SnapCenter Plug-in for VMware vSphere 4.3

Data Protection Guide

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NetApp®

Contents

Deciding whether to read the Data Protection Guide for SnapCenter Plug-in for VMware vSphere

This information describes how to use the Linux-based SnapCenter Plug-in for VMware vSphere virtual appliance (Open Virtual Appliance format). It describes how to use the SnapCenter vSphere web client in vCenter to perform crash-consistent and VM-consistent backup and restore operations for VMs, datastores, and VMDKs, and how to register the SnapCenter VMware plug-in with SnapCenter Server to support application-consistent backup and restore operations.

Overview of SnapCenter Plug-in for VMware vSphere

For SnapCenter 4.2 and later, SnapCenter Plug-in for VMware vSphere is deployed as a Linux-based virtual appliance.

The SnapCenter VMware plug-in adds the following functionality to your environment:

- Support for VM-consistent and crash-consistent data protection operations for VMware virtual machines (VMs) and datastores.
- Support for SnapCenter application-consistent (application over VMDK/RDM) data protection operations for databases and file systems on primary and secondary storage on VMs.
- Support for VMs, VMDKs, and datastores
  The SnapCenter VMware plug-in provides a VMware vSphere web client in vCenter. You use the web client GUI to perform VM-consistent backups of VMs, VMDKs, and datastores. You can also restore VMs and VMDKs, and restore files and folders that reside on a guest OS.

  NOTE: When backing up VMs, VMDKs, and datastores, the plug-in does not support RDMs. Backup jobs for VMs ignore RDMs. If you need to back up RDMs, you must use a SnapCenter application-based plug-in.

  The SnapCenter VMware plug-in includes a MySQL database that contains the SnapCenter VMware plug-in metadata.
- Support for virtualized databases
  The SnapCenter VMware plug-in supports backup, recovery, and cloning of virtualized applications and file systems (for example, virtualized SQL, Oracle, and Exchange databases) when you have the appropriate application-based SnapCenter plug-ins installed and you are using SnapCenter to perform data protection operations. These data protection operations are managed using the SnapCenter GUI.
  SnapCenter natively leverages the SnapCenter VMware plug-in for all data protection operations on VMDKs, raw device mappings (RDMs), and NFS datastores. After the virtual appliance is deployed, the plug-in handles all interactions with vCenter. The SnapCenter VMware plug-in supports all SnapCenter application-based plug-ins.

  NOTE: SnapCenter does not support single Snapshot copies of databases and VMs together. Backups for VMs and databases must be scheduled and run independently, which creates separate Snapshot copies, even if the databases and VMs are hosted in the same volume. Database application backups must be scheduled by using the SnapCenter GUI; VM and datastore backups must be scheduled by using the SnapCenter vSphere web client GUI.
- VMware Tools is required for VM consistent Snapshot copies
  If VMware Tools is not installed and running, the file system is not quiesced and a crash-consistent Snapshot is created.
- VMware Storage vMotion is required for restore operations in SAN (VMFS) environments
  The restore workflow for VMware file system (VMFS) utilizes the VMware Storage vMotion feature. Storage vMotion is a part of the vSphere Standard License but is not available with the vSphere Essentials or Essentials Plus licenses.
  Most restore operations in NFS environments use native ONTAP functionality (for example, Single File SnapRestore) and do not require VMware Storage vMotion.
- The SnapCenter VMware plug-in is deployed as a virtual appliance in a Linux VM
  Although the virtual appliance must be installed as a Linux VM, the SnapCenter VMware plug-in supports both Windows-based and Linux-based vCenters. SnapCenter natively uses this plug-in without user intervention to communicate with your vCenter to support

SnapCenter application-based plug-ins that perform data protection operations on Windows and Linux virtualized applications.

In addition to these major features, the SnapCenter Plug-in for VMware vSphere also provides support for iSCSI, Fibre Channel, FCoE, VMDK over NFS 3.0 and 4.1, and VMDK over VMFS 5.0 and 6.0.

For the latest information about supported versions, see the NetApp Interoperability Matrix Tool (IMT).

For information about NFS protocols and ESXi, see the VMware "vSphere Storage" documentation.

For information about SnapCenter data protection, see the Data Protection Guide for your SnapCenter plug-in in the SnapCenter Documentation Center.

For information about deploying the SnapCenter VMware plug-in, see the SnapCenter Plug-in for VMware vSphere Deployment Guide.

For information about supported upgrade and migration paths, see the SnapCenter Plug-in for VMware vSphere Release Notes.

Logging in to the SnapCenter vSphere web client

When the SnapCenter Plug-in for VMware vSphere is deployed, it installs a SnapCenter vSphere web client, which is displayed on the vCenter screen with other vSphere web clients.

Before you begin

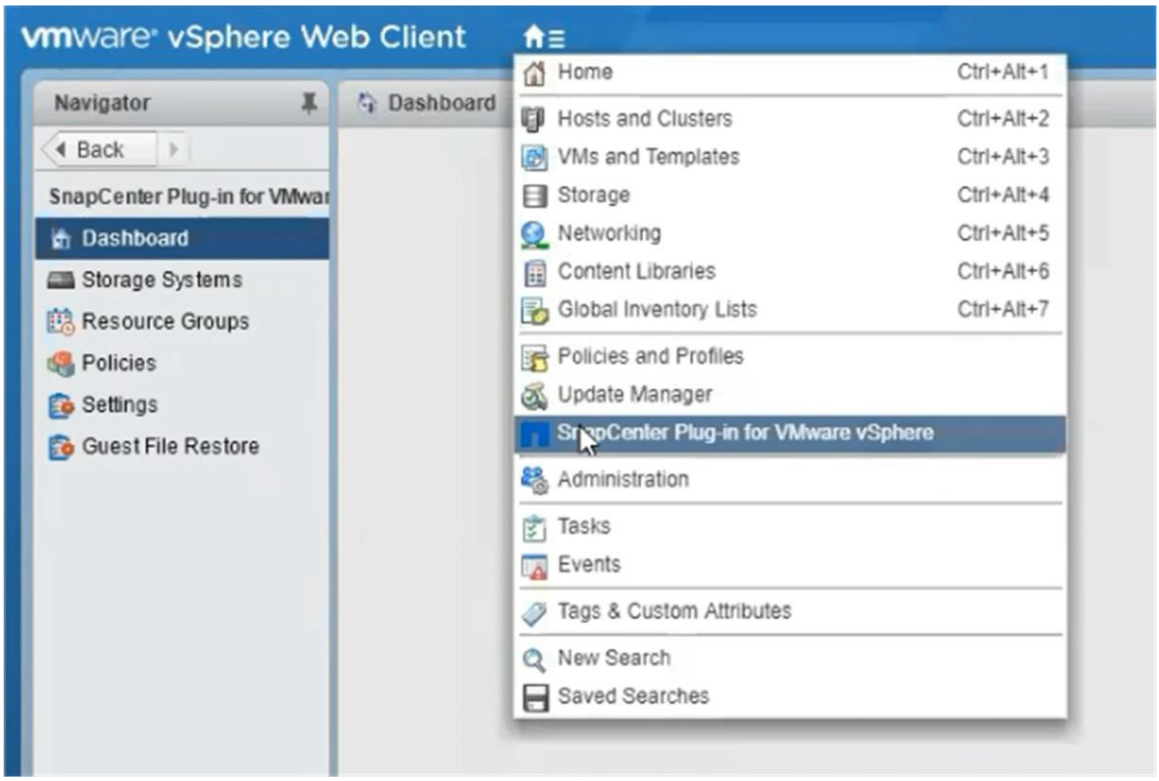
Transport Layer Security (TLS) must be enabled in vCenter. Refer to the VMware documentation.

Steps

1. In your browser, navigate to VMware vSphere vCenter.
2. On the VMware screen, click **vSphere Web Client (Flex)** or **vSphere Client (HTML5)**.
3. Log in to the **VMware vCenter Single Sign-On** page.

   IMPORTANT: Click the **Login** button. Due to a known VMware issue, do not use the ENTER key to log in. For details, see the VMware documentation on ESXi Embedded Host Client issues.

4. On the **VMware vSphere Web Client** page, click  (Flex home) or **Menu** (HTML5) in the toolbar, and then select **SnapCenter Plug-in for VMware vSphere**.



Registering the SnapCenter Plug-in for VMware vSphere with SnapCenter Server

If you want to perform application-over-VMDK workflows in SnapCenter (application-consistent protection workflows for virtualized databases and file systems), you must register the SnapCenter VMware plug-in with the SnapCenter Server.

NOTE: If you are a SnapCenter user and you upgraded to SnapCenter 4.2 or later and migrated your application-over-VMDK backups to the SnapCenter VMware plug-in, the migration command automatically registers the plug-in.

Before you begin

- You must be running SnapCenter Server 4.2 or later.
- You must have deployed the SnapCenter Plug-in for VMware vSphere and enabled the SnapCenter VMware plug-in.
- For vCenters in Linked Mode, you must register the SnapCenter VMware plug-in for each vCenter.

About this task

- You register the SnapCenter VMware plug-in with SnapCenter Server by using the SnapCenter GUI to add a “vsphere” type host.

  Port 8144 is predefined for communication within the virtual appliance.

  NOTE: You can register multiple instances of the SnapCenter VMware plug-in on the same SnapCenter Server to support application-based data protection operations on VMs. You cannot register the same SnapCenter VMware plug-in on multiple SnapCenter Servers.

- For vCenters in Linked Mode, you must register a SnapCenter VMware plug-in for each vCenter.

Steps

1. In the SnapCenter GUI left navigation pane, click **Hosts**.
2. Verify that the **Managed Hosts** tab is selected at the top.
3. Click **Add** to start the wizard.
4. On the **Add Hosts** dialog box, specify the host you want to add to the SnapCenter Server:

For this field…	Do this…
Host Type	Select "**vSphere**" as the type of host.
Host name	Enter the IP address of the SnapCenter VMware plug-in.
Credential	Enter the username and password for the SnapCenter VMware plug-in that was provided during the deployment.

5. Click **Submit**.

   When the VM host is successfully added, it is displayed on the Managed Hosts tab.
6. In the left navigation pane, click **Settings**, then click the **Credential** tab, and then click **Add** to add credentials for the virtual appliance.
7. Provide the credential information that was specified during the deployment of the SnapCenter VMware virtual appliance.

   NOTE: You must select **Linux** for the Authentication field.

After you finish

If the SnapCenter VMware plug-in credentials are modified, you must also update the registration in SnapCenter Server using the SnapCenter Managed Hosts page.

Overview of the different SnapCenter GUIs

The SnapCenter Plug-in for VMware vSphere is a standalone plug-in that is different from other SnapCenter plug-ins. You must use the web client GUI in vCenter for all backup and restore operations for VMs, VMDKs, and datastores. You also use the web client GUI Dashboard to monitor the list of protected and unprotected VMs. For all other SnapCenter plug-ins (application-based plug-ins), you use the SnapCenter GUI for backup and restore operations and job monitoring.

NOTE: The SnapCenter VMware plug-in supports the Flex and HTML5 vSphere web clients. It does not support vCenter thick clients.

To protect VMs and datastores, you use the SnapCenter vSphere web client interface. The web client GUI integrates with NetApp Snapshot copy technology on the storage system. This enables you to back up VMs and datastores in seconds and restore VMs without taking an ESXi host offline.

There is also a management GUI to perform administrative operations on the SnapCenter VMware plug-in.

Use this GUI…	To perform these operations...	And to access these backups...
SnapCenter vSphere web client GUI	VM and datastore backup VMDK attach and detach Datastore mount and unmount VM and VMDK restore Guest file and folder restore	Backups of VMs and datastores that were performed by using the SnapCenter vSphere web client GUI.
SnapCenter GUI	Backup and restore of databases and applications on VMs, including	Backups performed by using the SnapCenter GUI.

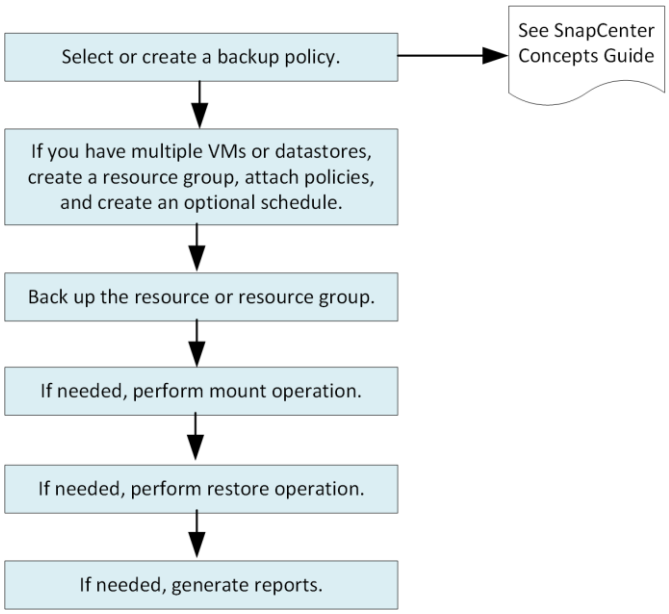
	protecting databases for Microsoft SQL Server, Microsoft Exchange, SAP HANA, and Oracle. Database clone	
SnapCenter Plug-in for VMware vSphere management GUI	Modify the plug-in configuration Disable/enable the plug-in	N.A.
vCenter GUI	Add SnapCenter SCV roles to vCenter Active Directory users Add resource access to users or groups	N.A.

NOTE: For VM consistent backup and restore operations, you must use the SnapCenter vSphere web client GUI. Although it is possible to perform some operations using VMware tools, for example, mounting or renaming a datastore, those operations will not be registered in the SnapCenter repository and, therefore, are not recognized.

NOTE: SnapCenter does not support single Snapshot copies of databases and VMs together. Backups for VMs and databases must be scheduled and run independently, which creates separate Snapshot copies, even if the databases and VMs are hosted in the same volume. Application backups must be scheduled by using the SnapCenter GUI; VM and datastore backups must be scheduled by using the SnapCenter vSphere web client GUI.

SnapCenter Plug-in for VMware vSphere data protection workflow

The data protection workflow lists the tasks that you perform for data protection.



Using the SnapCenter vSphere web client Dashboard

The SnapCenter vSphere web client Dashboard gives you a first glance into the status of your data protection jobs and your VM protection status, and access to jobs and log information for troubleshooting. The Dashboard is updated once an hour.

Viewing SnapCenter vSphere web client status information

This page displays summary status information. The information is updated once an hour.

Steps

1. In the left Navigator pane of the vSphere web client, click **Dashboard**, select a vCenter Server, and then click the **Status** tab.
2. View specific information or click a link for more details.

This Dashboard tile…	Displays the following information…
Recent job activities	The three to five most recent backup, restore, and mount jobs. • Click on a job ID to see more details about that job. • Click **See all** to go to the Job Monitor tab for more details on all jobs.
Jobs	A count of each job type (backup, restore, and mount) performed within the selected time window. Hover the cursor over a section of the chart to see more details for that category.
Latest Protection Summary	Summaries of the data protection status of primary and secondary VMs or datastores within the selected time window. • Click the drop-down menu to select **VMs** or **Datastores**. • For secondary storage, select **SnapVault** or **SnapMirror**. • Hover the cursor over a section of a chart to see a list of the VMs or Datastores in that category. In the Successful category, the most recent backup is listed for each resource. • You can change the time window by editing the configuration file. The default is 7 days. • Internal counters are updated after each primary or secondary backup. The dashboard tile is refreshed every six hours. The refresh time cannot be changed. **Note**: If you use a mirror-vault protection policy, then the counters for the protection summary are displayed in the SnapVault summary chart, not in the SnapMirror chart.
Configuration	The total number of each type of object managed by the SnapCenter Plug-in for VMware vSphere. • Click the SVMs link to go to the Storage page for more details. • Click the Resource Groups link to go to the Resource Group page for more details. • Click the Backup Policies link to go to the Policies page for more details. Also displays the total count of VMs and datastores available in the vCenter instance.
Storage	The total number of Snapshot copies, SnapVault, and SnapMirror copies, generated and the amount of storage used for primary and secondary Snapshot copies. The line graph separately plots primary and secondary storage consumption on a day-by-day basis over a rolling 90-day period. Storage information is updated once every 24 hours at 12:00 A.M. Storage Savings is the ratio of logical capacity (Snapshot copy savings plus storage consumed) to the physical capacity of primary storage. The bar chart illustrates the storage savings. • Hover the cursor over a line on the chart to see detailed day-by-day results.

	• Hover the cursor over a section in the Storage Savings chart to see more details.

Monitoring SnapCenter vSphere jobs

After performing any data protection operation using the SnapCenter vSphere web client, you can monitor the job status from the Job Monitor tab in the Dashboard and view job details.

Steps

1. In the left Navigator pane of the vSphere web client, click **Dashboard**, select a vCenter Server, and then click the **Job Monitor** tab.

   The Job Monitor tab lists each job and its status, start time, and end time. If the job names are long, you might need to scroll to the right to view the start and end times. The display is refreshed every 30 seconds.

   - Click  (refresh icon) in the toolbar to refresh the display on-demand.
   - Click  (filter icon) to select the time range, type, and status of jobs you want displayed.
   - Click  (refresh icon) in the Job Details window to refresh the display while the job is running.

If the Dashboard does not display job information, see the KB article: SnapCenter vSphere web client dashboard does not display jobs.

Downloading SnapCenter vSphere web client job logs

You can download the job logs from the Job Monitor tab on the Dashboard of the SnapCenter vSphere web client.

If you encounter unexpected behavior while performing data protection operations using the SnapCenter vSphere web client, you can use the log files to identify the cause and resolve the problem.

NOTE: Jobs and job messages are retained for 90 days. Job logs that are older than the configured retention are purged at 16:30:00 every Sunday. You cannot modify this schedule.

Steps

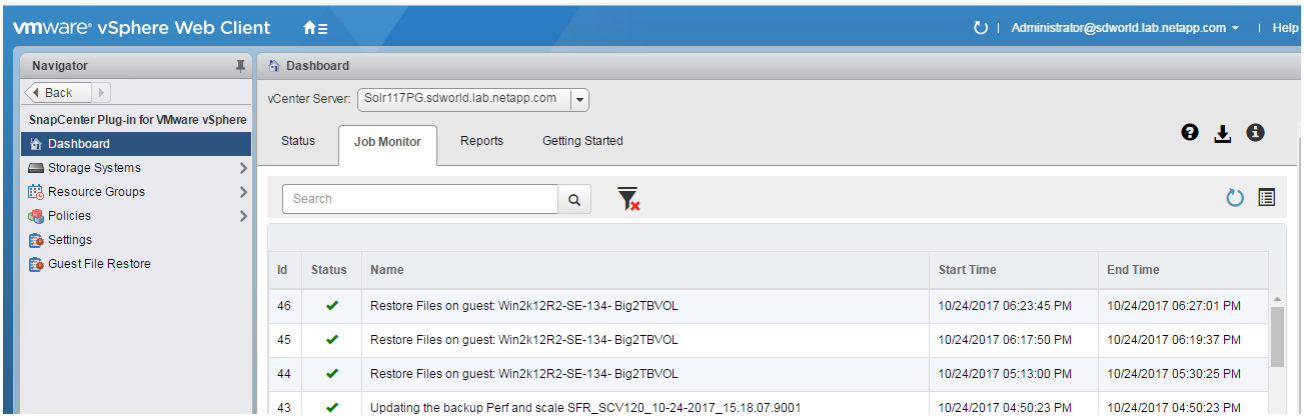
1. In the left Navigator pane of the vSphere web client, click **Dashboard**, select a vCenter Server, and then click the **Job Monitor** tab.
2. Click  (download icon) in the Job Monitor title bar.

   You might need to scroll to the right to see the icon.

   You can also double-click a job to access the Job Details window and then click **Download Job Logs**.

Result

Job logs are located on the Linux VM host where the SnapCenter VMware plug-in is deployed. The default job log location is `/var/log/netapp`.



If you tried to download job logs but the log file named in the error message has been deleted, you might encounter the following error: `HTTP ERROR 500 Problem accessing /export-scv-logs`. To correct this error, check the file access status and permissions for the file named in the error message and correct the access problem.

Accessing SnapCenter vSphere web client reports

You can request reports for one or more jobs from the dashboard.

NOTE: The Reports tab contains information on the jobs that are selected on the Jobs page in the Dashboard. If no jobs are selected, the Reports tab is blank.

Steps

- In the left Navigator pane of the vSphere web client, click **Dashboard**, select a vCenter Server, and then click the **Reports** tab.
- For Backup Reports, you can do the following:
  - Modify the report

    Click (filter icon) to modify the time range, job status type, resource groups, and policies to be included in the report.
  - Generate a detailed report

    Double-click any job to generate a detailed report for that job.
- Optional: On the Reports tab, click **Download** and select the format (HTML or CSV).

  You can also click (download icon) to download plug-in logs.

Types of reports by the SnapCenter vSphere web client

The SnapCenter vSphere web client provides customizable report options that provide you with details about your data protection jobs and plug-in resource status.

NOTE: Backup schedules are executed in the time zone in which the SnapCenter VMware plug-in is deployed. vCenter reports data in the time zone in which the vCenter is located. Therefore, if the SnapCenter VMware plug-in and the vCenter are in different time zones, data in the SnapCenter vSphere web client Dashboard might not be the same as the data in the reports.

NOTE: Information on migrated backups is not displayed in the Dashboard until backups are performed after the migration.

Report type	Description
Backup Report	Displays overview data about backup jobs. Click a section/status on the graphic to see a list of jobs with that status on the Reports tab. For each job, the report lists the job ID, corresponding resource group,

	backup policy, start time and duration, status, and job details which includes the job name (Snapshot copy name) if the job completed, and any warning or error messages. You can download the Report table in HTML or CSV format. You can also download the Job Monitor job logs for all the jobs (not just the jobs in the report). Deleted backups are not included in the report.
Mount Report	Displays overview data about mount jobs. Click a section/status on the graphic to see a list of jobs with that status on the Reports tab. For each job, the report lists the job ID, job status, job name, and job start and end times. The job name includes the Snapshot copy name. For example: `Mount Backup <snapshot-copy-name>`. You can download the Report table in HTML or CSV format. You can also download the Job Monitor job logs for all the jobs (not just the jobs in the report).
Restore Report	Displays overview status information about restore jobs. Click a section/ status on the graphic to see a list of jobs with that status on the Reports tab. For each job, the report lists the job ID, job status, job name, and job start and end times. The job name includes the Snapshot copy name. For example: `Restore Backup <snapshot-copy-name>`. You can download the Report table in HTML or CSV format. You can also download the Job Monitor job logs for all the jobs (not just the jobs in the report).
Last Protection Status of VMs or Datastores Report	Displays overview information about the protection status, during the configured number of days, for VMs and datastores managed by the SnapCenter VMware plug-in. The default is 7 days; you can modify the value in the properties file. Click a section/status on the on the primary protection chart to see a list of VMs or datastores with that status on the Reports tab. The VM or Datastores Protection Status Report for protected VMs and datastores displays the names of VMs or datastores that have been backed up during the configured number of days, the latest Snapshot copy name, and the start and end times for the latest backup run. The VM or Datastores Protection Status Report for unprotected VMs or datastores displays the names of VMs or datastores that do not have any successful backups during the configured number of days. You can download the Report table in HTML or CSV format. You can also download the Job Monitor job logs for all the jobs (not just the jobs in the report). **NOTE**: This report is refreshed every hour when the plug-in cache is refreshed. Therefore, the report might not display VMs or datastores that were recently backed up.

Generating a support bundle

There are two ways you can generate all the information needed by the NetApp Support Team for diagnosing any issue: from the SnapCenter Plug-in for VMware vSphere virtual appliance GUI or from the maintenance console menu.

Generating a support bundle from the SnapCenter Plug-in for VMware vSphere GUI

Before you begin

To log on to the SnapCenter Plug-in for VMware vSphere management GUI, you must know the IP address and the log in credentials.

- The IP address was displayed when the SnapCenter VMware plug-in was deployed.

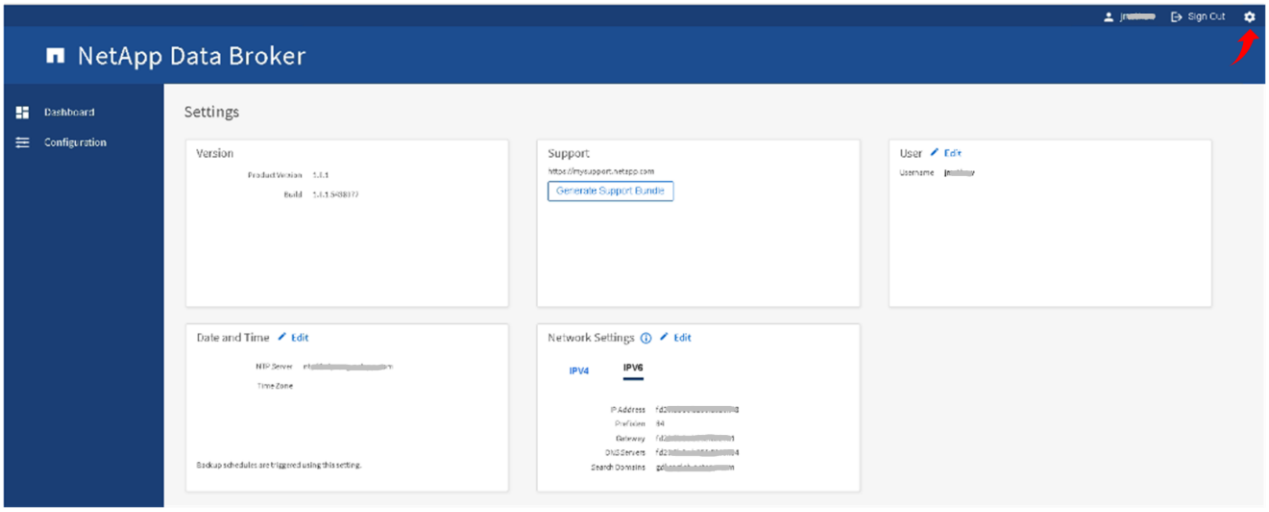
- Use the log in credentials provided during the deployment of the SnapCenter VMware plug-in or as later modified.

Steps

1. Log in to the SnapCenter Plug-in for VMware vSphere GUI.

   Use the format `https://<OVA-IP-address>:8080`.

2. Click the Settings icon in the top toolbar.



3. On the **Settings** page, in the **Support** section, click **Generate Support Bundle**.
4. After the support bundle is generated, click the link that is provided to download the bundle to NetApp.

Generating a support bundle from the maintenance console

Steps

1. Open a maintenance console window.
2. From the Main Menu, select menu option **4) Support and Diagnostics**.
3. From the Support and Diagnostics Menu, select menu option **1) Generate support bundle**.

Using Role-based access control

SnapCenter Plug-in for VMware vSphere provides an additional level of RBAC for managing virtualized resources. The plug-in supports both vCenter Server RBAC and Data ONTAP RBAC.

> **NOTE**: SnapCenter and ONTAP RBAC applies only to SnapCenter Server application-consistent (application over VMDK) jobs. If you use the SnapCenter VMware plug-in to support SnapCenter application-consistent jobs, you must assign the `SnapCenterAdmin` role; you cannot change the permissions of the `SnapCenterAdmin` role.

The SnapCenter VMware plug-in ships with predefined vCenter roles. You must use the vCenter GUI to add these roles to vCenter Active Directory users to perform SnapCenter operations.

You can create and modify roles and add resource access to users at any time. However, when you are setting up the SnapCenter VMware plug-in for the first time, you should at least add Active Directory users or groups to roles, and then add resource access to those users or groups.

Types of RBAC for SnapCenter Plug-in for VMware vSphere users

If you are using the SnapCenter Plug-in for VMware vSphere, the vCenter Server provides an additional level of RBAC. The plug-in supports both vCenter Server RBAC and ONTAP RBAC.

- **vCenter Server RBAC**

  This security mechanism applies to all jobs performed by the SnapCenter VMware plug-in, which includes VM-consistent, VM crash-consistent, and SnapCenter Server application-consistent (application over VMDK) jobs. This level of RBAC restricts the ability of vSphere users to perform SnapCenter VMware plug-in tasks on vSphere objects, such as virtual machines (VMs) and datastores.

  The SnapCenter VMware plug-in deployment creates the following roles for SnapCenter operations on vCenter:

  ```
  SCV Administrator
  SCV Backup
  SCV Guest File Restore
  SCV Restore
  SCV View
  ```

  The vSphere administrator sets up vCenter Server RBAC by doing the following:

  - Setting the vCenter Server permissions on the root object (also known as the root folder). You can then refine the security by restricting child entities that do not need those permissions.
  - Assigning the SCV roles to Active Directory users.

  > **NOTE**: At a minimum, all users must be able to view vCenter objects. Without this privilege, users cannot access the SnapCenter vSphere web client GUI.

- **ONTAP RBAC**

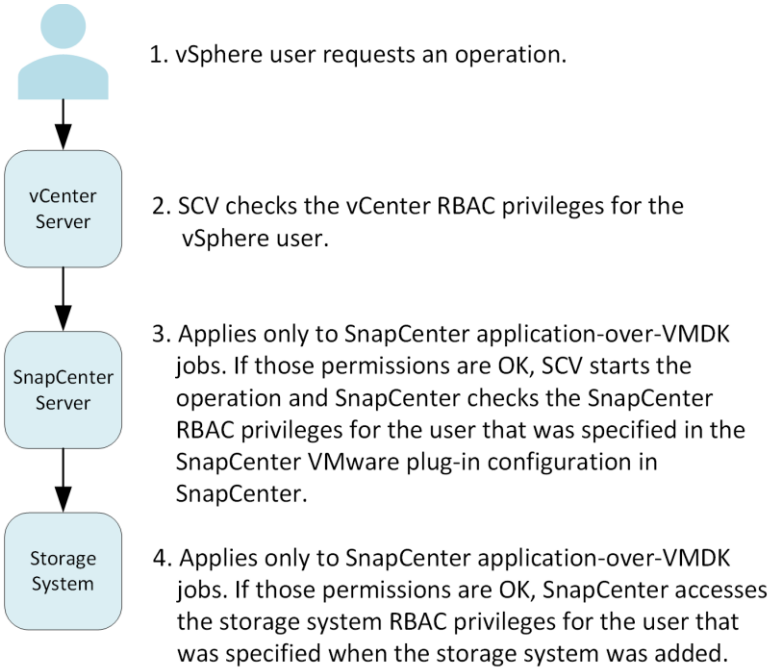
  This security mechanism applies only to SnapCenter Server application-consistent (application over VMDK) jobs. This level restricts the ability of SnapCenter to perform specific storage operations, such as backing up storage for datastores, on a specific storage system.

  Use the following workflow to set up ONTAP and SnapCenter RBAC:

  1. The storage administrator creates a role on the storage VM with the necessary privileges.
  2. Then the storage administrator assigns the role to a storage user.

3. The SnapCenter administrator adds the storage VM to the SnapCenter Server, using that storage username.
4. Then the SnapCenter administrator assigns roles to SnapCenter users.

The following diagram provides an overview of the validation workflow for RBAC privileges (both vCenter and ONTAP):



*SCV=SnapCenter Plug-in for VMware vSphere

ONTAP RBAC features in SnapCenter Plug-in for VMware vSphere

NOTE: ONTAP RBAC applies only to SnapCenter Server application-consistent (application over VMDK) jobs.

ONTAP role-based access control (RBAC) enables you to control access to specific storage systems and the actions a user can perform on those storage systems. The SnapCenter VMware plug-in works with vCenter Server RBAC, SnapCenter RBAC (when needed to support application-based operations), and ONTAP RBAC to determine which SnapCenter tasks a specific user can perform on objects on a specific storage system.

SnapCenter uses the credentials that you set up (username and password) to authenticate each storage system and determine which operations can be performed on that storage system. The SnapCenter VMware plug-in uses one set of credentials for each storage system. These credentials determine all tasks that can be performed on that storage system; in other words, the credentials are for SnapCenter, not an individual SnapCenter user.

ONTAP RBAC applies only to accessing storage systems and performing SnapCenter tasks related to storage, such as backing up VMs. If you do not have the appropriate ONTAP RBAC privileges for a specific storage system, you cannot perform any tasks on a vSphere object hosted on that storage system.

Each storage system has one set of ONTAP privileges associated with it.

Using both ONTAP RBAC and vCenter Server RBAC provides the following benefits:

- Security

  The administrator can control which users can perform which tasks on both a fine-grained vCenter Server object level and a storage system level.

- Audit information

  In many cases, SnapCenter provides an audit trail on the storage system that lets you track events back to the vCenter user who performed the storage modifications.

- Usability

  You can maintain controller credentials in one place.

Predefined roles packaged with SnapCenter Plug-in for VMware vSphere

To simplify working with vCenter Server RBAC, the SnapCenter VMware plug-in provides a set of predefined roles that enable users to perform SnapCenter tasks. There is also a read-only role that allows users to view SnapCenter information, but not perform any tasks.

The predefined roles have both the required SnapCenter-specific privileges and the native vCenter Server privileges to ensure that tasks complete correctly. In addition, the roles are set up to have the necessary privileges across all supported versions of vCenter Server.

As an administrator, you can assign these roles to the appropriate users.

NOTE: The SnapCenter VMware plug-in returns these roles to their default values (initial set of privileges) each time you restart the vCenter web client service or modify your installation. If you upgrade the SnapCenter VMware plug-in, the predefined roles are automatically upgraded to work with that version of the plug-in.

You can see the predefined roles in the vCenter GUI by clicking  > **Administration** > **Roles**.

Role	Description
SCV Administrator	Provides all native vCenter Server and SnapCenter-specific privileges necessary to perform all SnapCenter Plug-in for VMware vSphere tasks.
SCV View	Provides read-only access to all the SnapCenter VMware plug-in backups, resource groups, and policies.
SCV Backup	Provides all native vCenter Server and SnapCenter-specific privileges necessary to back up vSphere objects (virtual machines and datastores). The user also has access to the configure privilege. The user cannot restore from backups.
SCV Restore	Provides all native vCenter Server and SnapCenter-specific privileges necessary to restore vSphere objects that have been backed up using the SnapCenter VMware plug-in and to restore guest files and folders. The user also has access to the configure privilege. The user cannot back up vSphere objects.
SCV Guest File Restore	Provides all native vCenter Server and SnapCenter-specific privileges necessary to restore guest files and folders. The user cannot restore VMs or VMDKs.

How to configure ONTAP RBAC for SnapCenter Plug-in for VMware vSphere

NOTE: ONTAP RBAC applies only to SnapCenter Server application-consistent (application over VMDK) jobs.

You must configure ONTAP RBAC on the storage system if you want to use it with the SnapCenter VMware plug-in. From within ONTAP, you must perform the following tasks:

- Create a single role.

  ONTAP 9 Administrator Authentication and RBAC Power Guide

- Create a username and password (storage system credentials) in ONTAP for the role.

  This storage system credential is needed to allow you to configure the storage systems for the SnapCenter VMware plug-in. You do this by entering the credentials in the plug-in. Each time you log in to a storage system using these credentials, you are presented with the set of SnapCenter functions that you set up in ONTAP when you created the credentials.

You can use the administrator or root login to access all the SnapCenter tasks; however, it is a good practice to use the RBAC feature provided by ONTAP to create one or more custom accounts with limited access privileges.

Minimum ONTAP privileges required

Adding storage

Before you can backup or restore VMs, you must add storage clusters or storage VMs by using the SnapCenter vSphere web client. Adding storage enables the SnapCenter Plug-in for VMware vSphere to recognize and manage backup and restore operations in vCenter.

Before you begin

The ESXi server, the SnapCenter VMware plug-in, and each vCenter must be synchronized to the same time. If you try to add storage but the time settings for your vCenters are not synchronized, the operation might fail with a Java certificate error.

About this task

The SnapCenter VMware plug-in performs backup and restore operations on directly connected storage VMs and on storage VMs in a storage cluster.

NOTE: If you are using the SnapCenter VMware plug-in to support application-based backups on VMDKs, then you must use the SnapCenter GUI to enter storage credentials and register storage systems.

- For vCenters in linked mode, you must separately add storage systems to each vCenter.
- Names for storage VMs must resolve to management LIFs.
  If you added etc host entries for storage VM names in SnapCenter, you must verify that they are also resolvable from the virtual appliance.

  NOTE: If you add a storage VM with a name that cannot resolve to the management LIF, then scheduled backup jobs fail because the plug-in is unable to discover any datastores or volumes on that storage VM. If this occurs, either add the storage VM to SnapCenter and specify the management LIF, or add a cluster that contains the storage VM and specify the cluster management LIF.
- Storage credentials are not shared between multiple instances of the SnapCenter VMware plug-in or between Windows SnapCenter Server and the SnapCenter plug-in on vCenter.

Steps

1. In the left Navigator pane of the vSphere web client, click **Storage Systems**.
2. On the Storage Systems page, click **Add**.
3. In the **Add Storage System** dialog box, enter the basic storage VM or cluster information:

For this field…	Do this…
vCenter Server	Select the vCenter Server
Storage system	Enter the FQDN or IP address of a storage cluster or storage VM. The SnapCenter VMware plug-in does not support multiple storage systems with the same name on different clusters. Each storage system that is supported by SnapCenter must have a unique data LIF IP address.
Platform	Select the platform.
Username	Enter the ONTAP username that is used to log on to the storage VM.
Password	Enter the storage VM logon password.
Protocol	Select HTTP or HTTPS.
Port	Select port 443 (the default) or port 80 to communicate with vCenter.

Timeout	Enter the number of seconds vCenter waits before timing out the operation. The default is 60 seconds.
Preferred IP	If the storage VM has more than one IP address, check this box and enter the IP address that you want SnapCenter to use. **NOTE**: Do not use square brackets ([]) when entering the IP address.
Log SnapCenter Server events to syslog	Check the box to log events to the log for plug-in. This option logs only the events for the SnapCenter VMware plug-in.
Send AutoSupport Notification for failed operations to storage system	Check the box if you want Autosupport notification for failed data protection jobs. You must also enable Autosupport on the storage VM and configure the Autosupport email settings.

4. Click **Add**.

   If you added a storage cluster, all storage VMs in that cluster are automatically added. Automatically added storage VMs (sometimes called “implicit” storage VMs) are displayed on the cluster summary page with a hyphen (-) instead of a username. Usernames are displayed only for explicit storage entities.

Backing up VMs, VMDKs, and datastores

Use the SnapCenter vSphere web client to perform data protection operations for VMs, VMDKs, and datastores. All backup operations are performed on resource groups, which can contain any combination of one or more VMs and datastores. You can back up on demand or according to a defined protection schedule.

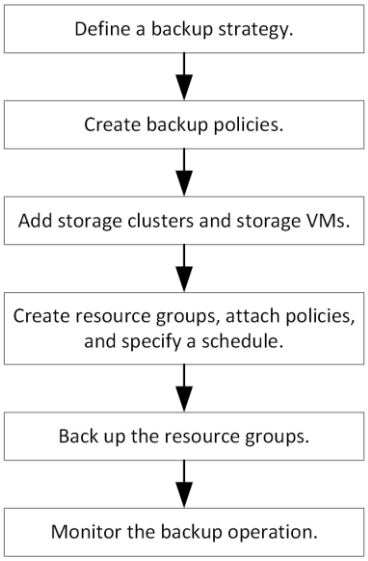
When you back up a datastore, you are backing up all the VMs in that datastore.

Backup and restore operations cannot be performed simultaneously on the same resource group.

You should review the SnapCenter Plug-in for VMware vSphere Deployment Guide for information on what the SnapCenter VMware plug-in does and does not support.

In MetroCluster configurations, the SnapCenter VMware plug-in might not be able to detect a protection relationship after a failover. See KB article: Unable to detect SnapMirror or SnapVault relationship after MetroCluster failover.

The following workflow shows the sequence in which you must perform the backup operations:



Viewing VM and datastore backups

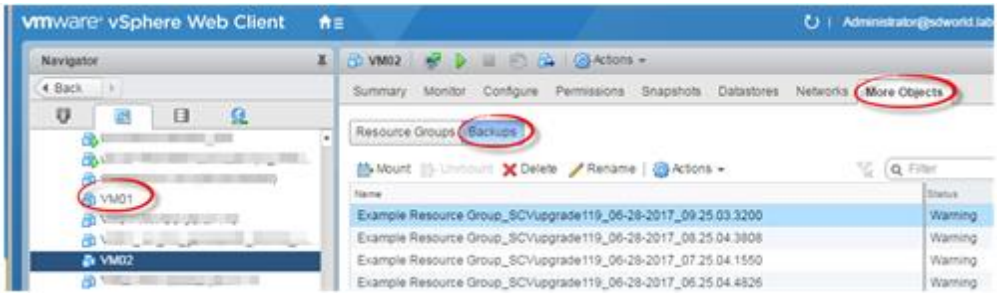
When you are preparing to back up or restore a VM or datastore, you might want to see all the backups that are available for that resource and view details of those backups.

About this task

NOTE: Browsing large file folders, for example 10k file folders, might take one or more minutes the first time. Subsequent browsing sessions take less time.

Steps

1. In the VMware vSphere web client page, click (Flex home) or **Menu** (HTML5) in the toolbar, and then select **VMs and Templates** from the drop-down list.
2. Navigate to the VM for which you want to view backups, then select the **More Objects** tab, and then select the **Backups** tab.



3. Double-click the backup that you want to view.

Creating backup policies for VMs and datastores

You must create backup policies before you use the SnapCenter Plug-in for VMware vSphere to back up VMs and datastores.

Before you begin

- You must have read the prerequisites.
- You must have secondary storage relationships configured.
  - If you are replicating Snapshot copies to a mirror or vault secondary storage, the relationships must be configured and the SnapCenter administrator must have assigned the storage VMs to you for both the source and destination volumes.
  - To successfully transfer Snapshot copies to secondary storage for Version-FlexibleMirror relationships on an NFS datastore, make sure that the SnapMirror policy type is Asynchronous Mirror and that the "all_source_snapshots" option is checked.
  - When the number of Snapshot copies on the secondary storage (mirror-vault) reaches the maximum limit, the activity to register backup and apply retention in the backup operation fails with the following error: `This Snapshot copy is currently used as a reference Snapshot copy by one or more SnapMirror relationships. Deleting the Snapshot copy can cause future SnapMirror operations to fail.`

    To correct this issue, configure the SnapMirror retention policy for the secondary storage to avoid reaching the maximum limit of Snapshot copies.

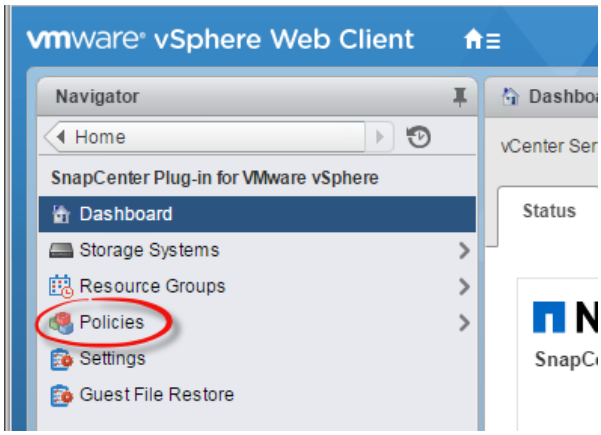
  For information about how administrators assign resources to users, see the *SnapCenter Administration Guide*.
- If you want VM consistent backups, you must have VMware Tools installed and running. VMware Tools is needed to quiesce VMs.

About this task

Most of the fields on these wizard pages are self-explanatory. The following information describes some of the fields for which you might require guidance.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Policies**.



2. In the **Policies** page, click **New Policy** in the toolbar.
3. In the **New Backup Policy** page, enter the policy name, a description, and select the vCenter Server that will use the policy.
   - Linked mode

     In linked mode, each vCenter has a separate virtual appliance. Therefore, you can use duplicate names across vCenters. However, you must create the policy in the same vCenter as the resource group.
   - Supported characters

     Do not use the following special characters in VM, datastore, cluster, policy, backup, or resource group names: % & * $ # @ ! \ / : * ? " < > - | ; ' , .

     An underscore character (_) is allowed.
4. Specify the retention settings.

   IMPORTANT: You should set the retention count to 2 backups or higher if you plan to enable SnapVault replication. If you set the replication count to 1 backup to keep, the retention operation can fail. This is because the first Snapshot copy is the reference Snapshot copy for the SnapVault relationship until the newer Snapshot copy is replicated to the target.

   NOTE: The maximum retention value is 1018 backups for resources on ONTAP 9.4 or later, and 254 backups for resources on ONTAP 9.3 or earlier. Backups will fail if retention is set to a value higher than what the underlying ONTAP version supports. This is also true for spanning datastores. If a spanning datastore includes resources on both ONTAP 9.3 and earlier and on ONTAP 9.4 and later, make sure you set the retention value below 254.
5. Specify the frequency settings.

   The policy specifies the backup frequency only. The specific protection schedule for backing up is defined in the resource group. Therefore, two or more resource groups can share the same policy and backup frequency but have different backup schedules.
6. In the **Replication** fields, specify replication to secondary storage:

For this field…	Do this…
Update SnapMirror after backup	Select this option to create mirror copies of backup sets on another volume that has a SnapMirror relationship to the primary backup volume. If a volume is configured with a mirror-vault relationship, you must select only the **Update SnapVault after backup** option if you want backups copied to the mirror-vault destinations.
Update SnapVault after backup	Select this option to perform disk-to-disk backup replication on another volume that has a SnapVault relationship to the primary backup volume.

	If a volume is configured with a mirror-vault relationship, you must select only this option if you want backups copied to the mirror-vault destinations.
Snapshot label	Enter an optional, custom label to be added to SnapVault and SnapMirror Snapshot copies created with this policy. The Snapshot label helps to distinguish Snapshots created with this policy from other Snapshots on the secondary storage system. **Note:** A maximum of 31 characters is allowed for Snapshot copy labels.

7. Optional: In the **Advanced** fields, select the fields that are needed.

For this field…	Do this…
VM consistency	Check this box to quiesce the VMs and create a VMware snapshot each time the backup job runs. **Attention**: You must have VMware Tools running on the VM to perform VM consistent backups. If VMware Tools is not running, a crash-consistent backup is performed instead. **Note**: When you check the VM consistency box, backup operations might take longer and require more storage space. In this scenario, the VMs are first quiesced, then VMware performs a VM consistent snapshot, then SnapCenter performs its backup operation, and then VM operations are resumed.
Include datastores with independent disks	Check this box to include in the backup any datastores with independent disks that contain temporary data.
Scripts	Enter the fully qualified path of the prescript or postscript that you want the SnapCenter VMware plug-in to run before or after backup operations. For example, you can run a script to update SNMP traps, automate alerts, and send logs. **Note**: Prescripts and postscripts must be located on the virtual appliance VM. To enter multiple scripts, press **Enter** after each script path to list each script on a separate line. The character ";" is not allowed. **Note**: The script path is validated at the time the script is executed.

8. Click **Add**.

   You can verify that the policy is created and review the policy configuration by selecting the policy in the Policies page.

Prescripts and postscripts

You can use custom prescripts and postscripts as part of your data protection operations. These scripts enable automation either before your data protection job or after. For example, you might include a script that automatically notifies you of data protection job failures or warnings. Before you set up your prescripts and postscripts, you should understand some of the requirements for creating these scripts.

Supported script types

Only Perl scripts are supported.

Script path location

Prescripts and postscripts are run by the SnapCenter Plug-in for VMware vSphere. Therefore, the scripts must be located on the SnapCenter VMware plug-in VM.

NOTE: The script path is validated at the time the script is executed.

Where to specify scripts

Scripts are specified in backup policies. When a backup job is started, the policy automatically associates the script with the resources being backed up.

When you create a backup policy, the wizards in some plug-ins provide separate fields to specify prescripts and postscripts. Other wizards only provide a single field for both.

To specify multiple scripts, press **Enter** after each script path to list each script on a separate line. Semicolons (;) are not allowed. You can specify multiple prescripts and multiple postscripts. A single script can be coded as both a prescript and a postscript and can call other scripts.

When scripts are executed

Scripts are executed according to the value set for `BACKUP_PHASE`.

- BACKUP_PHASE=PRE_BACKUP

  Prescripts are executed in the `PRE_BACKUP` phase of the operation.

  NOTE: If a prescript fails, the backup also fails.

- BACKUP_PHASE=POST_BACKUP or BACKUP_PHASE=FAILED_BACKUP

  Postscripts are executed in the `POST_BACKUP` phase of the operation after the backup completes successfully or in the `FAILED_BACKUP` phase if the backup does not complete successfully.

  NOTE: If a postscript fails, the backup completes successfully, and a warning message is sent.

Environment variables passed to scripts

You can use the following environment variables in scripts.

Environment variable	Description
`BACKUP_NAME`	Name of the backup. Variable passed in postscripts only.
`BACKUP_DATE`	Date of the backup, in the format *`yyyymmdd`* Variable passed in postscripts only.
`BACKUP_TIME`	Time of the backup, in the format *`hhmmss`* Variable passed in postscripts only.
`BACKUP_PHASE`	The phase of the backup in which you want the script to run. Valid values are: `PRE_BACKUP`, `POST_BACKUP`, and `FAILED_BACKUP`. Variable passed in prescripts and postscripts.
`STORAGE_SNAPSHOTS`	The number of storage snapshots in the backup. Variable passed in postscripts only.
`STORAGE_SNAPSHOT.#`	One of the defined storage snapshots, in the following format: `<filer>:/vol/<volume>:<ONTAP-snapshot-name>` Variable passed in postscripts only.
`VIRTUAL_MACHINES`	The number of VMs in the backup. Variable passed in prescripts and postscripts.

`VIRTUAL_MACHINE.#`	One of the defined virtual machines, in the following format:
	`<VM name>|<VM UUID>|<power-state>|<VM snapshot>|<ip-addresses>`
	`<power-state>` has the values `POWERED_ON`, `POWERED_OFF`, or `SUSPENDED`
	`<VM snapshot>` has the values `true` or `false`
	Variable passed in prescripts and postscripts.

Script timeouts

The timeout for backup scripts is 15 minutes and cannot be modified.

Creating resource groups for VMs and datastores

A resource group is the container to which you add one or more VMs or datastores that you want to protect. For example, you can back up a single VM, or you can back up all the VMs in a datastore. Resource groups can contain any combination of VMs and datastores.

About this task

You can add or remove VMs and datastores from a resource group at any time.

- Backing up a single resource
  To back up a single resource (for example, a single VM), you must create a resource group that contains that single resource.
- Backing up multiple resources
  To back up multiple resources, you must create a resource group that contains multiple resources.
- Optimizing Snapshot copies
  To optimize Snapshot copies, you should group into one resource group the VMs and datastores that are associated with the same volume.
- Backup policies
  Although it is possible to create a resource group without a backup policy, you can only perform scheduled data protection operations when at least one policy is attached to the resource group. You can use an existing policy, or you can create a new policy while creating a resource group.

  NOTE: A resource group can contain VMs, and SAN and NAS datastores; it cannot contain VSAN or vVOL datastores.

  IMPORTANT: Do not add VMs that are in an inaccessible state. Although you can create a resource group that contains inaccessible VMs, backups for that resource group will fail.

- Compatibility checks
  SnapCenter performs compatibility checks when you attempt to create a resource group.
  Managing compatibility check failures

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Resource Groups**, select the vCenter Server for the resource group, and then click  (**Create Resource Group**).

   This is the easiest way to create a resource group. However, you can also create a resource group with one resource by performing one of the following:

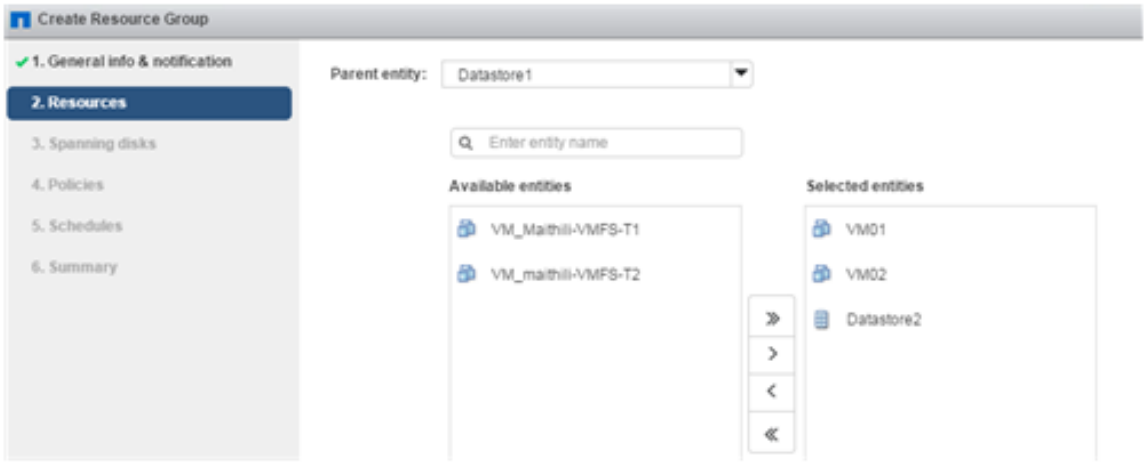
   - To create a resource group for one VM, click  (Flex home) or **Menu** (HTML5) > **VMs and Templates,** then right-click a VM, then select All **NetApp SnapCenter Actions** from the drop-down list, and then select **Create Resource Group** from the secondary drop-down list.
   - To create a resource group for one datastore, click  (Flex home) or **Menu** (HTML5) > **Storage,** then right-click a datastore, then select **All NetApp SnapCenter Actions** from the drop-down list, and then select **Create Resource Group** from the secondary drop-down list.

   The Create Resource Group wizard begins.

2. In the **General Info & Notification** page in the wizard, do the following:

For this field…	Do this…
vCenter Server	From the drop-down list, select the server for the vCenter.
Name	Enter a name for the resource group. Do not use the following special characters in VM, datastore, policy, backup, or resource group names: % & * $ # @ ! \ / : * ? " < > - | ; ' , . An underscore character (_) is allowed. VM or datastore names with special characters are truncated, which makes it difficult to search for a specific backup. In linked mode, each vCenter has a separate SnapCenter VMware plug-in repository. Therefore, you can use duplicate names across vCenters.
Description	Enter a description of the resource group.
Notification	From the drop-down list, select when you want to receive notifications about operations on this resource group: Error or warnings: Send notification for errors and warnings only Errors: Send notification for errors only Always: Send notification for all message types Never: Do not send notification
Email send from	Enter the email address you want the notification sent from.
Email send to	Enter the email address of the person you want to receive the notification. For multiple recipients, use a comma to separate the email addresses.
Email subject	Enter the subject you want for the notification emails.
Custom Snapshot format	If you want to use custom Snapshot copy names, select this checkbox and then enter a name format. • By default, this feature is disabled. • The default Snapshot copy names use the format `<ResourceGroup>_<HostName>_<TimeStamp>` However, you can specify a custom format using the variables $ResourceGroup, $Policy, $HostName, $ScheduleType, and $CustomText. Use the drop-down list in the custom name format box to select which variables you want to use, and the order in which they are used. If you select $CustomText, enter the custom text in the additional box that is provided. A timestamp is automatically added to the end of the custom name format you specify. • Special characters For special characters in names, follow the same guidelines given for the Name field.

3. On the Resource page, in the Available entities list, select the resources you want in the resource group, then click > to move your selections to the Selected entities list.



By default, the Available entities list displays the Datacenter object and the selection options display the datastores. You can click a datastore to view the VMs within the datastore and add them to the resource group.

When you click **Next**, the system first checks that SnapCenter manages and is compatible with the storage on which the selected VMs or datastores are located.

If the message `Selected virtual machine is not SnapCenter compatible` or `Selected datastore is not SnapCenter compatible` is displayed, then a selected VM or datastore is not compatible with SnapCenter. See Managing compatibility check failures for more information.

4. On the **Spanning disks** page, select an option for VMs with multiple VMDKs across multiple datastores:

   Always exclude all spanning datastores [This is the default for datastores.]

   Always include all spanning datastores [This is the default for VMs.]

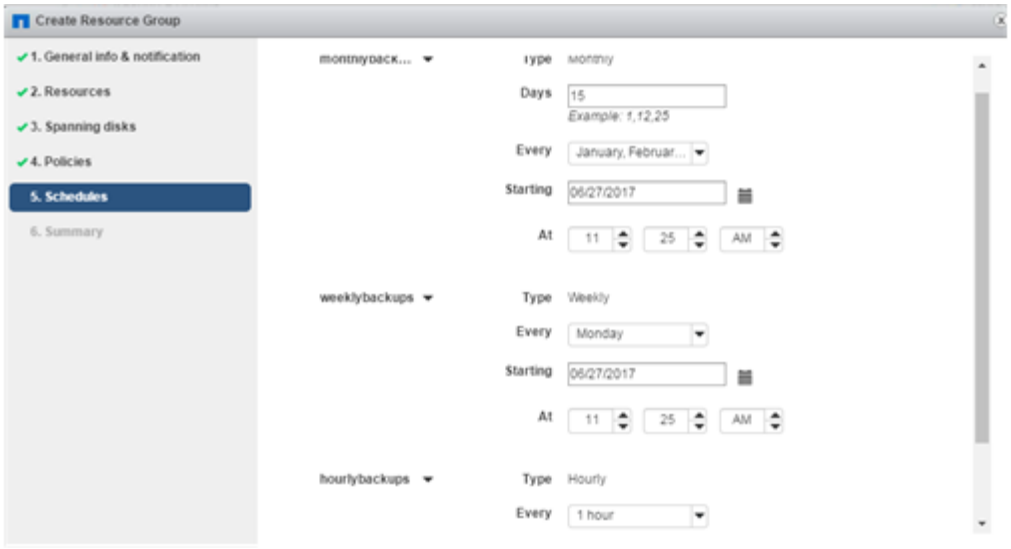
   Manually select the spanning datastores to be included

5. On the **Policies** page, select one or more policies from the list.

To use…	Do this…
An existing policy	Select one or more policies from the list.
A new policy	a. Click Create Policy. b. Complete the New Backup Policy wizard to return to the Create Resource Group wizard.

NOTE: In Linked Mode, the list includes policies in all the linked vCenters. You must select a policy that is on the same vCenter as the resource group.

6. On the **Schedules** page, configure the backup schedule for each selected policy.



You must fill in each field. The SnapCenter VMware plug-in creates schedules in the time zone in which the SnapCenter VMware plug-in is deployed. You can modify the time zone by using the SnapCenter Plug-in for VMware vSphere GUI.

Modifying the time zone for backups

7. Review the summary, and then click **Finish**.

   Before you click **Finish**, you can go back to any page in the wizard and change the information.

   After you click **Finish**, the new resource group is added to the resource groups list.

NOTE: If the quiesce operation fails for any of the VMs in the backup, then the backup is marked as not VM consistent even if the policy selected has VM consistency selected. In this case, it is possible that some of the VMs were successfully quiesced.

Managing compatibility check failures

SnapCenter performs compatibility checks when you attempt to create a resource group.

Reasons for incompatibility might be:

- VMDKs are on unsupported storage; for example, on an ONTAP system running in 7-Mode or on a non-ONTAP device.
- A datastore is on NetApp storage running Clustered Data ONTAP 8.2.1 or earlier.
  SnapCenter version 4.*x* supports ONTAP 8.3.1 and later.
  The SnapCenter Plug-in for VMware vSphere does not perform compatibility checks for all ONTAP versions; only for ONTAP versions 8.2.1 and earlier. Therefore, always see the NetApp Interoperability Matrix Tool (IMT) for the latest information about SnapCenter support.
- A shared PCI device is attached to a VM.
- A preferred IP is not configured in SnapCenter.
- You have not added the storage VM (SVM) management IP to SnapCenter.
- The storage VM is down.

To correct a compatibility error, perform the following:

- Make sure the storage VM is running.
- Make sure that the storage system on which the VMs are located have been added to the SnapCenter Plug-in for VMware vSphere inventory.
- Make sure the storage VM is added to SnapCenter. Use the Add storage system option on the SnapCenter vSphere web client GUI.
- If there are spanning VMs that have VMDKs on both NetApp and non-NetApp datastores, then move the VMDKs to NetApp datastores.

Adding a single VM or datastore to a resource group

You can quickly add a single VM or datastore to any existing resource group managed by the SnapCenter Plug-in for VMware vSphere.

About this task

You can add SAN and NAS datastores but not VSAN or VVOL datastores.

Steps

1. In the VMware vSphere web client GUI, click  (Flex home) or **Menu** (HTML5) in the toolbar, and navigate to the VM or datastore that you want to add.
2. In the left Navigator pane, right-click on the VM or datastore, select **All NetApp SnapCenter Actions** from the drop-down list, and then select **Add To Resource Group** from the secondary drop-down list.

   The system first checks that SnapCenter manages and is compatible with the storage system on which the selected VM is located and then displays the **Add to Resource Group** page. If the message `SnapCenter Compatibility Error` is displayed, then the selected VM is not compatible with SnapCenter. If the selected VM is not compatible, then you must first add the appropriate storage VM to SnapCenter.
3. In the **Add to Resource Group** page, select a resource group, and then click **OK**.

   When you click **OK**, the system first checks that SnapCenter manages and is compatible with the storage on which the selected VMs or datastores are located.

   If the message `Selected virtual machine is not SnapCenter compatible` or `Selected datastore is not SnapCenter compatible` is displayed, then a selected VM or datastore is not compatible with SnapCenter. See Managing compatibility check failures for more information.

Adding multiple VMs and datastores to a resource group

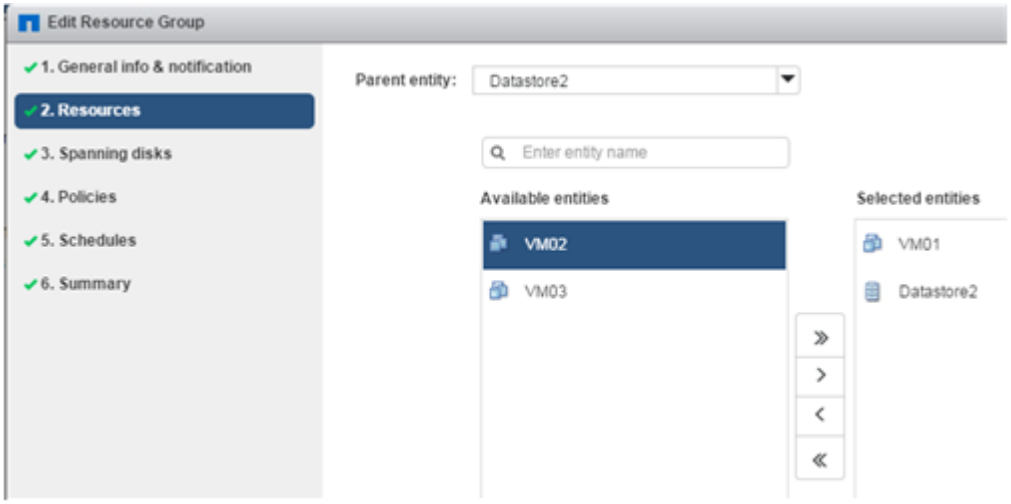
You can add multiple VMs and datastores to any existing resource group by using the SnapCenter vSphere web client Edit Resource Group wizard.

About this task

NOTE: You can add SAN and NAS datastores but not VSAN or VVOL datastores.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Resource Groups**, then select a resource group, and then click Edit to start the wizard.
2. On the **Resource** page, in the Available entities list, select a VM or datastore you want to add to the resource group, then click **>** to move your selection to the Selected entities list. You can move all the available entities by clicking **>>**.



   By default, the Available entities list displays the Datacenter object. You can click a datastore to view the VMs within the datastore and add them to the resource group.

   When you click **Next**, the system first checks that SnapCenter manages and is compatible with the storage on which the selected VMs or datastores are located. If the message `Some entities are not SnapCenter compatible.` is displayed, then a selected VM or datastore is not compatible with SnapCenter. See Managing compatibility check failures for more information.
3. Repeat Step 2 for each VM or datastore that you want to add.
4. Click **Next** until you reach the **Summary** page, and then review the summary and click **Finish**.

Backing up VM and datastore resource groups on demand

A backup operation on a resource group is performed on all the resources defined in the resource group. You can back up a resource group on demand from the SnapCenter vSphere web client GUI in vCenter. If a resource group has a policy attached and a schedule configured, then backups occur automatically according to the schedule.

Before you begin

You must have created a resource group with a policy attached.

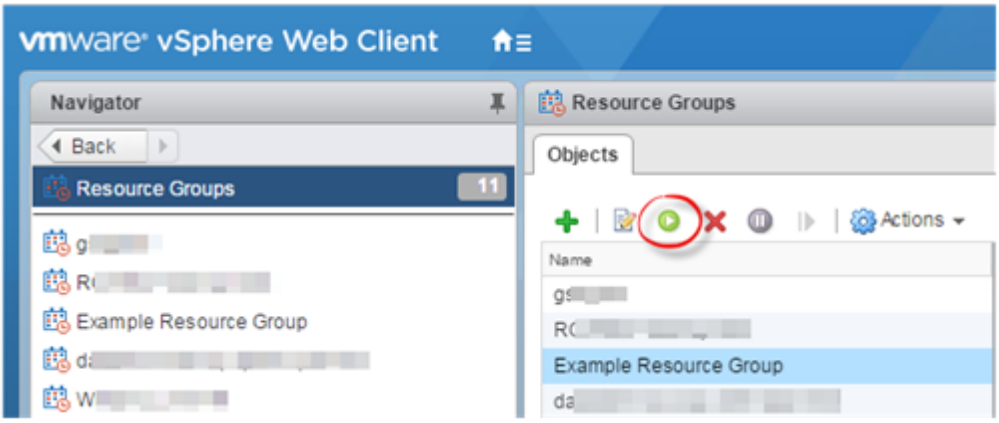
IMPORTANT: Do not start an on-demand backup job when a job to back up the SnapCenter VMware plug-in MySQL database is already running.

About this task

NOTE: In earlier releases of Virtual Storage Console (VSC), you could perform an on-demand backup without having a backup job configured for a VM or datastore. However, for the SnapCenter VMware plug-in, VMs and datastores must be in a resource group before you can perform backups.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Resource Groups**.
2. In the **Objects** tab of the **Resource Groups** page, select the resource group you want to back up, and then click (**Run Now**) in the toolbar.



3. If the resource group has multiple policies configured, then in the **Backup Now** dialog box, select from the drop-down list the policy you want to use for this backup operation, and then click **Yes**.
4. Click **OK** to start the backup.
5. Optional: Monitor the operation progress by clicking **Recent Tasks** at the bottom of the window or on the dashboard **Job Monitor** for more detail.

Result

NOTE: If the quiesce operation fails for any of the VMs in the backup, then the backup is marked as not VM consistent even if the policy selected has VM consistency selected. In this case, it is possible that some of the VMs were successfully quiesced.

Backing up the SnapCenter Plug-in for VMware vSphere MySQL database

The SnapCenter VMware plug-in includes a MySQL database (also called an NSM database) that contains the metadata for all jobs performed by the plug-in. You should back up this repository regularly.

You should also back up the repository before performing migrations or upgrades.

Before you begin

IMPORTANT: Do not start a job to back up the MySQL database when an on-demand backup job is already running.

Steps

1. Open a maintenance console window.
2. From the Main Menu, select menu option **1) Application Configuration**.
3. From the Application Configuration Menu, select menu option **6) MySQL backup and restore**.
4. From the MySQL Backup and Restore Configuration Menu, select **1) Configure MySQL backup**.
5. At the prompt, enter the backup location for the repository, the number of backups to keep, and the time the backup should start.

   All inputs are saved when you enter them. When the backup retention number is reached, older backups are deleted when new backups are performed.

   TIP: Repository backup names have the prefix “nsm” or “SC_Quartz”. Because the repository restore function looks for those prefixes, you should not change them.

Restoring from backups

You can restore VMs, VMDKs, files, and folders from primary or secondary backups. VMs are always restored to the original host and datastore; VMDKs can be restored to either the original or an alternate datastore. You cannot use the SnapCenter Plug-in for VMware vSphere to restore a datastore, only the individual VMs in the datastore. You can also restore individual files and folders in a guest file restore session, which attaches a backup copy of a virtual disk and then restores the selected files or folders.

You cannot restore backups of storage VMs that have been removed. For example, if you add a storage VM using the management LIF and then create a backup, and then you remove that storage VM and add a cluster that contains that same storage VM, the restore operation for the backup will fail.

How restore operations are performed

For VMFS environments, the SnapCenter Plug-in for VMware vSphere uses clone and mount operations with Storage VMotion to perform restore operations. For NFS environments, the plug-in uses native ONTAP Single File SnapRestore (SFSR) to provide greater efficiency for most restore operations.

Restore operations	NFS environments		VMFS environments
	Performed using ONTAP SFSR	Performed using clone and mount with Storage VMotion	Performed using clone and mount with Storage VMotion
Restoring VMs and VMDKs from primary backups	✔		✔
Restoring VMs and VMDKs from secondary backups	✔		✔
Restoring deleted VMs and VMDKs from primary backups	✔		✔
Restoring deleted VMs and VMDKs from secondary backups		✔	✔
Restoring VMs and VMDKs from VM-consistent primary backups	✔		✔
Restoring VMs and VMDKs from VM-consistent secondary backups		✔	✔

Guest file restore operations are performed using clone and mount operations (not Storage VMotion) in both NFS and VMFS environments.

Searching for backups

You can search for and find a specific backup of a VM or datastore using the Restore wizard. After you locate a backup, you can then restore it.

Steps

1. In the SnapCenter vSphere web client GUI, click  (Flex home) or **Menu** (HTML5) in the toolbar, and then do one of the following:

To view backups for…	Do the following…
VMs	Select **VMs and Templates** from the drop-down list.
Datastores	Select **Storage** from the drop-down list.

2. In the left Navigator pane, expand the datacenter that contains the VM or datastore.

3. Optional: Right-click a VM or datastore, then select **All NetApp SnapCenter Actions** in the drop-down list, and then select **Restore** in the secondary drop-down list.
4. In the **Restore** wizard enter a search name and click **Search**.

   You can filter the backup list by clicking  (filter icon) and selecting a date and time range, selecting whether you want backups that contain VMware Snapshots, whether you want mounted backups, and the location. Click **OK**.

Restoring VMs from backups

When you restore a VM, you overwrite the existing content with the backup copy that you select. You can restore VMs from either a primary or secondary backup to the same ESXi server.

NOTE: Restore operations cannot finish successfully if there are Snapshot copies of the VM that were performed by software other than the SnapCenter Plug-in for VMware vSphere.

NOTE: The following restore workflow is not supported: Add a storage VM, then perform a backup of that VM, then delete the storage VM and add a cluster that includes that same storage VM, and then attempt to restore the original backup.

Before you begin

- A backup must exist.
  You must have created a backup of the VM using the SnapCenter VMware plug-in before you can restore the VM.
- The VM must not be in transit.
  The VM that you want to restore must not be in a state of vMotion or Storage vMotion.

About this task

- VM is unregistered and registered again
  The restore operation for VMs unregisters the original VM, restores the VM from a backup Snapshot copy, and registers the restored VM with the same name and configuration on the same ESXi server. You must manually add the VMs to resource groups after the restore.
- Restoring datastores
  You cannot restore a datastore, but you can restore any VM in the datastore.
- VMware consistency snapshot failures for a VM
  Even if a VMware consistency snapshot for a VM fails, the VM is nevertheless backed up. You can view the entities contained in the backup copy in the Restore wizard and use it for restore operations.
- A restore operation might fail if the storage tier of the FabricPool where the VM is located is unavailable.

Steps

1. In the SnapCenter vSphere web client GUI, click  (Flex home) or **Menu** (HTML5) in the toolbar, and then select **VMs and Templates** from the drop-down list.

   NOTE: If you are restoring a deleted VM, the storage VM credentials that were added to the SnapCenter VMware plug-in must be `vsadmin` or a user account that has all the same privileges as `vsadmin`. The host must be on a storage system that is running ONTAP 8.2.2 or later.
2. In the left Navigator pane, right-click a VM, then select **All NetApp SnapCenter Actions** in the drop-down list, and then select **Restore** in the secondary drop-down list.

3. In the **Restore** wizard, on the **Select Backup** page, select the backup copy that you want to restore from.

   You can search for a specific backup name or a partial backup name, or you can filter the backup list by clicking  (filter icon) and selecting a date and time range, selecting whether you want backups that contain VMware Snapshots, whether you want mounted backups, and the location. Click **OK** to return to the wizard.

4. On the **Select Scope** page, click **Entire virtual machine** in the **Restore scope** field and then select the ESXi host where the backup should be mounted.

   The restore destination is the same ESXi host where the VM was originally registered.

5. On the **Select Location** page, select the location of the datastore that you want to restore from.
6. Review the Summary page and then click **Finish**.
7. Optional: Monitor the operation progress by clicking **Recent Tasks** at the bottom of the screen.

   Refresh the screen to display updated information.

After you finish

Although the VMs are restored, they are not automatically added to their former resource groups. Therefore, you must manually add the VMs to the appropriate resource groups.

Restoring deleted VMs from backups

You can restore a deleted VM from a datastore primary or secondary backup to an ESXi host that you select.

Before you begin

- The user account for the storage system, on the Storage Systems page in the SnapCenter vSphere web client, must have the minimum ONTAP privileges required for ONTAP operations, as listed in the *SnapCenter Concepts Guide* and the *SnapCenter Installation and Setup Guide*.
- A backup must exist.
  You must have created a backup of the VM using the SnapCenter Plug-in for VMware vSphere before you can restore the VMDKs on that VM.

About this task

You cannot restore a datastore, but you can restore any VM in the datastore.

> **NOTE**: A restore operation might fail if the storage tier of the FabricPool where the VM is located is unavailable.

Steps

1. In the SnapCenter vSphere web client GUI, click  (Flex home) or **Menu** (HTML5) in the toolbar, and then select **Storage** from the drop-down list.
2. Select the datastore on which the deleted VM was located, then select the **More Objects** tab, and then select the **Backups** tab.
3. Double-click on a backup to see a list of all VMs that are included in the backup.
4. Select the deleted VM from the backup list and click **Restore**.

5. In the **Restore** wizard, on the **Select Backup** page, select the backup copy that you want to restore from.

   You can search for a specific backup name or a partial backup name, or you can filter the backup list by clicking  (filter icon) and selecting a date and time range, selecting whether you want backups that contain VMware Snapshots, whether you want mounted backups, and the location. Click **OK** to return to the wizard.

6. On the **Select Scope** page, click **Entire virtual machine** in the **Restore scope** field and then select the Destination ESXi host name.

   The restore destination can be any ESXi host that has been added to SnapCenter. This option restores the contents of the last datastore in which the VM resided from a Snapshot copy with the specified time and date. The **Restart VM** check box is checked if you select this option.

   If you are restoring a VM in an NFS datastore onto an alternate ESXi host that is in an ESXi cluster, then after the VM is restored, it is registered on the alternate host.

7. On the **Select Location** page, select the location of the datastore that you want to restore from.
8. Review the Summary page and then click **Finish**.

Restoring VMDKs from backups

You can restore one or more virtual machine disks (VMDKs) on a VM to the same datastore. You can restore existing VMDKs, or deleted or detached VMDKs from either a primary a secondary backup.

Before you begin

- A backup must exist.
  You must have created a backup of the VM using the SnapCenter Plug-in for VMware vSphere.
- The VM must not be in transit.
  The VM that you want to restore must not be in a state of vMotion or Storage vMotion.

About this task

- If the VMDK is deleted or detached from the VM, then the restore operation attaches the VMDK to the VM.
- A restore operation might fail if the storage tier of the FabricPool where the VM is located is unavailable.
- Attach and restore operations connect VMDKs using the default SCSi controller. VMDKs that are attached to a VM with a NVME controller are backed up, but for attach and restore operations they are connected back using a SCSi controller.

Steps

1. In the SnapCenter vSphere web client GUI, click  (Flex home) or **Menu** (HTML5) in the toolbar, and then select **VMs and Templates** from the drop-down list.
2. In the left Navigator pane, right-click a VM, then select **All NetApp SnapCenter Actions** in the drop-down list, and then select **Restore** in the secondary drop-down list.
3. In the **Restore** wizard, on the Select Backup page, select the backup copy that you want to restore from.

You can search for a specific backup name or a partial backup name, or you can filter the backup list by clicking  (filter icon) and selecting a date and time range, selecting whether you want backups that contain VMware Snapshots, whether you want mounted backups, and primary or secondary location. Click **OK** to return to the wizard.

4. On the **Select Scope** page, select the restore destination by clicking **Particular virtual disk** in the **Restore scope** field.

To…	Specify the restore destination…
Restore to the original datastore	Use the default, parent, datastore that is displayed.
Restore to an alternate datastore on the same ESXi host	Click on the destination datastore and select a different datastore from the list.

   You can unselect any datastores that contain VMDKs that you do not want to restore.

5. On the **Select Location** page, select the Snapshot copy that you want to restore (primary or secondary).
6. Review the Summary page and then click **Finish**.
7. Optional: Monitor the operation progress by clicking **Recent Tasks** at the bottom of the screen.

   Refresh the screen to display updated information.

Restoring the most recent backup of the SnapCenter VMware plug-in MySQL database

You can use the maintenance console to restore the most recent backup of the MySQL database (also called an NSM database) for the SnapCenter Plug-in for VMware vSphere.

Steps

1. Open a maintenance console window.
2. From the Main Menu, select menu option **1) Application Configuration**.
3. From the Application Configuration Menu, select menu option **6) MySQL backup and restore**.
4. From the MySQL Backup and Restore Configuration Menu, select **3) Restore MySQL backup**.
5. At the prompt “Restore using the most recent backup,” enter **y,** and then press **Enter**.

   The backup MySQL database is restored to its original location.

Restoring a specific backup of the SnapCenter VMware plug-in MySQL database

You can use the maintenance console to restore a specific backup of the MySQL database (also called an NSM database) for the SnapCenter Plug-in for VMware vSphere virtual appliance.

Steps

1. Open a maintenance console window.
2. From the Main Menu, select menu option **1) Application Configuration**.
3. From the Application Configuration Menu, select menu option **6) MySQL backup and restore**.
4. From the MySQL Backup and Restore Configuration Menu, select **2) List MySQL backups,** and then make a note of the backup you want to restore.

5. From the MySQL Backup and Restore Configuration Menu, select **3) Restore MySQL backup**.
6. At the prompt “Restore using the most recent backup,” enter **n**.
7. At the prompt “Backup to restore from,” enter the backup name, and then press **Enter**.

   The selected backup MySQL database is restored to its original location.

Attaching VMDKs to a VM

You can attach one or more VMDKs from a backup to the parent VM or to an alternate VM on the same ESXi host. This makes it easier to restore one or more individual files from a drive instead of restoring the entire drive. You can detach the VMDK after you have restored or accessed the files you need.

About this task

You have the following attach options:

- You can attach virtual disks from a primary or a secondary backup.
- You can attach virtual disks to the parent VM (the same VM that the virtual disk was originally associated with) or to an alternate VM on the same ESXi host.

The following limitations apply to attaching virtual disks:

- Attach and detach operations are not supported for Virtual Machine Templates.
- When more than 15 VMDKs are attached to an iSCSI controller, the virtual machine for SnapCenter Plug-in for VMware vSphere cannot locate VMDK unit numbers higher than 15 because of VMware restrictions.
  In this case, add the SCSi controllers manually and try the attach operation again.
- You cannot manually attach a virtual disk that was attached or mounted as part of a guest file restore operation.
- Attach and restore operations connect VMDKs using the default SCSi controller. VMDKs that are attached to a VM with a NVME controller are backed up, but for attach and restore operations they are connected back using a SCSi controller.

Steps

1. In the SnapCenter vSphere web client GUI, click  (Flex home) or **Menu** (HTML5) in the toolbar, and then select **VMs and Templates** from the drop-down list.
2. Optional: In the left Navigator pane, select a VM.
3. Optional: Click the **More Objects** tab and then select the **Backups** tab to view the list of backups for the selected VM.

   Scroll right to see all the columns on the screen.
4. In the left navigation pane, right-click the VM, then select **All NetApp SnapCenter Actions** in the drop-down list, and then select **Attach virtual disk** in the secondary drop-down list.
5. On the **Attach Virtual Disk** pane, in the **Backup** section, select a backup.

   You can filter the backup list by clicking  (filter icon) and selecting a date and time range, selecting whether you want backups that contain VMware snapshots, whether you want mounted backups, and the location. Click **OK**.
6. On the **Attach Virtual Disk** pane, in the **Select Disks** section, select one or more disks you want to attach and the location you want to attach from (primary or secondary).

   You can change the filter to display primary and secondary locations.

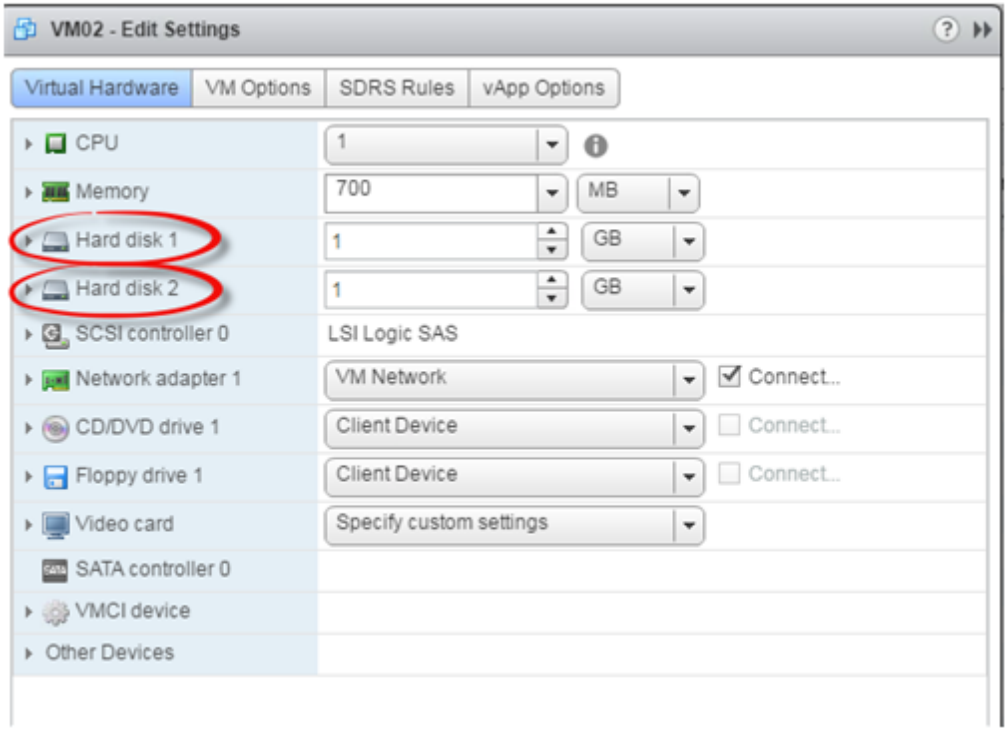
7. By default, the selected virtual disks are attached to the parent VM. To attach the selected virtual disks to an alternate VM in the same ESXi host, click **Click here to attach to alternate VM** and specify the alternate VM.
8. Click **Attach**.
9. Optional: Monitor the operation progress in the **Recent Tasks** section.

   Refresh the screen to display updated information.
10. Verify that the virtual disk is attached by performing the following:

    a. Click (Flex home) or **Menu** (HTML5) in the toolbar, and then select **VMs and Templates** from the drop-down list.

    b. In the left Navigator pane, right-click a VM, then select **Edit settings** in the drop-down list.

    c. In the **Edit Settings** box, click **Manage other disks** and then expand the list for each hard disk to see the list of disk files.



The Edit Settings page lists the disks on the VM. You can expand the details for each hard disk to see the list of attached virtual disks.

Result

You can access the attached disks from the host operating system and then retrieve the needed information from the disks.

Detaching a virtual disk

After you have attached a virtual disk to restore individual files, you can detach the virtual disk from the parent VM.

Steps

1. In the SnapCenter vSphere web client GUI, click (Flex home) or **Menu** (HTML5) in the toolbar, and then select **VMs and Templates** from the drop-down list.
2. Optional: In the left Navigator pane, select a VM.

3. Optional: Click the **More Objects** tab and then select the **Backups** tab to view the list of backups for the selected VM.

   Scroll right to see all the columns on the screen.

4. In the left navigation pane, right-click the VM, then select **All NetApp SnapCenter Actions** in the drop-down list, and then select **Detach virtual disk** in the secondary drop-down list.

5. On the **Detach Virtual Disk** screen, select one or more disks you want to detach, then click the **Detach the selected disk(s)** button, and then click **Confirm**.

   NOTE: Make sure that you select the correct virtual disk. Otherwise, you might cause an impact on production work.

6. Optional: Monitor the operation progress in the **Recent Tasks** section.

   Refresh the screen to display updated information.

7. Verify that the virtual disk is detached by performing the following:

   a. Click  in the toolbar, and then select **VMs and Templates** from the drop-down list.

   b. In the left Navigator pane, right-click a VM, then select **Edit settings** in the drop-down list.

   c. In the **Edit Settings** box, click **Manage other disks** and then expand the list for each hard disk to see the list of disk files.

      The Edit Settings page lists the disks on the VM. You can expand the details for each hard disk to see the list of attached virtual disks.

Restoring guest files and folders

You can restore files or folders from a virtual machine disk (VMDK) on a Windows guest OS.

Guest restore workflow

Guest OS restore operations require multiple steps.

Guest OS restore operations include the following steps:

1. Attach
   Attach a virtual disk to a guest VM or proxy VM and start a guest file restore session.
2. Wait
   Wait for the attach operation to complete before you can browse and restore. When the attach operation finishes, a guest file restore session is automatically created and an email notification is sent.
3. Select files or folders
   Browse the VMDK in the Guest File Restore session and select one or more files or folders to restore.
4. Restore
   Restore the selected files or folders to a specified location.

Prerequisites for restoring guest files and folders

Before you restore one or more files or folders from a VMDK on a Windows guest OS, you must be aware of all the requirements.

- VMware Tools must be installed and running.

  SnapCenter uses information from VMware Tools to establish a connection to the VMware Guest OS.

- The Windows Guest OS must be running Windows Server 2008 R2 or later.

  For the latest information about supported versions, see the NetApp Interoperability Matrix Tool (IMT).

- The credentials for the target VM must specify the built-in domain administrator account or the built-in local administrator account. The username must be "Administrator." Before starting the restore operation, the credentials must be configured for the VM to which you want to attach the virtual disk. The credentials are required for both the attach operation and the subsequent restore operation. Workgroup users can use the built-in local administrator account.

  Attention: If you must use an account that is not the built-in administrator account, but has administrative privileges within the VM, you must disable UAC on the guest VM.

- You must know the backup Snapshot copy and VMDK to restore from.

  SnapCenter Plug-in for VMware vSphere does not support searching of files or folders to restore. Therefore, before you begin you must know the location of the files or folders with respect to the Snapshot copy and the corresponding VMDK.

- Virtual disk to be attached must be in a SnapCenter backup.

  The virtual disk that contains the file or folder you want to restore must be in a VM backup that was performed using the virtual appliance for SnapCenter Plug-in for VMware vSphere.

- To use a proxy VM, the proxy VM must be configured.

  If you want to attach a virtual disk to a proxy VM, the proxy VM must be configured before the attach and restore operation begins.

- For files with non-English-alphabet names, you must restore them in a directory, not as a single file.

  You can restore files with non-alphabetic names, such as Japanese Kanji, by restoring the directory in which the files are located.

- Restoring from a Linux guest OS is not supported

  You cannot restore files and folders from a VM that is running Linux guest OS. However, you can attach a VMDK and then manually restore the files and folders. For the latest information on supported guest OS, see the NetApp Interoperability Matrix Tool (IMT).

Guest file restore limitations

Before you restore a file or folder from a guest OS, you should be aware of what the feature does not support.

- You cannot restore dynamic disk types inside a guest OS.
- If you restore an encrypted file or folder, the encryption attribute is not retained. You cannot restore files or folders to an encrypted folder.
- The Guest File Browse page displays the hidden files and folder, which you cannot filter.
- You cannot restore from a Linux guest OS.
  You cannot restore files and folders from a VM that is running Linux guest OS. However, you can attach a VMDK and then manually restore the files and folders. For the latest information on supported guest OS, see the NetApp Interoperability Matrix Tool (IMT).
- You cannot restore from a NTFS file system to a FAT file system.

  When you try to restore from NTFS-format to FAT-format, the NTFS security descriptor is not copied because the FAT file system does not support Windows security attributes.

- You cannot restore guest files from a cloned VMDK or an uninitialized VMDK..
- You cannot restore from secondary backups if the backup was performed on a system running ONTAP 9.2 or later and if the VMware consistency option was on.
- You cannot restore the directory structure for a file.

  If a file in a nested directory is selected to be restored, the file is not restored with the same directory structure. The directory tree is not restored, only the file. If you want to restore a directory tree, you can copy the directory itself at the top of the structure.

Restoring guest files and folders from VMDKs

You can restore one or more files or folders from a VMDK on a Windows guest OS.

About this task

By default, the attached virtual disk is available for 24 hours and then it is automatically detached. You can choose in the wizard to have the session automatically deleted when the restore operation completes, or you can manually delete the Guest File Restore session at any time, or you can extend the time in the **Guest Configuration** page.

Guest file or folder restore performance depends upon two factors: the size of the files or folders being restored; and the number of files or folders being restored. Restoring a large number of small-sized files might take a longer time than anticipated compared to restoring a small number of large-sized files, if the data set to be restored is of same size.

IMPORTANT: Only one attach or restore operation can run at the same time on a VM. You cannot run parallel attach or restore operations on the same VM.

IMPORTANT: The guest restore feature allows you to view and restore system and hidden files and to view encrypted files. Do not attempt to overwrite an existing system file or to restore encrypted files to an encrypted folder. During the restore operation, the hidden, system, and

encrypted attributes of guest files are not retained in the restored file. Viewing or browsing reserved partitions might cause an error.

Steps

1. In the SnapCenter vSphere web client in vCenter, click (Flex home) or **Menu** (HTML5) **> VMs and Templates,** then right-click a VM, then select **All NetApp SnapCenter Actions** from the drop-down list, and then select **Guest File Restore** from the secondary drop-down list.

   Select the VM where you want to attach the virtual disk. If you do not want to attach directly to that VM, you can select a proxy VM in the wizard.

   Before you start the wizard, make sure the target VM for the guest file restore operation has valid credentials.

   The Guest File Restore wizard begins.

2. In the **Restore Scope** page, specify the backup that contains the virtual disk you want to attach by doing the following:
   a. In the **Backup Name** table, select the backup that contains the virtual disk that you want attach.
   b. In the **VMDK** table, select the virtual disk that contains the files or folders you want to restore.
   c. In the **Locations** table, select the location, primary or secondary, of the virtual disk that you want to attach.

3. In the **Guest Details** page, do the following:
   a. Choose where to attach the virtual disk by doing the following:

Select this option…	If…
A single job	You want to attach the virtual disk to the VM that you right-clicked before you started the wizard, and then select the credential for the VM. **Note:** Credentials must already be created for the VM.
All jobs for the plug-in	You want to attach the virtual disk to a proxy VM and then select the proxy VM. **Note:** The proxy VM must be configured before the attach and restore operation begins.

   b. Select the **Send email notification** option.

      This option is required if you want to be notified when the attach operation finishes and the virtual disk is available. The notification email includes the virtual disk name, the VM name, and the newly assigned drive letter for the VMDK.

TIP: Enable this option because a guest file restore is an asynchronous operation and there might be a time latency to establish a guest session for you.

      This option uses the email settings that are configured when you set up the VMware vSphere web client in vCenter.

4. Review the summary, and then click **Finish**.

   Before you click **Finish**, you can go back to any page in the wizard and change the information.

5. Wait until the attach operation completes.

   You can view the progress of the attach operation in the Guest File Restore page, or in the Dashboard job monitor, or you can wait for the email notification.

6. To find the files that you want to restore from the attached virtual disk, click > **SnapCenter Plug-in for VMware vSphere**, then in the left Navigator pane click **Guest File Restore** and select the **Guest Configuration** tab.

   In the Guest Session Monitor table, you can display additional information about a session by clicking **...** in the right column.

7. Select the guest file restore session for the virtual disk that was listed in the notification email.

   All partitions are assigned a drive letter, including system reserved partitions. If a VMDK has multiple partitions, you can select a specific drive by selecting the drive in the drop-down list in the drive field at the top of the Guest File Browse page.

8. Click the **Browse Files** icon to view a list of files and folders on the virtual disk.

   When you double click a folder to browse and select individual files, there might be a time latency while fetching the list of files because the fetch operation is performed at run time.

   For easier browsing, you can use filters in your search string. The filters are case-sensitive, Perl expressions without spaces. The default search string is `.*`. The following table shows some example Perl search expressions.

This expression…	Searches for…
.	Any character except a newline character.
.*	Any string. This is the default.
a	The character `a`.
ab	The string `ab`.
a|b	The character `a` or `b`.
a*	Zero or more instances of the character `a`.
a+	One or more instances of the character `a`.
a?	Zero or one instance of the character `a`.
a{x}	Exactly x number of instances of the character `a`.
a{x,}	At least x number of instances of the character `a`.
a{x,y}	At least x number of instances of the character `a` and at most y number.
\	Escapes a special character.

NOTE: The Guest File Browse page displays all hidden files and folders. in addition to all other files and folders.

9. Select one or more files or folders that you want to restore, and then click **Select Restore Location**.

   The files and folders to be restored are listed in the Selected File(s) table.

10. In the **Select Restore Location** page, specify the following:

Option	Description
Restore to path	Enter the UNC share path to the guest where the selected files will be restored. For example: `\\10.60.136.65\c$`
If original file(s) exist	Select the action to be taken if the file or folder to be restored already exists on the restore destination: Always overwrite or Always skip. **Note**: If the folder already exists, then the contents of the folder are merged with the existing folder.
Disconnect Guest Session after successful restore	Select this option if you want the guest file restore session to be deleted when the restore operation completes.

11. Click **Restore.**

    You can view the progress of the restore operation in the Guest File Restore page, or in

the Dashboard job monitor, or you can wait for the email notification. The time it takes for the email notification to be sent depends upon the length of time of the restore operation.

The notification email contains an attachment with the output from the restore operation. If the restore operation fails, open the attachment for additional information.

Setting up proxy VMs for restore operations

If you want to use a proxy VM for attaching a virtual disk for guest file restore operations, you must set up the proxy VM before you begin the restore operation. Although you can set up a proxy VM at any time, it might be more convenient to set it up immediately after the plug-in deployment completes.

Steps

1. In the SnapCenter vSphere web client, click (Flex home) or **Menu** (HTML5) in the toolbar, and then select **SnapCenter Plug-in for VMware vSphere** from the drop-down list.
2. In the left Navigator pane, click **Guest File Restore**.
3. In the **Run As Credentials** section, do one of the following:

To do this…	Do this…
Use existing credentials	Select any of the configured credentials.
Add new credentials	1. Click (Add). 2. In the **Run As Credentials** dialog box, enter the credentials. 3. Click **Select VM**, then select a VM in the **Proxy VM** dialog box. Click **Save** to return to the **Run As Credentials** dialog box. 4. Enter the credentials. For Username, you must enter “Administrator”.

The SnapCenter VMware plug-in uses the selected credentials to log into the selected proxy VM.

NOTE: The Run As credentials must be the default domain administrator that is provided by Windows or the built-in local administrator. Workgroup users can use the built-in local administrator account.

4. In the **Proxy Credentials** section, click (Add) to add a VM to use as a proxy.
5. In the **Proxy VM** dialog box, complete the information, and then click Save.

Configuring credentials for VM guest file restores

When you attach a virtual disk for guest file or folder restore operations, the target VM for the attach must have credentials configured before you restore.

About this task

	User Access Control Enabled	User Access Control Disabled
Domain user	A domain user with “administrator” as the username works fine. For example, “NetApp\administrator”. However, a domain user with “xyz” as the username that belongs to a local administrator group will not work. For example, you cannot use “ NetApp\xyz”.	Either a domain user with “administrator” as the username or a domain user with “xyz” as the username that belongs to a local administrator group, works fine. For example, “NetApp\administrator” or “ NetApp\xyz”.
Workgroup user	A local user with “administrator” as the username works fine. However, a local user with “xyz” as the username that belongs to a local	Either a local user with “administrator” as the username or a local user with “xyz” as the username that belongs to a local administrator group, works fine.

	administrator group will not work.	However, a local user with “xyz” as the username that does not belong to local administrator group will not work.

In the above examples, “ NetApp” is the dummy domain name and “xyz” is the dummy local username.

Steps

1. In the SnapCenter vSphere web client in vCenter, click (Flex home) or **Menu** (HTML5) in the toolbar, and then select **SnapCenter Plug-in for VMware vSphere** from the drop-down list.
2. In the left Navigator pane, click **Guest File Restore**.
3. In the **Run As Credentials** section, do one of the following:

To do this…	Do this…
Use existing credentials	Select any of the configured credentials.
Add new credentials	5. Click (Add). 6. In the **Run As Credentials** dialog box, enter the credentials. 7. Enter the credentials. For Username, you must enter “Administrator”. 8. Click **Select VM**, then select a VM in the **Proxy VM** dialog box. Click **Save** to return to the **Run As Credentials** dialog box. Select the VM that should be used to authenticate the credentials.

The SnapCenter VMware plug-in uses the selected credentials to log on to the selected VM.

4. Click **Save**.

Extending the time of a guest file restore session

By default, an attached Guest File Restore VMDK is available for 24 hours and then it is automatically detached. You can extend the time in the **Guest Configuration** page.

About this task

You might want to extend a guest file restore session if you want to restore additional files or folders from the attached VMDK at a later time. However, because guest file restore sessions use a lot of resources, extending the session time should be performed only occasionally.

Steps

1. In the SnapCenter vSphere web client in vCenter, click (Flex home) or **Menu** (HTML5) in the toolbar, and then select **SnapCenter Plug-in for VMware** from the drop-down list.
2. In the left Navigator pane, click **Guest File Restore**.
3. Select a guest file restore session and then click (Extend Selected Guest Session) in the Guest Session Monitor title bar.

   The session is extended for another 24 hours.

Guest file restore scenarios you might encounter

When attempting to restore a guest file, you might encounter any of the following scenarios.

- Guest file restore session is blank

  This issue occurs when you create a guest file restore session and while that session was active, the guest operating system is rebooted. When this occurs, VMDKs in the guest OS

might remain offline. Therefore, when you try to browse the guest file restore session, the list is blank.

To correct the issue, manually put the VMDKs back online in the guest OS. When the VMDKs are online, the guest file restore session will display the correct contents.

- Guest file restore attach disk operation fails

  This issue occurs when you start a guest file restore operation but the attach disk operation fails even though VMware Tools is running and the Guest OS credentials are correct. If this occurs, the following error is returned:
  `Error while validating guest credentials, failed to access guest system using specified credentials: Verify VMWare tools is running properly on system and account used is Administrator account, Error is SystemError vix error codes = (3016, 0).`

  To correct the issue, restart the VMware Tools Windows service on the Guest OS, and then retry the guest file restore operation.

- Guest email shows ?????? for the file name

  This issue occurs when you use the guest file restore feature to restore files or folders with non-English characters in the names and the email notification displays "??????" for the restored file names. The email attachment correctly lists the names of the restored files and folders.

- Backups are not detached after guest file restore session is discontinued

  This issue occurs when you perform a guest file restore operation from a VM-consistent backup. While the guest file restore session is active, another VM-consistent backup is performed for the same VM. When the guest file restore session is disconnected, either manually or automatically after 24 hours, the backups for the session are not detached.

  To correct the issue, manually detach the VMDKs that were attached from the active guest file restore session.

Mounting and unmounting datastores

You can mount a datastore from a backup if you want to access files in the backup. You can either mount the backup to the same ESXi host where the backup was created or to an alternate ESXi host that has the same type of VM and host configurations. You can mount a datastore multiple times on a host.

Mounting a datastore backup

You can manually mount a datastore backup if you want to access the files in the backup.

Before you begin

- If you want to mount to an alternate ESXi host, you must ensure that the alternate ESXi host can connect to the storage and has the following:
  - Same UID and GID as that of the original host
  - Same virtual appliance for SnapCenter Plug-in for VMware vSphere version as that of original host
- Because the ESXi can only discover one unique LUN per datastore, the operation will fail if it finds more than one. This can occur if you start a mount operation before a previous mount operation has finished, or if you manually clone LUNs, or if clones are not deleted from storage during an unmount operation. To avoid discovery of multiple clones, you should clean up all stale LUNs on the storage.

About this task

NOTE: A mount operation might fail if the storage tier of the FabricPool where the datastore Is located is unavailable.

Steps

1. In the SnapCenter vSphere web client in vCenter, click  (Flex home) or **Menu** (HTML5) in the toolbar, and then select **Storage** from the drop-down list.
2. Right-click a datastore and select **NetApp SnapCenter** in the drop-down list, and then select **Mount Backup** in the secondary drop-down list.
3. On the **Mount Datastore** page, select a backup and a backup location, and then click **Finish**.
4. Optional: To verify that the datastore is mounted, perform the following:
   a. Click  in the toolbar, and then select **Storage** from the drop-down list.
   b. The left Navigator pane displays the datastore you mounted at the top of the list.

NOTE: If you perform an attach or mount operation on a SnapVault destination volume that is protected by SnapVault schedules and is running ONTAP 8.3, you might see an extra Snapshot copy listed in the attach or mount dialog screen. This occurs because the attach or mount operation clones the SnapVault destination volume and ONTAP updates the volume by creating a new Snapshot copy.

To prevent new Snapshot copies from being created when you clone the volume, turn off the ONTAP schedule for the SnapVault volume. Previously existing Snapshot copies are not deleted.

Unmounting a datastore backup

You can unmount a datastore backup when you no longer need to access the files in the datastore.

If a backup is listed as mounted in the SnapCenter vSphere web client GUI, but it is not listed in the unmount backup screen, then you need to use the REST API "`/backup/{backup-Id}/cleanup`" to clean up the out-of-bound datastores and then try the unmount procedure again.

If you attempt to mount a backup copy of an NFS datastore on a storage VM (SVM) with the root volume in a load-sharing mirror relationship and you might encounter the error "`You may have reached the maximum number of NFS volumes configured in the vCenter. Check the vSphere Client for any error messages.`" To prevent this problem, change the maximum volumes setting by navigating to **ESX** > **Manage** > **Settings** > **Advance System Settings** and changing the NFS.MaxVolumes value. Maximum value is 256.

Steps

1. In the SnapCenter vSphere web client, click  (Flex home) or **Menu** (HTML5) in the toolbar, and then select **Storage** from the drop-down list.
2. In the left Navigator pane, right-click a datastore, then select **NetApp SnapCenter** in the drop-down list, and then select **Unmount** in the secondary drop-down list.

   NOTE: Make sure that you select the correct datastore to unmount. Otherwise, you might cause an impact on production work.

3. In the **Unmount Cloned Datastore** dialog box, click the **Unmount the cloned datastore** option, and then click **Confirm**.

Managing resource groups for VMs and datastores

You can create, modify, and delete backup resource groups, and perform backup operations on resource groups.

You can perform the following tasks on resource groups for VMs and datastores:

- Suspend and resume scheduled operations on the resource group
- Create a resource group
- Add VMs or datastores to a resource group
- Delete VMs or datastores from a resource group
- Modify a resource group
- Create a backup using the resource group
- Delete a resource group

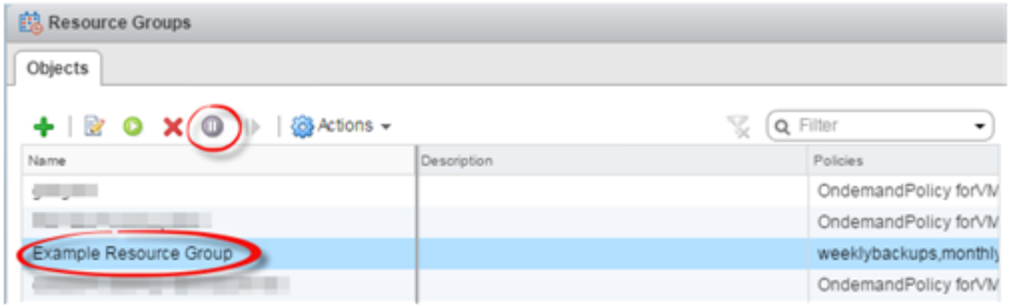
NOTE: Resource groups are called backup jobs in Virtual Storage Console (VSC).

Suspending and resuming operations on resource groups

You can temporarily disable scheduled operations from starting on a resource group. Later when you want, you can enable those operations.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Resource Groups**.
2. On the **Resource Groups** page, on the **Objects** tab, select a resource group in the table and click (Suspend).



3. In the **Suspend resource group** confirmation box, click **Yes** to confirm.

After you finish

On the Resource Groups page, the job status for the suspended resource is `Under_Maintenance`. You might need to scroll to the right of the table to see the Job Status column.

To resume backup operations, select the resource group, and then click (Resume). After backup operations are resumed, the Job Status changes to `Production`.

Modifying resource groups

You can remove or add resources in resource groups in vCenter, detach or attach policies, modify schedules, or modify any other resource group option.

About this task

If you want to modify the name of a resource group, do not use the following special characters in VM, datastore, policy, backup, or resource group names:

% & * $ # @ ! \ / : * ? " < > - | ; ' , .

An underscore character (_) is allowed.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Resource Groups**.
2. On the **Resource Groups** page, on the **Objects** tab, select a resource group in the table and then click (Edit).
3. On the left list in the **Edit Resource Group** wizard, click the category that you want to modify and enter your changes.

   You can make changes in multiple categories.
4. Click **Next** until you see the Summary page, and then click **Finish**.

Deleting resource groups

You can delete a resource group in vCenter if you no longer need to protect the resources in the resource group. You must ensure that all resource groups are deleted before you remove SnapCenter Plug-in for VMware vSphere from vCenter.

About this task

All resource group delete operations are performed as force deletes. The delete operation detaches all policies from the vCenter resource group, removes the resource group from SnapCenter Plug-in for VMware vSphere, and deletes all backups and Snapshot copies of the resource group.

NOTE: In a SnapVault relationship, the last Snapshot copy cannot be deleted; therefore, the resource group cannot be deleted. Before deleting a resource group that is part of a SnapVault relationship, you must use either OnCommand System Manager or use the ONTAP CLI to remove the SnapVault relationship, and then you must delete the last Snapshot copy.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Resource Groups**.
2. On the **Resource Groups** page, on the **Objects** tab, select a resource group in the table and then click (Delete).
3. In the **Delete resource group** confirmation box, click **Yes** to confirm.

Managing policies for VMs and datastores

You can create, modify, view, detach, and delete backup policies for SnapCenter Plug-in for VMware vSphere. Policies are required to perform data protection operations.

Detaching policies

You can detach policies from a SnapCenter VMware plug-in resource group when you no longer want those policies to govern data protection for the resources. You must detach a policy before you can remove it or before you modify the schedule frequency.

About this task

NOTE: The guidelines for detaching policies from the SnapCenter VMware plug-in resource groups using the SnapCenter vSphere web client differ from the guidelines for SnapCenter resource groups. For a SnapCenter vSphere web client resource group, it is possible to detach all policies, which leaves the resource group with no policy. However, to perform any data protection operations on that resource group, you must attach at least one policy.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Resource Groups**.
2. On the **Resource Groups** page, select a resource group in the table and then click (Edit).
3. On the **Policies** page of the **Edit Resource Group** wizard, clear the check mark next to the policies you want to detach.

   You can also add a policy to the resource group by checking the policy.
4. Make any additional modifications to the resource group in the rest of the wizard, and then click **Finish**.

Modifying policies

You can modify policies for a SnapCenter Plug-in for VMware vSphere resource group. You can modify the frequency, replication options, Snapshot copy retention settings, or scripts information while a policy is attached to a resource group.

About this task

Modifying SnapCenter VMware plug-in backup policies differs from modifying backup policies for SnapCenter application-based plug-ins. You do not need to detach policies from resource groups when you modify the plug-in policies.

Before you modify the replication or retention settings, you should consider the possible consequences.

- Increasing replication or retention settings

  Backups continue to accumulate until they reach the new setting.
- Decreasing replication or retention settings

  Backups in excess of the new setting are deleted when the next backup is performed.

NOTE: To modify a SnapCenter VMware plug-in policy schedule, you must modify the schedule in the plug-in resource group.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Policies**.
2. On the **Policies** page, select a policy, and then click then click  (Edit Policy) in the toolbar.
3. Modify the policy fields.
4. When you are finished, click **Update**.

Result

The changes take effect when the next scheduled backup is performed.

Deleting policies

If you no longer require a configured backup policy for SnapCenter Plug-in for VMware vSphere, you might want to delete it.

Before you begin

You must have detached the policy from all resource groups in the virtual appliance for SnapCenter before you can delete it.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Policies**.
2. On the **Policies** page, select a policy, and then click then click  (Remove) in the toolbar.
3. In the confirmation dialog box click **Yes**.

Managing backups of VMs and datastores

You can rename and delete backups performed by SnapCenter Plug-in for VMware vSphere. You can also delete multiple backups simultaneously.

Renaming backups

You can rename SnapCenter Plug-in for VMware vSphere backups if you want to provide a better name to improve searchability.

Steps

1. In the SnapCenter vSphere web client GUI, click (Flex home) or **Menu** (HTML5) in the toolbar, and then select **VMs and Templates** from the drop-down list.
2. In the left Navigator pane, select a VM for which you want to rename a backup, then select the **More Objects** tab, and then select the **Backups** tab.
3. Select the backup that you want to rename and click **Rename**.
4. On the **Rename Backup** dialog box, enter the new name, and click **OK**.

   Do not use the following special characters in VM, datastore, policy, backup, or resource group names: & * $ # @ ! \ / : * ? " < > - | ; ' , . An underscore character (_) is allowed.

Deleting backups

You can delete SnapCenter Plug-in for VMware vSphere backups if you no longer require the backup for other data protection operations. You can delete one backup or delete multiple backups simultaneously.

Before you begin

You cannot delete backups that are mounted. You must unmount a backup before you can delete it.

About this task

Snapshot copies on secondary storage are managed by your ONTAP retention settings, not by the SnapCenter VMware plug-in. Therefore, when you use the SnapCenter VMware plug-in to delete a backup, Snapshot copies on primary storage are deleted but Snapshot copies on secondary storage are not deleted. If a Snapshot copy still exists on secondary storage, the SnapCenter VMware plug-in retains the metadata associated with the backup to support restore requests. When the ONTAP retention process deletes the secondary Snapshot copy, then the SnapCenter VMware plug-in also deletes the metadata.

Steps

1. In the SnapCenter vSphere web client GUI, click (Flex home) or **Menu** (HTML5) in the toolbar, and then select **VMs and Templates** from the drop-down list.
2. In the left Navigator pane, select a VM, then select the More Objects tab, and then select the **Backups** tab.
3. Do one of the following:

To delete this many backups…	Do the following…
One	Select the backup and click **Delete**.

2 to 40	Select the backups, then click **Actions**, and then click **Delete** in the drop-down list. **NOTE**: You can select a maximum of 40 backups to delete.

4. Click **Yes** to confirm the delete operation.
5. Refresh the backup list by clicking the (refresh button) on the left vSphere menu bar.

Managing storage systems

Before you can back up or restore VMs or datastores using the SnapCenter vSphere web client, you must add the storage.

Modifying storage VMs

You can use the SnapCenter vSphere web client to modify the configurations of clusters and storage VMs that are registered in SnapCenter Plug-in for VMware vSphere and used for VM data protection operations.

NOTE: If you modify a storage VM that was automatically added as part of a cluster (sometimes called an implicit storage VM), then that storage VM changes to an explicit storage VM and can be separately deleted without changing the rest of the storage VMs in that cluster. On the Storage Systems page, the username is blank for implicit storage VMs; usernames are displayed only for explicit storage VMs in the cluster list and have the ExplicitSVM flag set to true.

NOTE: If you added storage VMs for application-based data protection operations using the SnapCenter GUI, you must use the same GUI to modify those storage VMs.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Storage Systems**.
2. On the **Storage Systems** page, select the storage VM to be modified and then click **Edit Storage System**.
3. On the **Edit Storage System** dialog box, enter the new values, and then click **Add** to apply the changes.

Renaming storage VMs

If you rename a VM after you added it to a resource group, the new name might not be displayed on the Resources page because the SnapCenter Plug-in for VMware vSphere acts on the VM UUID, not the name.

To make sure new VM names are displayed on the Resources page, do the following.

Steps

1. Edit the resource group and remove the VM.
2. Rename the VM.
3. Re-add the VM to the resource group.

Modifying the configured storage timeout

Even though backups have run successfully in the past, they might start failing when the time that the SnapCenter Plug-in for VMware vSphere must wait for the storage system exceeds the configured timeout period. If this condition occurs, you can increase the configured timeout.

You might encounter the error `Unable to discover resources on SCV: Unable to get storage details for datastore <xxx>…`

Steps

1. In the SnapCenter vSphere web client, click **Storage Systems**.
2. On the Storage Systems page, select the storage system to be modified and click **Edit**.

3. In the Timeout field, increase the number of seconds; 180 seconds is recommended for large environments.

Removing storage VMs using the SnapCenter VMware vSphere web client

You can use the SnapCenter vSphere web client to remove storage VMs from the inventory in vCenter.

NOTE: If you added storage VMs for application-based data protection operations using the SnapCenter GUI, you must use the same GUI to modify those storage VMs.

Before you begin

You must unmount all datastores in the storage VM before you can remove the storage VM.

About this task

NOTE: If a resource group has backups that reside on a storage VM that you remove, then subsequent backups for that resource group fail.

Steps

1. In the left Navigator pane of the SnapCenter vSphere web client, click **Storage Systems**.
2. On the **Storage Systems** page, select the storage VM to be removed and then click **Remove**.
3. In the **Remove Storage System** confirmation box, click **Yes** to confirm.
4. If the removed storage VM was managed by an ESXi 6.7 Server, then you must restart the web client service.

Managing SnapCenter Plug-in for VMware vSphere

You need to use the SnapCenter Plug-in for VMware vSphere management GUI to update the virtual appliance configuration, which includes vCenter credentials, virtual appliance credentials, and time zones for backups.

Accessing the maintenance console

You can manage your application, system, and network configurations by using the maintenance console for SnapCenter Plug-in for VMware vSphere. You can change your administrator password and maintenance password by using the maintenance console. You can also generate support bundles and start remote diagnostics by using the maintenance console.

Before you begin

Before stopping and restarting the SnapCenter Plug-in for VMware vSphere service, you should suspend all schedules.

About this task

- The defaults are "`maint`" as the username and "`admin123`" as the password to log in to the maintenance console for SnapCenter Plug-in for VMware vSphere.

  TIP: After deployment, modify the default login credentials.

- You must set a password for the "diag" user while enabling remote diagnostics.
  To obtain the root user permission to execute the command, use the `sudo <command>`.

Steps

1. Access the **Summary** tab of the virtual appliance and then click  to start the maintenance console.

   You can access the following maintenance console options:

Category	Available maintenance options
Application Configuration	Display virtual appliance summary Start or stop SnapCenter VMware plug-in service Change login username or password Change MySQL password Configure MySQL backup List MySQL backups Restore MySQL backup
System Configuration	Reboot or shutdown virtual machine Change 'maint' user password Change time zone Change NTP server Enable/Disable SSH Access Increase jail disk size (/jail) Upgrade Install VMware Tools
Network Configuration	Display or change IP address settings Display or change domain name search settings Display or change static routes Commit changes Ping a host
Support and Diagnostics	Generate support bundle Access diagnostic shell

	Enable remote diagnostic access Generate core dump bundle

Modifying the time zone for backups

When you configure a backup schedule for a SnapCenter Plug-in for VMware vSphere resource group, the schedule is automatically set for the time zone in which SnapCenter VMware plug-in is deployed. You can modify that time zone by using the SnapCenter Plug-in for VMware vSphere management GUI.

Before you begin

You must know the IP address and the log in credentials for the SnapCenter Plug-in for VMware vSphere management GUI.

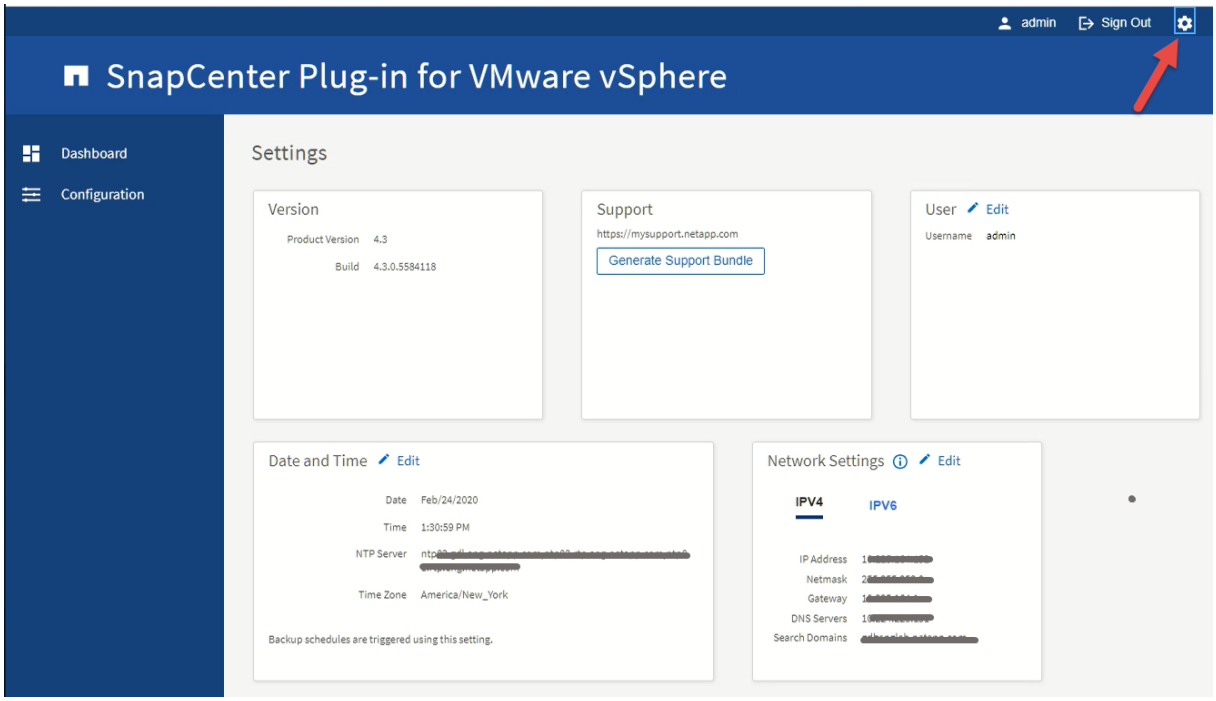
- The IP address was displayed when the SnapCenter VMware plug-in was deployed.
- Use the log in credentials provided during the deployment of the SnapCenter VMware plug-in or as later modified.

Steps

1. Log in to the SnapCenter VMware plug-in management GUI.

   Use the format `https://<appliance-IP-address>:8080`

2. Click the Settings icon in the top toolbar.



3. On the **Settings** page, in the **Date and Time** section, click **Edit**.
4. Select the new time zone and click **Save**.

   The new time zone will be used for all backups performed by the SnapCenter VMware plug-in.

Modifying the logon credentials for SnapCenter Plug-in for VMware vSphere

You can modify the logon credentials for the SnapCenter Plug-in for VMware vSphere management GUI.

Before you begin

You must know the IP address and the log on credentials for the SnapCenter Plug-in for VMware vSphere management GUI.

- The IP address was displayed when the SnapCenter VMware plug-in was deployed.
- Use the log in credentials provided during the deployment of the SnapCenter VMware plug-in or as later modified.

Steps

1. Log in to the SnapCenter VMware plug-in management GUI.

   Use the format `https://<appliance-IP-address>:8080`
2. Click the Settings icon in the top toolbar.
3. On the **Settings** page, in the **User** section, click **Edit**.
4. Enter the new username or password and click **Save**.

   IMPORTANT: If you change the password, it might take several minutes before all the services come back up.

Modifying the SnapCenter VMware plug-in password from the maintenance console

If you do not know the admin password for the SnapCenter Plug-in for VMware vSphere management GUI, you can set a new password from the maintenance console.

Before you begin

Before stopping and restarting the SnapCenter Plug-in for VMware vSphere service, you should suspend all schedules.

About this task

You must use the default "`maint`" as the username and "`admin123`" as the password to log in to the maintenance console of the SnapCenter VMware plug-in.

Steps

1. Access the **Summary** tab of the virtual appliance and then click to start the maintenance console.
2. Enter "**1**" for Application Configuration.
3. Enter "**4**" for Change username or password.
4. Enter the new password.

   The SnapCenter VMware virtual appliance service is stopped and restarted.

Modifying the vCenter logon credentials in SnapCenter Plug-in for VMware vSphere

You can modify the vCenter logon credentials that are configured in SnapCenter Plug-in for VMware vSphere. These settings are used by the plug-in to access vCenter.

Before you begin

You must know the IP address and the log on credentials for the SnapCenter Plug-in for VMware vSphere management GUI.

- The IP address was displayed when the SnapCenter VMware plug-in was deployed.
- Use the log in credentials provided during the deployment of the SnapCenter VMware plug-in or as later modified.

Steps

1. Log in to the SnapCenter VMware plug-in management GUI.

   Use the format `https://<appliance-IP-address>:8080`
2. In the left navigation pane, click **Configuration**.
3. On the **Configuration** page, in the **vCenter** section, click **Edit**.
4. Enter the new username or password and then click **Save**.

   Do not modify the port number.

Modifying the network settings

You can modify the network settings that are configured in SnapCenter Plug-in for VMware vSphere. These settings are used by the plug-in to access vCenter.

Before you begin

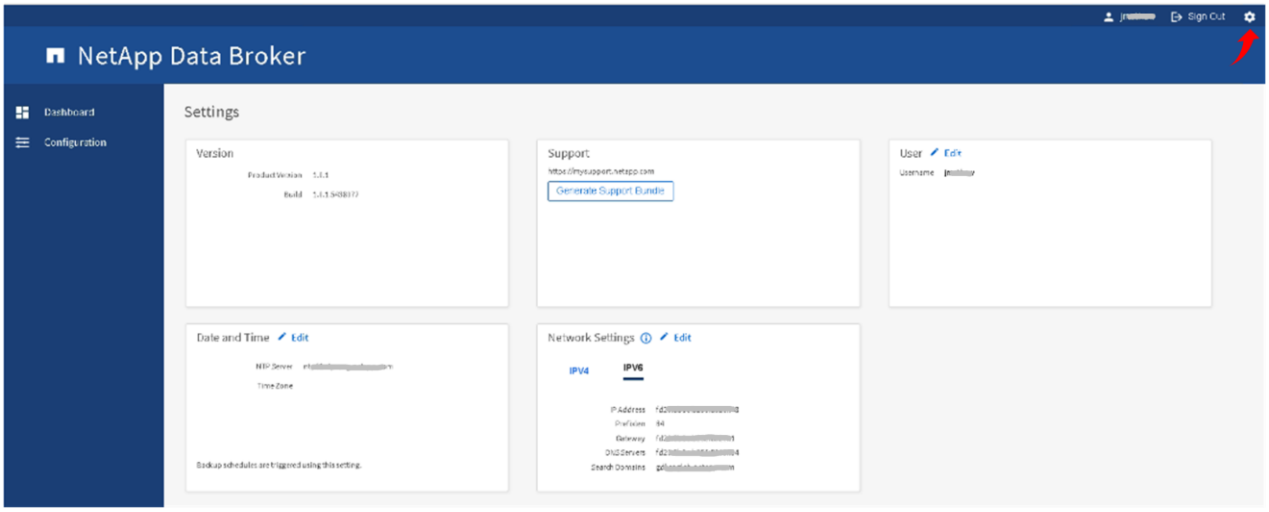
You must know the IP address and the log on credentials for the SnapCenter Plug-in for VMware vSphere management GUI.

- The IP address was displayed when the SnapCenter VMware plug-in was deployed.
- Use the log in credentials provided during the deployment of the SnapCenter VMware plug-in or as later modified.

Steps

1. Log in to the SnapCenter VMware plug-in management GUI.

   Use the format `https://<appliance-IP-address>:8080`
2. Click the Settings icon in the top toolbar.



3. On the **Settings** page, in the **Network Settings** section, click **IPv4** or **IPv6**, and then click **Edit**.
4. Enter the new information and click **Save**.

   If you are removing a network setting, do the following:

- IPv4: In the **IP Address** field, enter `0.0.0.0` and then click **Save**.
- IPv6: In the **IP Address** field: enter `::0` and then click **Save**.

> **NOTE**: If you are using both IPv4 and IPv6, you cannot remove both network settings. The remaining network must specify the DNS Servers and Search Domains fields.

If the SnapCenter vSphere web client does not respond after you modify the IP address of the SnapCenter VMware plug-in, see the KB article: SnapCenter vSphere web client GUI hangs after changing the OVA IP.

Enabling SSH for SnapCenter Plug-in for VMware vSphere

When the SnapCenter VMware plug-in is deployed, SSH is disabled by default.

Steps

1. From the SnapCenter vSphere web client, select the VM where the SnapCenter VMware plug-in is located.
2. Right-click the VM and select **Open Console** to open a maintenance console window.

   The defaults for the SnapCenter VMware plug-in maintenance console are as follows:

   Username: "`maint`"

   Password: "`admin123`"
3. From the Main Menu, select menu option **2) System Configuration**.
4. From the System Configuration Menu, select menu option **6) Enable SSH access** and then enter "**y**" at the confirmation prompt.
5. Wait for the message "Enabling SSH Access…" then press **Enter** to continue, and then enter **X** at the prompt to exit Maintenance Mode.

Creating and importing certificates

The SnapCenter VMware plug-in employs SSL encryption for secure communication with the client browser. While this does enable encrypted data across the wire, creating a new self-signed certificate, or using your own Certificate Authority (CA) infrastructure or a third party CA ensures that the certificate is unique for your environment. See the KB article: How to create and/or import an SSL certificate to VMware plug-in for SnapCenter.

Stopping SnapCenter Plug-in for VMware vSphere when in Linked Mode

If you stop the SnapCenter VMware plug-in service in a vCenter that is in Linked Mode, resource groups are not available in all the linked vCenters, even when the SnapCenter VMware plug-in service is running in the other linked vCenters.

You must unregister the SnapCenter VMware plug-in extensions manually.

Steps

1. On the linked vCenter that has the SnapCenter VMware plug-in service stopped, navigate to the Managed Object Reference (MOB) manager.
2. In the Properties option, select Extension Manager to display a list of the registered extensions.
3. Unregister the extensions `com.netapp.scvm.webclient` and `com.netapp.aegis`.

Disabling and enabling SnapCenter Plug-in for VMware vSphere

If you no longer need the SnapCenter data protection features, you must change the configuration of the SnapCenter VMware plug-in. For example, if you deployed the plug-in in a test environment, you might need to disable the SnapCenter features in that environment and enable them in a production environment.

Before you begin

- You must have administrator privileges.
- Make sure that no SnapCenter jobs are running.

About this task

When you disable the SnapCenter VMware plug-in, all resource groups are suspended and the plug-in is unregistered as an extension in vCenter.

When you enable the SnapCenter VMware plug-in, the plug-in is registered as an extension in vCenter, all resource groups are in production mode, and all schedules are enabled.

Steps

1. Optional: Back up the SnapCenter VMware plug-in MySQL repository in case you want to restore it to a new virtual appliance.
   Backing up the SnapCenter Plug-in for VMware vSphere MySQL database
2. Log in to the SnapCenter VMware plug-in management GUI.

   The IP of the SnapCenter VMware plug-in is displayed when you deploy the plug-in.
3. Click **Configuration** in the left navigation pane, and then click the Service option in the **Plug-in Details** section to disable the plug-in.
4. Confirm your choice.
   - If you only used the SnapCenter VMware plug-in to perform VM consistent backups

     The plug-in is disabled, and no further action is required.
   - If you used the SnapCenter VMware plug-in to perform application-consistent backups

     The plug-in is disabled, and further cleanup is required.

     a. Log in to VMware vSphere.

     b. In the left navigator screen, right-click the instance of the SnapCenter VMware plug-in (the name of the `.ova` file that was used when the virtual appliance was deployed) and select **Delete from Disk**.

     c. Log in to SnapCenter and remove the vSphere host.

Removing SnapCenter Plug-in for VMware vSphere

If you no longer need to use the SnapCenter data protection features, you must disable the SnapCenter VMware plug-in to unregister it from Vcenter, then remove the SnapCenter VMware plug-in from vCenter, and then manually delete leftover files.

Before you begin

- You must have administrator privileges.
- Make sure that no SnapCenter jobs are running.

Steps

1. Log in to the SnapCenter VMware plug-in management GUI.

   The IP of the SnapCenter VMware plug-in is displayed when you deploy the plug-in.

2. Click **Configuration** in the left navigation pane, and then click the Service option in the **Plug-in Details** section to disable the plug-in.
3. Log in to VMware vSphere.
4. In the left navigator screen, right-click the instance of the SnapCenter VMware plug-in (the name of the `.ova` file that was used when the virtual appliance was deployed) and select **Delete from Disk**.
5. Manually delete the following files in the pickup folder of the vCenter server:

   ```
   vsc-httpclient3-security.jar
   scv-api-model.jar
   scvm_webui_service.jar
   scvm_webui_ui.war
   gson-2.5.jar
   ```

6. If you used the SnapCenter VMware plug-in to support other SnapCenter plug-ins for application-consistent backups, log in to SnapCenter and remove the vSphere host.

After you finish

The virtual appliance is still deployed but the SnapCenter VMware plug-in is removed.

NOTE: After removing the host VM for the SnapCenter VMware plug-in, the plug-in might remain listed in vCenter until the local vCenter cache is refreshed. However, because the plug-in was removed, no SnapCenter VMware vSphere operations can be performed on that host. If you want to refresh the local vCenter cache, first make sure the appliance is in a Disabled state on the SnapCenter VMware plug-in Configuration page, and then restart the vCenter web client service.

Managing the SnapCenter vSphere web client service

If the SnapCenter vSphere web client starts to behave incorrectly, you might need to clear the browser cache. If the problem persists, then restart the SnapCenter vSphere web client service.

Restarting the SnapCenter vSphere web client service in a Linux vCenter

If your vCenter is on a Linux appliance, then you must use Linux commands to restart the SnapCenter vSphere web client service.

Before you begin

You must be running vCenter 6.5 or later.

Steps

1. If you are running vCenter 6.5 or later, Flex or HTML5, perform the following:
   a) Use SSH to log in to the vCenter Server Appliance as root.
   b) Access the Appliance Shell or BASH Shell by using the following command:
      `shell`
   c) Stop the web client service by using the following command:

Client	Command
Flex	`service-control --stop vsphere-client`
HTML5	`service-control --stop vsphere-ui`

   d) Delete all stale scvm packages on vCenter by using the following command:

Client	Command
Flex	`etc/vmware/vsphere-client/vc-packages/vsphere-client-serenity/` `rm -rf com.netapp.scvm.webclient-<version_number>`
HTML5	`etc/vmware/vsphere-ui/vc-packages/vsphere-client-serenity/` `rm -rf com.netapp.scvm.webclient-<version_number>`

IMPORTANT: Do not remove the VASA or VSC7.x and later packages.

   e) Start the web client service by using the following command:

Client	Command
Flex	`service-control --start vsphere-client`
HTML5	`service-control --start vsphere-ui`

2. If you are running vCenter 6.0 update 3 Flex (HTML5 is not supported), perform the following:
   a) Use SSH to log in to the vCenter Server Appliance as root.
   b) Access the Appliance Shell or BASH Shell by using the following command:
      `shell`
   c) Navigate to the directory by using the following command:
      `cd /bin`
   d) Stop the web client service by using the following command:
      `service-control --stop vsphere-client`
   e) Delete all stale scvm packages on vCenter by using the following command:
      `etc/vmware/vsphere-client/vc-packages/vsphere-client-serenity/`
      `rm -rf com.netapp.scvm.webclient-<version_number>`
   f) Start the web client service by using the following command:

```
service-control --start vsphere-client
```

Restarting the SnapCenter vSphere web client service in a Windows vCenter

If your vCenter is on a Windows host, then you must use Windows commands to restart the SnapCenter web client service.

Before you begin

You must be running vCenter 6.5 or later.

Steps

1. If you are running vCenter 6.5 or later, perform the following:
   a) Stop the web client service by using the following command:

Client	Command
Flex	`service-control --stop vsphere-client`
HTML5	`service-control --stop vsphere-ui`

   Wait for the message `Completed Stop service request.`

   b) Delete all stale `scvm` packages on vCenter by performing the following:
      i. Navigate to the vCenter `vsphere-client-serenity/` folder.

Client	Location of folder
Flex	`C:\ProgramData\VMware\vCenterServer\cfg\vsphere-client\vc-packages\vsphere-client-serenity\`
HTML5	`C:\ProgramData\VMware\vCenterServer\cfg\vsphere-ui\vc-packages\vsphere-client-serenity\`

      ii. Delete all plug-in folders with the following name: `com.netapp.scvm.webclient-<version_number>`.

   c) Restart the web client service by using the following command:

Client	Command
Flex	`service-control --start vsphere-client`
HTML5	`service-control --start vsphere-ui`

   Wait for the message `Completed Start service request.`

2. If you are running vCenter 6.0 update 3 or later, perform the following:
   a) Open Server Manager on the Windows system on which vCenter Server is running.
   b) Click **Configuration** > **Services**.
   c) Select **VMware vSphere Web Client** and click **Stop**.
   d) Delete all stale packages on vCenter by performing the following:
      i. Navigate to the vCenter `vsphere-client-serenity/` folder.

Client	Location of folder

Flex	vCenter Server Appliance:
	`etc/vmware/vsphere-client/vc-packages/vsphere-client-serenity/`
	vCenter Server for Windows:
	`C:\ProgramData\VMware\vCenterServer\cfg\vsphere-client\vc-packages\vsphere-client-serenity\`
	Mac OS:
	`/var/lib/vmware/vsphere-client/vsphere-client/vc-packages/vsphere-client-serenity/`

HTML5	vCenter Server Appliance: `etc/vmware/vsphere-ui/vc-packages/vsphere-client-serenity/`

	vCenter Server for Windows:
	`C:\ProgramData\VMware\vCenterServer\cfg\vsphere-ui\vc-packages\vsphere-client-serenity\`
	Mac OS:
	`/var/lib/vmware/vsphere-ui/vsphere-client/vc-packages/vsphere-client-serenity/`

ii. Delete all plug-in folders with the following name: `com.netapp.scvm.webclient-<version_number>`.

e) Select **VMware vSphere Web Client** and click **Start**.

Using REST APIs for VMware vSphere

You can use the SnapCenter Plug-in for VMware vSphere REST APIs to perform common data protection operations. The plug-in has different Swagger web pages from the Windows SnapCenter Swagger web pages.

- REST API workflows are documented for the following operations on VMs and datastores using the REST APIs for VMware vSphere:
  - Add and modify storage VMs and clusters
  - Create and modify resource groups
  - Backup VMs, scheduled and on-demand
  - Restore VMs and deleted VMs
  - Restore VMDKs
  - Mount and unmount datastores
- Operations that are not supported by the REST APIs for VMware vSphere
  - Guest file restore
  - Installation and configuration of the SnapCenter VMware plug-in
  - Assign RBAC roles or access to users
- `uri` parameter

  The `uri` parameter always returns a "null" value.
- Login timeout

  The default timeout is 120 minutes (2 hours). You can configure a different timeout value in the vCenter settings.
- Token management

  For security, REST APIs use a mandatory token that is passed with each request and is used in all API calls for client validation. The REST APIs for VMware vSphere use the VMware authentication API to obtain the token. VMware provides the token management.

  To obtain the token, use `/4.1/auth/login` REST API and provide the vCenter credentials.
- API version designations

  Each REST API name includes the SnapCenter version number in which the REST API was first released. For example, the REST API `/4.1/datastores/{moref}/backups` was first released in SnapCenter 4.1.

  REST APIs in future releases will usually be backward compatible and will be modified to accommodate new features as needed.

Accessing REST APIs using the Swagger API web page

REST APIs are exposed through the Swagger web page. You can access the Swagger web page to display the SnapCenter Server or SnapCenter Plug-in for VMware vSphere REST APIs, as well as to manually issue an API call. You can use SnapCenter Plug-in for VMware vSphere REST APIs to perform protection operations on VMs and datastores.

The plug-in has different Swagger web pages from the Windows SnapCenter Swagger web pages.

Before you begin

For SnapCenter Plug-in for VMware vSphere REST APIs, you must know either the IP address or the host name of the SnapCenter VMware plug-in.

NOTE: The plug-in only supports REST APIs for the purpose of integrating with third party applications and does not support PowerShell cmdlets or a CLI.

Steps

1. From a browser, enter the URL to access the plug-in Swagger web page:

   `https://<appliance_IP_address_or_host_name>:8144/api/swagger-ui.html#`

   NOTE: Ensure that the REST API URL does not have the following characters: +, ., %, and &.

   #### Example

   Access the SnapCenter VMware plug-in REST APIs:

   ```
   https://192.0.2.82:8144/api/swagger-ui.html#
   https://OVAhost:8144/api/swagger-ui.html#
   ```

   Log ins use the vCenter authentication mechanism to generate the token.

2. Click an API resource type to display the APIs in that resource type.

REST API workflows for adding and modifying storage VMs

To perform add and modify storage VM operations using the SnapCenter Plug-in for VMware vSphere REST APIs, you must follow the prescribed sequence of REST API calls.

For each REST API, add `https://<server>:<port>` at the front of the REST API to form a complete endpoint.

Workflow for adding storage VM operations

Step	REST API	Comments
1	`/4.1/storage-system`	`Add Storage System` adds the specified storage VM to SnapCenter Plug-in for VMware vSphere.

Workflow for modifying storage VM operations

Step	REST API	Comments
1	`/4.1/storage-system`	`getSvmAll` gets the list of all available storage VMs. Note the **name** of the storage VM that you want to modify.
2	`/4.1/storage-system`	`Modify Storage System` modifies the specified storage VM. Pass the **name** from Step 1 in addition to all the other required attributes.

REST API workflows for creating and modifying resource groups

To perform create and modify resource group operations using the SnapCenter Plug-in for VMware vSphere REST APIs, you must follow the prescribed sequence of REST API calls.

For each REST API, add `https://<server>:<port>` at the front of the REST API to form a complete endpoint.

Workflow for creating resource groups

Step	REST API	Comments
1	`/4.1/policies`	`Get Policies` gets the list of VMware vSphere web client policies. Note the **policyId** that you want to use when creating the resource group and the policy **frequency**. If no policies are listed, then use the `Create Policy` REST API to create a new policy.
2	`/4.1/resource-groups`	`Create a Resource Group` creates a resource group with the specified policy. Pass the **policyId** from Step 1 and enter the policy **frequency** details in addition to all other required attributes.

Workflow for modifying resource groups

Step	REST API	Comments
1	`/4.1/resource-groups`	`Get List of Resource Groups` gets the list of VMware vSphere web client resource groups. Note the **resourceGroupId** that you want to modify.
2	`/4.1/policies`	If you want to modify the assigned policies, `Get Policies` gets the list of VMware vSphere web client policies. Note the **policyId** that you want to use when modifying the resource group and the policy **frequency**.
3	`/4.1/resource-groups/{resouceGroupId}`	`Update a Resource Group` modifies the specified resource group. Pass the **resourceGroupId** from Step 1. Optionally, pass the **policyId** from Step 2 and enter the **frequency** details in addition to all other required attributes.

REST API workflow for backing up on demand

To perform backup operations on demand using the SnapCenter Plug-in for VMware vSphere REST APIs, you must follow the prescribed sequence of REST API calls.

For each REST API, add `https://<server>:<port>` at the front of the REST API to form a complete endpoint.

Step	REST API	Comments
1	`/4.1/resource-groups`	`Get List of Resource Groups` gets the list of VMware vSphere web client resource groups. Note the **resourceGroupId** and the **policyId** for the resource group you want to back up.
2	`/4.1/resource-groups/backupnow`	`Run a backup on a Resource Group` backs up the resource group on demand. Pass the **resourceGroupId** and the **policyId** from Step 1.

REST API workflow for restoring VMs

To perform restore operations for VM backups using the SnapCenter Plug-in for VMware vSphere REST APIs, you must follow the prescribed sequence of REST API calls.

For each REST API, add `https://<server>:<port>` at the front of the REST API to form a complete endpoint.

Step	REST API	Comments

1	Go to `http://<vCenter-IP>/mob`	Find the VM moref from the VMware Managed Objects URL. Note the **moref** for the VM that you want to restore.
2	`/4.1/vm/{moref}/backups`	`Get VM Backups` gets a list of backups for the specified VM. Pass the **moref** from Step 1. Note the **backupId** of the backup you want to restore.
3	`/4.1/vm/backups/{backupId}/snapshotlocations`	`Get snapshot locations` gets the location of the Snapshot copy for the specified backup. Pass the **backupId** from Step 2. Note the **snapshotLocationsList** information.
4	`/4.1/vm/{moref}/backups/availableesxhosts`	`Get available ESX Hosts` gets the information for the host on which the backup is stored. Note the **availableEsxHostsList** information.
5	`/4.1/vm/{moref}/backups/{backupId}/restore`	`Restore a VM from a backup` restores the specified backup. Pass the information from Steps 3 and 4 in the **restoreLocations** attribute. **Note**: If the VM backup is a partial backup, set the `restartVM` parameter to "false". You cannot restore a VM that is a template.

REST API workflow for restoring deleted VMs

To perform restore operations for VM backups using the SnapCenter Plug-in for VMware vSphere REST APIs, you must follow the prescribed sequence of REST API calls.

For each REST API, add `https://<server>:<port>` at the front of the REST API to form a complete endpoint.

Step	REST API	Comments
1	Go to `http://<vCenter-IP>/mob`	Find the VM uuid from the VMware Managed Objects URL. Note the **uuid** for the VM that you want to restore.
2	`/4.1/vm/{uuid}/backups`	`Get VM Backups` gets a list of backups for the specified VM. Pass the **uuid** from Step 1. Note the **backupId** of the backup you want to restore.
3	`/4.1/vm/backups/{backupId}/snapshotlocations`	`Get snapshot locations` gets the location of the Snapshot copy for the specified backup. Pass the **backupId** from Step 2. Note the **snapshotLocationsList** information.
4	`/4.1/vm/{moref}/backups/availableesxhosts`	`Get available ESX Hosts` gets the information for the host on which the backup is stored. Note the **availableEsxHostsList** information.
5	`/4.1/vm/{uuid}/backups/{backupId}/restore`	`Restore VM from a backup using uuid or restore a deleted VM` restores the specified backup. Pass the **uuid** from Step 1. Pass the **backupId** from Step 2. Pass the information from Steps 3 and 4 in the **restoreLocations** attribute. **NOTE**: If the VM backup is a partial backup, set the `restartVM` parameter to "false". You cannot restore a VM that is a template.

REST API workflow for restoring VMDKs

To perform restore operations for VMDKs using the SnapCenter Plug-in for VMware vSphere REST APIs, you must follow the prescribed sequence of REST API calls.

For each REST API, add `https://<server>:<port>` at the front of the REST API to form a complete endpoint.

Step	REST API	Comments
1	Go to `http://<vCenter-IP>/mob`	Find the VM moref from the VMware Managed Objects URL. Note the **moref** for the VM in which the VMDK is located.
2	`/4.1/vm/{moref}/backups`	`Get VM Backups` gets a list of backups for the specified VM. Pass the **moref** from Step 1. Note the **backupId** of the backup you want to restore.
3	`/4.1/vm/backups/{backupId}/snapshotlocations`	`Get snapshot locations` gets the location of the Snapshot copy for the specified backup. Pass the **backupId** from Step 2. Note the **snapshotLocationsList** information.
4	`/4.1/vm/{moref}/backups/vmdklocations`	`Get Vmdk Locations` gets a list of VMDKs for the specified VM. Note the **vmdkLocationsList** information.
5	`/4.1/vm/{ moref}/backups/{backupId}/availabledatastores`	`Get Available Datastores` gets a list of datastores that are available for the restore operation. Pass the **moref** from Step 1. Pass the **backupId** from Step 2. Note the **DatastoreNameList** information.
6	`/4.1/vm/{moref}/backups/availableesxhosts`	`Get available ESX Hosts` gets the information for the host on which the backup is stored. Pass the **moref** from Step 1. Note the **availableEsxHostsList** information.
7	`/4.1/vm/{moref}/backups/{backupId}/restorevmdks`	`Restore a VMDK from a backup` restores the specified VMDK from the specified backup. In the **esxHost** attribute, pass the information from **availableEsxHostsList** in Step 6. Pass the information from Steps 3 through 5 to the **vmdkRestoreLocations** attribute: • In the **restoreFromLocation** attribute, pass the information from **snapshotLocationsList** in Step 3. • In the **vmdkToRestore** attribute, pass the information from **vmdkLocationsList** in Step 4. • In the **restoreToDatastore** attribute, pass the information from **DatastoreNameList** in Step 5.

REST API workflows for attaching and detaching VMDKs

To perform attach and detach operations for VMDKs using the SnapCenter Plug-in for VMware vSphere REST APIs, you must follow the prescribed sequence of REST API calls.

For each REST API, add `https://<server>:<port>` at the front of the REST API to form a complete endpoint.

Workflow for attaching VMDKs

Step	REST API	Comments

1	Go to `http://<vCenter-IP>/mob`	Find the VM moref from the VMware Managed Objects URL. Note the **moref** for the VM to which you want to attach a VMDK.
2	`/4.1/vm/{moref}/backups`	`Get VM Backups` gets a list of backups for the specified VM. Pass the **moref** from Step 1. Note the **backupId** of the backup you want to restore.
3	`/4.1/vm/{moref}/backups/{backupId}/vmdklocations`	`Get VMDK Locations` gets a list of VMDKs for the specified VM. Pass the **backupId** from Step 2 and the **moref** from Step 1. Note the **vmdkLocationsList** information.
4	`/4.1/vm/{moref}/attachvmdks`	`Attach VMDKs` attaches the specified VMDK to the original VM. Pass the **backupId** from Step 2 and the **moref** from Step 1. Pass the **vmdkLocationsList** from Step 3 to the **vmdkLocations** attribute. **NOTE**: To attach a VMDK to a different VM, pass the moref of the target VM in the **alternateVmMoref** attribute.

Workflow for detaching VMDKs

Step	REST API	Comments
1	Go to `http://<vCenter-IP>/mob`	Find the VM moref from the VMware Managed Objects URL. Note the **moref** for the VM on which you want to detach a VMDK.
2	`/4.1/vm/{moref}/backups`	`Get VM Backups` gets a list of backups for the specified VM. Pass the **moref** from Step 1. Note the **backupId** of the backup you want to restore.
3	`/4.1/vm/{moref}/backups/{backupId}/vmdklocations`	`Get VMDK Locations` gets a list of VMDKs for the specified VM. Pass the **backupId** from Step 2 and the **moref** from Step 1. Note the **vmdkLocationsList** information.
4	`/4.1/vm/{moref}/detachvmdks`	`Detach VMDKs` detaches the specified VMDK. Pass the **moref** from Step 1. Pass the VMDK **vmdkLocationsList** details from Step 3 to the **vmdksToDetach** attribute.

REST API workflows for mounting and unmounting datastores

To perform mount and unmount operations for datastore backups using the SnapCenter Plug-in for VMware vSphere REST APIs, you must follow the prescribed sequence of REST API calls.

For each REST API, add `https://<server>:<port>` at the front of the REST API to form a complete endpoint.

Workflow for mounting datastores

Step	REST API	Comments

1	Go to `http://<vCenter-IP>/mob`	Find the datastore moref from the VMware Managed Objects URL. Note the **moref** for the datastore that you want to mount.
2	`/4.1/datastores/{moref}/backups`	`Get the list of backups for a datastore` gets a list of backups for the specified datastore. Pass the **moref** from Step 1. Note the **backupId** that you want to mount.
3	`/4.1/datastores/backups/{backupId}/snapshotlocators`	`Get the list of Snapshot Locations` gets details about the location of the specified backup. Pass the **backupId** from Step 2. Note the **datastore** and the **location** from the **snapshotLocationsList** list.
4	`/4.1/datastores/{moref}/availableEsxHosts`	`Get the list of Available Esxi Hosts` gets the list of ESXi hosts that are available for mount operations. Pass the **moref** from Step 1. Note the **availableEsxHostsList** information.
5	`/4.1/datastores/backups/{backupId}/mount`	`Mount datastores for a backup` mounts the specified datastore backup. Pass the **backupId** from Step 2. In the **datastore** and **location** attributes, pass the information from **snapshotLocationsList** in Step 3. In the **esxHostName** attribute, pass the information from **availableEsxHostsList** in Step 4.

Workflow for unmounting datastores

Step	REST API	Comments
1	`/4.1/datastores/backups/{backupId}/mounted`	`Get the list of mounted datastores.` Note the datastore **moref**(s) that you want to unmount.
2	`/4.1/datastores/unmount`	`UnMount datastores for a backup` unmounts the specified datastore backup. Pass the datastore **moref**(s) from Step 1.

REST APIs for downloading jobs and generating reports

To generate reports and download logs for VMware vSphere web client jobs using the SnapCenter Plug-in for VMware vSphere REST APIs, you must use the REST API calls for VMware vSphere.

For each REST API, add `https://<server>:<port>` at the front of the REST API to form a complete endpoint.

Getting job details

Use the following REST APIs in the Jobs section to get detailed information on jobs:

REST API	Comments
`/4.1/jobs`	`Get all jobs` gets the job details for multiple jobs. You can narrow the scope of the request by specifying a job type, such as `backup`, `mountBackup`, or `restore`.
`/4.1/jobs/{id}`	`Get job details` gets detailed information for the specified job.

Downloading logs

Use the following REST API in the Jobs section to download job logs:

REST API	Comments
`/4.1/jobs/{id}/logs`	`getJobLogsById` downloads the logs for the specified job.

Generating reports

Use the following REST APIs in the Reports section to generate reports:

REST API	Comments
`4.1/reports/protectedVM`	`Get Protected VM List` gets a list of the protected VMs during the last seven days.
`/4.1/reports/unProtectedVM`	`Get Unprotected VM List` gets a list of the unprotected VMs during the last seven days.

Using advanced settings

To improve operational efficiency, you can modify the `scbr.override` configuration file to change default values. These values control settings such as the number of VMware snapshots that are created or deleted during a backup or the amount of time before a backup script stops running.

The `scbr.override` configuration file is used by the SnapCenter Plug-in for VMware vSphere environments that support SnapCenter application-based data protection operations. If this file does not exist, then you must create it from the template file.

Creating the `scbr.override` configuration file

1. Go to `\opt\netapp\scvservice\standalone_aegis\etc\scbr\scbr.override-template`.
2. Copy the `scbr.override-template` file to a new file called `scbr.override` in the `\opt\netapp\scvservice\standalone_aegis\etc\scbr` directory.

Using the `scbr.override` configuration file

- By default, the template uses "#" to comment the configuration properties. To use a property to modify a configuration value, you must remove the "#" characters.
- You must restart the service on the SnapCenter Plug-in for VMware vSphere host for the changes to take effect.

Properties you can override to customize your configuration

You can use the properties that are listed in the `scbr.override` configuration file to change default values.

`dashboard.protected.vm.count.interval=7`

Specifies the number of days for which the dashboard displays VM protection status.

The default value is "7".

`guestFileRestore.guest.operation.interval=5`

Specifies the time interval, in seconds, that SnapCenter Plug-in for VMware vSphere monitors for completion of guest operations on the guest (Online Disk and Restore Files). The total wait time is set by `guestFileRestore.online.disk.timeout` and `guestFileRestore.restore.files.timeout`.

The default value is "5".

`guestFileRestore.monitorInterval=30`

Specifies the time interval, in minutes, that the SnapCenter VMware plug-in monitors for expired guest file restore sessions. Any session that is running beyond the configured session time is disconnected.

The default value is "30".

`guestFileRestore.online.disk.timeout=100`

Specifies the time, in seconds, that the SnapCenter VMware plug-in waits for an online disk operation on a guest VM to complete. Note that there is an additional 30-second wait time before the plug-in polls for completion of the online disk operation.

The default value is "100".

`guestFileRestore.restore.files.timeout=3600`

Specifies the time, in seconds, that the SnapCenter VMware plug-in waits for a restore files operation on a guest VM to complete. If time is exceeded, the process is ended and the job is marked as failed.

The default value is "3600" (1 hour).

guestFileRestore.robocopy.directory.flags=/R:0 /W:0 /ZB /CopyAll /EFSRAW /A-:SH /e /NJH /NDL /NP

Specifies the extra robocopy flags to use when copying directories during guest file restore operations.

Do not remove /NJH or add /NJS because this will break the parsing of the restore output.

Do not allow unlimited retries (by removing the /R flag) because this might cause endless retries for failed copies.

The default values are "/R:0 /W:0 /ZB /CopyAll /EFSRAW /A-:SH /e /NJH /NDL /NP" .

guestFileRestore.robocopy.file.flags=/R:0 /W:0 /ZB /CopyAll /EFSRAW /A-:SH /NJH /NDL /NP

Specifies the extra robocopy flags to use when copying individual files during guest file restore operations.

Do not remove /NJH or add /NJS because this will break the parsing of the restore output.

Do not allow unlimited retries (by removing the /R flag) because this might cause endless retries for failed copies.

The default values are "/R:0 /W:0 /ZB /CopyAll /EFSRAW /A-:SH /NJH /NDL /NP" .

guestFileRestore.sessionTime=1440

Specifies the time, in minutes, that SnapCenter Plug-in for VMware vSphere keeps a guest file restore session active.

The default value is "1440" (24 hours).

guestFileRestore.use.custom.online.disk.script=true

Specifies whether to use a custom script for onlining disks and retrieving drive letters when creating guest file restore sessions. The script must be located at `[Install Path] \etc\guestFileRestore_onlineDisk.ps1`. A default script is provided with the installation. The values `[Disk_Serial_Number]`, `[Online_Disk_Output]`, and `[Drive_Output]` are replaced in the script during the attach process.

The default value is "false".

include.esx.initiator.id.from.cluster=true

Specifies that the SnapCenter VMware plug-in should include iSCSI and FCP intiator IDs from all the ESXi hosts in the cluster in the application over VMDK workflows.

The default value is "false".

max.concurrent.ds.storage.query.count=15

Specifies the maximum number of concurrent calls that the SnapCenter VMware plug-in can make to the SnapCenter Server to discover the storage footprint for the datastores. The plug-in makes these calls when you restart the Linux service on the SnapCenter VMware plug-in VM host.

nfs.datastore.mount.retry.count=3

Specifies the maximum number of times the SnapCenter VMware plug-in tries to mount a volume as a NFS Datastore in vCenter.

The default value is "3".

nfs.datastore.mount.retry.delay=60000

Specifies the time, in milliseconds, that the SnapCenter VMware plug-in waits between attempts to mount a volume as a NFS Datastore in vCenter.

The default value is "60000" (60 seconds).

script.virtual.machine.count.variable.name= VIRTUAL_MACHINES

Specifies the environmental variable name that contains the virtual machine count. You must define the variable before you execute any user-defined scripts during a backup job.

For example, VIRTUAL_MACHINES=2 means that two virtual machines are being backed up.

script.virtual.machine.info.variable.name=VIRTUAL_MACHINE.%s

Provides the name of the environmental variable that contains information about the nth virtual machine in the backup. You must set this variable before executing any user defined scripts during a backup.

For example, the environmental variable VIRTUAL_MACHINE.2 provides information about the second virtual machine in the backup.

script.virtual.machine.info.format= %s|%s|%s|%s|%s

Provides information about the virtual machine. The format for this information, which is set in the environment variable, is the following: `VM name|VM UUID| VM power state (on|off)|VM snapshot taken (true|false)|IP address(es)`

The following is an example of the information you might provide:
`VIRTUAL_MACHINE.2=VM 1|564d6769-f07d-6e3b-68b1f3c29ba03a9a|POWERED_ON||true|10.0.4.2`

storage.connection.timeout=600000

Specifies the amount of time, in milliseconds, that the SnapCenter Server waits for a response from the storage system.

The default value is "600000" (10 minutes).

vmware.esx.ip.kernel.ip.map

There is no default value. You use this value to map the ESXi IP address to the VMkernel IP address. By default, the SnapCenter VMware plug-in uses the management VMkernel adapter IP address of the ESXi host. If you want the SnapCenter VMware plug-in to use a different VMkernel adapter IP address, you must provide an override value.

In the following example, the management VMkernel adapter IP address is 10.225.10.56; however, the SnapCenter VMware plug-in uses the specified address of 10.225.11.57 and 10.225.11.58. And if the management VMkernel adapter IP address is 10.225.10.60, the plug-in uses the address 10.225.11.61.

```
vmware.esx.ip.kernel.ip.map=10.225.10.56:10.225.11.57,10.225.11.
58; 10.225.10.60:10.225.11.61
```

vmware.max.concurrent.snapshots=30

Specifies the maximum number of concurrent VMware snapshots that the SnapCenter VMware plug-in performs on the server.

This number is checked on a per datastore basis and is checked only if the policy has "VM consistent" selected. If you are performing crash-consistent backups, this setting does not apply.

The default value is "30".

vmware.max.concurrent.snapshots.delete=30

Specifies the maximum number of concurrent VMware snapshot delete operations, per datastore, that the SnapCenter VMware plug-in performs on the server.

This number is checked on a per datastore basis.

The default value is "30".

vmware.query.unresolved.retry.count=10

Specifies the maximum number of times the SnapCenter VMware plug-in retries sending a query about unresolved volumes because of "...time limit for holding off I/O..." errors.

The default value is "10".

vmware.quiesce.retry.count=0

Specifies the maximum number of times the SnapCenter VMware plug-in retries sending a query about VMware snapshots because of "...time limit for holding off I/O..." errors during a backup.

The default value is "0".

vmware.quiesce.retry.interval=5

Specifies the amount of time, in seconds, that the SnapCenter VMware plug-in waits between sending the queries regarding VMware snapshot "...time limit for holding off I/O..." errors during a backup.

The default value is "5".

vmware.query.unresolved.retry.delay= 60000

Specifies the amount of time, in milliseconds, that the SnapCenter VMware plug-in waits between sending the queries regarding unresolved volumes because of "...time limit for holding off I/O..." errors. This error occurs when cloning a VMFS datastore.

The default value is "60000" (60 seconds).

vmware.reconfig.vm.retry.count=10

Specifies the maximum number of times the SnapCenter VMware plug-in retries sending a query about reconfiguring a VM because of "...time limit for holding off I/O..." errors.

The default value is "10".

vmware.reconfig.vm.retry.delay=30000

Specifies the maximum number of time in milliseconds that the SnapCenter VMware plug-in waits between sending queries regarding reconfiguring a VM because of "...time limit for holding off I/O..." errors.

The default value is "30000" (30 seconds).

vmware.rescan.hba.retry.count=3

Specifies the amount of time, in milliseconds, that the SnapCenter VMware plug-in waits between sending the queries regarding rescanning the host bus adapter because of "...time limit for holding off I/O..." errors.

The default value is "3".

vmware.rescan.hba.retry.delay=30000

Specifies the maximum number of times the SnapCenter VMware plug-in retries requests to rescan the host bus adapter.

The default value is "30000".

Migrating to the Linux-based SnapCenter Plug-in for VMware vSphere

You use Windows PowerShell cmdlets to migrate SnapCenter Plug-in for VMware vSphere metadata from the Windows-based SnapCenter Server to the Linux-based SnapCenter Plug-in for VMware vSphere virtual appliance.

There are two migration options:

- Migrating from SnapCenter
  You must migrate metadata for the following from Windows-based SnapCenter:
  - VM-consistent backups performed by the SnapCenter Plug-in for VMware vSphere when the plug-in was running as a Windows-based component of SnapCenter.
  - Application-consistent data protection metadata of virtualized databases or file systems performed by a SnapCenter application-based plug-in with support from the SnapCenter Plug-in for VMware vSphere when the plug-in was running as a Windows-based component of SnapCenter.

  To migrate, you use the Windows SnapCenter PowerShell cmdlet `invoke-SCVOVAMigration`.
  You can only migrate metadata from SnapCenter 4.0 or later.
- Migrating from VSC
  You can migrate VSC 6.2.x (SMVI) metadata for backup jobs that are not integrated with SnapCenter.
  To migrate, you use the *NetApp ToolChest: NetApp Import Utility for SnapCenter and Virtual Storage Console* . Make sure to select the VSC to SnapCenter migration option.

NOTE: You can only migrate metadata for existing backups. For example, if you do not have existing backups, then you cannot migrate policies only.

Supported migration paths

See the SnapCenter Plug-in for VMware vSphere Release Notes for information on supported upgrade and migration paths.

Migrating from SnapCenter to the SnapCenter Plug-in for VMware vSphere virtual appliance

You use the SnapCenter Windows PowerShell cmdlets to migrate SnapCenter VM-consistent backup metadata and SnapCenter application-consistent for virtualized data backup metadata to the SnapCenter Plug-in for VMware vSphere virtual appliance.

Before you begin

- You must be running SnapCenter Server 4.2 or later.
- You must use Admin credentials.
- The SnapCenter Plug-in for VMware vSphere virtual appliance must be deployed with the SnapCenter VMware plug-in enabled and registered on vCenter.
- On the SnapCenter VMware plug-in dashboard, the status for SnapCenter Plug-in for VMware vSphere must be “connected.”
- You must have created a Linux type Run As credential using the account that was specified during the deployment of the SnapCenter VMware plug-in.
- All guest file restore sessions must be deleted.

- SnapCenter hosts must be configured with IP addresses, not fully qualified domain names (FQDN).

  NOTE: In a Linked Mode environment, you must migrate all linked nodes together.

- Names for storage VMs must resolve to management LIFs.
  If you added `etc` host entries for storage VM names in SnapCenter, you must verify that they are also resolvable from the virtual appliance.

About this task

- The migration command migrates metadata from SnapCenter 4.0, 4.1, and 4.1.1 only. If you are using an earlier version of SnapCenter then you must first upgrade before you can migrate.
  - What is migrated:
    SnapCenter metadata, which includes storage systems, customized throttles and email settings in the SnapCenter configuration file, policies, resource groups, backup metadata, and mounts.
    (the migration fails when it encounters prescripts or postscripts)
  - What is not migrated:
    - Pre- and post-scripts that are configured for resource groups
    - Active guest file restore sessions, guest file restore credentials, and proxy VMs

      NOTE: If you begin migration when a guest file restore session is active, the session is deleted and the attached disk is not unmounted. You might have to delete the attached disk manually.

    - `scbr.override` configuration file
    - Snapshots that are deleted from ONTAP
- To ensure migration success, the migration command suspends all hosts that are registered with SnapCenter. After the migration process finishes successfully, SnapCenter hosts are resumed.
- You must use the Windows Powershell cmdlet `invoke-SCVOVAMigration` for each instance of the SnapCenter VMware plug-in that is registered with SnapCenter. The cmdlet does the following:
  - Suspends all schedules to prevent job failures during the migration. After a successful migration, schedules are automatically re-enabled.
  - Migrates storage connections and metadata.
  - Creates backup schedules for post-migration backups.
  - Uninstalls the existing SnapCenter Plug-in for VMware vSphere from the Windows host.

    NOTE: If the SnapCenter VMware plug-in is installed on the SnapCenter Server host and protection is configured for the SnapCenter repository, then the migration process also uninstalls the Windows-based plug-in package that contains the SnapCenter Plug-in for VMware vSphere and the SnapCenter Plug-in for Windows, and then reinstalls the latest version of SnapCenter Plug-in for Windows to support the repository protection. The host type in the SnapCenter GUI changes from “vsphere” to “Windows”.

  - Removes the vSphere host and resource groups from the Windows SnapCenter Server.
  - Activates the backup jobs on the Linux-based SnapCenter VMware plug-in.

    - Registers the vSphere host for the SnapCenter VMware plug-in `with SnapCenter to support application-based backups of virtualized databases and file systems (application over VMDK backups).
- Metadata for application-based VMDK backups is stored in the SnapCenter Server repository. Metadata for VM and datastore backups is stored in the SnapCenter VMware plug-in MySQL repository.

Steps

1. Back up the MySQL database and then copy and move that backup to a different location to make sure it does not get deleted due to the retention policy.

   Backing up the SnapCenter Plug-in for VMware vSphere MySQL database
2. Log on to the SnapCenter vSphere web client and verify that no jobs are running.
3. Log on to the SnapCenter GUI using the SnapCenter Admin username.

   If you use any other username to log in, even if that username has all permissions, might cause a migration error.
4. In the Windows SnapCenter GUI left navigation pane, click **Settings**, then click the **Credential** tab, and then click **Add** to add credentials for the virtual appliance.
5. Create the name of the Run As credential to be used in the `invoke-SCVOVAMigration` cmdlet.

   NOTE: You must select **Linux** for the Authentication field.

   This step adds the credentials that SnapCenter Server uses to access the virtual appliance during the migration.
6. Open a Windows PowerShell window and run the following cmdlets:

   ```
   Open-SmConnection
   ```

   ```
   invoke-SCVOVAMigration -SourceSCVHost old-SCV-host-IP
   -DestinationSCVOVAHost new-appliance-IP
   -OVACredential appliance-credentials
   -ByPassValidationCheck -Overwrite -ContinueMigrationOnStorageError -
   ScheduleOffsetTime time-offset
   ```

   The migration command suspends job schedules before migrating metadata and registers the virtual appliance with SnapCenter Server.

   NOTE: Use the `ScheduleOffsetTime` parameter if the source SnapCenter host and the destination SnapCenter VMware virtual appliance host are in different time zones. The value can be a positive or negative time offset to adjust scheduled backup run times. Specify the time difference in the format `hh:mm:ss`; for example, 06:00:00, or -06:00:00 for a negative value.

After you finish

- Migration log bundle
  Download the migration log bundle from the `App_Data/MigrationLog` directory in the SnapCenter installation folder. Keep the migration log bundle until you are sure that the migration was successful.
- Job details on the Dashboard
  Information on the migrated backups is listed in the SnapCenter vSphere web client recent jobs pane but detailed information is not displayed in the Dashboard until backups are performed after the migration.
- Authentication errors

If you do not use Admin credentials, you might encounter an authentication error.
Managing authentication errors

- Backup names
  Backup names before migration have the format `RGName_HostName_Timestamp`.
  For example, `-NAS_DS_RG_perf1server_07-05-2019_02.11.59.9338`.
  Backup names after migration have the format `RGName_Timestamp`.
  For example, `-NAS_VM_RG_07-07-2019_21.20.00.0609`.
- Pre- and post-scripts
  Scripts that are configured for resource groups are not migrated. Because scripts written for Windows systems might not run on the Linux-based virtual appliance, you might need to recreate all or part of the scripts and add those scripts after migration. For example, file paths in Windows do not exist in Linux, and an invoke for a .bat batch file does not work in Linux.
  One solution is to put an existing Windows-based script on the Linux-based virtual appliance and test whether the script works with no changes. If it does not work correctly, then replace each Windows-based command in the script with a corresponding Linux compatible command.
- Guest file restore credentials
  Guest file restore credentials are not migrated. Therefore, you must create new guest file credentials after the migration.
- `scbr.override` configuration file
  If you have customized settings in the `scbr.override` configuration file, then you must move that file to the SnapCenter VMware plug-in virtual appliance and restart the web client service.
- Upgrade SnapCenter application-based plug-ins
  If you use the SnapCenter VMware plug-in to support other SnapCenter plug-ins, then you must update those plug-ins to 4.2 or later.
- Uninstall SnapCenter Server
  If you use SnapCenter *only* for VM-consistent or crash-consistent data protection, then after all VM backups are migrated to the SnapCenter VMware plug-in, you can uninstall SnapCenter Server on the Windows host

Correcting “Bad Gateway” errors during migration

There are several reasons why you might encounter a “Bad Gateway” error.

Scenario 1

You manually added files or other content to the SnapCenter Plug-in for VMware vSphere and then tried to migrate. In this scenario, there is not enough space in the appliance for the migration process.

To correct this error, remove any manually added files.

Scenario 2

The SnapCenter Plug-in for VMware vSphere connection was stopped, or the service was stopped during the migration.

The SnapCenter Plug-in for VMware vSphere connection status must be “connected” during the migration process. You can also manually update the time out configuration in the virtual appliance.

Managing authentication errors

If you do not use the Admin credentials, you might receive an authentication error after deploying the SnapCenter Plug-in for VMware vSphere or after migrating. If you encounter an authentication error, you must restart the service.

Steps

1. Log on to the SnapCenter VMware plug-in management GUI using the format `https://<OVA-IP-address>:8080`.
2. Restart the service.

Minimum ONTAP privileges required

The minimum ONTAP privileges that are required vary according to the SnapCenter plug-ins you are using for data protection.

All SnapCenter plug-ins require the following minimum privileges, except where noted in the information following these tables.

All-access commands: Minimum privileges required for ONTAP 8.3 and later
event generate-autosupport-log
job history show job stop
lun lun create lun delete lun igroup add lun igroup create lun igroup delete lun igroup rename lun igroup show lun mapping add-reporting-nodes lun mapping create lun mapping delete lun mapping remove-reporting-nodes lun mapping show lun modify lun move-in-volume lun offline lun online lun persistent-reservation clear lun resize lun serial lun show
snapmirror list-destinations snapmirror policy add-rule snapmirror policy modify-rule snapmirror policy remove-rule snapmirror policy show snapmirror restore snapmirror show snapmirror show-history snapmirror update snapmirror update-ls-set
version

All-access commands: Minimum privileges required for ONTAP 8.3 and later
volume clone create volume clone show volume clone split start volume clone split stop volume create volume destroy volume file clone create volume file show-disk-usage volume offline volume online volume modify

volume qtree create volume qtree delete volume qtree modify volume qtree show volume restrict volume show volume snapshot create volume snapshot delete volume snapshot modify volume snapshot rename volume snapshot restore volume snapshot restore-file volume snapshot show volume unmount
vserver cifs vserver cifs share create vserver cifs share delete vserver cifs shadowcopy show vserver cifs share show vserver cifs show vserver export-policy vserver export-policy create vserver export-policy delete vserver export-policy rule create vserver export-policy rule show vserver export-policy show vserver iscsi vserver iscsi connection show vserver show

Read-only commands: Minimum privileges required for ONTAP 8.3 and later
network interface network interface failover-groups network interface show vserver

Additional information for SnapCenter Plug-in for VMware vSphere

- If you are running ONTAP 8.2.x

  You must login as `vsadmin` on the storage VM to have the appropriate privileges for SnapCenter Plug-in for VMware vSphere operations.

- If you are running ONTAP 8.3 and later

  You must login as `vsadmin` or with a role that has the minimum privileges listed in the tables above.

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