SnapCenter Plug-in for SAP HANA Databases

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SnapCenter Plug-in for SAP HANA Databases

SnapCenter Plug-in for SAP HANA Database overview

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). You can use the Plug-in for SAP HANA Database in both Windows and Linux environments. The plug-in that is not installed on the HANA database host is known as the centralized host plug-in. The centralized host plug-in can manage multiple HANA databases across different hosts.

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.

What you can do using the SnapCenter Plug-in for SAP HANA Database

When you install the Plug-in for SAP HANA Database in your environment, you can use SnapCenter to back up, restore, and clone SAP HANA databases and their resources. You can also perform tasks supporting those operations.

- Add databases.
- Create backups.
- Restore from backups.
- Clone backups.
- Schedule backup operations.
- Monitor backup, restore, and clone operations.
- View reports for backup, restore, and clone operations.

SnapCenter Plug-in for SAP HANA Database features

SnapCenter integrates with the plug-in application and with NetApp technologies on the storage system. To work with the Plug-in for SAP HANA Database, you use the SnapCenter graphical user interface.

- **Unified graphical user interface**

  The SnapCenter interface provides standardization and consistency across plug-ins and environments. The SnapCenter interface enables you to complete consistent backup, restore, and clone operations across plug-ins, use centralized reporting, use at-a-glance dashboard views, set up role-based access control (RBAC), and monitor jobs across all plug-ins.

- **Automated central administration**

  You can schedule backup operations, configure policy-based backup retention, and perform restore operations. You can also proactively monitor your environment by configuring SnapCenter to send email alerts.

- **Nondisruptive NetApp Snapshot copy technology**

  SnapCenter uses NetApp Snapshot copy technology with the Plug-in for SAP HANA Database to back up resources.

Using the Plug-in for SAP HANA Database also offers the following benefits:

- Support for backup, restore, and clone workflows
- RBAC-supported security and centralized role delegation

  You can also set the credentials so that the authorized SnapCenter users have application-level permissions.

- Creation of space-efficient and point-in-time copies of resources for testing or data extraction by using NetApp FlexClone technology

  A FlexClone license is required on the storage system where you want to create the clone.

- Support for the consistency group (CG) Snapshot copy feature of ONTAP as part of creating backups.
- Capability to run multiple backups simultaneously across multiple resource hosts

  In a single operation, Snapshot copies are consolidated when resources in a single host share the same volume.

- Capability to create Snapshot copies using external commands.
- Support for file-based backup.
- Support for Linux LVM on XFS file system.

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
Physical server	iSCSI-connected LUNs
Physical and virtual servers	NFS-connected volumes

Minimum ONTAP privileges required

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

All-access commands: Minimum privileges required for ONTAP 8.2.*x* and later
event generate-autosupport-log
job history show job stop
lun lun create lun delete lun igroup add lun igroup create lun igroup delete lun igroup rename lun igroup show lun mapping add-reporting-nodes lun mapping create lun mapping delete lun mapping remove-reporting-nodes lun mapping show lun modify lun move-in-volume lun offline lun online lun persistent-reservation clear lun resize lun serial lun show

All-access commands: Minimum privileges required for ONTAP 8.2.*x* and later
snapmirror policy add-rule snapmirror policy modify-rule snapmirror policy remove-rule snapmirror policy show snapmirror restore snapmirror show snapmirror show-history snapmirror update snapmirror update-ls-set snapmirror list-destinations
version

All-access commands: Minimum privileges required for ONTAP 8.2.*x* and later
volume clone create
volume clone show
volume clone split start
volume clone split stop
volume create
volume destroy
volume file clone create
volume file show-disk-usage
volume offline
volume online
volume modify
volume qtree create
volume qtree delete
volume qtree modify
volume qtree show
volume restrict
volume show
volume snapshot create
volume snapshot delete
volume snapshot modify
volume snapshot rename
volume snapshot restore
volume snapshot restore-file
volume snapshot show
volume unmount

All-access commands: Minimum privileges required for ONTAP 8.2.*x* and later
vserver cifs
vserver cifs share create
vserver cifs share delete
vserver cifs shadowcopy show
vserver cifs share show
vserver cifs show
vserver export-policy
vserver export-policy create
vserver export-policy delete
vserver export-policy rule create
vserver export-policy rule show
vserver export-policy show
vserver iscsi
vserver iscsi connection show
vserver show

Read-only commands: Minimum privileges required for ONTAP 8.2.*x* and later
network interface
network interface show
vserver

Prepare storage systems for SnapMirror and SnapVault replication for SAP HANA databases

You can use a SnapCenter plug-in with ONTAP SnapMirror technology to create mirror copies of backup sets on another volume, and with ONTAP SnapVault technology to perform disk-to-disk backup replication for standards compliance and other governance-related purposes. Before you perform these tasks, you must configure a data-protection relationship between the source and destination volumes and initialize the relationship.

If you are coming to SnapCenter from a NetApp SnapManager product and are satisfied with the data protection relationships you have configured, you can skip this section.

A data protection relationship replicates data on primary storage (the source volume) to secondary storage (the destination volume). When you initialize the relationship, ONTAP transfers the data blocks referenced on the source volume to the destination volume.

SnapCenter does not support cascade relationships between SnapMirror and SnapVault volumes (**Primary** > **Mirror** > **Vault**). You should use fanout relationships.

SnapCenter supports the management of version-flexible SnapMirror relationships. For details about version-flexible SnapMirror relationships and how to set them up, see the ONTAP documentation.

Backup strategy for SAP HANA databases

Define a backup strategy for SAP HANA databases

Defining a backup strategy before you create your backup jobs helps you to have the backups that you require to successfully restore or clone your resources. Your service-level agreement (SLA), recovery time objective (RTO), and recovery point objective (RPO) largely determine your backup strategy.

About this task

An SLA defines the level of service that is expected and addresses many service-related issues, including the availability and performance of the service. RTO is the time by which a business process must be restored after a disruption in service. RPO defines the strategy for the age of the files that must be recovered from backup storage for regular operations to resume after a failure. SLA, RTO, and RPO contribute to the data protection strategy.

Steps

1. Determine when you should back up your resources.
2. Decide how many backup jobs you require.
3. Decide how to name your backups.
4. Decide whether you want to create a Snapshot copy-based policy to back up application-consistent Snapshot copies of the database.
5. Decide whether you want to verify the integrity of the database.
6. Decide whether you want to use NetApp SnapMirror technology for replication or NetApp SnapVault technology for long-term retention.
7. Determine the retention period for the Snapshot copies on the source storage system and the SnapMirror destination.
8. Determine whether you want to run any commands before or after the backup operation and provide a prescript or postscript.

Automatic discovery of resources on Linux host

Resources are SAP HANA databases and Non-data Volume on the Linux host that are managed by SnapCenter. After installing the SnapCenter Plug-in for SAP HANA Database plug-in, the SAP HANA databases on that Linux host are automatically discovered and displayed on the Resources page.

Automatic discovery is supported for the following SAP HANA resources:

- Single containers

  After installing or upgrading the plug-in, the single container resources located on a centralized host plug-in will continue as manually added resources.

  After installing or upgrading the plug-in, the SAP HANA databases are automatically discovered only on the SAP HANA Linux hosts, which are directly registered into SnapCenter.

- Multitenant database container (MDC)

  After installing or upgrading the plug-in, the MDC resources located on a centralized host plug-in will continue as manually added resource.

  You must continue to manually add the MDC resources on the centralized host plug-in after upgrading to SnapCenter 4.3.

  For SAP HANA Linux hosts directly registered in SnapCenter, installing or upgrading the plug-in will trigger an automatic discovery for resources on the host. After upgrading the plug-in, for every MDC resource that was located on the plug-in host, another MDC resource will be automatically discovered with a different GUID format and registered in SnapCenter. The new resource will be in locked state.

  For example, in SnapCenter 4.2, if E90 MDC resource was located on the plug-in host and registered manually, after upgrading to SnapCenter 4.3, another E90 MDC resource with a different GUID will be discovered and registered in SnapCenter.

The Data Protection Guide for SAP HANA databases has more information on how to work with the new MDC resource on a SnapCenter plug-in host for data protection operations

Automatic discovery is not supported for the following configurations:

- RDM and VMDK layouts

  In case the above resources are discovered, the data protection operations are not supported on these resources.

- HANA multiple-host configuration
- HANA System Replication
- Multiple instances on the same host

Type of backups supported

Backup type specifies the type of backup that you want to create. SnapCenter supports File-Based Backup and Snapshot copy-based backup types for SAP HANA databases.

File-Based Backup

File-Based Backups verify the integrity of the database. You can schedule the file-based backup operation to occur at specific intervals. Only active tenants are backed up. You cannot restore and clone File-Based backups from SnapCenter.

Snapshot copy based backup

Snapshot copy-based backups leverage NetApp Snapshot copy technology to create online, read-only copies of the volumes on which the SAP HANA databases reside.

How SnapCenter Plug-in for SAP HANA Database uses consistency group Snapshot copies

You can use the plug-in to create consistency group Snapshot copies for resource groups. A consistency group is a container that can house multiple volumes so that you can manage them as one entity. A consistency group is simultaneous Snapshot copies of multiple volumes, providing consistent copies of a group of volumes.

You can also specify the wait time for the storage controller to consistently group Snapshot copies. The available wait time options are **Urgent**, **Medium**, and **Relaxed**. You can also enable or disable Write Anywhere File Layout (WAFL) sync during consistent group Snapshot copy operation. WAFL sync improves the performance of a consistency group Snapshot copy.

How SnapCenter manages housekeeping of log and data backups

SnapCenter manages the housekeeping of log and data backups on the storage system and file system levels, and within the SAP HANA backup catalog.

The Snapshot copies on the primary or secondary storage and their corresponding entries in the SAP HANA catalog are deleted based on the retention settings. The SAP HANA catalog entries are also deleted during backup and resource group deletion.

Considerations for determining backup schedules for SAP HANA database

The most critical factor in determining a backup schedule is the rate of change for the resource. You might back up a heavily used resource every hour, while you might back up a rarely used resource once a day. Other factors include the importance of the resource to your organization, your service-level agreement (SLA) and your recovery point objective (RPO).

Backup schedules have two parts, as follows:

- Backup frequency (how often backups are to be performed)

  Backup frequency, also called schedule type for some plug-ins, is part of a policy configuration. For example, you might configure the backup frequency as hourly, daily, weekly, or monthly.

- Backup schedules (exactly when backups are to be performed

  Backup schedules are part of a resource or resource group configuration. For example, if you have a resource group that has a policy configured for weekly backups, you might configure the schedule to back up every Thursday at 10:00 p.m.

Number of backup jobs needed for SAP HANA databases

Factors that determine the number of backup jobs that you need include the size of the

resource, the number of volumes used, the rate of change of the resource, and your Service Level Agreement (SLA).

Backup naming conventions for Plug-in for SAP HANA databases

You can either use the default Snapshot copy naming convention or use a customized naming convention. The default backup naming convention adds a timestamp to Snapshot copy names that helps you identify when the copies were created.

The Snapshot copy uses the following default naming convention:

```
resourcegroupname_hostname_timestamp
```

You should name your backup resource groups logically, as in the following example:

```
dts1_mach1x88_03-12-2015_23.17.26
```

In this example, the syntax elements have the following meanings:

- *dts1* is the resource group name.
- *mach1x88* is the host name.
- *03-12-2015_23.17.26* is the date and timestamp.

Alternatively, you can specify the Snapshot copy name format while protecting resources or resource groups by selecting **Use custom name format for Snapshot copy**. For example, customtext_resourcegroup_policy_hostname or resourcegroup_hostname. By default, the time stamp suffix is added to the Snapshot copy name.

Restore and recovery strategy for SAP HANA databases

Define a restore and recovery strategy for SAP HANA resources

You must define a strategy before you restore and recover your database so that you can perform restore and recovery operations successfully.

Steps

1. Determine the restore strategies supported for manually added SAP HANA resources
2. Determine the restore strategies supported for auto discovered SAP HANA databases
3. Decide the type of recovery operations that you want to perform.

Types of restore strategies supported for manually added SAP HANA resources

You must define a strategy before you can successfully perform restore operations using SnapCenter. There are two types of restore strategies for manually added SAP HANA resources. You cannot recover manually added SAP HANA resources.

You cannot recover manually added SAP HANA resources.

Complete resource restore

- Restores all volumes, qtrees, and LUNs of a resource

> If the resource contains volumes or qtrees, the Snapshot copies taken after the Snapshot copy selected for restore on such volumes or qtrees are deleted and cannot be recovered. Also, if any other resource is hosted on the same volumes or qtrees, then that resource is also deleted.

File level restore

- Restores files from volumes, qtrees, or directories
- Restores only the selected LUNs

Types of restore strategies supported for automatically discovered SAP HANA databases

You must define a strategy before you can successfully perform restore operations using SnapCenter. There are two types of restore strategies for automatically discovered SAP HANA databases.

Complete resource restore

- Restores all volumes, qtrees, and LUNs of a resource
  - The **Volume Revert** option should be selected to restore the entire volume.

> If the resource contains volumes or qtrees, the Snapshot copies taken after the Snapshot copy selected for restore on such volumes or qtrees are deleted and cannot be recovered. Also, if any other resource is hosted on the same volumes or qtrees, then that resource is also deleted.

Tenant Database

- Restores the tenant database

If **Tenant Database** option is selected, then HANA studio or HANA recovery scripts external to SnapCenter must be used to perform the recovery operation.

Types of restore operations for auto discovered SAP HANA databases

SnapCenter supports volume-based SnapRestore (VBSR), Single File SnapRestore, and connect-and-copy restore types for automatically discovered SAP HANA databases.

Volume-based SnapRestore (VBSR) is performed in NFS environments for the following scenarios:

- When the backup selected for restore is taken on releases earlier than SnapCenter 4.3, and only if the **Complete Resource**option is selected
- When the backup selected for restore is taken in SnapCenter 4.3, and if the **Volume Revert** option is selected

Single File SnapRestore is performed in NFS environments for the following scenarios:

- When the backup selected for restore is taken in SnapCenter 4.3, and if only the **Complete Resource** option is selected
- For multitenant database containers (MDC), when the backup selected for restore is taken on SnapCenter 4.3, and the **Tenant Database** option is selected
- When the backup selected is from a SnapMirror or SnapVault secondary location, and the **Complete Resource** option is selected

Single File SnapRestore is performed in SAN environments for the following scenarios:

- When backups are taken on releases earlier than SnapCenter 4.3, and only if the **Complete Resource** option is selected
- When backups are taken in SnapCenter 4.3, and only if the **Complete Resource** option is selected
- When the backup is selected from a SnapMirror or SnapVault secondary location, and the **Complete Resource** option is selected

Connect-and-copy based restore is performed in SAN environments for the following scenario:

- For MDC, when the backup selected for restore is taken in SnapCenter 4.3, and the **Tenant Database** option is selected

Complete Resource, **Volume Revert**, and **Tenant Database** options are available on the Restore Scope page.

Types of recovery operations supported for SAP HANA databases

SnapCenter enables you to perform different types of recovery operations for SAP HANA databases.

- Recover the database up to the most recent state
- Recover the database up to a specific point in time

  You must specify the date and time for recovery.

- Recover the database up to a specific data backup

SnapCenter also provides the No recovery option for SAP HANA databases.

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