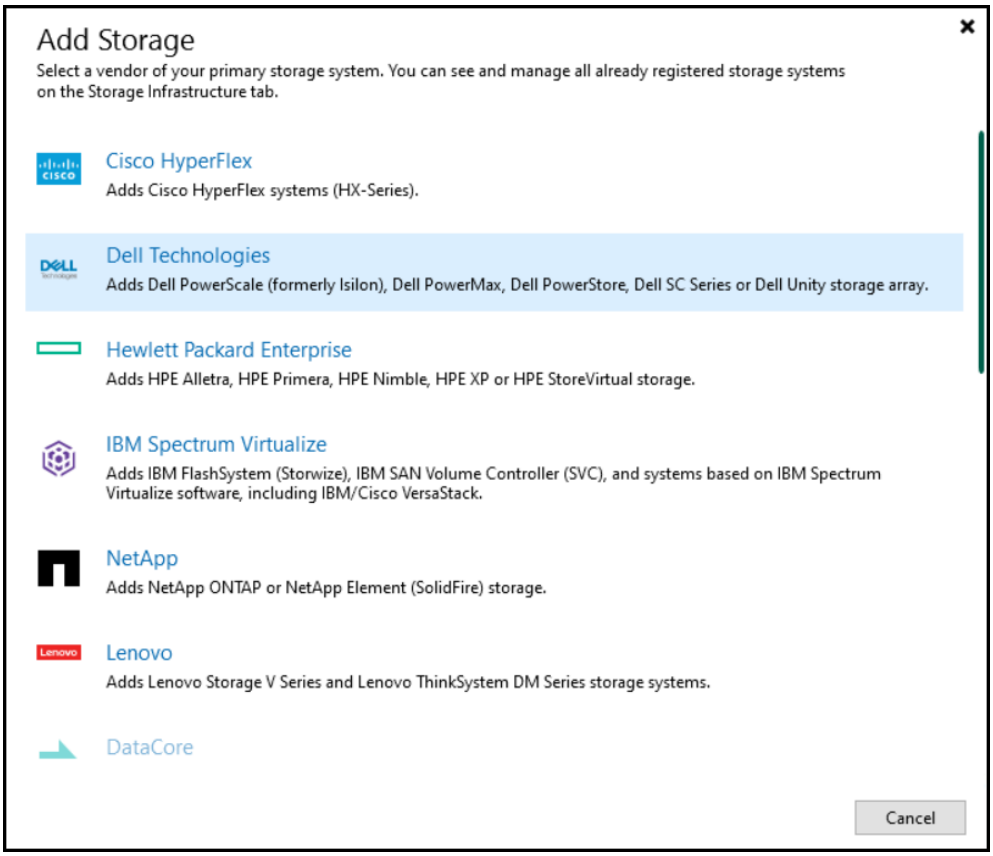


Figure 53. Adding PowerMax storage: Step 2

In Step 3 in Figure 54 select **Dell PowerMax**.

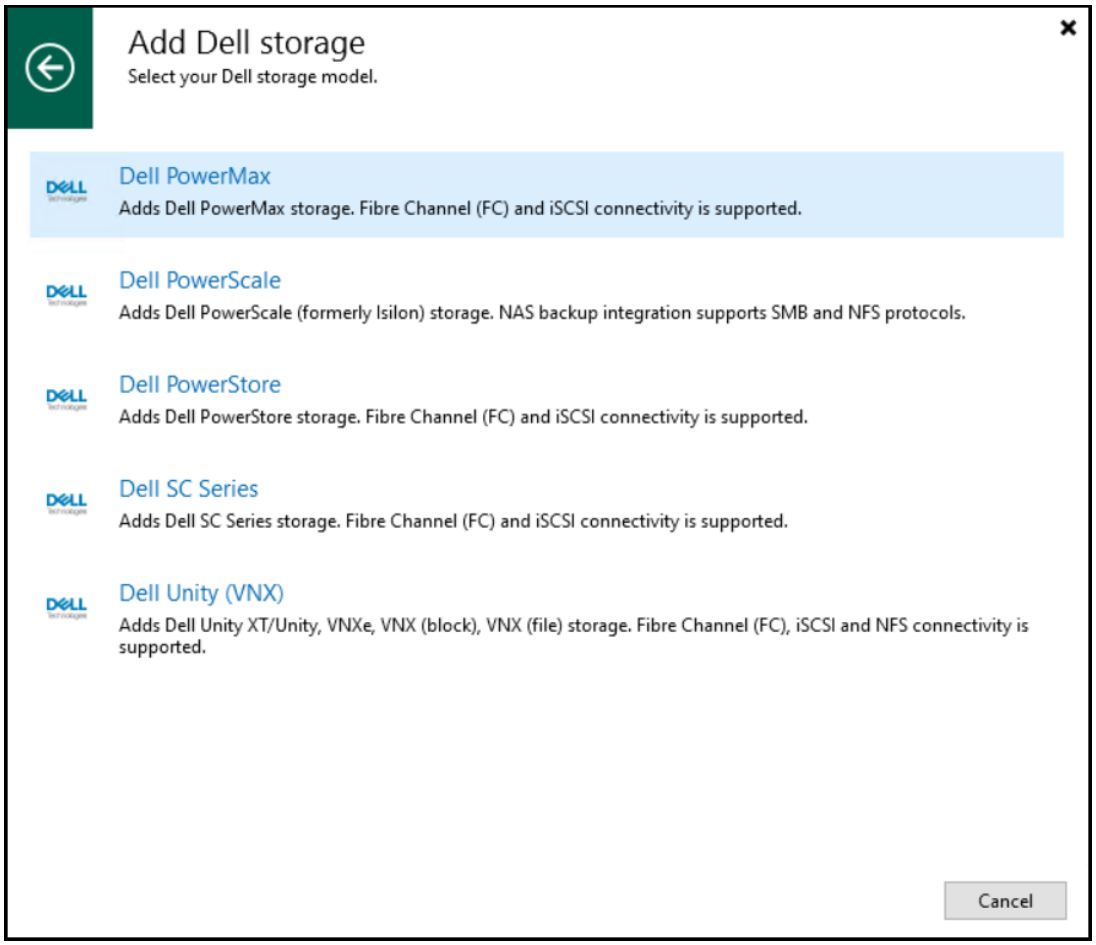


Figure 54. Adding PowerMax storage: Step 3

In Figure 55, specify the IP or hostname for the Unisphere for PowerMax environment. This contains the REST 10 API that the PowerMax Plug-in will call. The Unisphere environment can either be the embedded installation or an external implementation but must meet the minimum version requirement. Note that the PowerMax Plug-in will discover only local arrays, but not remote ones. Be sure the proper **Role** check box is selected for VMware vSphere.

Note: The PowerMax Plug-in does not prevent the user from adding a secondary Unisphere for PowerMax environment that manages the same local array. Adding a second environment, however, is not recommended.

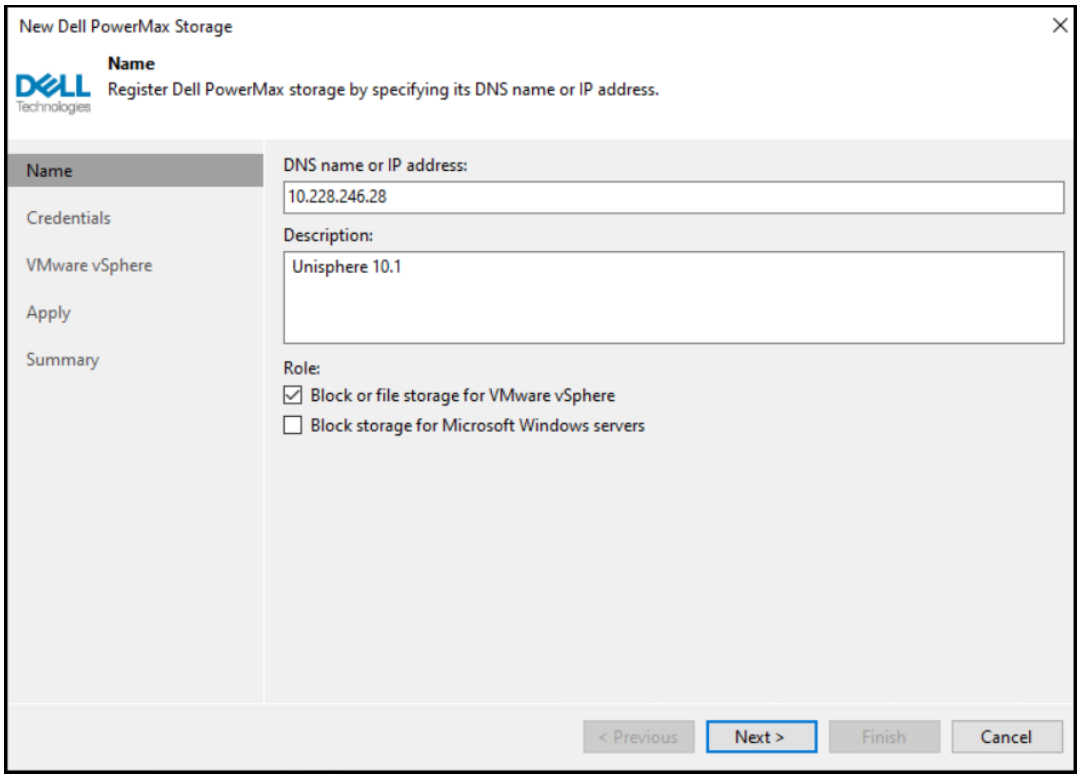


Figure 55. Adding PowerMax storage: Step 4

Next, add credentials for Unisphere, as shown in Figure 56. The user must have storage administrator privilege. This example uses the default of **smc**.

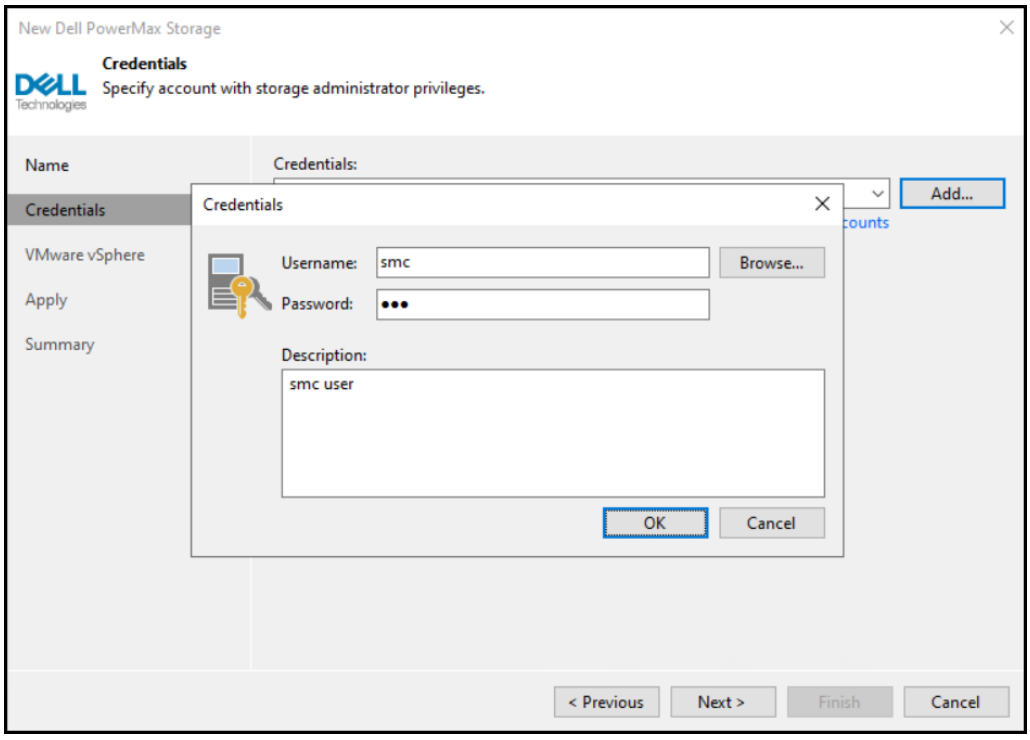


Figure 56. Adding PowerMax storage: Steps 5

At this point, with the addition of the credentials, Veeam will save the storage in the database. This means that even if **cancel** is chosen here, the Unisphere instance will be added with the default settings for the remainder of the screens. It can be edited to make changes, however.

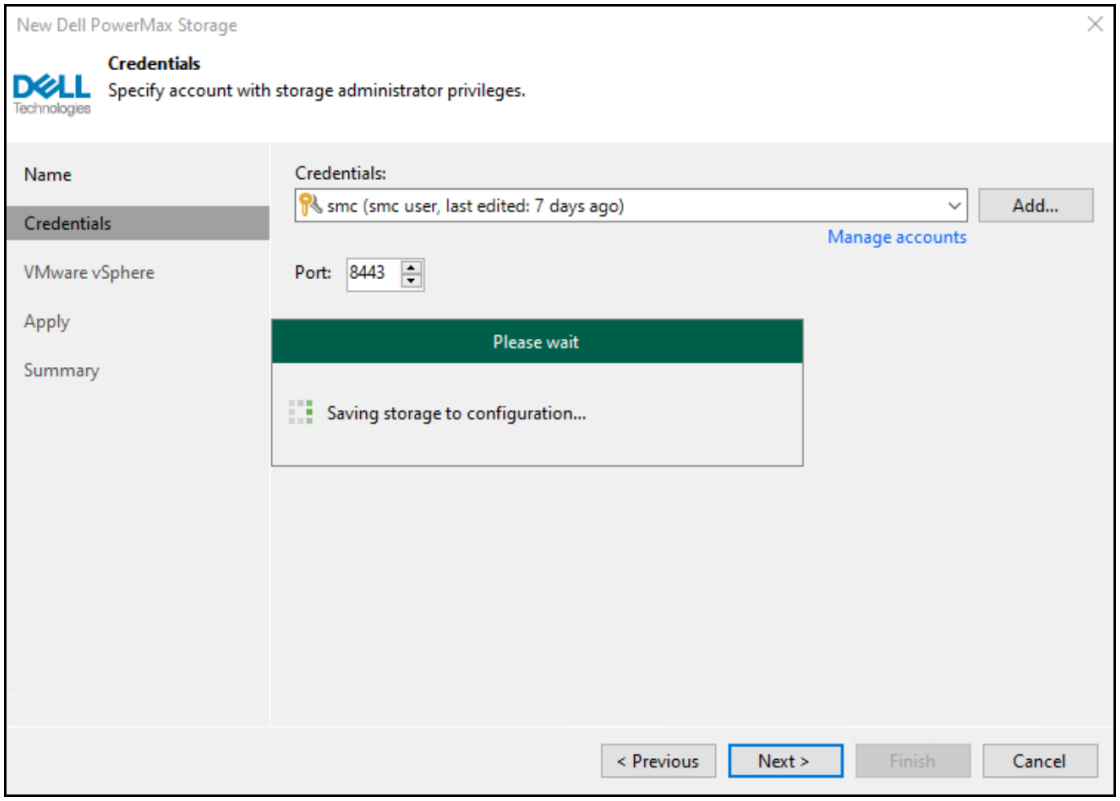


Figure 57. Saving PowerMax configuration – Step 6

In Step 7 in Figure 58, change the options as needed for the chosen environment. Generally, the only necessary change here is which protocol to use. The PowerMax Plug-in supports both Fibre Channel and iSCSI. Both can be used, though most customers will only use one protocol. If an export host has a masking view for Fibre Channel and iSCSI, and both boxes are checked, there is no way to control which masking view Veeam will use. Note that NFS is grayed-out.

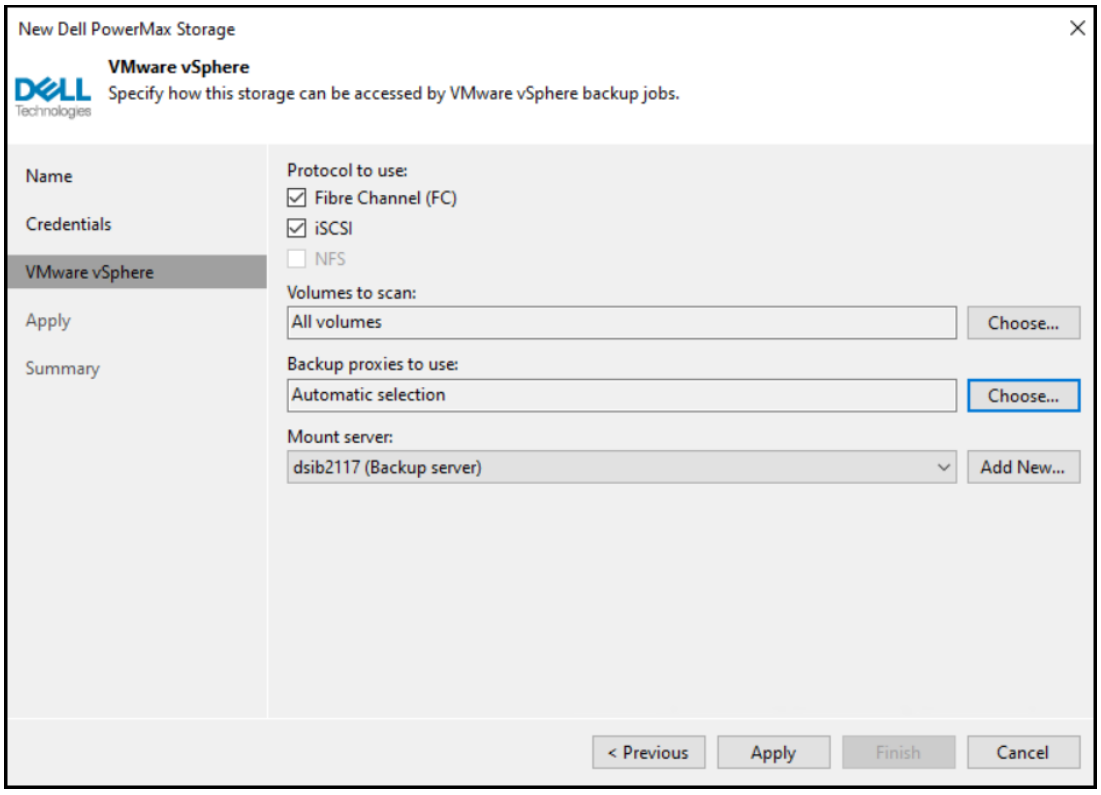


Figure 58. Adding PowerMax Storage: Step 7

By default, the PowerMax Plug-in discovers all devices on all local arrays. If that is desired, no further action is required; simply select **Apply** or **Finish**. Veeam will do an initial discovery of all the devices on the array as shown in Figure 59Figure 60, whether or not they are currently host-accessible, regardless of the protocol(s) chosen and regardless of whether they're associated with a snapshot or not. Devices are displayed in the format **<array_id>:<device_id>:<identifier>**. In addition, if a snapshot exists and a viable backup proxy host is configured as shown in Figure 58, Veeam will attempt to mount the snapshot (with a temporary snapshot target device) and record the VMs if any exist. In Figure 60Figure 59, the red box highlights that Veeam discovered a viable backup proxy and will be able to mount devices. Note both the successes and failures in the log messages.

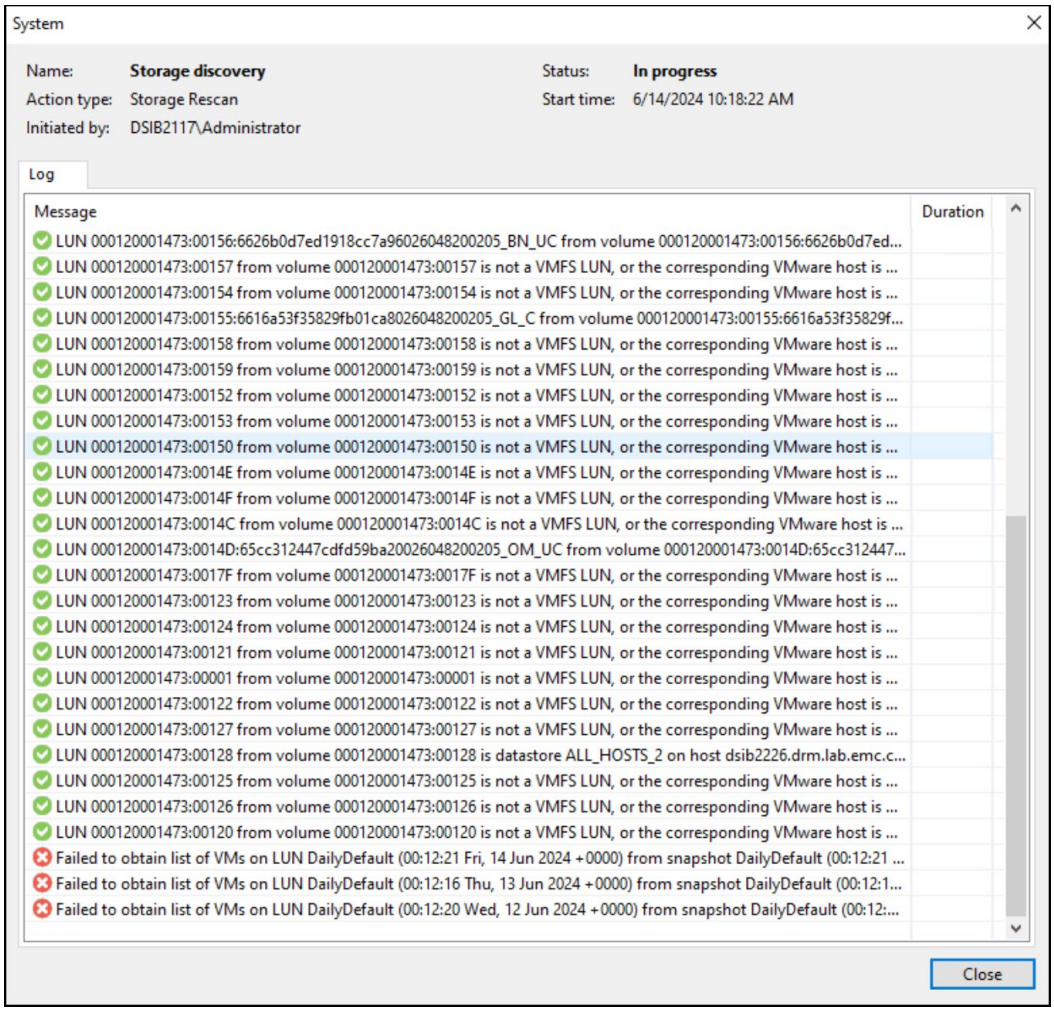


Figure 59. Veeam array discovery - Complete

Note: Veeam will not discover virtual volumes (vVols) because they are not supported and cannot be manipulated by the REST API.

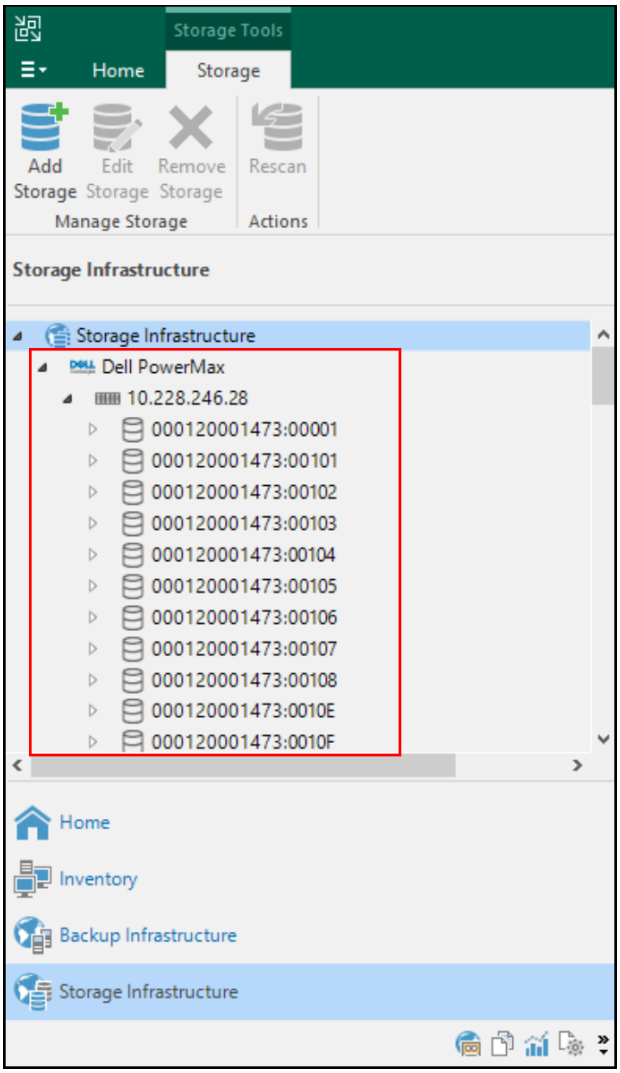


Figure 60. Storage discovery

6.1 Connection options

6.1.1 Edit storage

If a change to the protocol in use, Fibre Channel or iSCSI, is required, navigate to **Storage Infrastructure** and expand the **Dell PowerMax** icon to reveal registered Unisphere for PowerMax environments. Right-click on an instance and select **Edit storage…**.

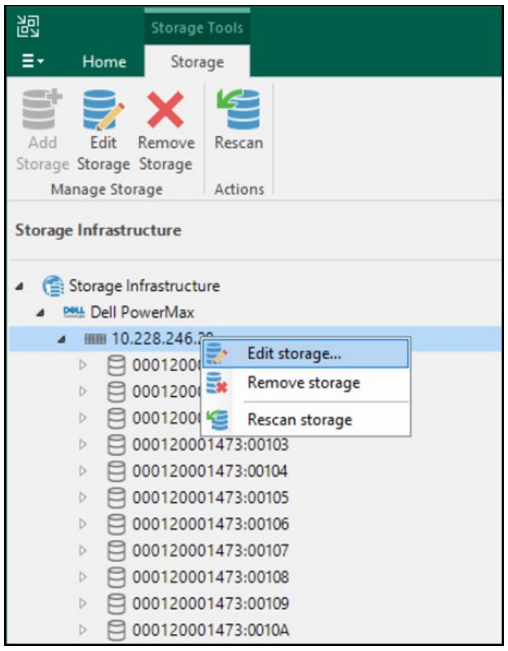


Figure 61. Edit storage to add protocol: Step 1

Click on the **VMware vSphere** selection on the left-hand side. In Step 2, the box for iSCSI is not checked. Check the box and select **Apply** as shown in Figure 62.

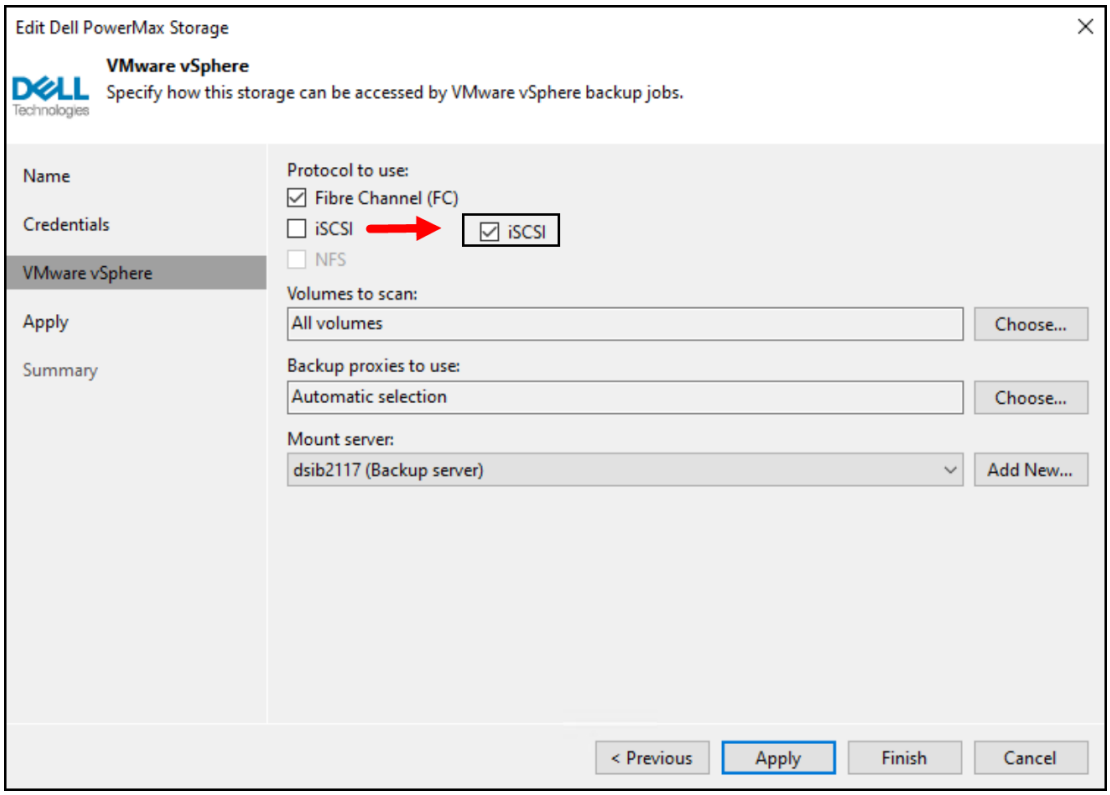


Figure 62. Add iSCSI protocol: Step 2

New changes are saved. Click **Finish** in Figure 63 to complete with a new storage discovery.

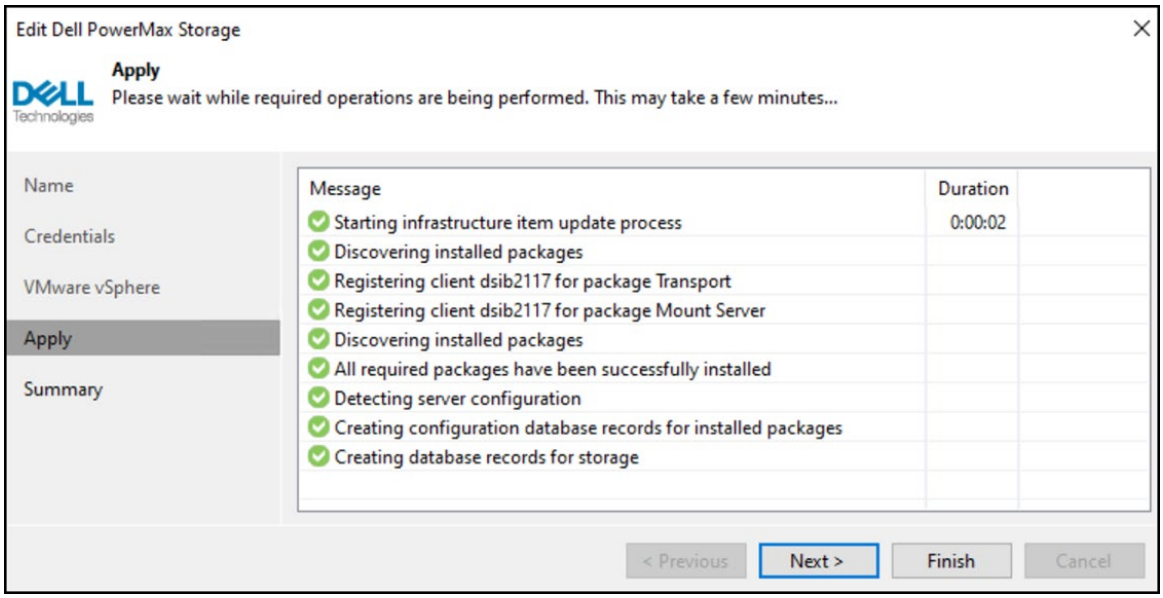


Figure 63. Add iSCSI protocol: Finish

6.1.2 Backup proxy

Once a backup proxy is set up, if it will be the sole proxy used with PowerMax or a particular Unisphere instance, it is a best practice to update the PowerMax Plug-in to use it. To do this, navigate to **Storage Infrastructure** and expand the Unisphere instance. Right-click on the instance and select **Edit storage…** as shown in Figure 64.

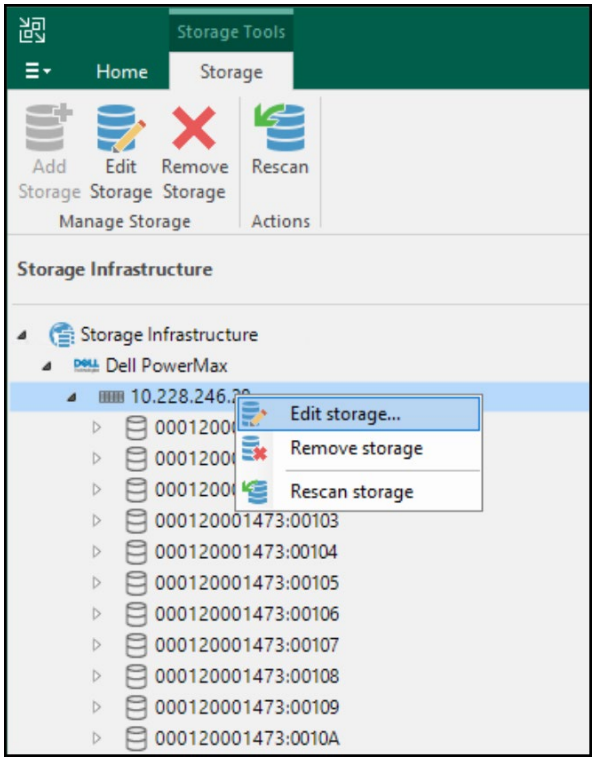


Figure 64. Update backup proxy for PowerMax: Step 1

In Step 2 select **VMware** vSphere in the left-hand menu. Next click **Choose** next to **Backup proxies to use** and select the backup proxy desired. In this example, **dsib0127.drm.lab.emc.com** is chosen as it will be used in the next section with disk backups. Then select **finish** as shown in Figure 65.

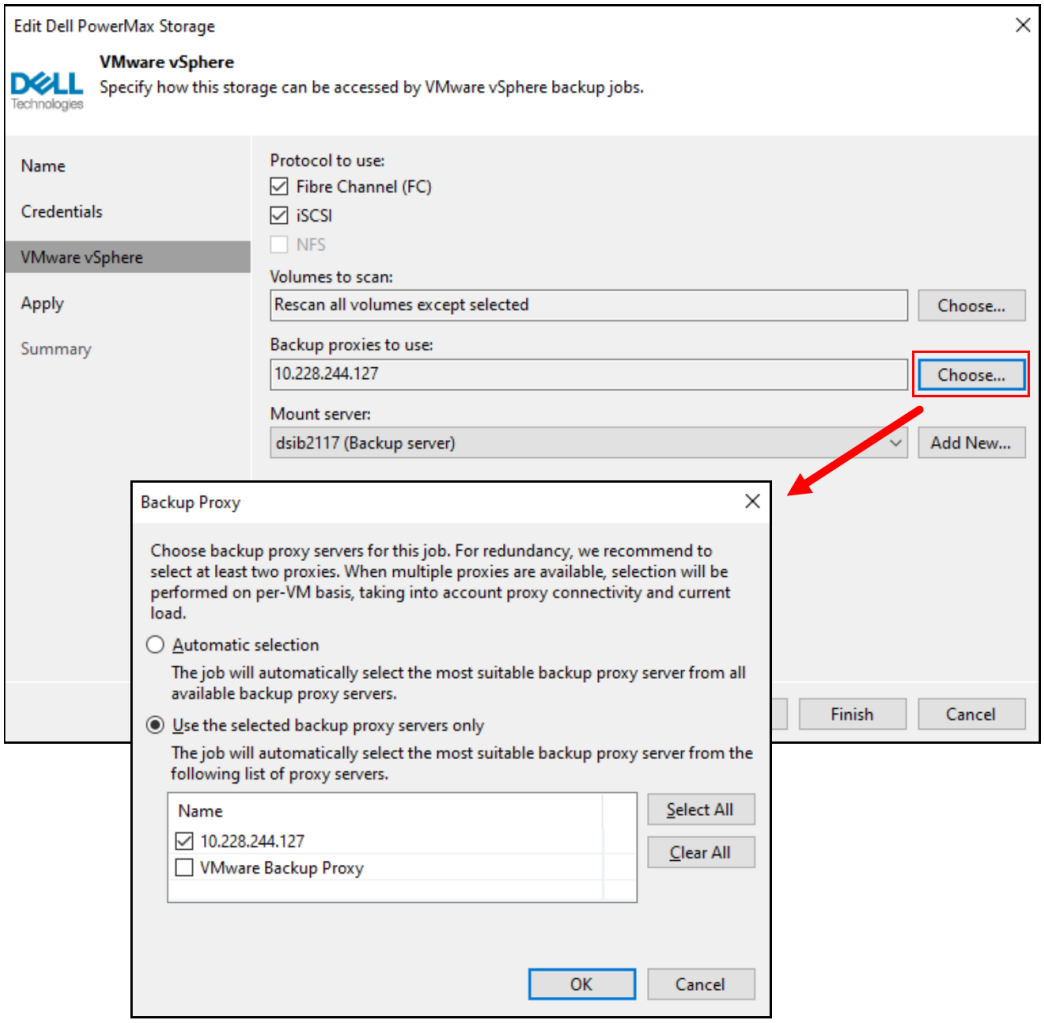


Figure 65. Update backup proxy for PowerMax: Steps 2

Veeam will then run a rescan on all the devices as shown in Figure 66. Note that if a snapshot cannot be exported to the backup proxy (**dsib0127.drm.lab.emc.com**), it will show a white ‘x in a red box, while a success will show a white check mark in a green box.

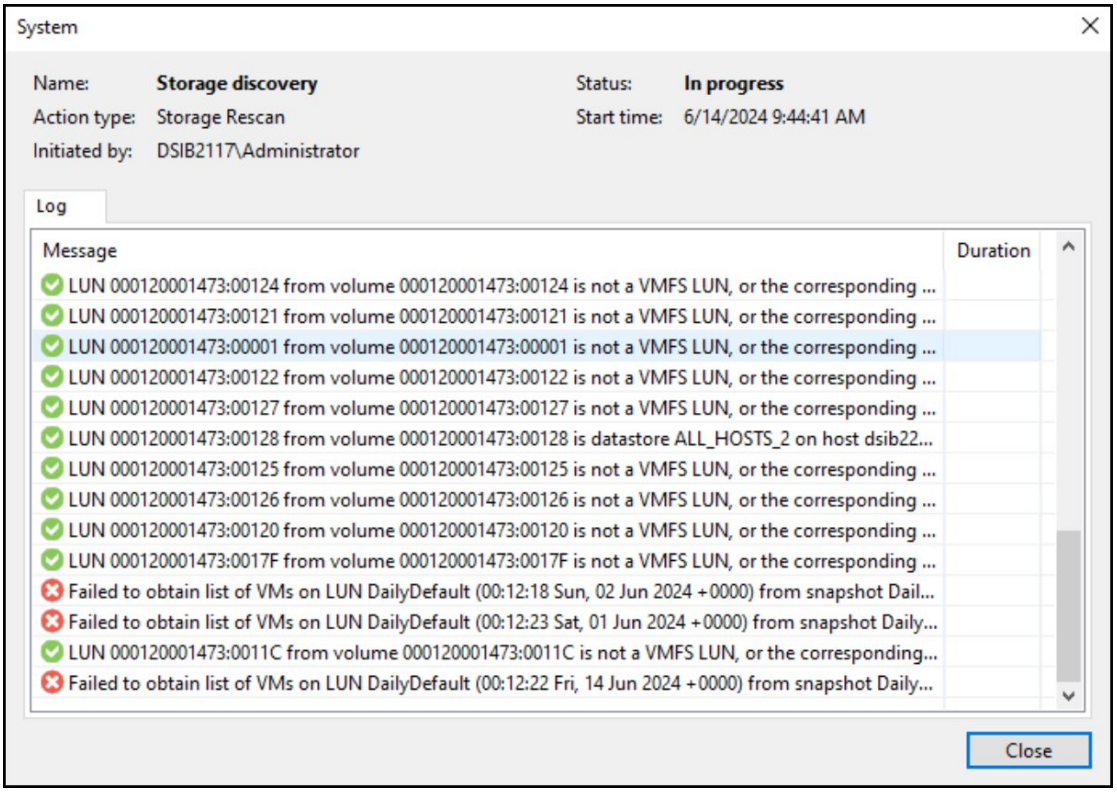


Figure 66. Update backup proxy for PowerMax: Scan

6.2 Filtering PowerMax arrays and/or volumes from Veeam

If there are multiple local arrays in the Unisphere environment but not all are necessary or required, it is possible to limit the arrays and/or specific volumes. There are two different ways to achieve this: Through the Veeam GUI or the PowerMax Plug-in.

6.2.1 Veeam GUI

It is possible to change what arrays or volumes Veeam can use for backup and restore, either during the initial addition of the storage or by editing the existing storage. In this example, the filtering will be done during the addition of the array. In Figure 58 from the section on Adding PowerMax storage in Veeam, there is a **Choose…** button next to **Volumes to scan:** Select this in Step 1. The screen is repeated in Figure 67.

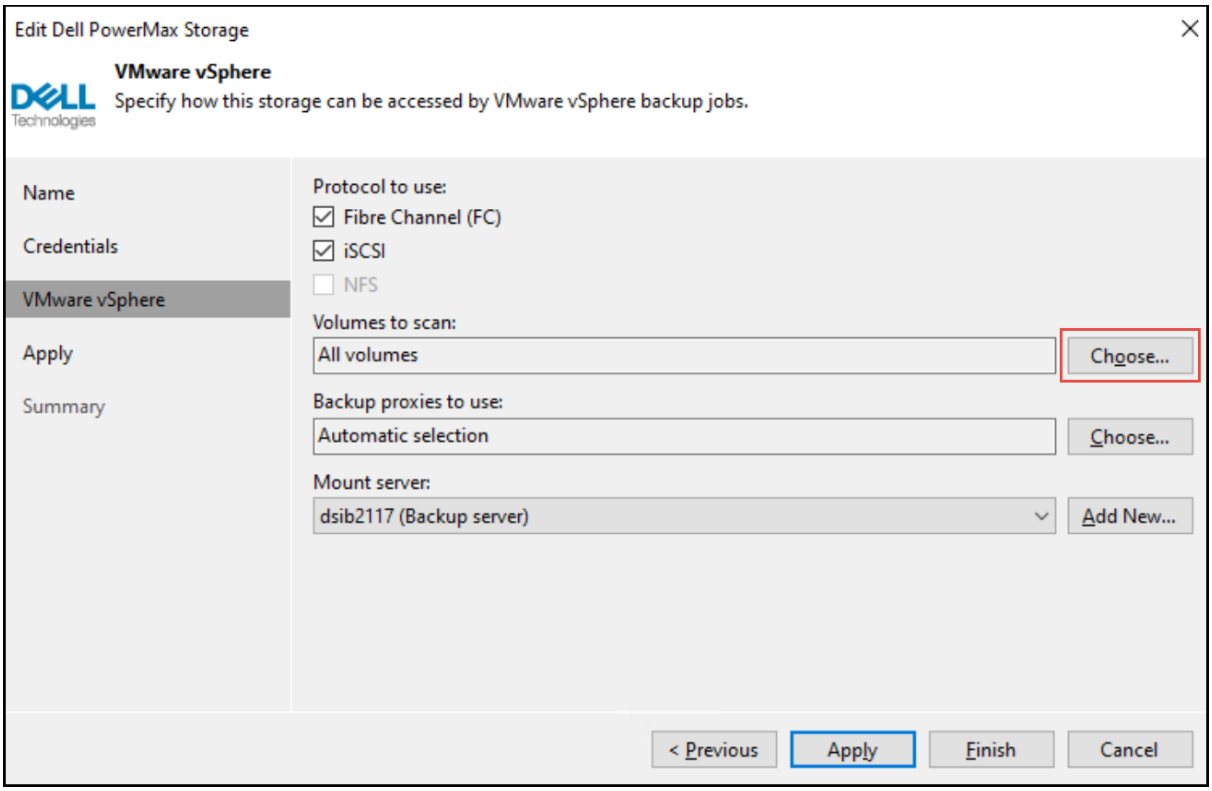


Figure 67. Filter arrays/volumes: Step 1

In the screen that pops-up, options are available for volume inclusion or exclusion. This example will demonstrate excluding volumes, but the process is exactly the same for including volumes as well. In Figure 68 change the radio button to **All volumes except:** and then select **Add…**. Then, two options are presented: **From infrastructure...** or **By wildcard…**. Begin by selecting the infrastructure option.

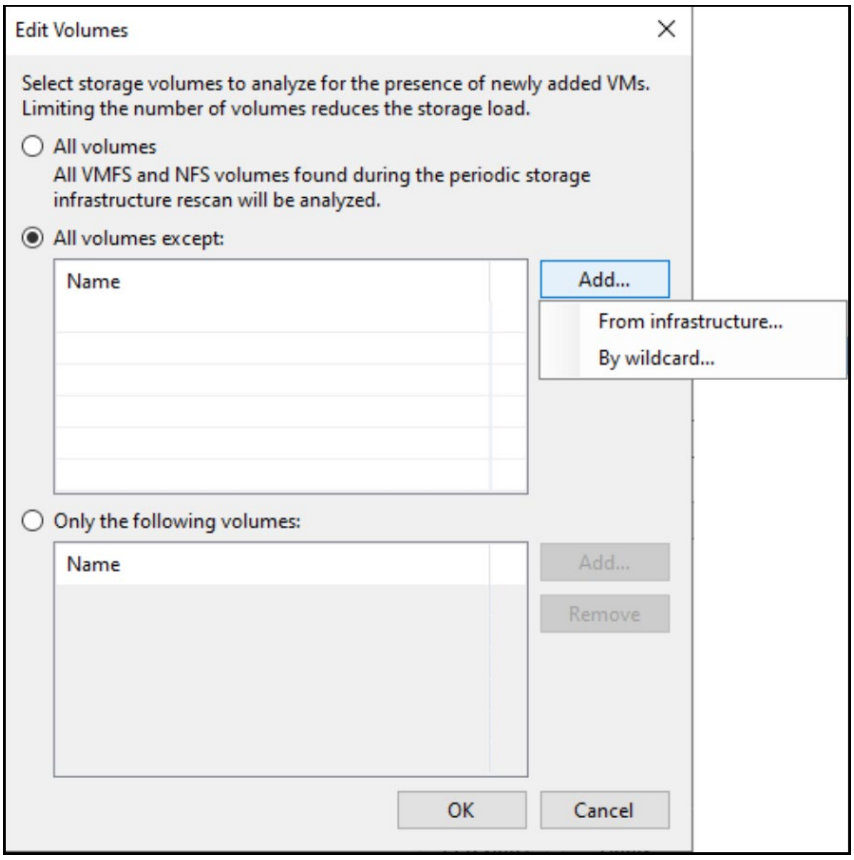


Figure 68. Volumes for inclusion/exclusion: Step 2

In Step 3, expand the Unisphere for PowerMax server and select the devices for exclusion. In this example, device 01 is selected. Select **OK** to return to the **Edit Volumes** screen.

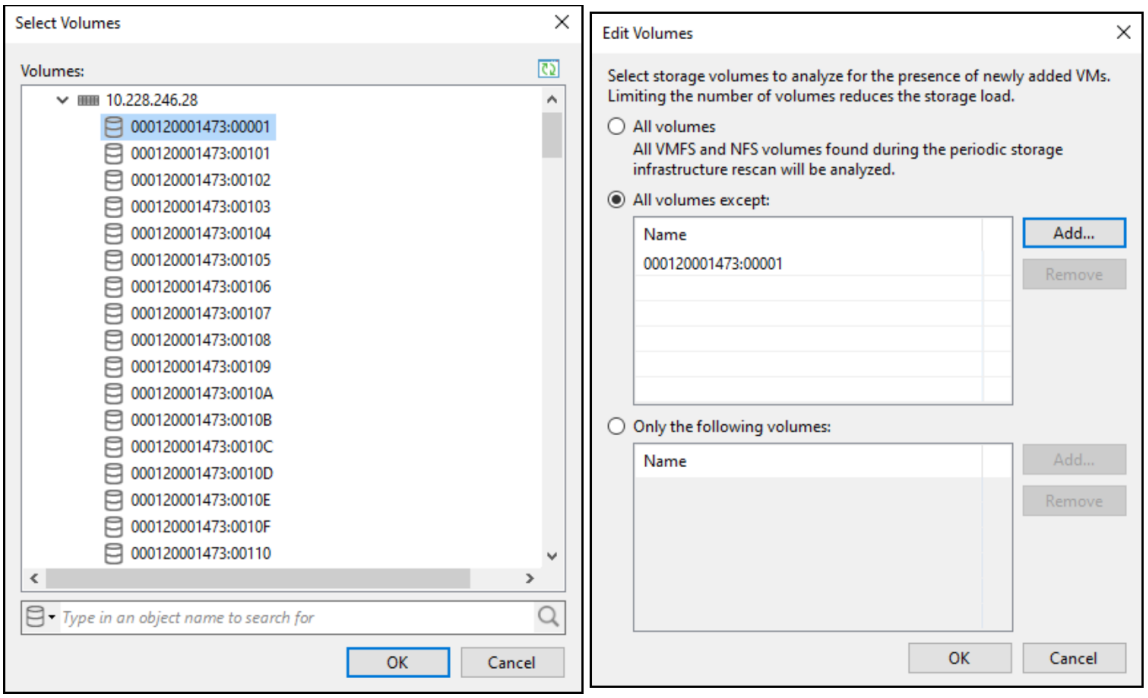


Figure 69. Volumes for inclusion/exclusion: Steps 3

Now select **Add…** once again but choose the wildcard option instead. In the pop-up box, enter in the wildcard string to match for exclusion as shown in Figure 70. Note the entire array 000120001473 is excluded from the search.

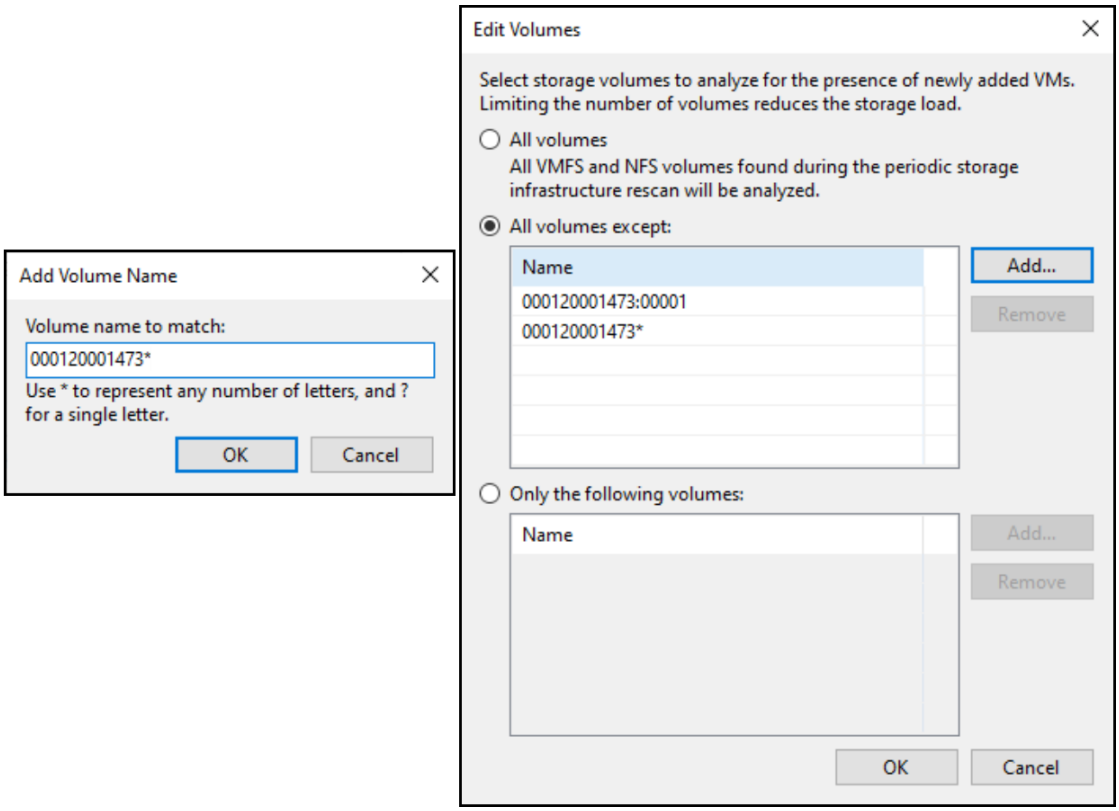


Figure 70. Volumes for inclusion/exclusion: Steps 4-5

This process may be repeated for any additional volumes or arrays. It is not possible to both exclude and include volumes or arrays. Only one option may be used.

6.2.2 PowerMax Plug-in option

In addition to the exclusion/inclusion in Veeam, the PowerMax Plug-in itself can remove an entire array from Unisphere. This works in a similar manner to an option in Dell Solutions Enabler. The PowerMax Plug-in uses a file called **symavoid.txt** which is stored in the PowerMax Plug-in directory (e.g., **…\Plugins\Storage\Dell PowerMax**) on the Veeam server. This text file should have a one-line entry for each array the user wants to remove. In Figure 71, there are two PowerMax arrays listed, so both will be left out of discovery. Unlike in Veeam filtering, individual devices cannot be filtered.

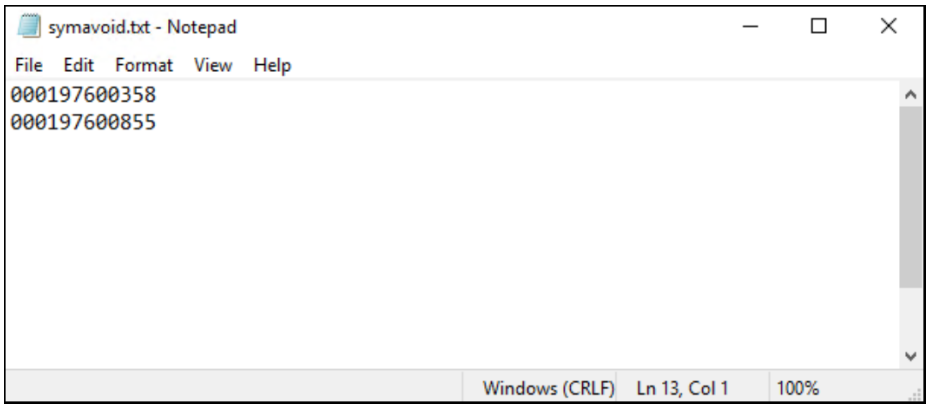


Figure 71. symavoid.txt file

6.2.2.1 Differences

The following are differences between the two filtering options.

The Veeam GUI offers the ability to completely remove arrays and devices from any use by the application, but filtering is performed after the REST API calls are made.
The symavoid.txt file has the benefit of filtering before the REST API calls are made but does not offer the specificity of excluding or including individual volumes.

6.2.2.2 Recommendations

It is best to use the filtering features as they're designed. Therefore, if the entire local array must be excluded, use the symavoid.txt file. Otherwise, the Veeam GUI is the most efficient.

SRDF/Metro is a specific use case that has particular handling. Please see the section SRDF/Metro with Veeam GUI filtering or symavoid.txt.

6.3 PowerMax storage volumes

As mentioned above, Veeam displays PowerMax volumes in the following format: **<array_id>:<device_id>:<identifier>**. In Figure 72, volumes from array 000120001473 are listed. In a red box is one of those volumes, which has a volume identifier assigned (**veeam_tag**).

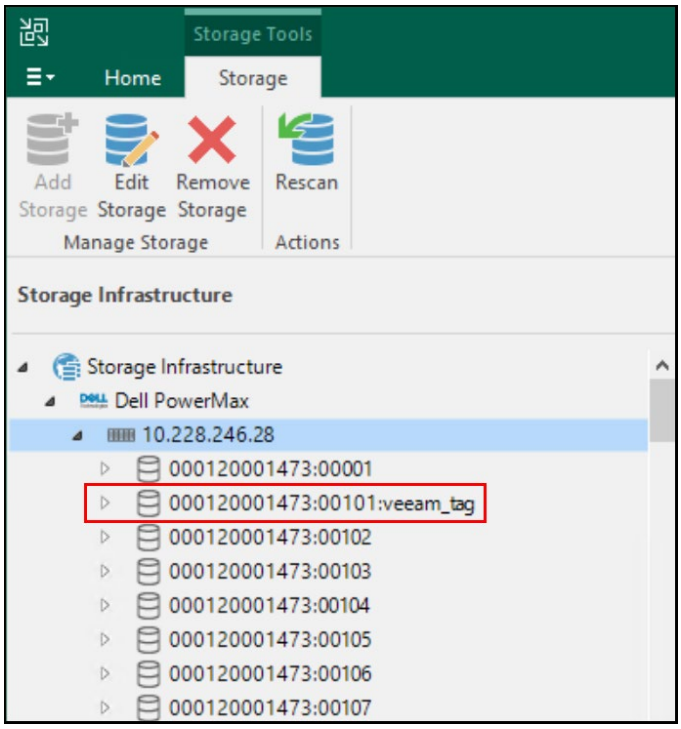


Figure 72. Veeam storage format display

To see the field where Veeam pulls this information, open Unisphere for PowerMax and navigate to the **volumes** screen under **storage**. In Figure 73, note the highlighted volume matches the one in Figure 72. The field that stores “veeam_tag” is called **volume identifier** and can be assigned to any device.

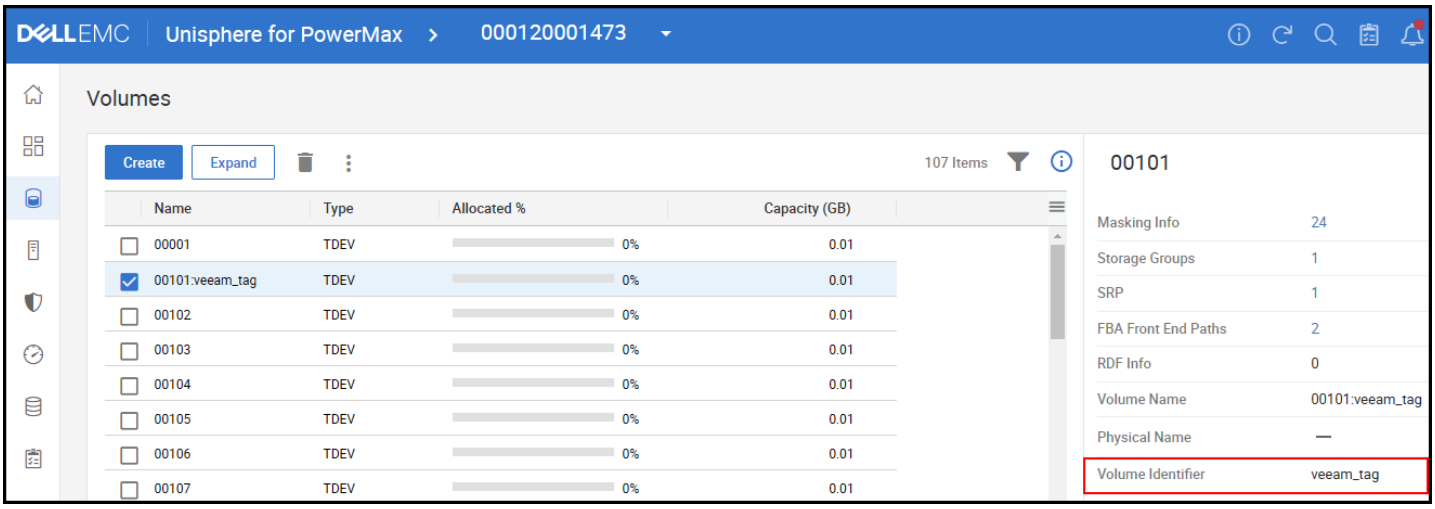


Figure 73. PowerMax volume format in Unisphere for PowerMax

6.3.1 Assign a volume identifier

To set a volume identifier on a volume, left-click on the three dots next to the garbage can (not displayed in Figure 74). Select **Set Volumes** and then **Identifier.** Then add a new identifier name and click **Run Now**. This name will now appear in Veeam and can be used as a tag to help Veeam users (e.g., a VM administrator) choose the correct device to snapshot if, for example, it’s not otherwise identified by a VMFS.

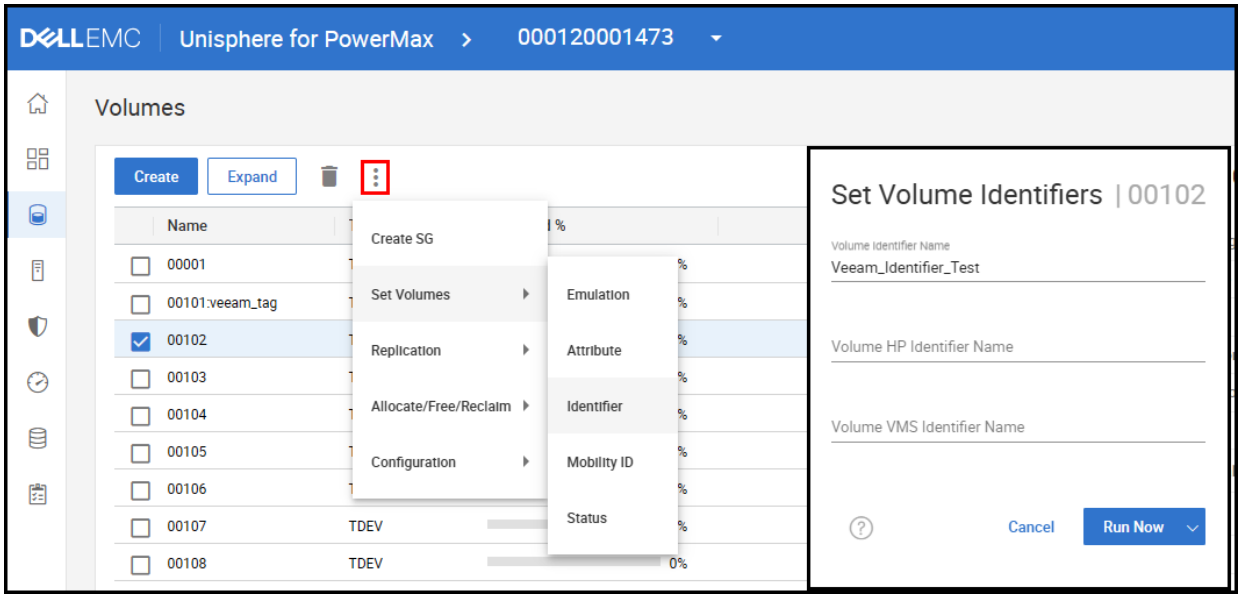


Figure 74. Setting volume identifier in Unisphere

Once set, right-click on the volume in Veeam and choose **Rescan volume**. The new identifier will appear as shown in Figure 75.

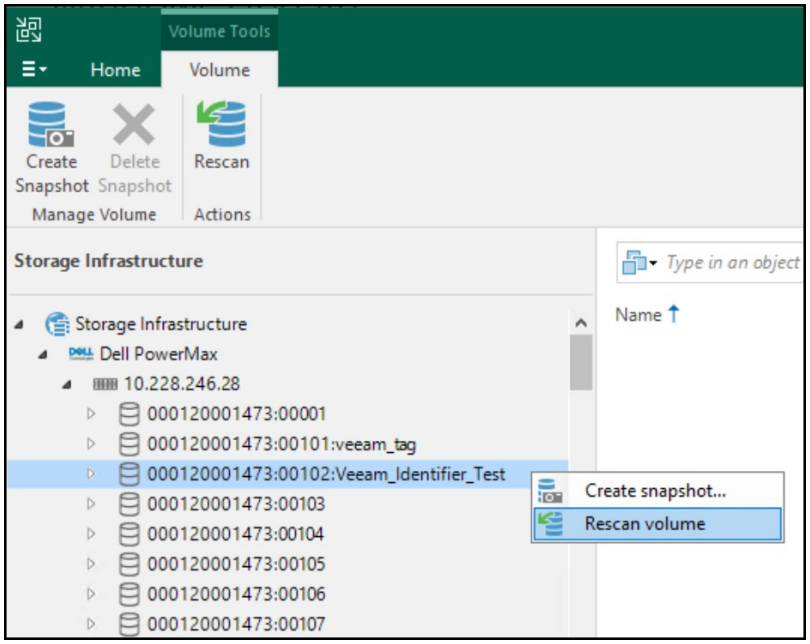


Figure 75. Volume identifier in Veeam

6.3.2 Storage detail

In the storage detail, view right-hand panel shown in Figure 76. Veeam will list all existing snapshots for the array devices. Unless filtering was employed, Veeam will list all array devices. However, Veeam does not make any attempt to validate whether devices are in use by any registered VMware vCenter before displaying, nor will it filter snapshots based on their use in Veeam. Veeam permits the use of existing snapshots, regardless of whether or not they were initiated from within Veeam or through another UI or CLI.

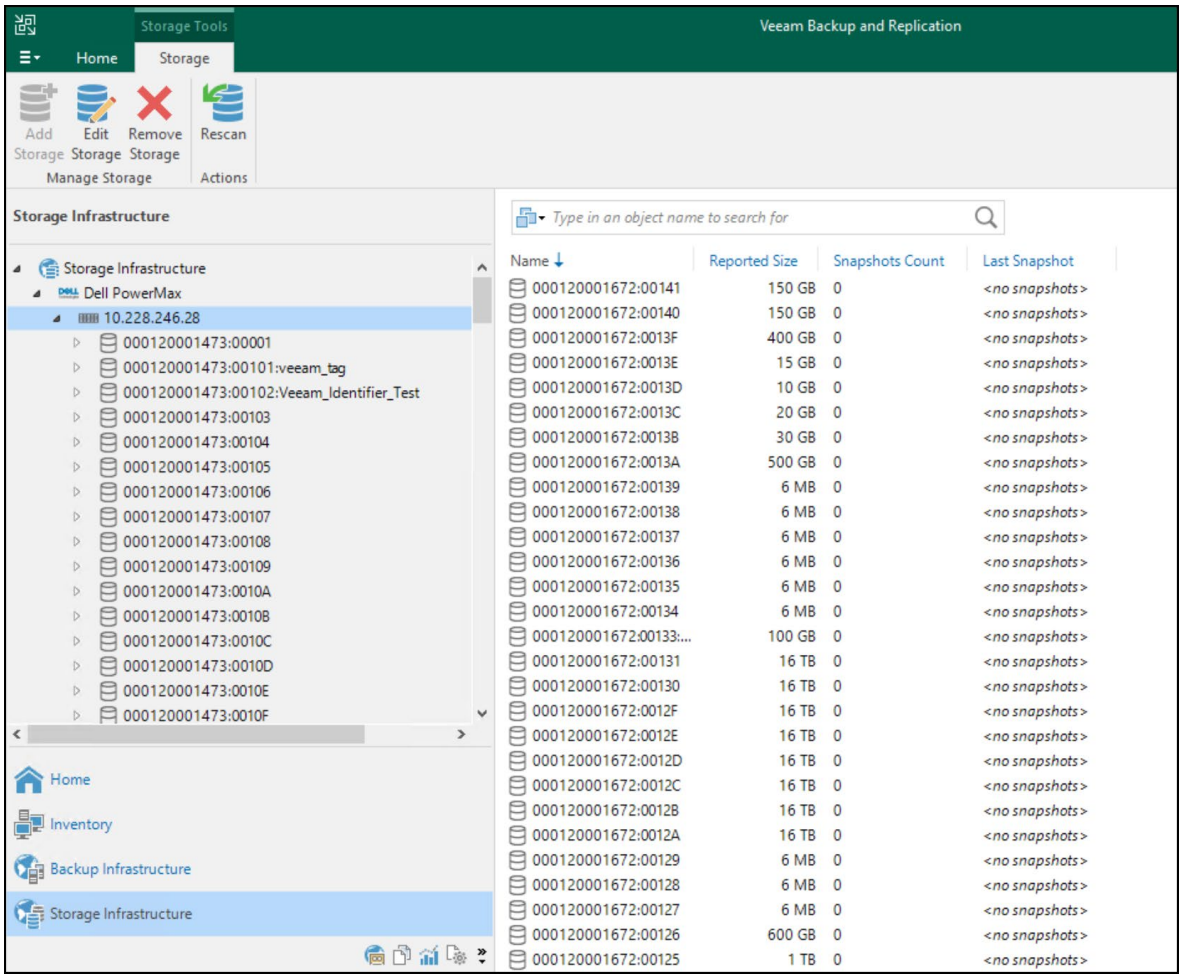


Figure 76. Veeam storage volume detail

To view the snapshot detail as shown in Figure 77, select the arrow next to one of the volumes in the left-hand panel. In this example, the snapshots are actually system-generated by a snapshot policy in Unisphere.

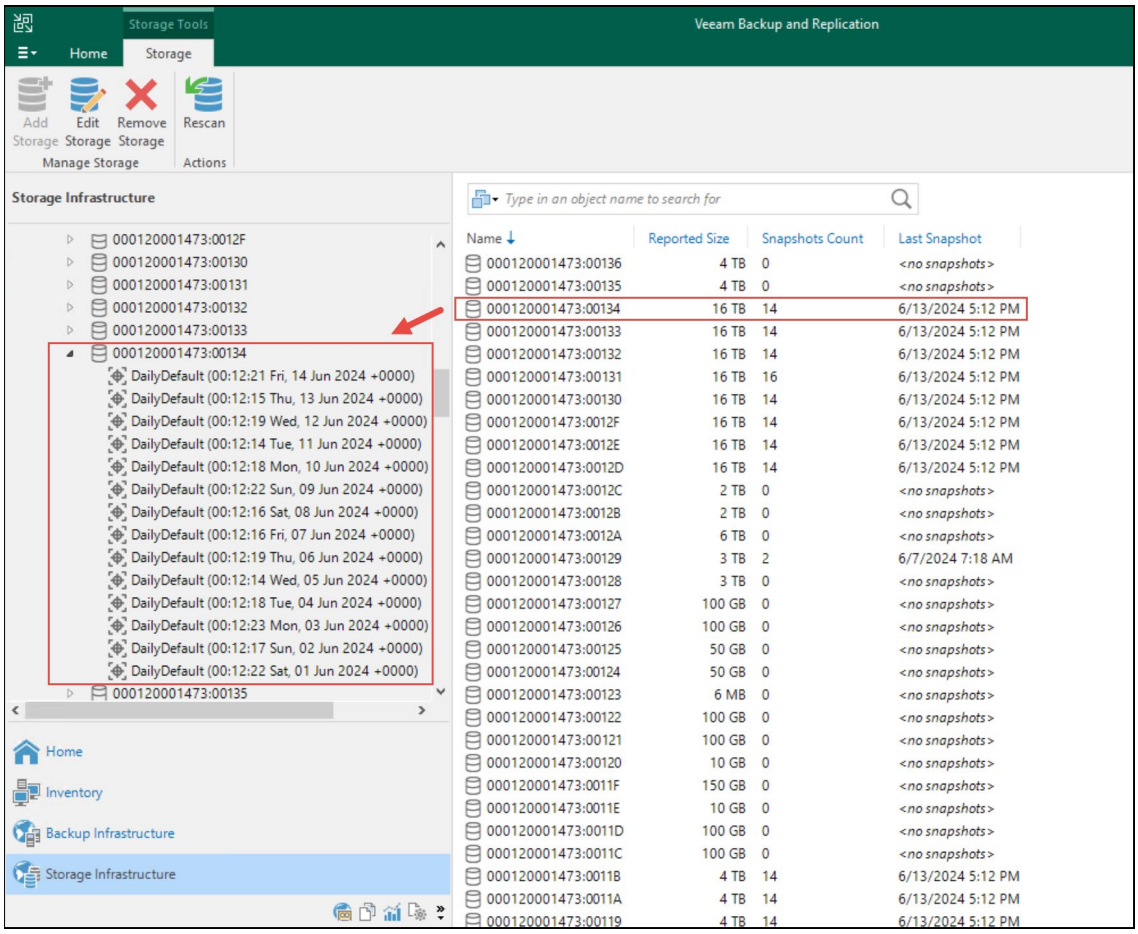


Figure 77. Snapshot detail in Veeam

6.3.3 Manual snapshots

From the Veeam console, the user can execute crash-consistent manual snapshots. These snapshots, if executed on devices with VMFS, are then available for recovery with Veeam. Like Solutions Enabler, Veeam has the advantage of being able to take snapshots of individual devices, which is not available within Unisphere for PowerMax.

To take a snapshot, highlight the desired device and right-click. Select **Create snapshot…** in Step1 in Figure 78.

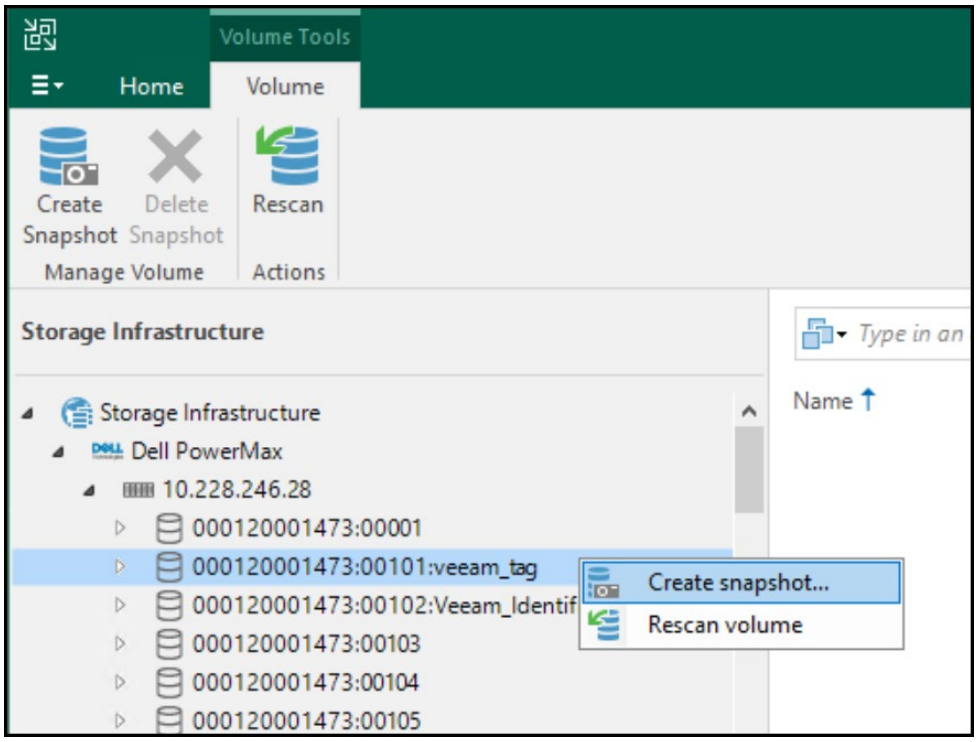


Figure 78. Creating a manual snapshot: Step 1

In Step 2, Figure 79 type in a **snapshot name**. The **snapshot description** is optional because PowerMax will not store the information. However, Veeam will keep this information in the history which is available as shown in Figure 82.

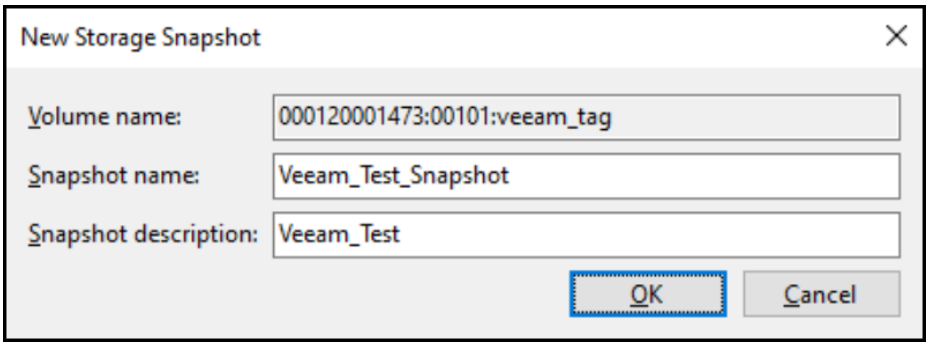


Figure 79. Creating a manual snapshot: Step 2

Note that there cannot be spaces in the snapshot name, or the following error will be generated, as shown in Figure 80.

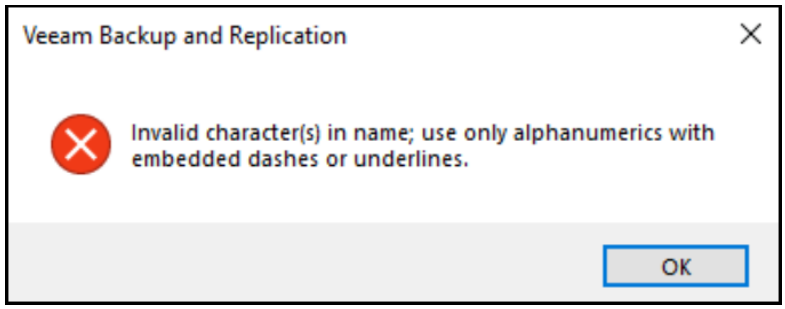


Figure 80. Snapshot naming error

Step 3, Figure 81 is the result of the creation. The snapshot job succeeded and is listed in the left-hand panel as “Veeam_Test_Snapshot”. Note that in this example, the device is not used in the VMware environment, however the user can still take a snapshot of it.

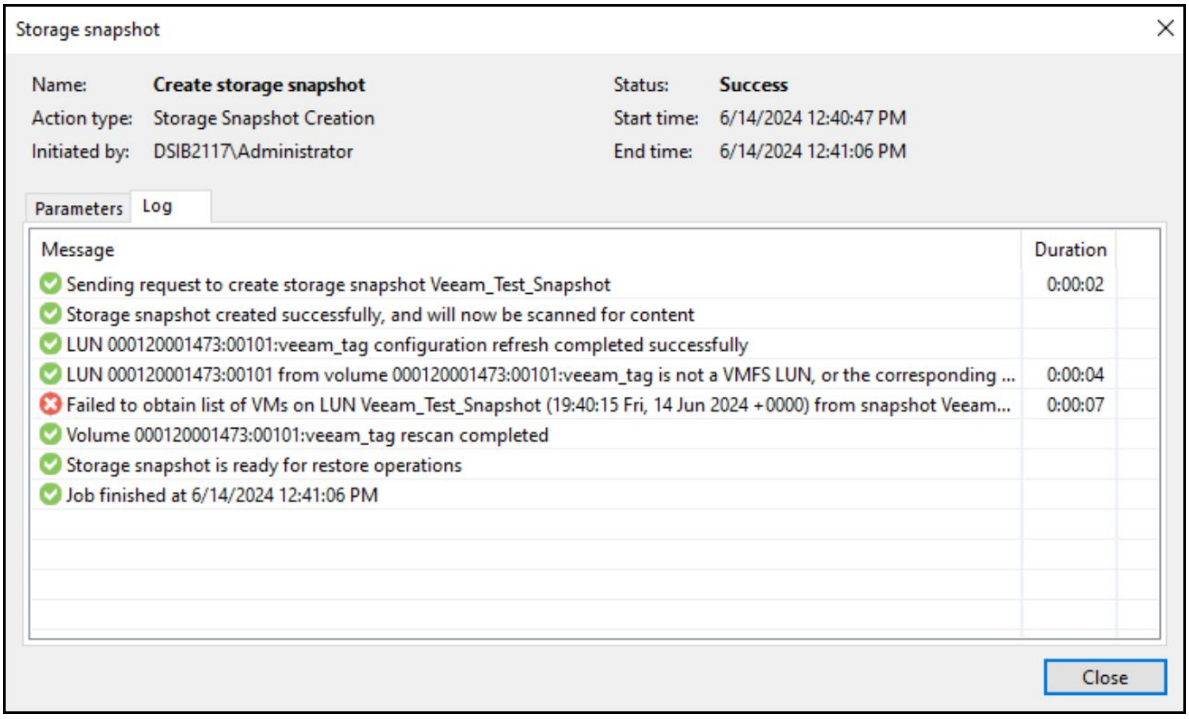


Figure 81. Creating a manual snapshot: Step 3

In order to see the description that’s provided in Figure 79 when the snapshot was taken, navigate to the **history** screen. Under **jobs > storage snapshots**, find the **create storage snapshot** job name. Because a manual snapshot is not executed through the job wizard, there is no unique job name. Each manual snapshot is listed as a **create storage** snapshot. Right-click on the job and select **statistics**. Under the **Parameters** tab are the details of the snapshot creation, including the highlighted description.

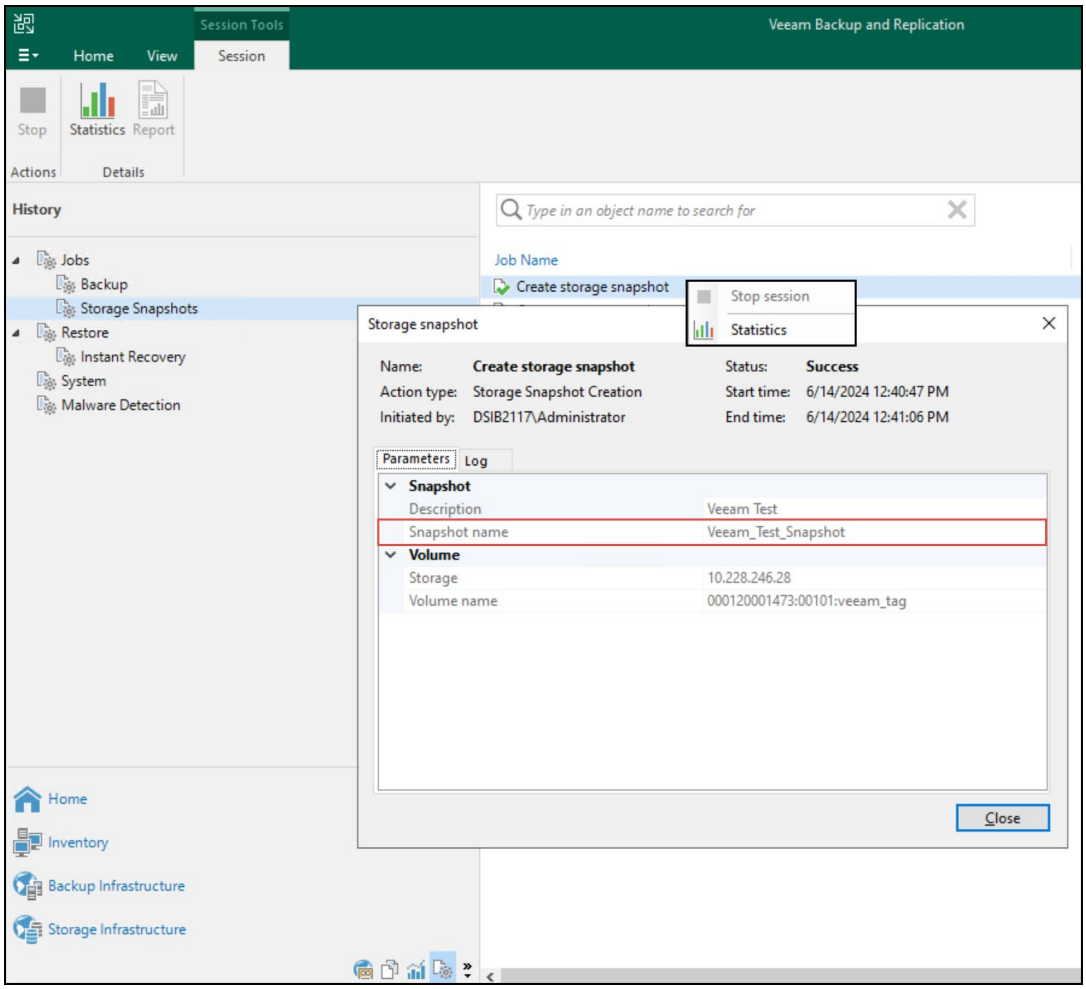


Figure 82. Snapshot history

6.4 Snapshot deletion

In addition to taking snapshots, it is possible to delete snapshots in Veeam.

Note: Since Veeam displays all snapshots for all devices, whether or not they are in use by VMware or Veeam, it is entirely possible to delete a snapshot on a device that is used elsewhere in a customer environment. Users should therefore take care before manually removing snapshots.

For this example, navigate to **Storage Infrastructure** and locate the device that contains the snapshot the user wishes to delete. Expand the device and highlight the snapshot. Right-click and select **Delete snapshot…**, to confirm the selection. Steps 1 is displayed in Figure 83.

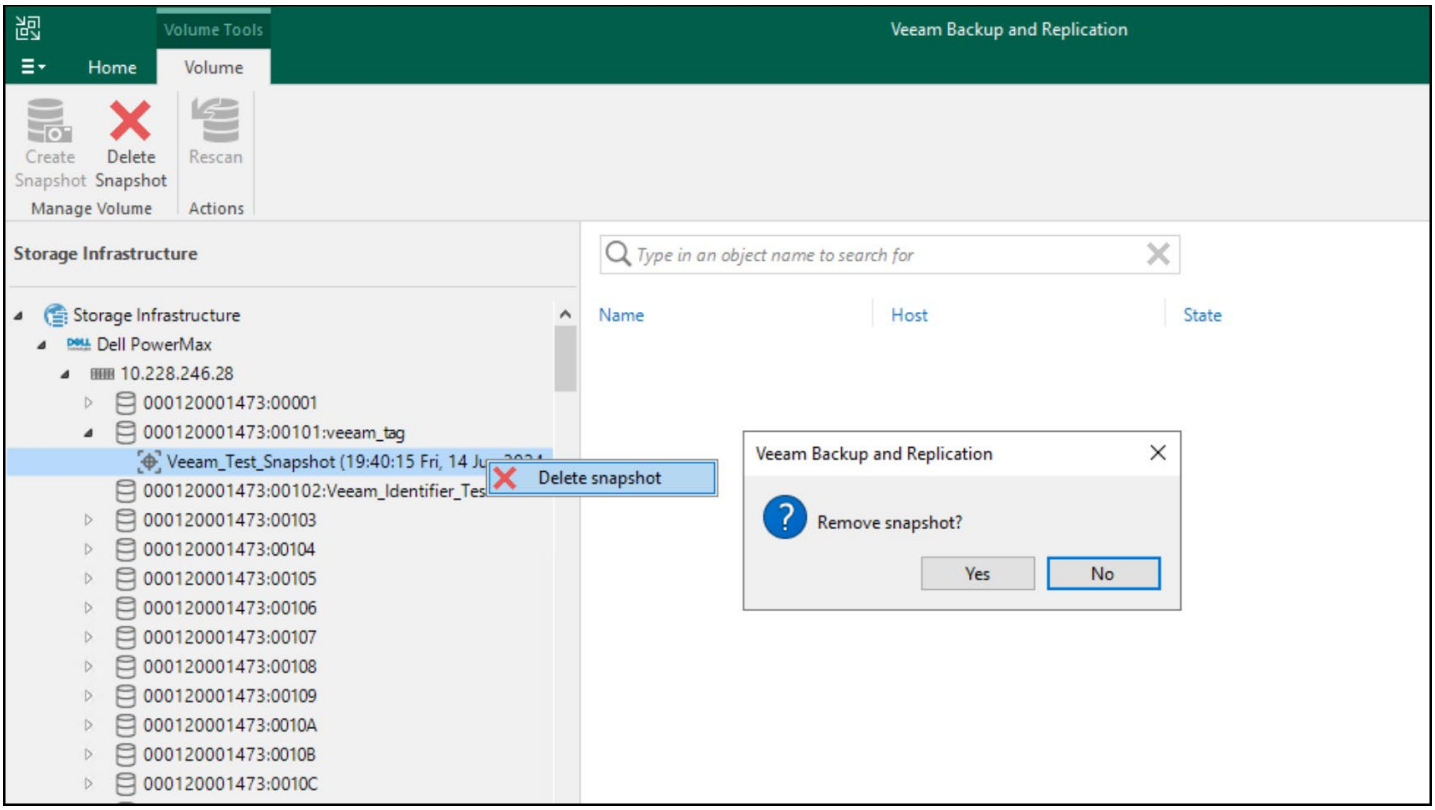


Figure 83. Manual snapshot deletion: Step 1

Veeam will display the log file as the snapshot is deleted. The process shown in Figure 84 takes seconds.

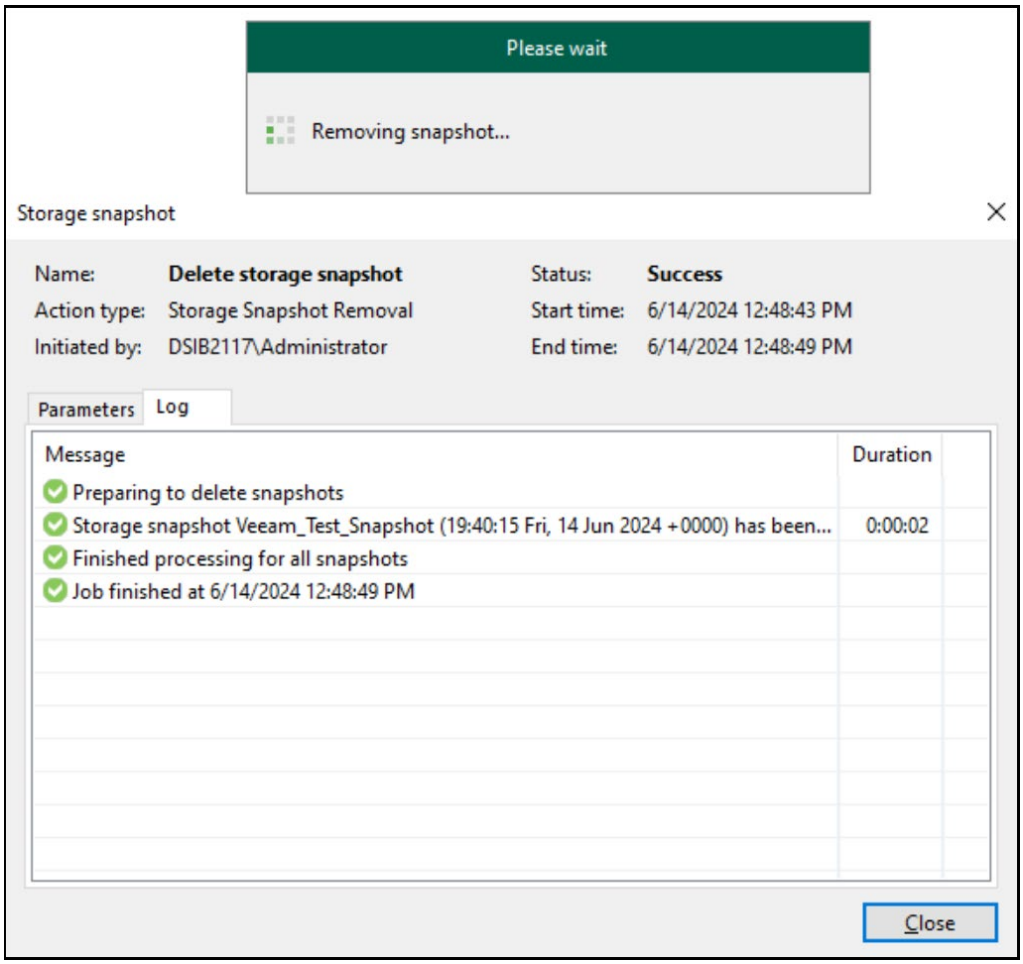


Figure 84. Manual snapshot deletion: Step 2

6.4.1 Linked snapshots

If a snapshot is currently linked to any target devices, deletion will fail. It is not possible to force an unlink first. In the following example, an attempt is made to delete one of the snapshots for device 50 on array 000197600450. The task then fails as shown in Figure 85, with Veeam passing along the error message that the snapshot has a linked target, even providing the linked target device (170).

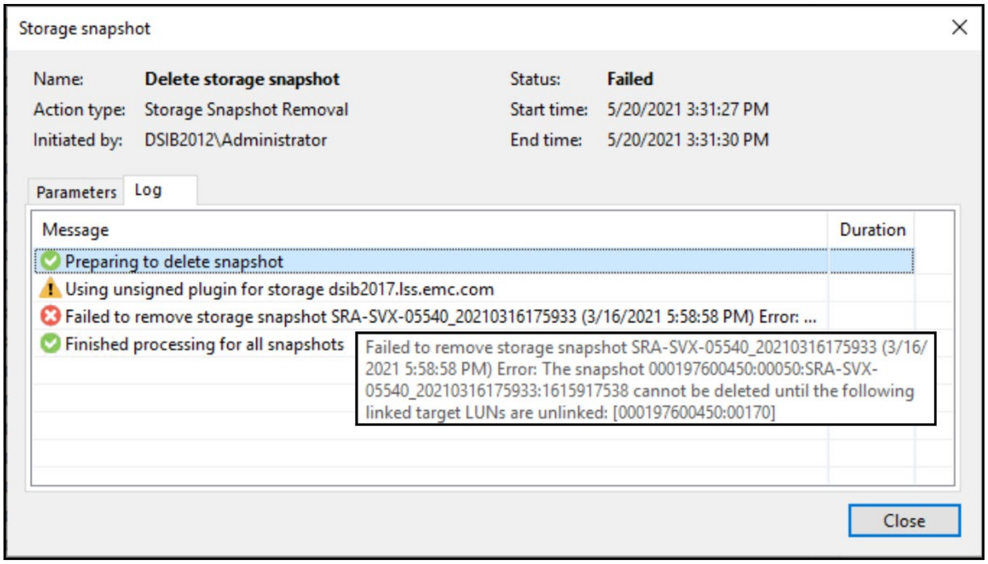


Figure 85. Snapshot deletion failure

The link can be confirmed either in Unisphere for PowerMax or with Solutions Enabler. Shown in Figure 86 is the Solutions Enabler output where the linked target for the snapshot in question is shown for device 50. Notice that there are actually two linked targets for device 50, but only one is for the snapshot that is being deleted.

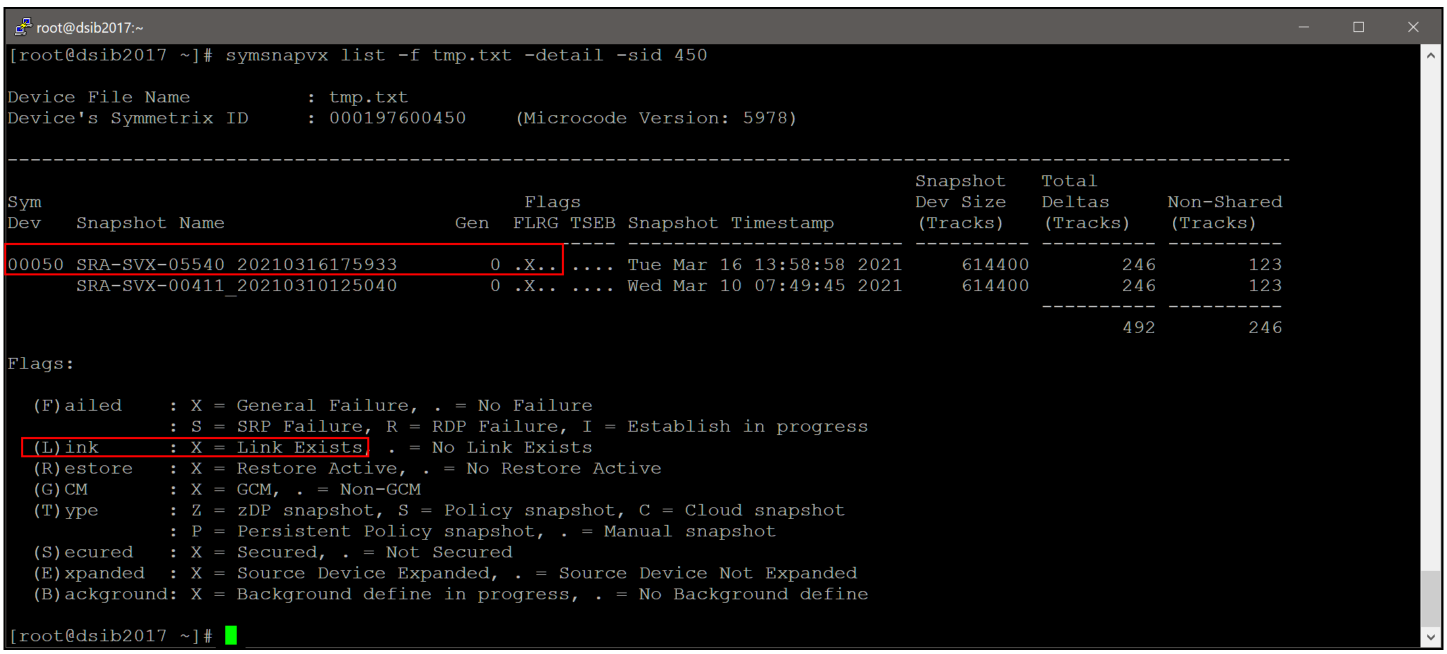


Figure 86. Solution Enabler showing a linked snapshot

7 Backup

Veeam and the PowerMax Plug-in support both Fibre Channel and iSCSI protocols. When taking a backup that uses the snapshot process with the PowerMax Plug-in, there is no difference between Fibre Channel and iSCSI. REST API calls are made to Unisphere over TCP/IP and the backup process appears the same in Veeam for either Fibre Channel or iSCSI so it is unnecessary to show both. This example uses Fibre Channel. As restore presents new devices over a particular protocol, both Fibre Channel and iSCSI will be included.

Note: All snapshots taken with the PowerMax Plug-in are crash consistent. Note, however, that if a VM has vmdks on more than one datastore, the PowerMax Plug-in will take separate snapshots of each device backing the datastores so consistency is not maintained across the entire VM. To guarantee that type of consistency, VM quiescing should be utilized. Veeam also integrates with applications like Oracle to ensure database consistency. Application consistency is covered in the section Application consistency.

7.1 VMFS with FC/iSCSI

Note: Within Veeam, there are many navigation paths one can use to execute the same task. For example, backing up a VM can be done from the backup infrastructure tab, the inventory tab, the home tab or from the menu bar at the top of the console. All paths are valid, but this document will only show one of the paths when explaining functionality. This is because any subsequent walkthrough wizards will always be the same.

From the banner menu, select **Backup Job -> Virtual machine…** as shown in Figure 87 to complete Step 1.

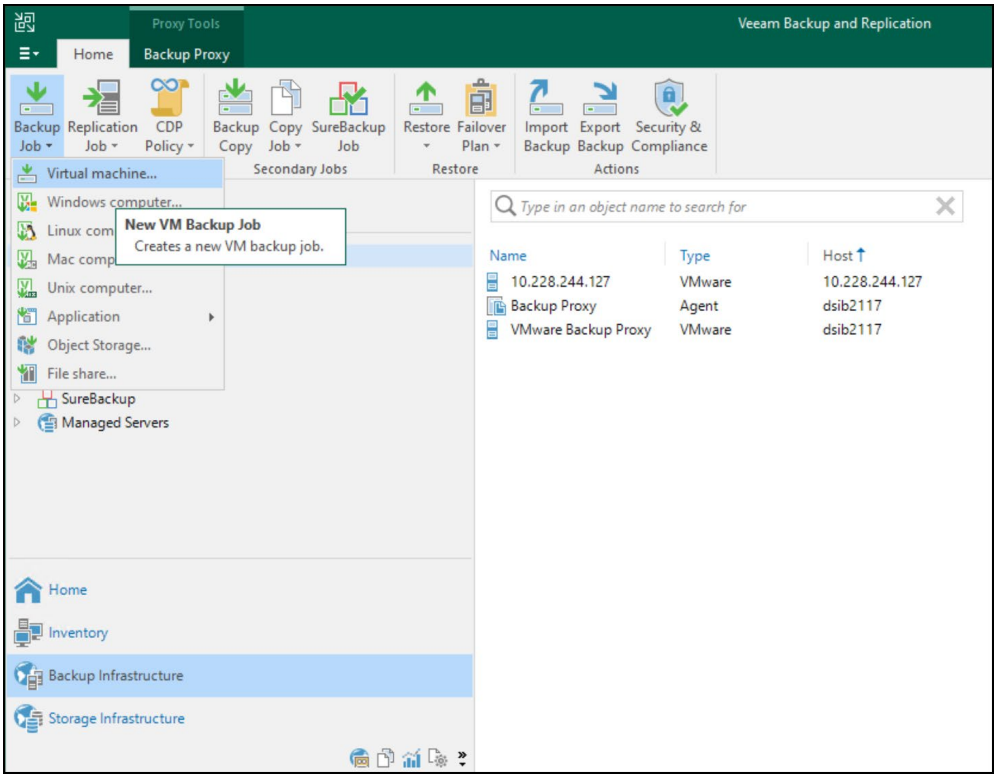


Figure 87. Backing up a VM: Step 1

In Step 2 provide a name for the backup job and a description if desired as shown in Figure 88. The backup name is not only used to reference the job in Veeam but is also the name of the Windows folder where the log files are stored on the host or VM where Veeam is installed.

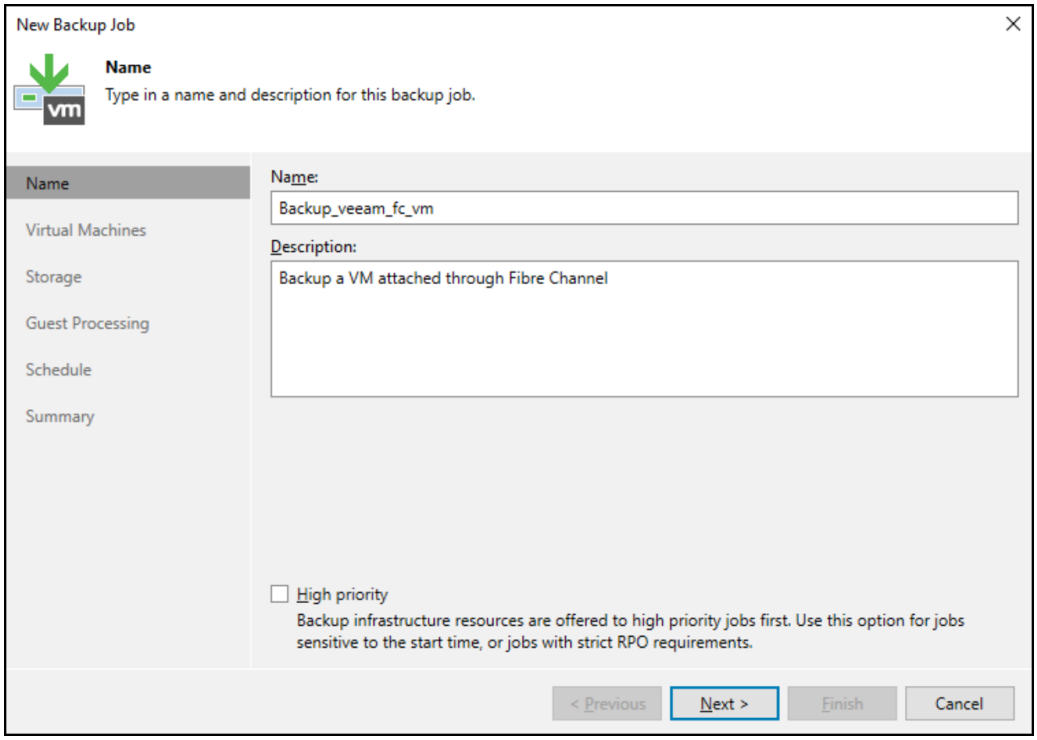


Figure 88. Backing up a VM: Step 2

Like in Figure 89, use the **Add…** button in Step 3 to search for and add the VMs one wants to back up. If multiple VMs are selected that span more than one datastore, whether on the same array or different arrays, the PowerMax Plug-in will take separate snapshots of each device. In other words, placing multiple VMs in the same backup job does not guarantee consistency across devices since more than one snapshot is taken.

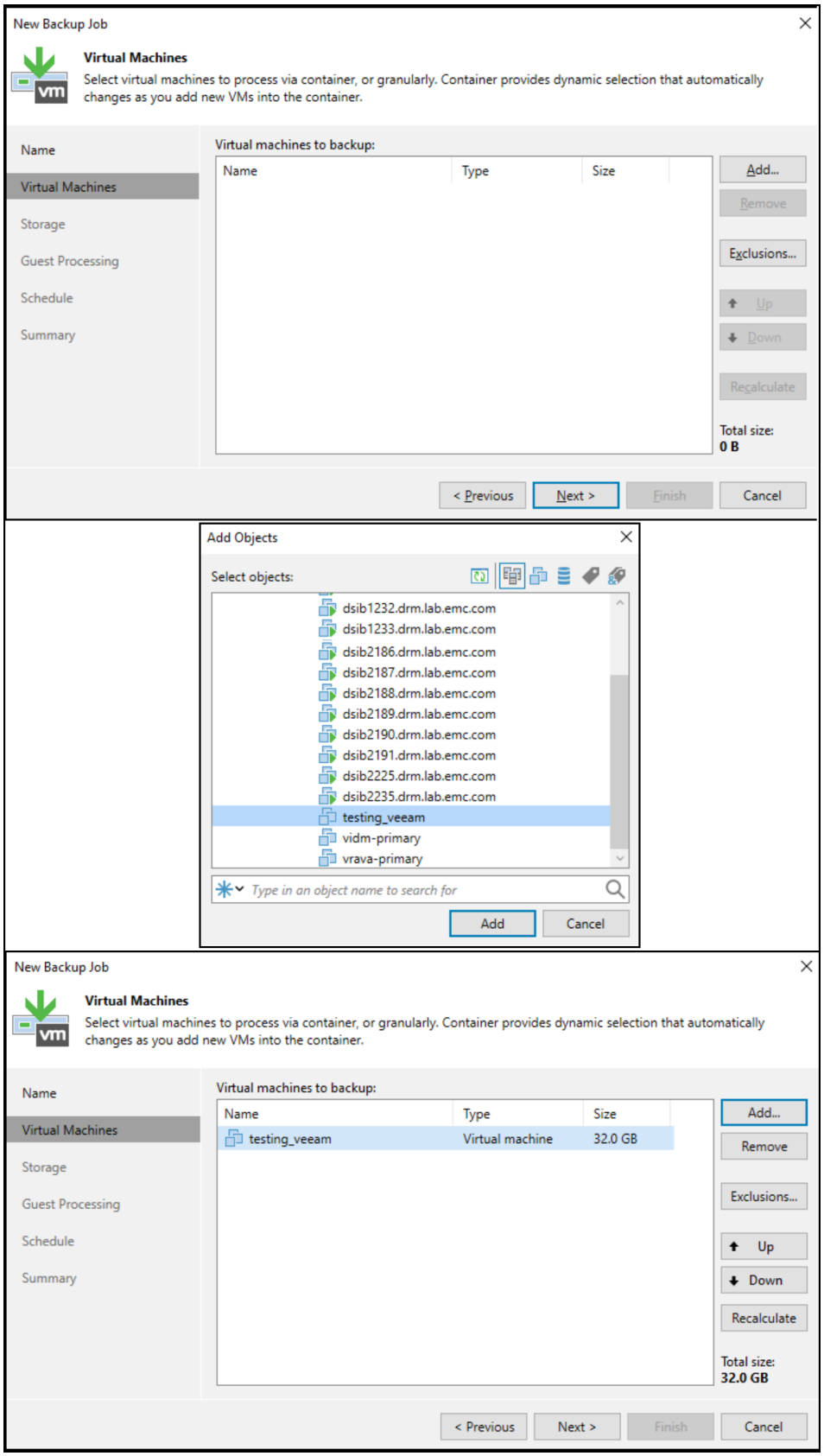


Figure 89. Backing up a VM: Step 3

Like in Figure 90, the **Backup repository** will default to **Dell PowerMax Snapshot**. Additional options are available through the **Advanced** button.

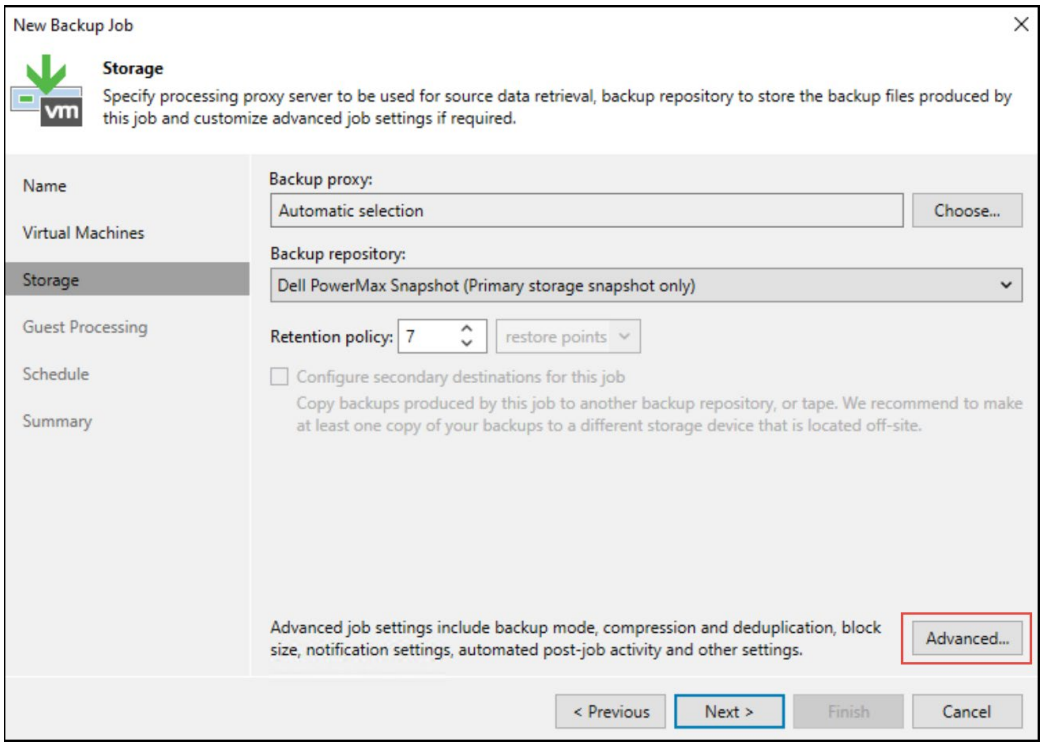


Figure 90. Backing up a VM: Step 4

Figure 91 shows the resulting screen when selecting the **Advanced** button in Step 4. There are three tabs for different functions: **notifications, vSphere** and **scripts**.

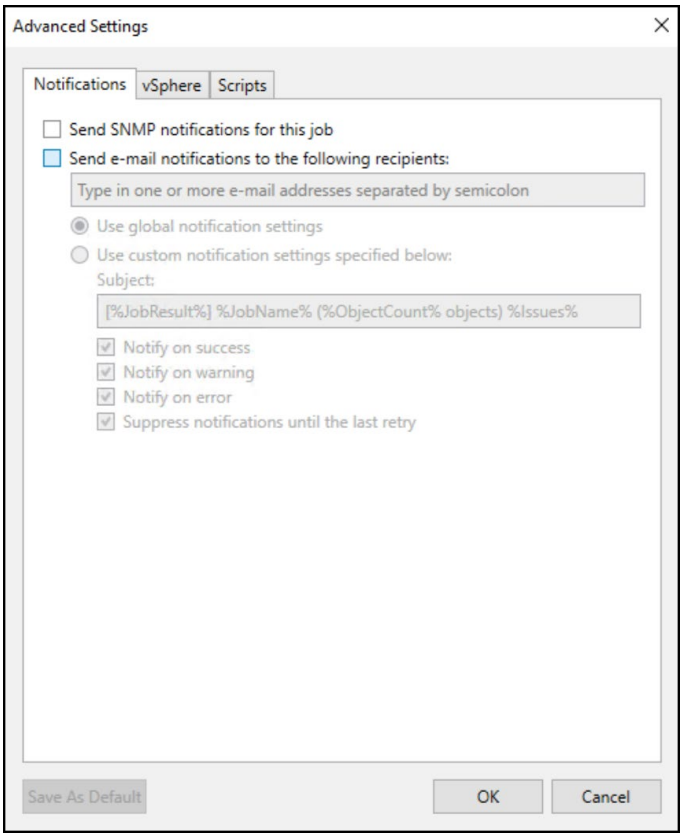


Figure 91. Backing up a VM: Step 5

By default, the check box is not checked in Figure 92, but it's checked here to highlight the options that can handle the Guest OS. This could be used to enable consistent backups of a Windows OS using the VSS Provider. See the section Application consistency before for more detail.

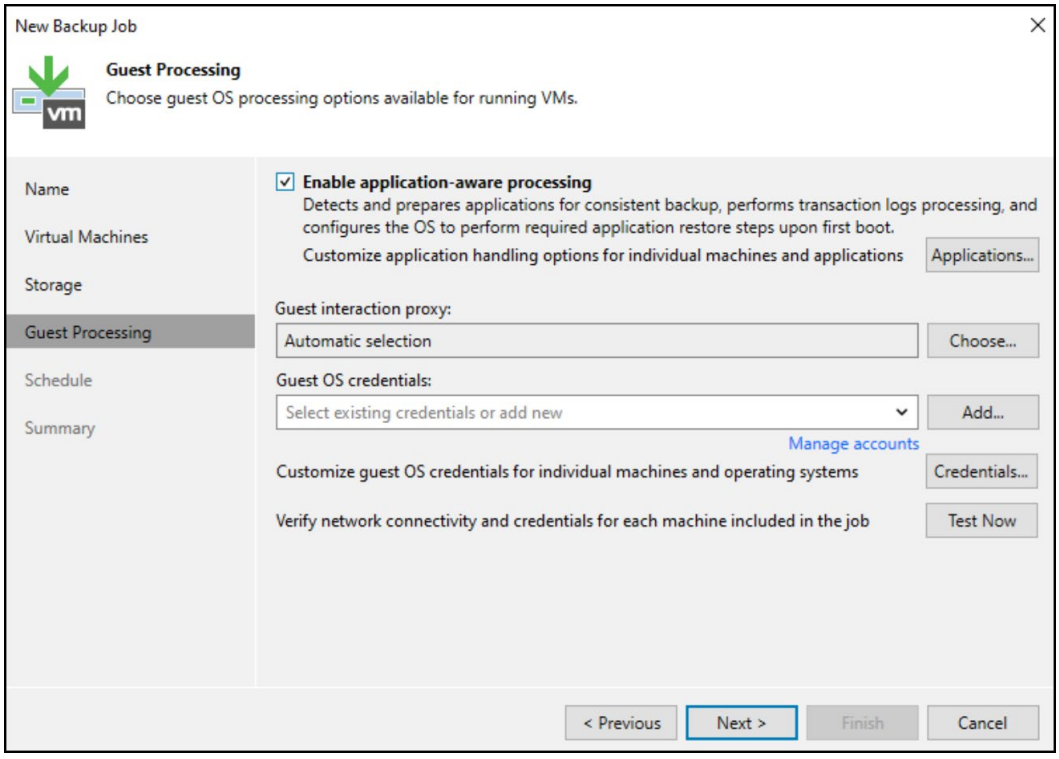


Figure 92. Backing up a VM: Step 6

The final option is the ability to schedule the job for a future run with some error handling. The check box **Run the job automatically** is not checked by default as shown in Figure 93.

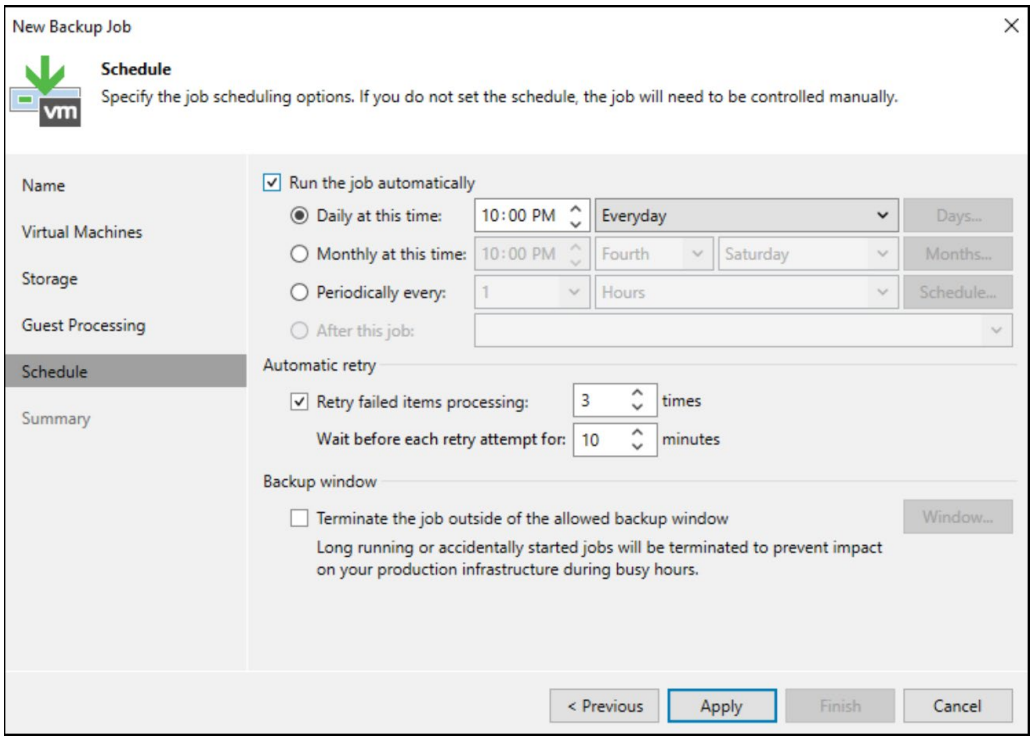


Figure 93. Backing up a VM: Step 7

The summary screen shown in Figure 94 provides information about the options for the backup. In addition, it shows the user how to run the job through the CLI.

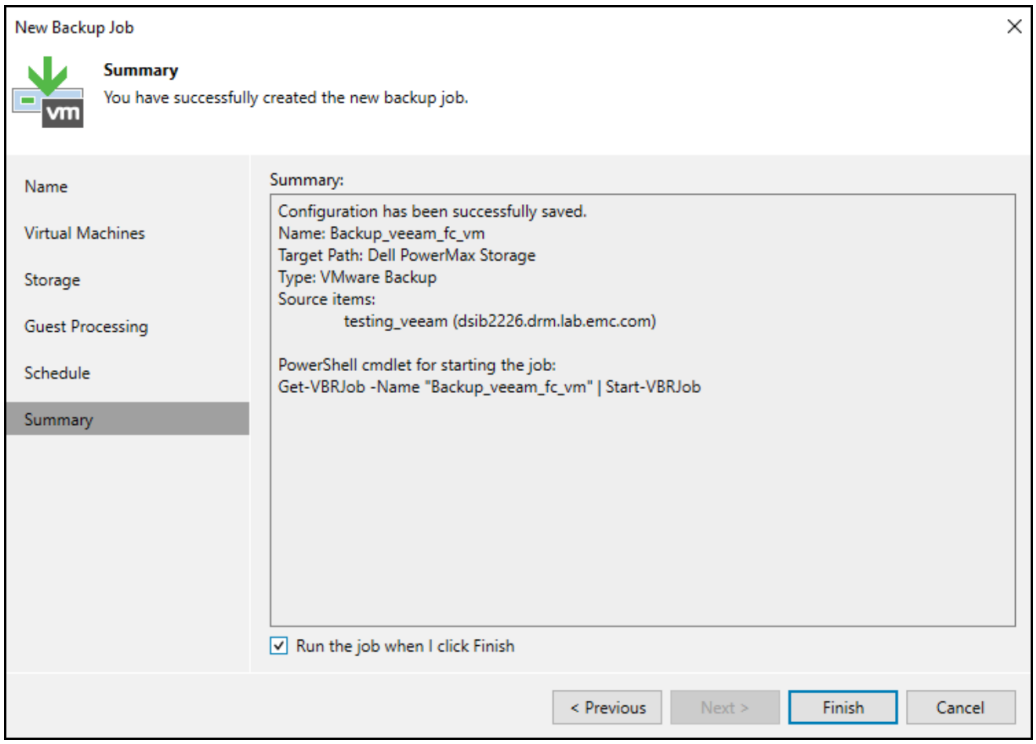


Figure 94. Backing up a VM : Step 8

The summary of the job run is shown in Figure 95.

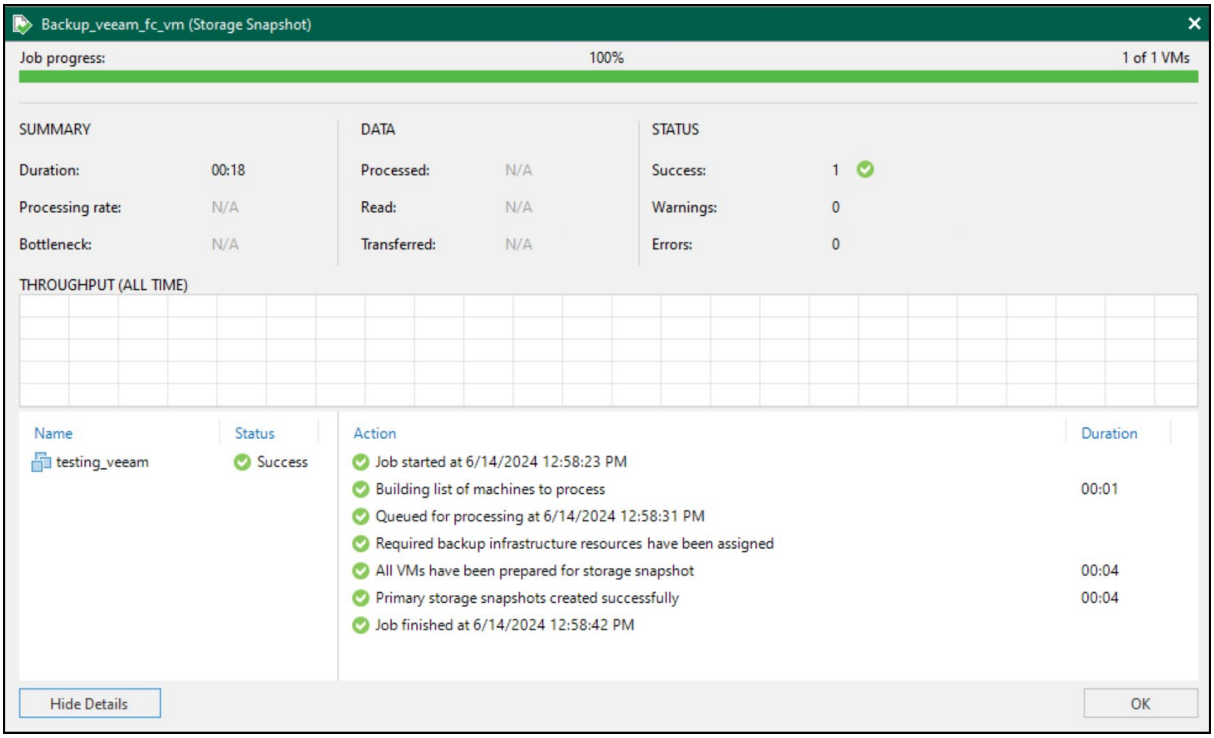


Figure 95. Backing up a VM: Summary

7.1.1 Application consistency

Veeam relies on application consistency through VSS on Windows GuestOS or quiescing on other platforms. Consistency is enabled as part of the backup job in the screen shown in Figure 96 (or like in Figure 92). Check the box labeled E**nable application-aware processing** (unchecked by default) and then the **Applications…** button.

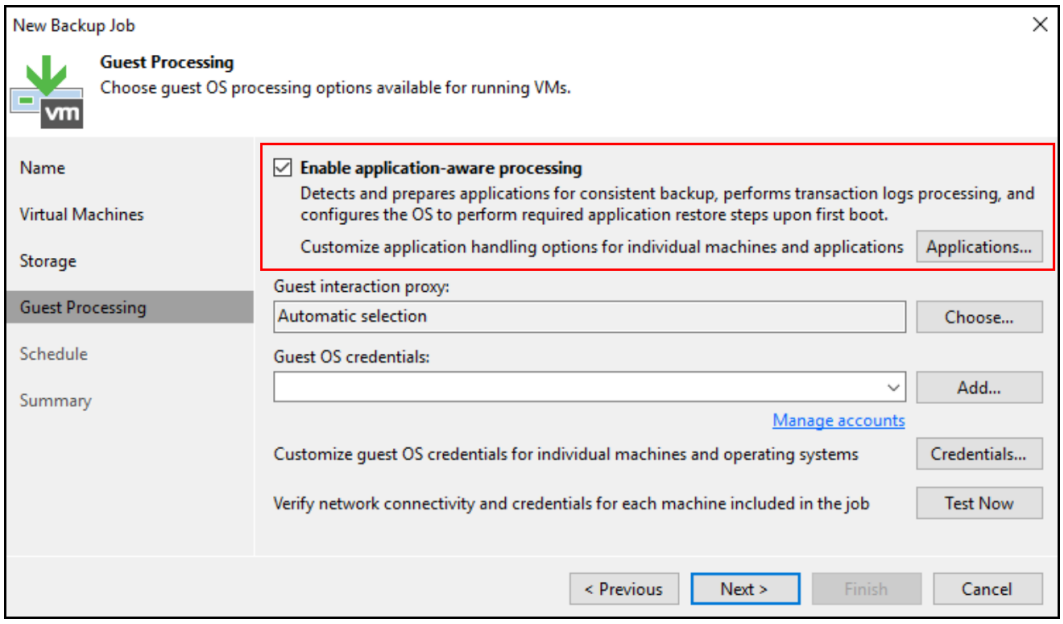


Figure 96. Adding application consistency to a backup

In this backup job, two VMs were selected and one, **dsib2016.lss.emc.com**, is a Linux (Ubuntu) OS. The other, **dsib2035.lss.emc.com**, is a Windows OS. Note that in Figure 97, Veeam starts with assuming both VMs are Windows OSes.

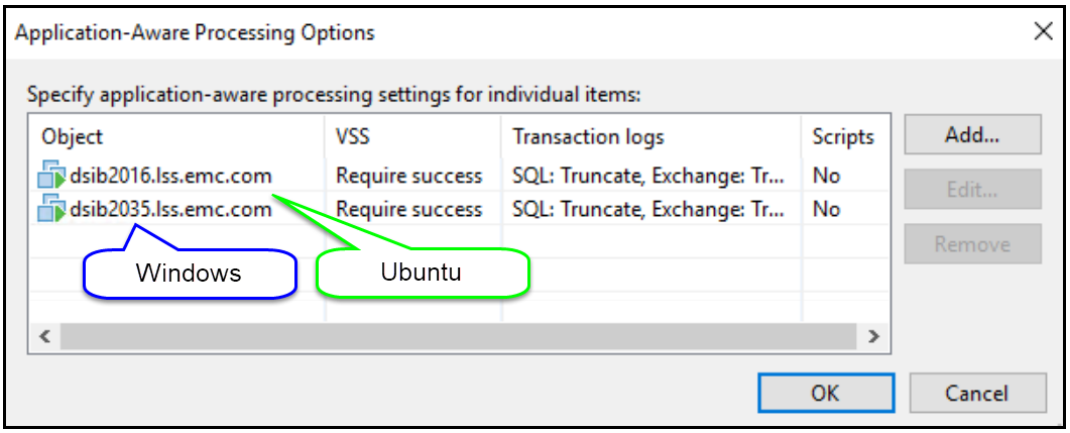


Figure 97. VMs for application consistency

Since VM dsib2035.lss.emc.com is Windows, it will not be adjusted. There are options that can be changed, but the default is sufficient for this setup. The other VM, dsib2016.lss.emc.com, requires changes to enable application consistency since it has a Linux OS. Again, in this one example, highlight the VM and select **Edit…**. Then select the radio button to **Disable application processing** as shown in Figure 98.

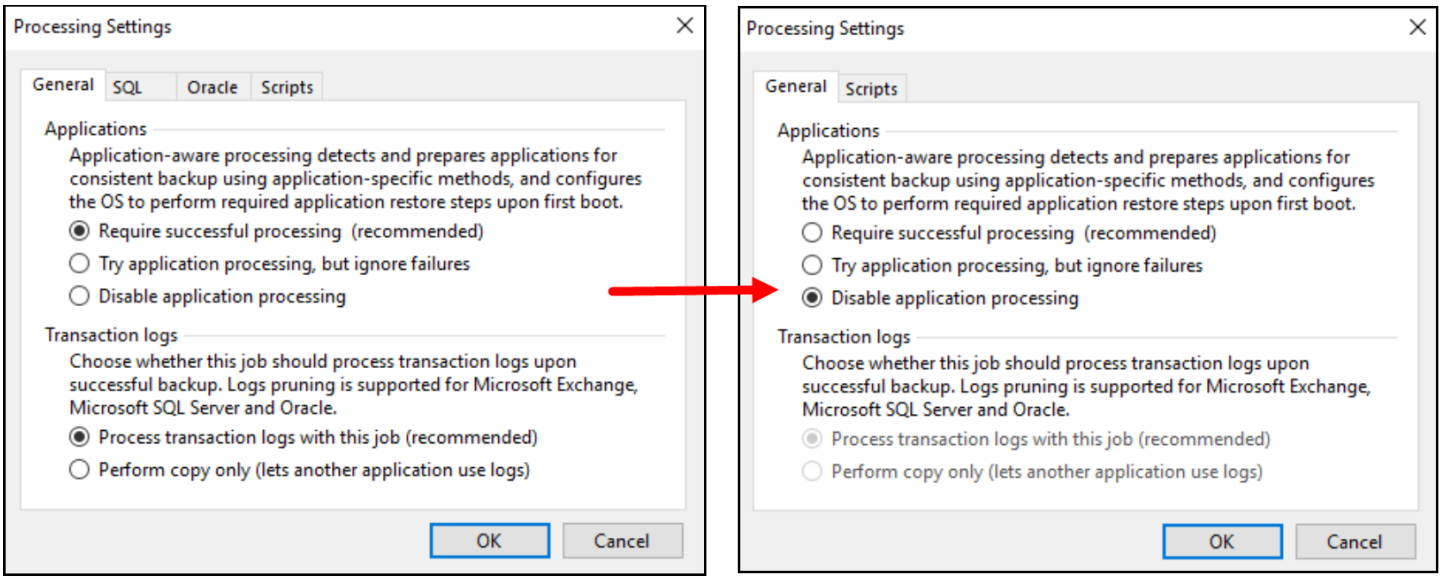


Figure 98. Disabling application processing

For this VM, a pre-script will be used to quiesce the application before the snapshot, then a post-script will be used to take it out of quiesce. Select the **Scripts** tab as shown in Figure 99 and select the appropriate scripts from the local backup server.

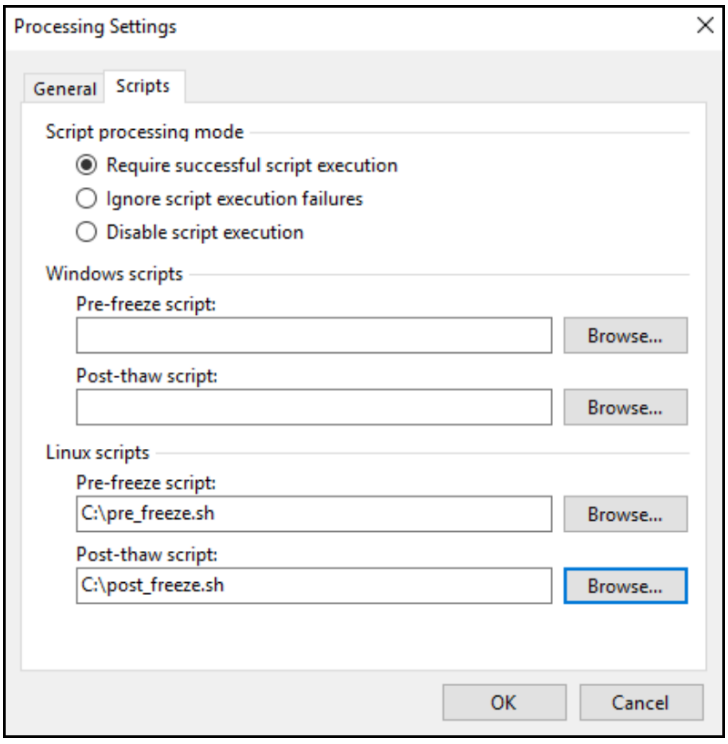


Figure 99. Pre- and post-thaw scripts

After selecting **OK**, the correct options appear as shown in Figure 100. The VMs will now be consistent when they are backed up.

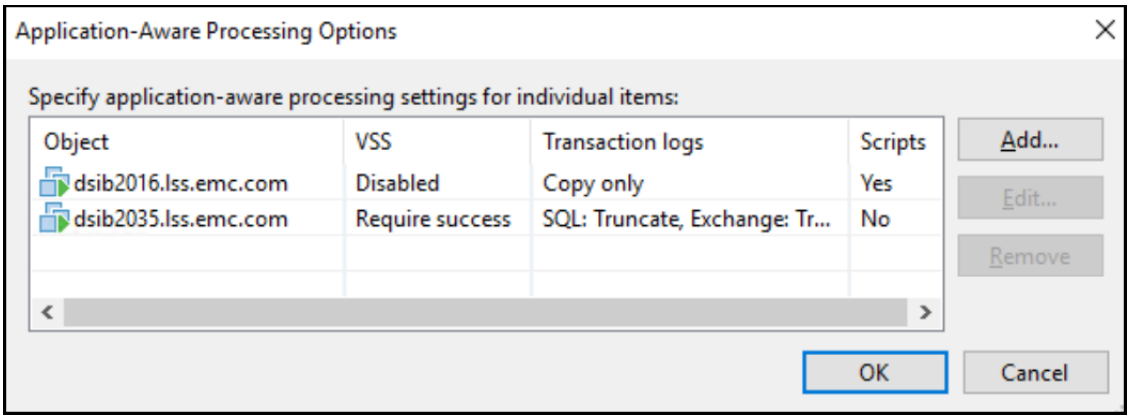


Figure 100. Processing options for each VM in a Veeam backup

8 Restore

8.1 VMFS with Fibre Channel

For continuity, the backed-up VM in the previous section will be restored first. For the restore, navigate to the **Inventory** on the left panel, highlight **Virtual Infrastructure** in the top left panel and select **Restore** in the right panel as shown in Figure 101.

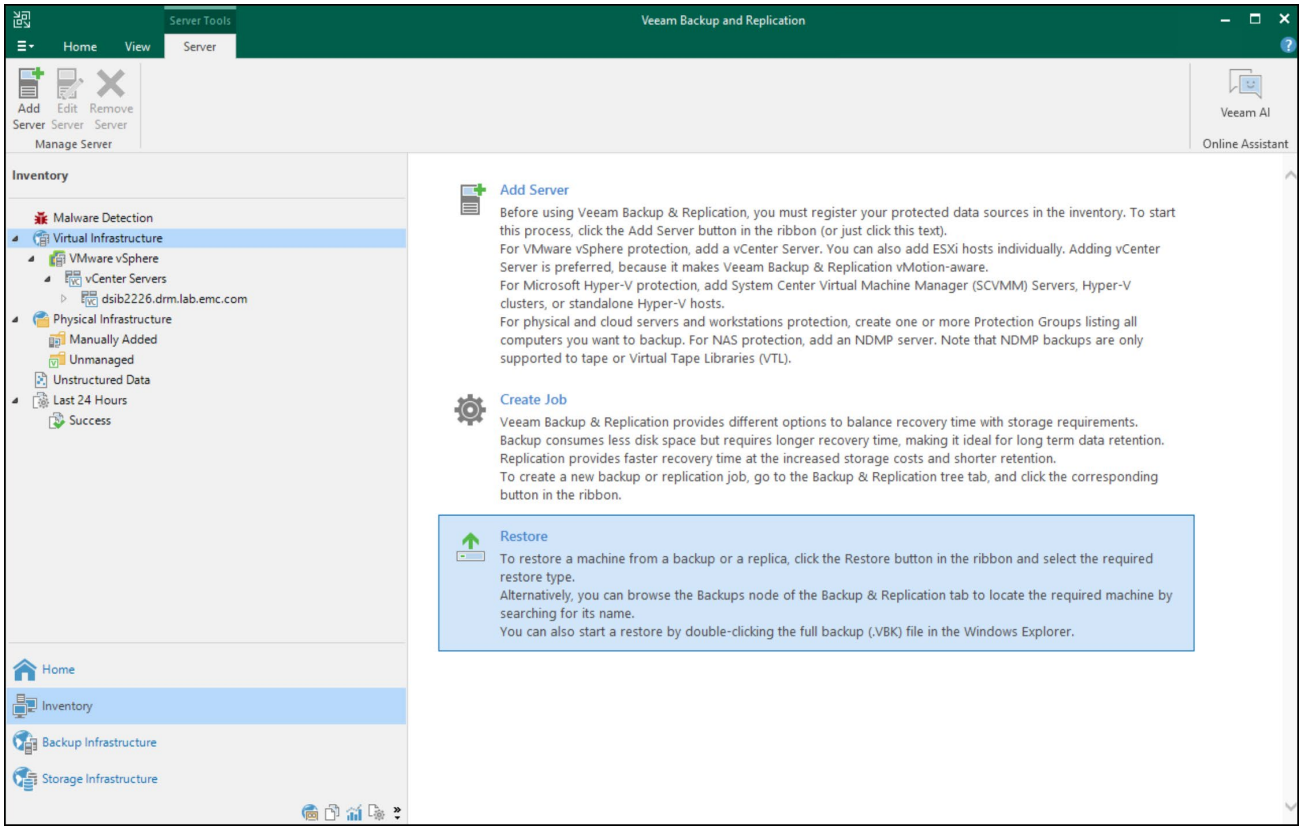


Figure 101. Restoring a VM with Fibre Channel: Step 1

In Step 2, Figure 102, select **Restore from backup**.

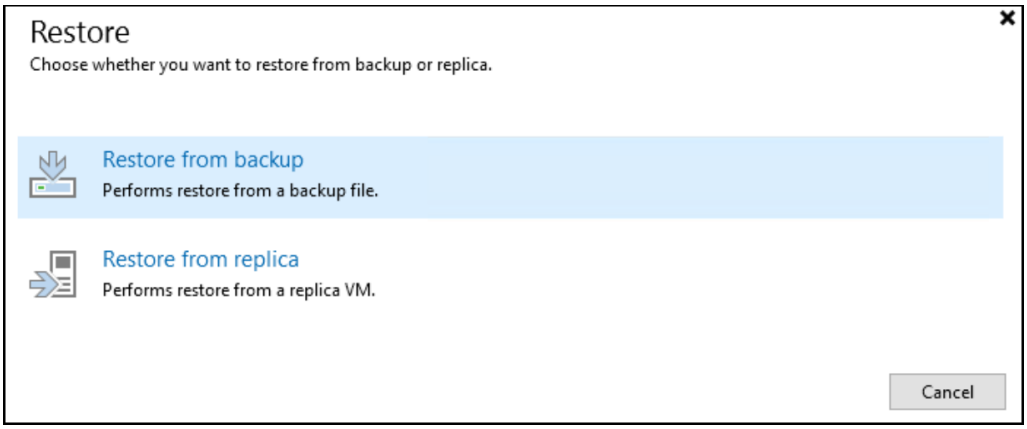


Figure 102. Restoring a VM with Fibre Channel: Step 2

In Step 3, select **Entire VM restore** as shown in Figure 103. The other options here are possible, but they will not be covered.

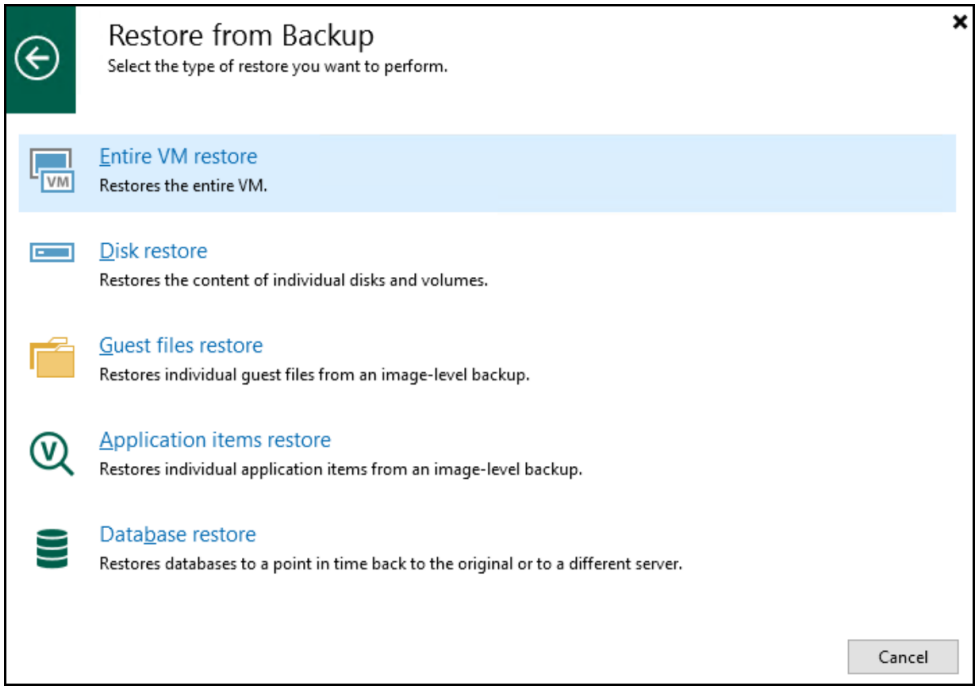


Figure 103. Restoring a VM with FC: Step 3

The only type of restore on this page that is used with the PowerMax Plug-in is **Instant recovery** in Step 4. Select this option as shown in Figure 104. The second item listed, **Entire VM restore**, will not recognize snapshot backups, only traditional file backups.

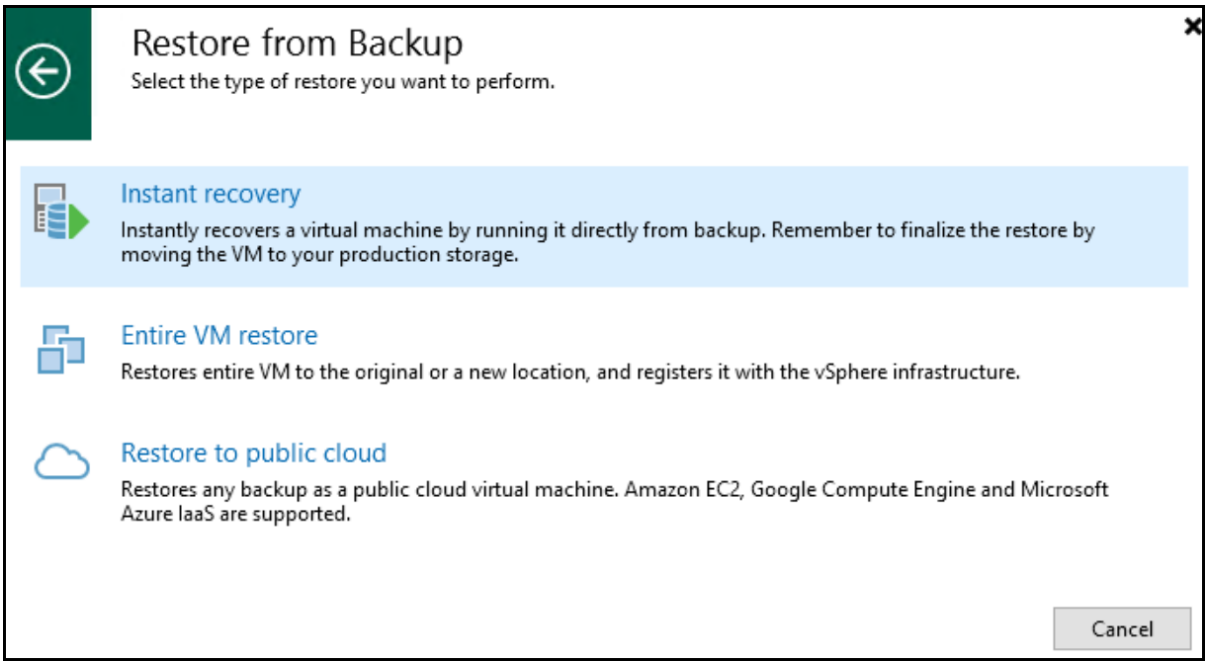


Figure 104. Restoring a VM with Fibre Channel: Step 4

Next in step 5, choose **Instant recovery to VMware vSphere** in Figure 105.

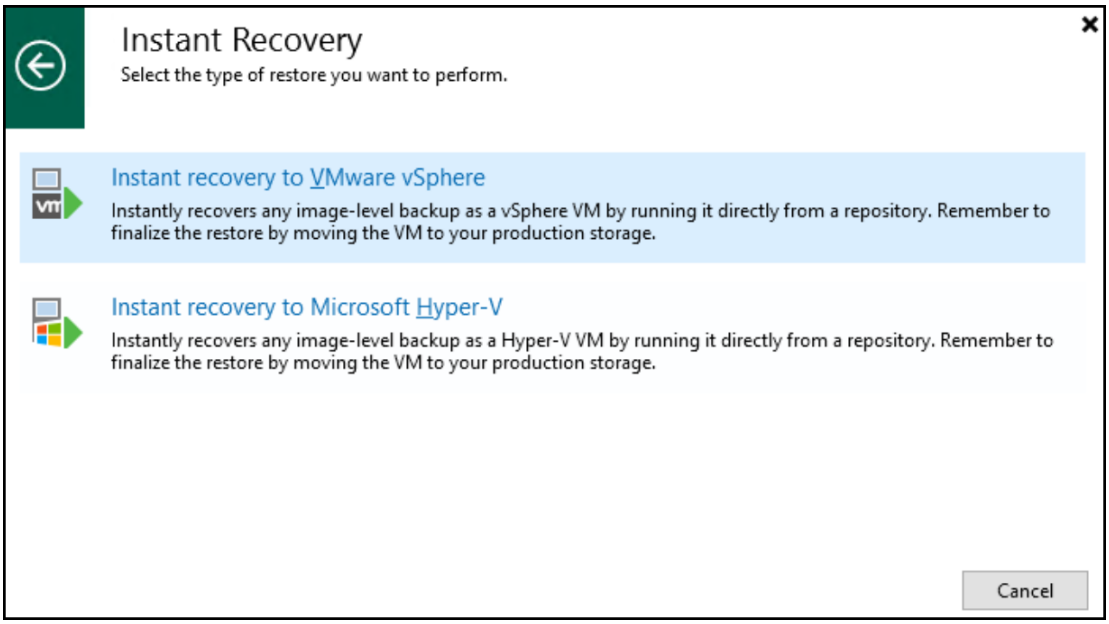


Figure 105. Restoring a VM with Fibre Channel: Step 5

Select the VMs the user wants to restore. This can be done by typing in the beginning of the VM name and Veeam will list them in Step 5, Figure 106. Double-click the VM to add it to the list.

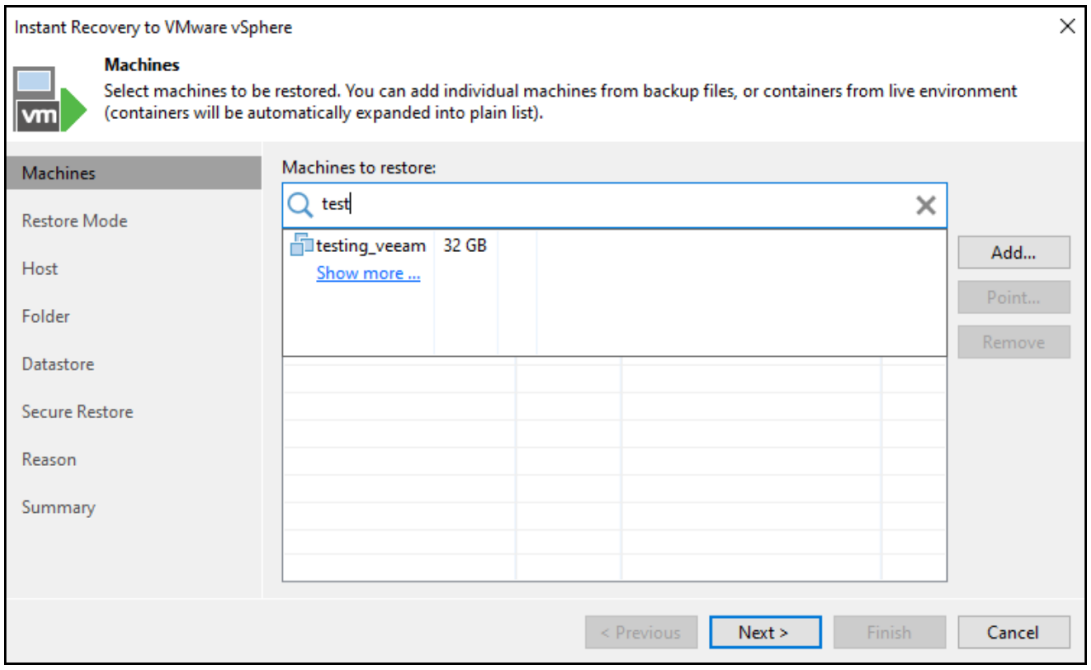


Figure 106. Restoring a VM with Fibre Channel: Step 5

If there is more than one restore point available (i.e., snapshot backup), select the **Point…** button in Step 6 in Figure 107 will list all existing restore points, regardless of how those snapshots were taken (i.e., Veeam, manually, a snapshot policy, etc.). Veeam, however, does not include the snapshot name in this view. To see the snapshot name associated with these points, navigate to the **Storage Infrastructure** screen and expand the volume in question (e.g. 149). There, the snapshot names are included with the timestamps as shown in Figure 108.

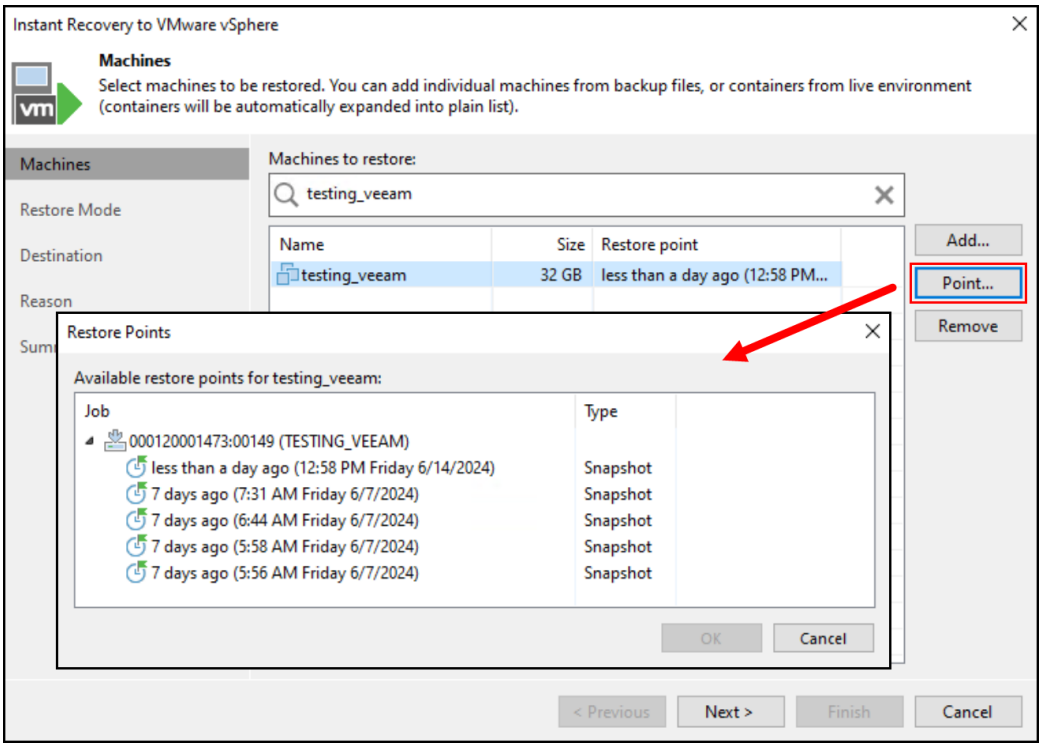


Figure 107. Restoring a VM with Fibre Channel: Step 6

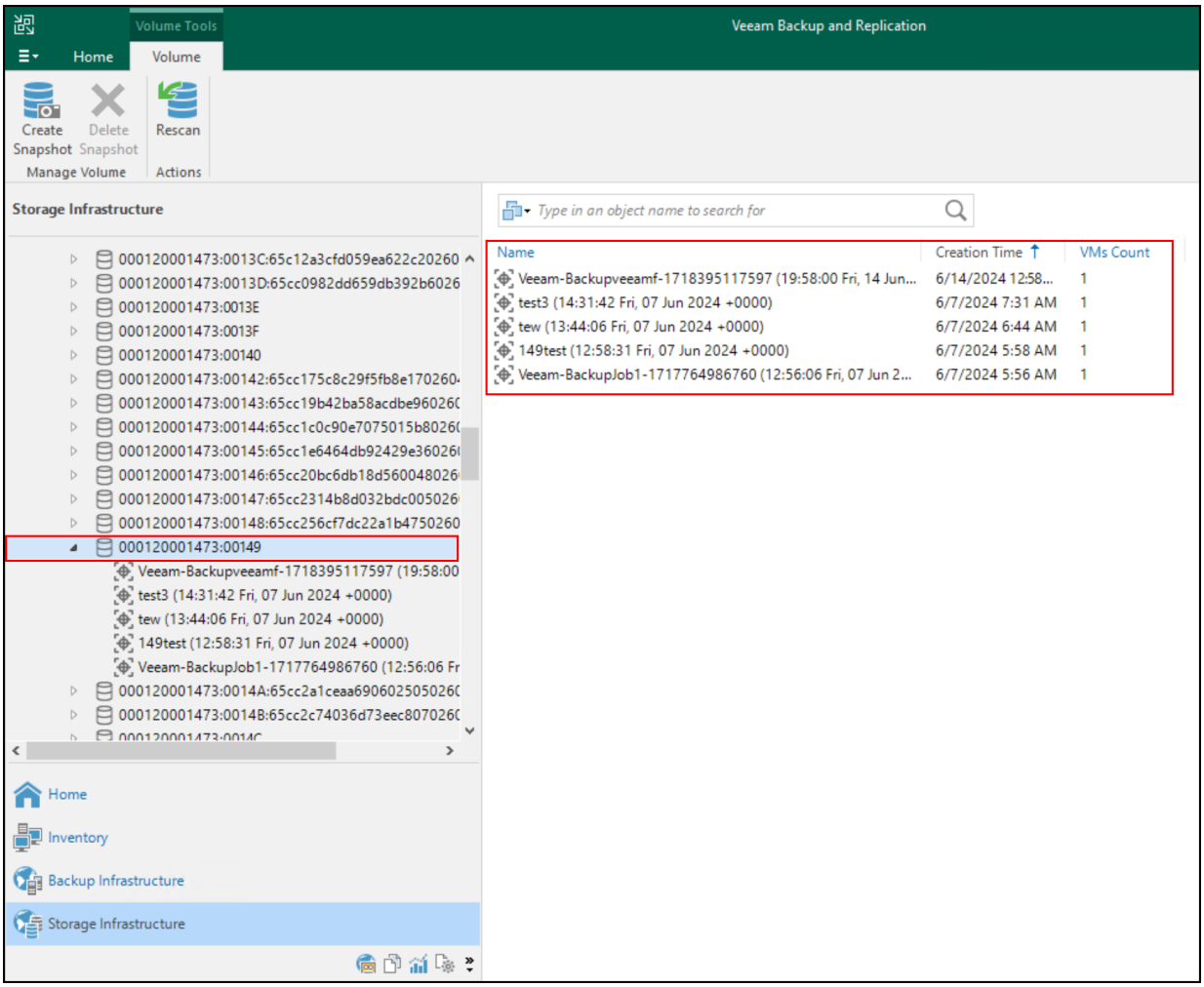


Figure 108. Snapshot name detail for restore points

If the machine name is unknown, one can select the **Add…** button. Then the user can navigate through the VMware infrastructure or review existing snapshots that have VMs and choose one or more as seen as shown in Figure 109.

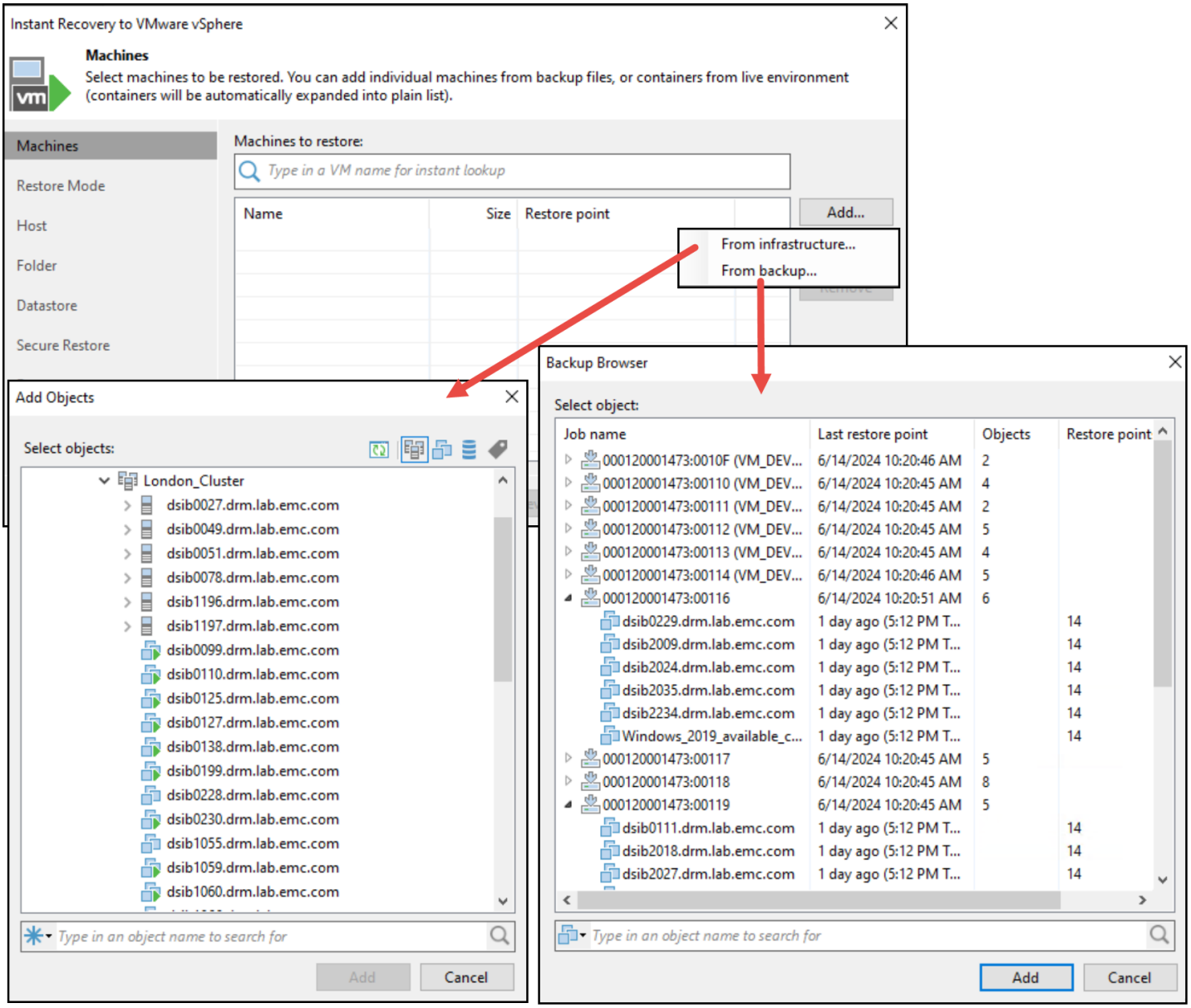


Figure 109. Restoring a VM with FC – alternate options to choose VMs

Once the VMs are selected by the user's chosen methodology, use the radio buttons as shown in Step 7, Figure 110, to restore the VM(s) to either the original location or a new location. If the original VM is lost, select the first radio button which will use the original VM name in the original vCenter and ESXi host. Otherwise select the second radio button, which lets the user rename the VM and choose where to restore it.

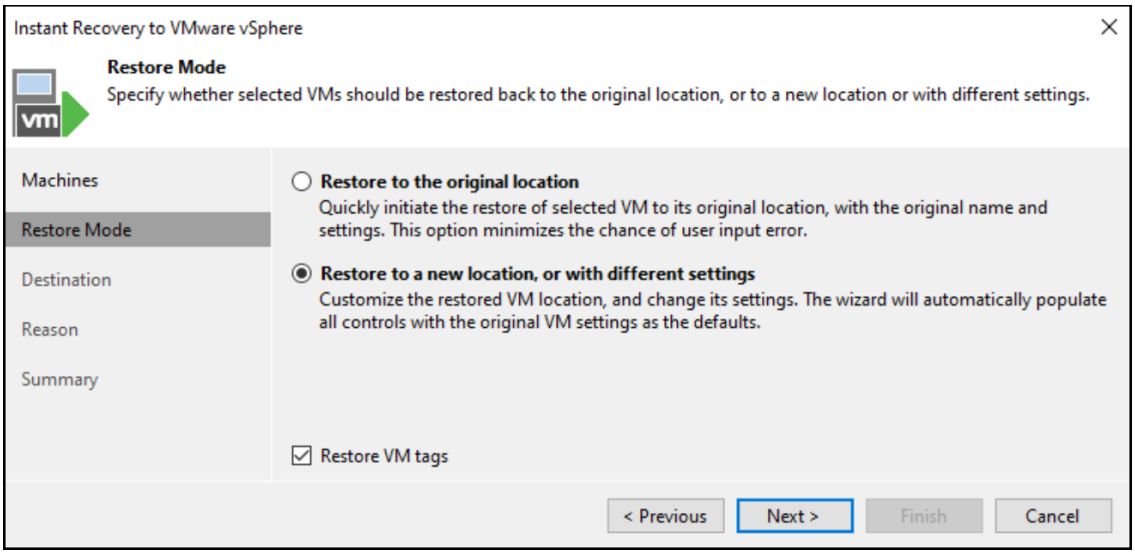


Figure 110. Restoring a VM with Fibre Channel: Step 7

If the original VM still exists and an attempt is made to restore to the original location, the error message as shown in Figure 111 will appear.

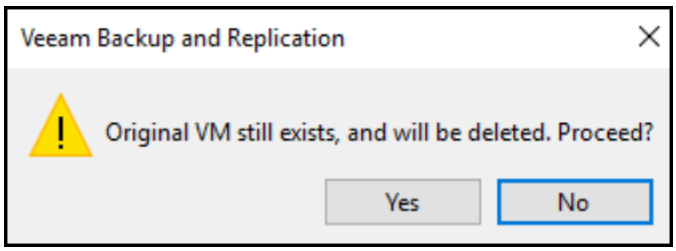


Figure 111. Restoring a VM with Fibre Channel: Original VM warning

Proceeding with the restore through the second option, rename the VM to prevent the previously mentioned conflict as in Step 8, Figure 112, and hit **Next** and then **Finish** in Figure 113. Note that if the BIOS UUID needs changing, select the **Advanced** button.

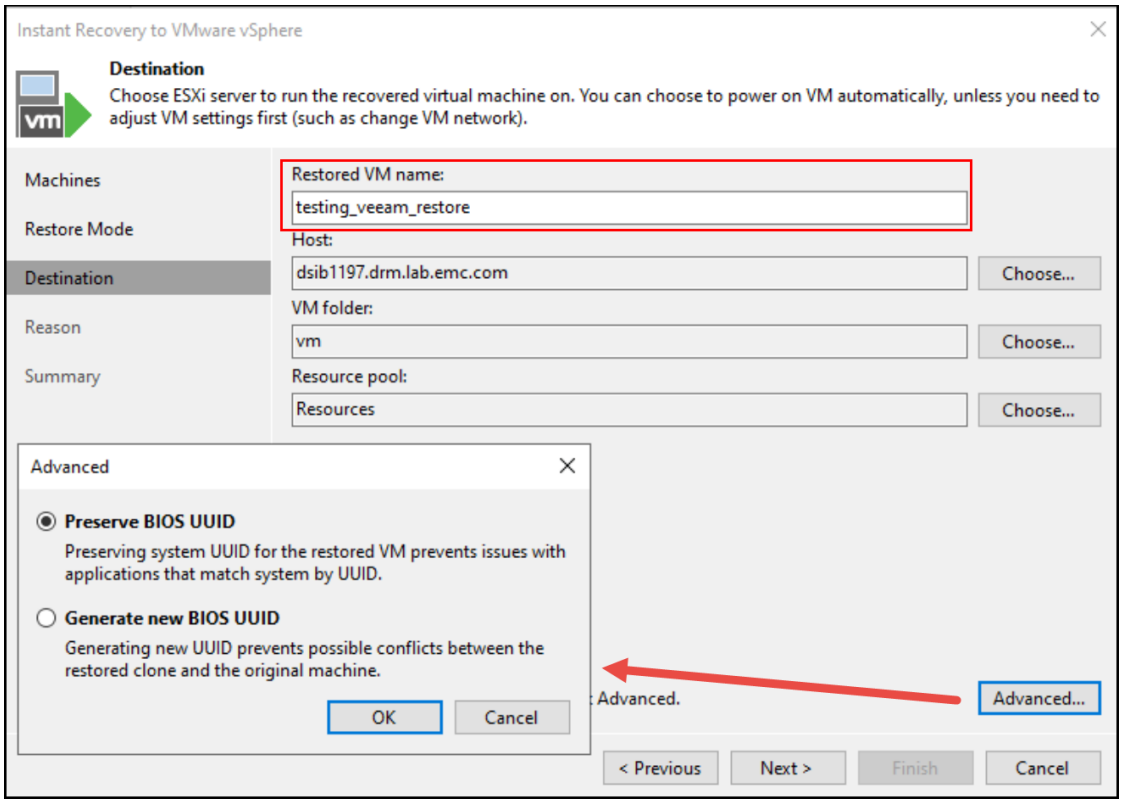


Figure 112. Restoring a VM with FC: Step 8

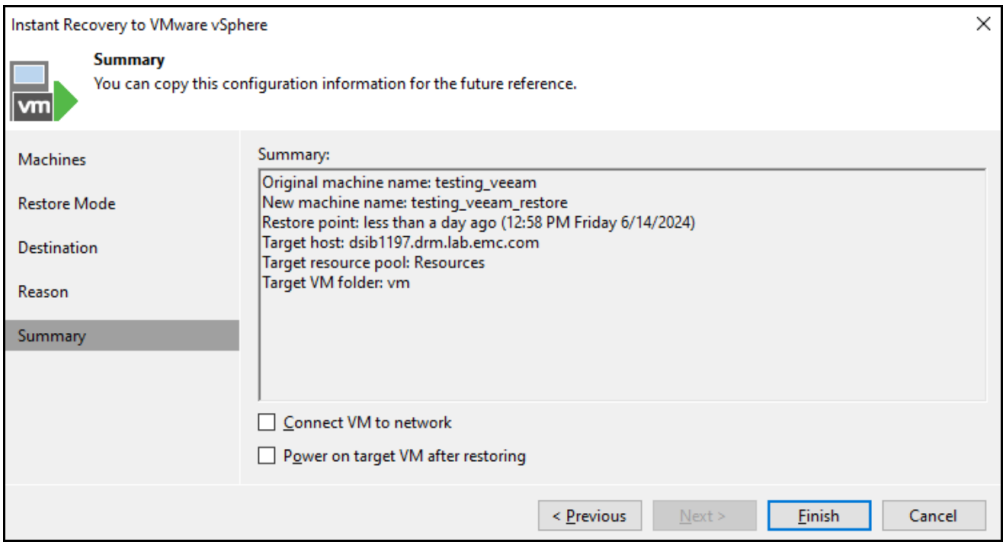


Figure 113. Restoring a VM with FC: Summary

The output of this session is immediately available as shown in Figure 114.

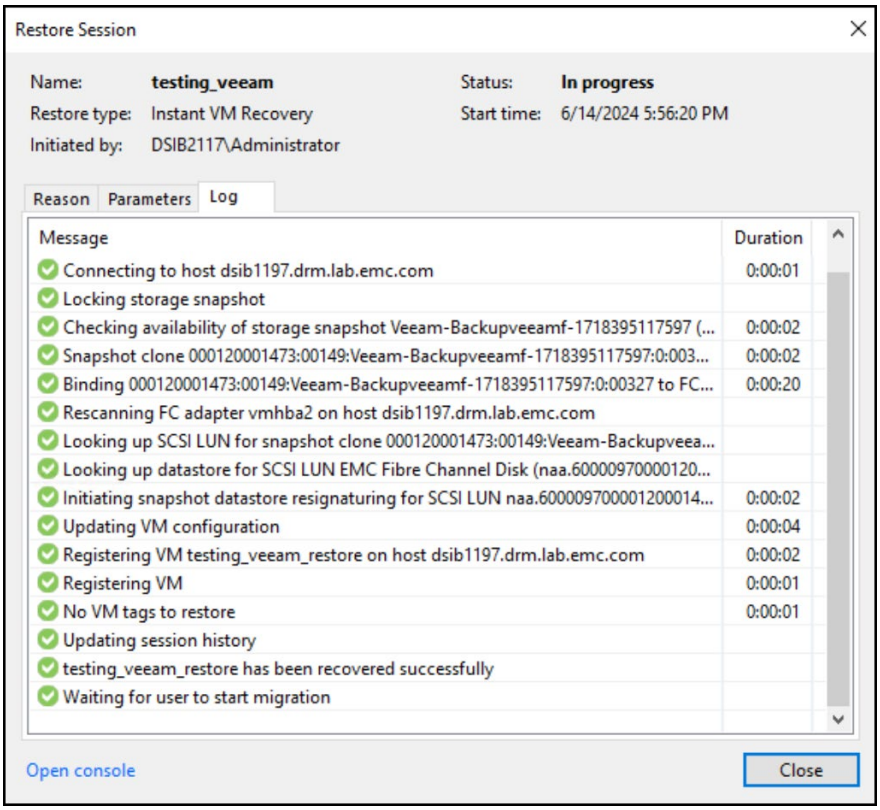


Figure 114. Restoring a VM with Fibre Channel: Log

The restore process creates a target device for the SnapVX snapshot and places it in the VEEAM_xxx storage group as shown in Figure 115, which is presented to the ESXi host through Fibre Channel connectivity.

Note: When using both Fibre Channel and iSCSI, depending on the chosen restore host, it is possible for the snapshot device to be presented through a different protocol than the original datastore device.

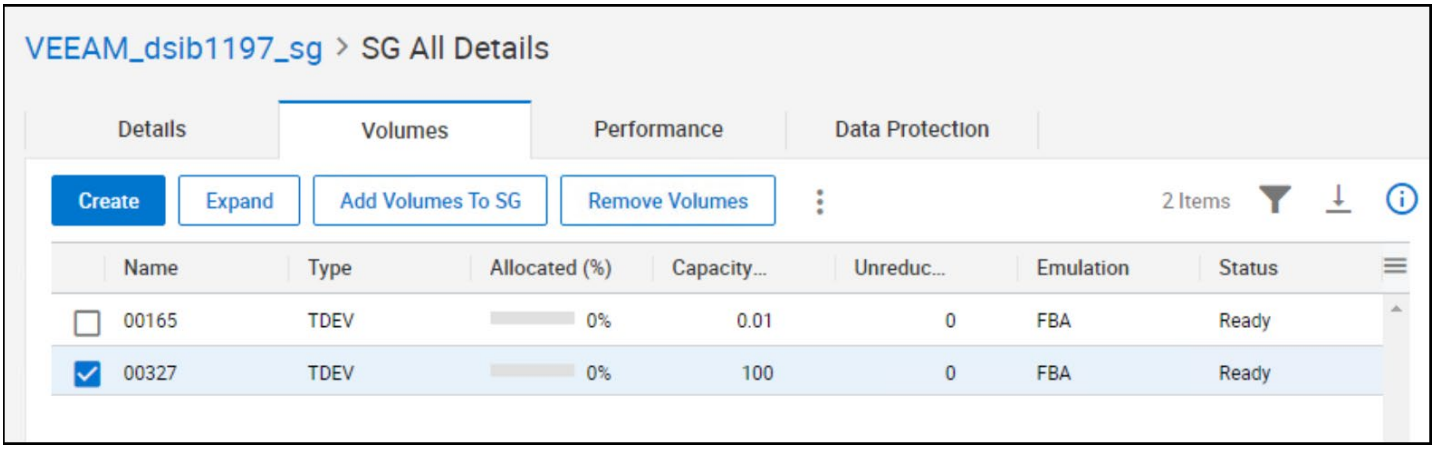


Figure 115. SnapVX target device mapped through Fibre Channel ports

Veeam completes the restore process by rescanning the ESXi host, resignaturing the VMFS on the device and registering the VM with the name previously provided. The resignatured datastore is shown in Figure 116. By default, VMware adds the **"snap_xxxx"** prefix to the datastore. This can be changed in the advanced options but is not recommended since it avoids unintended conflicts.

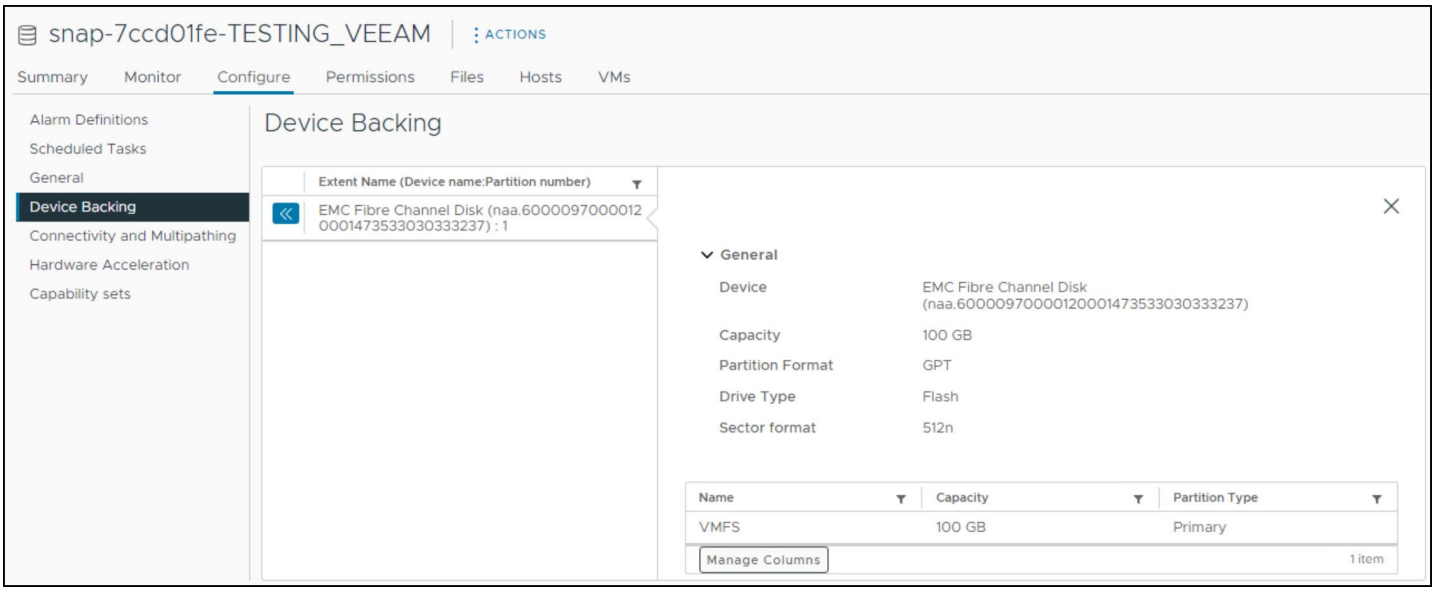


Figure 116. Snapshot device presented through Fibre Channel

Note that upon reaching this step, Veeam has completed the automated portion of the restore process and waits for the user. The last line of the log in Figure 114 refers to this: "**Waiting for the user to start migration**." Veeam has no knowledge of what the user wishes to do with the restored VM shown in Figure 117 and so it idles until the user initiates another Veeam action.

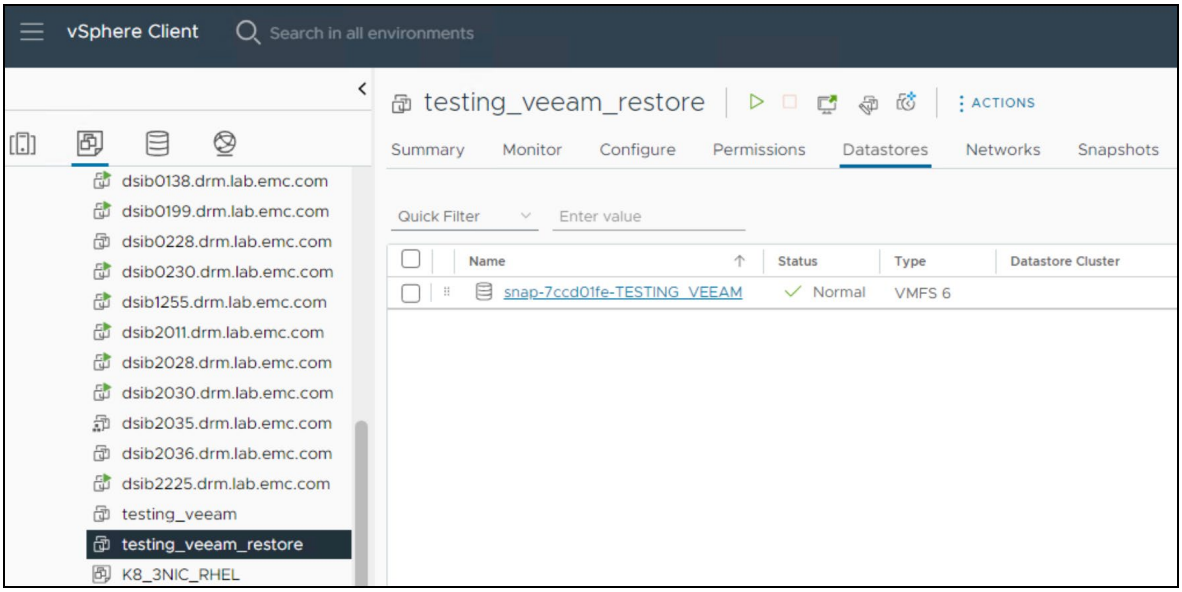


Figure 117. Restored VM veeam_fc_vm_restore

After the user is finished with the restored VM, the session can be ended. This is covered in the next section.

8.2 VMFS with iSCSI

The restore wizard for iSCSI proceeds the same as for Fibre Channel so it will not be covered in its entirety here. Instead, the summary of the iSCSI restore is shown in Figure 118. This example demonstrates the snapshot target being presented to host dsib0180.lss.emc.com through iSCSI.

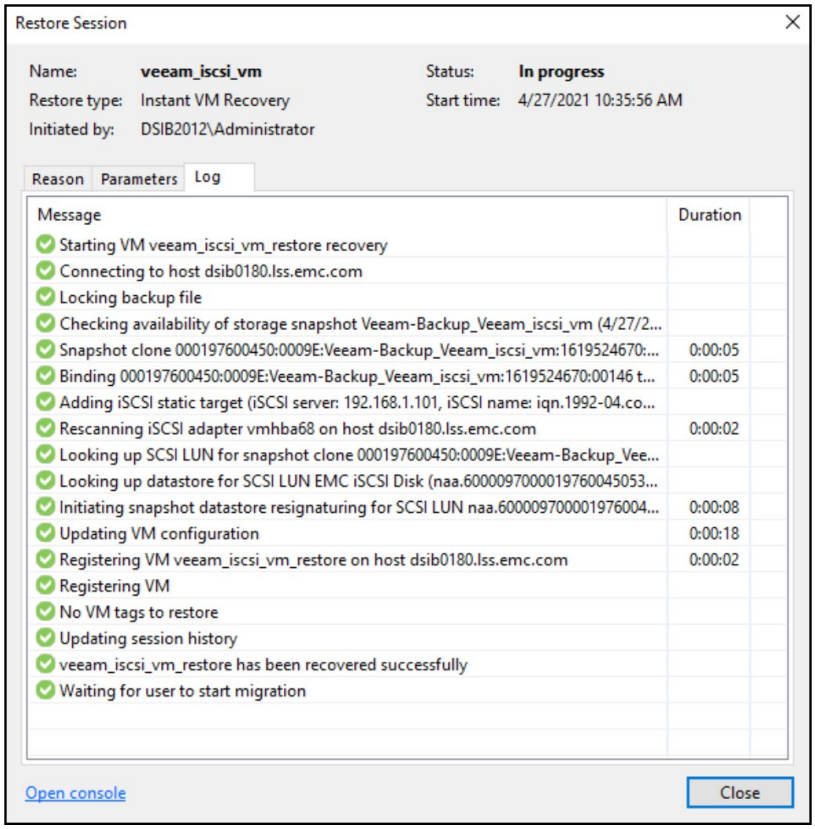


Figure 118. Restoring a VM with iSCSI: Log

The resignatured datastore is displayed in Figure 119. Note that the original datastore that the snapshot is based upon is presented through Fibre Channel, but since the snapshot target device is a net-new one, it can be presented through a different protocol as well like here.

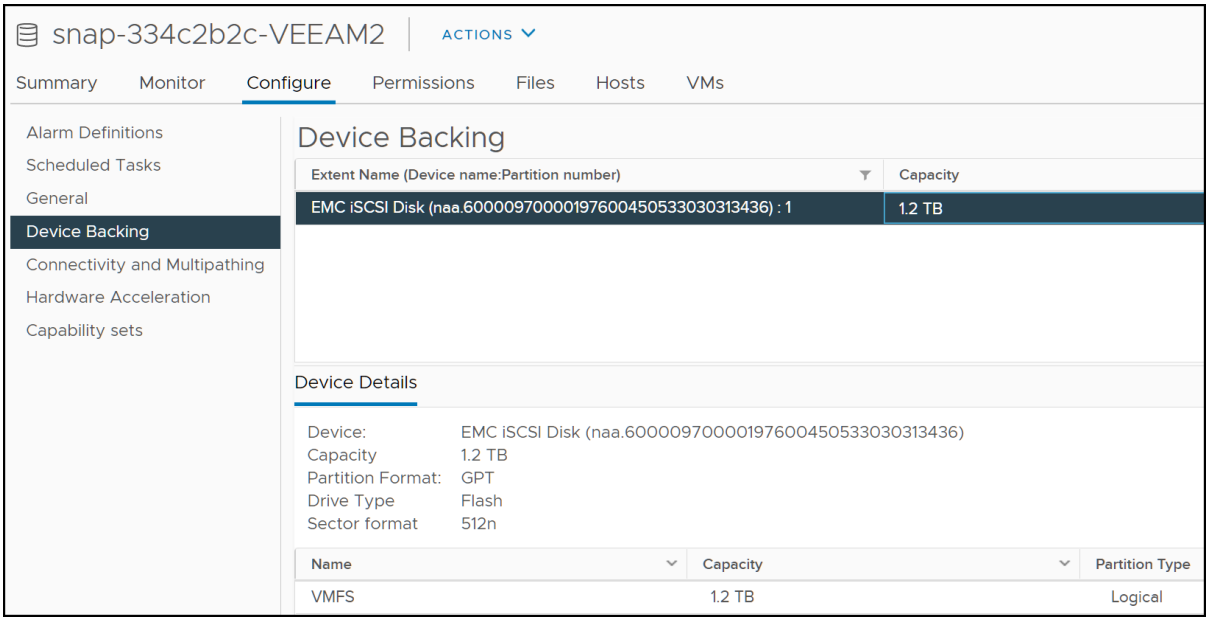


Figure 119. Snapshot device presented through iSCSI

8.3 End restore

A restore is considered an ongoing session. After the VM is moved from the snapshot datastore or its purpose has been served, the user needs to end the restore session. When a session is stopped, Veeam and the PowerMax Plug-in will:

Unregister the VM
Unmount the datastore
Remove the device from the storage group
Delete the device

Begin by selecting the **History** option at the bottom left-hand side and then **Instant Recovery** in the top left-hand side of the screen. Find the job name, which in this case **testing_veeam,** and right-click on it in Figure 120. Choose **Stop session**, and then select **Yes**.

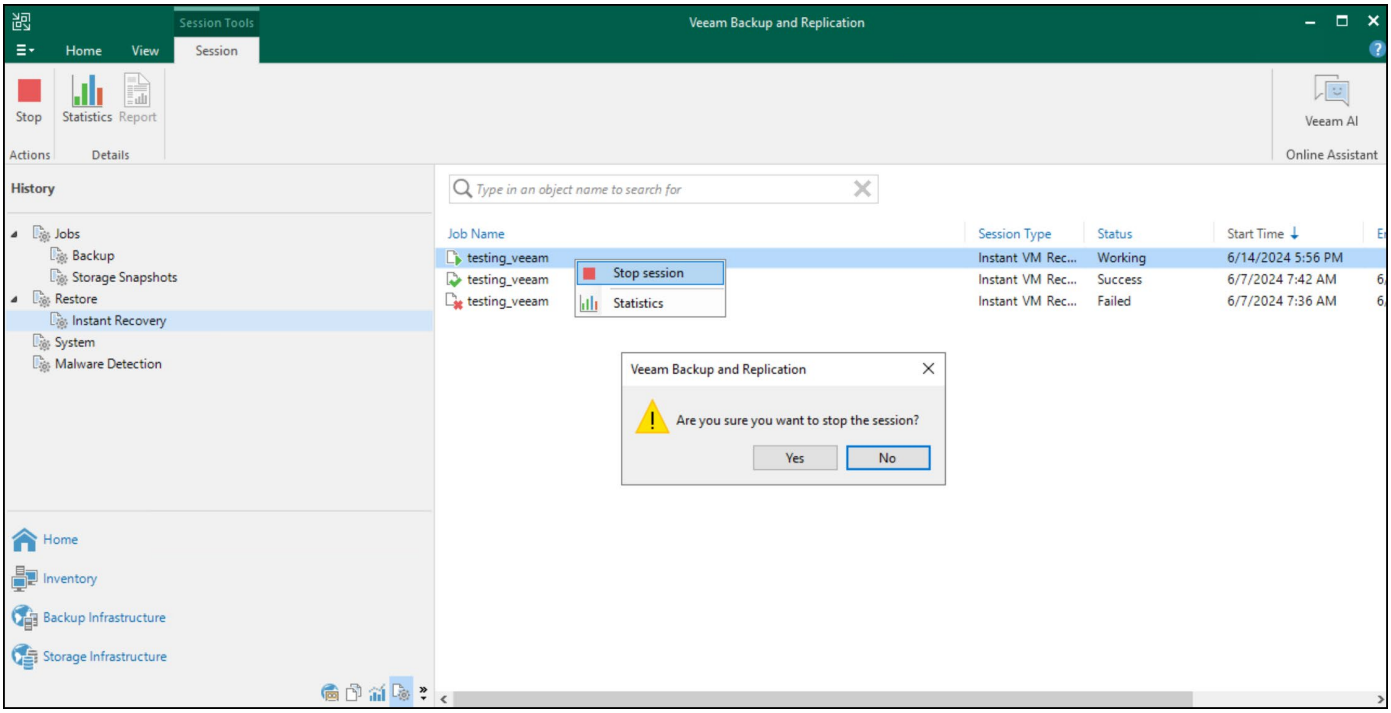


Figure 120. Stop restore session: Step

Once started, the vCenter will show the associated tasks as shown in Figure 121.

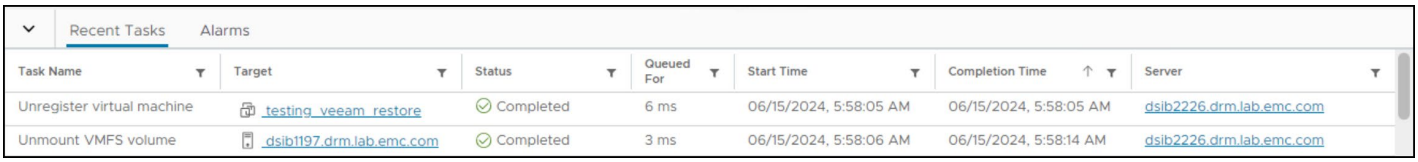


Figure 121. Stop restore session: vCenter

Double-click on the job name in the Veeam console (**testing_veeam**) and the log is displayed, which contains the detailed information from the session. Note that stopping the session appends the log information to the initial restore process. The red box as shown in Figure 122 is the end of the restore session, and the blue box is the start of the stop session.

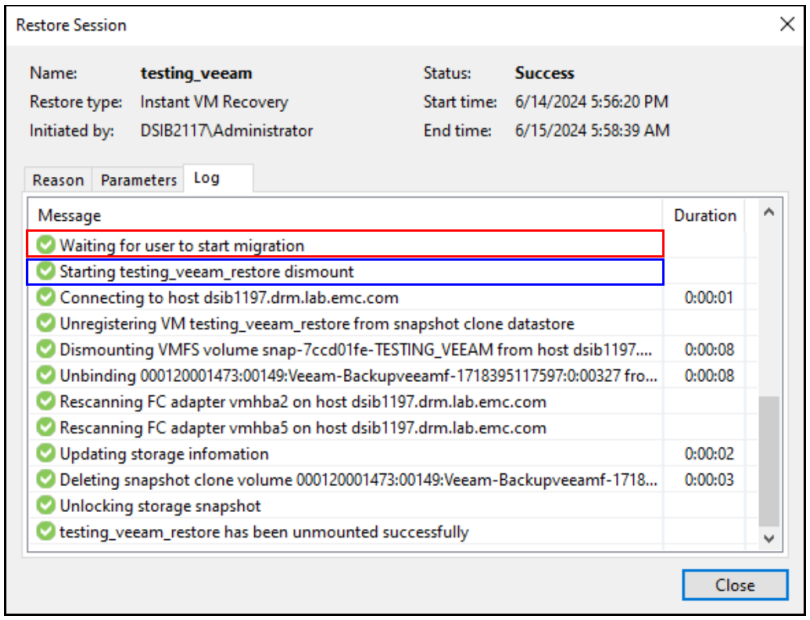


Figure 122. Stop restore session: Log

9 Proxy file backup to disk with snapshot

The previous discussion in the Backup section dealt with taking PowerMax snapshots as backups themselves. There are no files in that case, just a reference in Veeam to a snapshot on the array which can be used for restoring or other backup procedures. Veeam can back up a VM to disk by using a temporary array snapshot and avoid impact to the production VM. The PowerMax Plug-in can already do this feature, so once the Veeam software is properly configured to run a disk backup, it will take advantage of the snapshot.

9.1 Backup repository

Begin by ensuring that there is a backup disk repository where the VM will be backed up. Veeam offers a number of options from NFS to S3. The example below show a user adding a Windows-based repository with what Veeam calls direct-attached storage. In reality, the storage is a vmdk on a datastore located on a different array than where the production VM is stored.

Navigate to **Backup Infrastructure** and highlight **Backup Repositories**. Right-click and select **Add backup repository…** as shown in Figure 123.

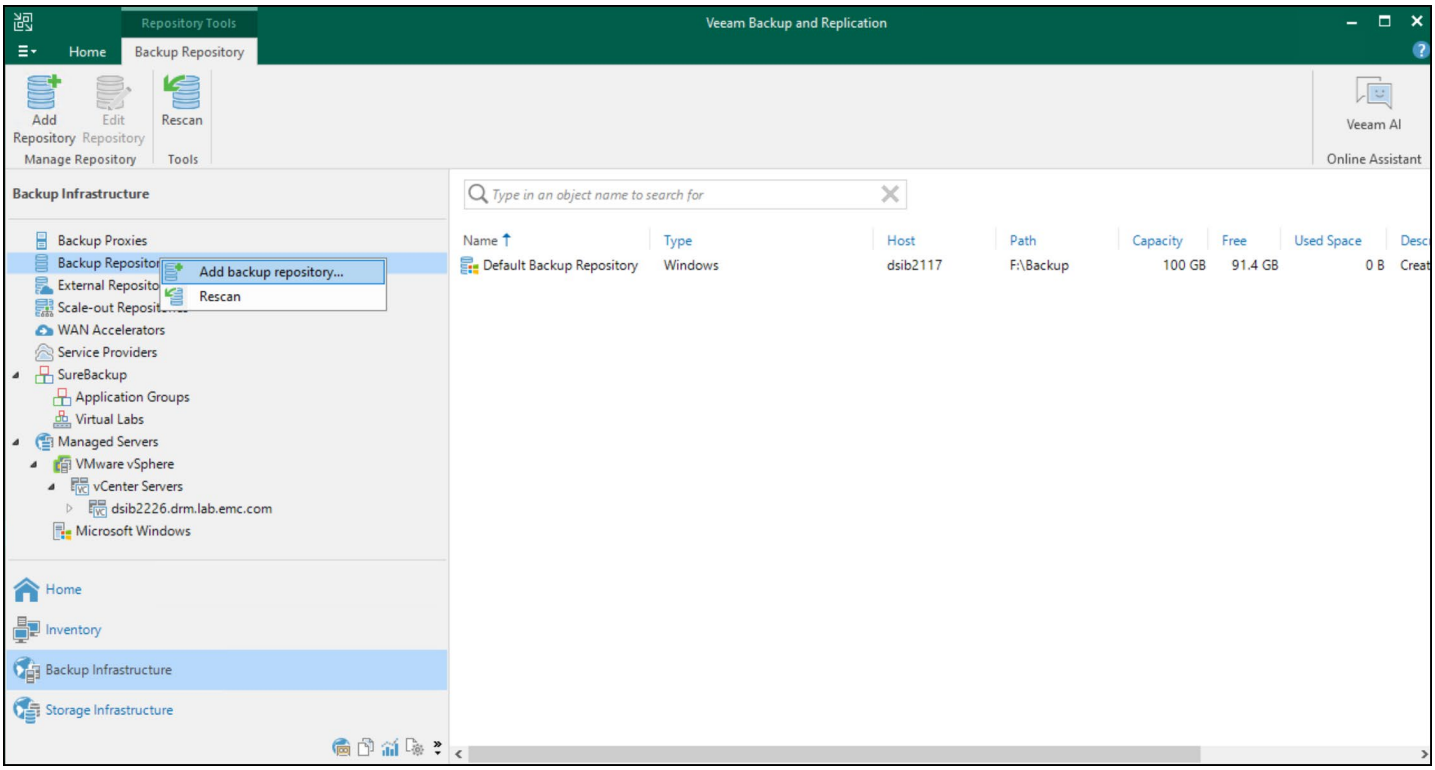


Figure 123. Adding backup repository: Step 1

In Step 2 in Figure 124 select **Direct attached storage**, then in Figure 125 select the operating system, Windows or Linux. In this example, Microsoft Windows is chosen.

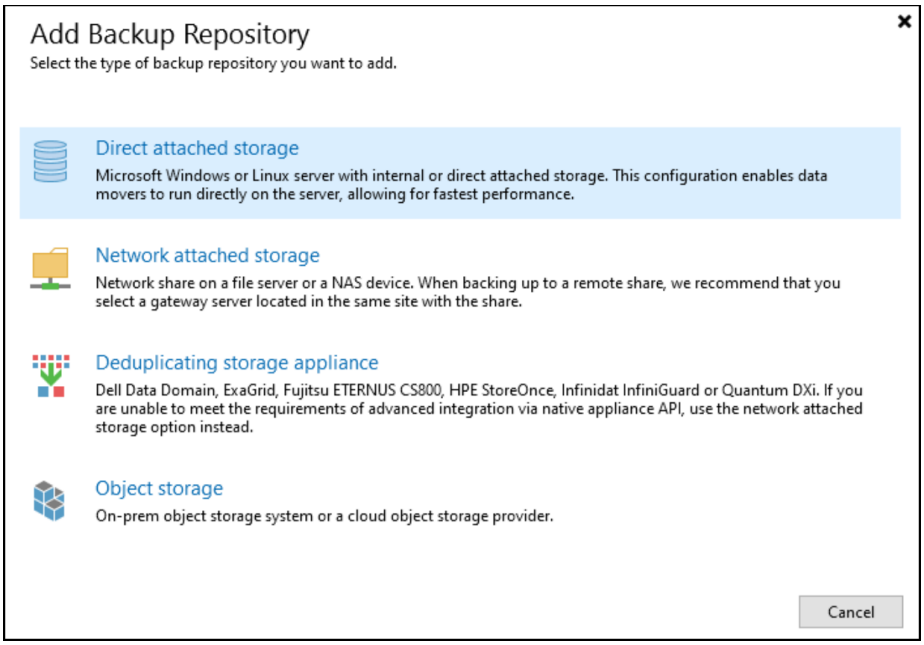


Figure 124. Adding a backup repository: Step 2

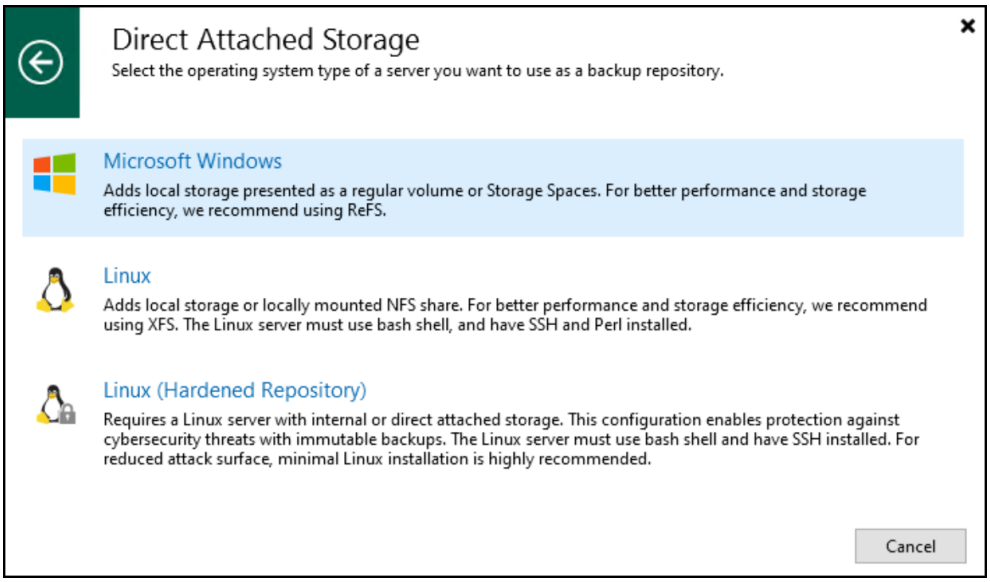


Figure 125. Adding a backup repository: Step 3

In Step 4, provide a name and description as shown in Figure 126.

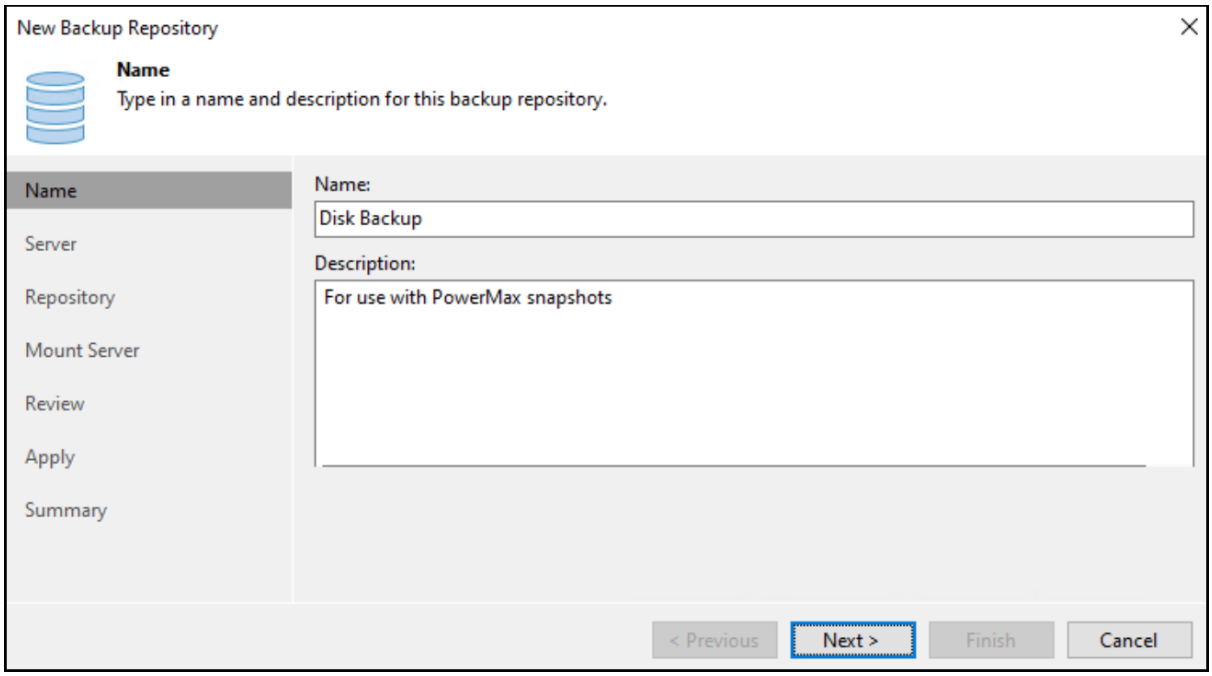


Figure 126. Adding a backup repository: Step 4

As shown in Figure 127 choose the drive where the user's backups will be placed. In order to see what is available on the server, select **Populate** in Step 6. The Windows drives (vmdks) are shown. Drive E is selected which has a capacity of 2 TBs.

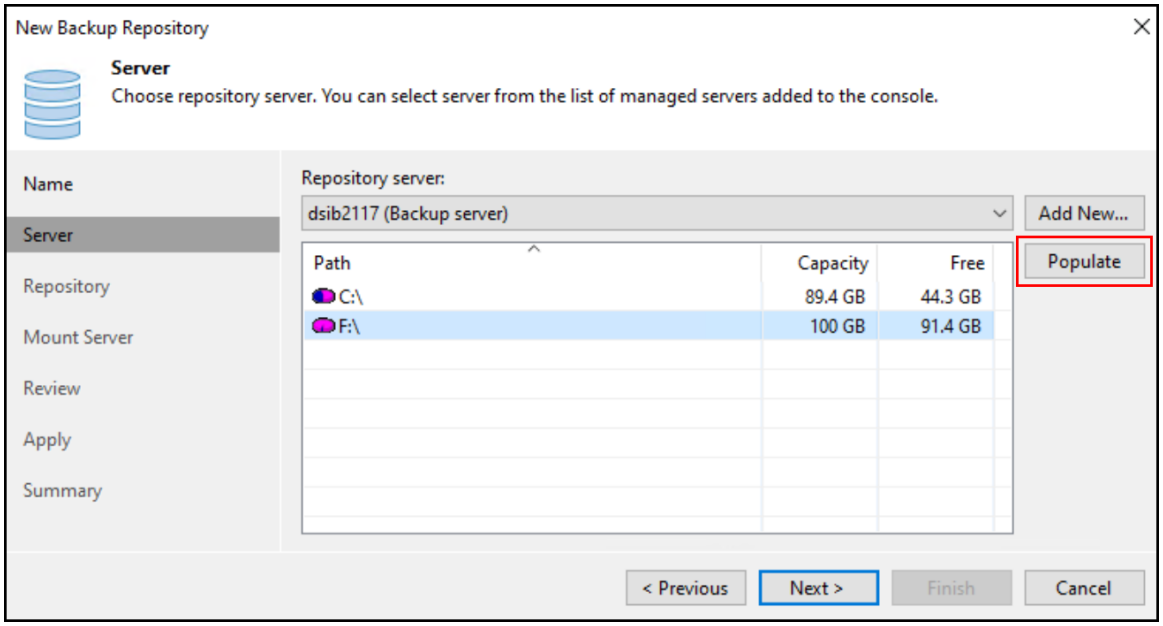


Figure 127. Adding a backup repository: Steps 6

Veeam will automatically create and use a folder called **Backups** on the drive. If the drive is a standard NTFS format, an error message appears as shown in Figure 128.

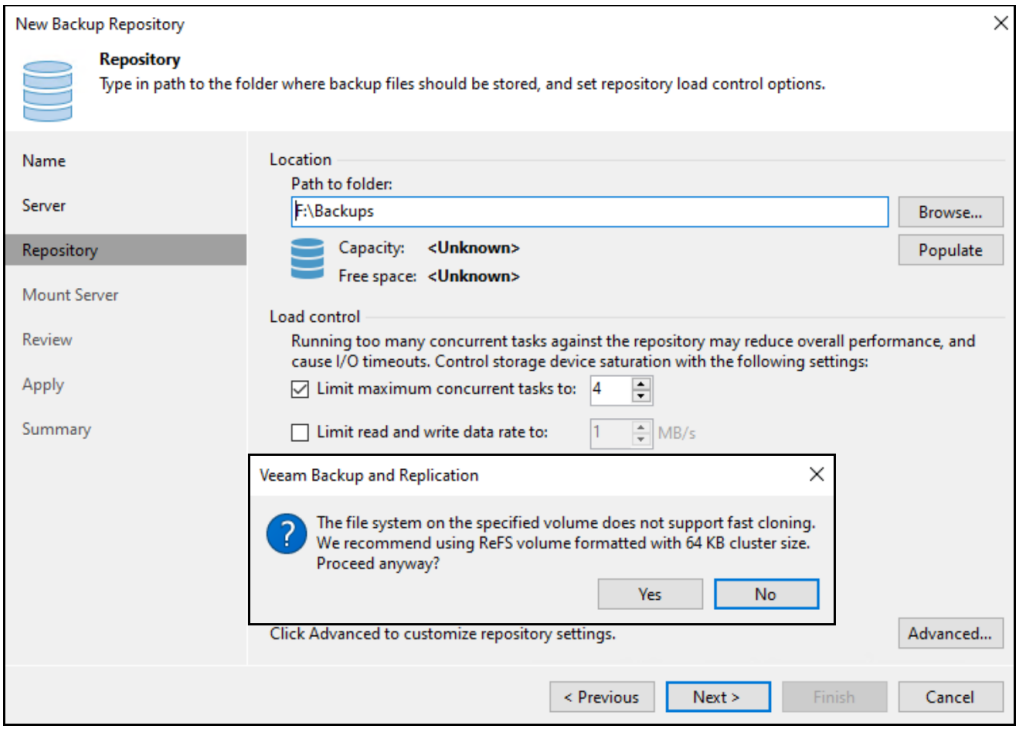


Figure 128. Adding a backup repository: Step 8

Once again, in Figure 129, Veeam provides the default entries that can be used. If this is the first drive configured, the cache folder will be the same as the one chosen in Figure 128.

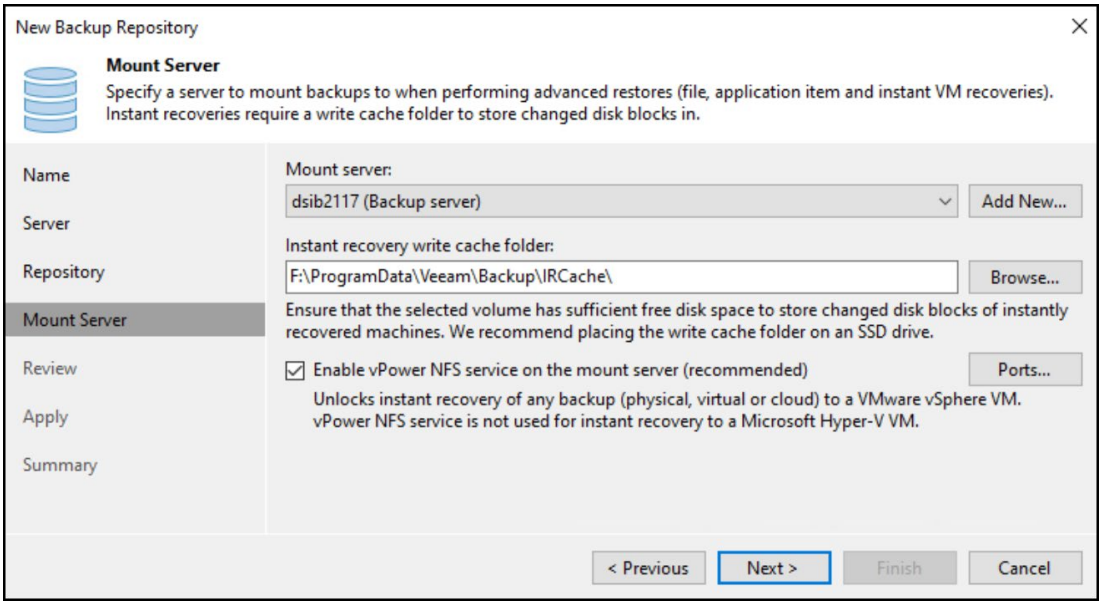


Figure 129. Adding a backup repository: Step 9

Review the options in Step 10. The status of the components as shown in Figure 130 is **already exists**, but if this was the first drive configured, the status would indicate the components will be installed. Note that if the chosen drive was used previously with Veeam and may have backups, check the box that allows Veeam to search for them.

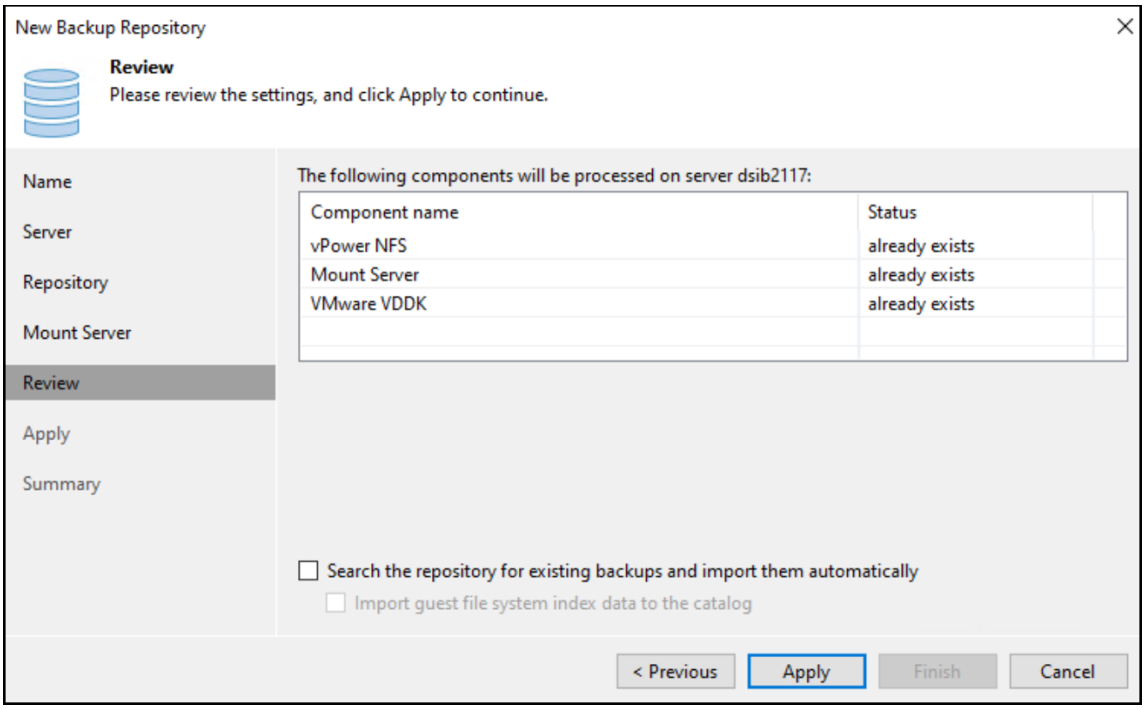


Figure 130. Adding backup repository: Step 10

Finally, apply the changes and check the messages shown in Figure 131 for success.

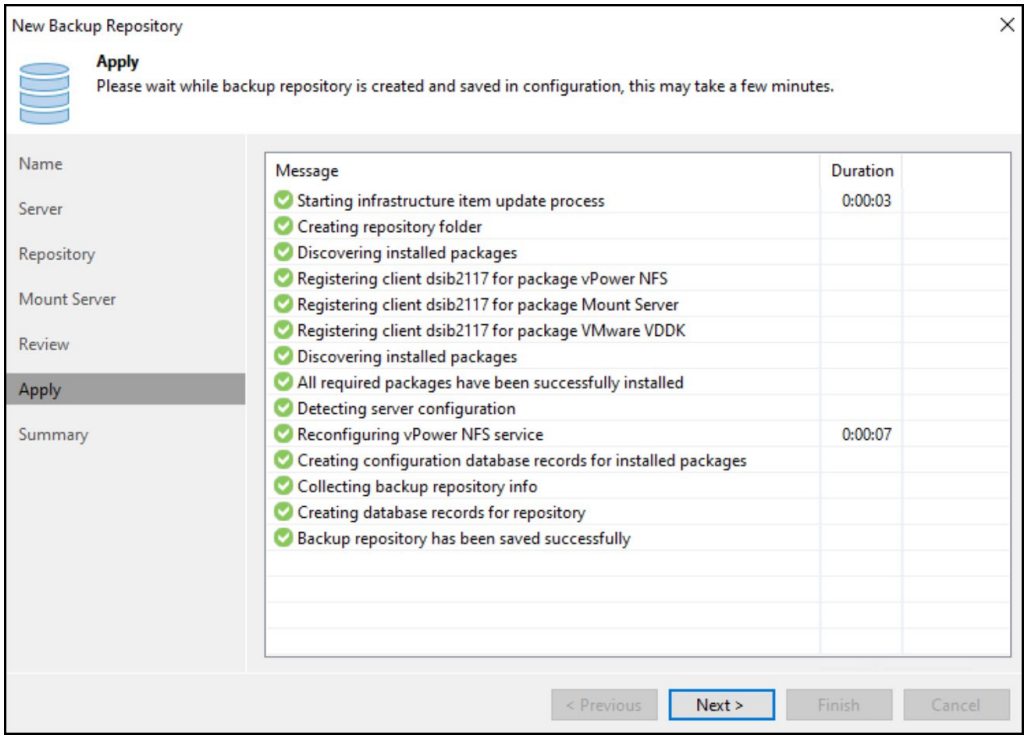


Figure 131. Adding backup repository: Step 11

Once complete, the summary shown in Figure 132 is displayed.

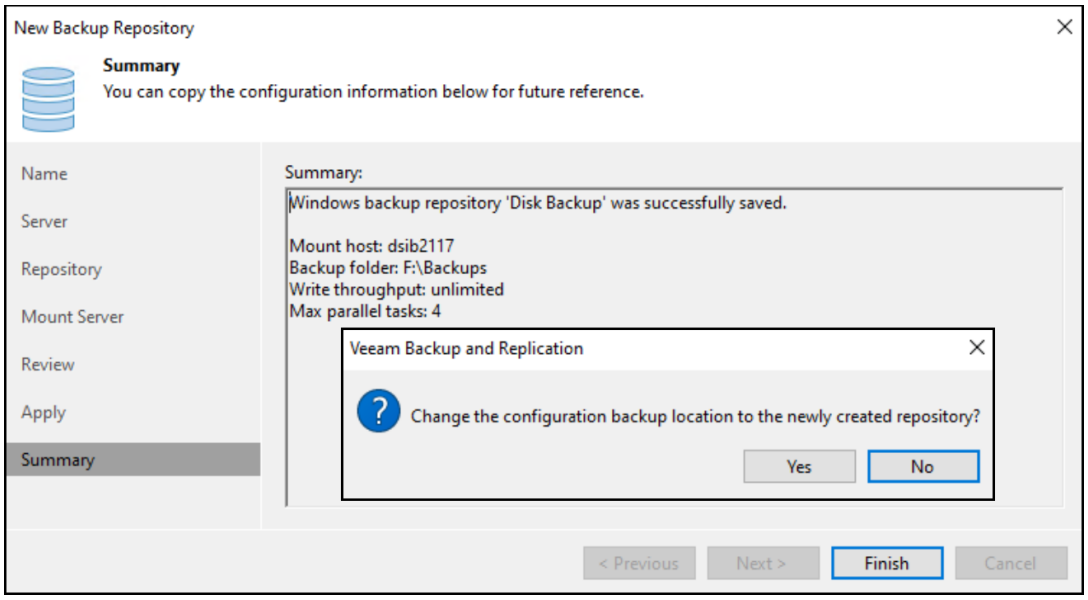


Figure 132. Adding backup repository: Summary

The repository is now available for use as shown in Figure 133.

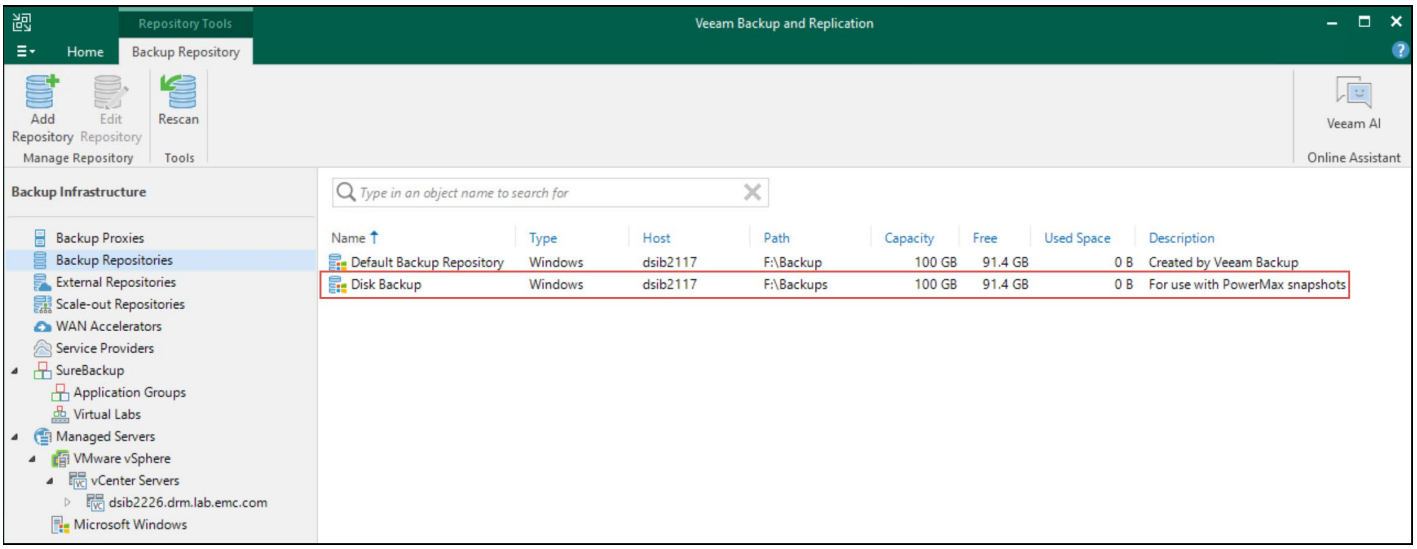


Figure 133. Backup repositories

9.2 Disk backup with PowerMax Plug-in

With one or more backup proxies in place, it is now possible to back up to disk with snapshots. The following example will use backup proxy dsib0127.drm.lab.emc.com.

9.2.1 VM backup

The process will back up VM **testing_veeam** which is located on datastore **TESTING_VEEAM**. The device ID is 149.

Begin the wizard from the **home** screen, and from the drop-down options for **Backup job**, select **Virtual machine…** as shown in Step 1, Figure 134.

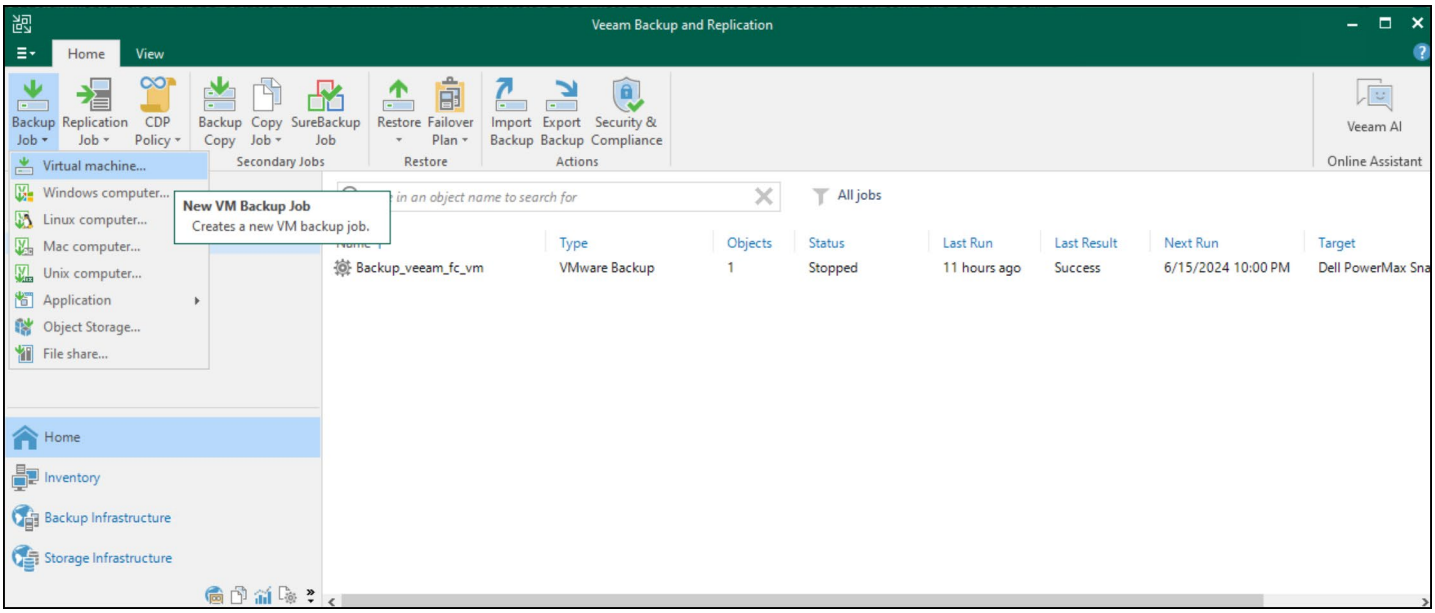


Figure 134. Disk backup with snapshot: Step 1

Begin by providing a backup name and a description if desired, as shown in Figure 135.

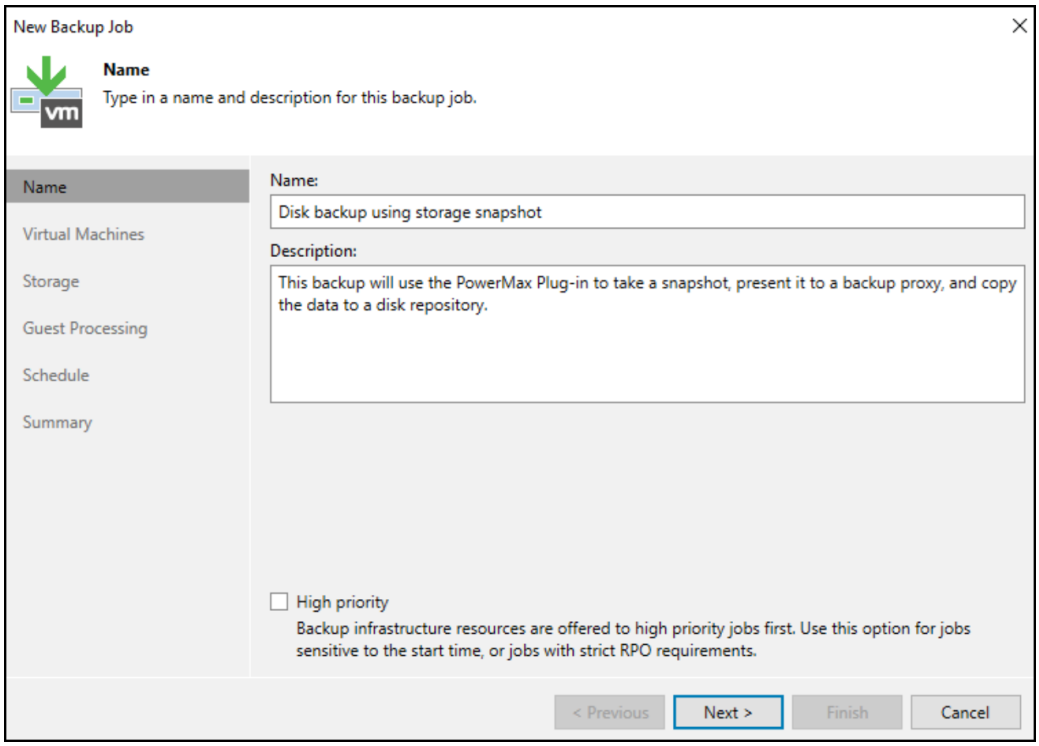


Figure 135. Disk backup with snapshot: Step 2

In the next screen shown in Step 3, select **Add…** and choose the VM(s) the user wants to back up. There are multiple ways to search for the desired objects as shown in Figure 136.

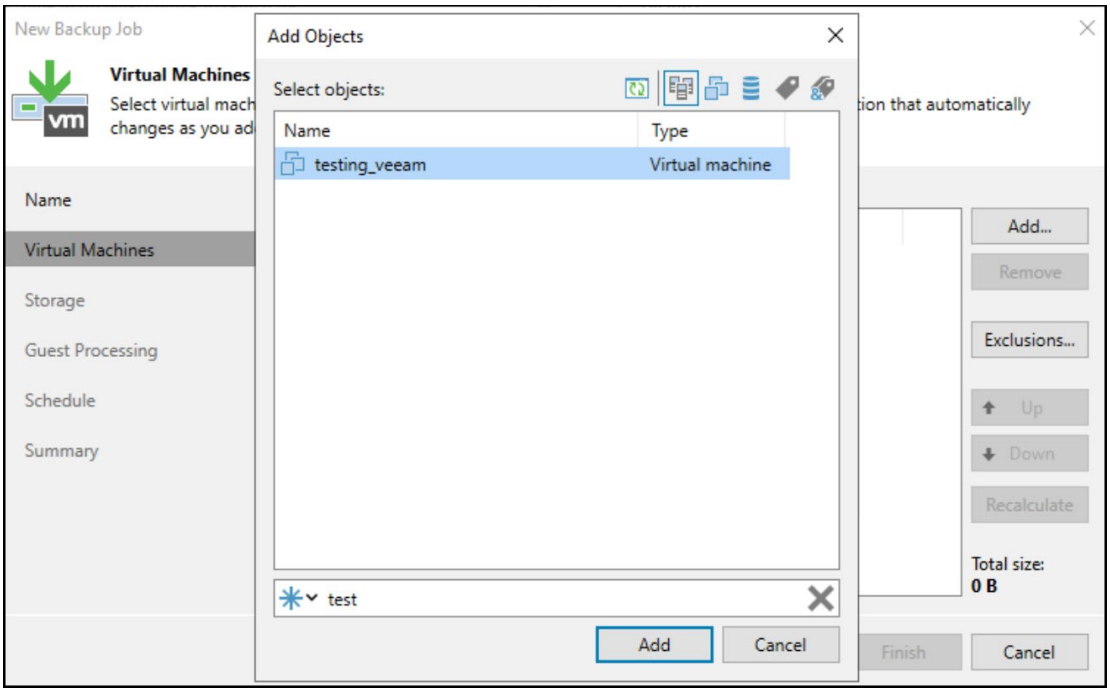


Figure 136. Disk backup with snapshot: Step 3

Under the **Storage** step, start by adjusting the **Backup proxy** to a previously created server that has Fibre Channel or iSCSI access to the array that backs the datastore that contains the VM. Note in the inset the backup proxy that was created in the section Backup proxy. Then choose the backup repository created in the section Backup repository. Both these steps are demonstrated in Figure 137.

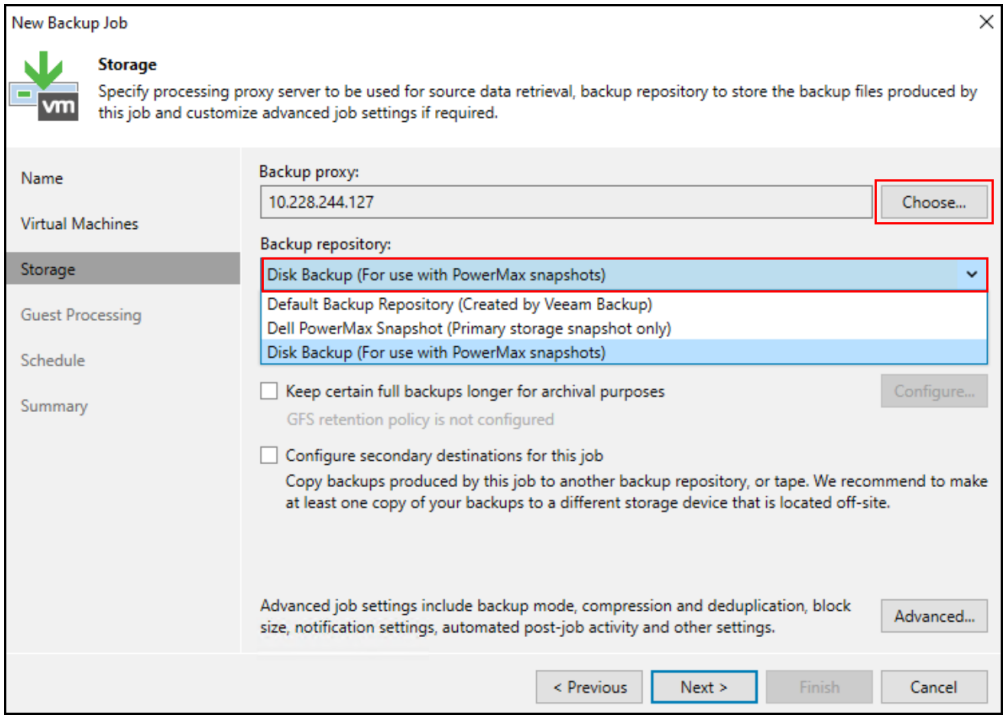


Figure 137. Disk backup with snapshot: Steps 4

If desired, there are advanced parameters available in the **Storage** step that can be adjusted. One setting of note is shown in Figure 138 under the **Integration** tab. By default, the checkbox for **Enable backup from storage snapshots** is selected. This should not be changed but is included here for reference.

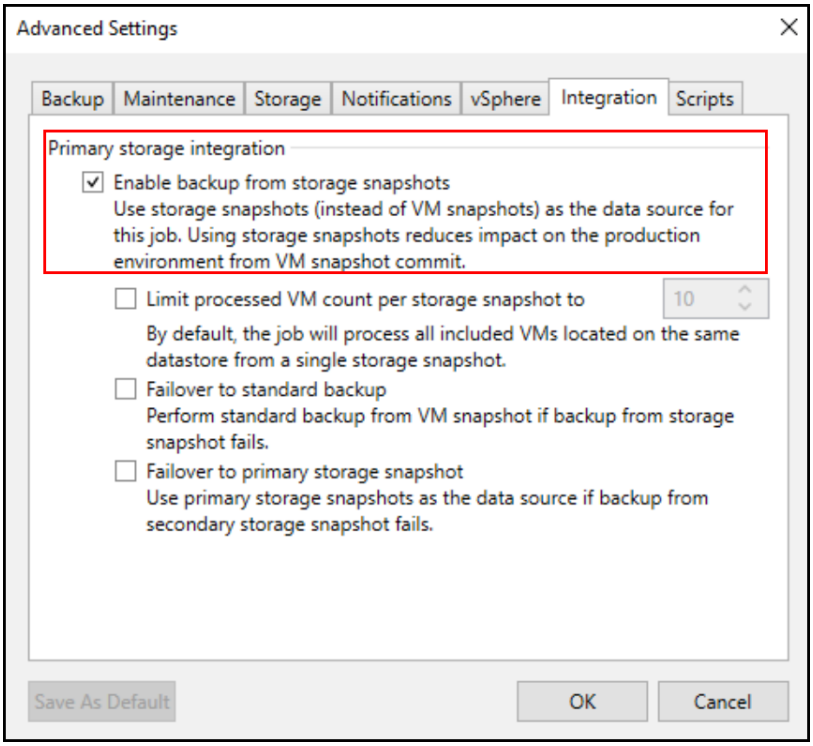


Figure 138. Disk backup with snapshot: advanced settings

Figure 139 offers options for the GuestOS. In this example, no changes are made.

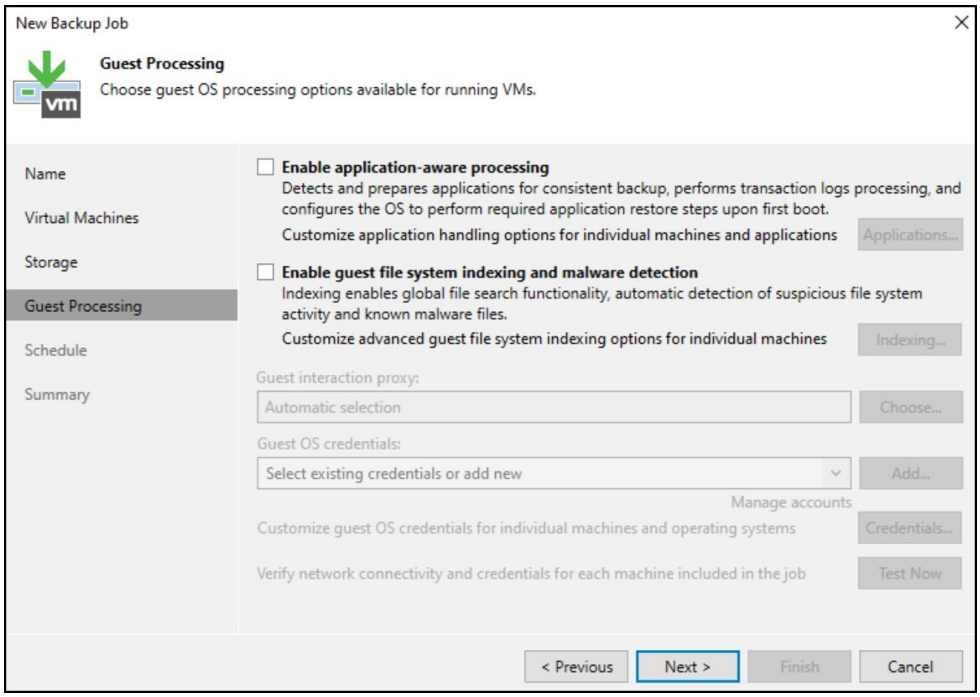


Figure 139. Disk backup with snapshot: Step 5

The final option available for the wizard in Figure 140, is to schedule the backup. The backup can also be tied to another job if there is a dependency between one or more VMs.

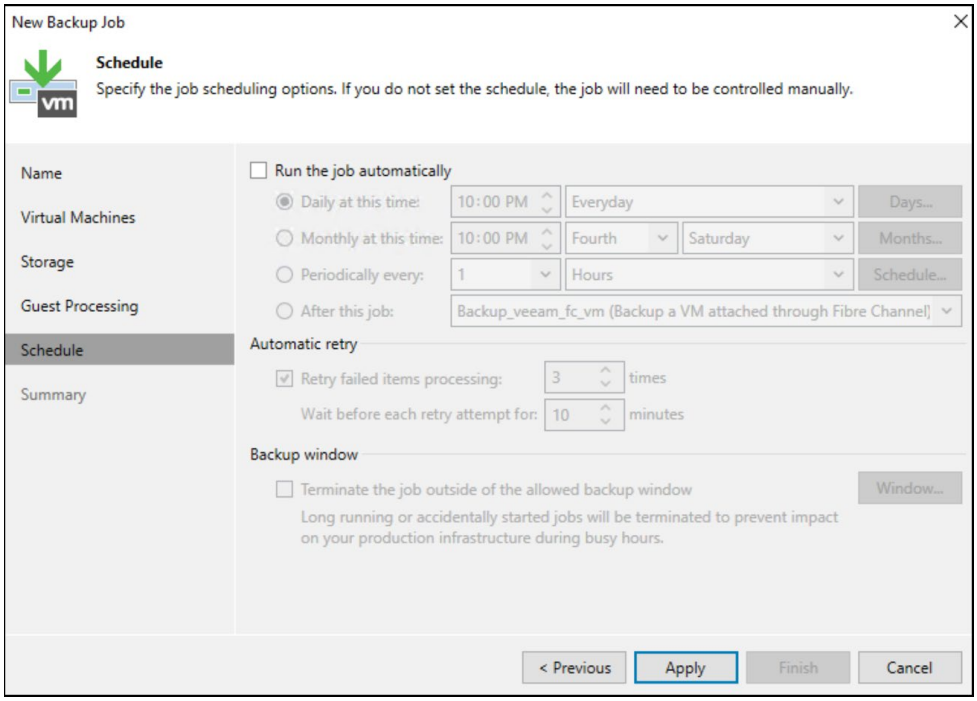


Figure 140. Disk backup with snapshot: Step 6

Click **Finish** as shown in Figure 141 to complete the backup setup. Here, the checkbox is selected to run the job immediately in order to test its viability before setting a schedule.

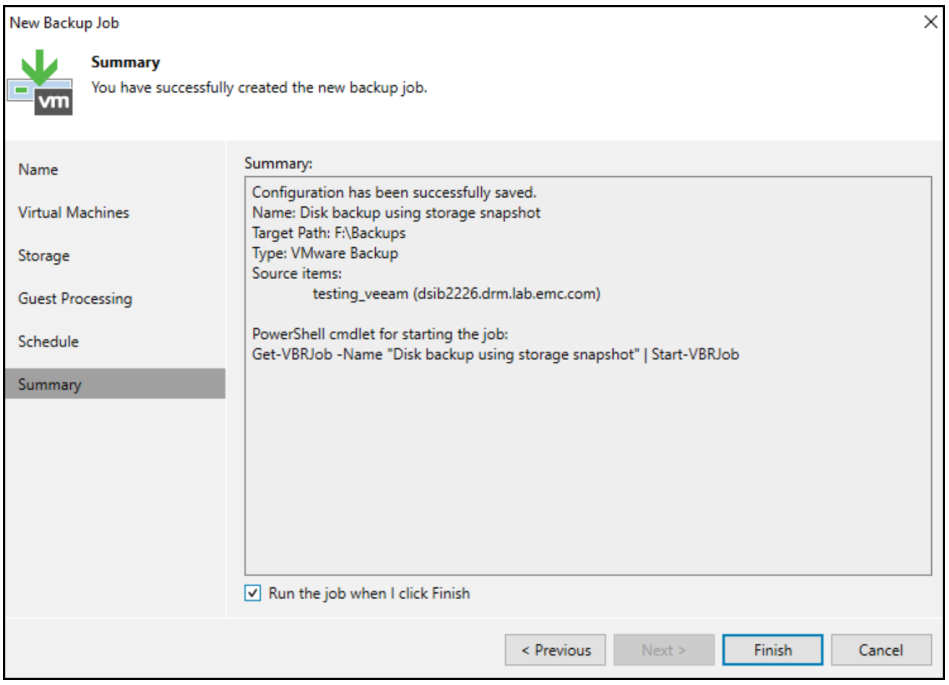


Figure 141. Disk backup with snapshot: Summary

As part of the job, the 100 GB linked target device is placed in the storage group so the backup proxy (dsib0127.drm.lab.emc.com) can have access to it. Veeam is then able to read the device's contents to back up the VM. The device is seen as Disk 3 in Figure 142. Do not make any changes to the device during the backup process. It is displayed here only for completeness.

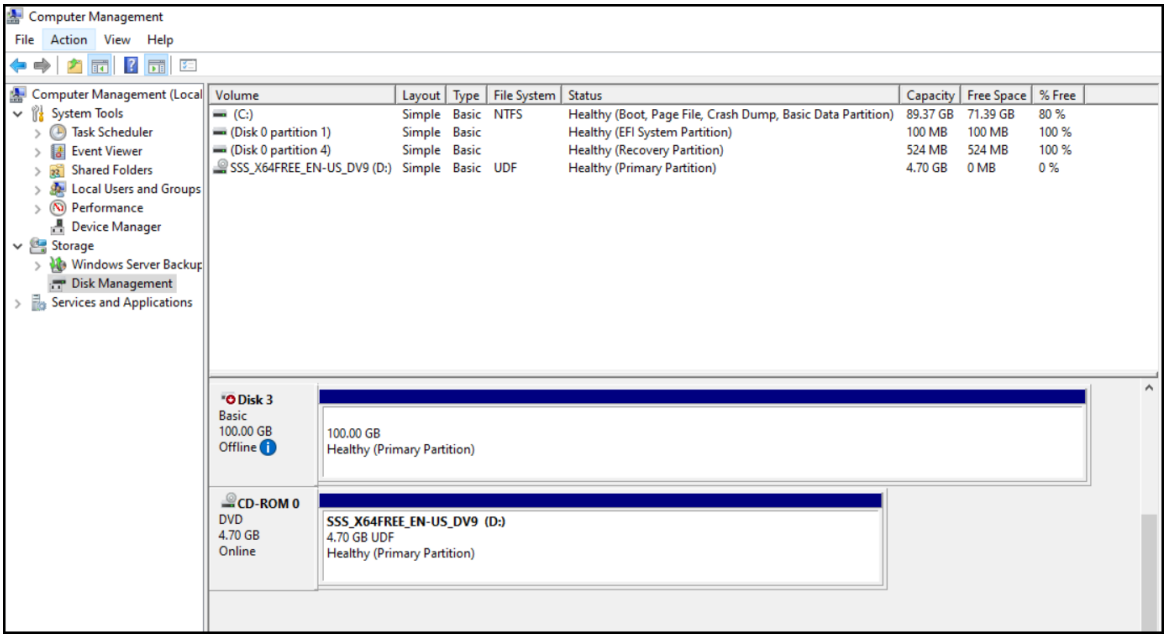


Figure 142. Disk backup with snapshot: Backup proxy server

To view the snapshot and linked target in Solutions Enabler run the `symsnapvx list` command as shown in Figure 143.

```
dsib2028:~ # symsnapvx list -sid 1672 -linked -detail -file dev.txt

Device File Name          : dev.txt
Device's Symmetrix ID     : 000120001672    (Microcode Version: 6079)

-------------------------------------------------------------------------------------------------
Sym                                          Link  Flgs                          Remaining  Done
Dev    Snapshot Name                   Gen   Dev   FCMDS Snapshot Timestamp       (Tracks)   (%)
------ ------------------------------- ----- ----- ----- ----------------------- ---------- ----
00142  VeeamAUX-Diskbacku-1718491837411    0 00144 .D.X. Sat Jun 15 18:49:56 2024          0  100
                                                                                  ----------
                                                                                           0


Flgs:

  (F)ailed   : F = Force Failed, X = General Failure, . = No Failure
             : S = SRP Failure, R = RDP Failure
  (C)opy     : I = CopyInProg, C = Copied, D = Copied/Destaged, . = NoCopy Link
  (M)odified : X = Modified Target Data, . = Not Modified
  (D)efined  : X = All Tracks Defined, . = Define in progress
  (S)napshot : X = Has snapshot waiting for define to complete
             : . = No snapshot waiting for define to complete

dsib2028:~ #
```

Figure 143. Disk backup with snapshot: Solutions Enabler output

Job progress is available in the Veeam GUI as shown in Figure 144. Note that the job takes a couple minutes to complete.

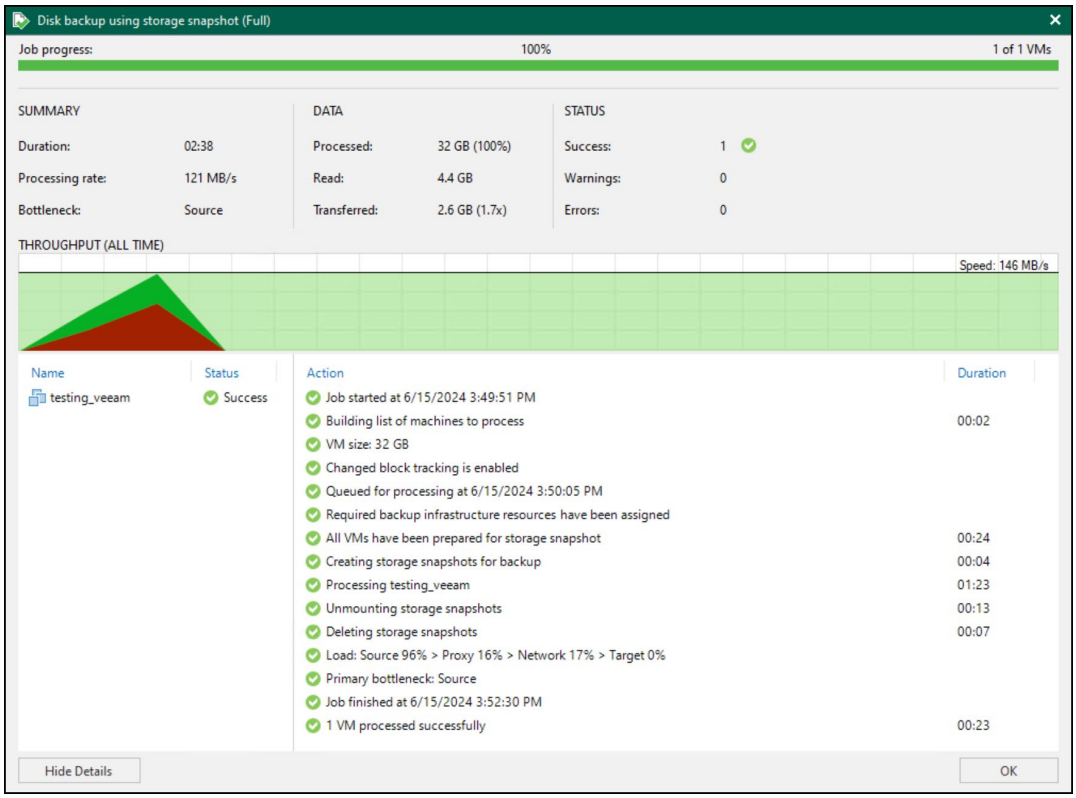


Figure 144. Disk backup with snapshot: Job progress

The backup files can be seen on the backup proxy server as shown in Figure 145.

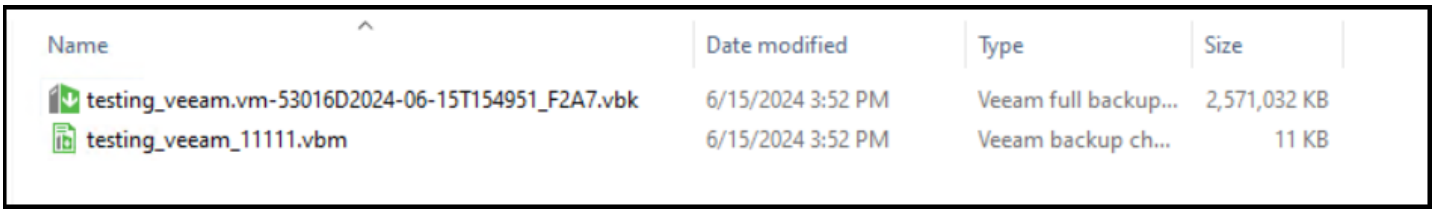


Figure 145. Disk backup with snapshot: Backup files on backup proxy server

10 Backup and restore Raw Device Mappings (RDM)

Veeam does not support backing up RDMs as part of a VM. This holds true for the PowerMax Plug-in, despite the fact that the array snapshots are taken at the device level. The lack of support, however, does not prevent Veeam from backing up the VM disks (vmdks) that are not RDMs. The backup of a VM with an RDM proceeds in the same manner as one without an RDM. The following will walk through the difference between a strictly VMFS backup and a VMFS and RDM backup.

The following VM as shown in Figure 146, **testing_veeam**, has two disks, one VMFS highlighted in blue and one DM highlighted in red, all on PowerMax array 000120001672.

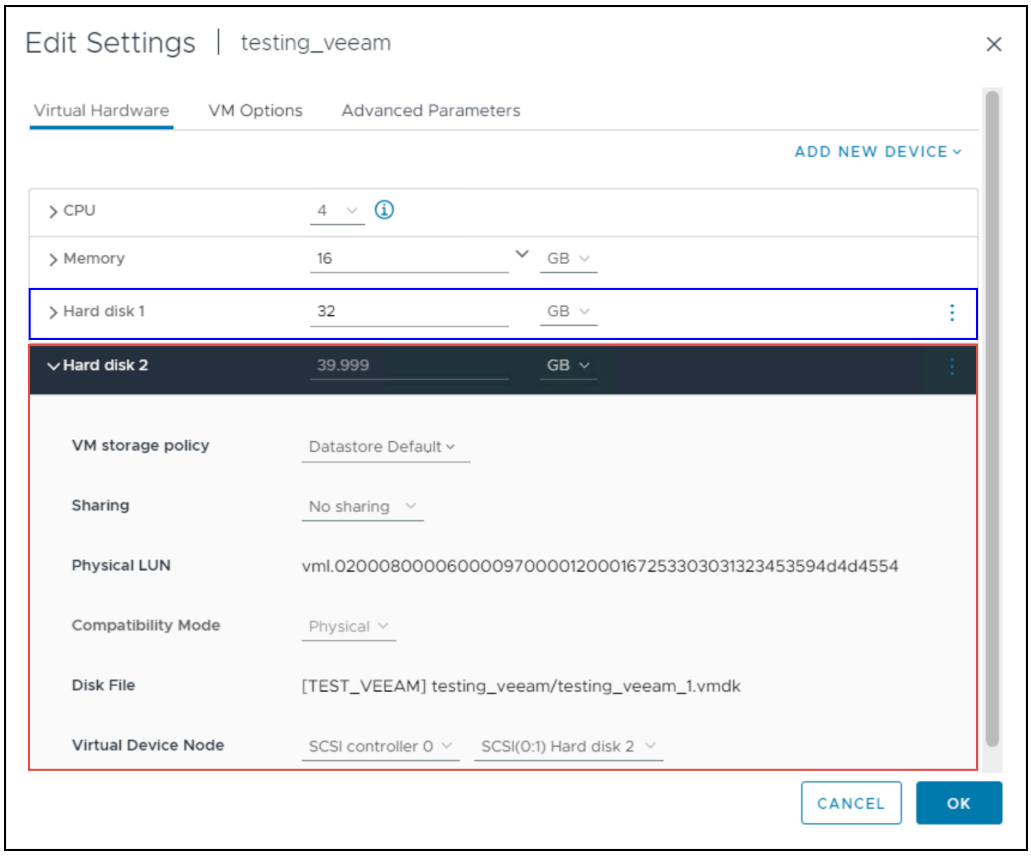


Figure 146. VM with VMFS and RDM

Within the Veeam console, navigate to the resource pool or the folder where the VM is stored and right-click on the VM in the right-hand panel. Select **Add to backup job -> New job….** as shown in Figure 147.

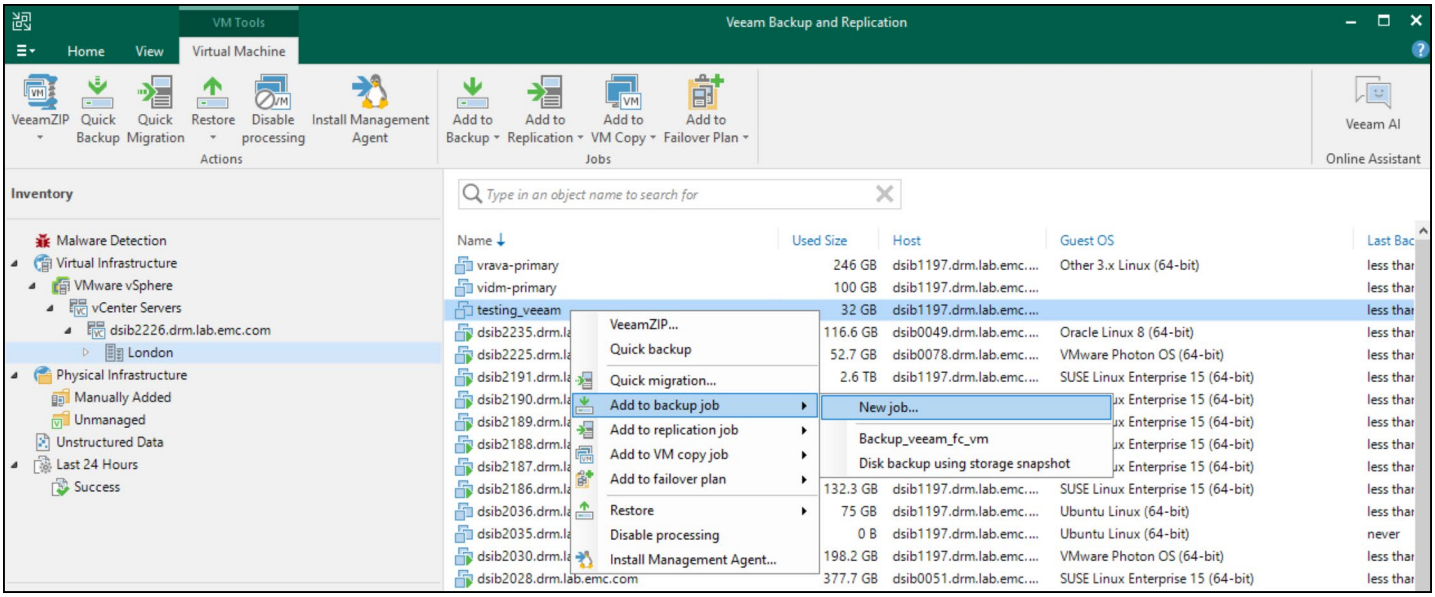


Figure 147. VM with VMFS and RDM backup: Step 1

Provide a name for the backup job and a description in Step 2, Figure 148.

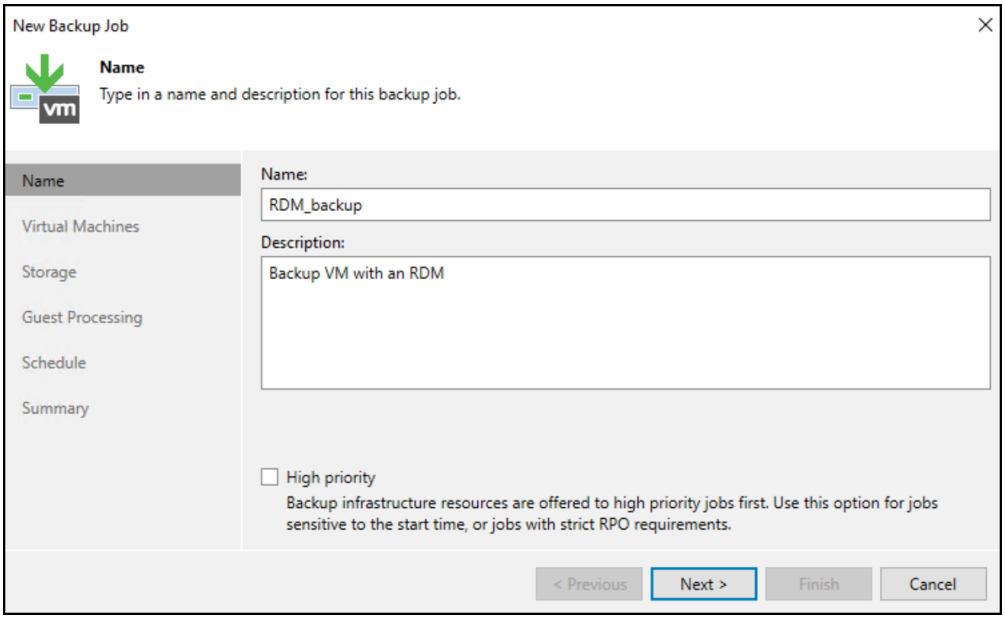


Figure 148. VM with VMFS and RDM backup: Step 2

In Step 3, Figure 149 Veeam provides the user with the option of adding more VMs and/or changing aspects of individual VMs. For example, individual disks can be removed from backup. Note that Veeam at this point does not have the RDM listed in exclusions as it was not manually excluded as part of the backup.

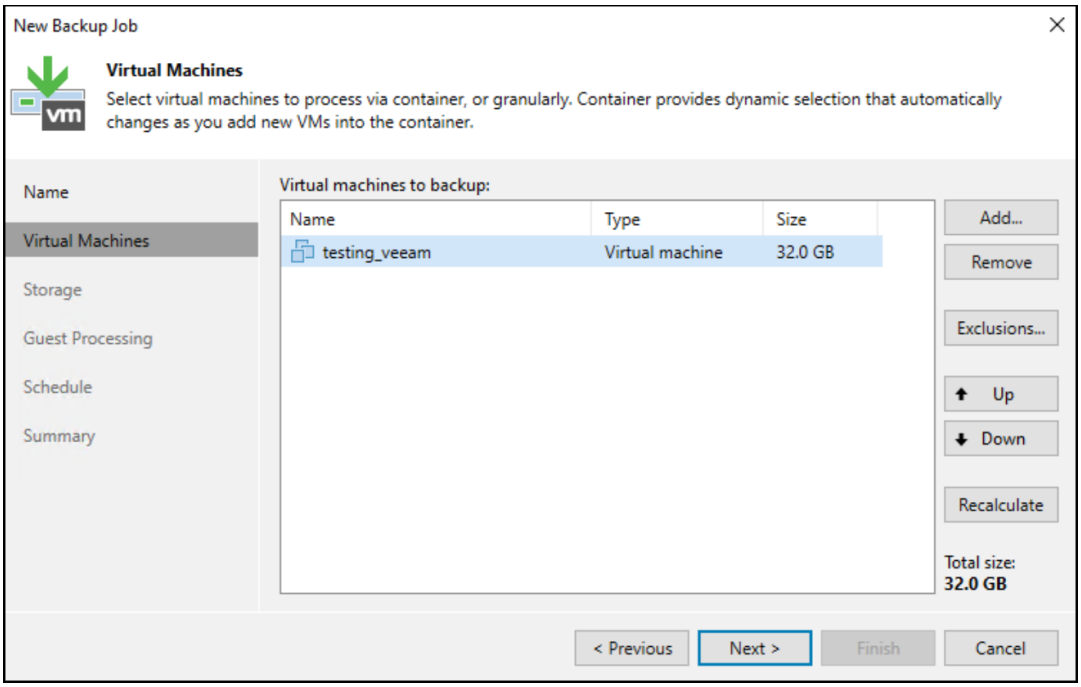


Figure 149. VM with VMFS and RDM backup: Step 3

Step 4 will default to the PowerMax Plug-in as the repository of choice and set the backup proxy as **Automatic selection** which cannot be altered. The other options in Figure 150 were discussed previously in the Backup section.

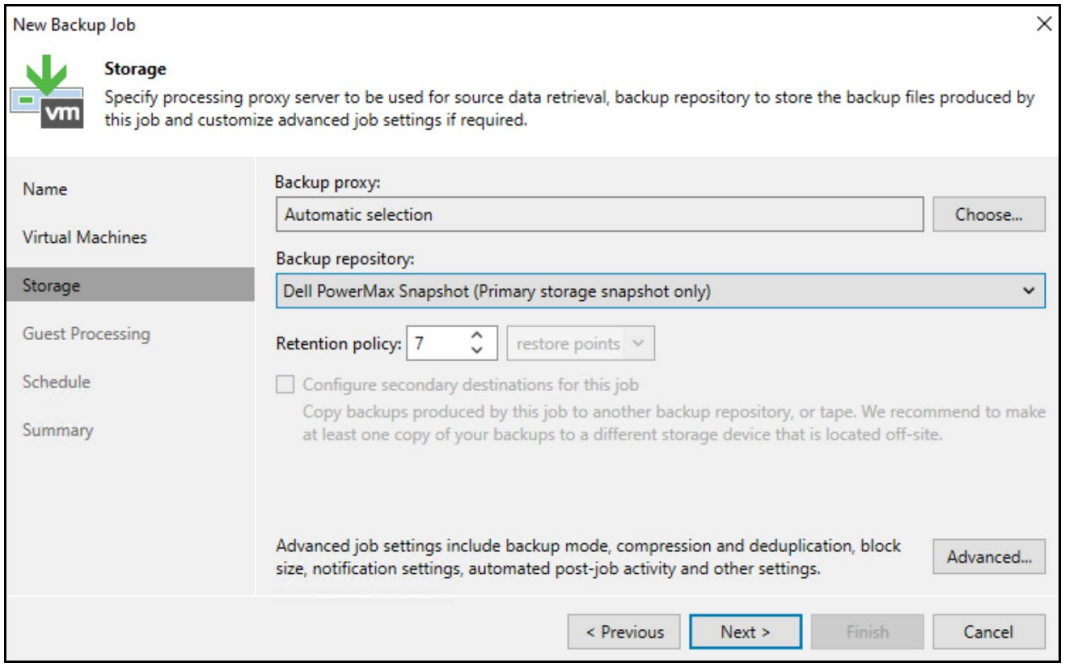


Figure 150. VM with VMFS and RDM backup: Step 4

As Steps 5 and 6 were detailed earlier in the paper, and as there is nothing specific to RDMs, they are simply included here for completeness in Figure 151 and Figure 152.

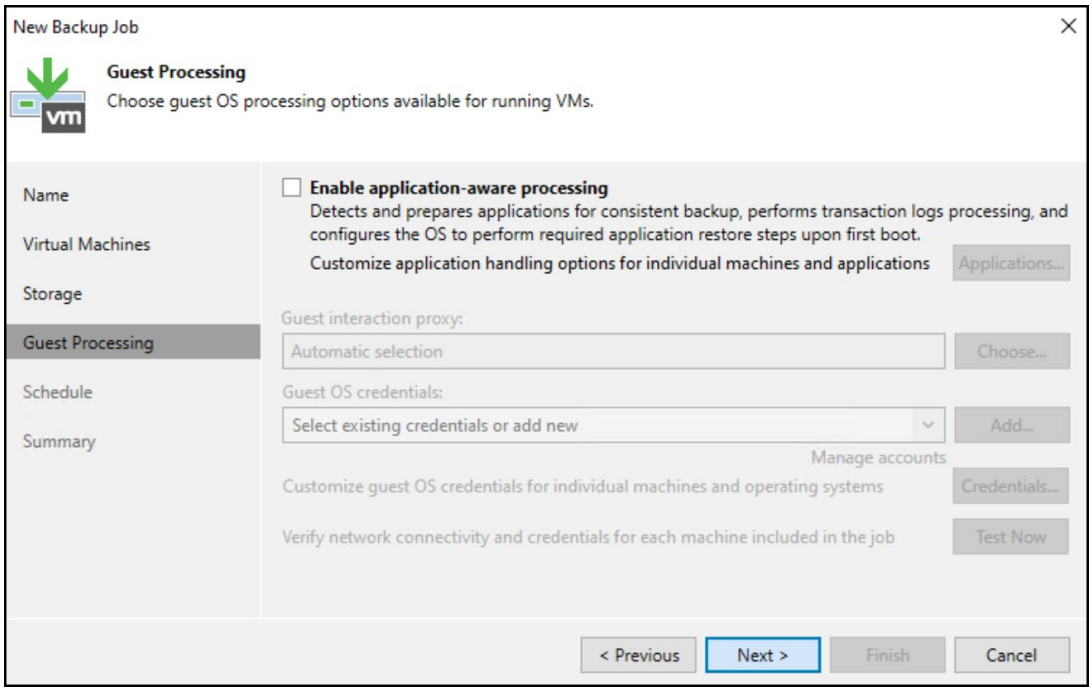


Figure 151. VM with VMFS and RDM backup: Step 5

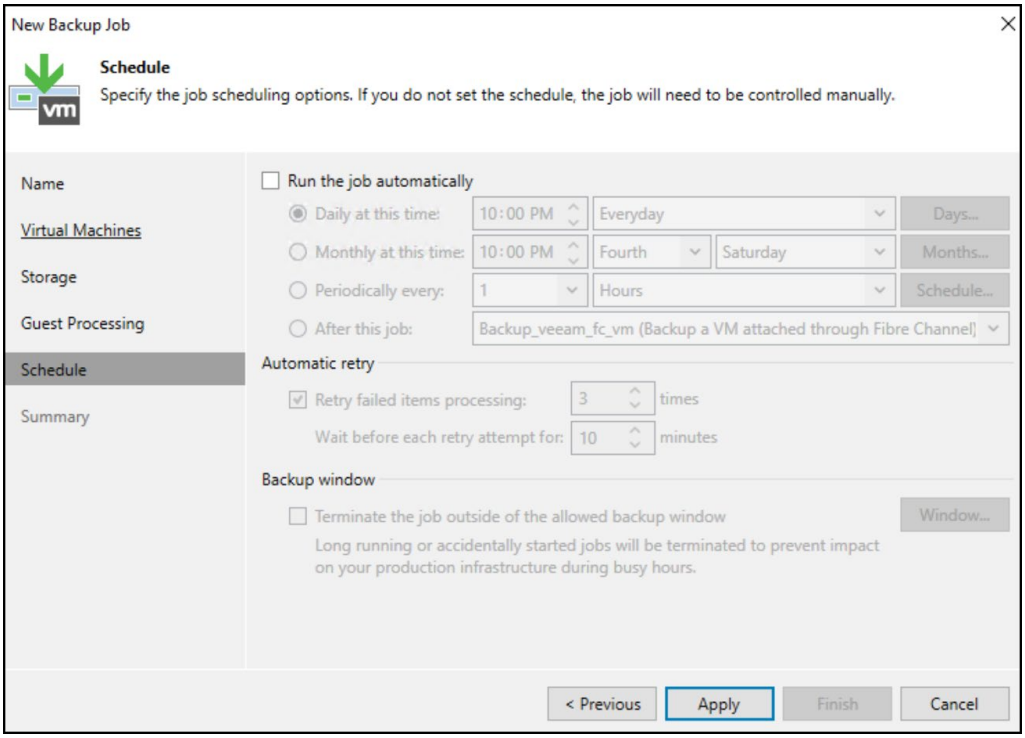


Figure 152. VM with VMFS and RDM backup: Step 6

In Step 7 in Figure 153 check the box **Run the job when I click Finish** and select **Finish**.

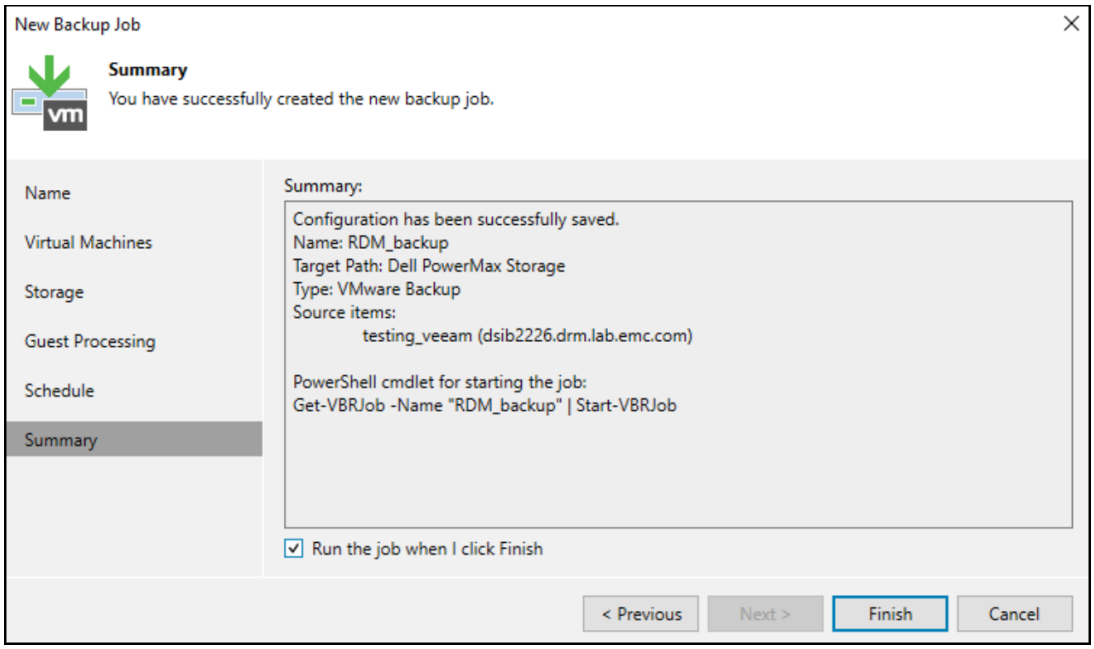


Figure 153. VM with VMFS and RDM backup: Step 7

Since this was a snapshot using PowerMax technology, it will complete quickly. Navigate to the **History** section to see if the job was successful. In Figure 154 the job is successful.

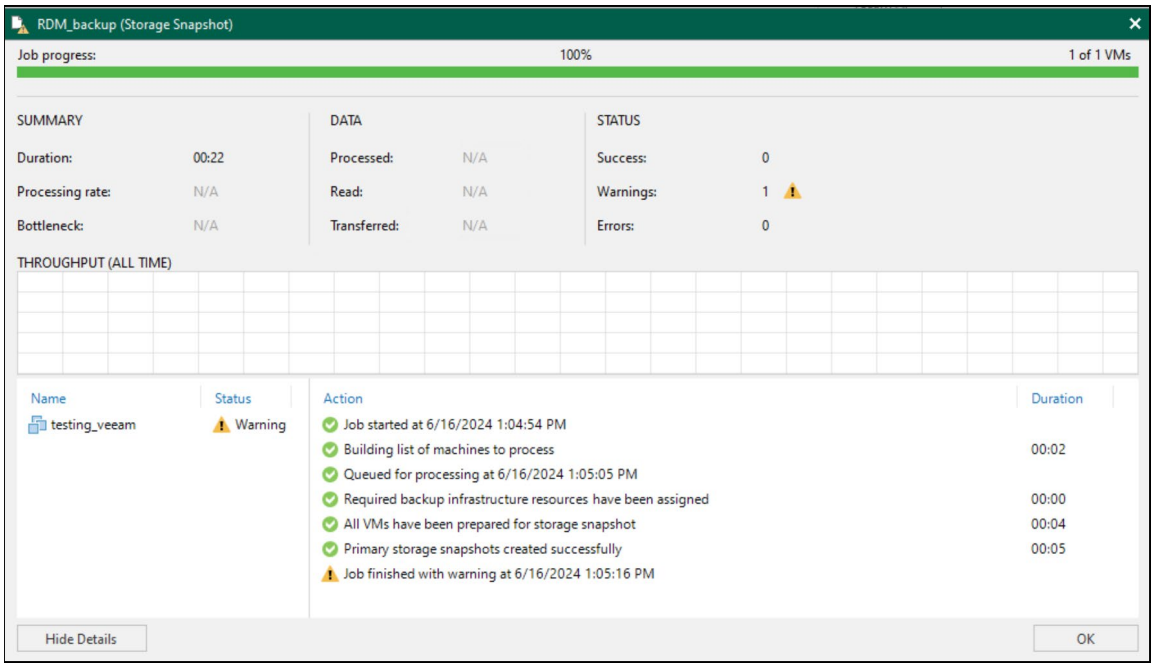


Figure 154. VM with VMFS and RDM backup: Complete

Since there are no additional messages, the assumption is that the VM was completely backed up. However, since there is an RDM, the logs need to be consulted. The logs by default are located on the Veeam Windows server in **c:\ProgramData\Veeam\Backup\<backup_job_name>**.

Reviewing the log in Figure 155 the expected entries are found which indicate that Veeam skipped the RDM. Note that Veeam views that job as successful since the VMFS disks were backed up.

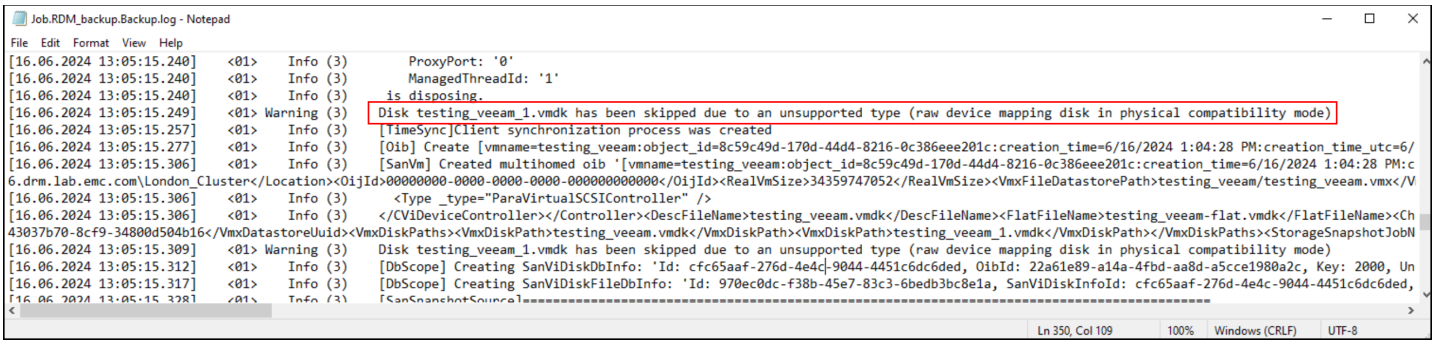


Figure 155. VM_VMFS_RDM_backup job log

If the VM is then restored, the configuration file (vmx) is adjusted to remove reference to the RDM. This is highlighted in Figure 156.

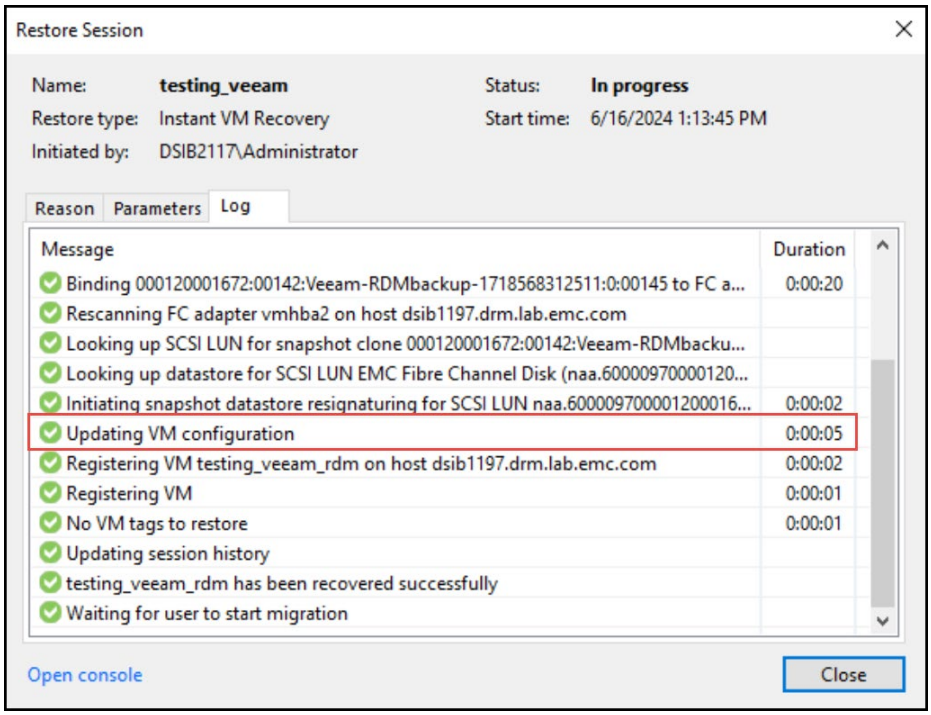


Figure 156. Veeam_rdm_vm restore

Looking at the restored VM, the RDM is gone as shown in Figure 157. Since Veeam allows the use of pre- and post-scripts, a manual snapshot could be executed against the RDM device in a pre-script, and then re-added in a post-script. However, the VMFS and RDM devices would not be consistent if that's required.

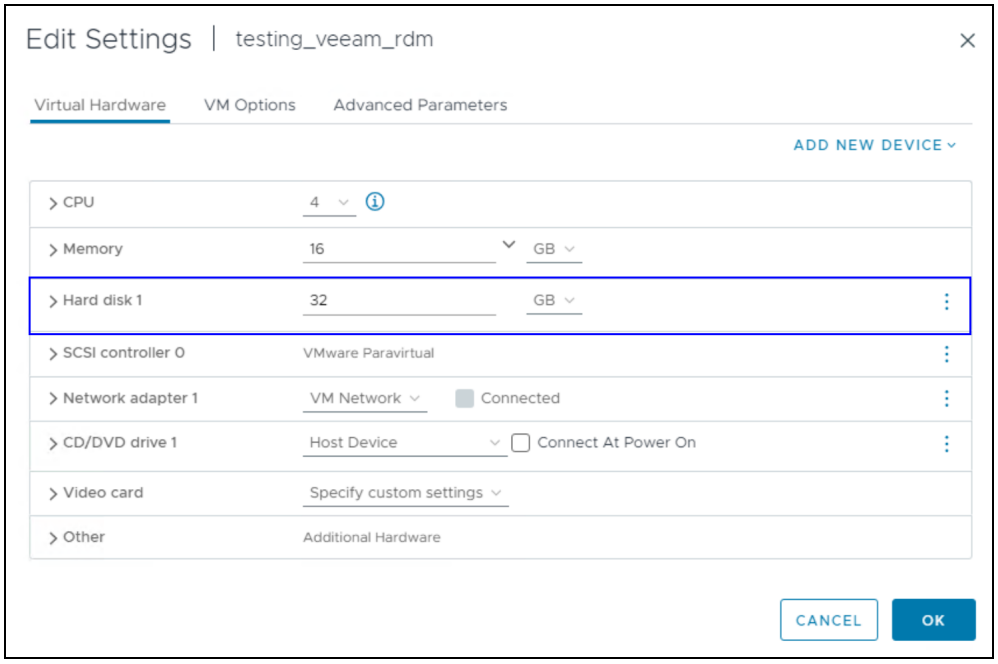


Figure 157. Veeam_rdm_vm post-restore

11 SRDF replication

Symmetrix Remote Data Facility, or SRDF, is Dell's premier replication technology for the PowerMax array. It offers asynchronous, synchronous and active configurations. In this release of PowerMax Plug-in, there is no direct integration with SRDF. Any replication relationship on the backend is unknown to the PowerMax Plug-in, but since the snapshot process is designed to work on both the R1 (local read/write) and R2 (remote write disabled) independently (i.e., snapshots are not replicated) the PowerMax Plug-in works without issue. For SRDF modes other than active mode (SRDF/Metro), there are no special considerations. SRDF/Metro will be addressed below.

Snapshots taken against an R2, when an appropriate backup proxy is set, will be scanned for VMs, though they will have no association with a VMware environment. Yet, these VMs can be used for restores. The next section will detail how this is accomplished.

11.1 Restoring VMs from R2 snapshots

Using the example in Figure 158, an asynchronous SRDF pair, A9 and 14B, exists between arrays 000120001473 and 000120001672.

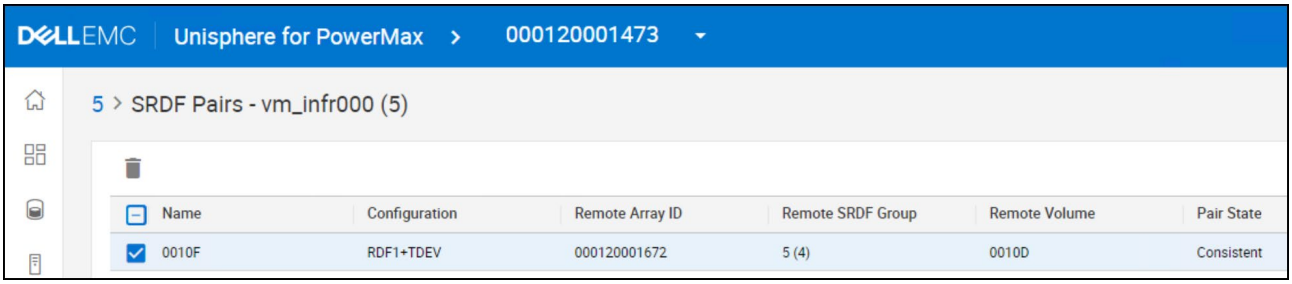


Figure 158. SRDF/A pair in Veeam environment

A backup of device **10F** was completed in Veeam, which backs datastore **VM_DEV_10F_SID_1473** with two VMs.

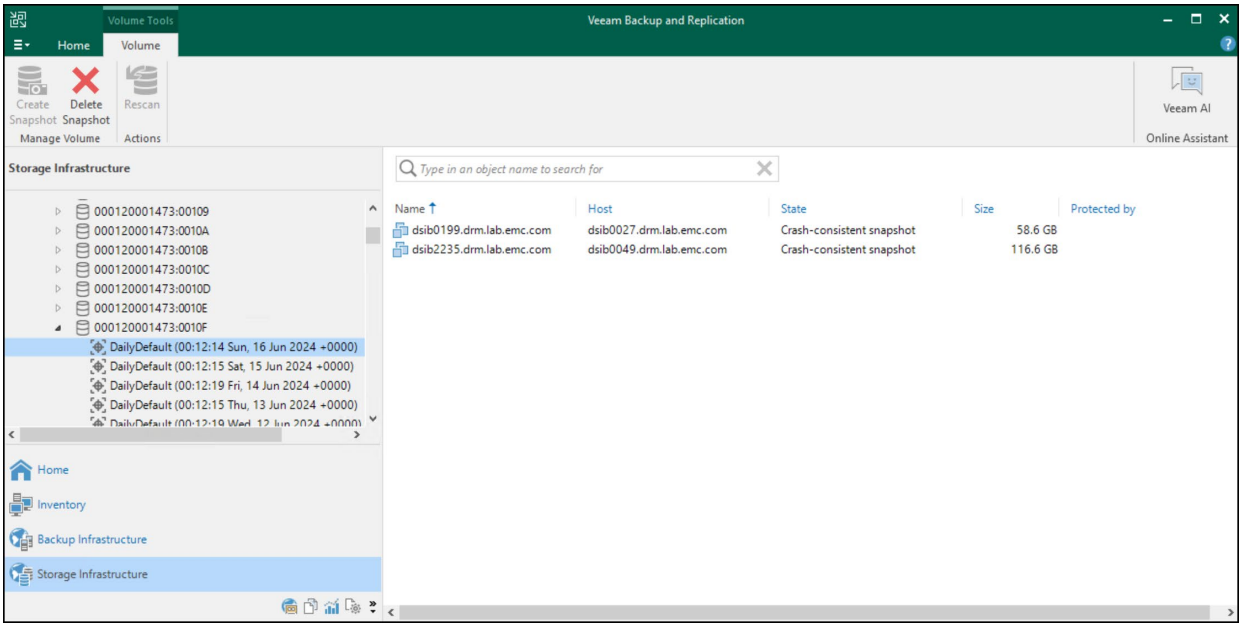


Figure 159. Backup of R1 device with 10F

Now as the R2 device, 10D, is write-disabled, it is not possible to use the backup workflow in Veeam. Therefore, the only option is a manual snapshot. Since this wizard was demonstrated in section Manual snapshots, only an abbreviated display is shown in Figure 160.

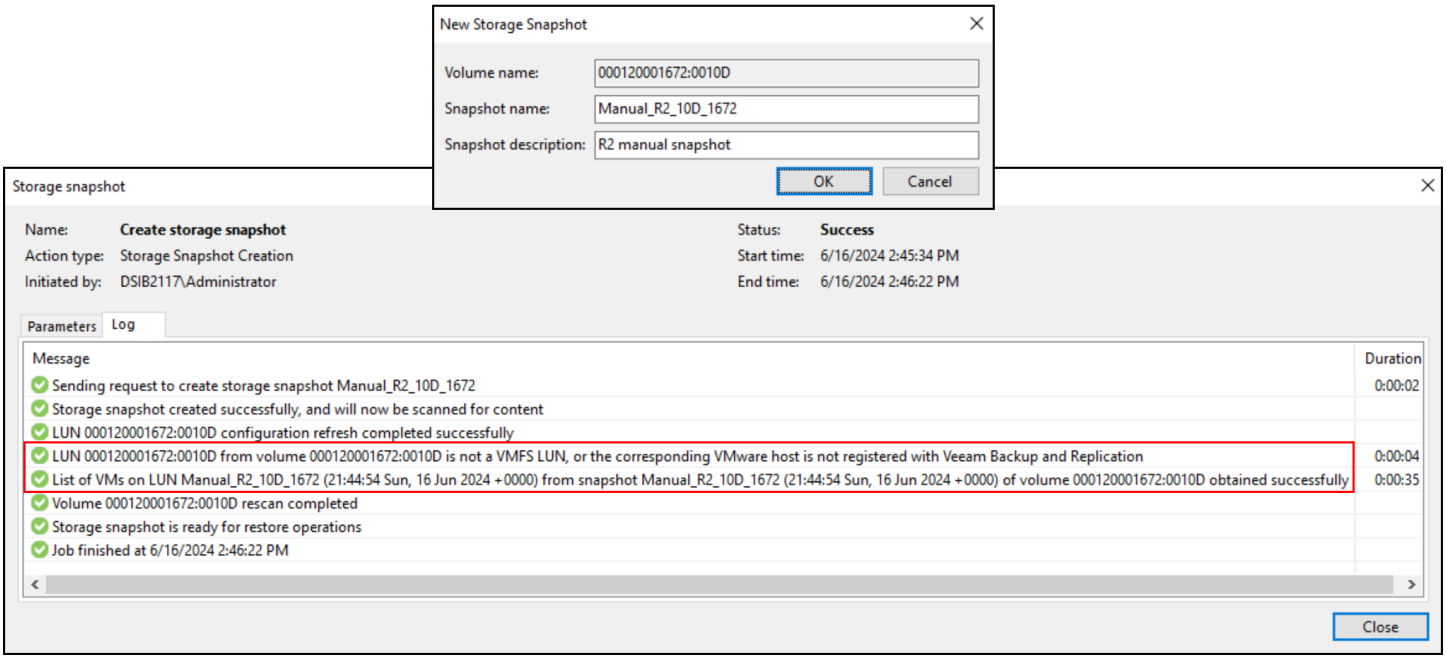


Figure 160. Manual snapshot of R2 device with datastore

In the log file above, a red box highlights two important outputs from Veeam. The first is that Veeam recognizes the device is not part of a VMware host or registered. Being an R2 write-disabled device, even if it is presented to the ESXi hosts, it does not have a mountable datastore. The second line of output, however, informs the user that Veeam has discovered VMs on the device. Since Veeam uses a proprietary process to read the device, it does not need a mounted datastore to discover the VMs. However the **Host** is empty since the VM is not registered.

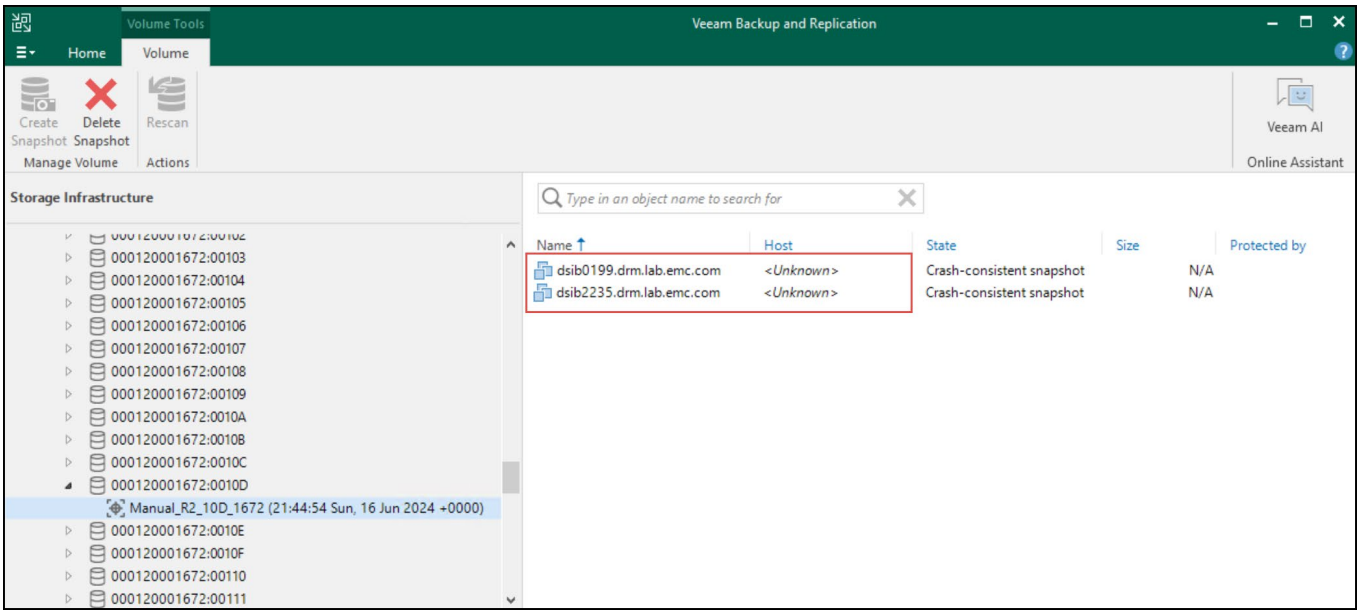


Figure 161. Manual snapshot with recorded VM

Since Veeam has recognized that there is a VM on the R2 device via the snapshot, it is possible to use the snapshot to restore the VM to the existing infrastructure.

11.1.1 R2 VM restore

When restoring the VM from the R2 snapshot, because the VM has no original location in the vCenter, it must be restored to a new location.

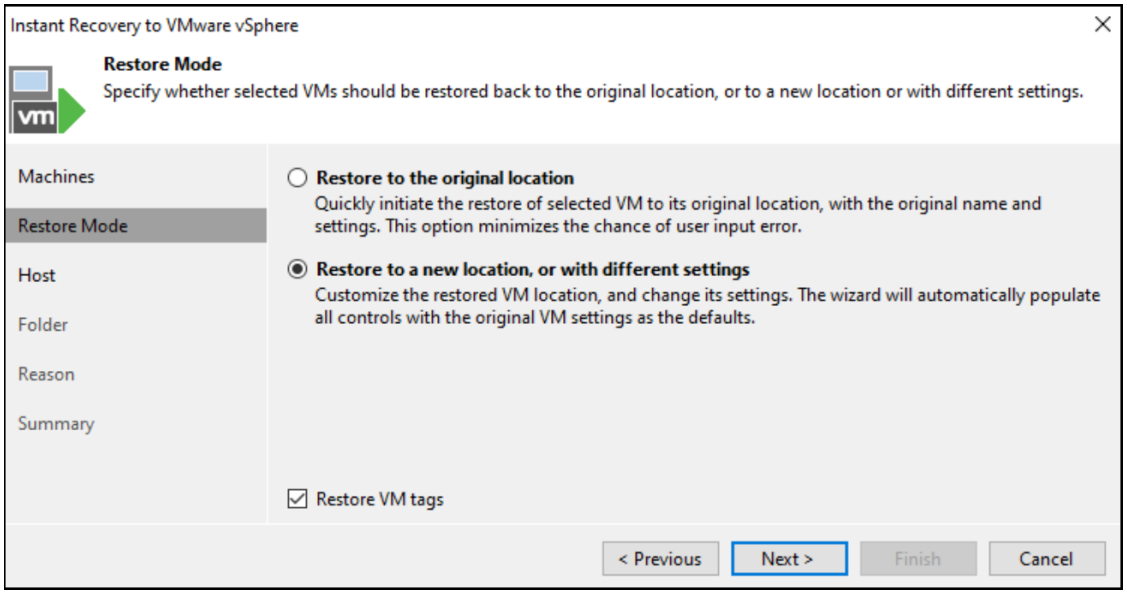


Figure 162. Restore R2 VM: Step 1

To demonstrate this, initially all locations are empty as shown in Figure 163. Update them with the appropriate locations and be sure to rename the VM if the user is restoring to the same location as the R1 VM. Both Host and Resource Pool must be selected before proceeding.

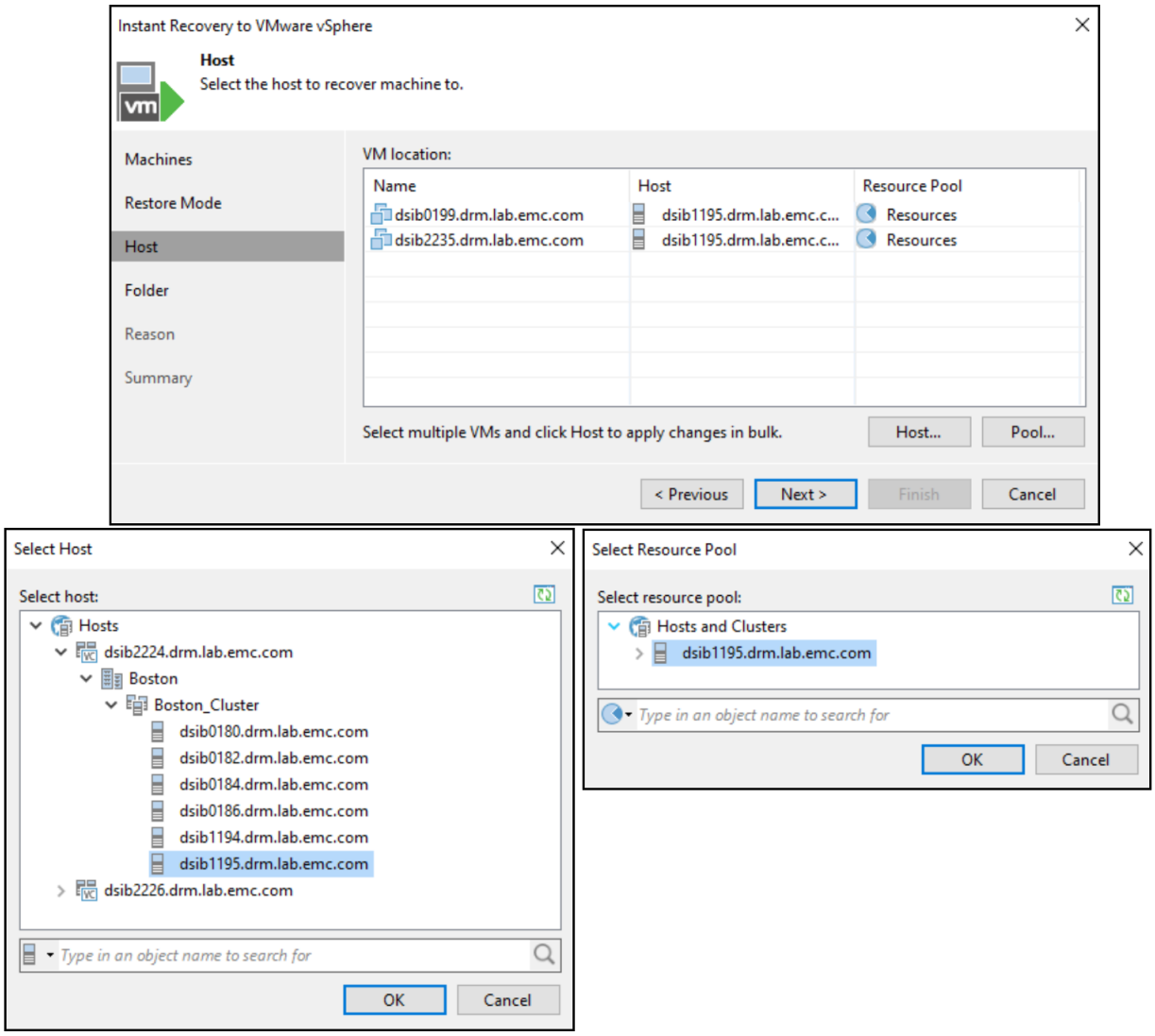


Figure 163. Restore R2 VM: Step 2

In Figure 164, **Customize…** the VMs with new BIOS UUID and prefixes.

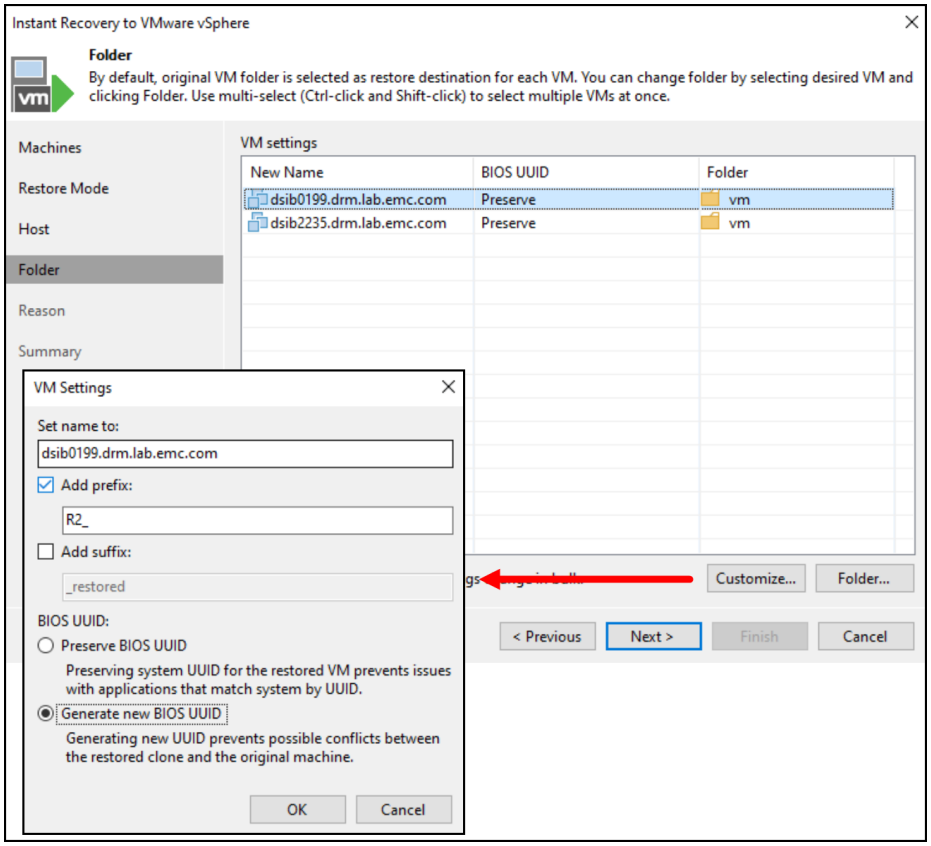


Figure 164. Restore R2 VM: Step 3

Review the summary before finishing as shown in Figure 165.

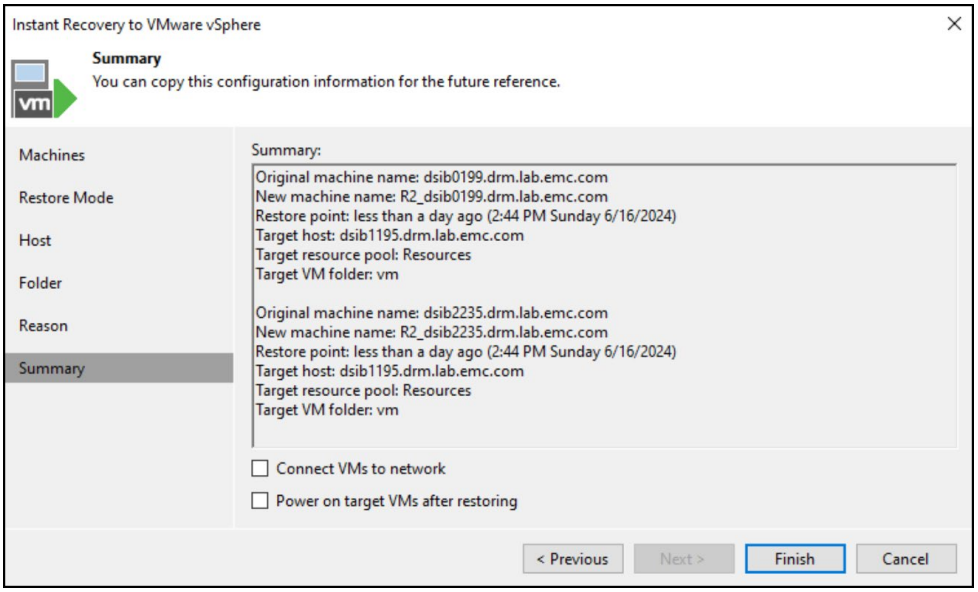


Figure 165. Restore R2 VM: Summary

The restore completes. Review in the log file as shown in Figure 166.

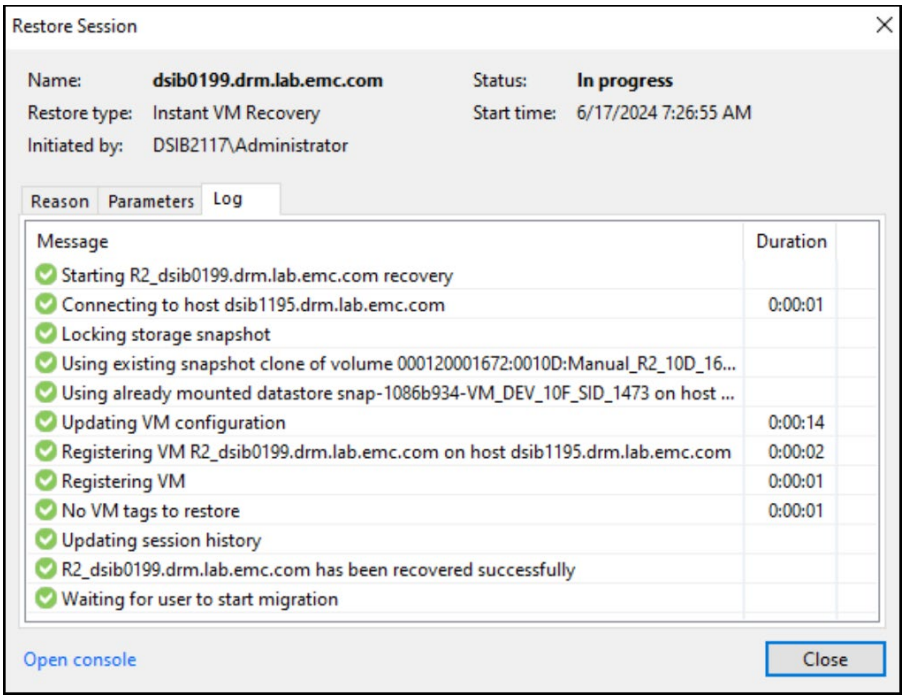


Figure 166. Restore R2 VM: Summary

The restored VM is now available in the vCenter as shown in Figure 167.

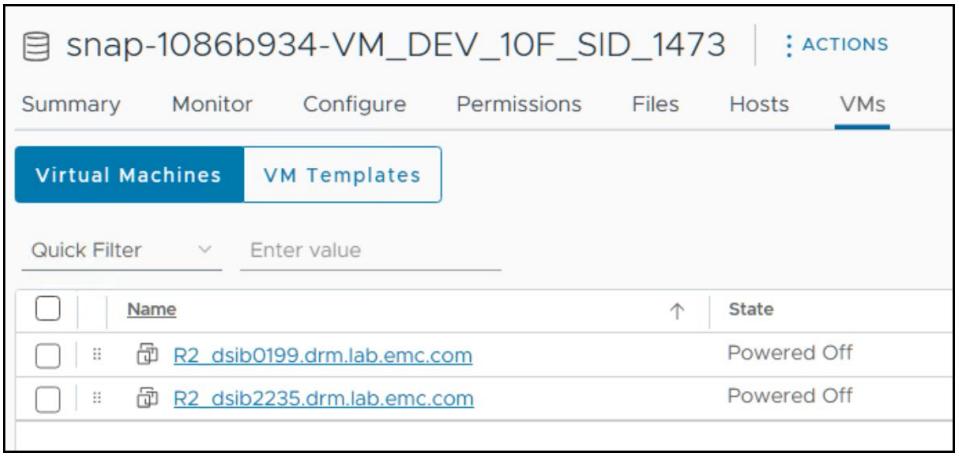


Figure 167. Restore R2 VM: vCenter

11.2 SRDF/Metro

The behavior of SRDF/Metro snapshots with the PowerMax Plug-in depends on the presentation of devices. The key to the configuration is to only add the array to the infrastructure that will be used for snapshots. This will not limit the ability to use uniform configurations if required, though Dell recommends non-uniform. While the ESXi hosts can see both paths with uniform, as long as Veeam is only configured for either the R1 or R2, this is where the snapshot will be taken. If both arrays are needed in the Veeam configuration for other reasons, then the exact R2 volumes in the Metro pair(s) should be excluded with the previously explained filtering mechanism. Figure 168 shows an example of excluding the R2 device 4C in the SRDF/Metro pair.

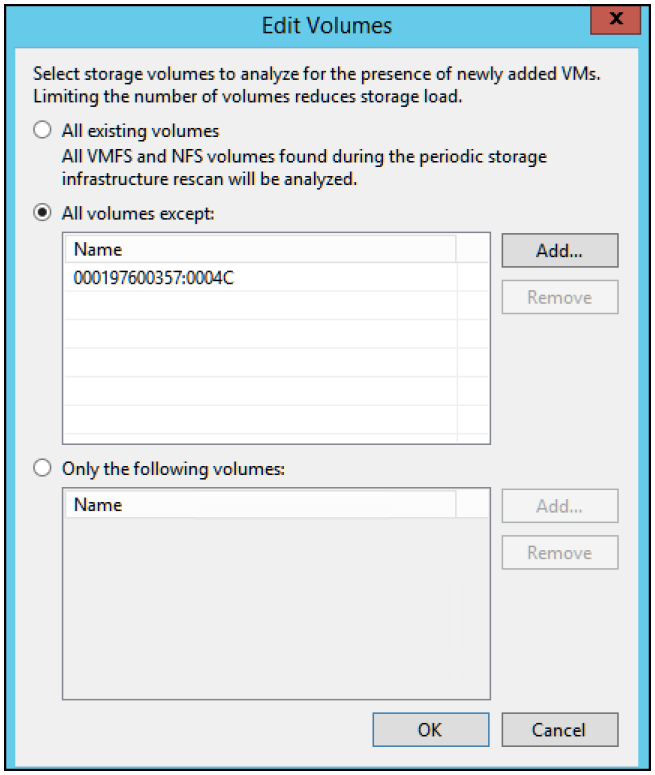
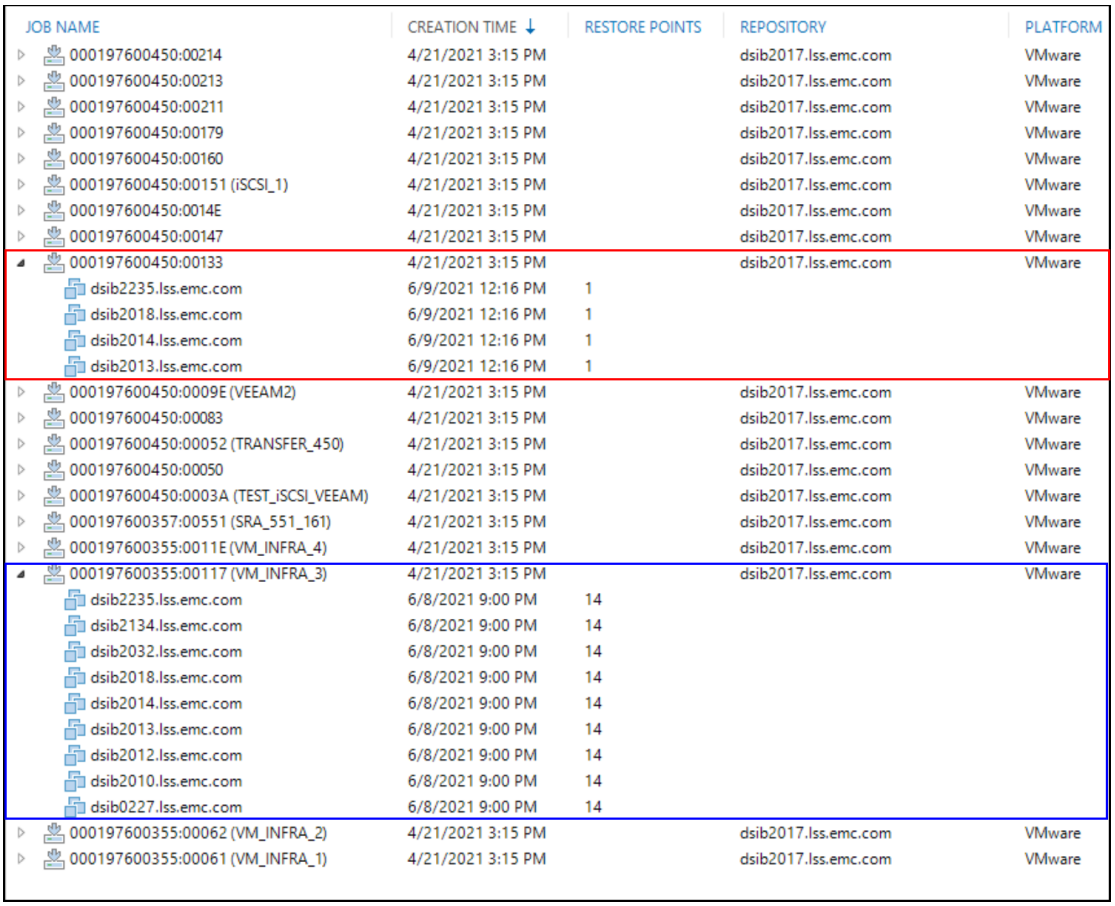


Figure 168. Exclude R2 SRDF/Metro device

If both arrays are configured in Veeam and filtering is not present on one of the devices, Veeam may choose either of the arrays for the snapshot, potentially causing issues during backup and restore. For example, in the image shown in Figure 169 in the blue box, Veeam automatically discovered the datastore VM_INFRA_3 and its VMs on device 117 on array 000197600355 (R1). Yet, when a manual backup was executed against VM dsib2235.lss.emc.com, Veeam took a snapshot of device 133 on array 000197600450 in the red box, which is the R2. Filtering is critical to prevent these situations.



JOB NAME	CREATION TIME	RESTORE POINTS	REPOSITORY	PLATFORM
000197600450:00214	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00213	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00211	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00179	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00160	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00151 (iSCSI_1)	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:0014E	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00147	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00133	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
dsib2235.lss.emc.com	6/9/2021 12:16 PM	1		
dsib2018.lss.emc.com	6/9/2021 12:16 PM	1		
dsib2014.lss.emc.com	6/9/2021 12:16 PM	1		
dsib2013.lss.emc.com	6/9/2021 12:16 PM	1		
000197600450:0009E (VEEAM2)	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00083	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00052 (TRANSFER_450)	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:00050	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600450:0003A (TEST_iSCSI_VEEAM)	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600357:00551 (SRA_551_161)	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600355:0011E (VM_INFRA_4)	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600355:00117 (VM_INFRA_3)	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
dsib2235.lss.emc.com	6/8/2021 9:00 PM	14		
dsib2134.lss.emc.com	6/8/2021 9:00 PM	14		
dsib2032.lss.emc.com	6/8/2021 9:00 PM	14		
dsib2018.lss.emc.com	6/8/2021 9:00 PM	14		
dsib2014.lss.emc.com	6/8/2021 9:00 PM	14		
dsib2013.lss.emc.com	6/8/2021 9:00 PM	14		
dsib2012.lss.emc.com	6/8/2021 9:00 PM	14		
dsib2010.lss.emc.com	6/8/2021 9:00 PM	14		
dsib0227.lss.emc.com	6/8/2021 9:00 PM	14		
000197600355:00062 (VM_INFRA_2)	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware
000197600355:00061 (VM_INFRA_1)	4/21/2021 3:15 PM		dsib2017.lss.emc.com	VMware

Figure 169. SRDF/Metro pair underlying VM_INFRA_3 datastore

11.2.1 SRDF/Metro with Veeam GUI filtering or symavoid.txt

As previously explained, the use of the symavoid.txt file allows the user to exclude a local array from discovery. While this improves performance for that activity, it may not prevent an unwanted action. The following situation illustrates the point:

User configures vCenter A with an SRDF/Metro device that is only presented from the R2 array (i.e., there are only paths to the R2 device).
A datastore is created on the R2 and then on a VM.
The user configures the symavoid.txt file to contain the R2 array and rescans, which removes the R2 array from Veeam. Presumably this will prevent any snapshot operation against the R2 device.
An attempt is made to back up a VM that is on the SRDF/Metro datastore (R2) and it succeeds, taking a snapshot of the R1 device instead.

The reason it succeeds is that Veeam looks at the device ID (external WWN) which is from the R1 array. Since the R1 array is configured, it makes a call to the REST API to take a snapshot of the R1. Now, technically the data on the R1 and R2 is the same, of course, but if the user then tries to run a restore of the VM, it is executed on the R1 array. If the Veeam masking view only exists on the R2 and not the R1, the restore is going to fail. It speaks to the importance in SRDF/Metro of using filtering.

If there are specific requirements in the customer environment that dictate the snapshot must be taken solely from either the R1 or the R2, use the Veeam GUI to exclude the actual device(s) on the R1 or R2. This guarantees the PowerMax Plug-in cannot take a snapshot on that array for that device.

12 Conclusion

This paper demonstrated how to use the PowerMax Plug-in with Veeam Backup & Replication software to take backups of VMware VMs on the PowerMax array. The array snapshot integration provides a far more efficient way to back up a virtual environment by reducing CPU, memory and network resources that are inherent in a host-based solution. The PowerMax Plug-in is able to use existing snapshots for restore, taking advantage of objects created or manipulated outside of the Veeam interface and providing more options to the VMware administrator.

A Error/warning messages

The following sections detail some known issues when using the PowerMax Plug-in. Although these situations are uncommon, they are included to avoid confusion for the user should they encounter one.

A.1 Unisphere version

If an attempt is made to connect to a Unisphere instance that does not meet the version requirements, the following error shown in Figure 170 is received.

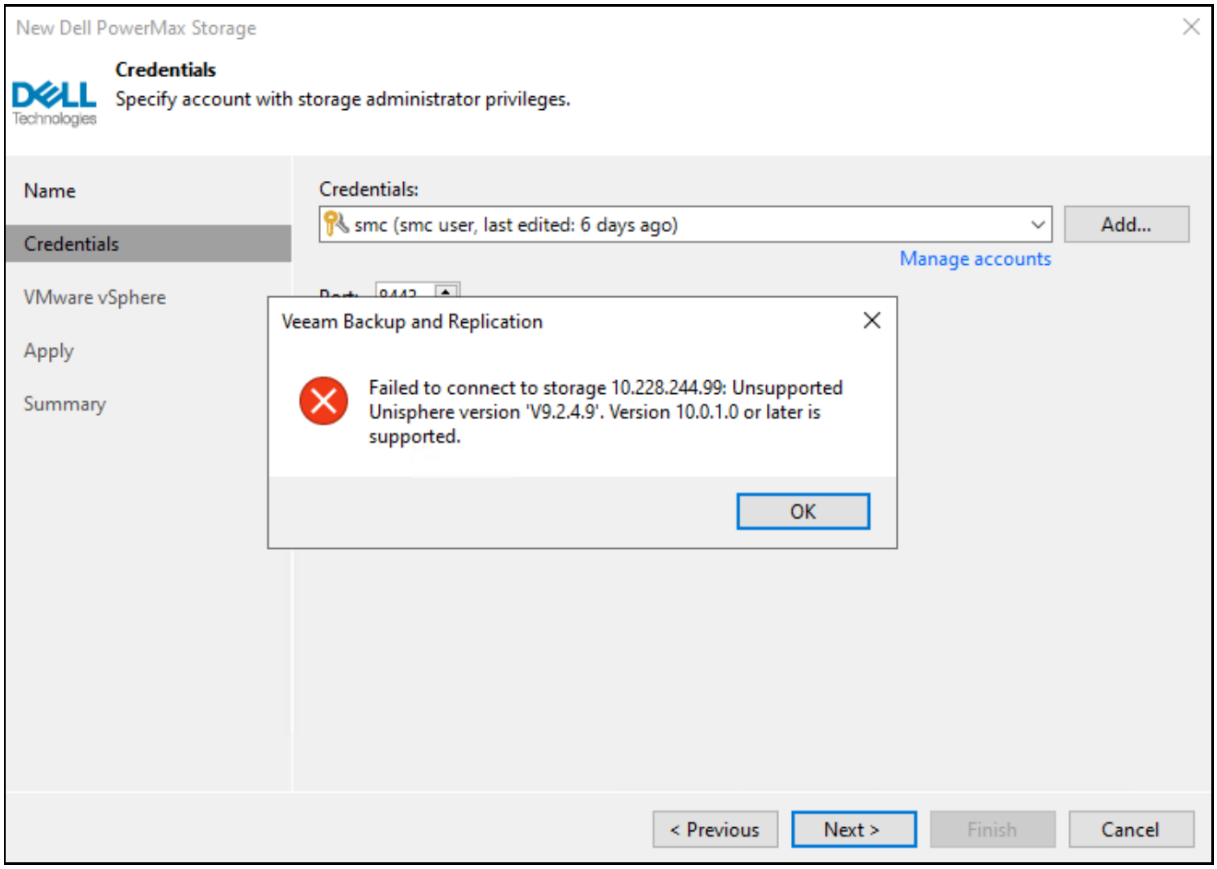


Figure 170. Unisphere version connection error

The log file **Console_<host>_<user>.log** in C:\ProgramData\Veeam\Backup\Console\localhost can be queried, though it offers similar information. However, if the IP/FQDN does not refer to a Unisphere instance, then the error shown in Figure 171 is returned.

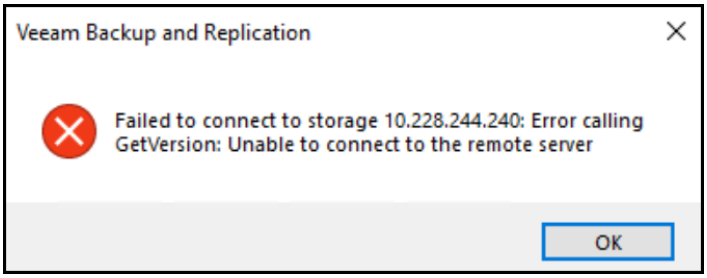


Figure 171. Generic connection error

The log file reports the same error as the GUI.

```
[28.06.2021 09:55:31] <01> Info     Response from storage 10.228.244.240: <?xml
version="1.0"?><ValidateConnectionResponce><error>Failed to connect to storage
10.228.244.240: Error calling GetVersion: Unable to connect to the remote
server</error><status>False</status></ValidateConnectionResponce>
```

A.2 Cleanup failures

A.2.1 Failure to remove snapshot

When a significant number of backup jobs to the Veeam repository are running, it is possible for the PowerMax Plug-in to fail to unlink the target device from the snapshot during cleanup. If this occurs, the PowerMax Plug-in will rename the snapshot to **VeeamAUX-DeletePending-<timestamp>**. This renaming will then allow the PowerMax Plug-in to retry operations at a later time. Therefore, this condition can be ignored.

If a significant number of these devices are present, their use of array cache could limit future operations. In such circumstances, the user should execute a rescan of the storage show in Figure 172 which will automatically remove the snapshot devices in question.

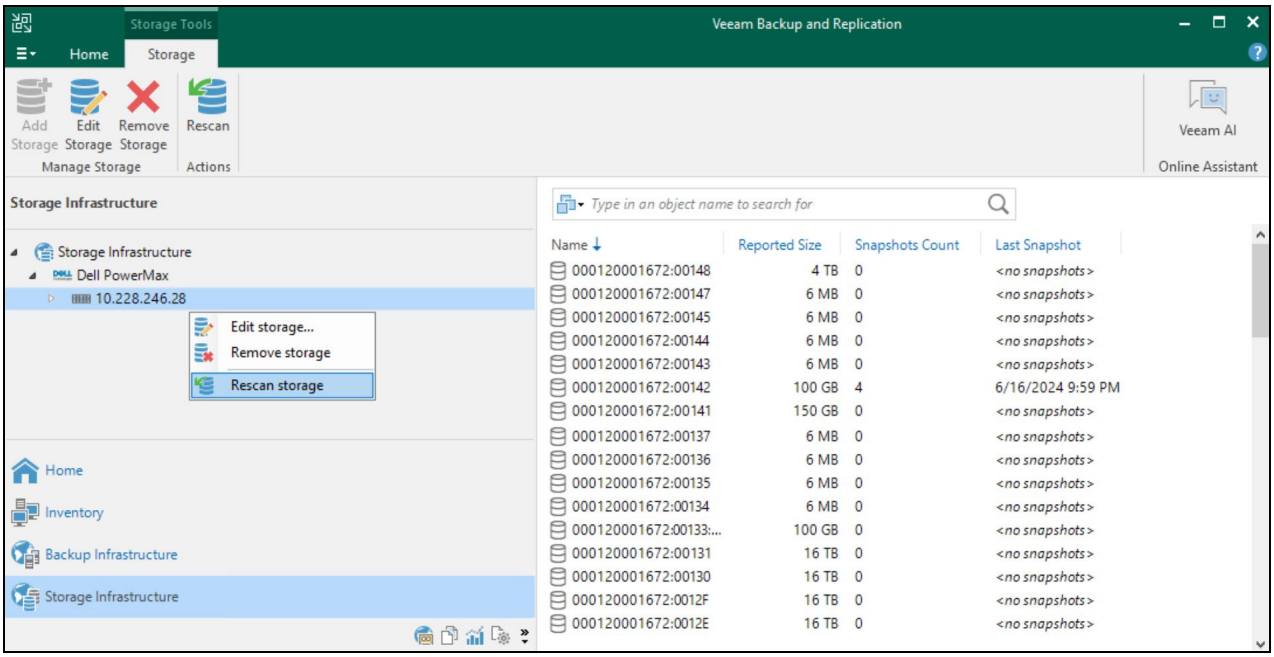


Figure 172. Rescan storage

A.2.2 Failure to remove linked target device

If the PowerMax Plug-in is unable to delete the linked target device during cleanup, it will rename the identifier of the device to **VeeamAUX-DeletePending**. An example of this is shown in Figure 173.

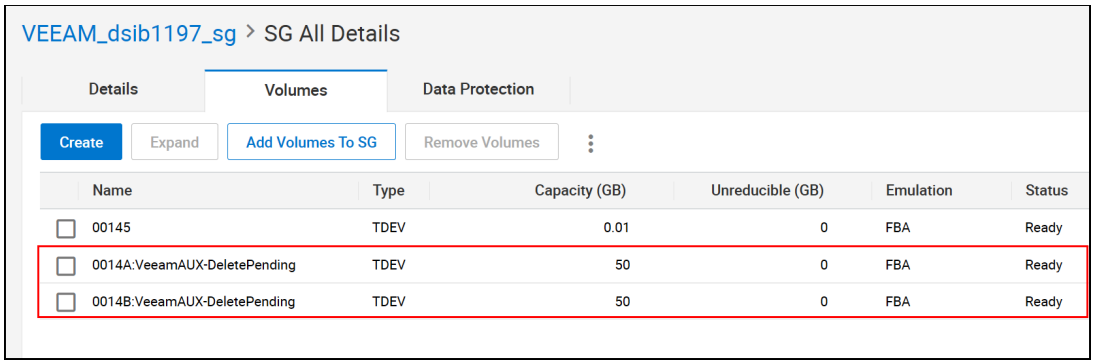


Figure 173. Undeleted linked targets

Again, this renaming signals the PowerMax Plug-in to clean up the devices at a later time. It is also possible to manually remove these devices if desired, though they may first have to be removed from the **Veeam_xxx** storage group.

A.3 Multi-writer flag

Veeam cannot back up VMs that have the multi-writer flag enabled on a device when dependent mode is set. This is because VMware does not support snapshotting a dependent mode vmdk. The VM dsib2019.lss.emc.com shown in Figure 174 is an Oracle RAC database, and so it requires multi-writer. Notice that Veeam errors out immediately when it discovers the flag, but also provides the workaround that setting the mode to independent would allow Veeam to skip the disks.

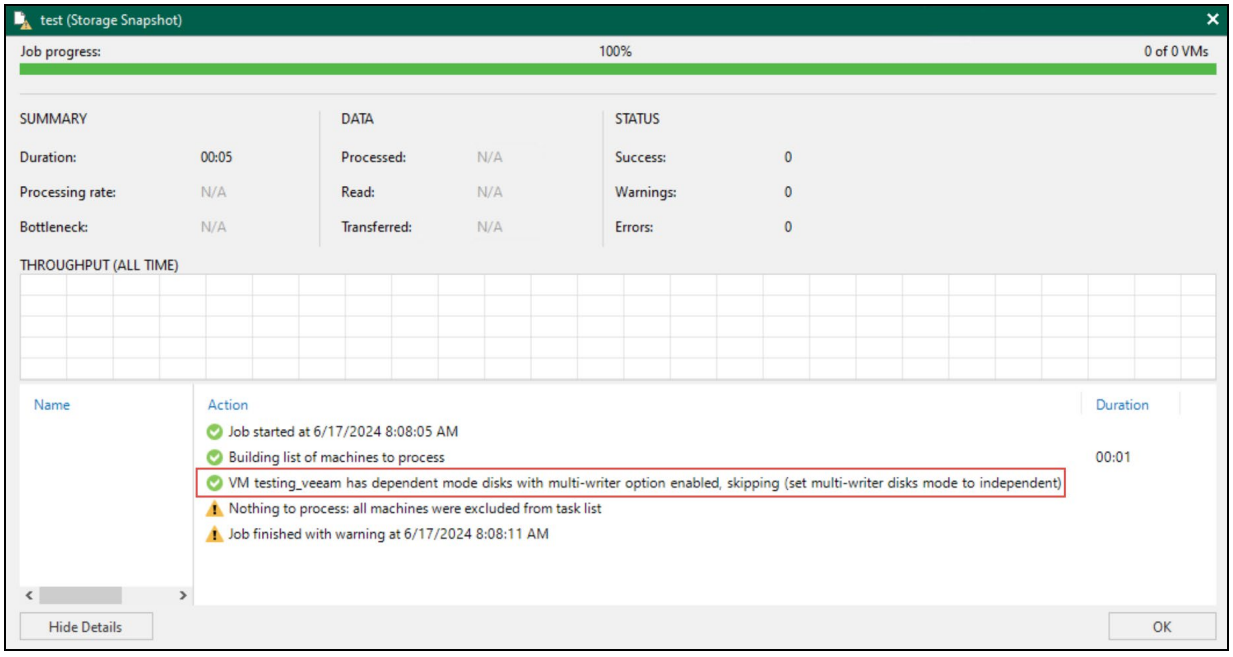


Figure 174. Multi-writer flag

A.4 VMware Virtual Volumes (vVols)

Veeam does not support backing up vVol VMs. An attempt is made to back up the following VM, vVol_355_VM_1, in Figure 175, which is located on a vVol datastore.

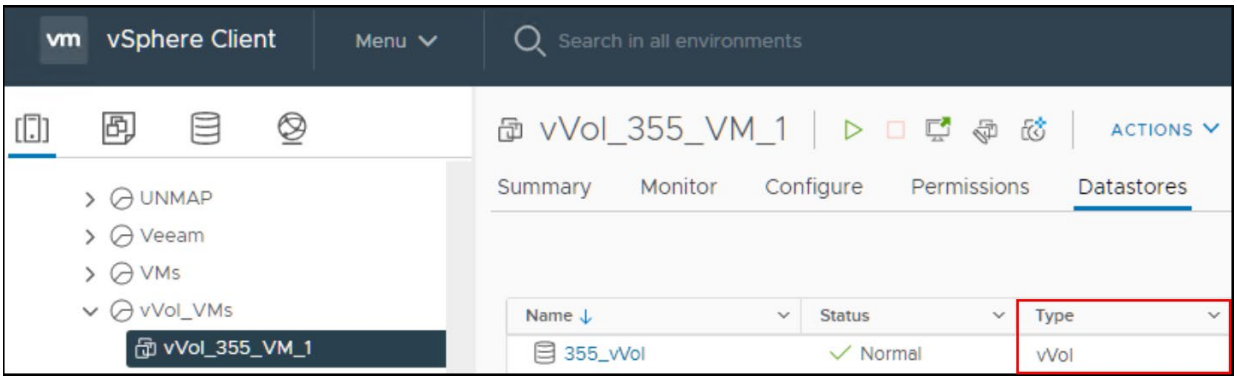


Figure 175. Veeam backup of a vVol VM

The Veeam log file records the result of the backup as shown in Figure 176. Note in particular the highlighted portion where Veeam recognizes the datastore is neither on SAN (VMFS) nor NAS (NFS), and therefore determines it is not snapshot-compatible.

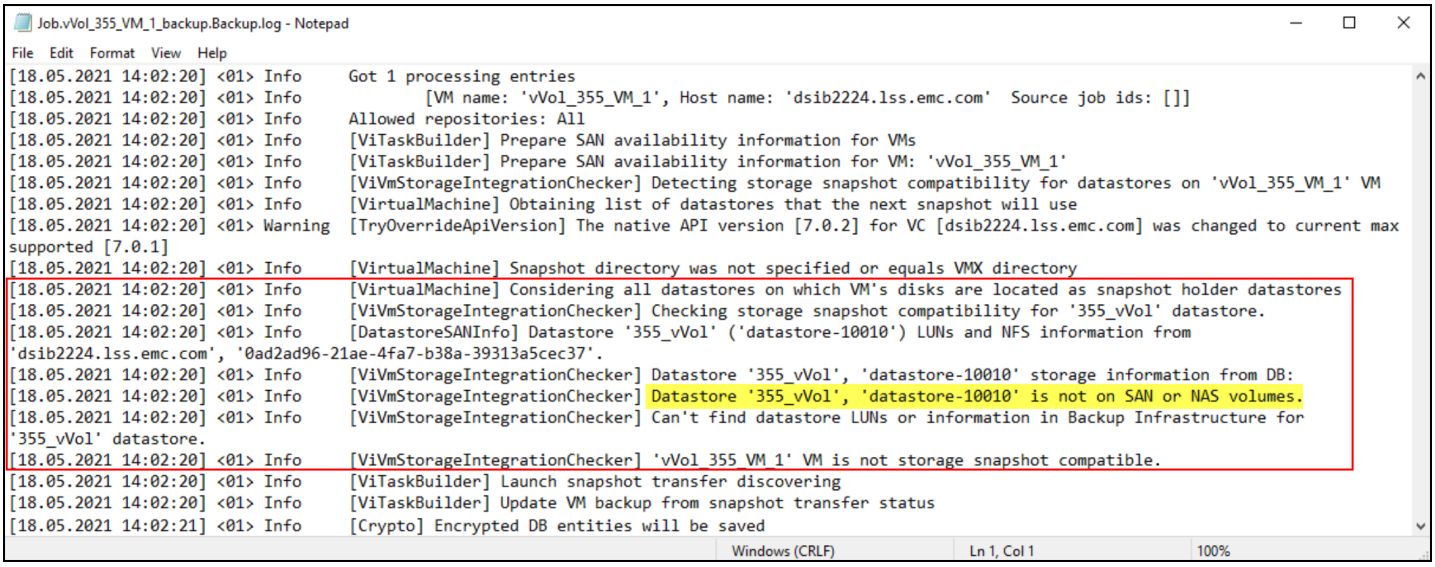


Figure 176. vVol VM backup

A.5 Duplicate extents

A condition can exist where a restore operation will fail because more than one copy of a VMFS datastore is presented to a recovery host. This may be the result of previously failed Veeam restores or operations that take place outside of Veeam. The failure will appear similar to Figure 177 which lists multiple devices that are not the ones that need resignaturing.

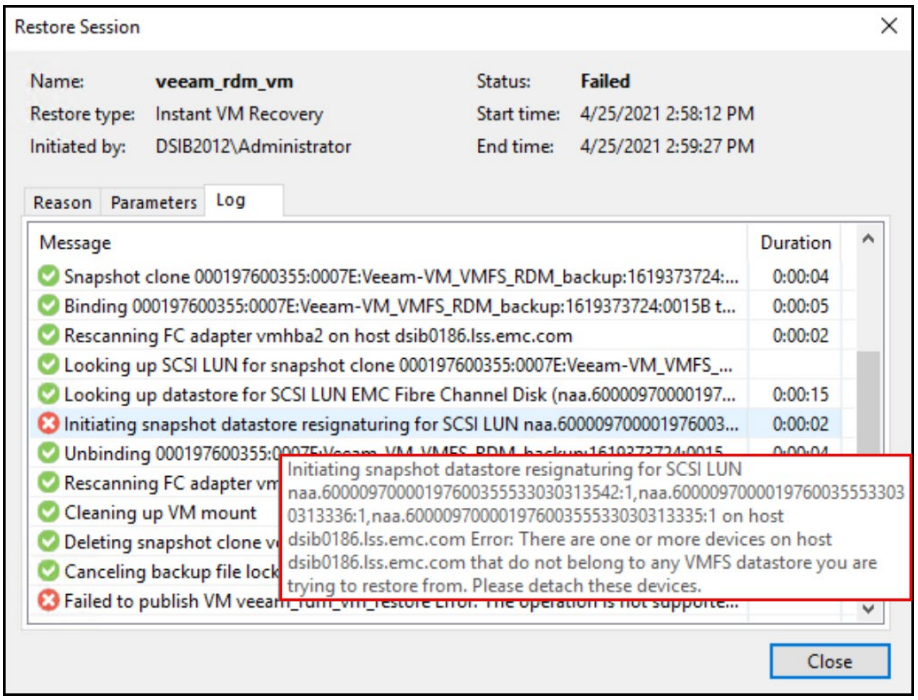


Figure 177. Failed restore operation due to multiple extents

The message itself is not explicit but reviewing the log file shown in Figure 178, Veeam notes that it cannot resignature a volume that has multiple extents. However, there aren't multiple extents, rather there are multiple devices, each with an extent.

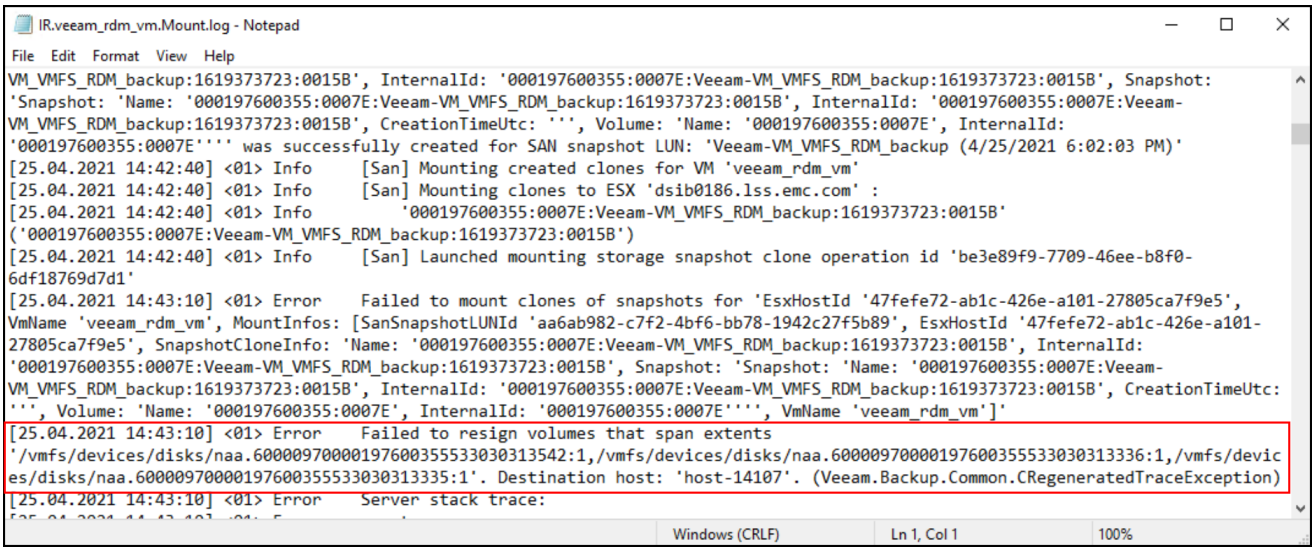


Figure 178. Restore log file with failed multiple extents listed

In ESXi in the red box as shown in Figure 179, these extents can be listed with the command `esxcli storage vmfs snapshot list`. Here two different datastores have multiple copies. These extra devices/extents might be the result of Veeam operations or SnapVX linked targets performed through a different interface, i.e. Unisphere for PowerMax.

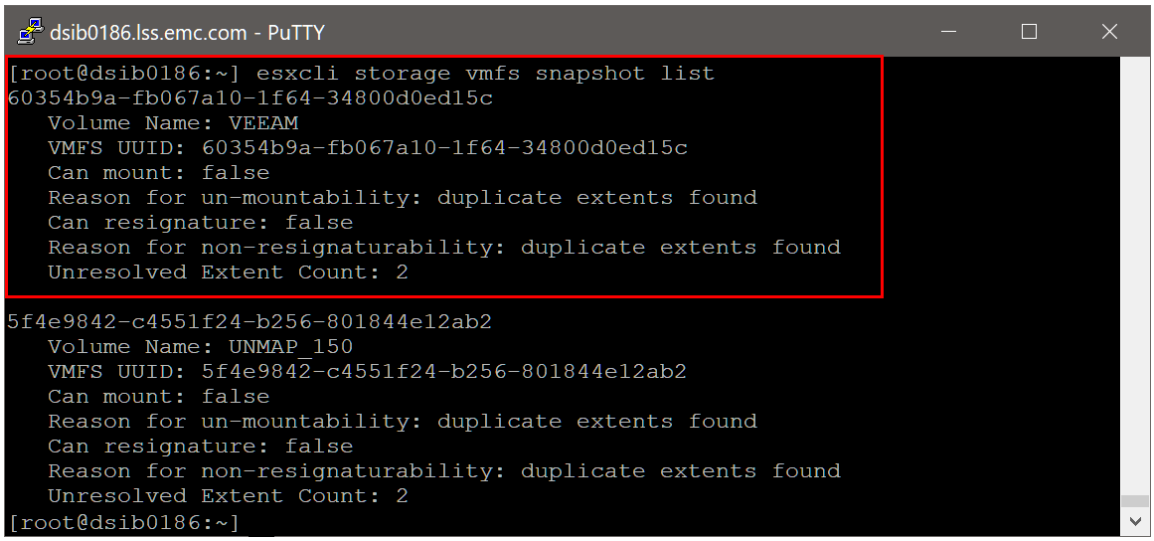


Figure 179. esxcli listing of multiple extents

Using the **naa** numbers listed in Figure 178, the devices for the **VEEAM** datastore are found to be 135 and 136, and these are devices from failed restores in the Veeam storage group shown in Figure 180. This is an unexpected state, indicating something went wrong previously with a cleanup. But because these devices have the identifier of **VeeamAUX-DeletePending,** they can be safely removed from the storage group and deleted.

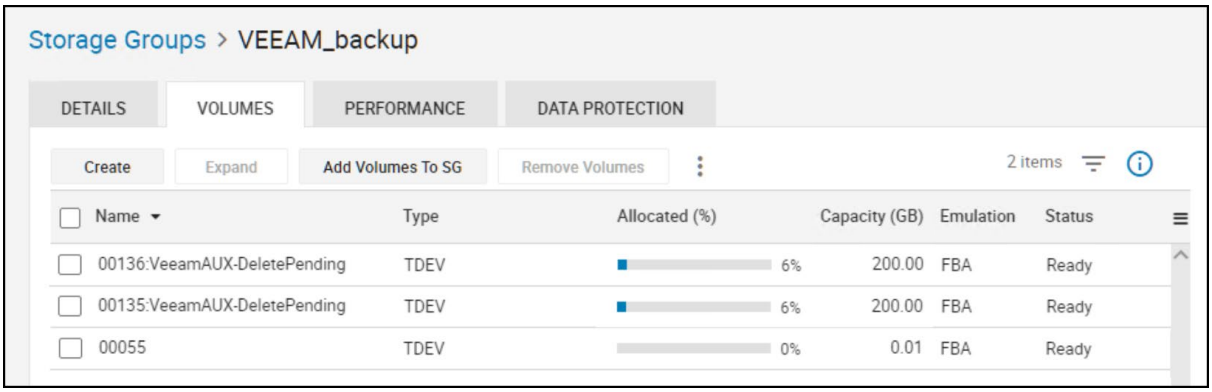


Figure 180. Devices from failed Veeam restore operations

Once the devices are removed, the extents for the volume name **VEEAM** are no longer listed in `esxcli` as shown in Figure 181 and the restore will succeed. Only the datastore **UNMAP_150** remains.

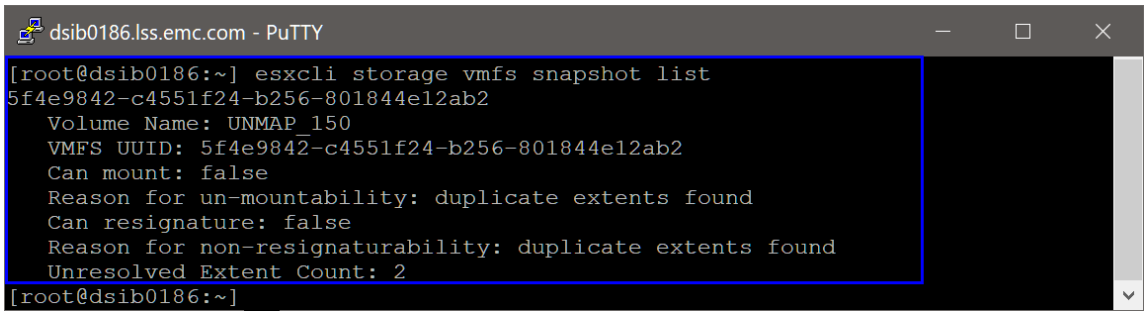


Figure 181. esxcli listing of multiple extents removed

A.6 Copy Session source

When conducting a backup, the user receives the following error message about a Copy Session source in Figure 182:

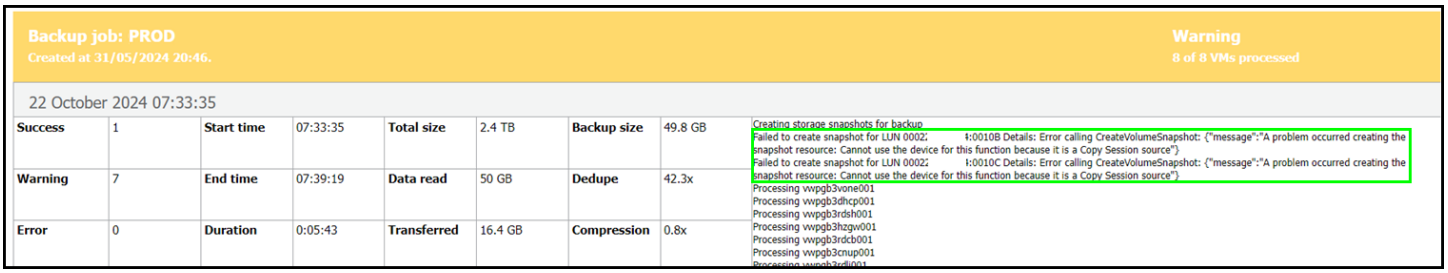


Figure 182. Cannot create snapshot due to Copy Session

Further review of the symapi.log file contains similar errors:

```
10/22/2024 06:35:26.769   3236  16822 EMC:UNIVMAX svx_control The SNAPVX
'Establish' operation FAILED on device: [ 010B - N/A ] (SID: 000220001234 with:
Cannot use the device for this function because it is a Copy Session source

10/22/2024 06:35:27.003   3236  16822 EMC:UNIVMAX svx_control The SNAPVX
'Establish' operation FAILED on device: [ 010C - N/A ] (SID: 000220001234) with:
Cannot use the device for this function because it is a Copy Session source
```

The error means that the devices, 10B and 10C, are actively being used by another process that does extent copying like SnapVX. In the case of VMware this is the VAAI primitive XCOPY. VMware issues VAAI primitives to the array to offload certain activities such as cloning or Storage vMotion. As backups are typically run during maintenance windows or low activity, there is normally no conflict between these two operations; however, if Storage DRS (SDRS) is configured, particularly at an aggressive setting, these errors in Veeam are possible. In such circumstances, care must be taken to minimize the overlap between the specific VMware activities that use XCOPY and Veeam backups.

B Technical support and resources

Dell.com/support is focused on meeting customer needs with proven services and support.

B.1 Related resources

B.1.1 Dell

The Dell PowerMax and VMware vSphere Configuration Guide
https://infohub.delltechnologies.com/t/dell-powermax-and-vmware-vsphere-configuration-guide-1/

Unisphere for PowerMax
https://support.emc.com/products/44740_Unisphere-for-PowerMax/Documentation/

Using VMware vSphere Storage APIs for Array Integration with Dell PowerMax
https://www.delltechnologies.com/asset/en-us/solutions/infrastructure-solutions/technical-support/h8115-powermax-vmware-vaai-wp.pdf

B.1.2 Veeam

Backup and Replication Guides
https://www.veeam.com/documentation-guides-datasheets.html?productId=8&version=product%3A8%2F221

https://helpcenter.veeam.com/docs/backup/vsphere/overview.html?ver=120

B.1.3 VMware

VMware vSphere
https://docs.vmware.com/