



**SnapCenter® Software 4.2**

# **Data Protection Guide**

For Custom Plug-ins

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 **NetApp®**



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## Deciding on whether to read the SnapCenter Data Protection Guide for Custom Plug-ins

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This information describes how to use SnapCenter to perform backup, restore, and clone operations on resources such as databases, instances, documents, or tablespaces.

You should read this information if you want to use SnapCenter in the following ways:

- You want to create data protection policies and resource groups for custom plug-in resources
- You want to perform backup, restore, or clone operations on custom plug-in resources using the graphical user interface (GUI)
- You want to perform backup, restore, or clone operations on custom plug-in resources using Windows cmdlets or CLI commands

You should have already performed the following tasks:

- Installed SnapCenter Server and the SnapCenter custom plug-in
- Configured role-based access control (RBAC), storage system connections, and credentials

You can also use the following information to help accomplish your data protection goals:

- SnapCenter Server and plug-in installation and setup  
[Installing and setting up SnapCenter](#)  
[Getting Started](#)
- SnapCenter concepts, including architecture, features, and benefits  
[Concepts](#)
- Other SnapCenter Data Protection Guides for specific types of resources, such as Microsoft SQL Server, Oracle, Windows file systems, and custom plug-ins
- SnapCenter PowerShell cmdlets or Linux commands  
[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)  
[SnapCenter Software 4.2 Linux Command Reference Guide](#)
- SnapCenter administration, including dashboards, reporting capabilities, and REST APIs, and managing licenses, storage connections, and the SnapCenter Server repository  
[Performing administrative tasks](#)
- SnapCenter developer information for custom plug-ins

## SnapCenter Custom Plug-ins overview

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You can develop custom plug-ins for applications that you use and then use SnapCenter to backup, restore, or clone these applications. Like other SnapCenter plug-ins, your custom plug-ins act as host-side components of the NetApp SnapCenter Software, enabling application-aware data protection and management of resources.

When Custom Plug-ins are installed, you can use SnapCenter with NetApp SnapMirror technology to create mirror copies of backup sets on another volume and use NetApp SnapVault technology to perform disk-to-disk backup replication. The Custom Plug-ins can be used in both Windows and Linux environments.

NetApp provides MySQL and DB2 custom plug-ins with SnapCenter Software 2.0 and later and MongoDB custom plug-in from 3.0 and later. These plug-ins can be downloaded from the [NetApp Storage Automation Store](#).

**Note:** MySQL, DB2, and MongoDB custom plug-ins are supported via the NetApp communities only.

You can create your own custom plug-ins by referring to the Developer's Guide for Creating Custom Plug-ins.

The Data Protection Guide for your plug-in has information about data protection operations.

The SnapCenter concepts documentation has information about the SnapCenter architecture, features, and benefits.

### Related information

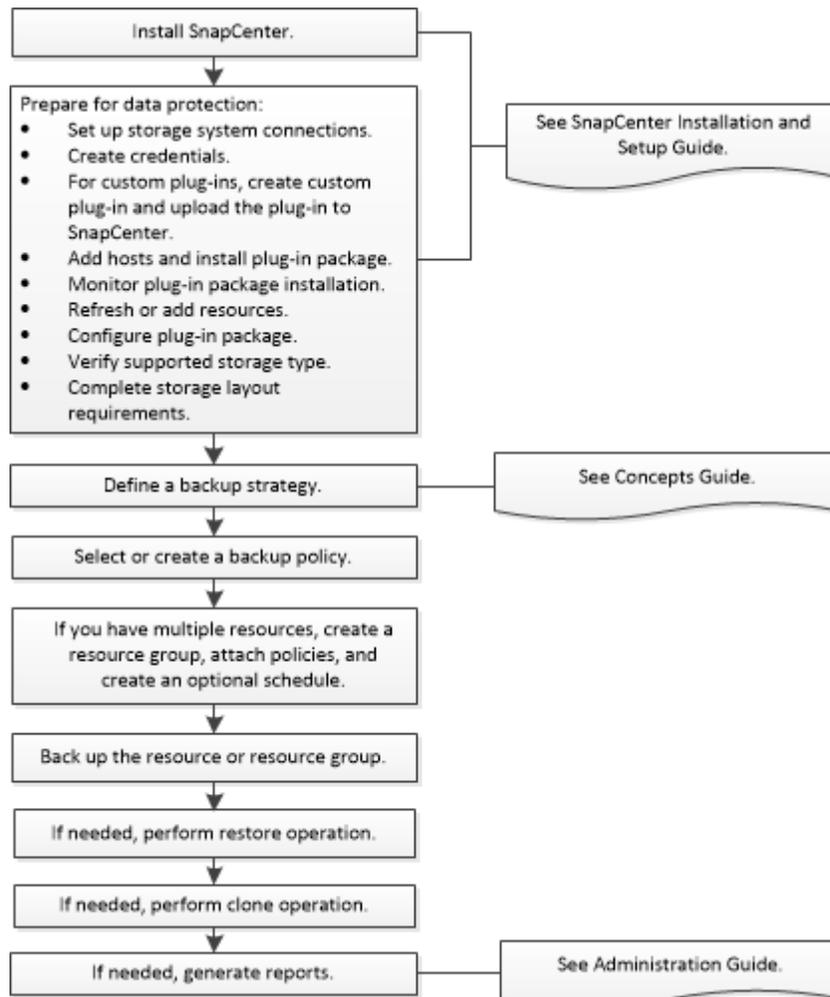
[Installing and setting up SnapCenter](#)

[SnapCenter Software 4.2 Developer's Guide for Creating Custom Plug-ins](#)

[Concepts](#)

## Data protection workflow for SnapCenter Custom Plug-ins resources

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



### Related tasks

[Backing up custom plug-in resources](#) on page 12

[Restoring custom plug-in resources](#) on page 27

[Cloning custom plug-in resource backups](#) on page 31

### Related information

[Installing and setting up SnapCenter](#)

[Concepts](#)

[Performing administrative tasks](#)

## Preparing for data protection

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Before performing any data protection operation such as backup, clone, or restore operations, you must define your strategy and set up the environment. You can also set up the SnapCenter Server to use SnapMirror and SnapVault technology.

To take advantage of SnapVault and SnapMirror technology, you must configure and initialize a data protection relationship between the source and destination volumes on the storage device. You can use NetApp System Manager or you can use the storage console command line to perform these tasks.

### Related information

[Installing and setting up SnapCenter](#)

## Prerequisites for using the SnapCenter Custom Plug-ins

Before you use SnapCenter Custom Plug-ins, the SnapCenter administrator must install and configure the SnapCenter Server and perform the prerequisite tasks.

- Install and configure SnapCenter Server.
- Log in to SnapCenter Server.
- Configure the SnapCenter environment by adding storage system connections and creating credentials, if applicable.
- Add hosts, and install and upload the plug-ins.
- If applicable, install Java 1.7 or Java 1.8 on your Linux Windows host.
- If you have multiple data paths (LIFs) or a dNFS configuration, you can perform the following using the SnapCenter CLI on the database host:
  - By default, all the IP addresses of the database host are added to the NFS storage export policy in storage virtual machine (SVM) for the cloned volumes. If you want to have a specific IP address or restrict to a subset of the IP addresses, run the `Set-PreferredHostIPsInStorageExportPolicy` CLI.
  - If you have multiple data paths (LIFs) in SVMs, SnapCenter chooses the appropriate data path (LIF) for mounting the NFS cloned volume. However, if you want to specify a specific data path (LIF), you must run the `Set-SvmPreferredDataPath` CLI.

The information regarding the parameters that can be used with the command and their descriptions can be obtained by running `help command_name`. Alternatively, you can also refer to the *Command Reference Guide*.

[SnapCenter Software 4.2 Linux Command Reference Guide](#)

- Set up SnapMirror and SnapVault, if you want backup replication.
- Ensure that port 9090 is not used by any other application on the host.  
Port 9090 must be reserved for use by SnapCenter Custom Plug-ins in addition to the other ports required by SnapCenter.

### Related information

[Installing and setting up SnapCenter](#)

## Storage types supported by SnapCenter Custom Plug-ins

SnapCenter supports a wide range of storage types on both physical and virtual machines. You must verify the support for your storage type before installing SnapCenter Custom Plug-ins.

Provisioning using SnapCenter is supported on Windows using SnapCenter Plug-in for Microsoft Windows. Provisioning is not supported for SnapCenter Plug-ins Package for Linux.

Machine	Storage type
Physical and virtual servers (VMDKs and RDM LUNs are not supported.)	FC-connected LUNs
	iSCSI-connected LUNs
	NFS-connected volumes

## How resources, resource groups, and policies are used for protecting custom plug-in resources

Before you use SnapCenter, it is helpful to understand basic concepts related to the backup, clone, and restore operations you want to perform. You interact with resources, resource groups, and policies for different operations.

- *Resources* are typically databases, Windows file systems, or VMs that you back up or clone with SnapCenter.
- A SnapCenter *resource group*, is a collection of resources on a host or cluster. When you perform an operation on a resource group, you perform that operation on the *resources* defined in the resource group according to the schedule you specify for the resource group. You can back up on demand a single resource or a resource group. You also can perform scheduled backups for single resources and resource groups.
- The *policies* specify the backup frequency, copy retention, replication, scripts, and other characteristics of data protection operations. When you create a resource group, you select one or more policies for that group. You can also select a policy when you perform a backup on demand for a single resource.

Think of a resource group as defining *what* you want to protect and when you want to protect it in terms of day and time. Think of a policy as defining *how* you want to protect it. If you are backing up all databases or backing up all file systems of a host, for example, you might create a resource group that includes all the databases or all the file systems in the host. You could then attach two policies to the resource group: a daily policy and an hourly policy. When you create the resource group and attach the policies, you might configure the resource group to perform a File-Based backup daily and another schedule that performs Snapshot based backup hourly.

## Logging in to SnapCenter

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SnapCenter supports role-based access control (RBAC). SnapCenter admin assigns roles and resources through SnapCenter RBAC to either a user in workgroup or active directory, or to groups in active directory. The RBAC user can now log in to SnapCenter with the assigned roles.

### Before you begin

- You should enable Windows Process Activation Service (WAS) in Windows Server Manager.
- If you want to use Internet Explorer as the browser to log in to the SnapCenter Server, you should ensure that the Protected Mode in Internet Explorer is disabled.

### About this task

During installation, the SnapCenter Server Install wizard creates a shortcut and places it on the desktop and in the Start menu of the host where SnapCenter is installed. Additionally, at the end of the installation, the Install wizard displays the SnapCenter URL based on the information that you provided during installation, which you can copy if you want to log in from a remote system.

**Attention:** If you have multiple tabs open in your web browser, closing just the SnapCenter browser tab does not log you out of SnapCenter. To end your connection with SnapCenter, you must log out of SnapCenter either by clicking the **Sign out** button, or by closing the entire web browser.

**Best Practice:** For security reasons, it is recommended that you do not enable your browser to save your SnapCenter password.

The default GUI URL is a secure connection to the default port 8146 on the server where the SnapCenter Server is installed (`https://server:8146`). If you provided a different server port during the SnapCenter installation, that port is used instead.

For Network Load Balance (NLB) deployment, you must access SnapCenter using the NLB cluster IP (`https://NLB_Cluster_IP:8146`). If you do not see the SnapCenter UI when you navigate to `https://NLB_Cluster_IP:8146` in Internet Explorer (IE), you must add the NLB IP address as a trusted site in IE on each plug-in host, or you must disable IE Enhanced Security on each plug-in host.

[NetApp KB Article 2025082: SnapCenter in an HA configuration with Application Request Routing enabled.](#)

In addition to using the SnapCenter GUI, you can use PowerShell cmdlets to create scripts to perform configuration, backup, and restore operations. Some cmdlets might have changed with each SnapCenter release. The SnapCenter cmdlet or SnapCenter CLI documentation has the details.

**Note:** If you are logging in to SnapCenter for the first time, you must log in using the credentials that you provided during the install process.

### Steps

1. Launch SnapCenter from the shortcut located on your local host desktop, or from the URL provided at the end of the installation, or from the URL provided by your SnapCenter administrator.
2. Enter user credentials.

To specify the following...	Use one of these formats...
Domain administrator	<p><i>NetBIOS\UserName</i></p> <p><i>UserName@UPN suffix</i> For example, username@netapp.com</p> <p><i>Domain FQDN\UserName</i></p>
Local administrator	<i>UserName</i>

3. If you are assigned more than one role, from the **Role** box, select the role that you want to use for this login session.

Your current user and associated role are shown in the upper right of SnapCenter after you are logged in.

### Result

If you are using SnapCenter for the first time, the Storage Systems page is displayed, and the Get Started pane is expanded.

If the logging fails with the error that site cannot be reached, you should map the SSL certificate to SnapCenter.

After logging to SnapCenter Server for the first time, the SnapCenter Server Configuration Checker schedule is created. The default values are Weekly and Every Sunday at 11:59 pm. To modify the schedule or run the SnapCenter Server schedule, click **Settings > Scheduled Configuration Checker**.

### After you finish

If you have untrusted Active Directory domains that you want SnapCenter to support, you must register those domains with SnapCenter before configuring the roles for the users on untrusted domains. The administration documentation has more details.

[Performing administrative tasks](#)

### Related information

[SnapCenter Software 4.2 Linux Command Reference Guide](#)

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

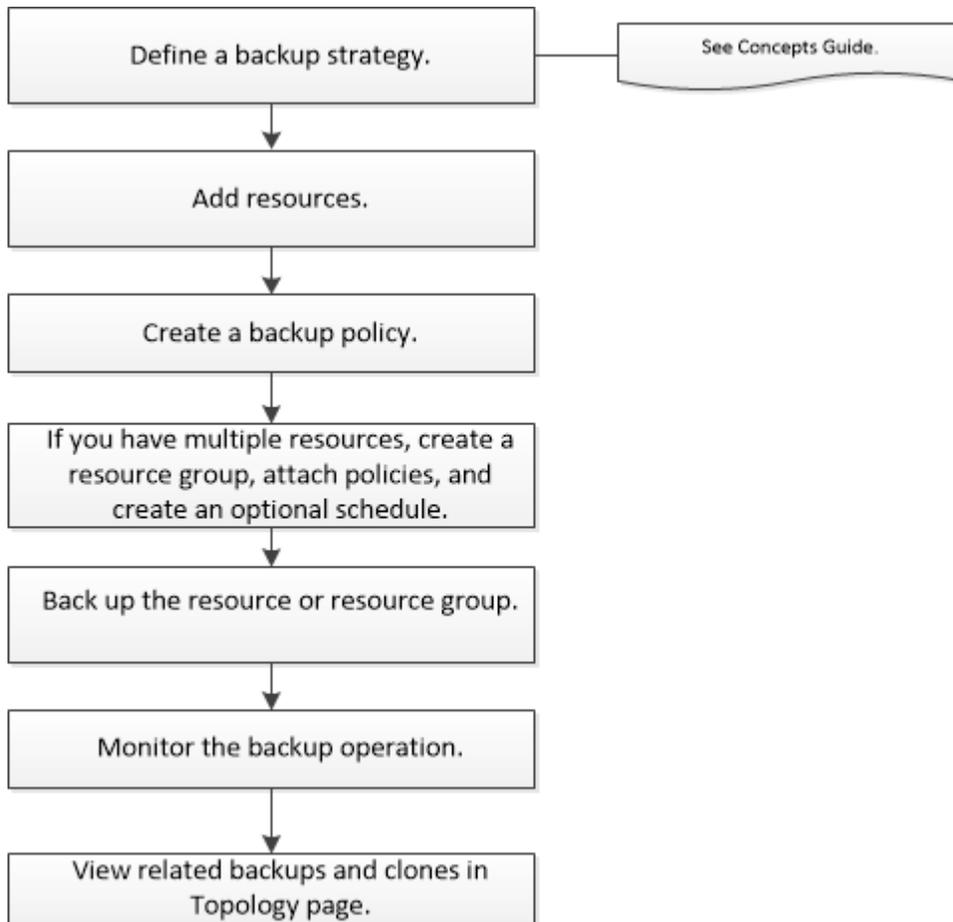
## Backing up custom plug-in resources

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The backup workflow includes planning, identifying the resources for backup, managing backup policies, creating resource groups and attaching policies, creating backups, and monitoring the operations.

### About this task

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



You can also use PowerShell cmdlets manually or in scripts to perform backup, restore, and clone operations. For detailed information about PowerShell cmdlets, use the SnapCenter cmdlet help or see the cmdlet reference information.

### Related references

[Data protection workflow for SnapCenter Custom Plug-ins resources](#) on page 7

### Related information

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

## Adding resources to SnapCenter Custom Plug-ins

You must add the resources that you want to back up or clone. Depending on your environment, resources might be either database instances or collections that you want to back up or clone.

### Before you begin

- You must have completed tasks such as installing the SnapCenter Server, adding hosts, creating storage system connections, and adding credentials.
- You must have created a custom plug-in.  
[Developer Guide for Creating Custom Plug-ins](#)
- You must have uploaded the plug-ins to SnapCenter Server.

### About this task

You can also add resources for MySQL and DB2 applications. These plug-ins can be downloaded from the [NetApp Storage Automation Store](#).

### Steps

1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
2. In the **Resources** page, click **Add Resource**.
3. In the **Provide Resource Details** page, perform the following actions:

For this field...	Do this...
Name	Enter the name of the resource.
Host name	Select the host.
Type	Select the type. Type is user defined as per the plug-in description file. For example, database and instance. In case the type selected has a parent, enter the details of the parent. For example, if the type is Database and the parent is Instance, enter the details of the Instance.
Credential name	(Optional) Select Credential or create a new credential.
Mount Points	Enter the mount paths where the resource is mounted. This is applicable only for a Windows host.

4. In the **Provide Storage Footprint** page, select a storage system and choose one or more volumes, LUNs, and qtrees, and then click **Save**.

Optional: Click the  icon to add more volumes, LUNs, and qtrees from other storage systems.

**Note:** SnapCenter Custom Plug-ins does not support automatic discovery of the resources and the storage details for physical and virtual environments. You must provide the storage information for physical and virtual environments while creating the resources.

5. In the **Resource Settings** page, provide custom key-value pairs for the resource.

Use the custom key-value pairs if you want to pass resource-specific information. For example, when you are using the MySQL plug-in, you must specify a HOST as `HOST=hostname`, Port as `port-no used for MySQL` and master-slave configuration as `MASTER_SLAVE = "YES"` or `"NO"` (name is MASTER\_SLAVE and value is "YES" or "NO").

Resource settings ⓘ

Custom key-value pairs for MySQL plug-in

Name	Value	
HOST	localhost	✕
PORT	3306	✕
MASTER_SLAVE	NO	+ ✕

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

### Result

The resources are displayed along with information such as type, host or cluster name, associated resource groups and policies, and overall status.

### After you finish

If you want to provide access to the assets to other users, the SnapCenter administrator must assign assets to those users. This enables users to perform the actions for which they have permissions on the assets that are assigned to them.

After adding the resources, you can modify the resource details. If a custom plug-in resource has backups associated with it, the following fields cannot be modified: resource name, resource type, and host name.

## Creating policies for custom plug-in resources

Before you use SnapCenter to back up custom plug-in specific resources, you must create a backup policy for the resource or resource group that you want to back up. A backup policy is a set of rules that governs how you manage, schedule, and retain backups. Additionally, you can specify replication, script, and application settings. Specifying options in a policy saves time when you want to reuse the policy for another resource group.

### Before you begin

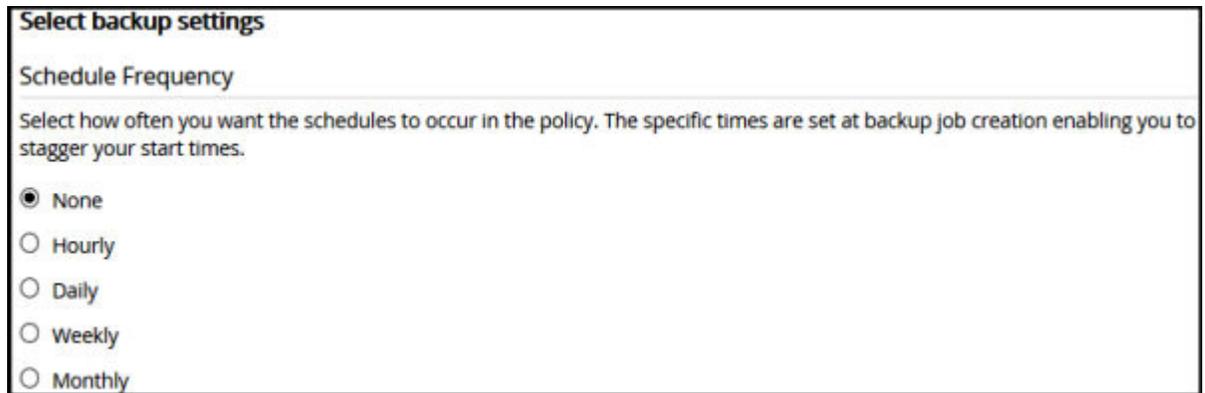
- You must have defined your backup strategy.  
For details, see the information about defining a data protection strategy for custom plug-ins.  
[Concepts](#)
- You must have prepared for data protection.  
Preparing for data protection includes tasks such as installing SnapCenter, adding hosts, creating storage system connections, and adding resources.
- SVMs must be assigned to you for mirror or vault operations.  
The SnapCenter administrator must have assigned the SVMs for both the source and destination volumes to you if you are replicating Snapshot copies to a mirror or vault.
- You must have manually added the resources that you want to protect.

**Steps**

1. In the left navigation pane, click **Settings**.
2. In the **Settings** page, click **Policies**.
3. Click **New**.
4. In the **Name** page, enter the policy name and description.
5. In the **Settings** page, perform the following steps:

- Specify the schedule type by selecting **Hourly**, **Daily**, **Weekly**, or **Monthly**.

**Note:** You can specify the schedule (start date, end date, and frequency) for the backup operation while creating a resource group. This enables you to create resource groups that share the same policy and backup frequency, but enables you to assign different backup schedules to each policy.



- In the Custom backup settings section, provide any specific backup settings that has to be passed to the plug-in in key-value format. You can provide multiple key-values to be passed to the plug-in.
6. In the **Retention** page, specify the retention settings for the backup type and the schedule type selected in the **Backup Type** page:

If you want to...	Then...
Keep a certain number of Snapshot copies	<p>Select <b>Total Snapshot copies to keep</b>, and then specify the number of Snapshot copies that you want to keep.</p> <p>If the number of Snapshot copies exceeds the specified number, the Snapshot copies are deleted with the oldest copies deleted first.</p> <p><b>Important:</b> You must set the retention count to 2 or higher if you plan to enable SnapVault replication. If you set the retention count to 1, the retention operation might fail because the first Snapshot copy is the reference Snapshot copy for the SnapVault relationship until a newer Snapshot copy is replicated to the target.</p> <p><b>Note:</b> The maximum retention value is 1018 for resources on ONTAP 9.4 or later, and 254 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.</p>
Keep the Snapshot copies for a certain number of days	Select <b>Keep Snapshot copies for</b> , and then specify the number of days for which you want to keep the Snapshot copies before deleting them.

7. In the **Replication** page, specify the replication settings:

For this field...	Do this...
<b>Update SnapMirror after creating a local Snapshot copy</b>	Select this field to create mirror copies of the backup sets on another volume (SnapMirror replication). If the protection relationship in ONTAP is of type Mirror and Vault and if you select only this option, Snapshot copy created on the primary will not be transferred to the destination, but will be listed in the destination. If this Snapshot copy is selected from the destination to perform a restore operation, then the following error message is displayed: Secondary Location is not available for the selected vaulted/mirrored backup.
<b>Update SnapVault after creating a local Snapshot copy</b>	Select this option to perform disk-to-disk backup replication (SnapVault backups).
<b>Secondary policy label</b>	Select a Snapshot label. Depending on the Snapshot label that you select, the ONTAP software applies the secondary Snapshot copy retention policy that determines how Snapshot copies are retained on the secondary storage system.
<b>Error retry count</b>	Enter the maximum number of replication attempts that can be allowed before the operation stops.

**Select secondary replication options** i

Update SnapMirror after creating a local Snapshot copy.

Update SnapVault after creating a local Snapshot copy.

Secondary policy label  i

Error retry count  i

- Review the summary and click **Finish**.

#### Related tasks

[Backing up resource groups of custom plug-in resources](#) on page 22

#### Related information

[Installing and setting up SnapCenter](#)

## Backing up individual custom plug-in resources

If an individual custom plug-in resource is not part of any resource group, you can back up the resource from the Resources page. You can back up the resource on demand, or, if the resource has a

policy attached and a schedule configured, then backups occur automatically according to the schedule.

**Before you begin**

- You must have created a backup policy.
- If you want to back up a resource that has a SnapMirror relationship with a secondary storage, the role assigned to the storage user should include the “snapmirror all” privilege. However, if you are using the “vsadmin” role, then the “snapmirror all” privilege is not required.

**Steps**

1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
2. Optional: In the **Resources** page, filter resources from the **View** drop-down list based on resource type.

Click , and then select the host name and the resource type to filter the resources. You can then click  to close the filter pane.

3. Click the resource that you want to back up.
4. In the **Resource** page, if you want to use a custom name, select the **Use custom name format for Snapshot copy** check box, and then enter a custom name format for the Snapshot copy name.

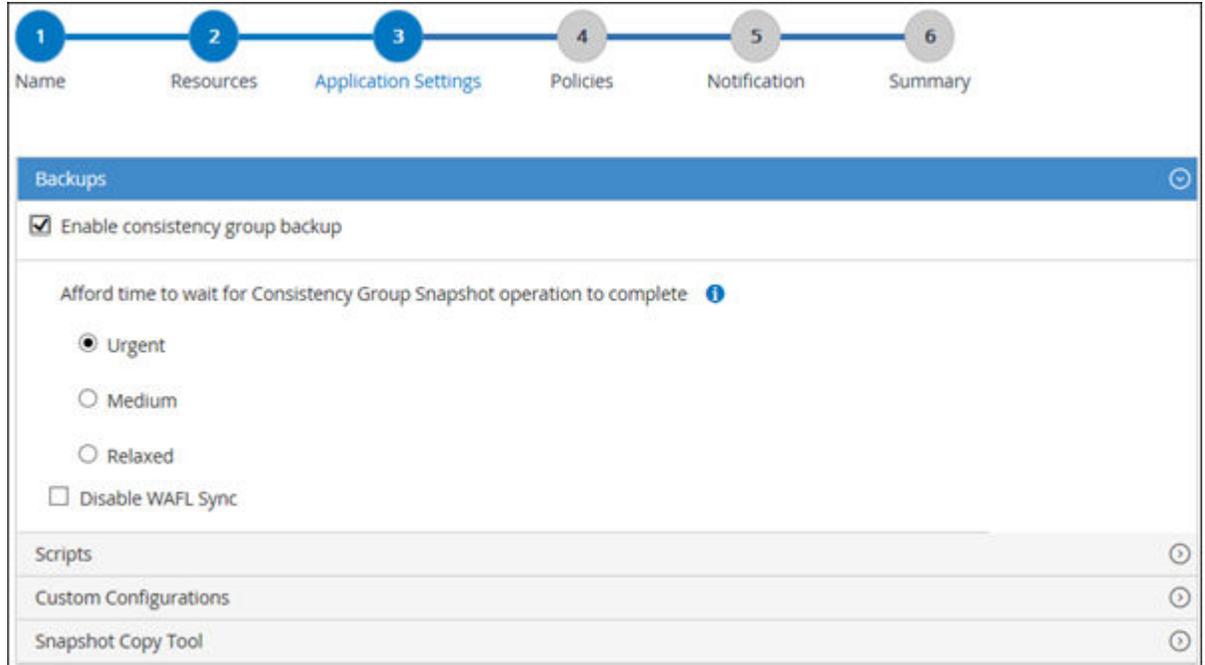
**Example**

For example, *customtext\_\_policy\_hostname* or *resource\_hostname*. By default, a timestamp is appended to the Snapshot copy name

5. Optional: In the **Application Settings** page, do the following:

- Click the **Backups** arrow to set additional backup options:  
Enable consistency group backup, if needed, and perform the following tasks:

For this field...	Do this...
Afford time to wait for Consistency Group Snapshot operation to complete	Select Urgent, Medium, or Relaxed to specify the wait time for Snapshot copy operation to complete. Urgent = 5 seconds, Medium = 7 seconds, and Relaxed = 20 seconds.
Disable WAFL Sync	Select this to avoid forcing a WAFL consistency point.



- Click the **Scripts** arrow to run pre and post commands for quiesce, Snapshot copy, and unquiesce operations. You can also run pre commands before exiting the backup operation. Prescripts and postscripts are run in the SnapCenter Server.
- Click the **Custom Configurations** arrow, and then enter the custom value pairs required for all jobs using this resource.
- Click the **Snapshot Copy Tool** arrow to select the tool to create Snapshot copies:

If you want...	Then...
SnapCenter to take a storage level Snapshot copy	Select <b>SnapCenter without File System Consistency</b> .
SnapCenter to use the plug-in for Windows to put the file system into a consistent state and then take a Snapshot copy	Select <b>SnapCenter with File System Consistency</b> .
To enter the command to create a Snapshot copy	Select <b>Other</b> , and then enter the command to create a Snapshot copy.

6. In the **Policies** page, perform the following steps:

- Select one or more policies from the drop-down list.

**Note:** You can also create a policy by clicking  .

In the Configure schedules for selected policies section, the selected policies are listed.

- Click  in the Configure Schedules column for the policy for which you want to configure a schedule.
- In the **Add schedules for policy** *policy\_name* dialog box, configure the schedule, and then click **OK**.

Where, *policy\_name* is the name of the policy that you have selected.

The configured schedules are listed in the Applied Schedules column.

7. In the **Notification** page, from the **Email preference** drop-down list, select the scenarios in which you want to send the emails.  
You must also specify the sender and receiver email addresses, and the subject of the email. SMTP must also be configured in **Settings > Global Settings**.
8. Review the summary, and then click **Finish**.  
The resources topology page is displayed.
9. Click **Back up Now**.
10. In the **Backup** page, perform the following steps:
  - a. If you have applied multiple policies to the resource, from the **Policy** drop-down list, select the policy that you want to use for backup.
  - b. Click **Backup**.
11. Monitor the operation progress by clicking **Monitor > Jobs**.

## Creating resource groups and attaching policies

A resource group is the container to which you must add resources that you want to back up and protect. A resource group enables you to back up all the data that is associated with a given application simultaneously. A resource group is required for any data protection job. You must also attach one or more policies to the resource group to define the type of data protection job that you want to perform.

### Steps

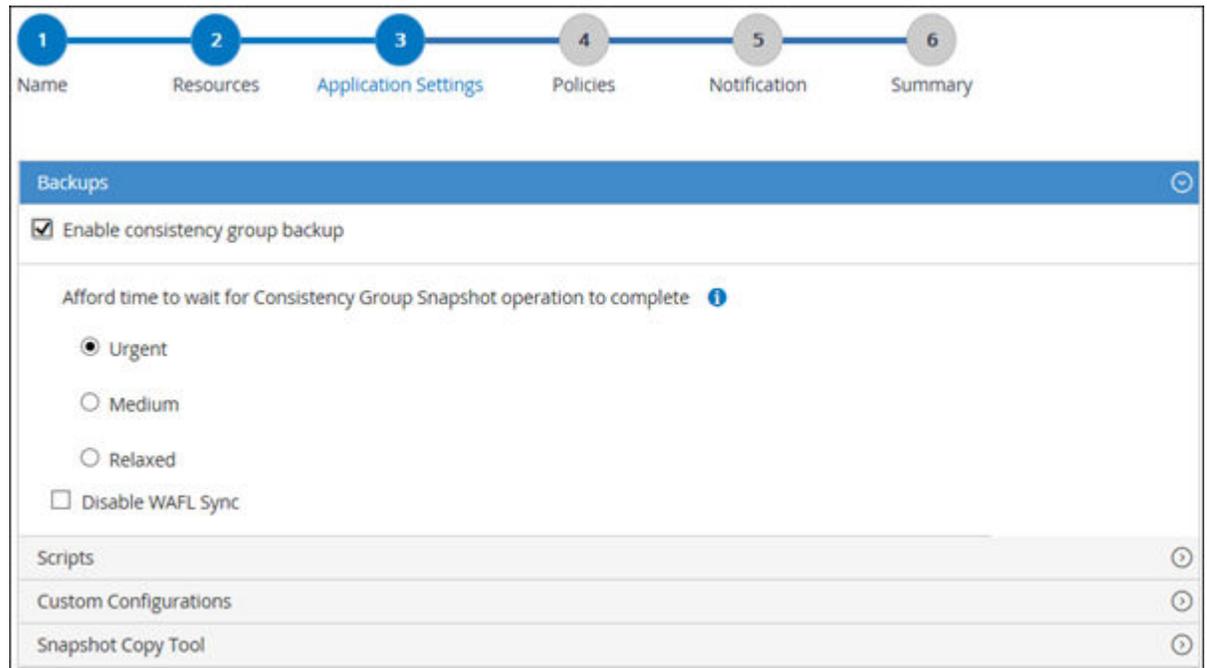
1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
2. In the **Resources** page, click **New Resource Group**.
3. In the **Name** page, perform the following actions:

For this field...	Do this...
Name	Enter a name for the resource group.
Tags	Enter one or more labels that will help you later search for the resource group. For example, if you add HR as a tag to multiple resource groups, you can later find all resource groups associated with the HR tag.
Use custom name format for Snapshot copy	Select this check box, and enter a custom name format that you want to use for the Snapshot copy name. For example, <i>customtext_resource_group_policy_hostname</i> or <i>resource_group_hostname</i> . By default, a timestamp is appended to the Snapshot copy name.

4. Optional: In the **Resources** page, select a host name from the **Host** drop-down list and resource type from the **Resource Type** drop-down list.  
This helps to filter information on the screen.

5. Select the resources from the **Available Resources** section, and then click the right arrow to move them to the **Selected Resources** section.
6. Optional: In the **Application Settings** page, do the following:
  - Click the **Backups** arrow to set additional backup options:  
Enable consistency group backup and perform the following tasks:

For this field...	Do this...
Afford time to wait for Consistency Group Snapshot operation to complete	Select Urgent, Medium, or Relaxed to specify the wait time for Snapshot copy operation to complete. Urgent = 5 seconds, Medium = 7 seconds, and Relaxed = 20 seconds.
Disable WAFL Sync	Select this to avoid forcing a WAFL consistency point.



- Click the **Scripts** arrow and enter the pre and post commands for quiesce, Snapshot copy, and unquiesce operations. You can also enter the pre commands to be executed before exiting in the event of a failure.
- Click the **Custom Configurations** arrow and enter the custom key-value pairs required for all data protection operations using this resource.
- Click the **Snapshot Copy Tool** arrow to select the tool to create Snapshot copies:

If you want...	Then...
SnapCenter to use the plug-in for Windows and put the file system into a consistent state before creating a Snapshot copy. For Linux resources, this option is not applicable.	Select <b>SnapCenter with File System Consistency</b> . This option is not applicable for SnapCenter Plug-in for SAP HANA Database.

If you want...	Then...
SnapCenter to create a storage level Snapshot copy	Select <b>SnapCenter without File System Consistency</b> .
To enter the command to be executed on the host to create Snapshot copies.	Select <b>Other</b> , and then enter the command to be executed on the host to create a Snapshot copy.

7. In the **Policies** page, perform the following steps:

- a. Select one or more policies from the drop-down list.

**Note:** You can also create a policy by clicking .

The policies are listed in the Configure schedules for selected policies section.

- b. In the Configure Schedules column, click  for the policy you want to configure.
- c. In the **Add schedules for policy** *policy\_name* dialog box, configure the schedule, and then click **OK**.

Where, *policy\_name* is the name of the policy that you have selected.

The configured schedules are listed in the Applied Schedules column.

8. In the **Notification** page, from the **Email preference** drop-down list, select the scenarios in which you want to send the emails.

You must also specify the sender and receiver email addresses, and the subject of the email. The SMTP server must be configured in **Settings > Global Settings**.

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

#### Related tasks

[Backing up resource groups of custom plug-in resources](#) on page 22

## Backing up resource groups of custom plug-in resources

A resource group is a collection of resources on a host or cluster. A backup operation on the resource group is performed on all resources defined in the resource group. You can back up a resource group on demand from the Resources page. 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.
- If you want to back up a resource that has a SnapMirror relationship to secondary storage, the role assigned to the storage user should include the “snapmirror all” privilege. However, if you are using the “vsadmin” role, then the “snapmirror all” privilege is not required.

#### About this task

#### Steps

1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.

2. In the **Resources** page, select **Resource Group** from the **View** list.  
You can search the resource group either by entering the resource group name in the search box or by clicking  and selecting the tag. You can then click  to close the filter pane.
3. In the **Resource Groups** page, select the resource group that you want to back up, and then click **Back up Now**.
4. In the **Backup** page, perform the following steps:
  - a. If you have associated multiple policies with the resource group, from the **Policy** drop-down list, select the policy that you want to use for backup.
  - b. Click **Backup**.
5. Monitor the operation progress by clicking **Monitor > Jobs**.

#### Related tasks

[Creating policies for custom plug-in resources](#) on page 15

[Creating resource groups and attaching policies](#) on page 20

[Monitoring backup operations](#) on page 23

[Viewing custom plug-in resource related backups and clones in the Topology page](#) on page 25

## Monitoring backup operations

You can monitor the progress of different backup operations by using the SnapCenter Jobs page. You might want to check the progress to determine when it is complete or if there is an issue.

#### About this task

The following icons appear on the Jobs page and indicate the state of the operation:

-  In progress
-  Completed successfully
-  Failed
-  Completed with warnings or could not start due to warnings
-  Queued
-  Canceled

#### Steps

1. In the left navigation pane, click **Monitor**.
2. In the **Monitor** page, click **Jobs**.
3. Optional: In the **Jobs** page, perform the following steps:
  - a. Click  to filter the list so that only backup operations are listed.
  - b. Specify the start and end dates.
  - c. From the **Type** drop-down list, select **Backup**.

- d. From the **Status** drop-down, select the backup status.
  - e. Click **Apply** to view the operations completed successfully.
4. Select a backup job, and then click **Details** to view the job details.
 

**Note:** Though the backup job status displays , when you click on job details you might see that some of the child tasks of the backup operation are still in progress.
  5. Optional: In the **Job Details** page, click **View logs**.
 

The **View logs** button displays the detailed logs for the selected operation.

#### Related tasks

[Backing up resource groups of custom plug-in resources](#) on page 22

## Monitoring operations in the Activity pane

The Activity pane displays the five most recent operations performed. The Activity pane also displays when the operation was initiated and the status of the operation.

#### About this task

The Activity pane displays information regarding backup, restore, clone, and scheduled backup operations.

#### Steps

1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
2. Click  on the **Activity** pane to view the five most recent operations.
 

When you click one of the operations, the operation details are listed in the Job Details page.

## Canceling the backup operations

You can cancel backup operations that are queued.

#### Before you begin

- You must be logged in as the SnapCenter Admin or job owner to cancel operations.

#### About this task

- You can cancel a backup operation from either the Monitor page or the Activity pane.
- You can use the SnapCenter GUI, PowerShell cmdlets, or CLI commands to cancel the backup operations.
- The **Cancel Job** button is disabled for operations that cannot be canceled.
- If you selected **All members of this role can see and operate on other members objects** in Users\Groups page while creating a role, you can cancel the queued backup operations of other members while using that role.

#### Step

1. Perform one of the following actions:

From the...	Action
Monitor page	<ol style="list-style-type: none"> <li>a. In the left navigation pane, click <b>Monitor &gt; Jobs</b>.</li> <li>b. Select the operation, and click <b>Cancel Job</b>.</li> </ol>
Activity pane	<ol style="list-style-type: none"> <li>a. After initiating the backup operation, click  on the Activity pane to view the five most recent operations.</li> <li>b. Select the operation.</li> <li>c. In the Job Details page, click <b>Cancel Job</b>.</li> </ol>

### Result

The operation is canceled, and the resource is reverted to the previous state.

### Related information

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

## Viewing custom plug-in resource related backups and clones in the Topology page

When you are preparing to back up or clone a resource, you might find it helpful to view a graphical representation of all backups and clones on the primary and secondary storage. In the Topology page, you can see all of the backups and clones that are available for the selected resource or resource group. You can view the details of those backups and clones, and then select them to perform data protection operations.

### About this task

You can review the following icons in the Manage Copies view to determine whether the backups and clones are available on the primary or secondary storage (Mirror copies or Vault copies).

- 
  - displays the number of backups and clones that are available on the primary storage.
- 
  - displays the number of backups and clones that are mirrored on the secondary storage using SnapMirror technology.

**Note:** Clones of a backup of a version-flexible mirror on a mirror-vault type volume are displayed in the topology view but the mirror backup count in the topology view does not include the version-flexible backup.
- 
  - displays the number of backups and clones that are replicated on the secondary storage using SnapVault technology.

**Note:** The number of backups displayed includes the backups deleted from the secondary storage. For example, if you have created 6 backups using a policy to retain only 4 backups, the number of backups displayed are 6.

**Note:** Clones of a backup of a version-flexible mirror on a mirror-vault type volume are displayed in the topology view but the mirror backup count in the topology view does not include the version-flexible backup.

### Steps

1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
2. In the **Resources** page, either select the resource or resource group from the **View** drop-down list.
3. Select the resource either from the resource details view or from the resource group details view.  
If the resource is protected, the topology page of the selected resource is displayed.

4. Review the **Summary card** to see a summary of the number of backups and clones available on the primary and secondary storage.

The Summary Card section displays the total number of backups and clones.

Clicking the refresh button starts a query of the storage to display an accurate count.

5. In the **Manage Copies** view, click **Backups** or **Clones** from the primary or secondary storage to see details of a backup or clone.

The details of the backups and clones are displayed in a table format.

6. Select the backup from the table, and then click the data protection icons to perform restore, clone, rename, and delete operations.

**Note:** You cannot rename or delete backups that are on the secondary storage system.

You cannot rename the backups that are on the primary storage system.

7. If you want to delete a clone, then select the clone from the table and click  to delete the clone.

### Related tasks

[Backing up resource groups of custom plug-in resources](#) on page 22

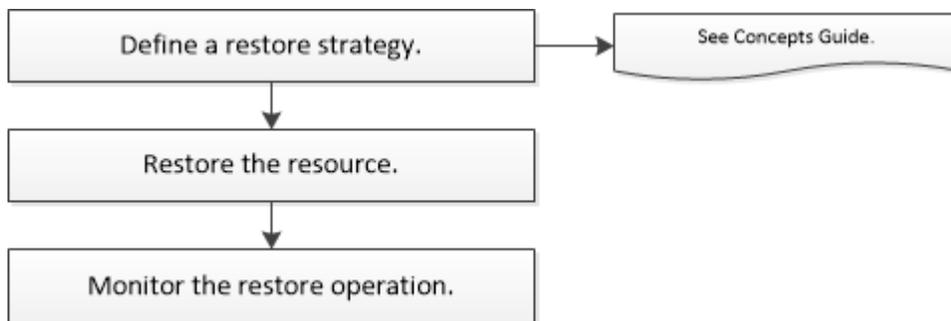
## Restoring custom plug-in resources

---

The restore and recovery workflow includes planning, performing the restore operations, and monitoring the operations.

### About this task

The following workflow shows the sequence in which you must perform the restore operation:



You can also use PowerShell cmdlets manually or in scripts to perform backup, restore, and clone operations. The SnapCenter cmdlet help and the cmdlet reference information contain detailed information about PowerShell cmdlets.

### Related references

[Data protection workflow for SnapCenter Custom Plug-ins resources](#) on page 7

### Related information

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

## Restoring a resource backup

You can use SnapCenter to restore resources. The capabilities of the restore operations depends upon the plug-in that you use.

### Before you begin

- You must have backed up the resource or resource groups.
- The SnapCenter administrator must have assigned you the storage virtual machines (SVMs) for both the source volumes and destination volumes if you are replicating Snapshot copies to a mirror or vault.
- You must have cancelled any backup operation that is currently in progress for the resource or resource group you want to restore.

### About this task

The default restore operation only restores storage objects. Restore operations at the application level can only be performed if the custom plug-in provides that capability.

## Steps

1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
2. In the **Resources** page, filter resources from the **View** drop-down list based on resource type.

The resources are displayed along with information such as type, host or cluster name, associated resource groups and policies, and status.

**Note:** Although a backup might be for a resource group, when you restore, you must select the individual resources you want to restore.

If the resource is not protected, *Not protected* is displayed in the Overall Status column.

The status *Not protected* in the Overall Status column can mean either that the resource is not protected, or that the resource was backed up by a different user.

3. Select the resource or select a resource group and then select a resource in that group.  
The resource topology page is displayed.
4. From the **Manage Copies** view, select **Backups** either from the primary or secondary (mirrored or vaulted) storage systems.
5. In the Primary backup(s) table, select the backup that you want to restore from, and then click



Primary Backup(s)	
Backup Name	End Date
rg1_scspr0191685001_01-05-2017_01.35.06.6463	1/5/2017 1:35:27 AM

6. In the **Restore Scope** page, select either **Complete Resource** or **File Level**.
  - a. If you selected **Complete Resource**, the resource backup is restored.  
If the resource contains volumes or qtrees as Storage Footprint, then newer Snapshot copies on such volumes or qtrees are deleted and cannot be recovered. Also, if any other resource is hosted on same volumes or qtrees, then that resource is also deleted.
  - b. If you selected **File Level**, then you can either select **All**, or select volumes or qtrees, and then enter the path related to the volumes or qtrees that are selected separated by commas.
    - You can select multiple volumes and qtrees.
    - If resource type is LUN, entire LUN is restored. You can select multiple LUNs.

**Note:** If you select **All**, all the files on the volumes, qtrees, or LUNs are restored.
7. In the **Recovery Type** page, perform the following steps: select option to apply logs. Make sure your plugin supports All logs and Logs until restore type before selecting it.

If you want to...	Do this...
Restore all logs	Select <b>All logs</b> . Ensure that the plug-in supports <b>All logs</b> .

If you want to...	Do this...
Restore all logs till the specified time	Select <b>Logs until</b> . Ensure that the plug-in supports <b>Logs until</b> .
Restore the resource backup	Select <b>None</b> .

8. Optional: In the **Pre ops** page, enter pre restore and unmount commands to run before performing a restore job.
9. Optional: In the **Post ops** page, enter mount and post restore commands to run after performing a restore job.
10. In the **Notification** page, from the **Email preference** drop-down list, select the scenarios in which you want to send the emails.  
  
You must also specify the sender and receiver email addresses, and the subject of the email. SMTP must also be configured in the **Settings > Global Settings** page.
11. Review the summary, and then click **Finish**.
12. Monitor the operation progress by clicking **Monitor > Jobs**.

## Monitoring restore operations

You can monitor the progress of different SnapCenter restore operations by using the Jobs page. You might want to check the progress of an operation to determine when it is complete or if there is an issue.

### About this task

Post-restore states describe the conditions of the resource after a restore operation and any further restore actions that you can take.

The following icons appear on the Jobs page, and indicate the state of the operation:

-  In progress
-  Completed successfully
-  Failed
-  Completed with warnings or could not start due to warnings
-  Queued
-  Canceled

### Steps

1. In the left navigation pane, click **Monitor**.
2. In the **Monitor** page, click **Jobs**.
3. Optional: In the **Jobs** page, perform the following steps:
  - a. Click  to filter the list so that only restore operations are listed.
  - b. Optional: Specify the start and end dates.

- c. From the **Type** drop-down list, select **Restore**.
  - d. From the **Status** drop-down list, select the restore status.
  - e. Click **Apply** to view the operations that are completed successfully.
4. Select the restore job, and then click **Details** to view the job details.
  5. Optional: In the **Job Details** page, click **View logs**.  
The **View logs** button displays the detailed logs for the selected operation.

## Canceling restore operations

You can cancel restore jobs that are queued.

### Before you begin

- You must be logged in as the SnapCenter Admin or job owner to cancel restore operations.

### About this task

- You can cancel a restore operation from either the Monitor page or the Activity pane.
- You cannot cancel a running restore operation.
- You can use the SnapCenter GUI, PowerShell cmdlets, or CLI commands to cancel the restore operations.
- The **Cancel Job** button is disabled for restore operations that cannot be canceled.
- If you selected **All members of this role can see and operate on other members objects** in Users\Groups page while creating a role, you can cancel the queued backup operations of other members while using that role.

### Step

1. Perform one of the following actions:

From the...	Action
Monitor page	<ol style="list-style-type: none"> <li>a. In the left navigation pane, click <b>Monitor &gt; Jobs</b>.</li> <li>b. Select the job and click <b>Cancel Job</b>.</li> </ol>
Activity pane	<ol style="list-style-type: none"> <li>a. After initiating the restore operation, click  on the Activity pane to view the five most recent operations.</li> <li>b. Select the operation.</li> <li>c. In the Job Details page, click <b>Cancel Job</b>.</li> </ol>

### Related information

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

## Cloning custom plug-in resource backups

---

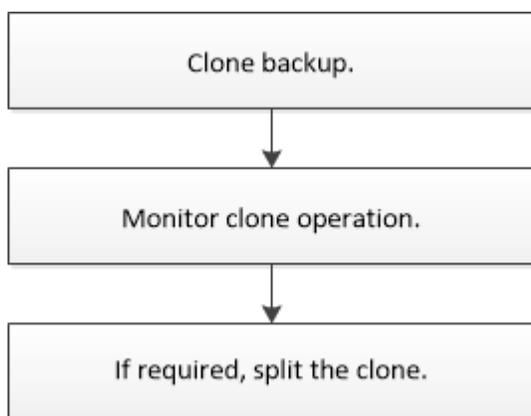
The clone workflow includes performing the clone operation and monitoring the operation.

### About this task

You might clone resource backups for the following reasons:

- To test functionality that has to be implemented using the current resource structure and content during application development cycles
- For data extraction and manipulation tools when populating data warehouses
- To recover data that was mistakenly deleted or changed

The following workflow shows the sequence in which you must perform the clone operation:



You can also use PowerShell cmdlets manually or in scripts to perform backup, restore, and clone operations. For detailed information about PowerShell cmdlets, use the SnapCenter cmdlet help or see the cmdlet reference information.

### Related references

[Data protection workflow for SnapCenter Custom Plug-ins resources](#) on page 7

### Related information

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

## Cloning from a backup

You can use SnapCenter to clone a backup. You can clone from primary or secondary backup. The capabilities of the clone operations depends upon the plug-in that you use.

### Before you begin

- You must have backed up the resources or resource group.
- The default clone operation only clones storage objects. Clone operations at the application level can only be performed if the custom plug-in provides that capability.

### Steps

1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
2. In the **Resources** page, filter resources from the **View** drop-down list based on resource type.  
The resources are displayed along with information such as type, host or cluster name, associated resource groups and policies, and status.
3. Select the resource or resource group.  
You must select a resource if you select a resource group.  
The resource or resource group topology page is displayed.
4. From the **Manage Copies** view, select **Backups** either from the primary or secondary (mirrored or vaulted) storage systems.
5. Select the data backup from the table, and then click .
6. In the **Locations** page, perform the following:

For this field...	Do this...
Clone server	By default, the source host is populated. If you want to specify a different host, select the host on which the clone should be mounted and the plug-in is installed.
Clone suffix	This is mandatory when the clone destination is the same as the source. Enter a suffix that will be appended to the newly cloned resource name. The suffix ensures that the cloned resource is unique on the host. For example, rs1_clone. If you are cloning to the same host as the original resource, you must provide a suffix to differentiate the cloned resource from the original resource; otherwise, the operation fails.

If the resource selected is a LUN and if you are cloning from a secondary backup, then the destination volumes are listed. Single source can have multiple destination volumes.

7. In the **Settings** page, perform the following:

For this field...	Do this...
Initiator name	Enter the host initiator name, which is either a IQDN or WWPN.
Igroup protocol	Select Igroup protocol.

**Note:** Settings page is displayed only if the storage type is LUN.

8. Optional: In the **Scripts** page, enter the commands for pre clone or post clone that should be run before or after the clone operation, respectively. Enter the mount command to mount a file system to a host.

For example:

Pre clone command: delete existing databases with the same name

Post clone command: verify a database or start a database.

Mount command for a volume or qtree on a Linux machine: mount<VSERVER\_NAME>:  
%<VOLUME\_NAME\_Clone /mnt>

9. In the **Notification** page, from the **Email preference** drop-down list, select the scenarios in which you want to send the emails.  
You must also specify the sender and receiver email addresses, and the subject of the email.
10. Review the summary and click **Finish**.
11. Monitor the operation progress by clicking **Monitor > Jobs**.

#### Related information

[NetApp Knowledgebase Answer 1087842: Database credential does not propagate to the cloned resource](#)

## Monitoring clone operations from the Jobs page

You can monitor the progress of SnapCenter clone operations by using the Jobs page. You might want to check the progress of an operation to determine when it is complete or if there is an issue.

#### About this task

The following icons appear on the Jobs page, and indicate the state of the operation:

-  In progress
-  Completed successfully
-  Failed
-  Completed with warnings or could not start due to warnings
-  Queued

#### Steps

1. In the left navigation pane, click **Monitor**.
2. In the **Monitor** page, click **Jobs**.
3. Optional: In the **Jobs** page, perform the following steps:
  - a. Click  to filter the list so that only clone operations are listed.
  - b. Specify the start and end dates.
  - c. From the **Type** drop-down list, select **Clone**.
  - d. From the **Status** drop-down list, select the clone status.
  - e. Click  to view the operations that are completed successfully.
4. Select the clone job, and then click **Details** to view the job details.
5. Optional: In the **Job Details** page, click **View logs**.  
The **View logs** button displays the detailed logs for the selected operation.

## Canceling clone operations

You can cancel clone operations that are queued.

### Before you begin

- You must be logged in as the SnapCenter Admin or job owner to cancel operations.

### About this task

- You can cancel a clone operation from either the Monitor page or the Activity pane.
- You cannot cancel a running clone operation.
- You can use the SnapCenter GUI, PowerShell cmdlets, or CLI commands to cancel the clone operations.
- If you selected **All members of this role can see and operate on other members objects** in Users\Groups page while creating a role, you can cancel the queued backup operations of other members while using that role.

### Step

- Perform one of the following actions:

From the...	Action
Monitor page	<ol style="list-style-type: none"> <li>In the left navigation pane, click <b>Monitor &gt; Jobs</b>.</li> <li>Select the operation, and click <b>Cancel Job</b>.</li> </ol>
Activity pane	<ol style="list-style-type: none"> <li>After initiating the clone operation, click  on the Activity pane to view the five most recent operations.</li> <li>Select the operation.</li> <li>In the Job Details page, click <b>Cancel Job</b>.</li> </ol>

### Related information

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

## Splitting a clone

You can use SnapCenter to split a cloned resource from the parent resource. The clone that is split becomes independent of the parent resource.

### About this task

- You cannot perform the clone split operation on an intermediate clone.  
For example, after you create clone1 from a database backup, you can create a backup of clone1, and then clone this backup (clone2). After you create clone2, clone1 is an intermediate clone, and

you cannot perform the clone split operation on clone1. However, you can perform the clone split operation on clone2.

After splitting clone2, you can perform the clone split operation on clone1 because clone1 is no longer the intermediate clone.

- When you split a clone, the backup copies and clone jobs of the clone are deleted.
- For information about clone split operation limitations, see the *Logical Storage Management Guide*.  
[ONTAP 9 Logical Storage Management Guide](#)

### Steps

1. In the left navigation pane, click **Resources**, and then select the appropriate plug-in from the list.
2. In the **Resources** page, select the appropriate option from the **View** list:

Option	Description
For database applications	Select <b>Database</b> from the View list.
For file systems	Select <b>Path</b> from the View list.

3. Select the cloned resource (for example, the database or LUN), and then click .
4. Review the estimated size of the clone that is to be split and the required space available on the aggregate, and then click **Start**.
5. Monitor the operation progress by clicking **Monitor > Jobs**.

### After you finish

If you want a longer poll time or shorter poll time to check whether the clone is split or not, you can change the value of `CloneSplitStatusCheckPollTime` parameter in `SMCoreServiceHost.exe.config` file to set the time interval for `SMCore` to poll for the status of the clone split operation. The value is in milliseconds and the default value is 5 minutes.

For example:

```
<add key="CloneSplitStatusCheckPollTime" value="300000" />
```

## Backing up, restoring, and cloning using PowerShell cmdlets

---

With SnapCenter Custom Plug-ins, you can use PowerShell cmdlets for scripting of backup, restore, and clone operations.

The following are common tasks you might perform using PowerShell cmdlets:

- Preparing the PowerShell environment
- Creating a storage system connection and a credential
- Backing up resources
- Restoring backups
- Cloning backups

The information regarding the parameters that can be used with the cmdlet and their descriptions can be obtained by running `Get-Help command_name`. Alternatively, you can also refer to the *Cmdlet Reference Guide*.

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

### Related information

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

## Creating a storage system connection and a credential using PowerShell cmdlets

You must create a storage virtual machine (SVM) connection and a credential before using PowerShell cmdlets to perform data protection operations.

### Before you begin

- You should have prepared the PowerShell environment to execute the PowerShell cmdlets.
- You should have the required permissions in the Infrastructure Admin role to create storage connections.
- You should ensure that the plug-in installations are not in progress.  
Host plug-in installations must not be in progress while adding a storage system connection because the host cache might not be updated and databases status might be displayed in the SnapCenter GUI as “Not available for backup” or “Not on NetApp storage”.
- Storage system names should be unique.  
SnapCenter does not support multiple storage systems with the same name on different clusters. Each storage system that is supported by SnapCenter should have a unique name and a unique data LIF IP address.

### About this task

The information regarding the parameters that can be used with the cmdlet and their descriptions can be obtained by running `Get-Help command_name`. Alternatively, you can also refer to the *Cmdlet Reference Guide*.

*SnapCenter Software 4.2 Windows Cmdlet Reference Guide***Steps**

1. Initiate a PowerShell connection session by using the `Open-SmConnection` cmdlet.

**Example**

This example opens a PowerShell session:

```
PS C:\> Open-SmStorageConnection
```

2. Create a new connection to the storage system by using the `Add-SmStorageConnection` cmdlet.

**Example**

This example creates a new storage system connection:

```
PS C:\> Add-SmStorageConnection -Storage test_vsl -Protocol Https
-Timeout 60
```

3. Create a new credential by using the `Add-SmCredential` cmdlet.

**Example**

This example creates a new credential named `FinanceAdmin` with Windows credentials:

```
PS C:> Add-SmCredential -Name FinanceAdmin -AuthMode Windows
-Credential sddev\administrator
```

## Backing up resources using PowerShell cmdlets

Backing up a resource includes establishing a connection with the SnapCenter Server, adding resources, adding a policy, creating a backup resource group, and backing up.

**Before you begin**

- You must have prepared the PowerShell environment to execute the PowerShell cmdlets.
- You must have added the storage system connection and created a credential.

**About this task**

The information regarding the parameters that can be used with the cmdlet and their descriptions can be obtained by running `Get-Help command_name`. Alternatively, you can also refer to the *Cmdlet Reference Guide*.

*SnapCenter Software 4.2 Windows Cmdlet Reference Guide***Steps**

1. Initiate a connection session with the SnapCenter Server for a specified user by using the `Open-SmConnection` cmdlet.

**Example**

```
Open-smconnection -SMSbaseurl https:\\snapctr.demo.netapp.com:8146\
```

The username and password prompt is displayed.

2. Add resources by using the `Add-SmResources` cmdlet.

**Example**

This example adds resources:

```
Add-SmResource -HostName '10.232.206.248' -PluginCode 'DB2' -
ResourceName NONREC1 -ResourceType Database -StorageFootPrint ( @
{"VolumeName"="DB2_NONREC1DB";"LunName"="DB2_NONREC1DB";"Vserver"="vse
rver_scauto_secondary"}) -Instance db2inst1
```

3. Create a backup policy by using the `Add-SmPolicy` cmdlet.

**Example**

This example creates a new backup policy:

```
Add-SMPolicy -PolicyName 'db2VolumePolicy' -PolicyType 'Backup' -
PluginPolicyType DB2 -description 'VolumePolicy'
```

4. Add a new resource group to SnapCenter by using the `Add-SmResourceGroup` cmdlet.

**Example**

This example creates a new resource group with the specified policy and resources:

```
Add-SmResourceGroup -ResourceGroupName
'Verify_ManualBackup_DatabaseLevel_MultipleVolume_unix' -Resources @(
{"Host"="10.232.206.248";"UId"="db2inst2\NONREC"},@{"Host"="10.232.206
.248";"UId"="db2inst1\NONREC"}) -Policies db2ManualPolicy
```

5. Initiate a new Snapshot copy job by using the `New-SmBackup` cmdlet.

**Example**

```
New-SMBackup -DatasetName
Verify_ManualBackup_DatabaseLevel_MultipleVolume_unix -Policy
db2ManualPolicy
```

6. View the status of the backup job by using the `Get-SmBackupReport` cmdlet.

**Example**

This example displays a job summary report of all jobs that were run on the specified date:

```
PS C:\> Get-SmBackupReport -JobId 351
Output:
BackedUpObjects      : {DB1}
FailedObjects        : {}
IsScheduled           : False
HasMetadata           : False
SmBackupId           : 269
SmJobId              : 2361
StartDateTime         : 10/4/2016 11:20:45 PM
```

```

EndDateTime           : 10/4/2016 11:21:32 PM
Duration              : 00:00:46.2536470
CreatedDateTime       : 10/4/2016 11:21:09 PM
Status                : Completed
ProtectionGroupName   : Verify_ASUP_Message_windows
SmProtectionGroupId   : 211
PolicyName            : test2
SmPolicyId            : 20
BackupName            :
Verify_ASUP_Message_windows_scc54_10-04-2016_23.20.46.2758
VerificationStatus    : NotVerified
VerificationStatuses  :
SmJobError            :
BackupType            : SCC_BACKUP
CatalogingStatus      : NotApplicable
CatalogingStatuses    :
ReportDataCreatedDateTime :

```

## Restoring resources using PowerShell cmdlets

Restoring a resource backup includes initiating a connection session with the SnapCenter Server, listing the backups and retrieving backup information, and restoring a backup.

### Before you begin

You must have prepared the PowerShell environment to execute the PowerShell cmdlets.

### About this task

The information regarding the parameters that can be used with the cmdlet and their descriptions can be obtained by running `Get-Help command_name`. Alternatively, you can also refer to the *Cmdlet Reference Guide*.

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

### Steps

1. Initiate a connection session with the SnapCenter Server for a specified user by using the `Open-SmConnection` cmdlet.

### Example

```
Open-smconnection -SMSbaseurl https:\\snapctr.demo.netapp.com:8146/
```

2. Retrieve the information about the one or more backups that you want to restore by using the `Get-SmBackup` and `Get-SmBackupReport` cmdlets.

### Example

This example displays information about all available backups:

```

C:\PS>PS C:\> Get-SmBackup

          BackupId          BackupName
-----
BackupTime          BackupType
-----
-----
          1          Payroll Dataset_vise-f6_08... 8/4/2015

```

```

11:02:32 AM          Full Backup
                2          Payroll Dataset_vise-f6_08... 8/4/2015
11:23:17 AM

```

### Example

This example displays detailed information about the backup from January 29th 2015 to February 3rd, 2015:

```

PS C:\> Get-SmBackupReport -FromDate "1/29/2015" -ToDate "2/3/2015"

SmBackupId          : 113
SmJobId             : 2032
StartDateTime       : 2/2/2015 6:57:03 AM
EndDateTime         : 2/2/2015 6:57:11 AM
Duration            : 00:00:07.3060000
CreatedDateTime     : 2/2/2015 6:57:23 AM
Status              : Completed
ProtectionGroupName : Clone
SmProtectionGroupId : 34
PolicyName          : Vault
SmPolicyId          : 18
BackupName          : Clone_SCSPR0019366001_02-02-2015_06.57.08
VerificationStatus  : NotVerified

SmBackupId          : 114
SmJobId             : 2183
StartDateTime       : 2/2/2015 1:02:41 PM
EndDateTime         : 2/2/2015 1:02:38 PM
Duration            : -00:00:03.2300000
CreatedDateTime     : 2/2/2015 1:02:53 PM
Status              : Completed
ProtectionGroupName : Clone
SmProtectionGroupId : 34
PolicyName          : Vault
SmPolicyId          : 18
BackupName          : Clone_SCSPR0019366001_02-02-2015_13.02.45
VerificationStatus  : NotVerified

```

3. Restore data from the backup by using the `Restore-SmBackup` cmdlet.

### Example

```

Restore-SmBackup -PluginCode 'DummyPlugin' -AppObjectId
'scc54.sscore.test.com\DummyPlugin\NTP\DB1' -BackupId 269 -Confirm:
>false
output:
Name          : Restore 'scc54.sscore.test.com\DummyPlugin\NTP
\DB1'
Id            : 2368
StartTime     : 10/4/2016 11:22:02 PM
EndTime       :
IsCancellable : False
IsRestartable : False
IsCompleted   : False
IsVisible     : True
IsScheduled   : False
PercentageCompleted : 0
Description   :
Status        : Queued
Owner         :
Error         :
Priority      : None
Tasks         : {}
ParentJobID   : 0

```

```

EventId           : 0
JobTypeId         :
ApisJobKey       :
ObjectId         : 0
PluginCode       : NONE
PluginName       :

```

## Cloning backups using PowerShell cmdlets

The clone workflow includes planning, performing the clone operation, and monitoring the operation.

### Before you begin

You must have prepared the PowerShell environment to execute the PowerShell cmdlets.

### About this task

For information about PowerShell cmdlets, use the SnapCenter cmdlet help or see the cmdlet reference information.

[SnapCenter Software 4.2 Windows Cmdlet Reference Guide](#)

### Steps

1. Initiate a connection session with the SnapCenter Server for a specified user by using the `Open-SmConnection` cmdlet.

#### Example

```
Open-SmConnection -SMSbaseurl https://snapctr.demo.netapp.com:8146/
```

2. List the backups that can be cloned using the `Get-SmBackup` or `Get-SmResourceGroup` cmdlet.

#### Example

This example displays information about all available backups:

```

C:\PS>PS C:\> Get-SmBackup

      BackupId           BackupName
-----
BackupTime           BackupType
-----
1
11:02:32 AM          Full Backup
2
11:23:17 AM          Payroll Dataset_vise-f6_08... 8/4/2015

```

#### Example

This example displays information about a specified resource group:

```

PS C:\> Get-SmResourceGroup

Description           :
CreationTime          : 10/10/2016 4:45:53 PM
ModificationTime     : 10/10/2016 4:45:53 PM

```

```

EnableEmail                : False
EmailSMTPServer            :
EmailFrom                  :
EmailTo                    :
EmailSubject               :
EnableSysLog               : False
ProtectionGroupType       : Backup
EnableAsupOnFailure       : False
Policies                   : {}
HostResourceMapping       : {}
Configuration              : SMCoreContracts.SmCloneConfiguration
LastBackupStatus          : Completed
VerificationServer         :
EmailBody                  :
EmailNotificationPreference : Never
VerificationServerInfo    :
SchedulerSQLInstance      :
CustomText                 :
CustomSnapshotFormat      :
SearchResources           : False
ByPassCredential          : False
IsCustomSnapshot          :
MaintenanceStatus         : Production
PluginProtectionGroupTypes : {SMSQL}
Tag                        :
IsInternal                 : False
EnableEmailAttachment     : False
VerificationSettings      : {}
Name                      : NFS_DB
Type                      : Group
Id                        : 2
Host                      :
UserName                  :
Passphrase                 :
Deleted                   : False
Auth                      : SMCoreContracts.SmAuth
IsClone                   : False
CloneLevel                : 0
Hosts                     :
StorageName               :
ResourceGroupNames        :
PolicyNames               :

Description                :
CreationTime               : 10/10/2016 4:51:36 PM
ModificationTime           : 10/10/2016 5:27:57 PM
EnableEmail                : False
EmailSMTPServer            :
EmailFrom                  :
EmailTo                    :
EmailSubject               :
EnableSysLog               : False
ProtectionGroupType       : Backup
EnableAsupOnFailure       : False
Policies                   : {}
HostResourceMapping       : {}
Configuration              : SMCoreContracts.SmCloneConfiguration
LastBackupStatus          : Failed
VerificationServer         :
EmailBody                  :
EmailNotificationPreference : Never
VerificationServerInfo    :
SchedulerSQLInstance      :
CustomText                 :
CustomSnapshotFormat      :
SearchResources           : False
ByPassRunAs               : False
IsCustomSnapshot          :
MaintenanceStatus         : Production
PluginProtectionGroupTypes : {SMSQL}
Tag                        :

```

```

IsInternal           : False
EnableEmailAttachment : False
VerificationSettings : {}
Name                 : Test
Type                 : Group
Id                   : 3
Host                 :
UserName              :
Passphrase            :
Deleted               : False
Auth                  : SMCoreContracts.SmAuth
IsClone               : False
CloneLevel            : 0
Hosts                 :
StorageName           :
ResourceGroupNames    :
PolicyNames           :

```

3. Initiate a clone operation from a clone resource group or an existing backup using the `New-SmClone` cmdlet.

#### Example

This example creates a clone from a specified backup with all logs:

```

New-SmClone -BackupName
Verify_delete_clone_on_qtree_windows_scc54_10-04-2016_19.05.48.0886 -
Resources @{"Host"="scc54.sscore.test.com";"Uid"="QTREE1"} -
CloneToInstance scc54.sscore.test.com -Suffix '_QtreeCloneWin9' -
AutoAssignMountPoint -AppPluginCode 'DummyPlugin' -initiatorname 'iqn.
1991-
05.com.microsoft:scc54.sscore.test.com' -igroupprotocol 'mixed'

```

4. View the status of the clone job by using the `Get-SmCloneReport` cmdlet.

#### Example

This example displays a clone report for the specified job ID:

```

PS C:\> Get-SmCloneReport -JobId 186

SmCloneId           : 1
SmJobId              : 186
StartDateTime        : 8/3/2015 2:43:02 PM
EndDateTime          : 8/3/2015 2:44:08 PM
Duration              : 00:01:06.6760000
Status                : Completed
ProtectionGroupName : Draper
SmProtectionGroupId  : 4
PolicyName            : OnDemand_Clone
SmPolicyId            : 4
BackupPolicyName     : OnDemand_Full_Log
SmBackupPolicyId     : 1
CloneHostName        : SCSPR0054212005.mycompany.com
CloneHostId          : 4
CloneName             : Draper__clone__08-03-2015_14.43.53
SourceResources       : {Don, Betty, Bobby, Sally}
ClonedResources       : {Don_DRAPER, Betty_DRAPER, Bobby_DRAPER,
Sally_DRAPER}
SmJobError            :

```

## Troubleshooting data protection operations

---

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

You can download the log files from the SnapCenter user interface by clicking **Monitor > Logs > Download**.

### Custom plug-in installation fails

#### Description

If the Java Runtime Environment (JRE) 1.7 is installed on a host with German operating system and if this host is added to the SnapCenter Server, the custom plug-in installation fails.

#### Error message

```
Internal Server Error.
```

#### Corrective action

Upgrade the JRE version to 1.8.

### Backup operation fails if Snapshot copies on the secondary storage reaches maximum limit

#### Description

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.

#### Error message

```
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.
```

#### Corrective action

You should configure SnapMirror retention policy for the secondary storage to avoid reaching the maximum limit of Snapshot copies on the secondary storage.

### Clone split estimation fails when the aggregate does not have space

#### Description

If the aggregate has no space, clone split estimation fails.

**Corrective action**

Increase the space on the aggregate.

**Clone split start operation fails****Description**

The clone split start operation fails when one of the following conditions are met:

- The volume or aggregate is offline.
- A clone split operation, backup operation, or restore operation is in progress on the clone resource.
- A clone split operation is in progress on an intermediate clone.

**Corrective action**

- If the volume or aggregate is offline, check the status of the volume or aggregate on the storage system and bring it back online.
- If a clone split operation, backup operation, or restore operation is in progress on the clone resource, restart the clone split operation after the clone split operation, backup operation, or restore operation is complete.
- If a clone split operation is in progress on an intermediate clone, split the child clones, and then restart the clone split start operation on this clone.

**Clone split operation stops responding****Description**

The clone split operation stops responding if the SMCore service restarts.

**Corrective action**

Use the `stop-smJob` cmdlet to stop the clone split operation, and then perform the clone split operation again.

**Databases on which the clone split operation was performed are listed as clones****Description**

During the clone split operation, if the SMCore service restarts, the status of the operation will not be sent to the server. Therefore, the databases on which the clone split operation was performed are listed as clones in the Resources page.

**Corrective action**

Run the `split clone` cmdlet again to clean the clone metadata in SnapCenter repository.

## Restore operation times out

### Description

During a restore operation that accesses VMs, the vCenter Server timed out while waiting for a response from the SnapCenter server.

This error can occur when VMotion or the actual restore operation exceeds the timeout set for responses from the SnapCenter server.

### Error message

The operation has timed out

### Corrective action

You can increase the SnapCenter server timeout value by including the following REST API in the appsetting section of the `SMCoreServiceHost.exe.Config` file located under `SmCore` in the SnapCenter Server:

```
<add key="RESTTimeout" value="timeout-value" />
```

The default timeout value is 10800000 (in milliseconds, which is 3 hours). You can increase that value, in milliseconds, as needed.

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