



**SnapCenter® Software 4.2**

# **Data Protection Guide**

For SAP HANA® Databases

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 **NetApp®**



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## Deciding on whether to read the SnapCenter Data Protection Guide for SAP HANA Database

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This information describes how to use SnapCenter to perform backup, restore, and clone operations on SAP HANA databases.

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 SAP HANA databases
- You want to perform backup, restore, or clone operations on SAP HANA databases using the graphical user interface (GUI)
- You want to perform backup, restore, or clone operations on SAP HANA databases using Windows cmdlets

You should have already performed the following tasks:

- Installed SnapCenter Server and the SnapCenter Plug-in for SAP HANA Database
- Configured role-based access control (RBAC), storage system connections, and credentials
- Deployed the NetApp Data Broker virtual appliance, enabled the SnapCenter Plug-in for VMware vSphere, and registered the plug-in with SnapCenter, if you want to protect SAP HANA databases on virtual machines. The NetApp Data Broker, SnapCenter Plug-in for VMware vSphere, documentation has more information.

[\*Deployment Guide for SnapCenter Plug-in for VMware vSphere\*](#)

[\*Data Protection Guide for VMs, Datastores, and VMDKs using the SnapCenter Plug-in for VMware vSphere\*](#)

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  
[\*SnapCenter Software 4.2 Windows Cmdlet 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 Plug-in for SAP HANA Database overview

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The SnapCenter Plug-in for SAP HANA Database is a host-side component of the NetApp SnapCenter software that enables application-aware data protection management of SAP HANA databases. The Plug-in for SAP HANA Database automates the backup, restore, and cloning of SAP HANA databases in your SnapCenter environment.

SnapCenter supports single container and multitenant database containers (MDC): single tenant types of SAP HANA database.

When the Plug-in for SAP HANA Database is installed, you can use SnapCenter with NetApp SnapMirror technology to create mirror copies of backup sets on another volume. You can also use the plug-in with NetApp SnapVault technology to perform disk-to-disk backup replication for standards compliance. You can use the plug-in in both Windows and Linux environments.

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.

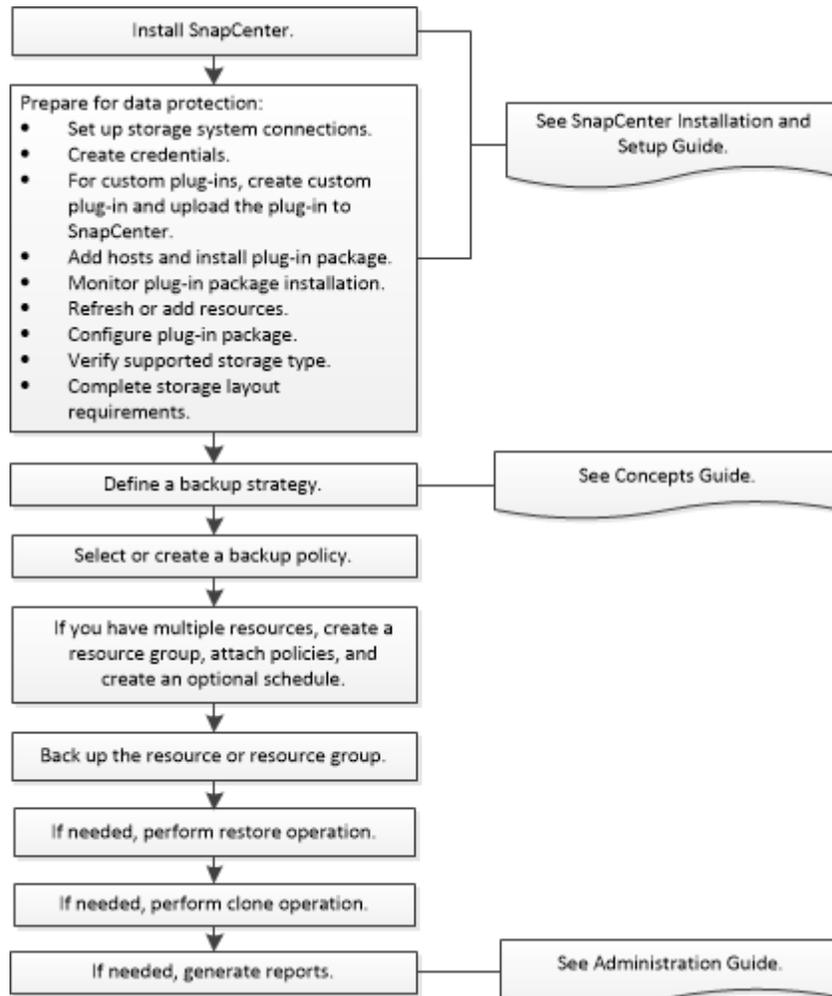
### Related information

[\*Concepts\*](#)

[\*Installing and setting up SnapCenter\*](#)

# Data protection workflow for SAP HANA databases

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



## Related tasks

[Backing up SAP HANA databases](#) on page 12

[Restoring SAP HANA databases](#) on page 27

[Cloning SAP HANA database 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 Plug-in for SAP HANA Database

Before you use SnapCenter Plug-in for SAP HANA Database, 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.
- If you are using SnapCenter Server to protect SAP HANA databases that reside on VMware RDM LUNs or VMDKs, you must deploy the NetApp Data Broker virtual appliance, enable the SnapCenter Plug-in for VMware vSphere, and register the plug-in with SnapCenter. See the NetApp Data Broker, SnapCenter Plug-in for VMware vSphere, documentation.

[Deployment Guide for SnapCenter Plug-in for VMware vSphere](#)

[Data Protection Guide for VMs, Datastores, and VMDKs using the SnapCenter Plug-in for VMware vSphere](#)

- Configure the SnapCenter environment by adding storage system connections and creating credentials, if applicable.
- Add hosts, and then install and upload the plug-ins.
- Install Java 1.7 or Java 1.8 on your Linux or Windows host.  
You must set the Java path in the environmental path variable of the host machine.
- Set up SnapMirror and SnapVault, if you want backup replication.
- Install the HDBSQL client on the host where you will install the Plug-in for SAP HANA Database.  
Configure the user store keys for the SAP HANA nodes that you will manage through this host.

### Related information

[Installing and setting up SnapCenter](#)

## Storage types supported by SnapCenter Plug-in for SAP HANA Database

SnapCenter supports a wide range of storage types on both physical machines and virtual machines (VMs). You must verify the support for your storage type before installing SnapCenter Plug-in for SAP HANA Database.

Machine	Storage type
Physical and virtual servers	FC-connected LUNs
	NFS-connected volumes

## How resources, resource groups, and policies are used in data protection of SAP HANA databases

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 SAP HANA databases 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, for example, you might create a resource group that includes all of the databases 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 full backup daily.

## 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 Windows Cmdlet Reference Guide](#)

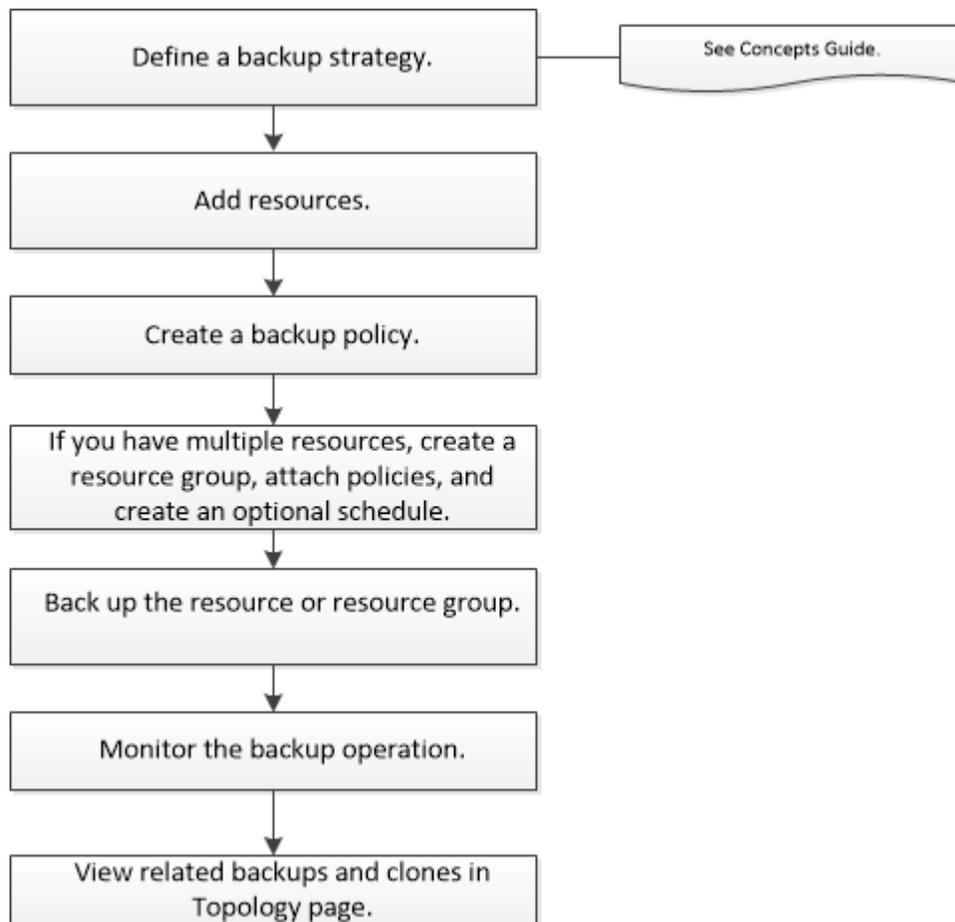
## Backing up SAP HANA databases

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You can either create a backup of a resource (database) or resource group. The backup workflow includes planning, identifying the databases 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. The SnapCenter cmdlet help and the cmdlet reference information contain more information about PowerShell cmdlets.

## Adding databases to SnapCenter Plug-in for SAP HANA Database

You must add the databases 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.

### Steps

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

For this field...	Do this...
Resource Type	Enter the resource type. Resource types are Single Container, Multitenant Database Containers (MDC) – Single Tenant, and Non-data Volumes.
SAP HANA System Name	Enter the descriptive SAP HANA system name.
SID	Enter the system ID (SID). The installed SAP HANA system is identified by a single SID.
Tenant Database	Enter the name of the tenant database for SAP HANA databases. This option is available only if you selected the Multitenant Database Containers (MDC) – Single Tenant resource type.
HDBSQL Client Host	Select the communication host.
HDB Secure User Store Keys	Enter the key to connect to the SAP HANA system. The key contains the login information to connect to the database.
HDBSQL OS User	Enter the user name for whom the HDB Secure User Store Key is configured. For Windows, it is mandatory for the HDBSQL OS User to be the SYSTEM user. Therefore, you must configure the HDB Secure User Store Key for the SYSTEM user.
Resource Name	Enter the resource name. This option is available only if you selected the Non-data Volumes.

**Provide Resource Details**

Single Container  
 Multitenant Database Container (MDC) - Single Tenant  
 Non-data Volumes

Resource Type

HANA System Name:

SID:

HDBSQL Client Host:

HDB Secure User Store Keys:

HDBSQL OS User:

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

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

**Note:** SnapCenter Plug-in for SAP HANA Database does not support automatic discovery of the resources and storage details for physical and virtual environments. You must provide the storage information for physical and virtual environments while adding the databases.

- In the **Resource Settings** page, perform the following actions:

For this field...	Do this...
Prefix	Enter the prefix of the File-Based backup name. If the prefix is not provided, the default value is used.
Location	Enter the path on the SAP HANA node to save the File-Based backup. If the path is not provided, SAP HANA uses the default path configured on the system, for example, <i>HANA shared path/ &lt;SID&gt;/HDBINSTANCE_ID/backup/data</i> .

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

The databases are displayed along with information such as the SID, Tenant Database for MDC, communication host, associated resource groups and policies, and overall status.

**After you finish**

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

After adding the databases, you can modify the SAP HANA database details.

You cannot modify the following if the SAP HANA database has backups associated with it:

- Multitenant database containers (MDC): SID, Tenant Database, or HDBSQL Client Host

- Single Container: SID or HDBSQL Client Host
- NonDataVolume: Resource name, Associated SID, or Plug-in Host

**Related information**

*[Performing administrative tasks](#)*

## Creating backup policies for SAP HANA databases

Before you use SnapCenter to back up SAP HANA database 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.

**Before you begin**

- You must have defined your backup strategy.  
For details, see the information about defining a data protection strategy for SAP HANA databases.  
*[Concepts](#)*
- You must have prepared for data protection by completing tasks such as installing SnapCenter, adding hosts, setting up storage system connections, and adding resources.
- 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.

**About this task**

Additionally, you can specify replication, script, and application settings in the policy. These options saves time when you want to reuse the policy for another resource group.

**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:

- Choose backup type:

If you want to...	Do this...
Perform an integrity check of the database	Select <b>File-Based Backup</b> .
Create a backup using Snapshot copy technology	Select <b>Snapshot Based</b> .

- 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 also enables you to assign different backup schedules to each policy.

**Select backup settings**

**Schedule Frequency**

Select how often you want the schedules to occur in the policy. The specific times are set at backup job creation enabling you to stagger your start times.

None  
 Hourly  
 Daily  
 Weekly  
 Monthly

- In the Custom backup settings section, provide any specific backup settings that have 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>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> <p><b>Important:</b> For Snapshot copy-based backups, 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>If you use the file-based backup to execute an integrity check, you must set the retention count to 1. This enables each of the block integrity checks to overwrite the backup that was created before, and retain only one file-based backup.</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. For Snapshot copy-based backups, specify the replication settings in the **Replication** page:

**Select secondary replication options** i

Update SnapMirror after creating a local Snapshot copy.

Update SnapVault after creating a local Snapshot copy.

Secondary policy label One Time ▼ i

Error retry count 3 i

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, the 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 Secondary Location is not available for the selected vaulted/mirrored backup error message is displayed.
<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.

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

**Related information**

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

## 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.

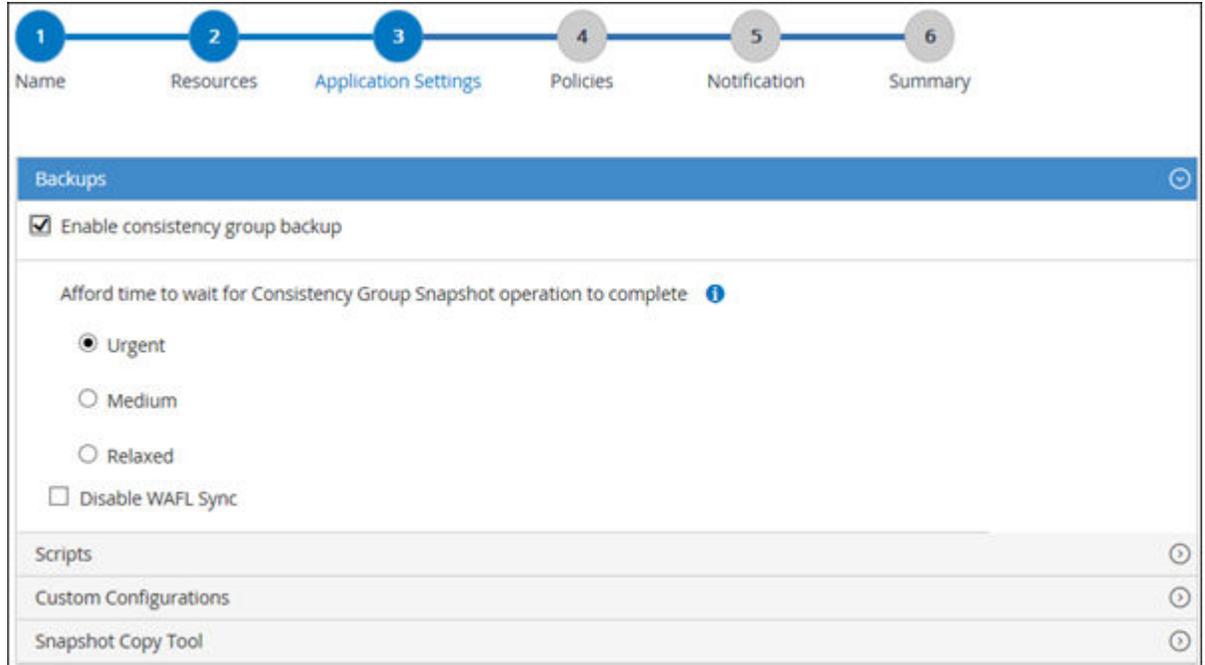
### Steps

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.
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:

- 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.

- In the Configure Schedules column, click  for the policy you want to configure.
- 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

[Creating backup policies for SAP HANA databases](#) on page 15

## Backing up SAP HANA databases

If a resource is not yet part of any resource group, you can back up the resource from the Resources page.

#### 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 **Resource** 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, select **Use custom name format for Snapshot copy**, and then enter a custom name format that you want to use for the Snapshot copy name.

#### Example

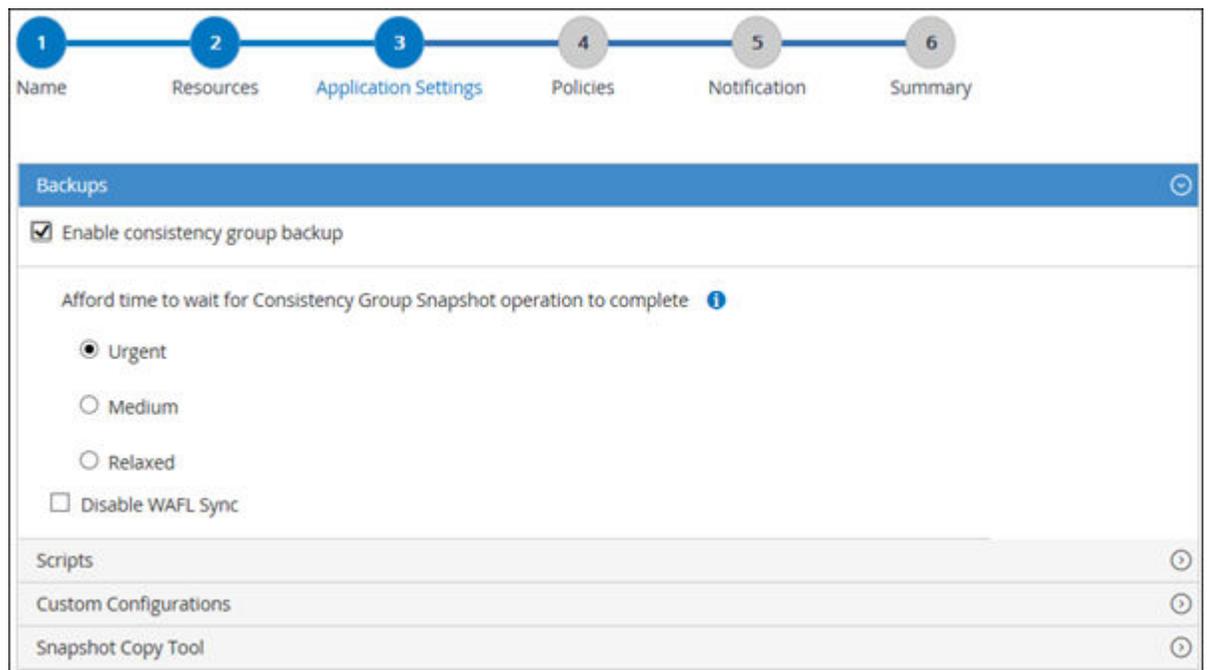
For example, *customtext\_\_policy\_hostname* or *resource\_hostname*. By default, a timestamp is appended to the Snapshot copy name.

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 <b>Urgent</b> , or <b>Medium</b> , or <b>Relaxed</b> to specify the wait time for Snapshot copy operation to finish. 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 create 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 create 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:
  - a. 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.

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

*policy\_name* is the name of the policy that you 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 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**.

#### Related tasks

[Creating backup policies for SAP HANA databases](#) on page 15

[Monitoring backup operations](#) on page 23

[Viewing SAP HANA database backups and clones in the Topology page](#) on page 25

[Backing up databases using PowerShell cmdlets](#) on page 38

## Backing up resource groups

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.

#### 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 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.

**About this task**

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.

**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 then 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 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 resource groups and attaching policies](#) on page 17

[Creating backup policies for SAP HANA databases](#) on page 15

[Monitoring backup operations](#) on page 23

[Viewing SAP HANA database backups and clones in the Topology page](#) on page 25

[Backing up databases using PowerShell cmdlets](#) on page 38

## 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.

**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 SAP HANA database 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.

**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.
-  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 created 6 backups using a policy to retain only 4 backups, the number of backups displayed is 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.

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.

### 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 File-Based backups, Snapshot copy 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, and delete operations.

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

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

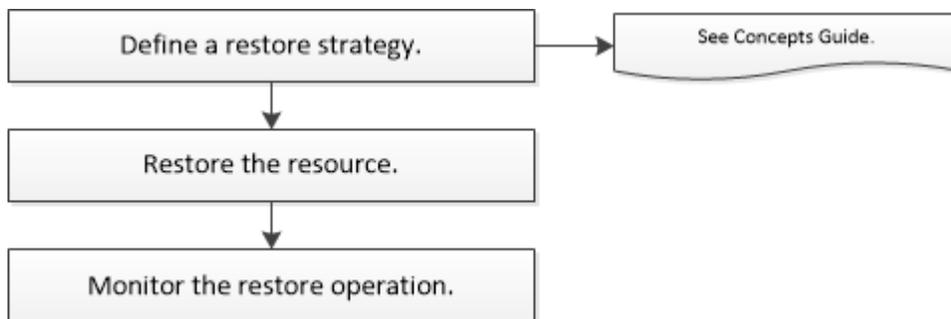
## Restoring SAP HANA databases

---

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 tasks

[Restoring SAP HANA database using PowerShell cmdlets](#) on page 41

### Related information

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

## Restoring a database backup

You can use SnapCenter to restore data from one or more backups.

### 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 canceled any backup operation that is currently in progress for the resource or resource group that you want to restore.

### About this task

File-based backup copies cannot be restored from SnapCenter.

### 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. This 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)	
<input type="text" value="search"/> <span>▼</span>	
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 select **Complete Resource**, all of the configured data volumes of the SAP HANA database are 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 select **File Level**, then you can either select **All** or select the specific volumes or qtrees, and then enter the path related to those volumes or qtrees, separated by commas

- You can select multiple volumes and qtrees.
- If the resource type is LUN, the 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. Optional: In the **Pre ops** page, enter pre restore and unmount commands to run before performing a restore job.

8. Optional: In the **Post ops** page, enter mount and post restore commands to run after performing a restore job.

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. SMTP must also be configured in the **Settings > Global Settings** page.

10. Review the summary, and then click **Finish**.
11. Monitor the operation progress by clicking **Monitor > Jobs**.

#### Related tasks

[Restoring SAP HANA database using PowerShell cmdlets](#) on page 41

## 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

- 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 job and click <b>Cancel Job</b>.</li> </ol>
Activity pane	<ol style="list-style-type: none"> <li>After initiating the restore 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](#)

## Cloning SAP HANA database backups

---

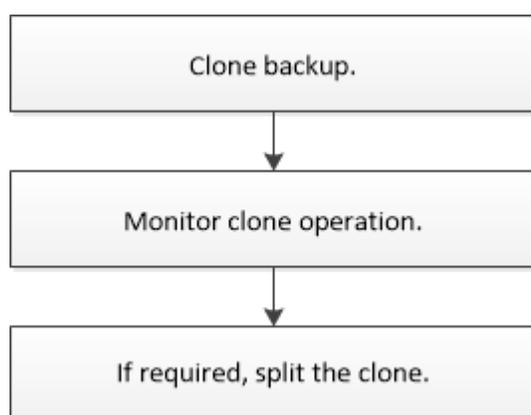
The clone workflow includes performing the clone operation and monitoring the operation.

### 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. The SnapCenter cmdlet help and the cmdlet reference information contain detailed information about PowerShell cmdlets.

### Related tasks

[Cloning SAP HANA database backups using PowerShell cmdlets](#) on page 43

### Related information

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

## Cloning a SAP HANA database backup

You can use SnapCenter to clone a backup. You can clone from primary or secondary backup.

### Before you begin

You must have backed up the resources or resource group.

### About this task

- You cannot clone file-based backups.

### 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 **Location** page, perform the following actions:

For this field...	Do this...
Clone server	Select the host on which the clone should be mounted and the plug-in is installed.
NFS Export IP Address	Enter IP addresses or the host names on which the cloned volumes will be exported.
iSCSI Initiator	Enter iSCSI initiator name of the host to which the LUNs are exported. This option is available only if you selected LUN resource type.
Protocol	Enter the LUN protocol. This option is available only if you selected LUN resource type.

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

7. Optional: In the **Scripts** page, perform the following steps: .
  - a. Enter the commands for pre clone or post clone that should be run before or after the clone operation, respectively.

#### Example

- Pre clone command: delete existing databases with the same name
  - Post clone command: verify a database or start a database.
- b. Enter the mount command to mount a file system to a host.

#### Example

Mount command for a volume or qtree on a Linux machine:

```
mount VSERVER_DATA_IP:${VOLUME_NAME_Clone} /mnt
```

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.

9. Review the summary, and then click **Finish**.
10. Monitor the operation progress by clicking **Monitor > Jobs**.

#### Related tasks

[Cloning SAP HANA database backups using PowerShell cmdlets](#) on page 43

[Viewing SAP HANA database backups and clones in the Topology page](#) on page 25

## 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 Plug-in for SAP HANA Database, you can use PowerShell cmdlets for scripting of backup, restore, and clone operations.

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

- 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 for SAP HANA database

You must create a storage virtual machine (SVM) connection and a credential before using PowerShell cmdlets to back up, restore, or clone SAP HANA databases.

### 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**

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

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

**Example**

```
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 shows how to create a new credential named `FinanceAdmin` with Windows credentials:

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

4. Add the SAP HANA communication host to SnapCenter Server.

**Example**

```
PS C:> Add-SmHost -HostName 10.232.204.61 -OSType Windows -RunAsName
FinanceAdmin -PluginCode hana
```

5. Install the package and the SnapCenter Plug-in for SAP HANA Database on the host.

For Linux:

**Example**

```
PS C:> Install-SmHostPackage -HostNames 10.232.204.61 -
ApplicationCode hana
```

For Windows:

**Example**

```
Install-SmHostPackage -HostNames 10.232.204.61 -ApplicationCode hana -
FilesystemCode scw -RunAsName FinanceAdmin
```

6. Set the path to the HDBSQL client.

For Windows:

**Example**

```
PS C:> Set-SmConfigSettings -Plugin -HostName 10.232.204.61 -
PluginCode hana -configSettings @{"HANA_HDBSQL_CMD" = "C:\Program
Files\sap\hdbclient\hdbsql.exe" }
```

For Linux:

**Example**

```
Set-SmConfigSettings -Plugin -HostName scs-hana.gdl.englab.netapp.com
-PluginCode hana -configSettings @{"HANA_HDBSQL_CMD"="/usr/sap/
hdbclient/hdbsql" }
```

## Backing up databases using PowerShell cmdlets

Backing up a database 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 shows how to add a SAP HANA database of `SingleContainer` type:

```
C:\PS> Add-SmResource -HostName '10.232.204.42' -PluginCode 'HANA' -
DatabaseName H10 -ResourceType SingleContainer -StorageFootPrint
(@{"VolumeName"="HanaData10";"StorageSystem"="vserver_scauto_primary" }
) -SID 'H10' -filebackuppath '/tmp/HanaFileLog' -userstorekeys 'HS10'
-osdbuser 'h10adm' -filebackupprefix 'H10_'
```

**Example**

This example shows how to add a SAP HANA database of MultipleContainers type:

```
C:\PS> Add-SmResource -HostName
'scspr0204312001.gdl.englab.netapp.com' -PluginCode 'HANA' -SID 'H11'
-TenantDatabaseName 'abc' -TenantType SingleTenant -DatabaseName
MDC_SN -ResourceType
MultipleContainers -userstorekeys 'KEY01' -StorageFootPrint
@(@{"storagesystem"="10.232.206.5";"volumename"="dummyvol"}) -
filebackuppath '/tmp/HanaFileLog' -userstorekeys 'HS10' -osdbuser
'h10adm' -filebackupprefix 'H10_'
```

**Note:** If you do not specify a value for `-filebackuppath` and `-filebackupprefix`, default values are used. The default OSDBUser for Windows is **SYSTEM**.

**Example**

This example shows how to create a non-data volume resource:

```
C:\PS> Add-SmResource -HostName 'SNAPCENTERN42.sscore.test.com' -
PluginCode 'hana' -ResourceName NonDataVolume -ResourceType
NonDataVolume -StorageFootPrint
(@{"VolumeName"="ng_pvol";"StorageSystem"="vserver_scauto_primary"}) -
sid 'S10'
```

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

**Example**

This example creates a backup policy for a Snapshot copy-based backup:

```
C:\PS> Add-SmPolicy -PolicyName hana_snapshotbased -PolicyType Backup
-PluginPolicyType hana -BackupType SnapshotBasedBackup
```

**Example**

This example creates a backup policy for a File-Based backup:

```
C:\PS> Add-SmPolicy -PolicyName hana_Filebased -PolicyType Backup -
PluginPolicyType hana -BackupType FileBasedBackup
```

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

**Example**

This example protects a single container resource:

```
C:\PS> Add-SmProtectResource -PluginCode HANA -Policies
hana_snapshotbased,hana_Filebased
-Resources @{"Host"="host.example.com";"UID"="SID"} -Description
test -usesnapcenterwithoutfilesystemconsistency
```

**Example**

This example protects a multiple containers resource:

```
C:\PS> Add-SmProtectResource -PluginCode HANA -Policies
hana_snapshotbased,hana_Filebased
-Resources @{"Host"="host.example.com";"UID"="SID
\TenantDatabaseName"} -Description test -
usesnapcenterwithoutfilesystemconsistency
```

**Example**

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

```
C:\PS> Add-SmResourceGroup -ResourceGroupName
'ResourceGroup_with_SingleContainer_MultipleContainers_Resources' -
Resources
@(@{"Host"="sccorelinux61.sscore.test.com";"Uid"="SID"},@{"Host"="scco
relinux61.sscore.test.com";"Uid"="SID\TenantDatabaseName"})
-Policies hana_snapshotbased,hana_Filebased -
usesnapcenterwithoutfilesystemconsistency -plugincode 'HANA'
```

**Example**

This example creates a non-data volume resource group:

```
Add-SmResourceGroup -ResourceGroupName
'Mixed_RG_backup_when_Remove_Backup_throguh_BackupName_windows' -
Resources
@(@{"Host"="SNAPCENTERN42.sscore.test.com";"Uid"="H11";"PluginName"="h
ana"},@{"Host"="SNAPCENTERN42.sscore.test.com";"Uid"="H31\H31";"Plugin
Name"="hana"},@{"Host"="SNAPCENTERN42.sscore.test.com";"Uid"="NonDataV
olume\S10\NonDataVolume";"PluginName"="hana"}) -Policies hanaprimary
```

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

**Example**

This example shows how to backup a resource group:

```
C:\PS> New-SMBackup -ResourceGroupName
'ResourceGroup_with_SingleContainer_MultipleContainers_Resources' -
Policy hana_snapshotbased
```

**Example**

This example backs up a protected resource:

```
C:\PS> New-SMBackup -Resources @{"Host"="10.232.204.42";"Uid"="SID
\TenantDatabaseName";"PluginName"="hana"} -Policy hana_Filebased
```

6. Monitor the job status (running, completed, or failed) by using the `Get-smJobSummaryReport` cmdlet.

**Example**

```
PS C:\> Get-smJobSummaryReport -JobID 123
```

7. Monitor the backup job details like backup ID, backup name to perform restore or clone operation by using the `Get-SmBackupReport` cmdlet.

**Example**

```

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 SAP HANA database using PowerShell cmdlets

Restoring a SAP HANA database 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. Identify the backup that you want to restore by using the `Get-SmBackup` and `Get-SmBackupReport` cmdlets.

**Example**

This example shows that there are two backups available for the restore:

```
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. Start the recovery process in the HANA studio.

The database is shut down.

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

**Note:** `AppObjectId` is "Host"\Plugin\UID, where `UID = SID` is for single container type resource and `UID = SID\TenantDatabaseName` is for multiple containers resource. You can get the `ResourceID` from the `Get-smResources` cmdlet.

```
Get-smResources -HostName cn24.sscore.test.com -PluginCode HANA
```

### Example

This example shows how to restore the database from the primary storage:

```
Restore-SmBackup -PluginCode HANA -AppObjectId cn24.sscore.test.com
\hana\H10 -BackupId 3
```

### Example

This example shows how to restore the database from the secondary storage:

```
Restore-SmBackup -PluginCode 'HANA' -AppObjectId cn24.sscore.test.com
\hana\H10 -BackupId 399 -Confirm:$false -Archive
@( @{"Primary"="<Primary
Vserver>:<PrimaryVolume>";"Secondary"="<Secondary
Vserver>:<SecondaryVolume>" } )
```

The backups will be available in HANA studio for recovery.

## Cloning SAP HANA database 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

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 backups to perform the clone operation by using the `Get-SmBackup` cmdlet.

### Example

This example shows that two backups are available for cloning:

```
C:\PS> 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

```

3. Initiate a clone operation from an existing backup and specify the NFS export IP addresses on which the cloned volumes are exported.

#### Example

This example shows that the backup to be cloned has an NFSExportIPs address of 10.232.206.169:

```

New-SmClone -AppPluginCode hana -BackupName
scscore1_sscore_test_com_hana_H73_scscore1_06-07-2017_02.54.29.3817
-Resources @{"Host"="scscore1.sscore.test.com";"Uid"="H73"} -
CloneToInstance shivsc4.sscore.test.com -Suffix '_c12' -mountcommand
'mount 10.232.206.169:%hana73data_Clone /hana83data' -
preclonecreatecommands '/home/scripts/scpre_clone.sh' -
postclonecreatecommands '/home/scripts/scpost_clone.sh'

```

**Note:** If NFSExportIPs is not specified, the default is exported to the clone target host.

4. Verify that the backups were cloned successfully by using the `Get-SmCloneReport` cmdlet to view the clone job details.

You can view details such as clone ID, start date and time, end date and time.

#### Example

```

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**.

### File-Based Backup workflow fails at custom file path

#### Description

The File-Based Backup workflow fails during the *Start file based backup* if the path provided does not have proper permission.

#### Error message

```
System.Exception : SmJobId [1525] Failed! JobError: [SCC-00301: Start of backup type [FileBasedBackup] for plug-in [hana] failed with error message:* 447: backup could not be completed: [2000004] Cannot open file "/.H30_sccorelinux61_sccore_test_com_hana_H30_H30_sccorelinux61_06-14-2018_12.58.00.3411_databackup_0_1" ((closed, mode= W, access= rw-r-----, flags= DIRECT|TRUNCATE|MULTI_WRITERS|UNALIGNED_SIZE), factory= (root= "/tmp/HanaFileLog/SYSTEMDB/" (access= rw-r-----, flags= AUTOCREATE_PATH|DISKFULL_ERROR, usage= DATA_BACKUP, fs= UNKNOWN (btrfs), config= (async_write_submit_active=on,async_write_submit_blocks=all,async_read_submit=on,num_submit_queues=1,num_completion_queues=1,size_kernel_io_queue=512,max_parallel_io_requests=64,min_submit_batch_size=16,max_submit_batch_size=64))), rc=2: No such file or directory SQLSTATE: HY000Start file backup query failed for database [SYSTEMDB] and comment [sccorelinux61_sccore_test_com_hana_H30_H30_sccorelinux61_06-14-2018_12.58.00.3411]StartAppBackup Failed]
```

#### Corrective action

Perform the following actions:

- Ensure that the file in the custom path and the parent directory in which it resides have read, write, and execute permission for other users.
- Change the ownership of the file in the custom path to <sid admin> user. You must ensure that the parent folders have the right permissions for the sid admin to access the required folders.

If the above corrective actions fail, perform the following action:

Manually create the folders SYSTEMDB and DB\_<SID> as sid admin user in the custom path given.

### User store key not found

#### Description

The backup operation fails during the quiesce operation if the user store key is not found.

**Error message**

```
SCC-00164: Application quiesce for plug-in [hana] failed with exit code
[1] and with error: The verification of HDB Secure User Store Key: HS73
failed with error: * -10104: Invalid value for KEY (HS73)[hdb-00008]
Running command on HANA node failed. Unable to execute hdbsql statement
using the hdbuserstore keys provided in the config. Update the userstore
keys and try again.
```

**Corrective action**

Update the user store key and try again.

**Invalid user store key****Description**

The backup operation fails during the quiesce operation if the user store key has an invalid user name, password, or port number.

**Error message**

```
SCC-00164: Application quiesce for plug-in [hana] failed with exit code
[1] and with error: [hdb-00004] Connection failed, as the connection to
the HANA node was refused. Connecting to database (SID: H73) using the
following HDB User Store Keys: [HS73] failed with error: [hdb-00004]
Connection failed, as the connection to the HANA node was refused.
Unable to execute hdbsql statement using the hdbuserstore keys provided
in the config. Update the userstore keys and try again.
```

**Corrective action**

Update the user store key and try again.

**Unable to access SAP HANA system****Description**

The backup operation fails during the quiesce operation if the SAP HANA system is not accessible or the host is down.

**Error message**

```
SCC-00164: Application quiesce for plug-in [hana] failed with exit code
[1] and with error: [hdb-00004] Connection failed, as the connection to
the HANA node was refused. Connecting to database ( SID: H73 ) using the
following HDB User Store Keys: [HS73] failed with error: [hdb-00004]
Connection failed, as the connection to the HANA node was refused.
Unable to execute hdbsql statement using the hdbuserstore keys provided
in the config. Update the userstore keys and try again.
```

**Corrective action**

Update the user store key and try again.

## Unable to access tenant database

### Description

The backup operation fails during the quiesce operation if the tenant database is inaccessible or invalid tenant database name is provided.

### Error message

```
SCC-00164: Application quiesce for plug-in [hana] failed with exit code
[1] and with error : Tenant Database : [R85INVALID] either does not
exist or it is inactive Client Verification failed for resource:
[R85\R85INVALID]
```

### Corrective action

Verify that the tenant database is valid and active.

## File-Based Backup workflow fails

### Description

The File-Based Backup workflow fails during the *Start file based backup* operation if the path provided does not exist.

### Error message

```
SCC-00301: Start of backup type [FileBasedBackup] for plug-in [hana]
failed with error message: * 447: backup could not be completed:
[2000002] Cannot create root directory "/invalid/", rc=13: Permission
denied SQLSTATE: HY000 [hdb-00008] Running command on HANA node failed.
Start file backup query failed for comment
[shivsc4_sccore_test_com_hana_H73_c12_shivsc4_05-17-2017_02.20.48.3132]
StartAppBackup Failed
```

### Corrective action

Provide the right path and try again.

## Unable to find Snapshot copy after successfully creating the backup

### Description

Backup operations with an update to SnapVault or SnapMirror might fail.

Depending on the rate of change of data between Snapshot copies, the time taken to update the Snapshot copy to secondary varies. If the delta between Snapshot copies is very high, it is recommended to change SnapshotCheckRetry and SnapshotCheckTimeout values.

### Error message

Snapshot copy could not be found on the destination storage system.

**Corrective action**

You must include the following parameters and specify the value in the `appsetting` section of the `SMCoreServiceHost.exe.Config` file located under `SmCore` in the SnapCenter Server.

- `<add key="SnapshotCheckRetry" value=retry_value/>`  
The `retry_value` assigned to `SnapshotCheckRetry` defines the maximum number of retries that are performed to discover the Snapshot copies on the secondary location.
- `<add key="SnapshotCheckTimeout" value=timeout_value/>`  
The `timeout_value` (milliseconds) assigned to `SnapshotCheckTimeout` defines the wait or sleep period for every retry.

## 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.

## Catalog entries are not deleted after volume based restore operation

**Description**

After the volume based restore operation, the backup metadata is deleted from the SnapCenter repository but the backup catalog entries remain in SAP HANA catalog.

**Corrective action**

Though the backup job status displays , you must click on job details to see the warning sign of some of the child tasks. Click on the warning sign and delete the indicated backup catalog entries manually.

## Invalid HDBSQL OS username

**Description**

The backup operation fails during the quiesce operation if the HDBSQL OS username provided is invalid.

**Error message**

```
SCC-00164: Application quiesce for plug-in [hana] failed with exit code [1] and with error : Verification of HDBSQL OS User : [hdbadmin] failed with error : [su: user hdbadmin does not exist]
```

**Corrective action**

Update the HDBSQL OS username, and then try again.

**Backup operation fails****Description**

The backup operation fails during the quiesce operation if the HDBSQL path is not set.

**Error message**

```
SCC-00164: Application quiesce for plug-in [hana] failed with exit code [1] and with error : Verification of HDBSQL OS User: [hdbadmin] failed with error: [su: user hdbadmin does not exist] SCC-00164: Application quiesce for plug-in [hana] failed with exit code [1] and with error: Verification of HDBSQL_CMD [hdbsql] failed with error: [bash: hdbsql: command not found...]. Set valid HDBSQL_CMD for the SAP HANA plug-in on this host using "Set-SmConfigSettings -Plugin -HostName hostname -PluginCode hana -configSettings @{ "HANA_HDBSQL_CMD"="path_to_HDBSQL_CMD" } " PowerShell cmdlet from SnapCenter Server.
```

**Corrective action**

Configure the HDBSQL path by running the cmdlet, or include the HDBSQL client path as part of the system path.

**Backup fails with error: Storage system(s) may need to be added, also ensure that the associated host is in a connected state****Description**

A backup failed because the preferred IP address that was configured for the SVM went down. When the preferred IP comes up again, the SnapCenter cache is not automatically refreshed. Therefore, SnapCenter could not find the Preferred IP when attempting to perform the backup.

**Corrective action**

Refresh the SnapCenter cache for the SVM:

1. In the left navigation pane of the SnapCenter GUI, click **Storage Systems**.
2. In the Storage Systems page, select the storage system used by the backup, and then click **Modify**.
3. Make sure that the **Preferred IP** check box is selected and that the IP is correct.
4. Reenter the storage system password, and then click **OK**.

This action refreshes the SnapCenter cache and updates the storage system configuration.

## Cannot enable SAP HANA

### 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, you cannot enable SAP HANA.

### Error message

```
Object reference not set to an instance of an object.
```

### Corrective action

Upgrade the JRE version to 1.8.

## 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.

## Managing policies

---

You can create, copy, modify, view, and delete backup policies.

### About this task

You can perform the following tasks related to policies:

- Create a policy.
- Modify a policy.
  - Note:** You can change the schedule type for a policy only after you detach the policy. To change the schedule you must modify the resource group.
- Copy a policy by accepting the default name or typing a new name.
- Detach a policy from a resource group.
- Delete a policy.

### Related tasks

[Creating backup policies for SAP HANA databases](#) on page 15

## Detaching policies

You can detach policies from a resource or resource group any time that you no longer want those policies to govern data protection for the resources. You must detach a policy before you can delete it or before you modify the schedule type.

### About this task

**Attention:** You cannot detach a policy from a resource or resource group if it is the only policy attached.

### 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.
3. Select the resource group, and then click **Modify Resource Group**.
4. In the **Policies** page of the **Modify Resource Group** wizard, from the drop-down list, clear the check mark next to the policies you want to detach.

**Note:** You cannot detach the last remaining policy from an individual resource because every resource must have at least one policy attached. Therefore, if you want to delete or modify the only policy attached to a resource, you must perform the following:

- a. Attach a second placeholder policy.
  - b. Detach the original policy from the resource.
5. Make any additional modifications to the resource group in the rest of the wizard, and then click **Finish**.

## Modifying policies

You can modify the replication options, Snapshot copy retention settings, error retry count, or scripts information while a policy is attached to a resource or resource group. You can modify the schedule type (frequency) only after you detach a policy.

### About this task

Modifying the schedule type in a policy requires additional steps because the SnapCenter Server registers the schedule type only at the time the policy is attached to a resource or resource group.

If you want to...	Then...
Add an additional schedule type	<p>Create a new policy and attach it to the necessary resources or resource groups.</p> <p>For example, if a resource group policy specifies only hourly backups and you want to add daily backups also, you can create a policy with a daily schedule type and add it to the resource group. The resource group would then have two policies: hourly and daily.</p>
Remove or change a schedule type	<ol style="list-style-type: none"> <li>1. Detach the policy from every resource and resource group that uses that policy.</li> <li>2. Modify the schedule type.</li> <li>3. Attach the policy again to all the resources and resource groups.</li> </ol> <p>For example, if a policy specifies hourly backups and you want to change that to daily backups, you must detach the policy first.</p> <p><b>Note:</b> You cannot detach the last remaining policy from a individual resource because every resource must have at least one policy attached. Therefore, if you want to modify the schedule type of the only policy attached to a resource, you must perform the following:</p> <ol style="list-style-type: none"> <li>1. Attach a second placeholder policy.</li> <li>2. Detach the original policy from every resource and resource group that uses that policy.</li> <li>3. Modify the schedule type.</li> <li>4. Attach the modified policy again to all the resources and resource groups.</li> <li>5. Detach the placeholder policy.</li> </ol>

### Steps

1. In the left navigation pane, click **Settings**.
2. In the **Settings** page, click **Policies**.
3. Select the policy, and then click **Modify**.

4. Modify the information, and then click **Finish**.

## Deleting policies

If you no longer require policies, you might want to delete them.

### Before you begin

You must have detached the policy from resource groups if the policy is associated with any resource group.

### Steps

1. In the left navigation pane, click **Settings**.
2. In the **Settings** page, click **Policies**.
3. Select the policy, and then click **Delete**.
4. Click **Yes**.

## Managing resource groups

---

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

### About this task

You can perform the following tasks related to resource groups:

- Create a resource group.
- Modify a resource group by selecting the resource group and clicking **Modify Resource Group** to edit the information you provided while creating the resource group.

**Note:** You can change the schedule while modifying the resource group. However, to change the schedule type you must modify the policy.

**Note:** If you remove resources from a resource group, the backup retention settings defined in the policies currently attached to the resource group will continue to be applied to the removed resources.

- Create a backup of a resource group.
- Create a clone of a backup.  
You can clone from the existing backups of SQL, Oracle, Windows file systems, custom applications, and SAP HANA database resources or resource groups.
- Create a clone of a resource group.  
This operation is supported only for SQL resource groups (which contains only databases). You can configure a schedule for cloning a resource group (clone lifecycle).
- Prevent scheduled operations on resource groups from starting.
- Delete a resource group.

### Related tasks

[Creating resource groups and attaching policies](#) on page 17

[Backing up resource groups](#) on page 22

## Stopping 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 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.
3. Select the resource group and click **Maintenance**.
4. Click **OK**.

### After you finish

If you want to resume operations on the resource group that you had put on maintenance mode, select the resource group and click **Production**.

## Deleting resource groups

You can delete a resource group if you no longer need to protect the resources in the resource group. You must ensure that resource groups are deleted before you remove plug-ins from SnapCenter.

### Before you begin

If you are managing SQL or Windows file system resources, you must have manually deleted all clones created for any of the resources in the resource group.

### About this task

You can optionally force the deletion of all backups, metadata, policies, and Snapshot copies associated with 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 remove the SnapVault relationship and then delete the last Snapshot copy.

### 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.
3. Select the resource group, and then click **Delete**.
4. Optional: Select the **Delete backups and detach policies associated with this Resource Group** check box to remove all backups, metadata, policies, and Snapshot copies associated with the resource group.
5. Click **OK**.

## Deleting SAP HANA database backups

---

You can delete SAP HANA database backups if you no longer require the backup for other data protection operations.

### Before you begin

All associated clones must have been deleted. If a backup is associated with a cloned resource, you cannot delete the 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 or resource group from the list.  
The resource or resource group topology page is displayed.
4. From the **Manage Copies** view, select **Backups** from the primary storage systems.  
You cannot delete the backups that are on the secondary storage system.
5. Select the backup, and then click .  
The associated SAP HANA catalogs of the backup are also deleted.
6. Click **OK**.

### Related information

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

## Deleting SAP HANA database clones

---

You can delete clones if you find them no longer necessary.

### About this task

A clone that has been cloned again cannot be deleted. For example, if the production database *db1* is cloned to *db1\_clone1* and subsequently cloned to *db1\_clone2*, and you decide that you want to delete *db1\_clone1*, you must first delete *db1\_clone2*, and then delete *db1\_clone1*.

### 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 or resource group from the list.  
The resource or the resource group topology page is displayed.
4. From the **Manage Copies** view, select **Clones** either from the primary or secondary (mirrored or replicated) storage systems.
5. Select the clone, and then click .
6. Optional: In the **Delete Clone** page, perform the following actions:
  - a. In the **Pre clone delete** field, enter the commands that should be run before deleting the clone.
  - b. In the **Unmount** field, enter the command to unmount the clone before deleting the clone.
7. Click **OK**.

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