Backup replication with SnapVault

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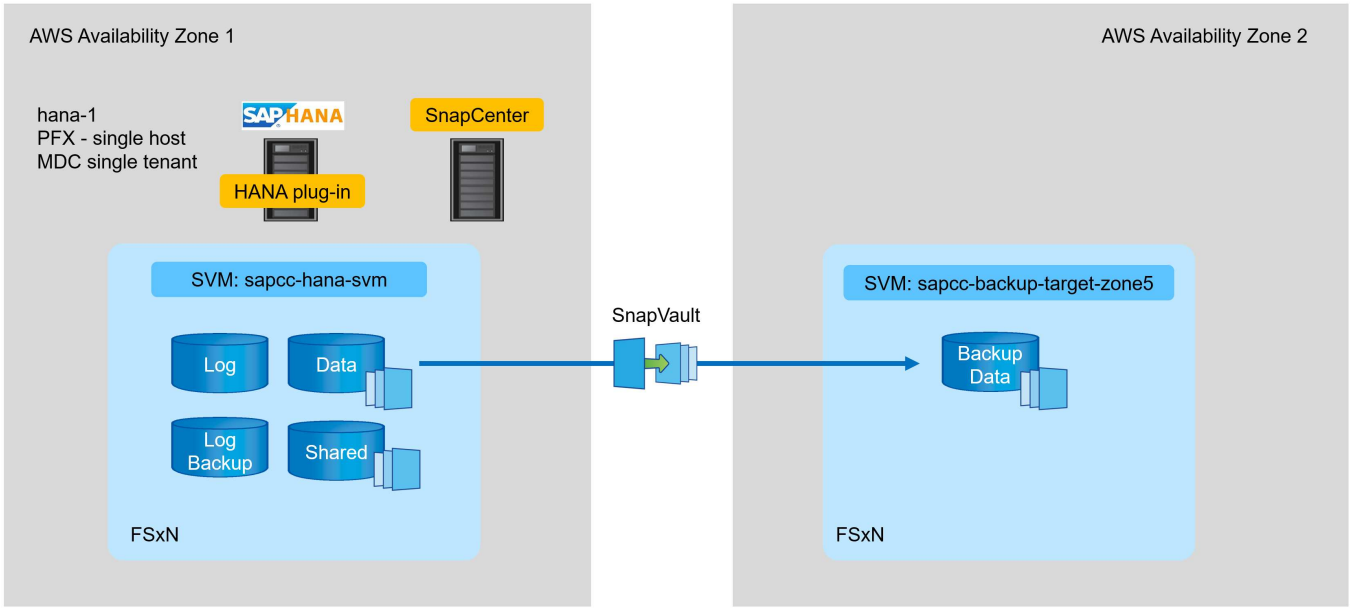
Overview - Backup replication with SnapVault

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).

- 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
            Logical    Status     Network            Current       Current
Is
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
-addrs 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-addrs` are cluster IPs of the destination cluster.

```
FsxId00fa9e3c784b6abbb::>  cluster peer create -address-family ipv4 -peer
-addrs  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
```

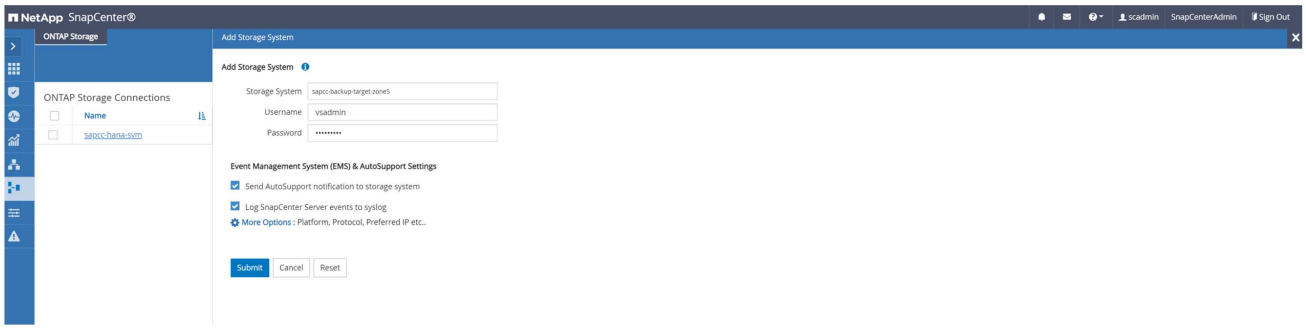
```
FsxId05f7f00af49dc7a3e::> snapmirror show

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    -
```

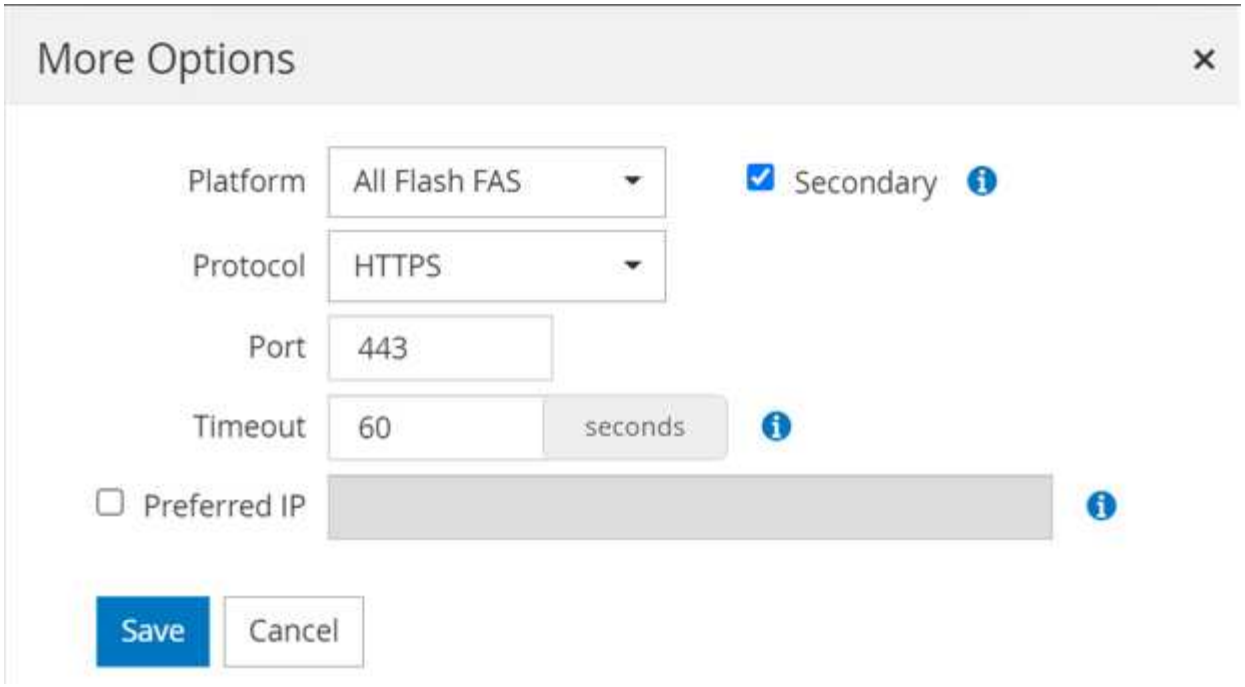
Add a backup SVM to SnapCenter

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

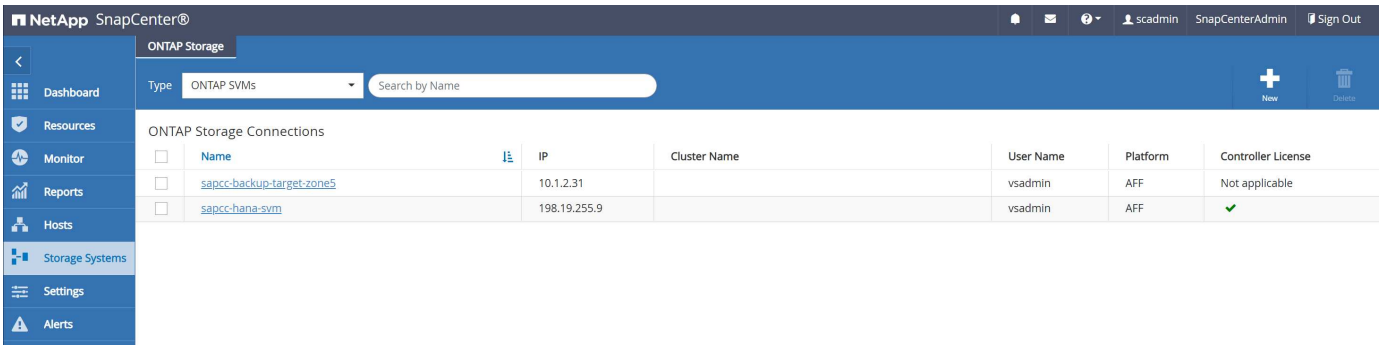
1. Configure the SVM where the SnapVault target volume is located in SnapCenter.



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



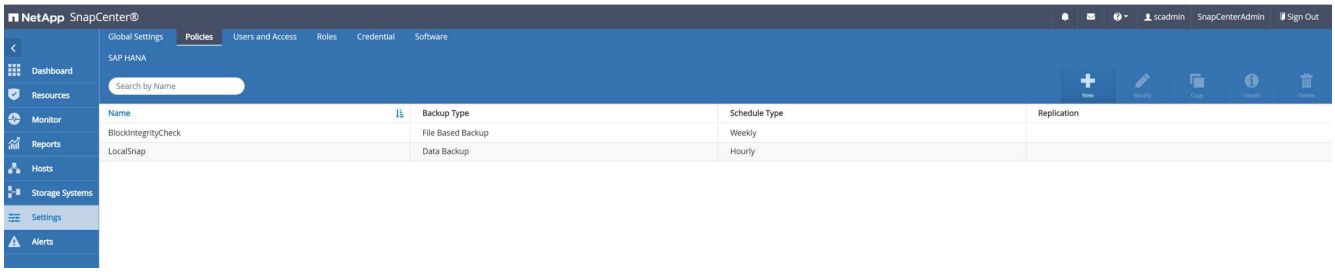
The SVM is now available in SnapCenter.



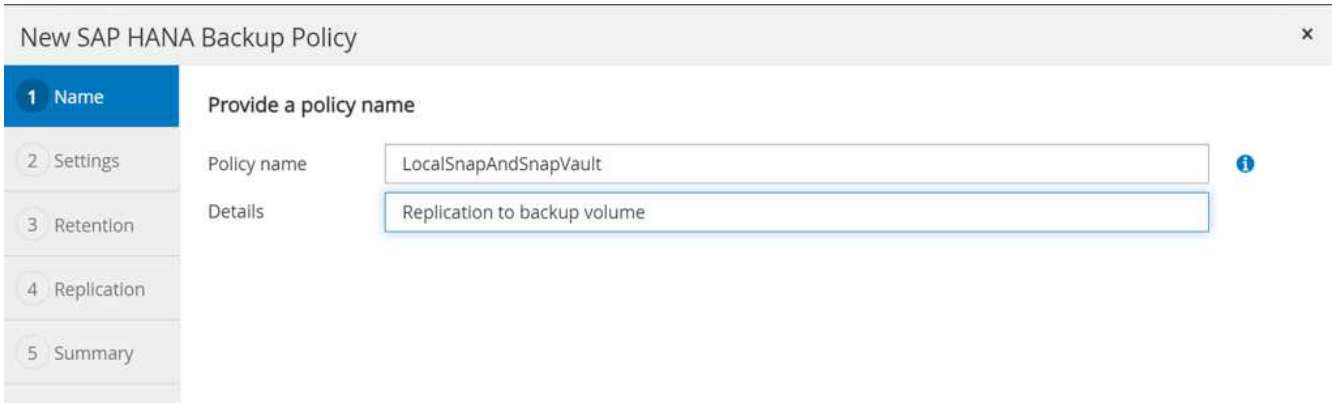
Create a new SnapCenter policy for backup replication

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

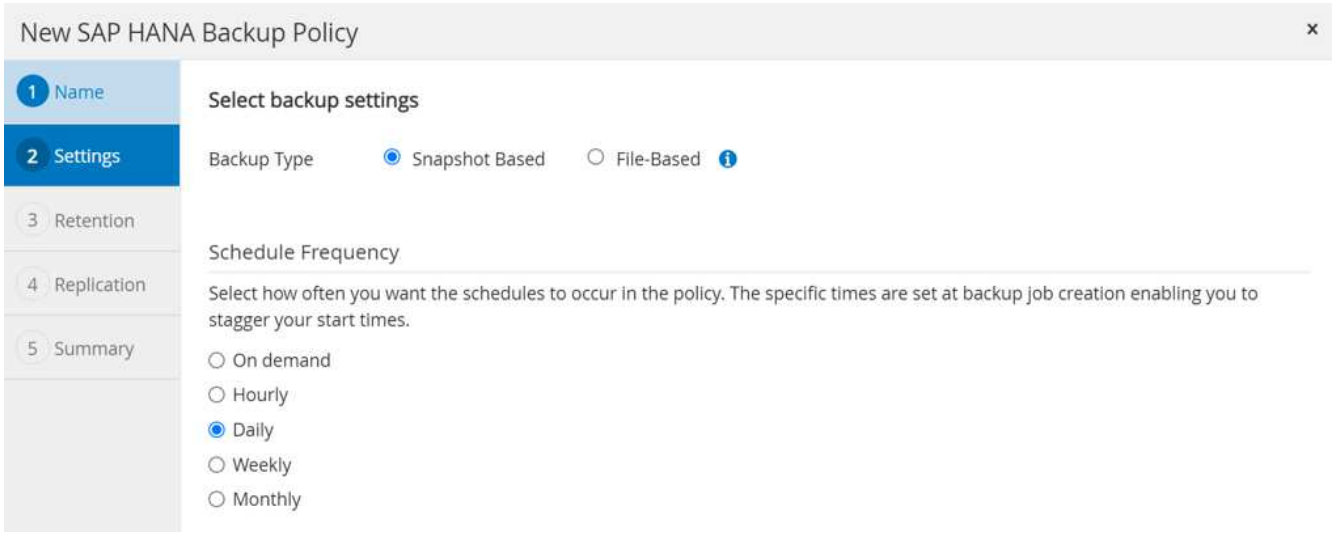
1. Provide a name for the policy.



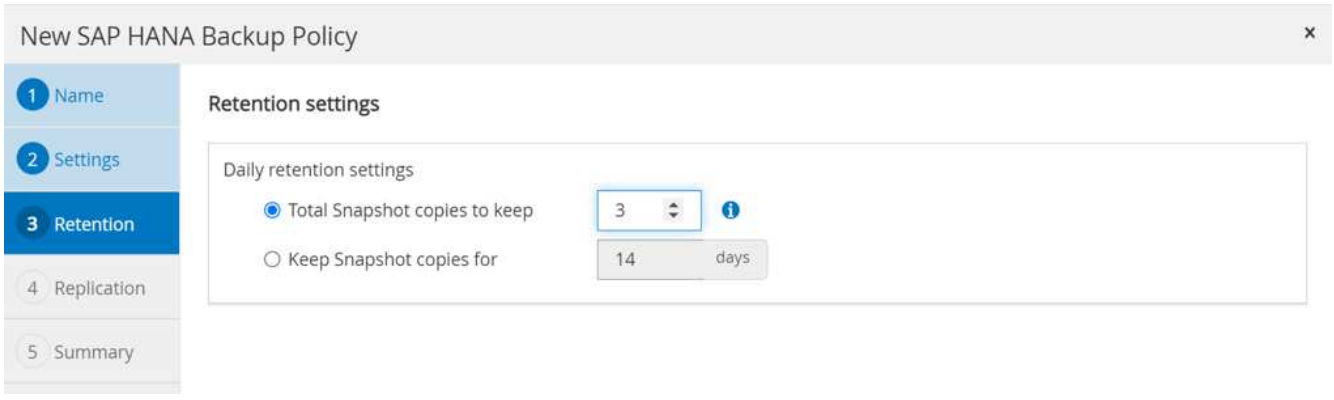
2. Select Snapshot backup and a schedule frequency. Daily is typically used for backup replication.



3. Select the retention for the Snapshot backups.

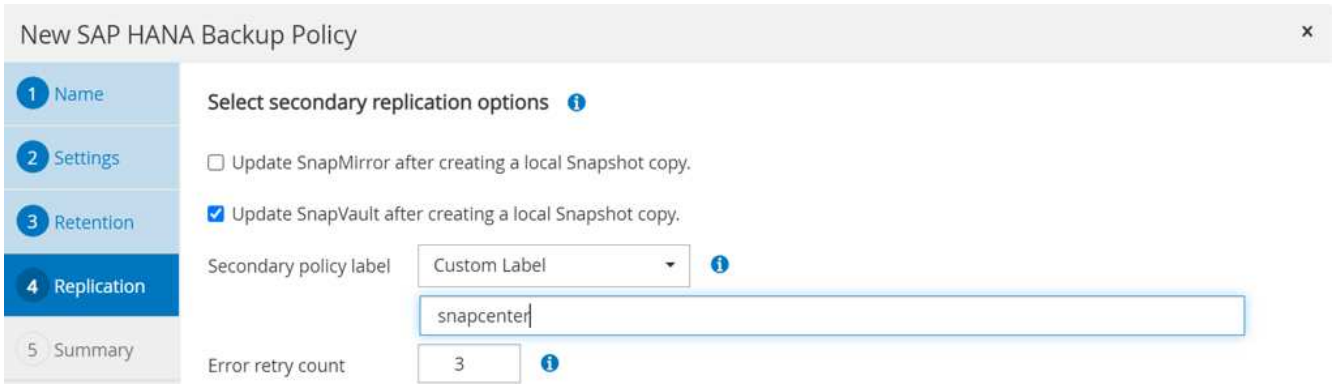


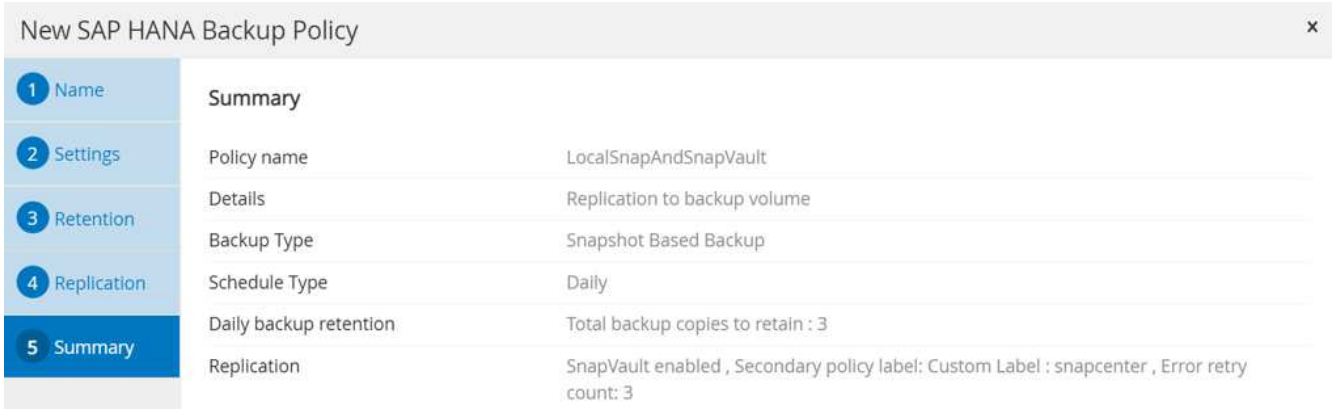
This is the retention for the daily Snapshot backups taken at the primary storage. The retention for secondary backups at the SnapVault target has already been configured previously using the add rule command at the ONTAP level. See “Configure replication relationships on FSx for ONTAP file systems”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



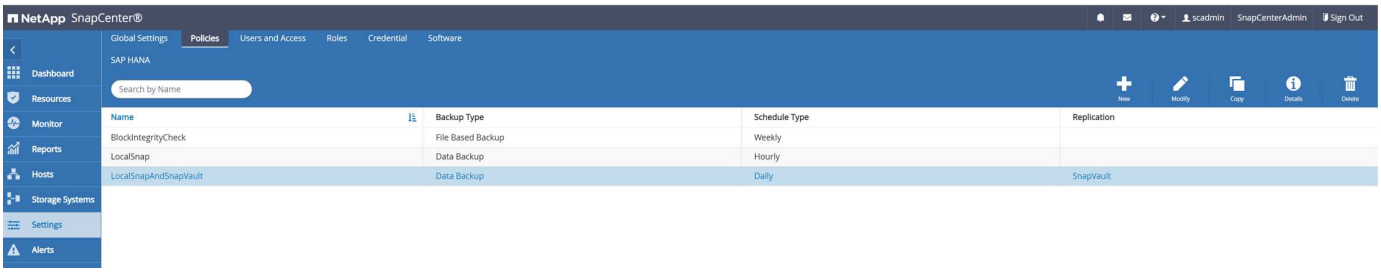
4. Select the Update SnapVault field and provide a custom label.

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



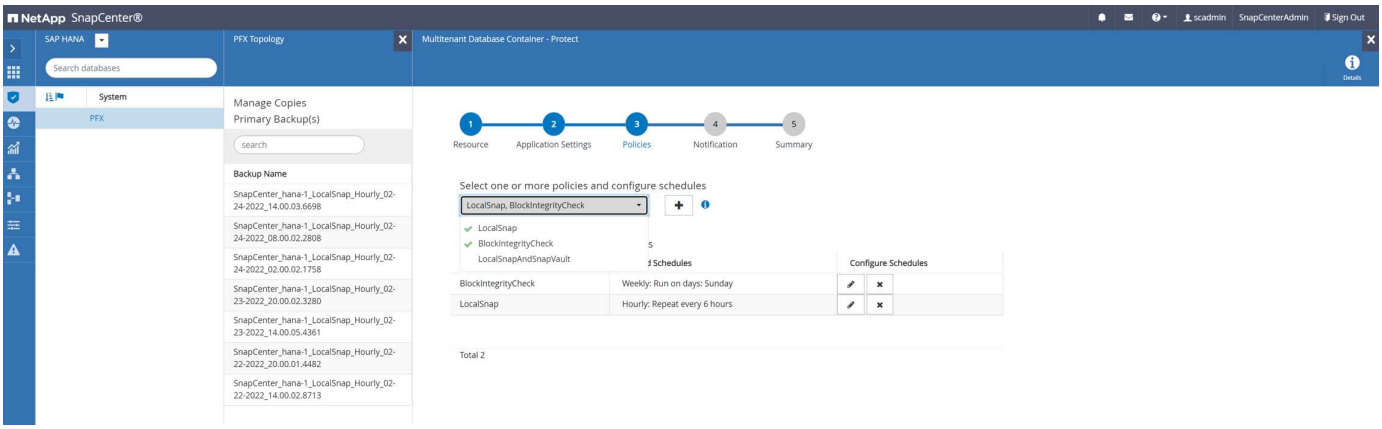


The new SnapCenter policy is now configured.

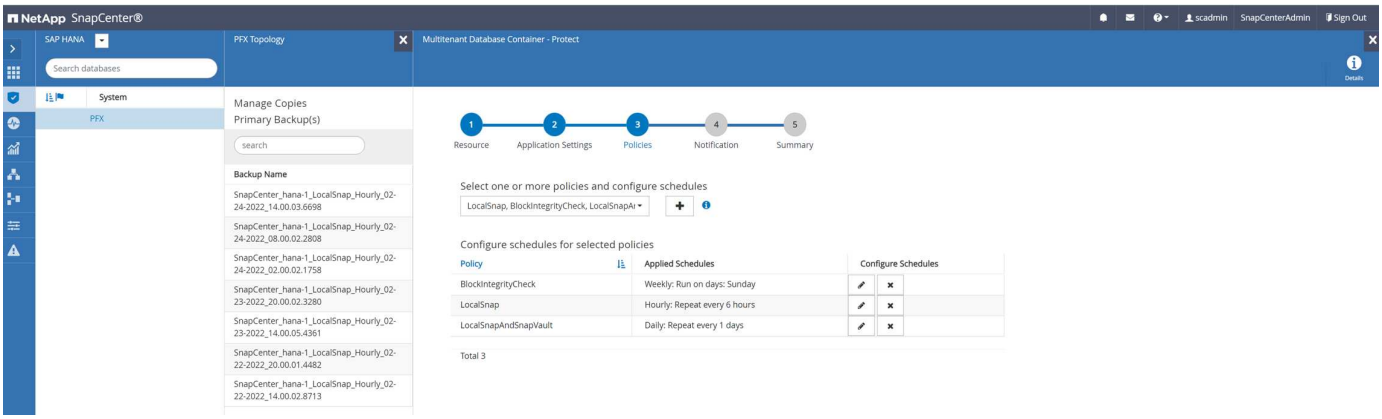


Add a policy to resource protection

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



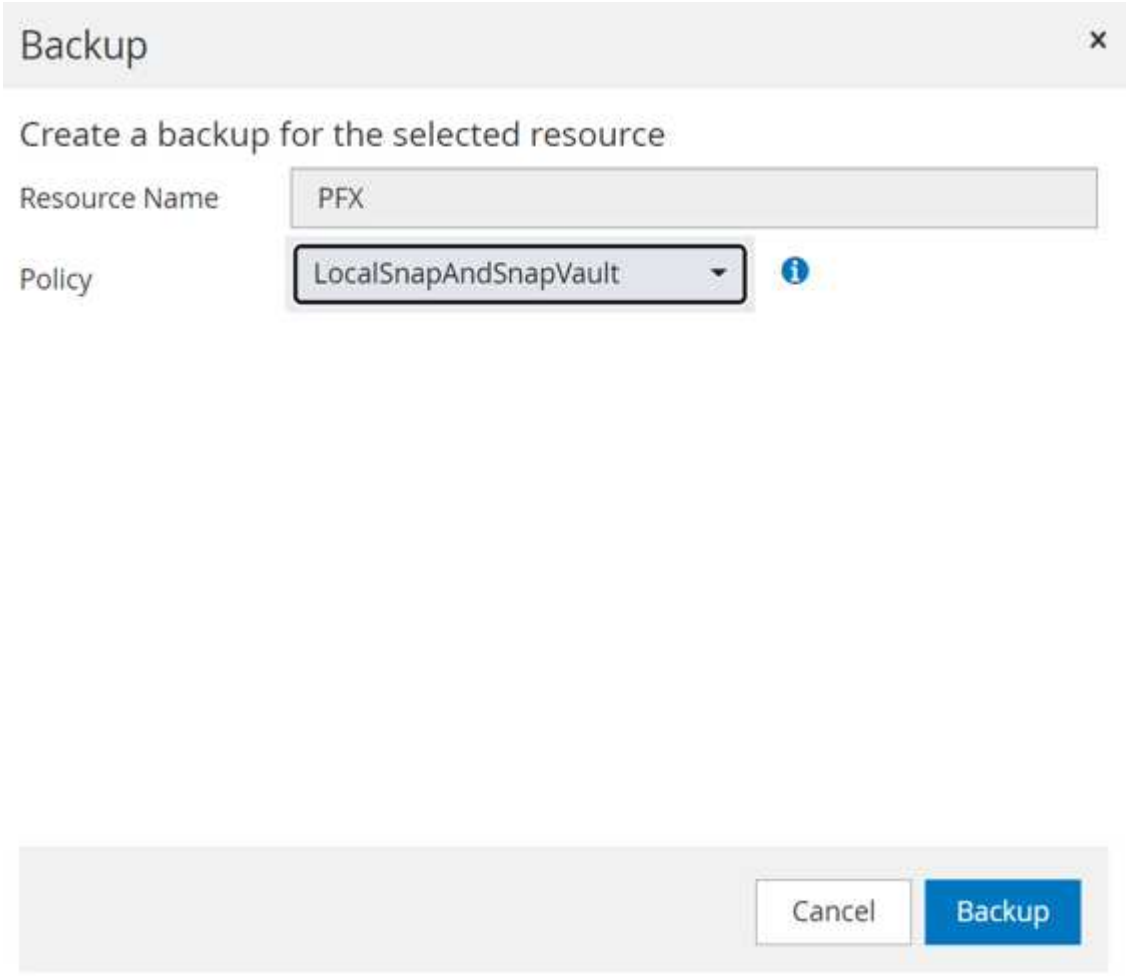
A daily schedule is defined in our setup.



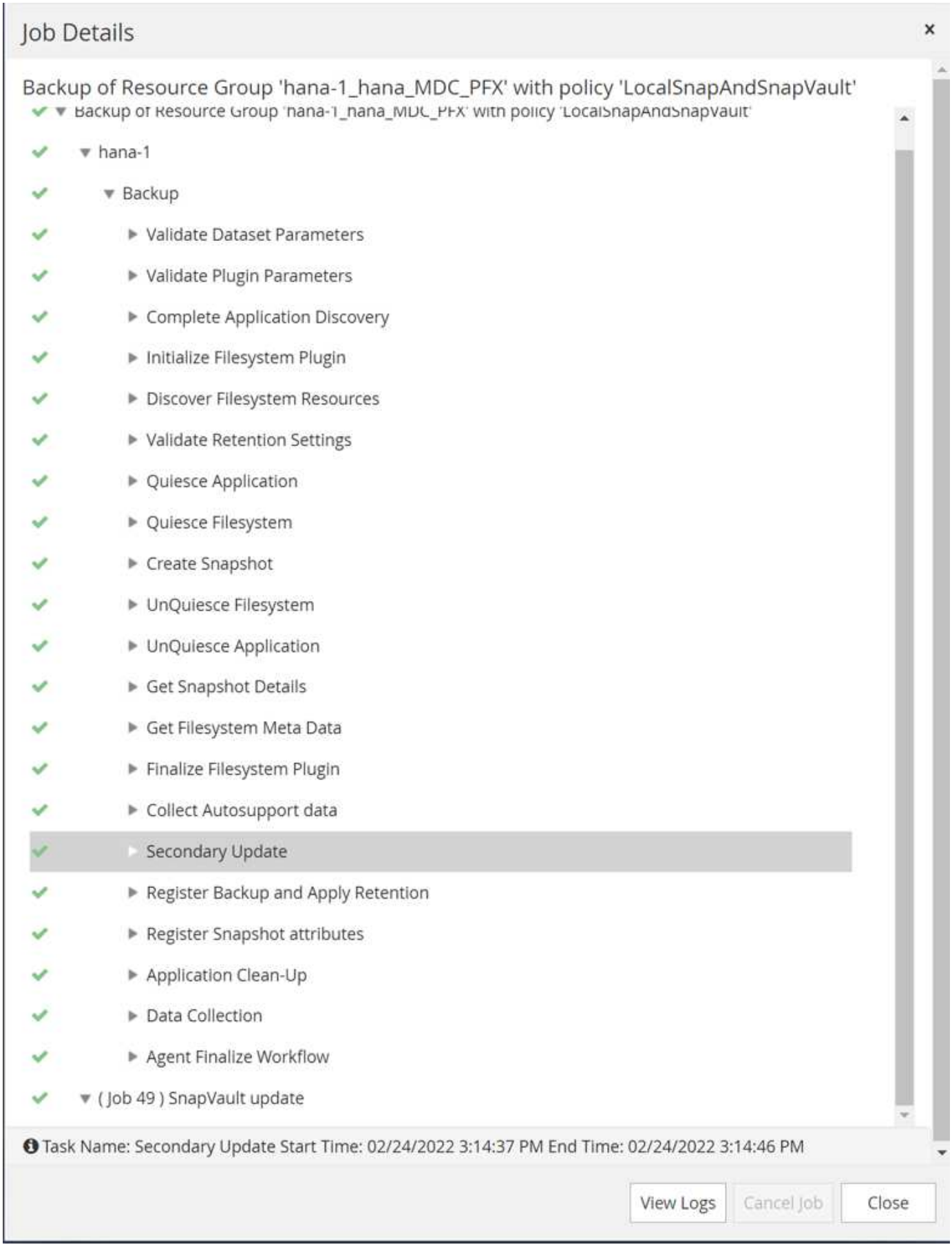
Create a backup with replication

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.



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.



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

`snapcenter`, as configured in the SnapCenter policy.

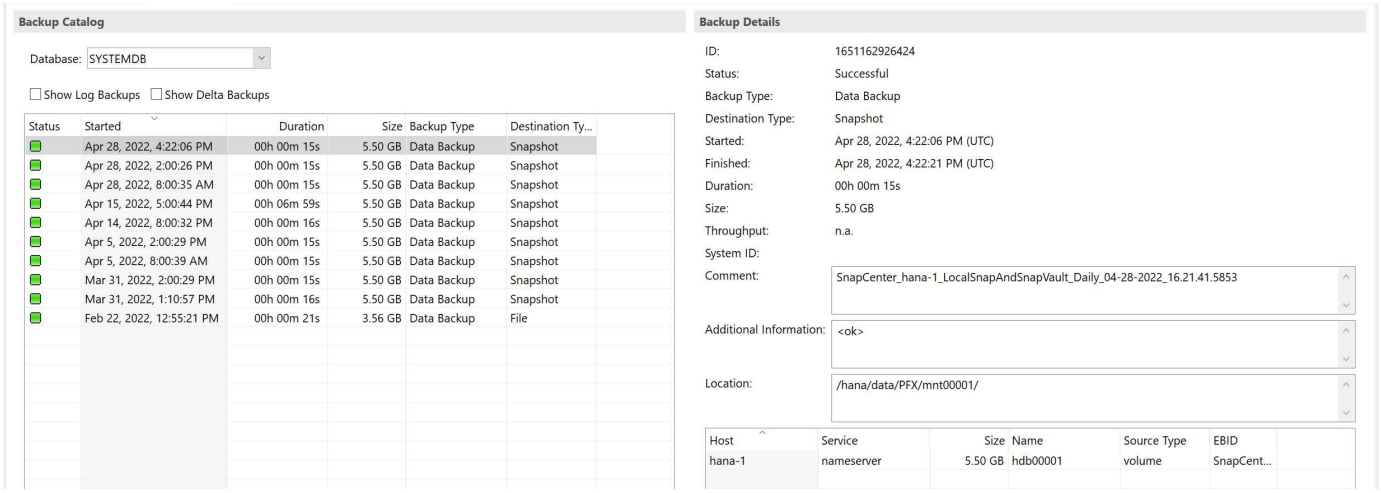
```
FsxId00fa9e3c784b6abbb::> snapshot show -vserver sapcc-hana-svm -volume
PFX_data_mnt00001 -fields snapmirror-label
vserver        volume            snapshot
snapmirror-label
-------------- -----------------
------------------------------------------------------------
----------------
sapcc-hana-svm 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.
```

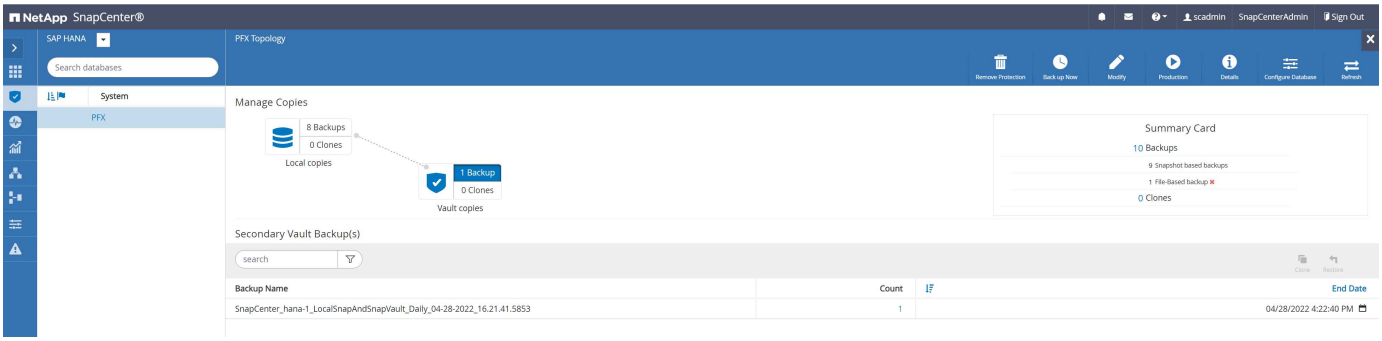
At the target volume, a Snapshot copy with the same name is created.

```
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.



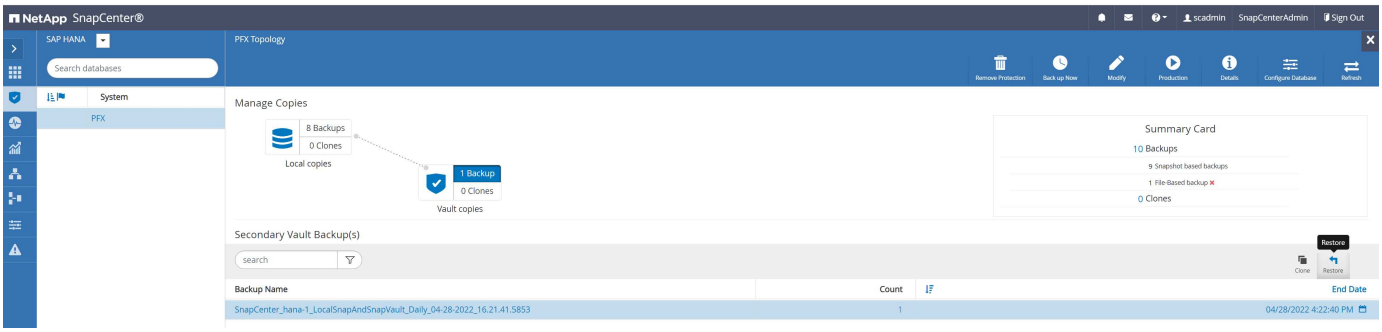
In SnapCenter, you can list the replicated backups by clicking Vault Copies in the topology view.



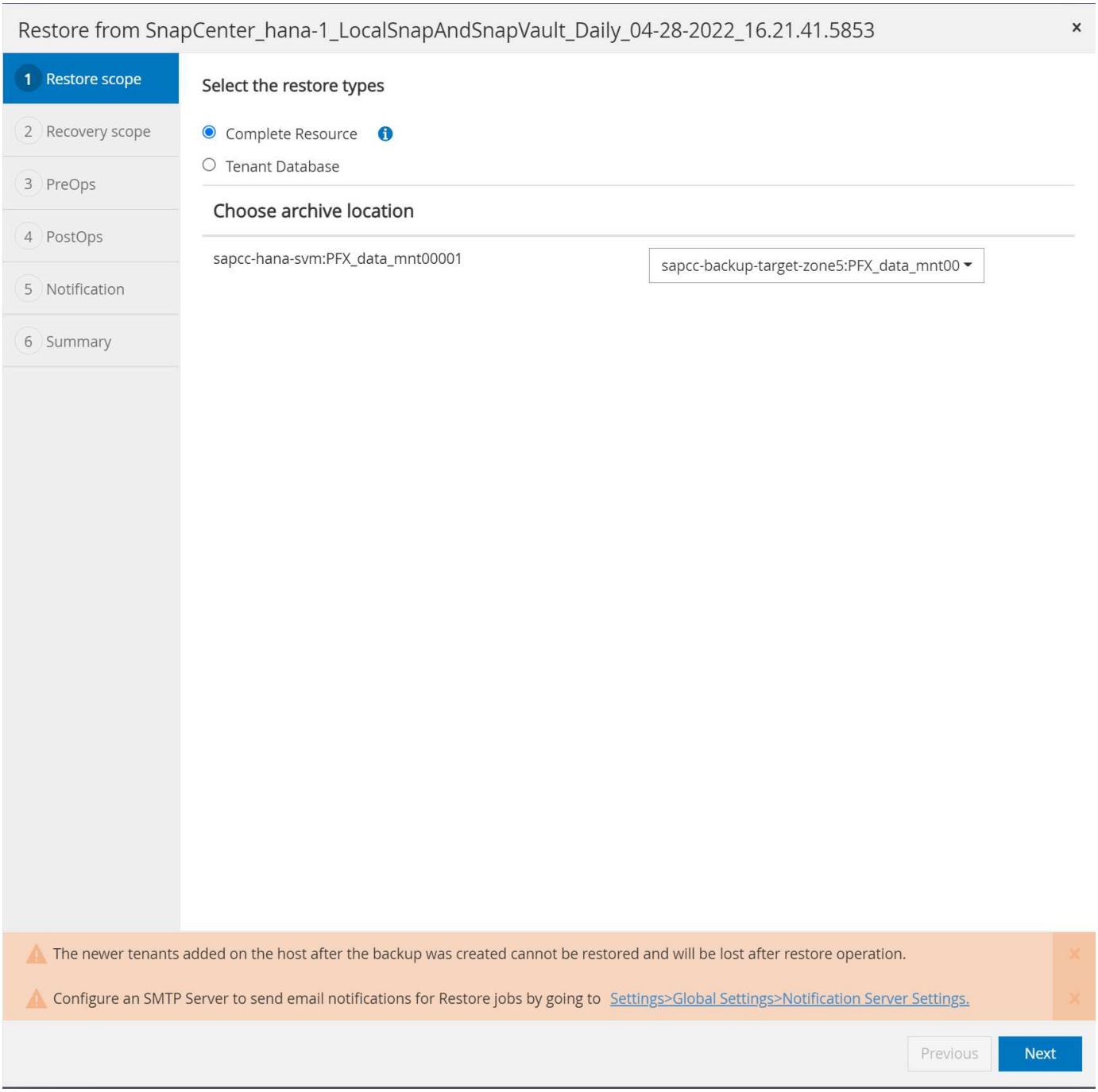
Restore and recover from secondary storage

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.



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

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