Restoring and recovering SAP HANA databases

Snap Creator Framework

NetApp
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Restoring and recovering SAP HANA databases

You use SAP HANA Studio and Snap Creator to restore and recover SAP HANA databases.

1. Within SAP HANA Studio:
    a. Select Recover for the SAP HANA system.
    b. SAP HANA system is shut down.
    c. Select the recovery type.
    d. Provide log backup locations.
    e. List of data backups is shown
    f. Select backup to see the external backup ID.
2. For a storage system running clustered Data ONTAP only:
    a. Only required if any other backup than the latest has been used for the restore.
    b. Only required for “Volume SnapRestore” from primary storage.
    c. Deactivate SnapVault relationships
3. Within Snap Creator:
    a. Select “Restore” for the SAP HANA system.
    b. Select restore from primary or secondary storage, depending on the availability of the backup at the primary storage.
    c. Select storage controller, volume name, and Snapshot copy name. Snapshot copy name correlates with the backup ID earlier.
    d. For multinode SAP HANA systems, multiple volumes need to be restored:
        i. Choose **Add more restore items**.
        ii. Select storage controller, volume name, and Snapshot copy name.
        iii. Repeat this process for all required volumes.
    e. For multitenant database containers (MDC) single tenant database systems, both the SYSTEM and TENANT databases are restored.
    f. Restore process is started
    g. Restore finished for all volumes.
4. At the database nodes, unmount and mount all data volumes to clean "Stale NFS Handles."
5. Within SAP HANA Studio:
    a. Select **Refresh** on backup list.
    b. Select available backup for recovery (green item).
    c. Start recovery process.
    d. For multitenant database containers (MDC) single tenant database systems, start the recovery process first for the SYSTEM database, and then for the TENANT database.
    e. The SAP HANA system is started.
6. (Optional) Resume SnapVault relationships for all restored volumes.

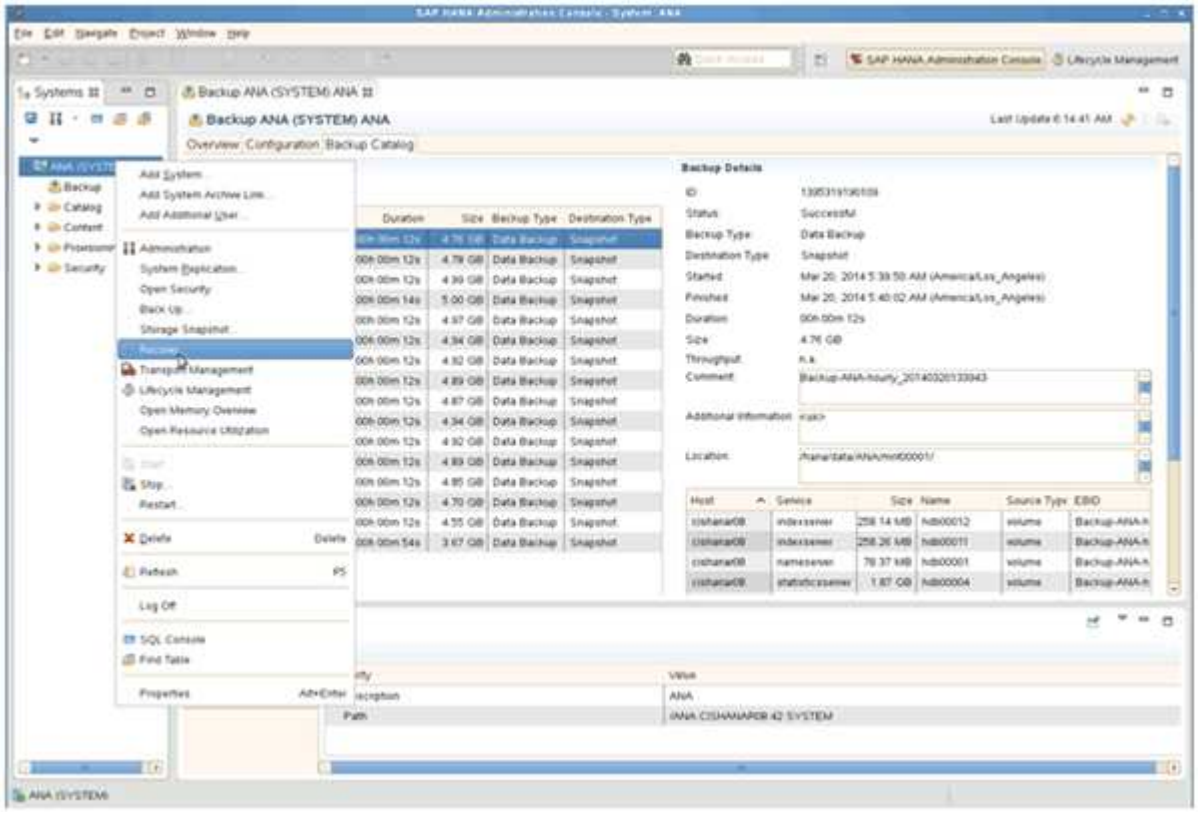
At the storage systems, this step is only required if a backup other than the latest one has been used for the restore.

Restoring and recovering databases from primary storage

You can restore and recover the database from the primary storage.

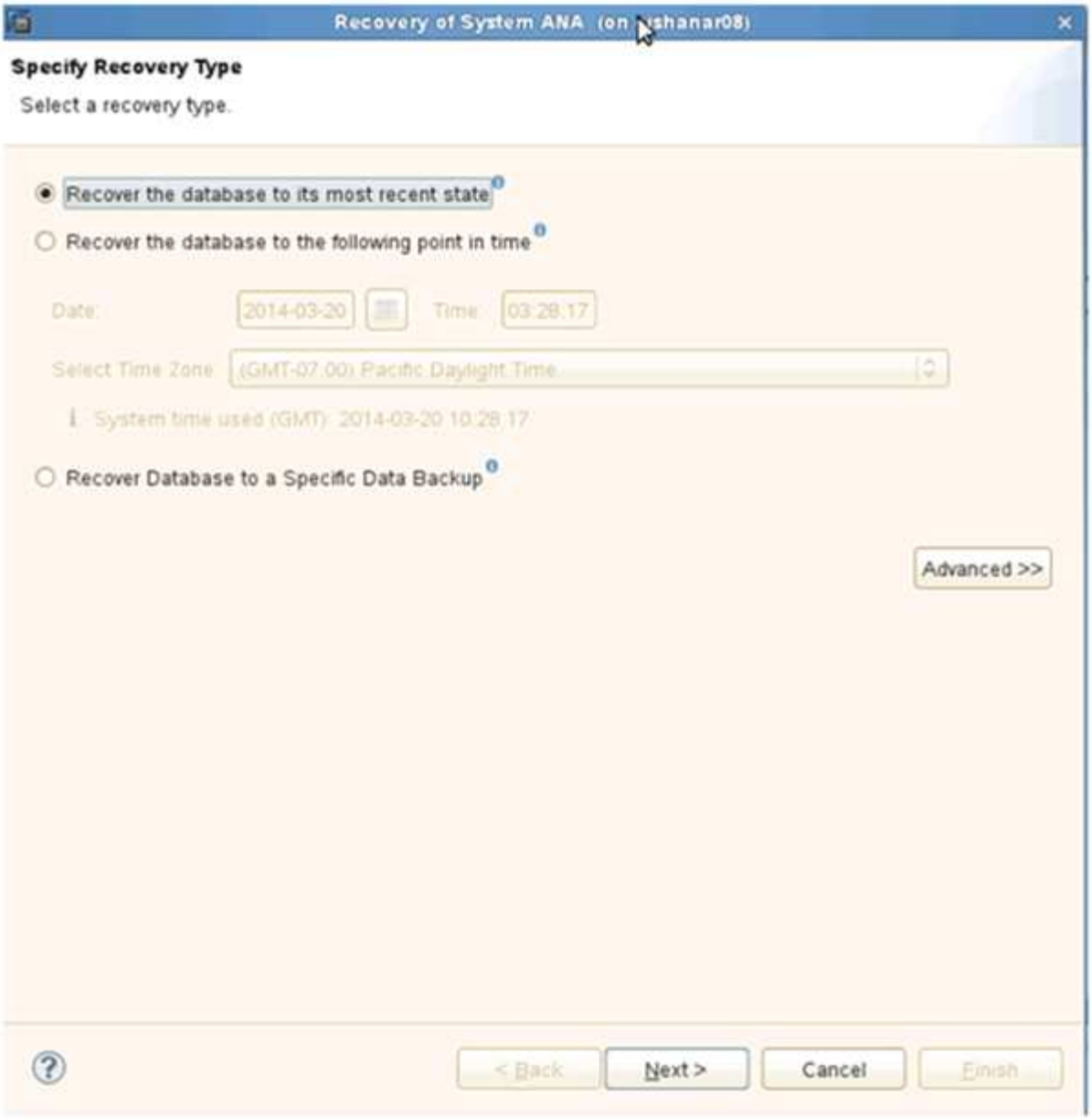
You cannot restore file-based backup copies from Snap Creator.

1. Within SAP HANA Studio, select **Recover** for the SAP HANA system.

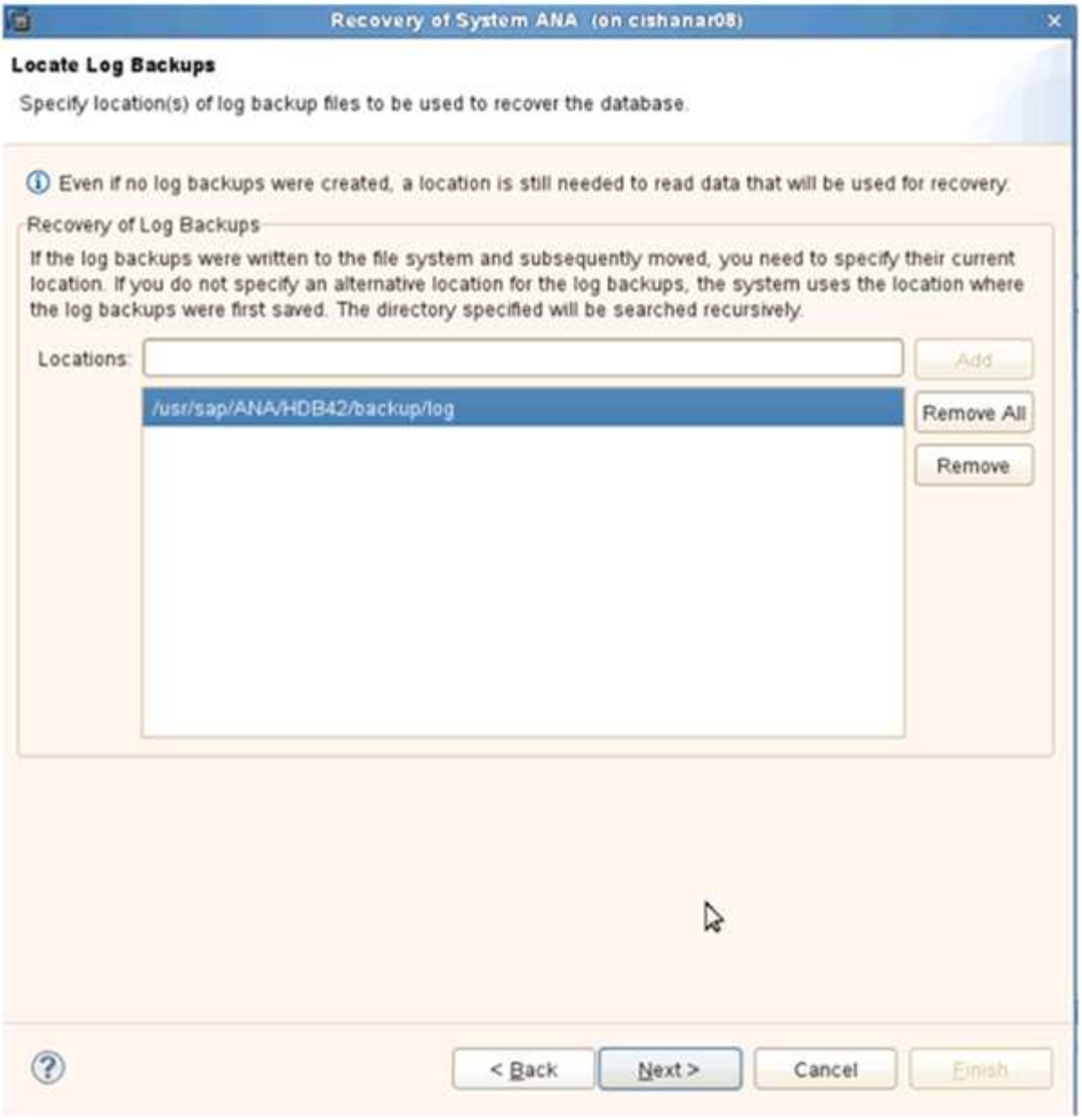


The SAP HANA system shuts down.

2. Select the recovery type and click **Next**.

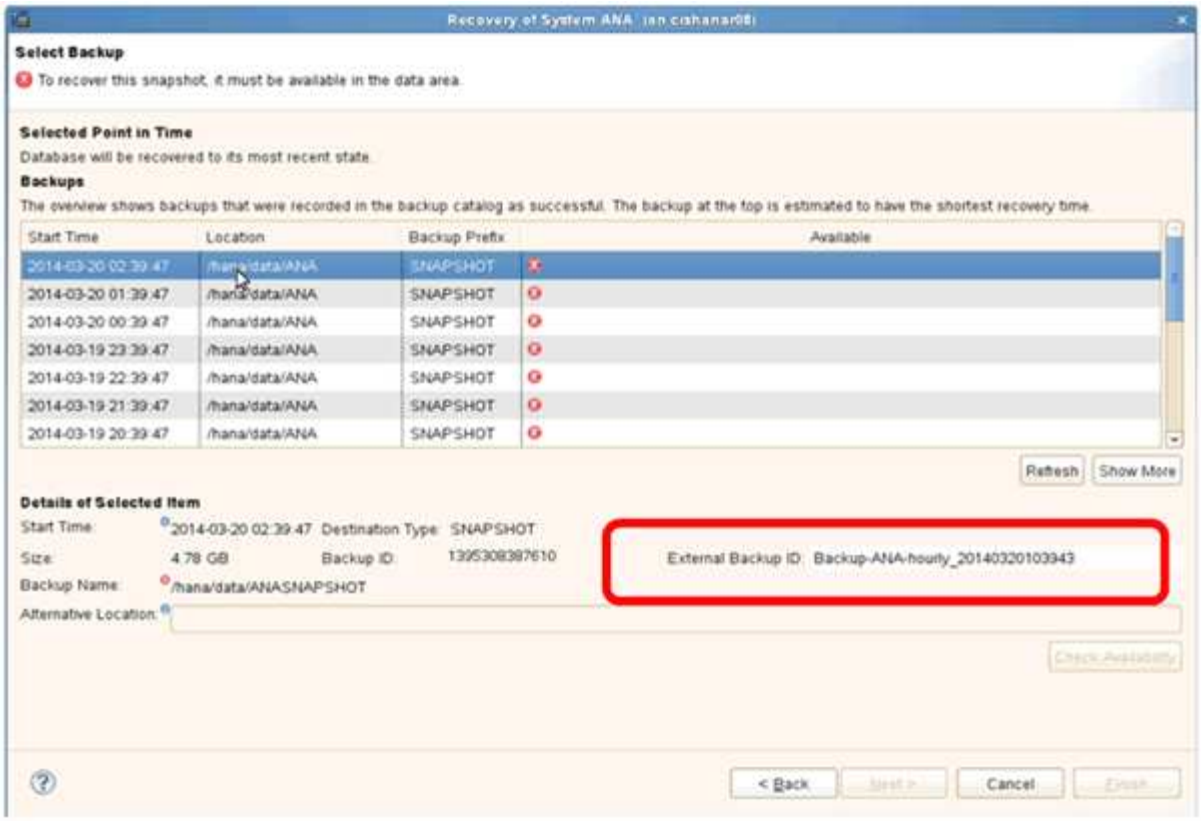


3. Provide the log backup locations and click **Next**.



The list of available backups you see is based on the content of the backup catalog.

4. Select the required backup and record the external backup ID.



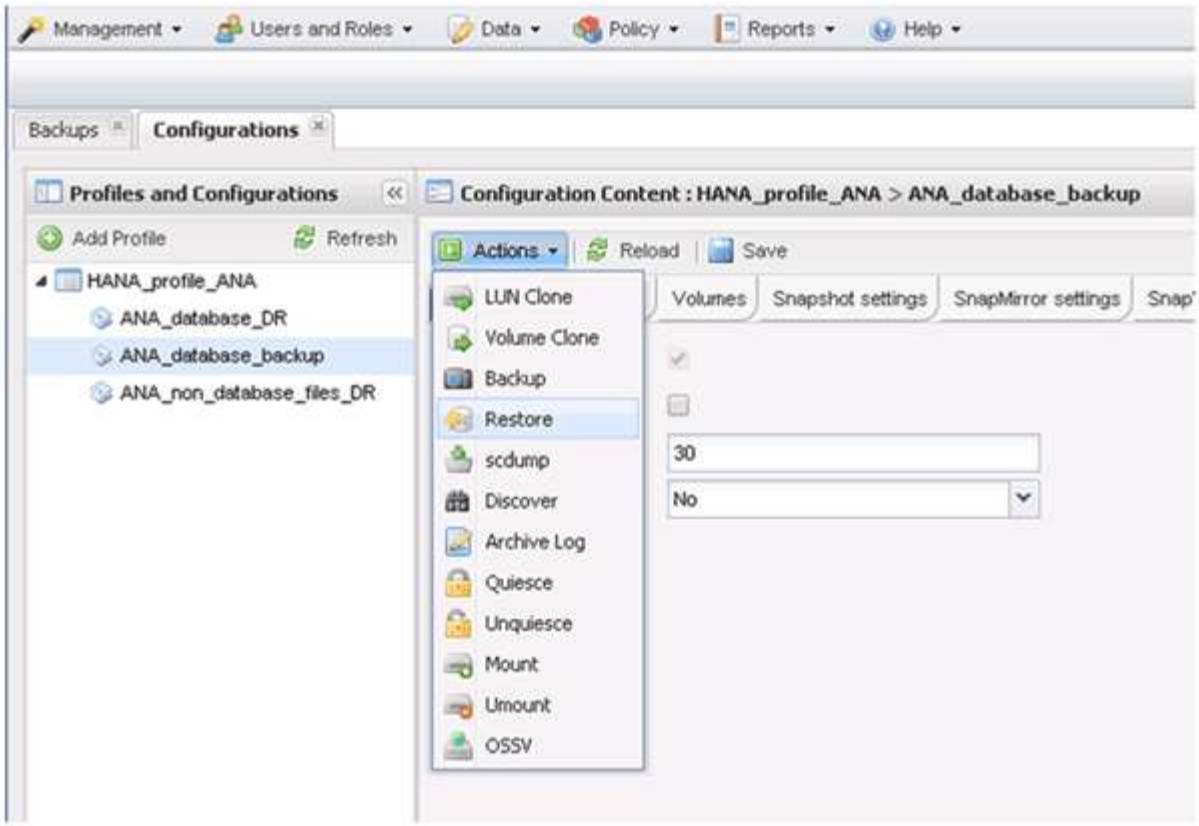
5. Deactivate the SnapVault relationship.

   This step is only required with clustered Data ONTAP.

   If you need to restore a Snapshot copy that is older than the Snapshot copy currently used as the base Snapshot copy for SnapVault, you must first deactivate the SnapVault relationship in clustered Data ONTAP. To do that, execute the following commands on the backup cluster console:

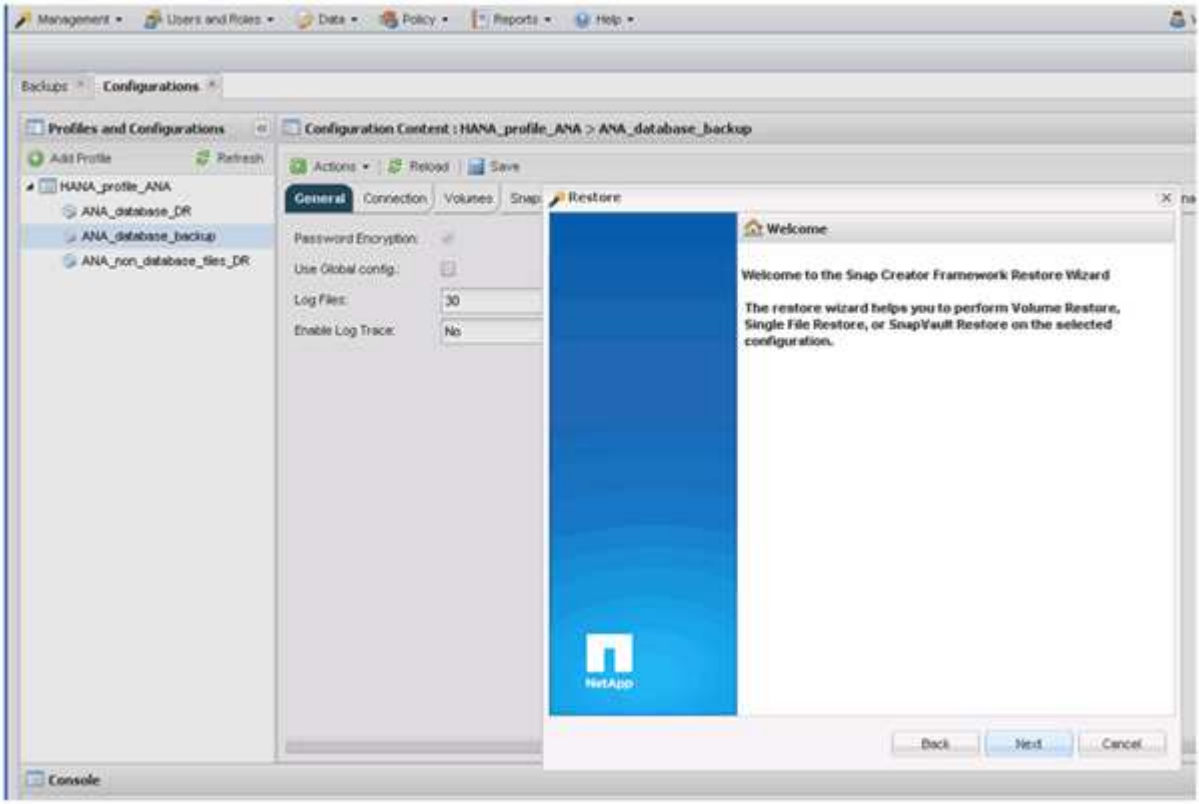
```
hana::> snapmirror quiesce -destination-path hana2b:backup_hana_data
Operation succeeded: snapmirror quiesce for destination
hana2b:backup_hana_data.

hana::> snapmirror delete -destination-path hana2b:backup_hana_data
Operation succeeded: snapmirror delete the relationship with destination
hana2b:backup_hana_data.

hana::> snapmirror release -destination-path hana2b:backup_hana_data
[Job 6551] Job succeeded: SnapMirror Release Succeeded
```

6. In the Snap Creator GUI, select the SAP HANA system, then select **Actions** > **Restore**.

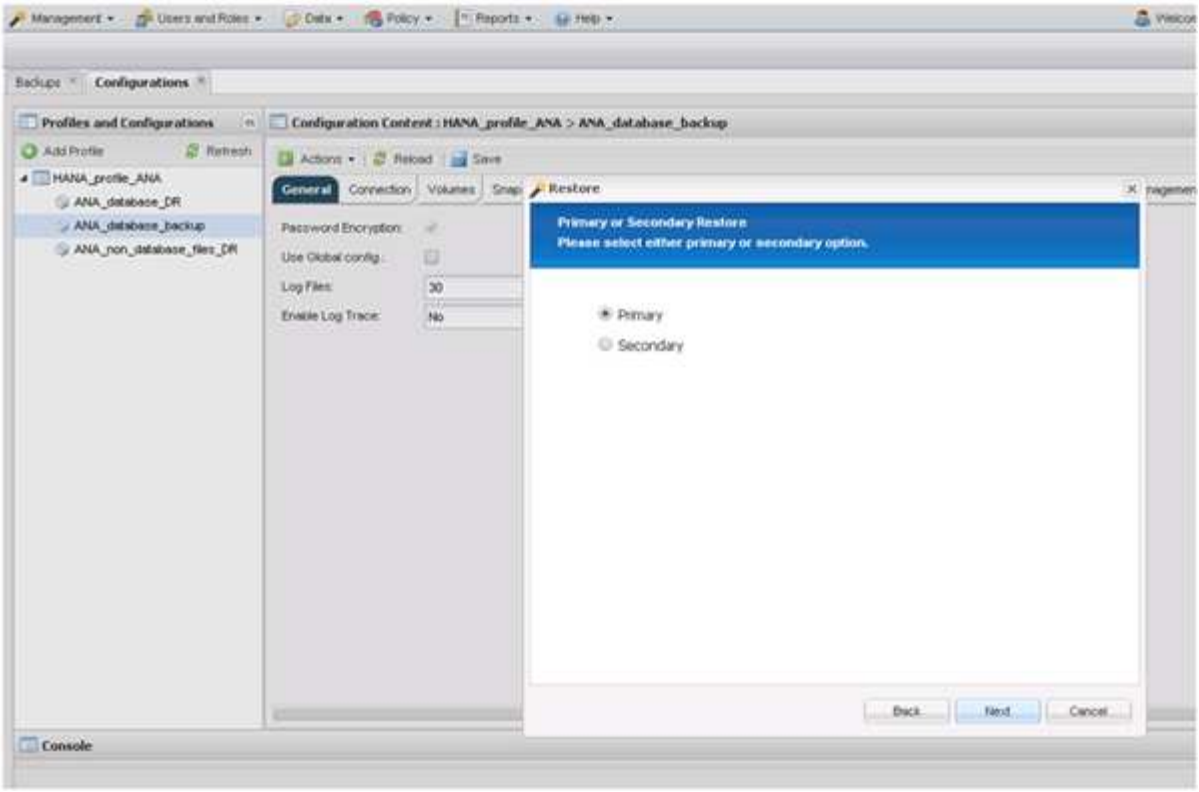


The Welcome to the Snap Creator Framework Restore Wizard screen appears.

7. Click **Next**.

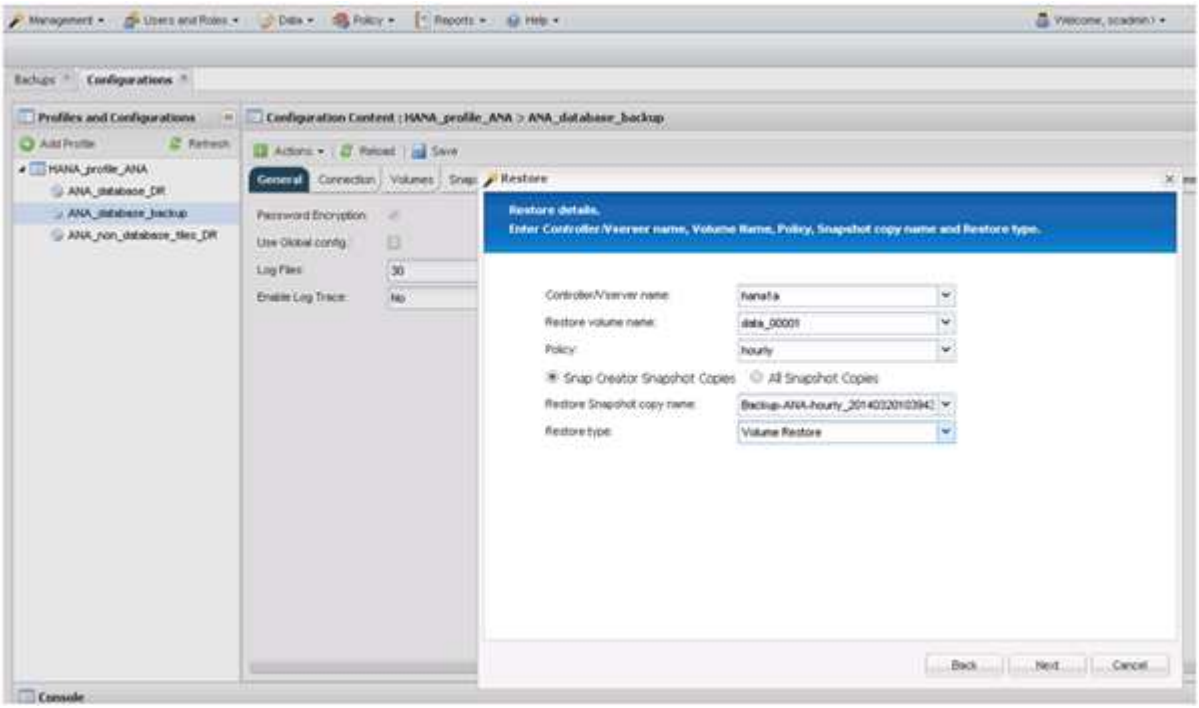


8. Select **Primary** and click **Next**.

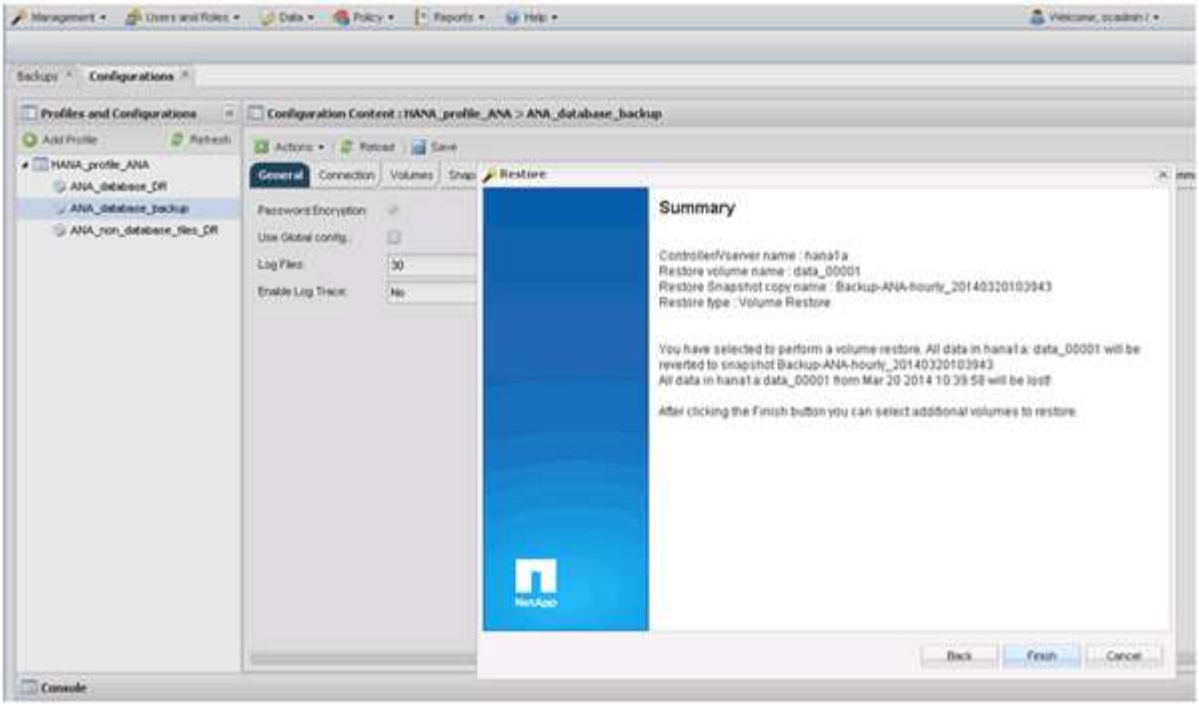


9. Select restore from primary storage.
10. Select the storage controller, the volume name, and the Snapshot name.

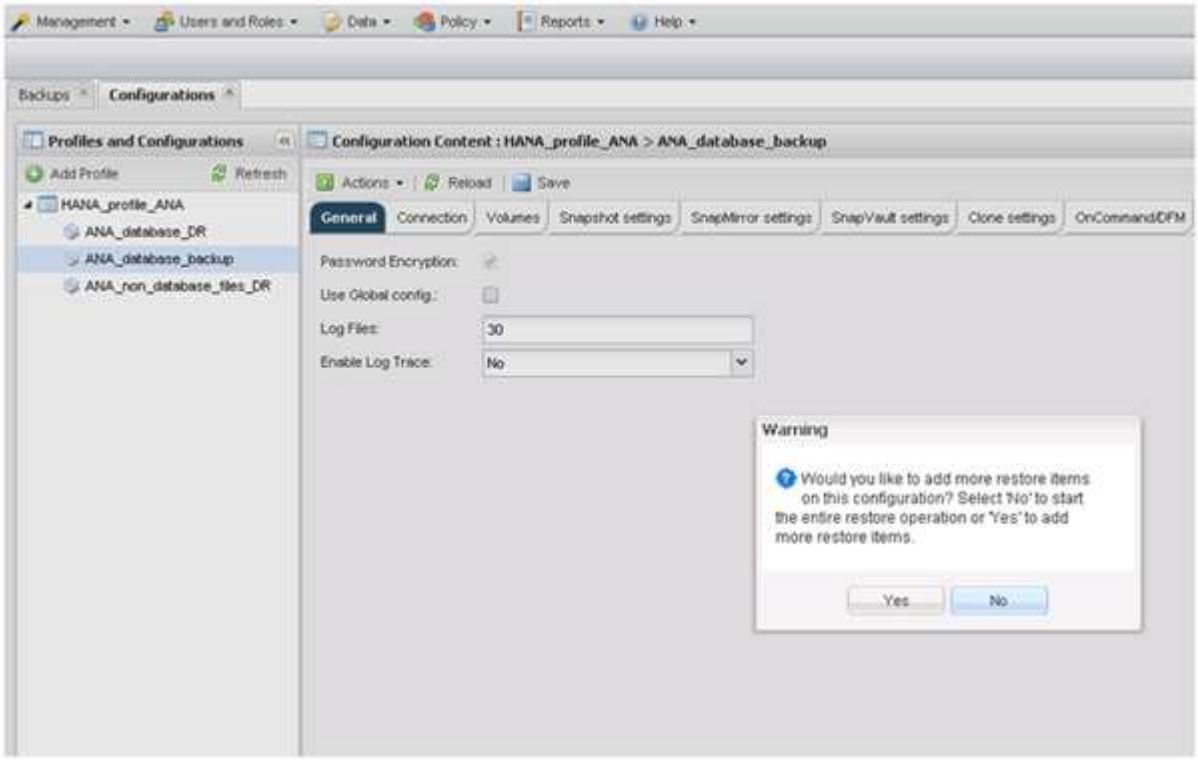
    The Snapshot name correlates with the backup ID that has been selected within SAP HANA Studio.



11. Click **Finish**.

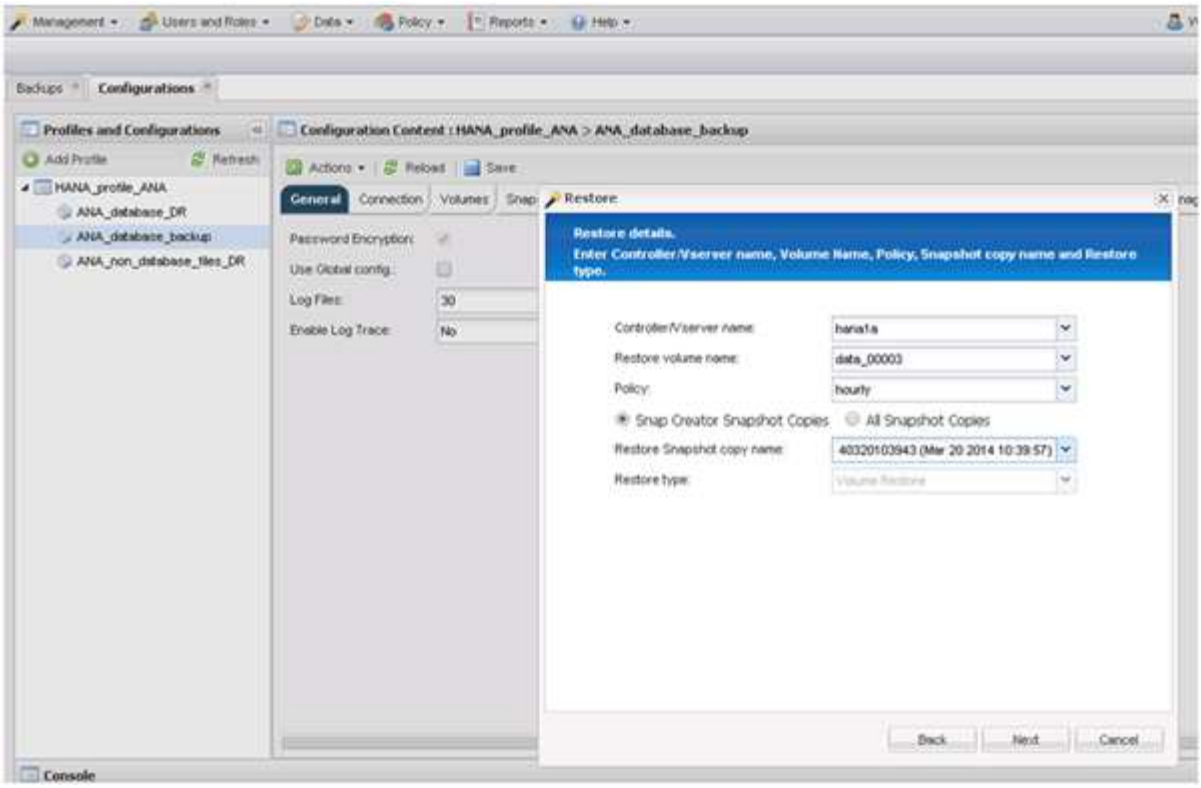


12. Click **Yes** to add more restore items.

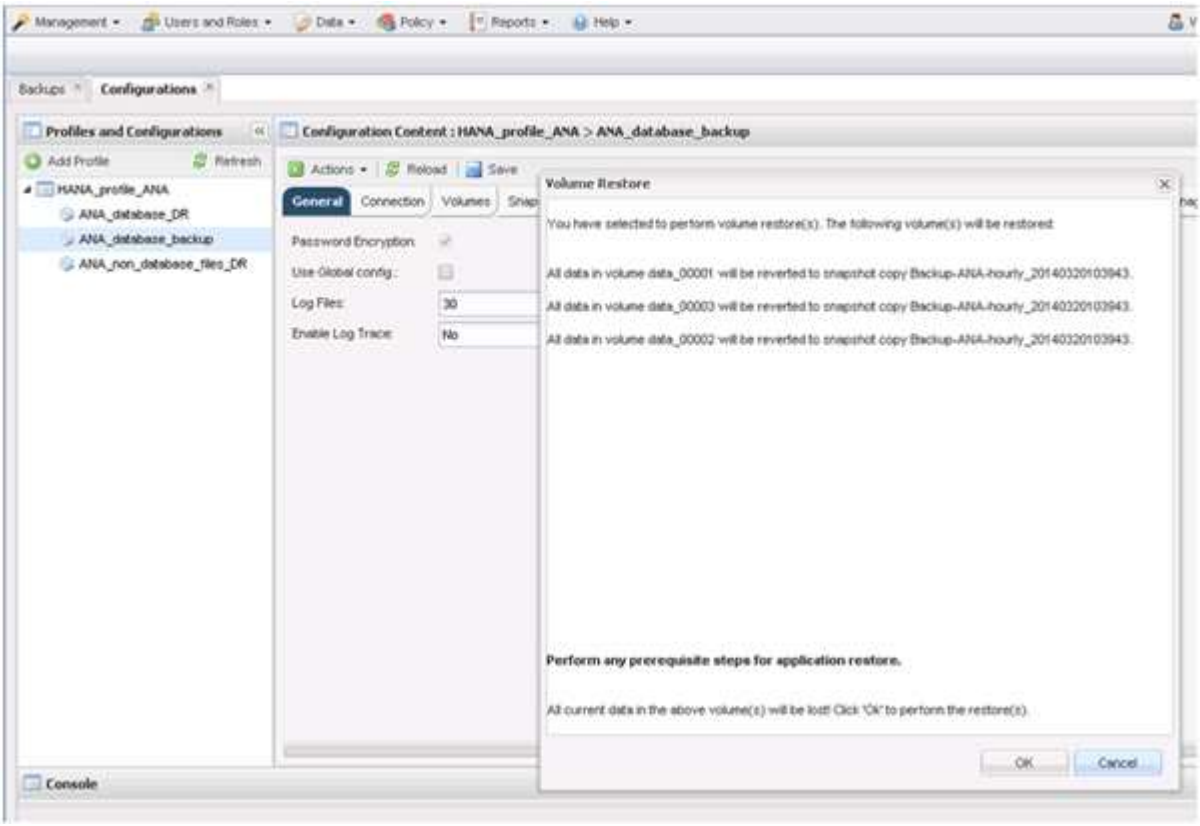


13. Select the storage controller, the additional volume name, and the Snapshot name.

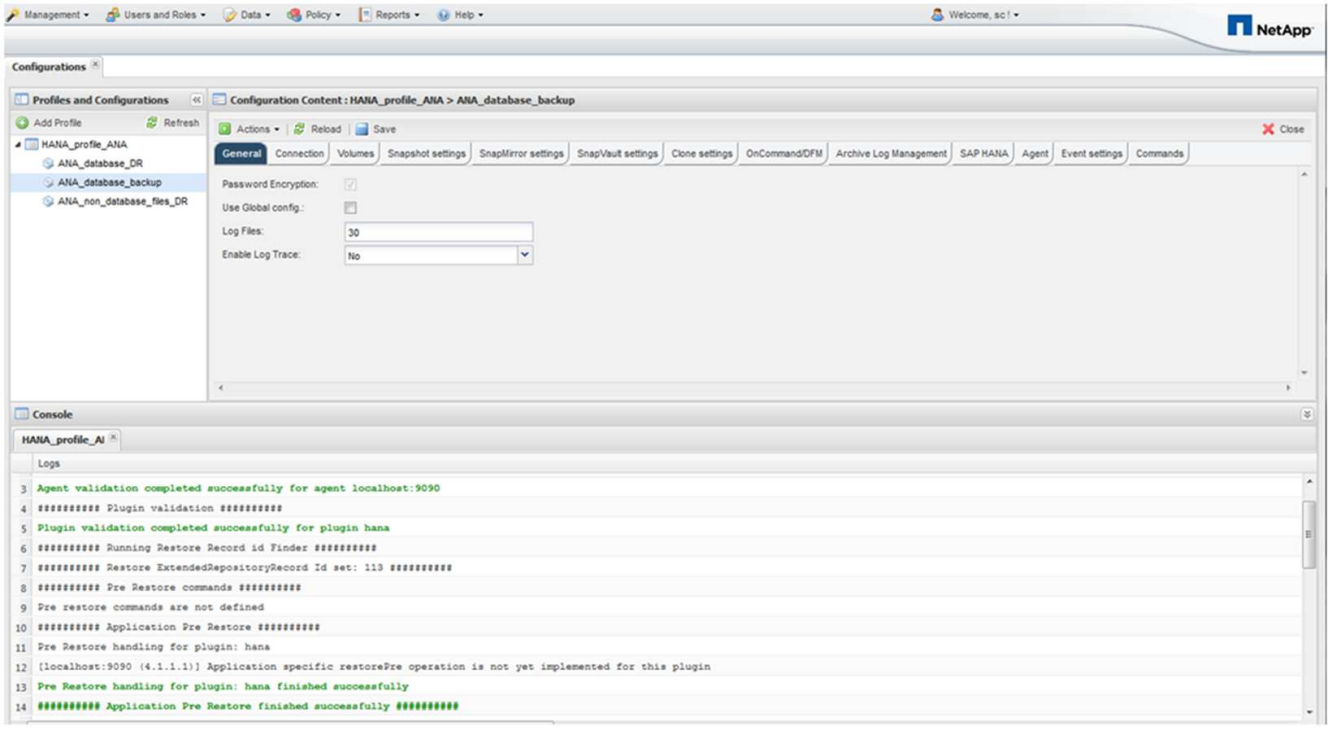
    The Snapshot name correlates with the backup ID that has been selected within SAP HANA Studio.



14. Repeat steps 10 through 13 until all required volumes are added; in our example, data_00001, data_00002, and data_00003 need to be selected for the restore process.
15. When all volumes are selected, click **OK** to start the restore process.



The restore process is started.



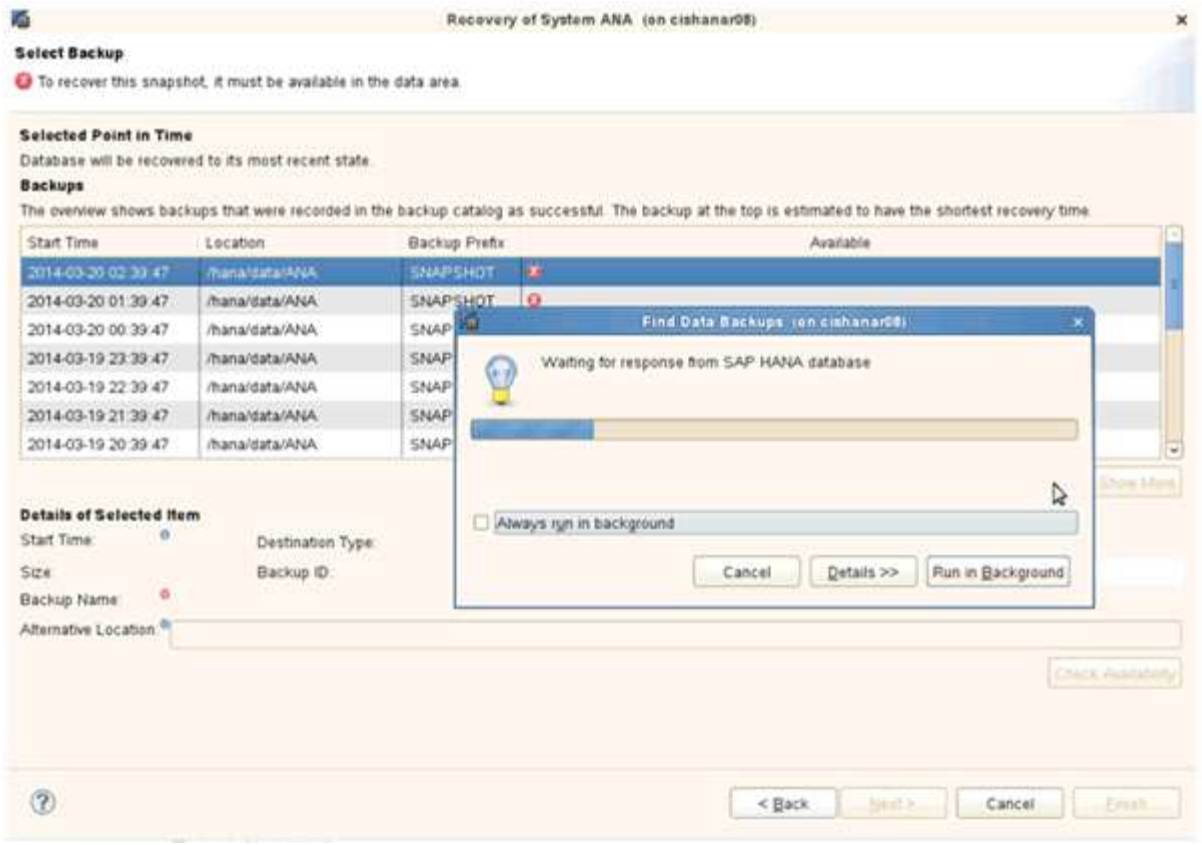
Wait until the restore process is finished.

16. On each database node, remount all data volumes to clean Stale NFS Handles.

    In the example, all three volumes need to be remounted at each database node.

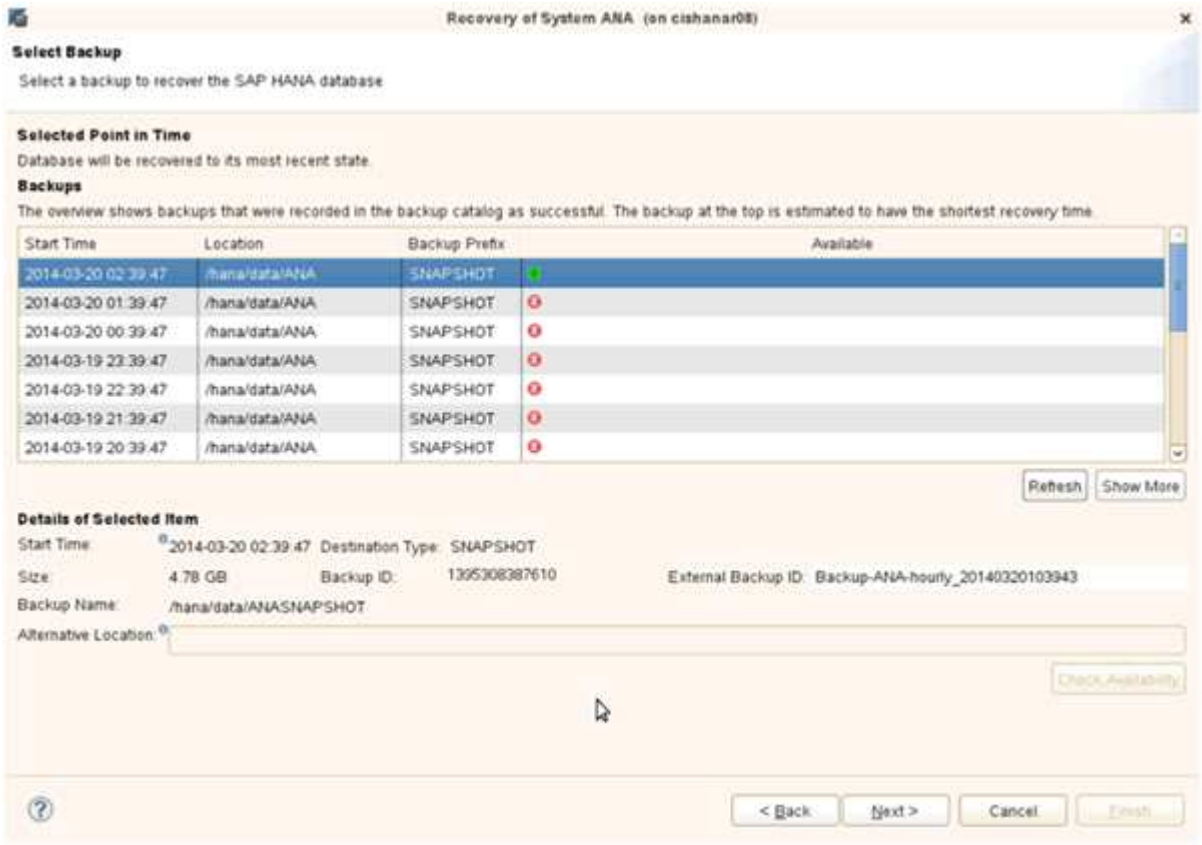
```
mount -o remount /hana/data/ANA/mnt00001
mount -o remount /hana/data/ANA/mnt00002
mount -o remount /hana/data/ANA/mnt00003
```

17. Go to SAP HANA Studio and click **Refresh** to update the list of available backups.

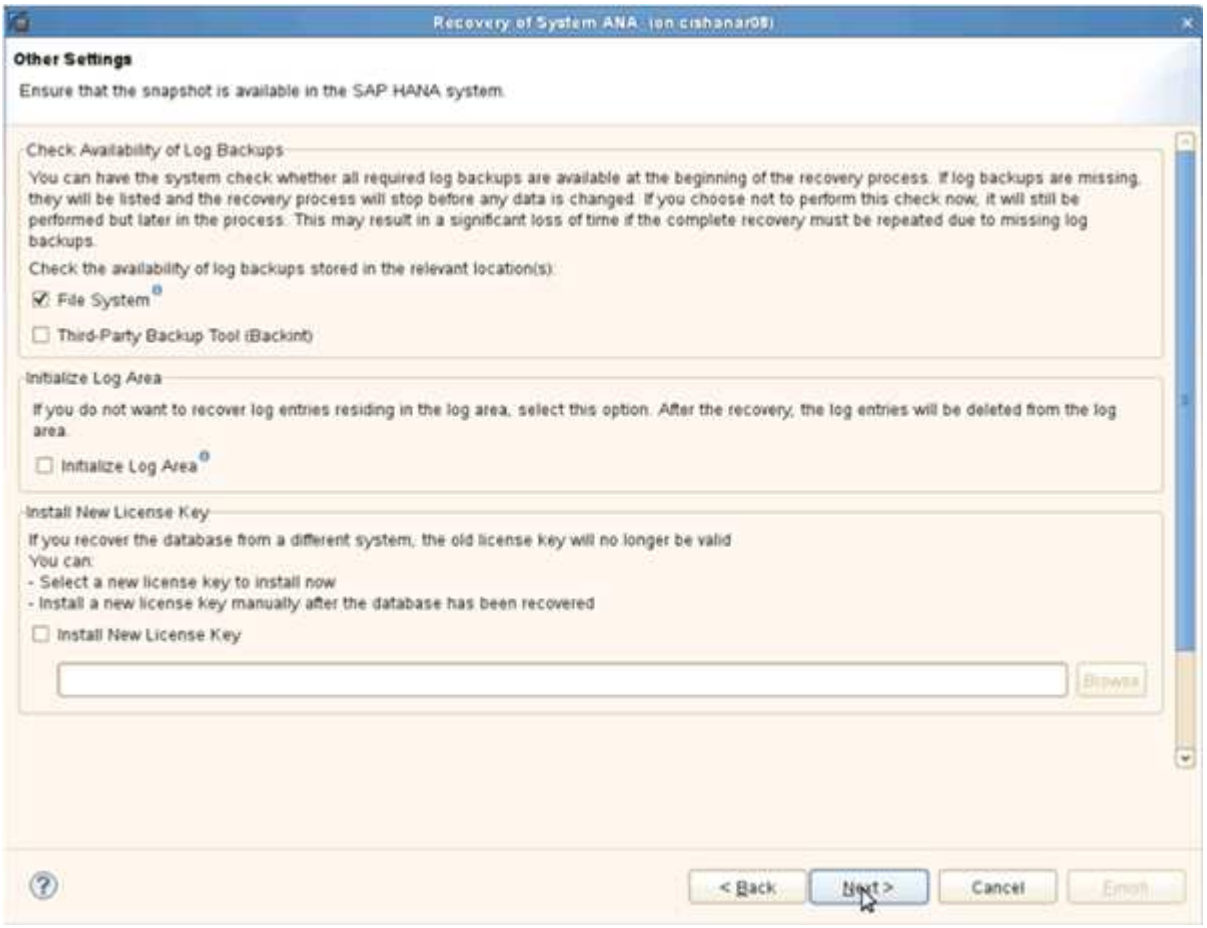


The backup that has been restored with Snap Creator is shown with a green icon in the list of backups.

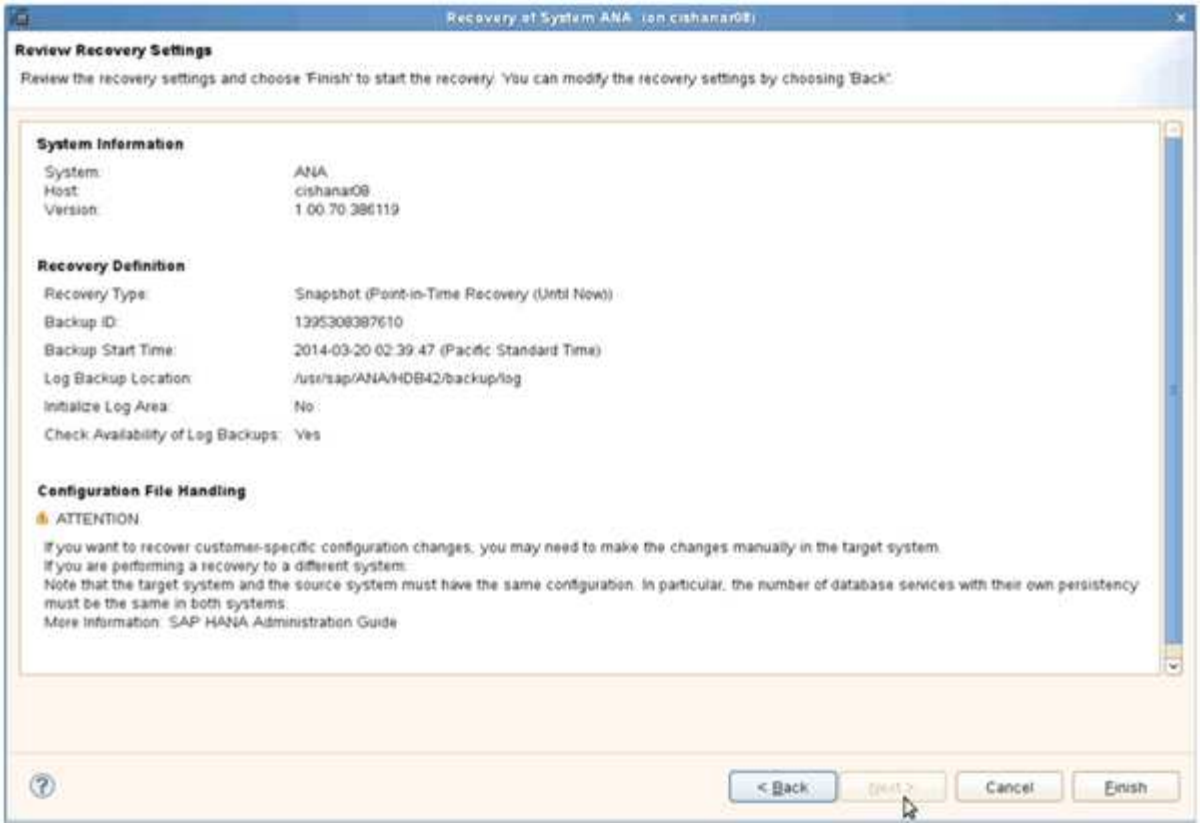
18. Select the backup and click **Next**.



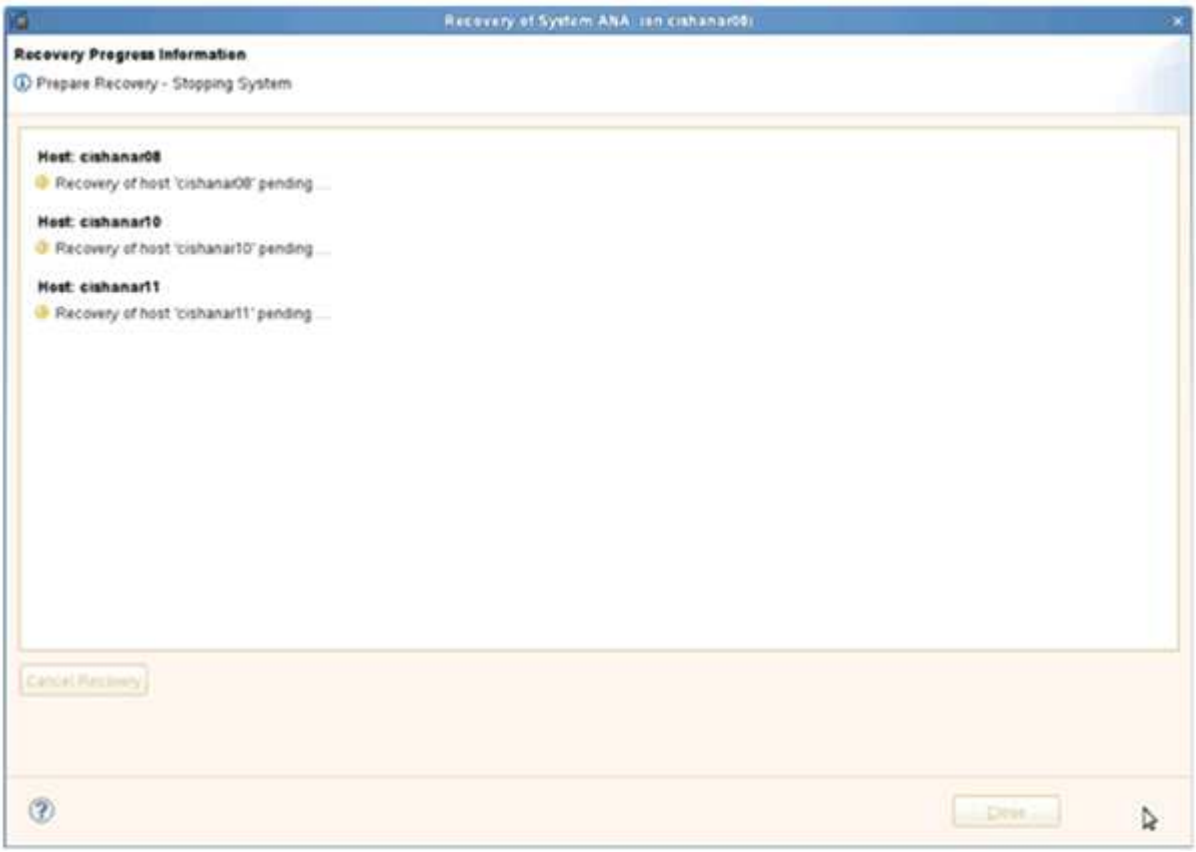
19. Select other settings as required and click **Next**.



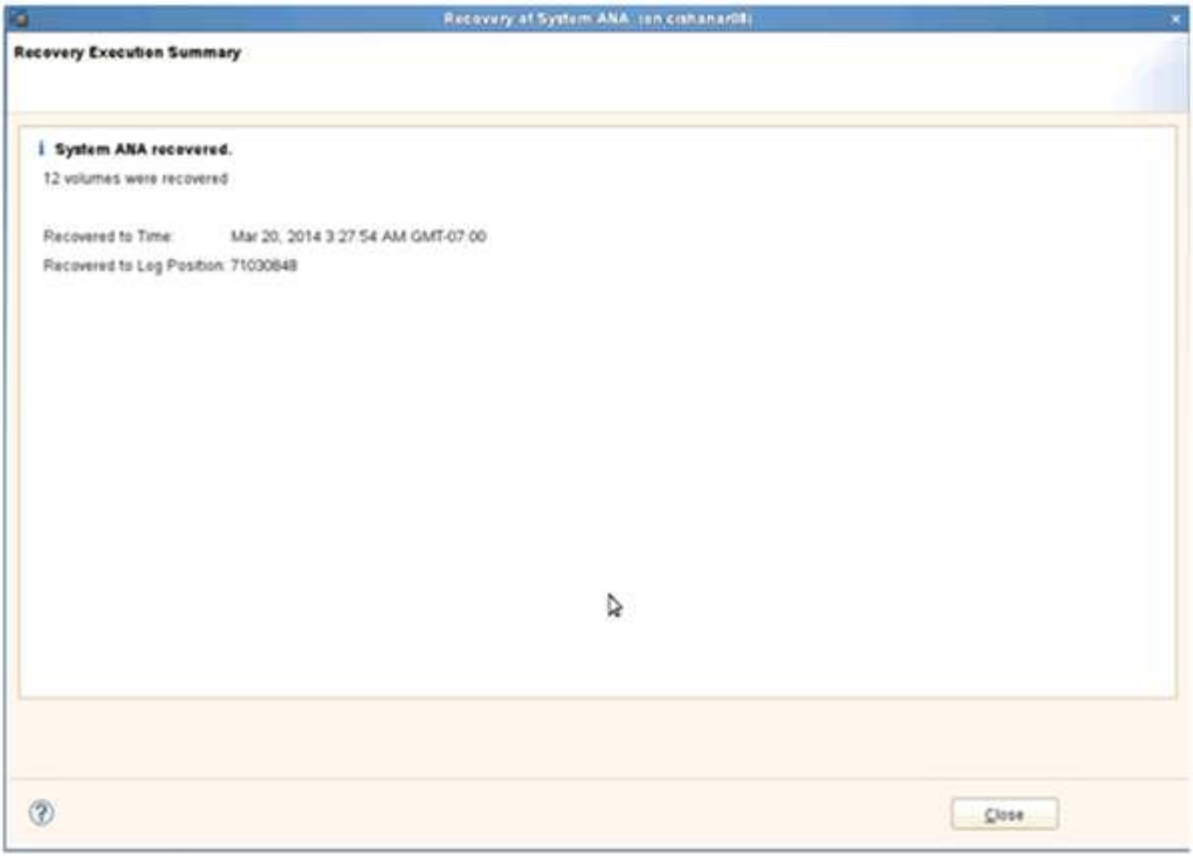
20. Click **Finish**.



The recovery process begins.



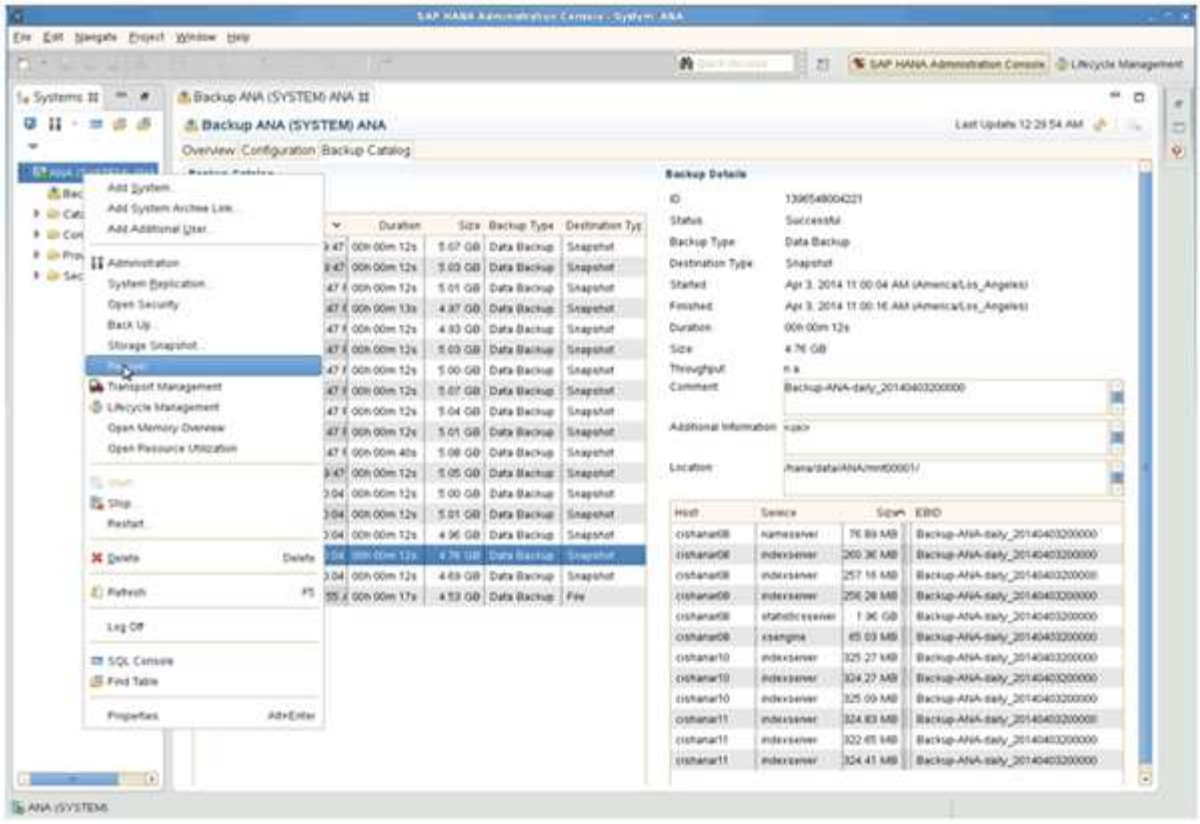
21. After recovery is finished, resume the SnapVault relationships, if required.



Restoring and recovering databases from secondary storage

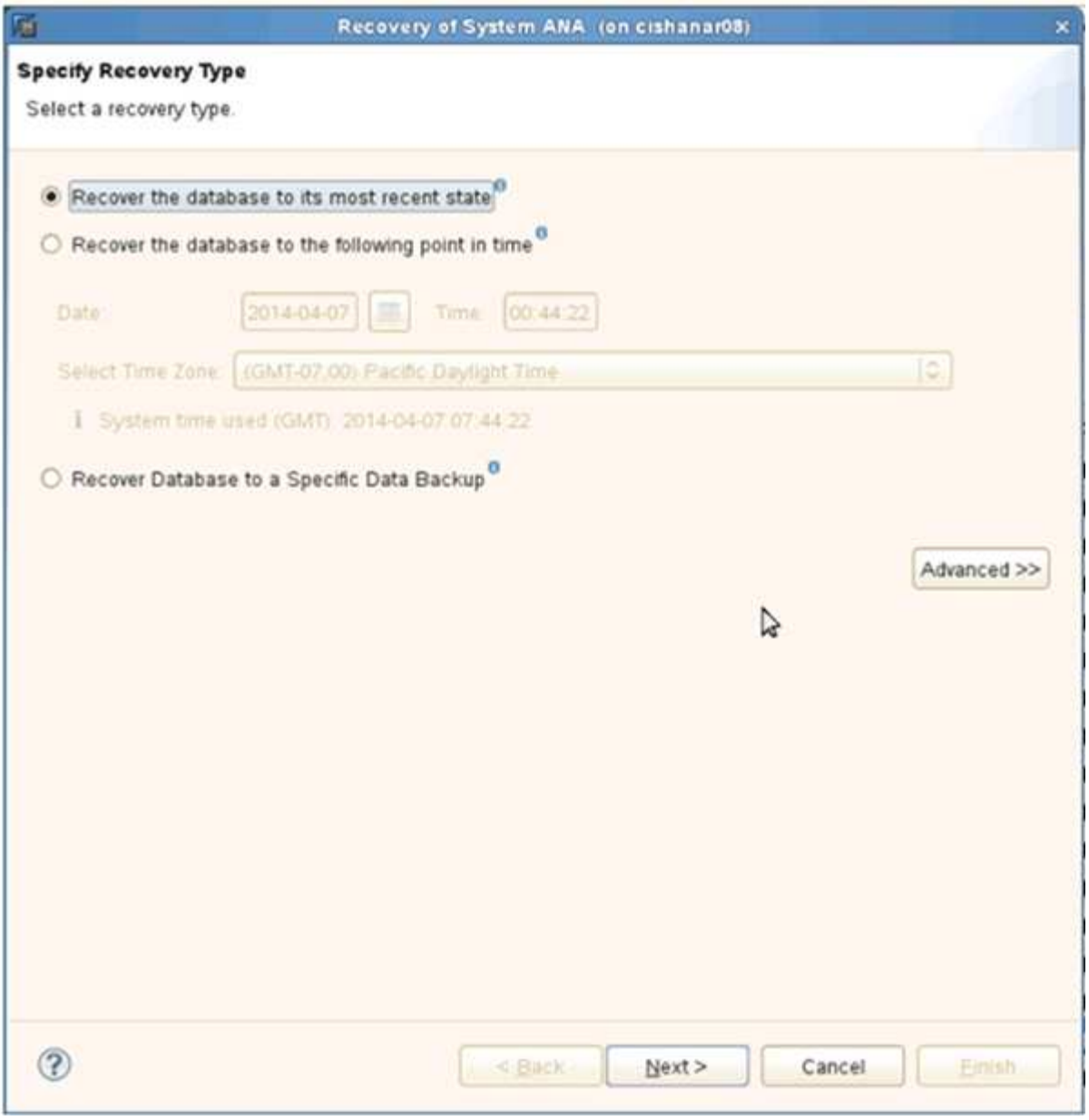
You can restore and recover the database from the secondary storage.

1. Within SAP HANA Studio, select **Recover** for the SAP HANA system.

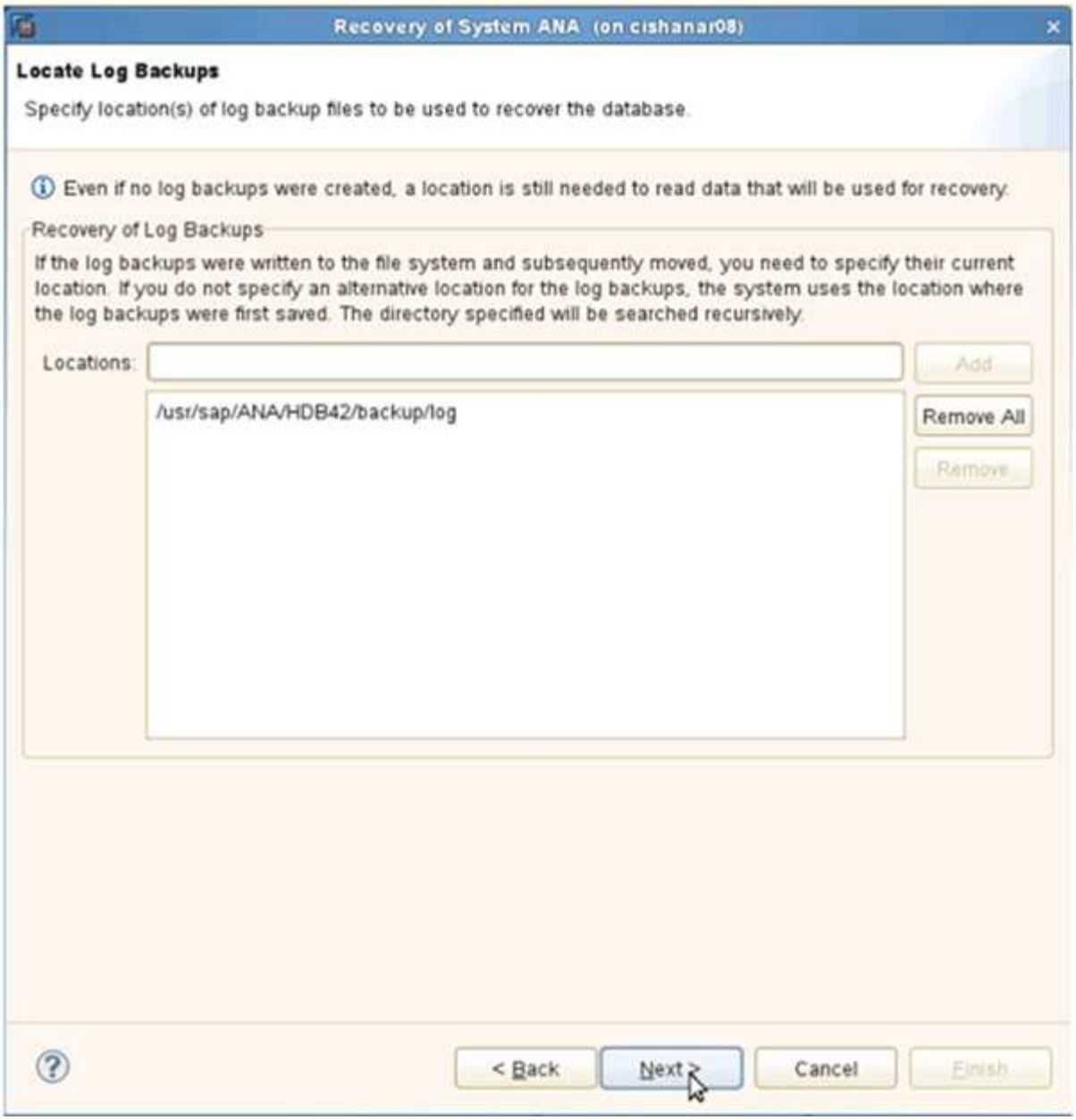


The SAP HANA system will be shut down.

2. Select the recovery type and click **Next**.

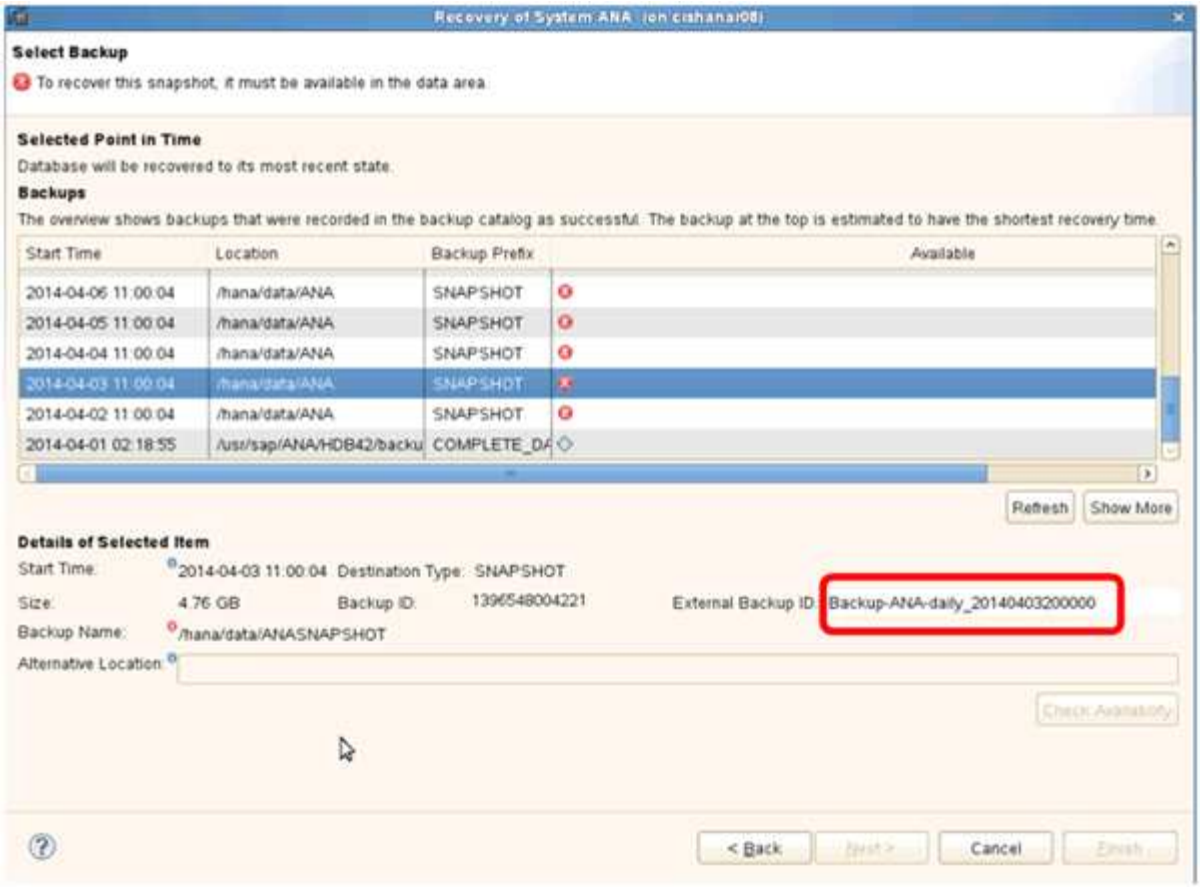


3. Provide log backup locations and click **Next**.

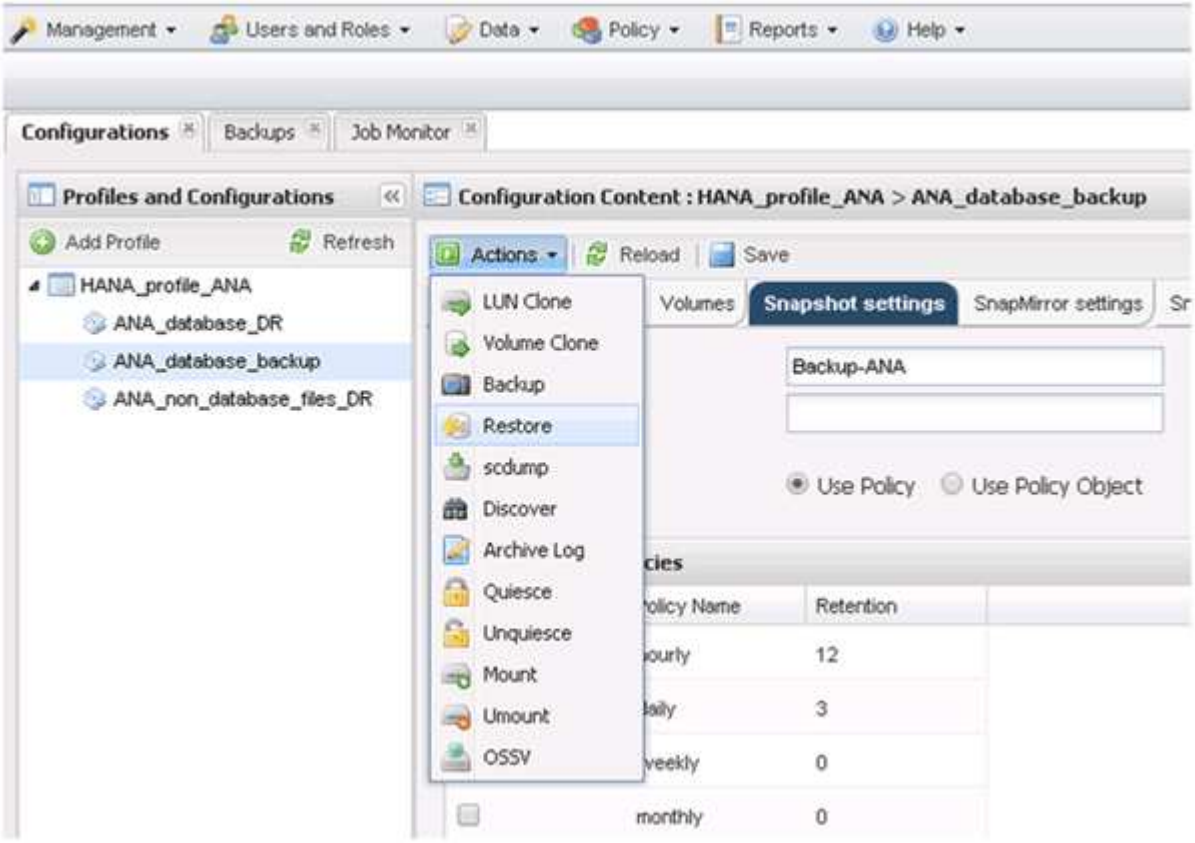


The list of available backups appear based on the content of the backup catalog.

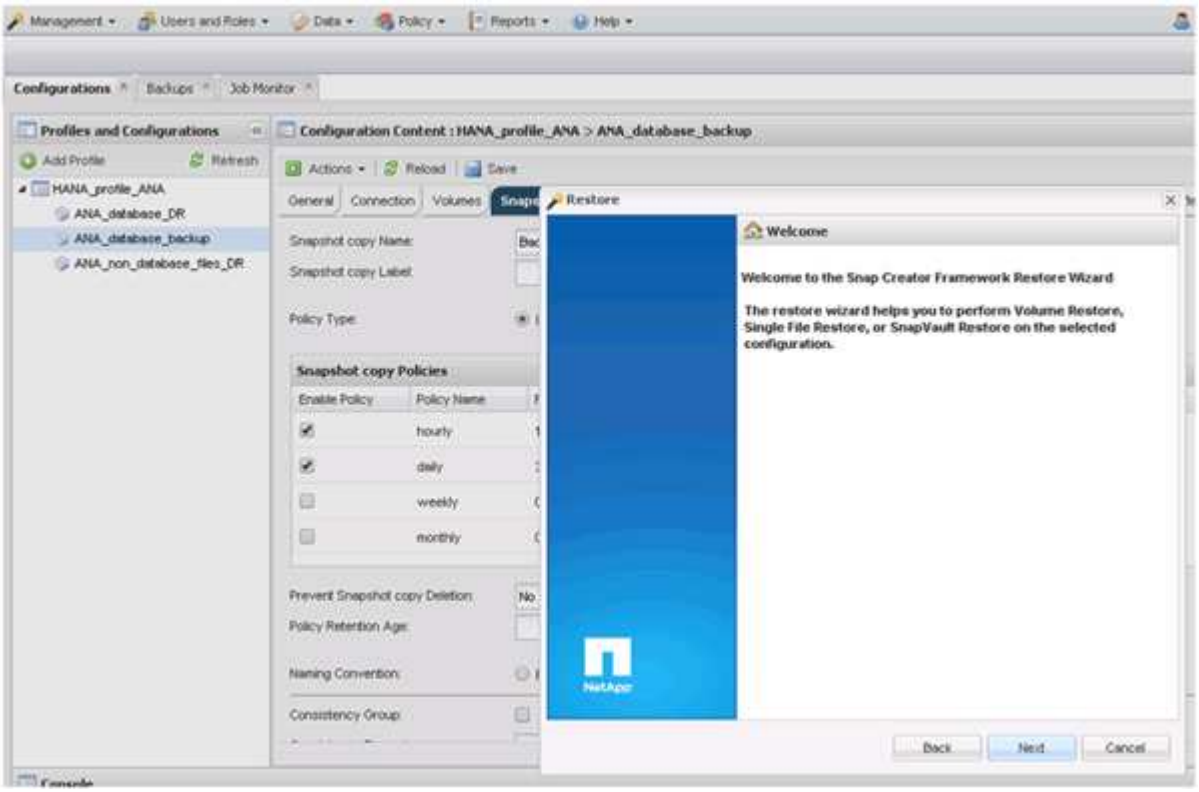
4. Select the required backup and write down external backup ID.



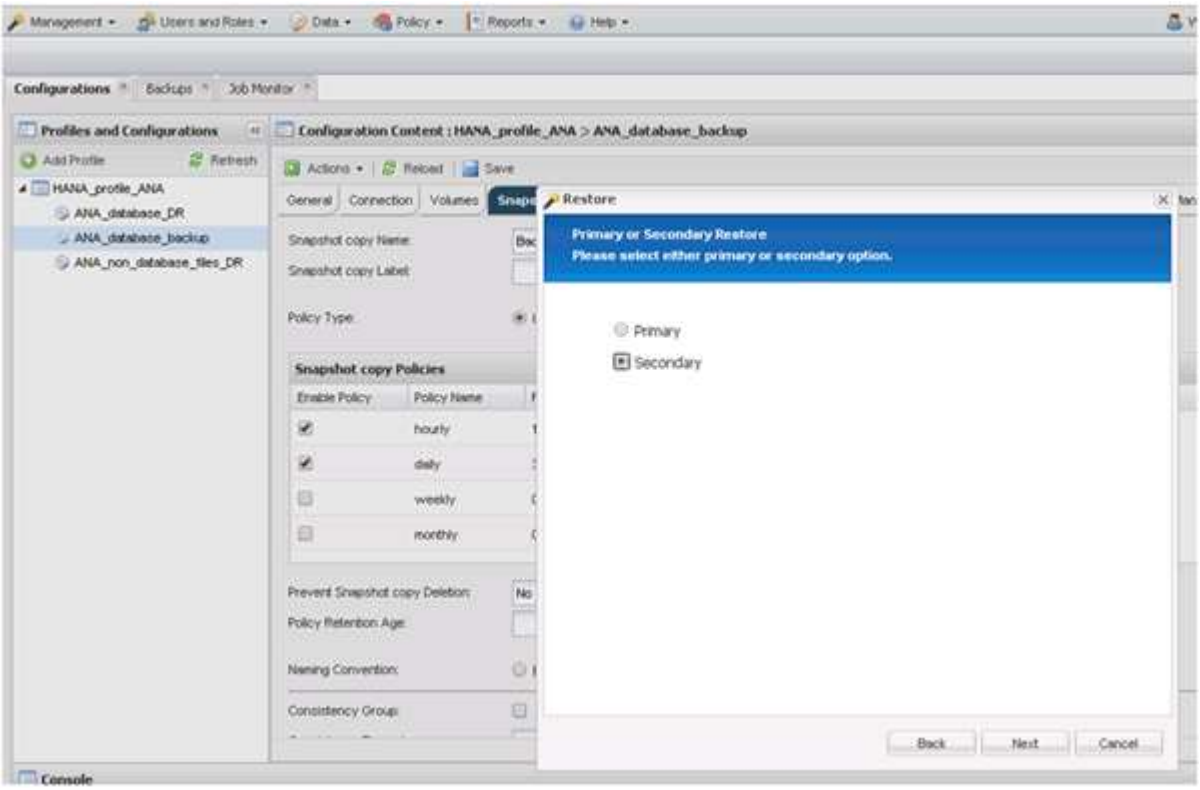
5. Go to the Snap Creator GUI.
6. Select the SAP HANA system, and then click **Actions** > **Restore**.



The Welcome screen appears.

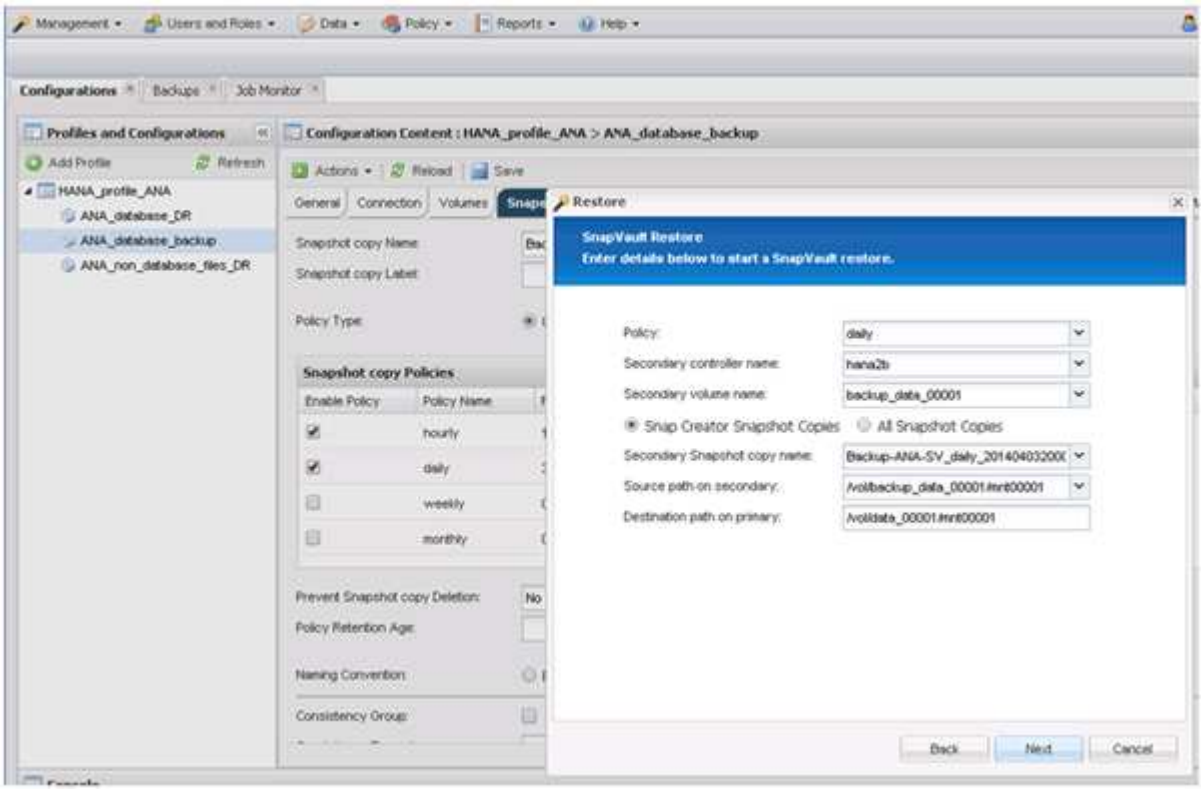


7. Click **Next**.
8. Select **Secondary** and click **Next**.

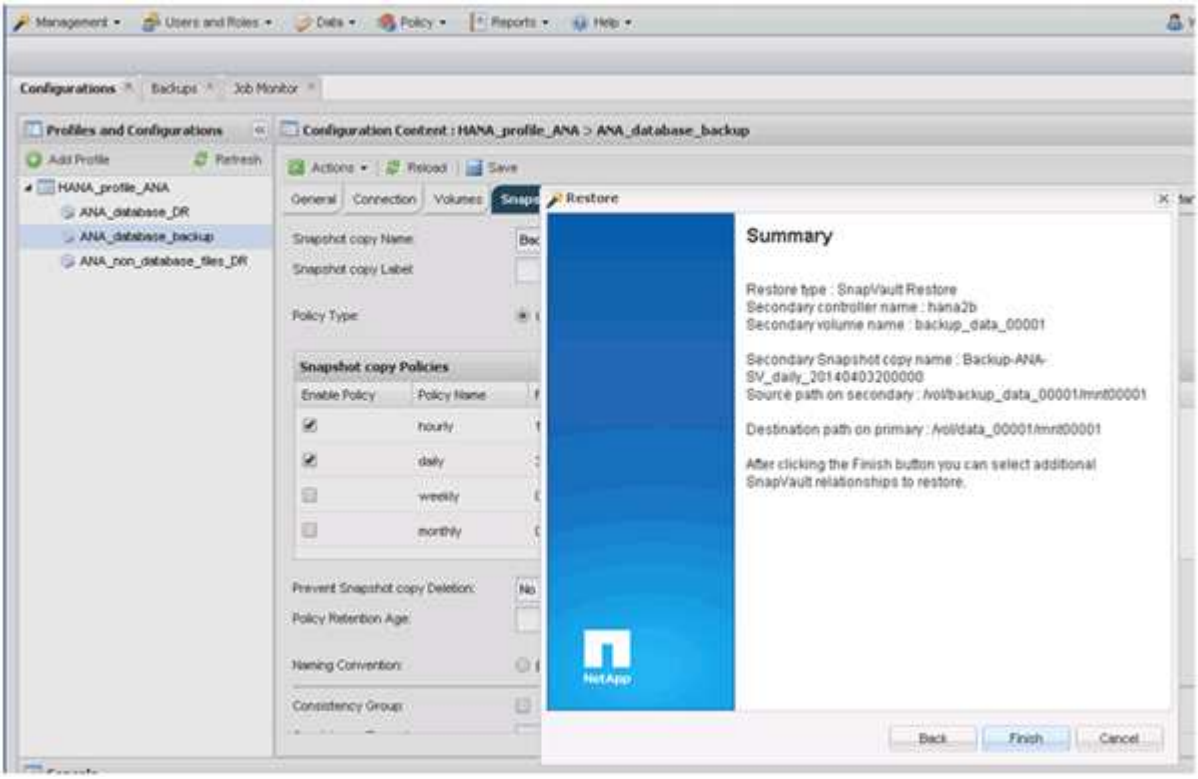


9. Enter the required information. The Snapshot name correlates with the backup ID that has been selected in

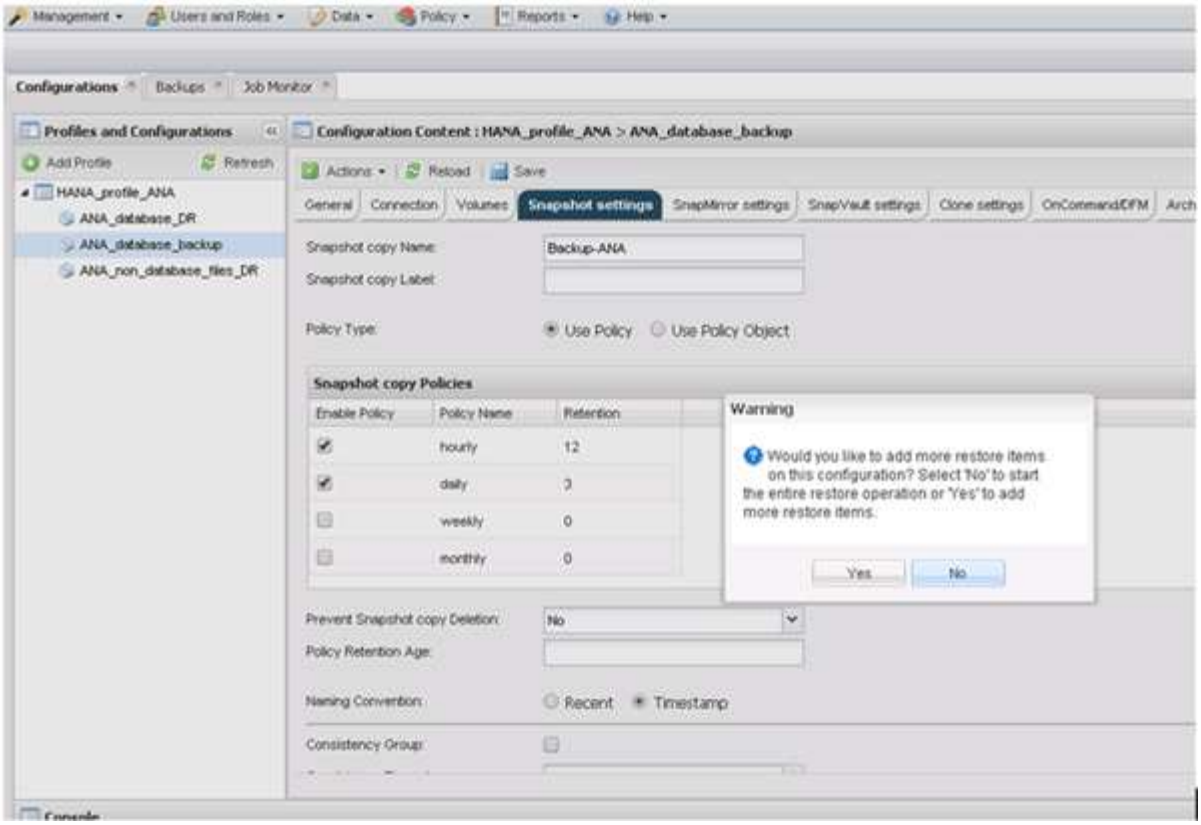
SAP HANA Studio.



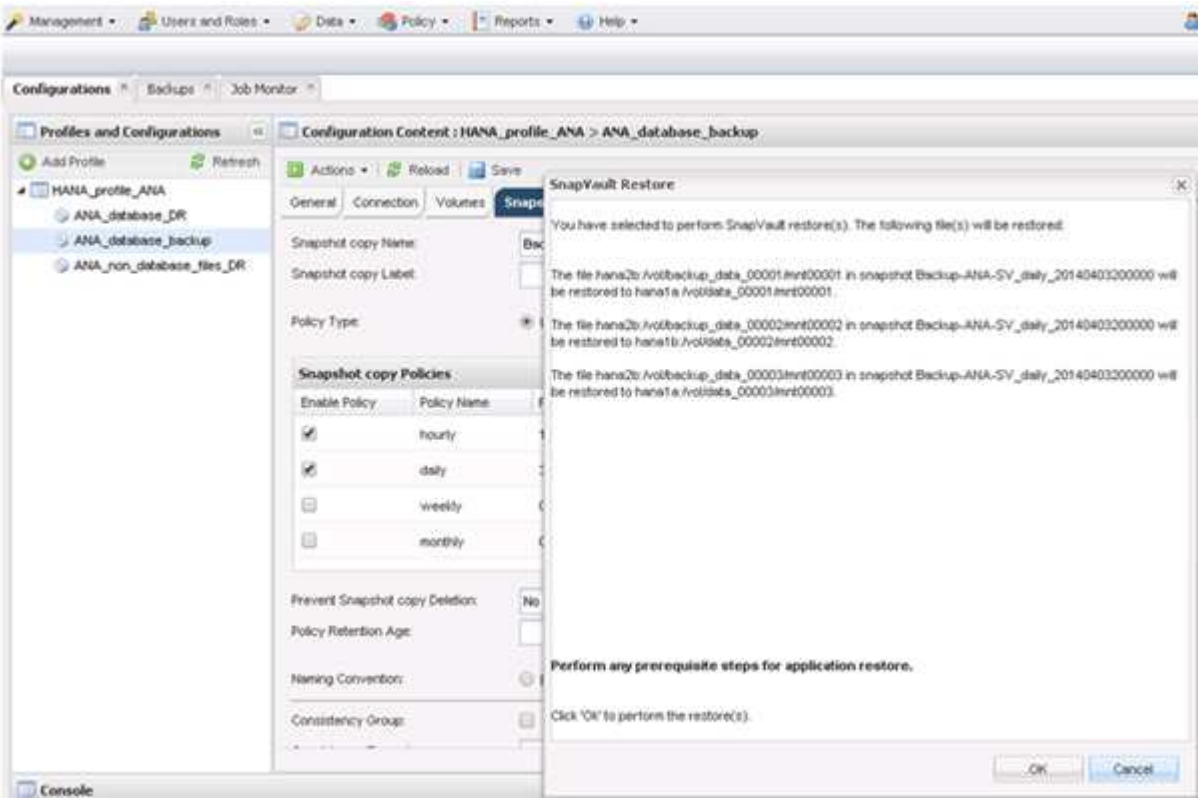
10. Select **Finish**.



11. Click **Yes** to add more items to restore.



12. Provide the required information for all volumes that need to be restored. In the setup data_00001, data_00002, and data_00003 need to be selected for the restore process.



13. When all volumes are selected, select **OK** to start the restore process.

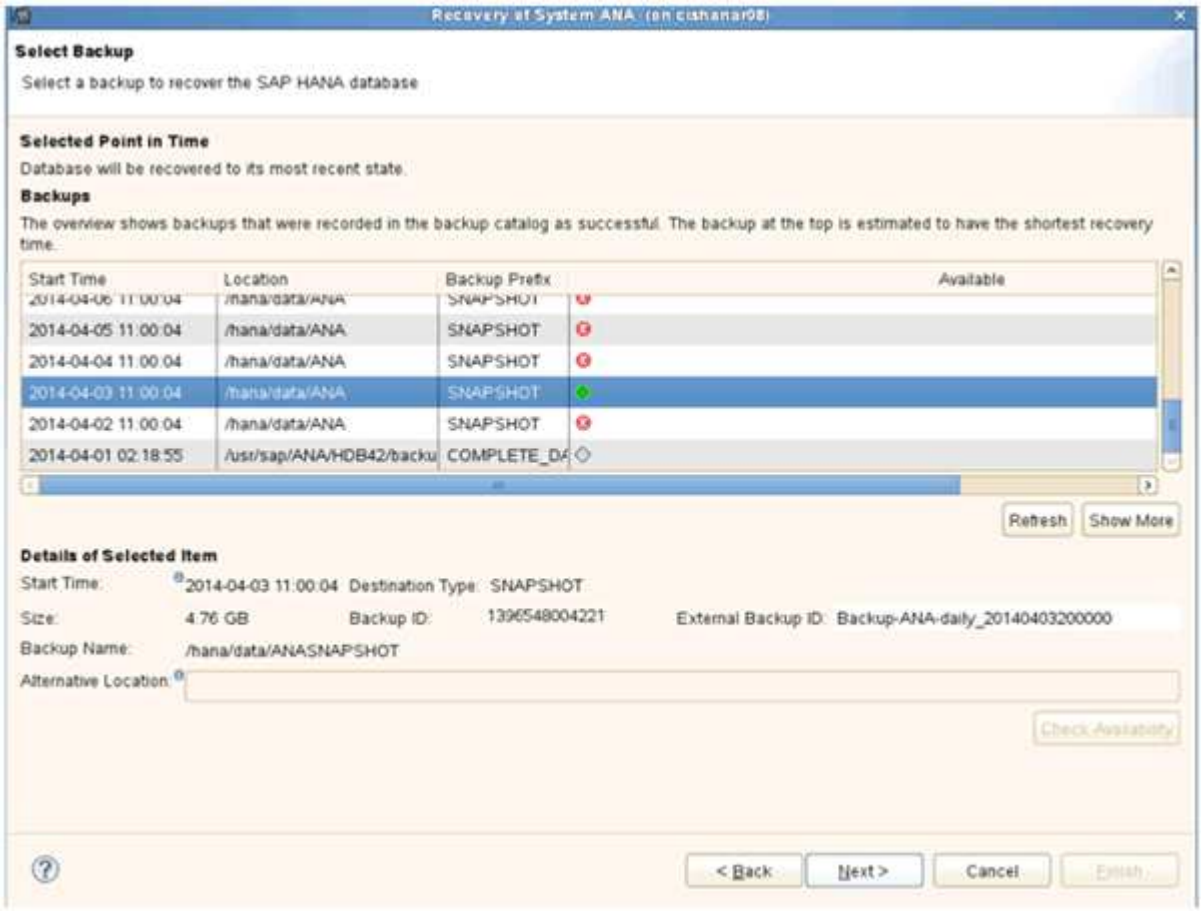
    Wait until the restore process is finished.

14. On each database node remount all data volumes to clean “Stale NFS Handles.”

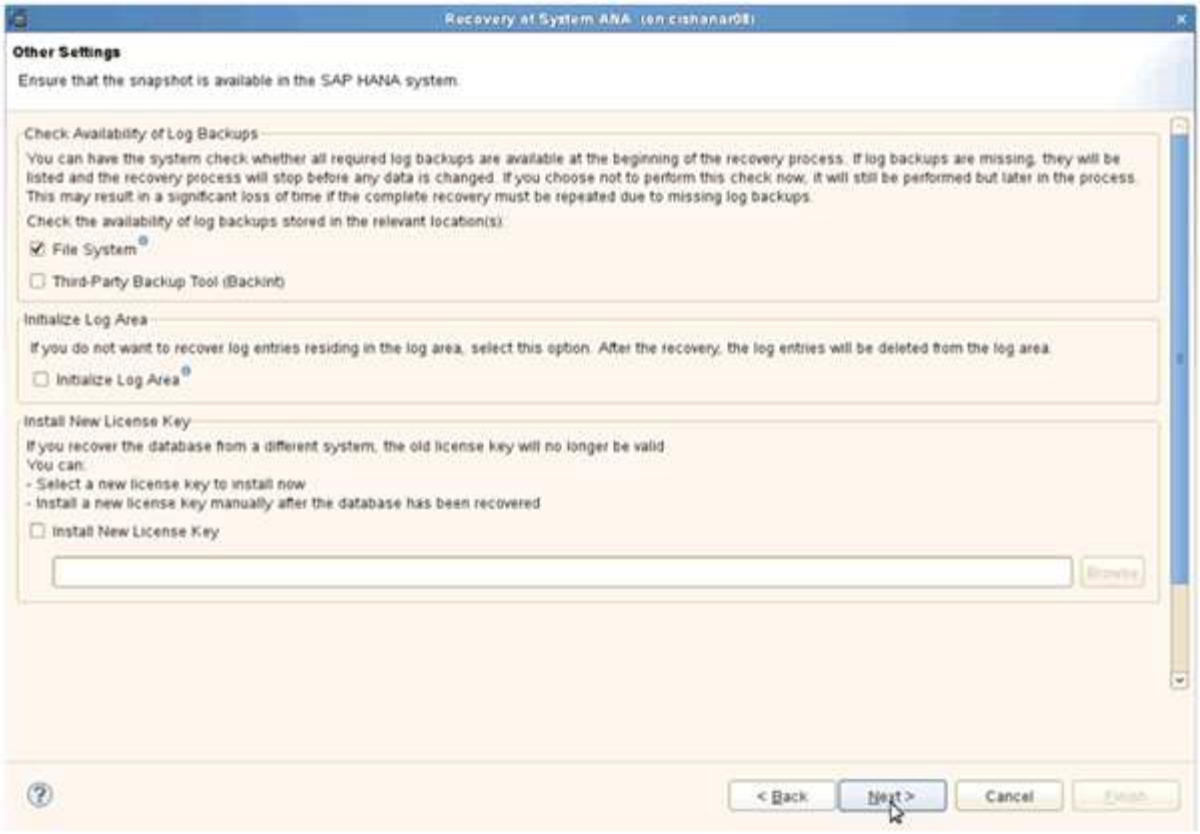
    In the example, all three volumes need to be remounted at each database node.

```
mount -o remount /hana/data/ANA/mnt00001
mount -o remount /hana/data/ANA/mnt00002
mount -o remount /hana/data/ANA/mnt00003
```

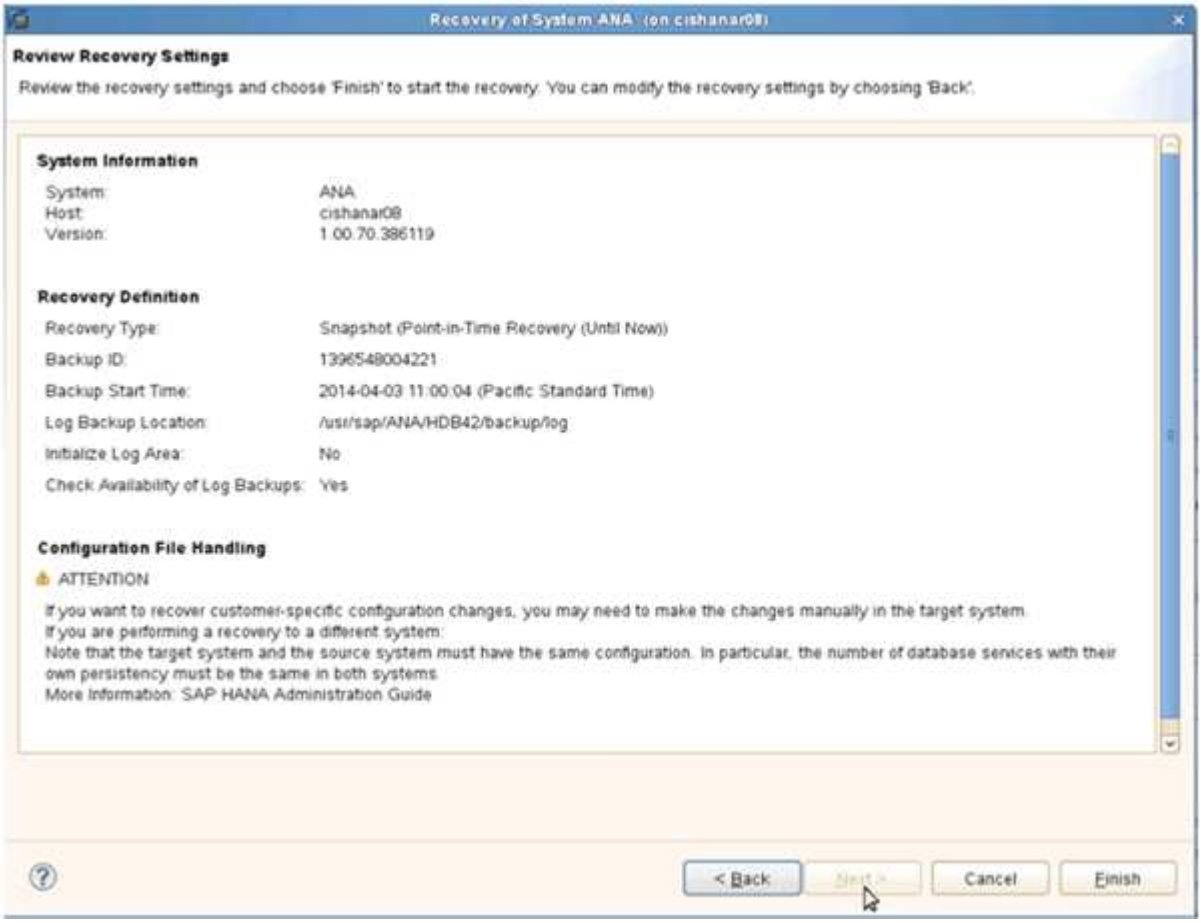
15. Go to SAP HANA Studio and click **Refresh** to update the backup list.



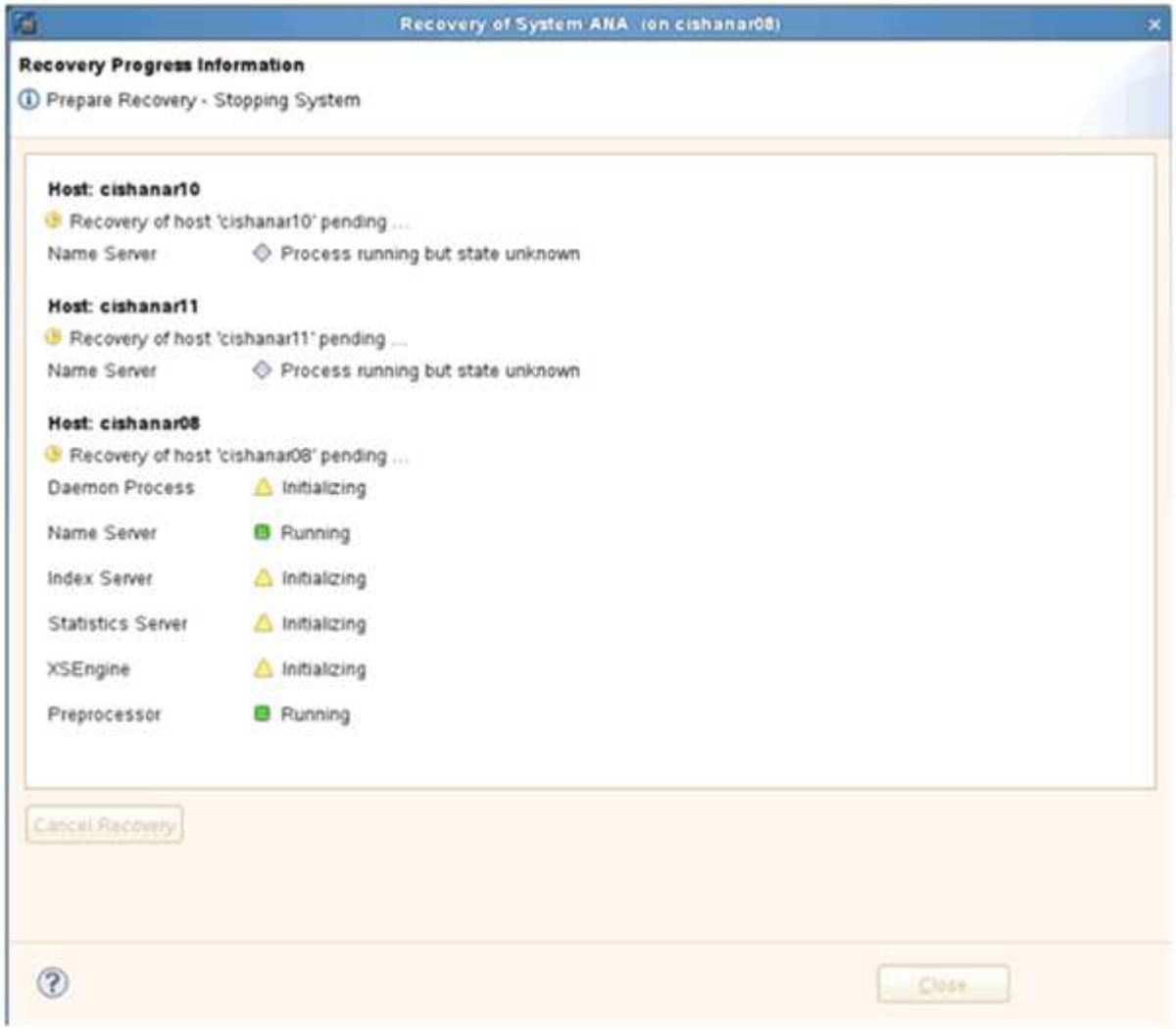
16. The backup that has been restored with Snap Creator is shown with a green icon in the list of backups. Select the backup and click **Next**.
17. Select other settings as required and click **Next**.



18. Click **Finish**.



The recovery process begins.



19. After the recovery process is finished, resume the SnapVault Relationships, if required.

Resuming a SnapVault relationship after a restore

Any restore that is not done using the latest Snapshot backup will delete the SnapVault relationship at the primary storage systems.

After the restore and recovery process is finished, the SnapVault relationship has to be resumed so that backups can be executed again with Snap Creator. Otherwise, Snap Creator will issue an error message, because it can't find the SnapVault relationship anymore at the primary storage systems.

The data transfer that is required will be based on a delta transfer, if there is still a common Snapshot copy between the source volume and the destination volume.

Resuming a SnapVault relationship with Data ONTAP operating in 7-Mode

If you restore using a Snapshot backup other than the latest one, you need to resume the SnapVault relationship so that Snap Creator can continue to run backups.

1. Resume the SnapVault relationship with Data ONTAP operating in 7-Mode by entering the following command. snapvault start -r -S source_controller:source_volumebackup_controller:backup_volume

   Perform this step for all volumes belonging to the SAP HANA database.

```
hana2b> snapvault start -r -S hana1a:/vol/data_00001/mnt00001
hana2b:/vol/backup_data_00001/mnt00001
The resync base snapshot will be: Backup-ANA-SV_daily_20140406200000
Resync may alter the data in this qtree.
Are you sure you want to resync the qtree? y
Mon Apr  7 14:08:21 CEST [hana2b:replication.dst.resync.success:notice]:
SnapVault resync of
/vol/backup_data_00001/mnt00001 to hana1a:/vol/data_00001/mnt00001 was
successful.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

```
hana2b> snapvault start -r -S hana1b:/vol/data_00002/mnt00002
hana2b:/vol/backup_data_00002/mnt00002
The resync base snapshot will be: Backup-ANA-SV_daily_20140406200000
Resync may alter the data in this qtree.
Are you sure you want to resync the qtree? y
Mon Apr  7 14:09:49 CEST [hana2b:replication.dst.resync.success:notice]:
SnapVault resync of
/vol/backup_data_00002/mnt00002 to hana1b:/vol/data_00002/mnt00002 was
successful.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

```
hana2b> snapvault start -r -S hana1a:/vol/data_00003/mnt00003
hana2b:/vol/backup_data_00003/mnt00003
The resync base snapshot will be: Backup-ANA-SV_daily_20140406200000
Resync may alter the data in this qtree.
Are you sure you want to resync the qtree? y
Mon Apr  7 14:10:25 CEST [hana2b:replication.dst.resync.success:notice]:
SnapVault resync of
/vol/backup_data_00003/mnt00003 to hana1a:/vol/data_00003/mnt00003 was
successful.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

When the data transfer is finished, you can again schedule backups by using Snap Creator.

Resuming a SnapVault relationship with clustered Data ONTAP

If you restore using a Snapshot backup other than the latest one, you need to resume the SnapVault relationship so that Snap Creator can continue to run backups.

1. Re-create and resynchronize the SnapVault relationship.

```
hana::> snapmirror create -source-path hana1a:hana_data -destination
-path
hana2b:backup_hana_data -type XDP
Operation succeeded: snapmirror create the relationship with destination
hana2b:backup_hana_data.

hana::> snapmirror resync -destination-path hana2b:backup_hana_data
-type XDP

Warning: All data newer than Snapshot copy sc-backup-
daily_20140430121000 on volume
hana2b:backup_hana_data will be deleted.
Do you want to continue? {y|n}: y
[Job 6554] Job is queued: initiate snapmirror resync to destination
"hana2b:backup_hana_data".
[Job 6554] Job succeeded: SnapMirror Resync Transfer Queued
```

2. To actually restart the SnapVault transfer, a manual Snapshot copy is required.

```
hana::> snapshot create -vserver hana1a -volume hana_data -snapshot
sv_resync

hana::> snapshot modify -vserver hana1a -volume hana_data -snapshot
sv_resync -snapmirror-label daily

hana::> snapmirror update -destination-path hana2b:backup_hana_data
Operation is queued: snapmirror update of destination
hana2b:backup_hana_data.
```

3. Verify that the SnapVault relationship appears in the destination list.

```
hana::> snapmirror list-destinations -source-path hana1a:hana_data
                                                    Progress
Source              Destination         Transfer   Last
Relationship
Path         Type  Path         Status Progress   Updated      Id
---------- ----- ------------ ------- --------- ------------
---------------
hana1a:hana_data
            XDP   hana2b:backup_hana_data
                              Transferring
                                      38.46KB   04/30 18:15:54
                                                             9137fb83-
cba9-11e3-85d7-123478563412
```

Restoring databases after primary storage failure

After a primary storage failure, or when all Snapshot copies are deleted from the volumes at the primary storage, Snap Creator will not be able to handle the restore, because there will no longer be a SnapVault relationship on the primary storage systems.

Restoring databases after a primary storage failure with Data ONTAP operating in 7-Mode

You can restore an SAP HANA database after a primary storage system running Data ONTAP operating in 7-Mode fails.

1. In this case, the restore has to be executed directly on the secondary storage system by using the following command: snapvault restore --s snapshot_name -S backup_controller:backup_volumesource_controller:source_volume

   Perform this step for all volumes belonging to the SAP HANA database.

```
hana1a>  snapvault restore -s Backup-ANA-SV_hourly_20140410103943 -S
hana2b:/vol/backup_data_00001/mnt00001 hana1a:/vol/data_00001/mnt00001
Restore will overwrite existing data in /vol/data_00001/mnt00001.
Are you sure you want to continue? y
Thu Apr 10 11:55:55 CEST [hana1a:vdisk.qtreePreserveComplete:info]:
Qtree preserve is complete for /vol/data_00001/mnt00001.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

```
hana1a>  snapvault restore -s Backup-ANA-SV_hourly_20140410103943 -S
hana2b:/vol/backup_data_00003/mnt00003 hana1a:/vol/data_00003/mnt00003
Restore will overwrite existing data in /vol/data_00003/mnt00003.
Are you sure you want to continue? y
Thu Apr 10 11:58:18 CEST [hana1a:vdisk.qtreePreserveComplete:info]:
Qtree preserve is complete for /vol/data_00003/mnt00003.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

```
hana1b>  snapvault restore -s Backup-ANA-SV_hourly_20140410103943 -S
hana2b:/vol/backup_data_00002/mnt00002 hana1b:/vol/data_00002/mnt00002
Restore will overwrite existing data in /vol/data_00002/mnt00002.
Are you sure you want to continue? y
Thu Apr 10 12:01:29 CEST [hana1b:vdisk.qtreePreserveComplete:info]:
Qtree preserve is complete for /vol/data_00002/mnt00002.
Transfer started.
Monitor progress with 'snapvault status' or the snapmirror log.
```

When the restore process is finished, you use SAP HANA to perform the recovery.

Restoring databases after a primary storage failure with clustered Data ONTAP

You can restore an SAP HANA database after a primary storage system running clustered Data ONTAP fails.

Assuming the primary volume is lost completely, you need to create a new primary volume and then restore from the backup volume.

1. Create a primary volume with type data protection.

```
hana::> volume create -vserver hana1a -volume hana_data -aggregate
aggr_sas_101 -size 300G -state online -type DP -policy default -autosize
-mode grow_shrink -space-guarantee none
-snapshot-policy none -foreground true
[Job 6744] Job is queued: Create hana_data.
[Job 6744] Job succeeded: Successful
```

2. Restore all data from the backup volume.

```
hana::> snapmirror restore -destination-path hana1a:hana_data -source
-path hana2b:backup_hana_data -source-snapshot sc-backup-
daily_20140505121000
[Job 6746] Job is queued: snapmirror restore from source
"hana2b:backup_hana_data" for the
snapshot sc-backup-daily_20140505121000.

hana::> job show -id 6746
Owning
Job ID Name                 Vserver    Node           State
------ -------------------- ---------- -------------- ----------
6746   SnapMirror restore   hana        hana01        Running
       Description: snapmirror restore from source
"hana2b:backup_hana_data" for the snapshot sc-backup-
daily_20140505121000
```

When the restore process is finished, you use SAP HANA to perform the recovery.

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