



# **Backup replication with SnapVault**

## **NetApp Solutions SAP**

NetApp  
December 03, 2023

This PDF was generated from [https://docs.netapp.com/us-en/netapp-solutions-sap/backup/amazon-fsx-backup-replication-with-snapvault\\_overview.html](https://docs.netapp.com/us-en/netapp-solutions-sap/backup/amazon-fsx-backup-replication-with-snapvault_overview.html) on December 03, 2023. Always check docs.netapp.com for the latest.

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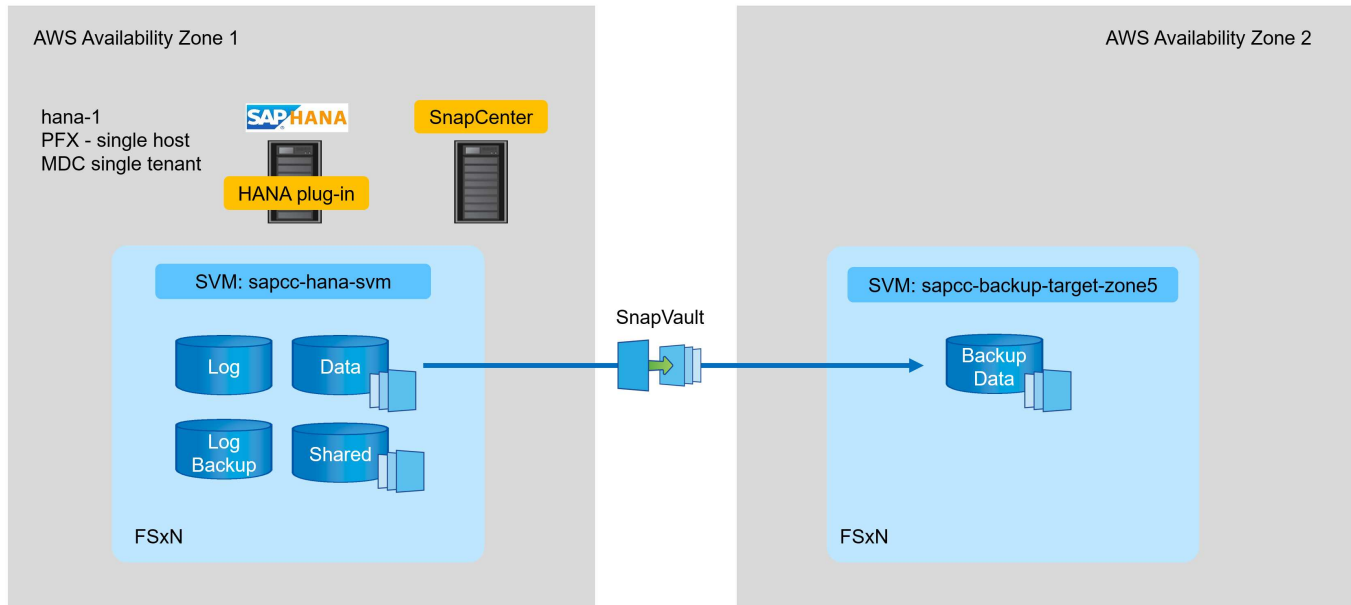
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# Backup replication with SnapVault

## Overview - Backup replication with SnapVault

In our lab setup, we use a second FSx for ONTAP file system in a second AWS availability zone to showcase the backup replication for the HANA data volume.

As discussed in chapter “[Data protection strategy](#)”, the replication target must be a second FSx for ONTAP file system in another availability zone to be protected from a failure of the primary FSx for ONTAP file system. Also, the HANA shared volume should be replicated to the secondary FSx for ONTAP file system.



### Overview of configuration steps

There are a couple of configuration steps that you must execute on the FSx for ONTAP layer. You can do this either with NetApp Cloud Manager or the FSx for ONTAP command line.

1. Peer FSx for ONTAP file systems. FSx for ONTAP file systems must be peered to allow replication between each other.
2. Peer SVMs. SVMs must be peered to allow replication between each other.
3. Create a target volume. Create a volume at the target SVM with volume type **DP**. Type **DP** is required to be used as a replication target volume.
4. Create a SnapMirror policy. This is used to create a policy for replication with type **vault**.
  - a. Add a rule to policy. The rule contains the SnapMirror label and the retention for backups at the secondary site. You must configure the same SnapMirror label later in the SnapCenter policy so that SnapCenter creates Snapshot backups at the source volume containing this label.
5. Create a SnapMirror relationship. Defines the replication relationship between the source and target volume and attaches a policy.
6. Initialize SnapMirror. This starts the initial replication in which the complete source data is transferred to the target volume.

When volume replication configuration is complete, you must configure the backup replication in SnapCenter as follows:

1. Add the target SVM to SnapCenter.
2. Create a new SnapCenter policy for Snapshot backup and SnapVault replication.
3. Add the policy to HANA resource protection.
4. You can now execute backups with the new policy.

The following chapters describe the individual steps in more detail.

## Configure replication relationships on FSx for ONTAP file systems

You can find additional information about SnapMirror configuration options in the ONTAP documentation at [SnapMirror replication workflow \(netapp.com\)](https://netapp.com).

- Source FSx for ONTAP file system: FsxId00fa9e3c784b6abbb
- Source SVM: sapcc-hana-svm
- Target FSx for ONTAP file system: FsxId05f7f00af49dc7a3e
- Target SVM: sapcc-backup-target-zone5

### Peer FSx for ONTAP file systems

```
FsxId00fa9e3c784b6abbb::> network interface show -role intercluster
      Logical      Status      Network      Current      Current
Is
Vserver      Interface  Admin/Oper  Address/Mask      Node      Port
Home
-----
----
FsxId00fa9e3c784b6abbb
      inter_1      up/up      10.1.1.57/24
FsxId00fa9e3c784b6abbb-01
                                     e0e
true
      inter_2      up/up      10.1.2.7/24
FsxId00fa9e3c784b6abbb-02
                                     e0e
true
2 entries were displayed.
```

```

FsxId05f7f00af49dc7a3e::> network interface show -role intercluster

```

Is	Logical	Status	Network	Current	Current
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	-----
----					
FsxId05f7f00af49dc7a3e	inter_1	up/up	10.1.2.144/24		
FsxId05f7f00af49dc7a3e-01					e0e
true					
	inter_2	up/up	10.1.2.69/24		
FsxId05f7f00af49dc7a3e-02					e0e
true					

2 entries were displayed.

```

FsxId05f7f00af49dc7a3e::> cluster peer create -address-family ipv4 -peer
-addr 10.1.1.57, 10.1.2.7
Notice: Use a generated passphrase or choose a passphrase of 8 or more
characters. To ensure the authenticity of the peering relationship, use a
phrase or sequence of characters that would be hard to guess.
Enter the passphrase:
Confirm the passphrase:
Notice: Now use the same passphrase in the "cluster peer create" command
in the other cluster.

```



peer-addr are cluster IPs of the destination cluster.

```

FsxId00fa9e3c784b6abbb::> cluster peer create -address-family ipv4 -peer
-addr 10.1.2.144, 10.1.2.69
Notice: Use a generated passphrase or choose a passphrase of 8 or more
characters. To ensure the authenticity of the peering relationship, use a
phrase or sequence of characters that would be hard to guess.
Enter the passphrase:
Confirm the passphrase:
FsxId00fa9e3c784b6abbb::>
FsxId00fa9e3c784b6abbb::> cluster peer show
Peer Cluster Name          Cluster Serial Number Availability
Authentication
-----
FsxId05f7f00af49dc7a3e    1-80-000011          Available      ok

```

## Peer SVMs

```

FsxId05f7f00af49dc7a3e::> vserver peer create -vserver sapcc-backup-
target-zone5 -peer-vserver sapcc-hana-svm -peer-cluster
FsxId00fa9e3c784b6abbb -applications snapmirror
Info: [Job 41] 'vserver peer create' job queued

```

```

FsxId00fa9e3c784b6abbb::> vserver peer accept -vserver sapcc-hana-svm
-peer-vserver sapcc-backup-target-zone5
Info: [Job 960] 'vserver peer accept' job queued

```

```

FsxId05f7f00af49dc7a3e::> vserver peer show
Peer Peer Peering
Remote
Vserver Vserver State Peer Cluster Applications
Vserver
-----
sapcc-backup-target-zone5
peer-source-cluster
peered FsxId00fa9e3c784b6abbb
snapmirror
sapcc-hana-svm

```

## Create a target volume

You must create the target volume with the type `DP` to flag it as a replication target.

```
FsxId05f7f00af49dc7a3e::> volume create -vserver sapcc-backup-target-zone5
-volume PFX_data_mnt00001 -aggregate aggr1 -size 100GB -state online
-policy default -type DP -autosize-mode grow_shrink -snapshot-policy none
-foreground true -tiering-policy all -anti-ransomware-state disabled
[Job 42] Job succeeded: Successful
```

## Create a SnapMirror policy

The SnapMirror policy and the added rule define the retention and the Snapmirror label to identify Snapshots that should be replicated. When creating the SnapCenter policy later, you must use the same label.

```
FsxId05f7f00af49dc7a3e::> snapmirror policy create -policy snapcenter-
policy -tries 8 -transfer-priority normal -ignore-atime false -restart
always -type vault -vserver sapcc-backup-target-zone5
```

```
FsxId05f7f00af49dc7a3e::> snapmirror policy add-rule -vserver sapcc-
backup-target-zone5 -policy snapcenter-policy -snapmirror-label
snapcenter -keep 14
```

```
FsxId00fa9e3c784b6abbb::> snapmirror policy showVserver Policy
Policy Number          Transfer
Name      Name          Type    Of Rules Tries Priority Comment
-----
FsxId00fa9e3c784b6abbb
      snapcenter-policy vault          1      8  normal  -
      SnapMirror Label: snapcenter                                Keep:      14
                                                                Total Keep: 14
```

## Create SnapMirror relationship

Now the relation between the source and target volume is defined as well as the type `XDP` and the policy we created earlier.

```
FsxId05f7f00af49dc7a3e::> snapmirror create -source-path sapcc-hana-
svm:PFX_data_mnt00001 -destination-path sapcc-backup-target-
zone5:PFX_data_mnt00001 -vserver sapcc-backup-target-zone5 -throttle
unlimited -identity-preserve false -type XDP -policy snapcenter-policy
Operation succeeded: snapmirror create for the relationship with
destination "sapcc-backup-target-zone5:PFX_data_mnt00001".
```

## Initialize SnapMirror

With this command, the initial replication starts. This is a full transfer of all data from the source volume to the target volume.

```
FsxId05f7f00af49dc7a3e::> snapmirror initialize -destination-path sapcc-
backup-target-zone5:PFX_data_mnt00001 -source-path sapcc-hana-
svm:PFX_data_mnt00001
Operation is queued: snapmirror initialize of destination "sapcc-backup-
target-zone5:PFX_data_mnt00001".
```

You can check the status of the replication with the `snapmirror show` command.

```
FsxId05f7f00af49dc7a3e::> snapmirror show
```

Progress									
Source		Destination		Mirror	Relationship	Total			
Last									
Path	Type	Path	State	Status	Progress		Healthy		
Updated									
-----									
-----									
sapcc-hana-svm:PFX_data_mnt00001									
	XDP	sapcc-backup-target-zone5:PFX_data_mnt00001							
			Uninitialized						
				Transferring	1009MB	true			
02/24 12:34:28									



```
FsxId05f7f00af49dc7a3e::> snapmirror show
```

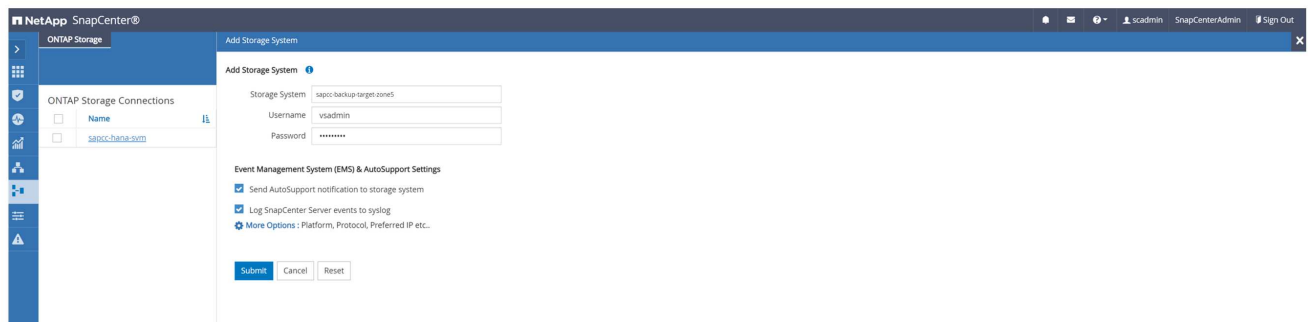
Progress

Source	Destination	Mirror	Relationship	Total		
Last						
Path	Type	Path	State	Status	Progress	Healthy
Updated						
-----						
-----						
sapcc-hana-svm:PFX_data_mnt00001						
	XDP	sapcc-backup-target-zone5:PFX_data_mnt00001				
		Snapmirrored				
			Idle		-	true -

## Add a backup SVM to SnapCenter

To add a backup SVM to SnapCenter, follow these steps:

1. Configure the SVM where the SnapVault target volume is located in SnapCenter.



2. On the More Options window, select All Flash FAS as the platform and select Secondary.

More Options

Platform

All Flash FAS

☒ Secondary

Protocol

HTTPS

Port

443

Timeout

60

seconds

☐ Preferred IP

Save

Cancel

The SVM is now available in SnapCenter.

NetApp SnapCenter®

scadmin

SnapCenterAdmin

Sign Out

Dashboard

Resources

Monitor

Reports

Hosts

Storage Systems

Settings

Alerts

ONTAP Storage

Type

ONTAP SVMs

Search by Name

New

Delete

ONTAP Storage Connections

<input type="checkbox"/>	Name	IP	Cluster Name	User Name	Platform	Controller License
<input type="checkbox"/>	<a href="#">sapcc-backup-target-zone5</a>	10.1.2.31		vsadmin	AFF	Not applicable
<input type="checkbox"/>	<a href="#">sapcc-hana-svm</a>	198.19.255.9		vsadmin	AFF	✓

## Create a new SnapCenter policy for backup replication

You must configure a policy for the backup replication as follows:

1. Provide a name for the policy.

NetApp SnapCenter®

scadmin

SnapCenterAdmin

Sign Out

Dashboard

Resources

Monitor

Reports

Hosts

Storage Systems

Settings

Alerts

Global Settings

Policies

Users and Access

Roles

Credential

Software

SAP HANA

Search by Name

New

Edit

Copy

Details

Delete

Name	Backup Type	Schedule Type	Replication
BlockIntegrityCheck	File Based Backup	Weekly	
LocalSnap	Data Backup	Hourly	

2. Select Snapshot backup and a schedule frequency. Daily is typically used for backup replication.

New SAP HANA Backup Policy

1 Name

2 Settings

3 Retention

4 Replication

5 Summary

Provide a policy name

Policy name

LocalSnapAndSnapVault

Details

Replication to backup volume

3. Select the retention for the Snapshot backups.

New SAP HANA Backup Policy

1 Name

2 Settings

3 Retention

4 Replication

5 Summary

Select backup settings

Backup Type

☒ Snapshot Based
 ☐ File-Based

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.

☐ On demand
 ☐ Hourly
 ☒ Daily
 ☐ Weekly
 ☐ Monthly

This is the retention for the daily Snapshot backups taken at the primary storage. The retention for secondary backups at the SnapVault target has already been configured previously using the add rule command at the ONTAP level. See “Configure replication relationships on FSx for ONTAP file systems” (xref).

New SAP HANA Backup Policy

1 Name

2 Settings

3 Retention

4 Replication

5 Summary

Retention settings

Daily retention settings

☒ Total Snapshot copies to keep
 

3

☐ Keep Snapshot copies for
 

14

days

4. Select the Update SnapVault field and provide a custom label.

This label must match the SnapMirror label provided in the add rule command at ONTAP level.

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New SAP HANA Backup Policy

1 Name

2 Settings

3 Retention

4 Replication

5 Summary

Select secondary replication options

☐ Update SnapMirror after creating a local Snapshot copy.
 ☒ Update SnapVault after creating a local Snapshot copy.

Secondary policy label
 

Custom Label

snapcenter

Error retry count
 

3

New SAP HANA Backup Policy

1 Name

2 Settings

3 Retention

4 Replication

5 Summary

Summary

Policy name	LocalSnapAndSnapVault
Details	Replication to backup volume
Backup Type	Snapshot Based Backup
Schedule Type	Daily
Daily backup retention	Total backup copies to retain : 3
Replication	SnapVault enabled , Secondary policy label: Custom Label : snapcenter , Error retry count: 3

The new SnapCenter policy is now configured.

NetApp SnapCenter®				
<div> <div>Global Settings</div> <div>Policies</div> <div>Users and Access</div> <div>Roles</div> <div>Credential</div> <div>Software</div> </div>				
SAP HANA				
<div> <div>Search by Name</div> <div> <div>+</div> <div>✎</div> <div>📄</div> <div>ℹ️</div> <div>🗑️</div> </div> </div>				
Name	Backup Type	Schedule Type	Replication	
BlockIntegrityCheck	File Based Backup	Weekly		
LocalSnap	Data Backup	Hourly		
LocalSnapAndSnapVault	Data Backup	Daily	SnapVault	

## Add a policy to resource protection

You must add the new policy to the HANA resource protection configuration, as shown in the following figure.

NetApp SnapCenter®

SAP HANA

Search databases

System

PFX

PFX Topology

Manage Copies

Primary Backup(s)

search

Backup Name

SnapCenter\_hana-1\_LocalSnap\_Hourly\_02-24-2022\_14.00.03.6698

SnapCenter\_hana-1\_LocalSnap\_Hourly\_02-24-2022\_08.00.02.2808

SnapCenter\_hana-1\_LocalSnap\_Hourly\_02-24-2022\_02.00.02.1758

SnapCenter\_hana-1\_LocalSnap\_Hourly\_02-23-2022\_20.00.02.3280

SnapCenter\_hana-1\_LocalSnap\_Hourly\_02-23-2022\_14.00.05.4361

SnapCenter\_hana-1\_LocalSnap\_Hourly\_02-22-2022\_20.00.01.4482

SnapCenter\_hana-1\_LocalSnap\_Hourly\_02-22-2022\_14.00.02.8713

Multitenant Database Container - Protect

1 Resource

2 Application Settings

3 Policies

4 Notification

5 Summary

Select one or more policies and configure schedules

LocalSnap, BlockIntegrityCheck

+

ℹ️

LocalSnap

BlockIntegrityCheck

LocalSnapAndSnapVault

5

1 Schedules

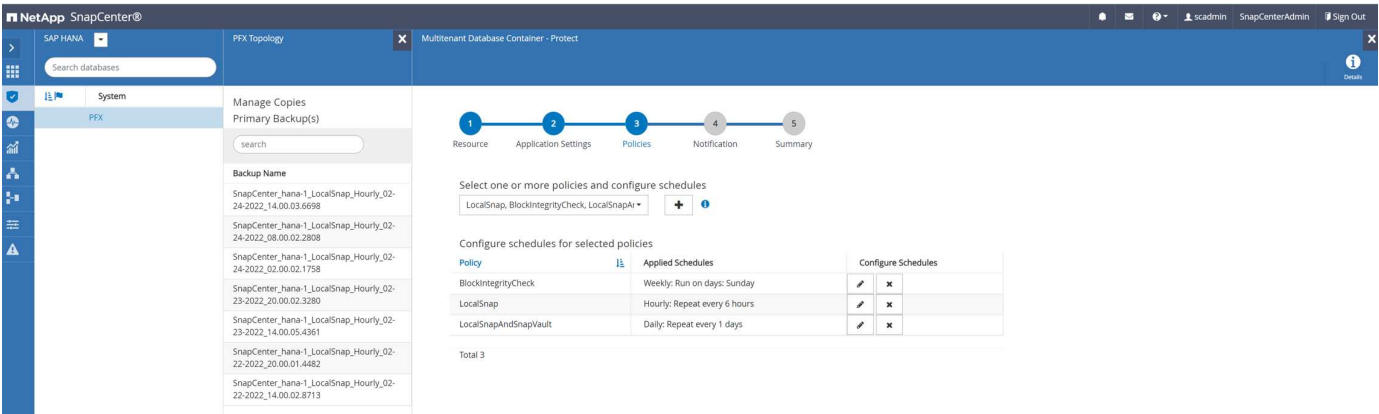
Configure Schedules

BlockIntegrityCheck	Weekly: Run on days: Sunday	✓	✕
LocalSnap	Hourly: Repeat every 6 hours	✓	✕

Total 2

10

A daily schedule is defined in our setup.



## Create a backup with replication

A backup is created in the same way as with a local Snapshot copy.

To create a backup with replication, select the policy that includes the backup replication and click Backup.

Backup

Create a backup for the selected resource

Resource Name

PFX

Policy

LocalSnapAndSnapVault

Cancel

Backup

Within the SnapCenter job log, you can see the Secondary Update step, which initiates a SnapVault update operation. Replication changed blocks from the source volume to the target volume.

Job Details

Backup of Resource Group 'hana-1\_hana\_MDC\_PFX' with policy 'LocalSnapAndSnapVault'

▼ Backup of Resource Group 'hana-1\_hana\_MDC\_PFX' with policy 'LocalSnapAndSnapVault'

▼ hana-1

▼ Backup

▶ Validate Dataset Parameters

▶ Validate Plugin Parameters

▶ Complete Application Discovery

▶ Initialize Filesystem Plugin

▶ Discover Filesystem Resources

▶ Validate Retention Settings

▶ Quiesce Application

▶ Quiesce Filesystem

▶ Create Snapshot

▶ UnQuiesce Filesystem

▶ UnQuiesce Application

▶ Get Snapshot Details

▶ Get Filesystem Meta Data

▶ Finalize Filesystem Plugin

▶ Collect Autosupport data

▶ Secondary Update

▶ Register Backup and Apply Retention

▶ Register Snapshot attributes

▶ Application Clean-Up

▶ Data Collection

▶ Agent Finalize Workflow

▼ ( Job 49 ) SnapVault update

Task Name: Secondary Update Start Time: 02/24/2022 3:14:37 PM End Time: 02/24/2022 3:14:46 PM

View Logs

Cancel Job

Close

On the FSx for ONTAP file system, a Snapshot on the source volume is created using the SnapMirror label,

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sapcenter, as configured in the SnapCenter policy.

```
FsxId00fa9e3c784b6abbb:> snapshot show -vserver sapcc-hana-svm -volume
PFX_data_mnt00001 -fields snapmirror-label
vserver          volume          snapshot
snapmirror-label
-----
-----
-----
sapcc-hana-svm PFX_data_mnt00001 SnapCenter_hana-1_LocalSnap_Hourly_03-31-
2022_13.10.26.5482 -
sapcc-hana-svm PFX_data_mnt00001 SnapCenter_hana-1_LocalSnap_Hourly_03-31-
2022_14.00.05.2023 -
sapcc-hana-svm PFX_data_mnt00001 SnapCenter_hana-1_LocalSnap_Hourly_04-05-
2022_08.00.06.3380 -
sapcc-hana-svm PFX_data_mnt00001 SnapCenter_hana-1_LocalSnap_Hourly_04-05-
2022_14.00.01.6482 -
sapcc-hana-svm PFX_data_mnt00001 SnapCenter_hana-1_LocalSnap_Hourly_04-14-
2022_20.00.05.0316 -
sapcc-hana-svm PFX_data_mnt00001 SnapCenter_hana-1_LocalSnap_Hourly_04-28-
2022_08.00.06.3629 -
sapcc-hana-svm PFX_data_mnt00001 SnapCenter_hana-1_LocalSnap_Hourly_04-28-
2022_14.00.01.7275 -
sapcc-hana-svm PFX_data_mnt00001 SnapCenter_hana-
1_LocalSnapAndSnapVault_Daily_04-28-2022_16.21.41.5853

snapcenter
8 entries were displayed.
```

At the target volume, a Snapshot copy with the same name is created.

```
FsxId05f7f00af49dc7a3e:> snapshot show -vserver sapcc-backup-target-zone5
-volume PFX_data_mnt00001 -fields snapmirror-label
vserver          volume          snapshot
snapmirror-label
-----
-----
-----
sapcc-backup-target-zone5 PFX_data_mnt00001 SnapCenter_hana-
1_LocalSnapAndSnapVault_Daily_04-28-2022_16.21.41.5853 snapcenter
FsxId05f7f00af49dc7a3e:>
```

The new Snapshot backup is also listed in the HANA backup catalog.

Backup Catalog						Backup Details					
Database: SYSTEMDB						ID:	1651162926424				
<input type="checkbox"/> Show Log Backups <input type="checkbox"/> Show Delta Backups						Status:	Successful				
Status	Started	Duration	Size	Backup Type	Destination Ty...	Backup Type:	Data Backup				
	Apr 28, 2022, 4:22:06 PM	00h 00m 15s	5.50 GB	Data Backup	Snapshot	Destination Type:	Snapshot				
	Apr 28, 2022, 2:00:26 PM	00h 00m 15s	5.50 GB	Data Backup	Snapshot	Started:	Apr 28, 2022, 4:22:06 PM (UTC)				
	Apr 28, 2022, 8:00:35 AM	00h 00m 15s	5.50 GB	Data Backup	Snapshot	Finished:	Apr 28, 2022, 4:22:21 PM (UTC)				
	Apr 15, 2022, 5:00:44 PM	00h 06m 59s	5.50 GB	Data Backup	Snapshot	Duration:	00h 00m 15s				
	Apr 14, 2022, 8:00:32 PM	00h 00m 16s	5.50 GB	Data Backup	Snapshot	Size:	5.50 GB				
	Apr 5, 2022, 2:00:29 PM	00h 00m 15s	5.50 GB	Data Backup	Snapshot	Throughput:	n.a.				
	Apr 5, 2022, 8:00:39 AM	00h 00m 15s	5.50 GB	Data Backup	Snapshot	System ID:					
	Mar 31, 2022, 2:00:29 PM	00h 00m 15s	5.50 GB	Data Backup	Snapshot	Comment:	SnapCenter_hana-1_LocalSnapAndSnapVault_Daily_04-28-2022_16.21.41.5853				
	Mar 31, 2022, 1:10:57 PM	00h 00m 16s	5.50 GB	Data Backup	Snapshot	Additional Information:	<ok>				
	Feb 22, 2022, 12:55:21 PM	00h 00m 21s	3.56 GB	Data Backup	File	Location:	/hana/data/PFX/mnt00001/				
						Host	Service	Size	Name	Source Type	EBID
						hana-1	nameserver	5.50 GB	hdb00001	volume	SnapCent...

In SnapCenter, you can list the replicated backups by clicking Vault Copies in the topology view.

## Restore and recover from secondary storage

To restore and recover from secondary storage, follow these steps:

To retrieve the list of all the backups on the secondary storage, in the SnapCenter Topology view, click Vault Copies, then select a backup and click Restore.

The restore dialog shows the secondary locations.



Restore from SnapCenter\_hana-1\_LocalSnapAndSnapVault\_Daily\_04-28-2022\_16.21.41.5853

1 Restore scope

2 Recovery scope

3 PreOps

4 PostOps

5 Notification

6 Summary

Select the restore types

☒ Complete Resource

☐ Tenant Database

Choose archive location

sapcc-hana-svm:PFX\_data\_mnt00001

sapcc-backup-target-zone5:PFX\_data\_mnt00

The newer tenants added on the host after the backup was created cannot be restored and will be lost after restore operation.

Configure an SMTP Server to send email notifications for Restore jobs by going to [Settings>Global Settings>Notification Server Settings.](#)

Previous

Next

Further restore and recovery steps are identical to those previously covered for a Snapshot backup at the primary storage.

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