HANA Backup using Azure Application Consistent Snapshot (AzAcsnap) tool

Datamart Systems

Version: 2.0

Revision History

Version	Date	Author	Approvers	Changes
1.0	8/10/2021	Kiran Kumar Chitturi		Initial Draft
1.0	10/7/2021	Senthil Vel Murugan		Added server scope list.
2.0	24/11/2021	Sasikumar Sampath		Updated the cron jobs details

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1 Introduction

Azure Application Consistent Snapshot tool (AzAcSnap) is a command-line tool that enables data protection for third-party databases by handling all the orchestration required to put them into an application consistent state before taking a storage snapshot, after which it returns them to an operational state.

To this end, it is acknowledged that this is a living document, meant to reflect the design as new standards/changes come online within the environment.

1.1 Purpose

The purpose of this document is to provides a guide for installing the Azure Application Consistent Snapshot tool to do HANA backup with Azure NetApp Files

1.2 Audience

This document is for the Infrastructure-specific architectural design as it relates to the SAP infrastructure on Azure Cloud. The target audience is intended to be Azure Technologists, BASIS Administrators and SAP Technical Architects. This document assumes a fundamental understanding of SAP Technical Architecture concepts. It may also be referenced by Equinor enterprise architects, infrastructure architects, security & compliance, and cybersecurity teams.

1.3 Assumptions

The following assumptions have been made and the implementation of the ANF HANA snapshot backup has been taking these into consideration:

- Any items that are not explicitly mentioned In-Scope are considered Out of Scope

2 Support Matrix from SAP

The snapshot tools can be used in the following scenarios.

Single SID
Multiple SID
HSR
Scale-out
MDC (Only single tenant supported)
Single Container
SUSE Operating System
RHEL Operating System
SKU TYPE I
SKU TYPE II
See Supported scenarios for HANA Large Instances

Snapshot Support Matrix from SAP
The following matrix is provided as a guideline on which versions of SAP HANA are supported by SAP for Storage Snapshot Backups.

Database Versions	**1.0 SPS12**	**2.0 SPS0**	**2.0 SPS1**	**2.0 SPS2**	**2.0 SPS3**	**2.0 SPS4**
Single Container Database	√	√	-	-	-	-
MDC Single Tenant	-	-	√	√	√	√
MDC Multiple Tenants	-	-	-	-	-	√

√ = supported by SAP for Storage Snapshots

3 Prerequisites for installation

1. **OS is patched**: See patching and SMT setup in How to install and configure SAP HANA (Large Instances) on Azure.
2. **Time Synchronization is set up**. The customer will need to provide an NTP compatible time server, and configure the OS accordingly.
3. **HANA is installed** : See HANA installation instructions in SAP NetWeaver Installation on HANA database.
4. **Enable communication with storage** (refer separate section for more details): Customer must set up SSH with a private/public key pair, and provide the public key for each node where the snapshot tools are planned to be executed to Microsoft Operations for setup on the storage back-end.
    1. **For Azure NetApp Files (refer separate section for details)**: Customer must generate the service principal authentication file.

       Important

       When validating communication with Azure NetApp Files, communication might fail or time-out. Check to ensure firewall rules are not blocking outbound traffic from the system running AzAcSnap to the following addresses and TCP/IP ports:

       - (https://)management.azure.com:443
       - (https://)login.microsoftonline.com:443

2. **For Azure Large Instance (refer separate section for details)**: Customer must set up SSH with a private/public key pair, and provide the public key for each node where the snapshot tools are planned to be executed to Microsoft Operations for setup on the storage back-end.

   Test this by using SSH to connect to one of the nodes (for example, `ssh -l <Storage UserName> <Storage IP Address>`). Type `exit` to logout of the storage prompt.

   Microsoft operations will provide the storage user and storage IP at the time of provisioning.

5. **Enable communication with SAP HANA** (refer separate section for more details): Customer must set up an appropriate SAP HANA user with the required privileges to perform the snapshot.
   1. This setting can be tested from the command line as follows using the text in `grey`
      - HANAv1

        ```
        hdbsql -n <HANA IP address> -i <HANA instance> -U <HANA user> "\s"
        ```

      - HANAv2

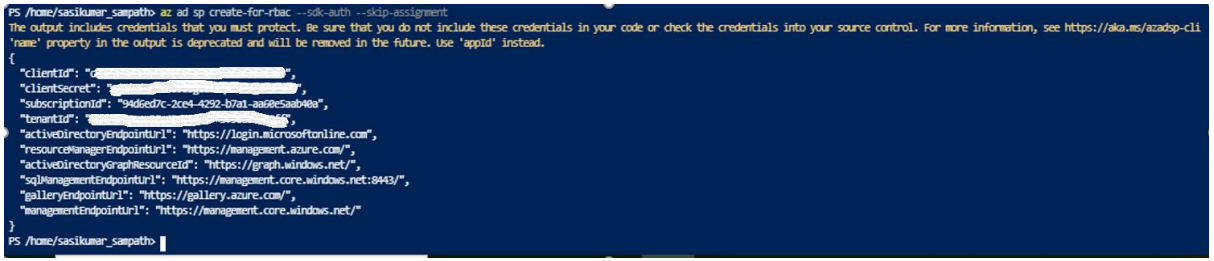
        ```
        hdbsql -n <HANA IP address> -i <HANA instance> -d SYSTEMDB -U <HANA user> "\s"
        ```

        - The examples above are for non-SSL communication to SAP HANA.

4 Create Service Principal

```
PS /home/sasikumar_sampath> az account show
{
  "environmentName": "AzureCloud",
```

```
PS /home/sasikumar_sampath> az account set -s 94d6ed7c-2ce4-4292-b7a1-aa60e5aab40a
PS /home/sasikumar_sampath>
```



Takedown the details as below.

{

"clientId": "xxxx-xxxx-xxxx-xxxx-xxxx-xxxxx-xxxxx",

"clientSecret": "xxxxxxx-xxx-xxxxxxx-xxxx-xxxxxx",

"subscriptionId": "94d6ed7c-2ce4-4292-b7a1-aa60e5aab40a",

"tenantId": "xxxxxx-xxxxxx-xxx-xxxxxx-xxxxxxx",

"activeDirectoryEndpointUrl": "https://login.microsoftonline.com",

"resourceManagerEndpointUrl": "https://management.azure.com/",

"activeDirectoryGraphResourceId": "https://graph.windows.net/",

"sqlManagementEndpointUrl": "https://management.core.windows.net:8443/",

```
 "galleryEndpointUrl": "https://gallery.azure.com/",
 "managementEndpointUrl": "https://management.core.windows.net/"
}
```

5 HANA Backup User

1. Connect to the SYSTEMDB to create the user

   >hdbsql -n sapp03db:37713 -i 77 -u SYSTEM -p <SYSTEM_USER_PASSWORD>

   Welcome to the SAP HANA Database interactive terminal.

   Type: \h for help with commands
   \q to quit

   hdbsql SYSTEMDB=>

2. Create the user
   This example creates the AZACSNAP user in the SYSTEMDB.

   hdbsql SYSTEMDB=> CREATE USER AZACSNAP PASSWORD <AZACSNAP_PASSWORD_CHANGE_ME> NO FORCE_FIRST_PASSWORD_CHANGE;

3. Grant the user permissions
   This example sets the permission for the AZACSNAP user to allow for performing a database consistent storage snapshot.

   ```
   hdbsql SYSTEMDB=> GRANT BACKUP ADMIN, CATALOG READ, MONITORING TO AZACSNAP;
   ```

4. Prevent user's password from expiring

   ```
   hdbsql SYSTEMDB=> ALTER USER AZACSNAP DISABLE PASSWORD LIFETIME;
   ```

5. Setup the SAP HANA Secure User Store (change the password)

   This example uses the hdbuserstore command from the Linux shell to setup the SAP HANA Secure User store.

   ```
   > hdbuserstore Set AZACSNAPKEY 10.213.x.x:33813 AZACSNAP <AZACSNAP_PASSWORD_CHANGE_ME>
   ```

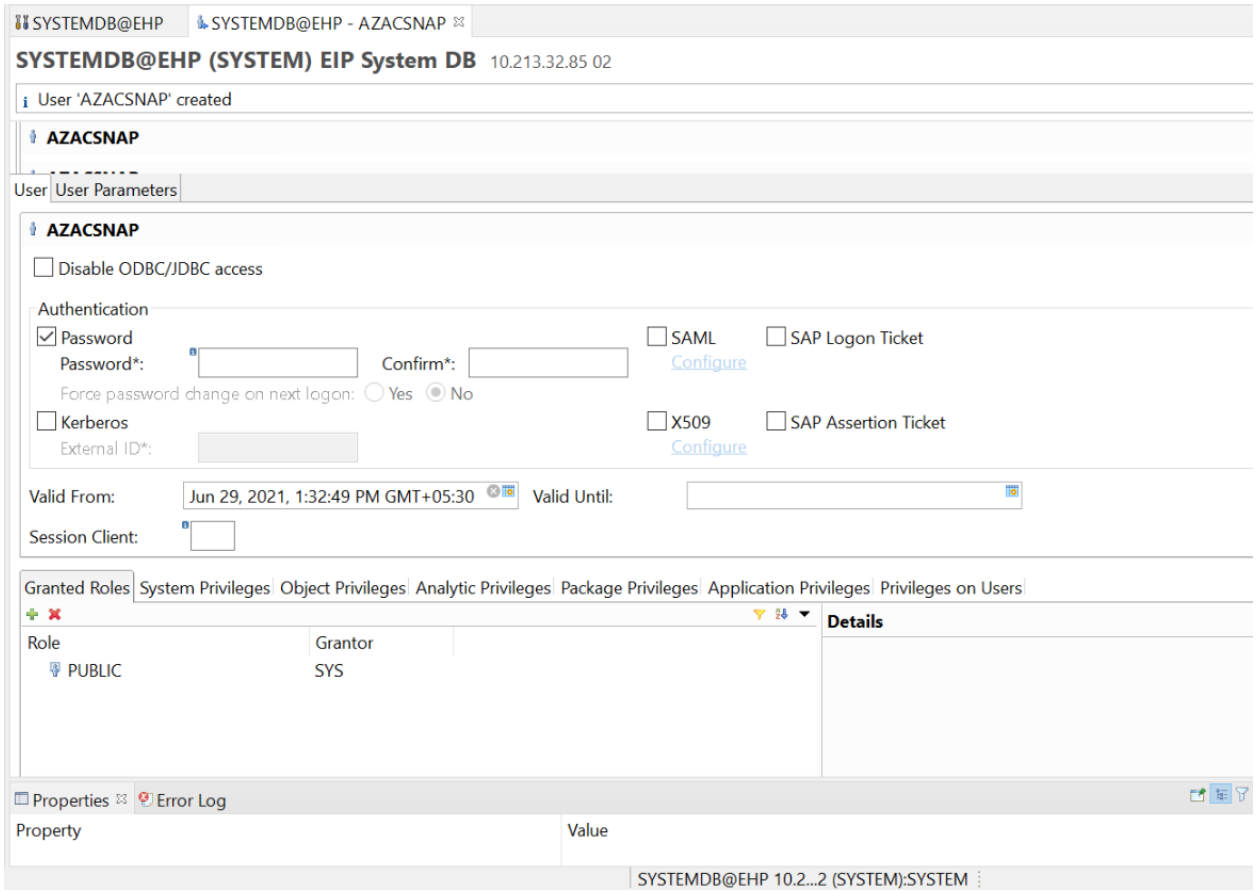
6. Check the SAP HANA Secure User Store

   To check if the secure user store is setup correctly, use the hdbuserstore command to list the output which should be similar to the following.
   More details on using hdbuserstore are available on the SAP website.

   ```
   > hdbuserstore List
   DATA FILE : /home/azacsnap/.hdb/sapprdhdb80/SSFS_HDB.
   DAT KEY FILE : /home/azacsnap/.hdb/sapprdhdb80/SSFS_HDB.KEY
   ```

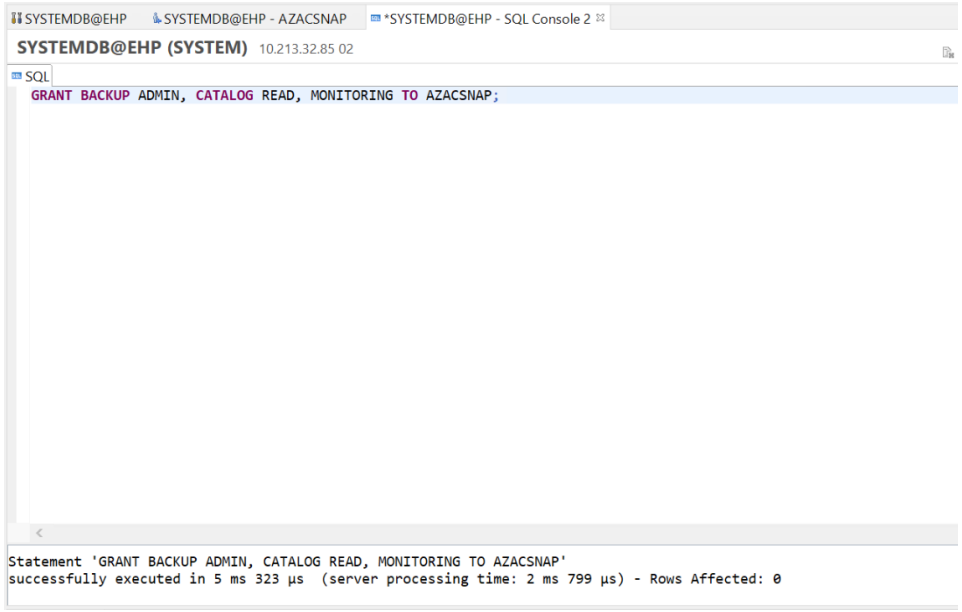
KEY AZACSNAP
ENV : <IP_address_of_host>:
USER: AZACSNAP

Step 1. Create new user AZACSNAP in the SYSTEMDB on SAP HANA DB

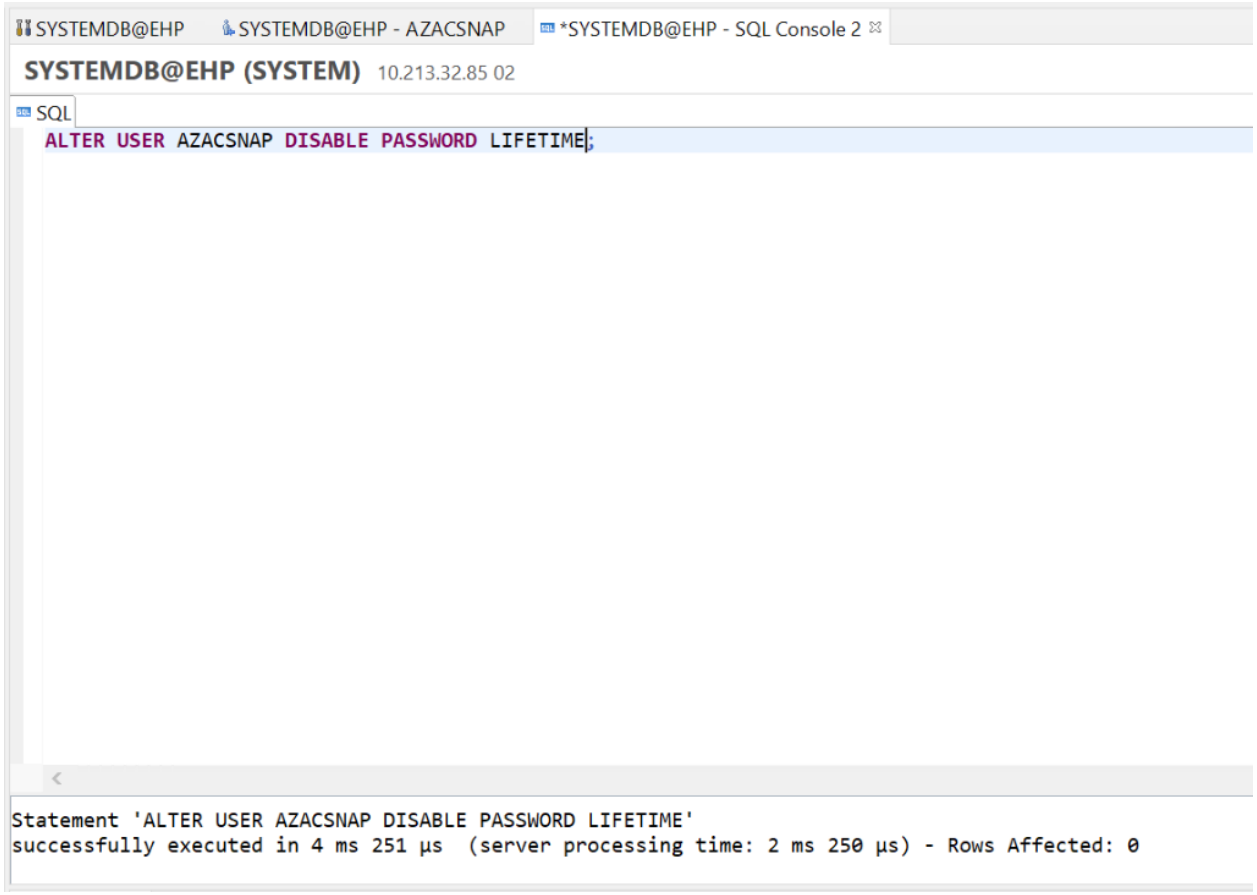


2. Grant Privileges to the AZACSNAP user

```
GRANT BACKUP ADMIN, CATALOG READ, MONITORING TO AZACSNAP;
```



3. Prevent user's password from expiring, by Disabling the password Expire Lifetime.



4. Creating New Key in Target DB host

hdbuserstore set AZACSNAPKEY sapeipdb01pr:30213 AZACSNAP Azacsnap@321

```
ehpadm@eds-eip-db01-use2-pr:/usr/sap/EHP/HDB02> hdbuserstore list
DATA FILE       : /home/ehpadm/.hdb/eds-eip-db01-use2-pr/SSFS_HDB.DAT

ehpadm@eds-eip-db01-use2-pr:/usr/sap/EHP/HDB02> hdbuserstore set AZACSNAPKEY sapeipdb01pr:30213 AZACSNAP Azacsnap@321
ehpadm@eds-eip-db01-use2-pr:/usr/sap/EHP/HDB02> hdbuserstore list
DATA FILE       : /home/ehpadm/.hdb/eds-eip-db01-use2-pr/SSFS_HDB.DAT
KEY FILE        : /home/ehpadm/.hdb/eds-eip-db01-use2-pr/SSFS_HDB.KEY

KEY AZACSNAPKEY
  ENV : sapeipdb01pr:30213
  USER: AZACSNAP
ehpadm@eds-eip-db01-use2-pr:/usr/sap/EHP/HDB02>
```

5. Now we have to register key to the database

hdbsql -U backup_key

```
ehpadm@eds-eip-db01-use2-pr:/usr/sap/EHP/HDB02> hdbsql -U AZACSNAPKEY

Welcome to the SAP HANA Database interactive terminal.

Type:  \h for help with commands
       \q to quit
```

6. Testing created key for the DB

```
hdbsql SYSTEMDB=> \S
host           : sapeipdb01pr
sid            : EHP
dbname         : SYSTEMDB
user           : AZACSNAP
kernel version: 2.00.055.00.1615413201
SQLDBC version:        libSQLDBCHDB 2.07.023.1612823292
autocommit     : ON
locale         : en_US.UTF-8
input encoding: UTF8
sql port       : sapeipdb01pr:30213

hdbsql SYSTEMDB=>
```

Successfully Tested.

6 Azacsnap tools installation

Download the AzAcsnap tool to a folder as below.

```
eds-eip-db01-use2-pr:~ # mkdir /tmp/azacsnap
```

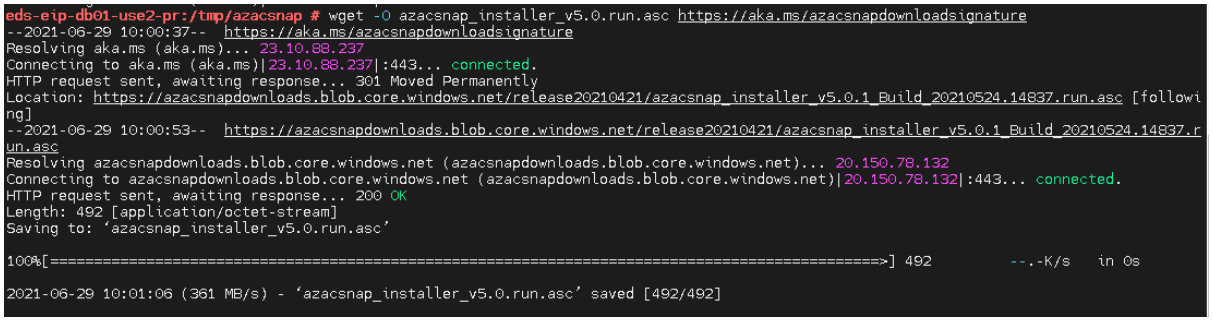
```
eds-eip-db01-use2-pr:~ # cd /tmp/azacsnap
```

wget -O azacsnap_installer_v5.0.run https://aka.ms/azacsnapdownload

```
eds-eip-db01-use2-pr:/tmp/azacsnap # wget -O azacsnap_installer_v5.0.run  https://aka.ms/azacsnapdownload
--2021-06-29 09:58:09--  https://aka.ms/azacsnapdownload
Resolving aka.ms (aka.ms)... 104.67.209.176
Connecting to aka.ms (aka.ms)|104.67.209.176|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://azacsnapdownloads.blob.core.windows.net/release20210421/azacsnap_installer_v5.0.1_Build_20210524.14837.run [following]
--2021-06-29 09:58:54--  https://azacsnapdownloads.blob.core.windows.net/release20210421/azacsnap_installer_v5.0.1_Build_20210524.14837.r
un
Resolving azacsnapdownloads.blob.core.windows.net (azacsnapdownloads.blob.core.windows.net)... 20.150.78.132
Connecting to azacsnapdownloads.blob.core.windows.net (azacsnapdownloads.blob.core.windows.net)|20.150.78.132|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 24403440 (23M) [application/octet-stream]
Saving to: 'azacsnap_installer_v5.0.run'

100%[=============================================================================================>] 24,403,440  7.58MB/s   in 3.1s

2021-06-29 09:59:05 (7.58 MB/s) - 'azacsnap_installer_v5.0.run' saved [24403440/24403440]
```

```
eds-eip-db01-use2-pr:/tmp/azacsnap # ls -l azacsnap_installer_v5.0.run
-rw-r----- 1 root root 24403440 May 26 04:17 azacsnap_installer_v5.0.run
```

wget -O azacsnap_installer_v5.0.run.asc https://aka.ms/azacsnapdownloadsignature




```
eds-eip-db01-use2-pr:/tmp/azacsnap # ls -l azacsnap_installer_v5.0.run.asc
-rw-r----- 1 root root 492 May 27 01:12 azacsnap_installer_v5.0.run.asc
eds-eip-db01-use2-pr:/tmp/azacsnap #
```

Grant “execute” permissions.

chmod +x azacsnap_installer_v5.0.run

```
eds-eip-db01-use2-pr:/tmp/azacsnap # chmod +x azacsnap_installer_v5.0.run
eds-eip-db01-use2-pr:/tmp/azacsnap #
```

Run the installer

./azacsnap_installer_v5.0.run -I

```
eds-eip-db01-use2-pr:/tmp/azacsnap # ./azacsnap_installer_v5.0.run -I
+------------------------------------------------------------+
|   Azure Application Consistent Snapshot Tool Installer     |
+------------------------------------------------------------+
|-> Installer version '5.0.1_Build_20210524.14837'
|-> Installing for Operating System 'SUSE'
|-> Create Snapshot user 'azacsnap', home directory, and set group membership to 'sapsys'.
|-> Configure azacsnap profile (.profile)
|-> Search filesystem for directories to add to azacsnap's $PATH
|-> Search filesystem for directories to add to azacsnap's $LD_LIBRARY_PATH
|-> Copying SSH keys for back-end storage for azacsnap.
|-> Copying HANA connection keystore for azacsnap.
|-> Extracting commands into /home/azacsnap/bin/.
|-> Making commands in /home/azacsnap/bin/ executable.

+------------------------------------------------------------+
|  Install complete!  Follow the steps below to configure.   |
+------------------------------------------------------------+

1. Change into the snapshot user account.....
     su - azacsnap
2. Setup the HANA Secure User Store..... (command format below)
     hdbuserstore Set <ADMIN_USER> <HOSTNAME>:<PORT> <admin_user> <password>
3. Change to location of commands.....
     cd /home/azacsnap/bin/
4. Configure the customer details file.....
     azacsnap -c configure --configuration new
5. Test the connection to storage.....
     azacsnap -c test --test storage
6. Test the connection to HANA.....
   a. without SSL
     azacsnap -c test --test hana
   b. with SSL,  you will need to choose the correct SSL option
     azacsnap -c test --test hana --ssl=<commoncrypto|openssl>
7. Run your first snapshot backup..... (example below)
     azacsnap -c backup --volume=data --prefix=hana_test --frequency=15min --retention=1

eds-eip-db01-use2-pr:/tmp/azacsnap #
```

7 Complete the setup of snapshot tools

```
eds-eip-db01-use2-pr:~ # cd /home/azacsnap/bin
```

Create the below file with the entries that follow.

```
eds-eip-db01-use2-pr:/home/azacsnap/bin # vi auth-file.json
```

Use the details captured earlier and save the file.

```
{
  "clientId": "xxxx-xxxx-xxxx-xxxx-xxxx-xxxxx-xxxxx",
  "clientSecret": "xxxxxxx-xxx-xxxxxxx-xxxx-xxxxxx",
  "subscriptionId": "94d6ed7c-2ce4-4292-b7a1-aa60e5aab40a",
  "tenantId": "xxxxxx-xxxxxx-xxx-xxxxxx-xxxxxxx",
  "activeDirectoryEndpointUrl": "https://login.microsoftonline.com",
  "resourceManagerEndpointUrl": "https://management.azure.com/",
  "activeDirectoryGraphResourceId": "https://graph.windows.net/",
  "sqlManagementEndpointUrl": "https://management.core.windows.net:8443/",
  "galleryEndpointUrl": "https://gallery.azure.com/",
  "managementEndpointUrl": "https://management.core.windows.net/"
}
```

The ownership and permission of the file auth-file.json has to be altered as shown below.

```
eds-eip-db01-use2-pr:/home/azacsnap/bin # chown azacsnap:sapsys auth-file.json
eds-eip-db01-use2-pr:/home/azacsnap/bin #
```

```
eds-eip-db01-use2-pr:/home/azacsnap/bin # chmod 600 auth-file.json
eds-eip-db01-use2-pr:/home/azacsnap/bin #
```

```
eds-eip-db01-use2-pr:/home/azacsnap/bin # ls -ltr
total 73008
-rwx------ 1 azacsnap sapsys 74754661 Jun 29 10:39 azacsnap
-rw------- 1 azacsnap sapsys      623 Jun 29 11:24 auth-file.json
eds-eip-db01-use2-pr:/home/azacsnap/bin #
```

The user azacsnap has to be logged in to, inorder to configure the snapshot at the target server.

```
eds-eip-db01-use2-pr:~ # su - azacsnap
azacsnap@eds-eip-db01-use2-pr:~>
```

```
azacsnap@eds-eip-db01-use2-pr:~> cd /home/azacsnap/bin/
azacsnap@eds-eip-db01-use2-pr:~/bin>
```

HDB User key has to be hardcoded as below.

```
azacsnap@eds-eip-db01-use2-pr:~/bin> hdbuserstore Set AZACSNAPKEY sapeipdb01pr:30213 AZACSNAP Azacsnap@321
azacsnap@eds-eip-db01-use2-pr:~/bin>
```

List the key to verify the same.

```
azacsnap@eds-eip-db01-use2-pr:~/bin> hdbuserstore list
DATA FILE       : /home/azacsnap/.hdb/eds-eip-db01-use2-pr/SSFS_HDB.DAT
KEY FILE        : /home/azacsnap/.hdb/eds-eip-db01-use2-pr/SSFS_HDB.KEY

KEY AZACSNAPKEY
  ENV : sapeipdb01pr:30213
  USER: AZACSNAP
azacsnap@eds-eip-db01-use2-pr:~/bin>
```

Snapshot configuration should began with the below command.

>azacsnap -c configure --configuration new

```
azacsnap@eds-eip-db01-use2-pr:~/bin> azacsnap -c configure --configuration new
Building new config file
Add comment to config file (blank entry to exit adding comments):
```

During the configuration, pay attention to the prompts and choose DATA and LOG.

```
eds-eip-db01-use2-pr:~ # su - azacsnap
azacsnap@eds-eip-db01-use2-pr:~> cd /home/azacsnap/bin/
azacsnap@eds-eip-db01-use2-pr:~/bin> hdbuserstore Set AZACSNAPKEY sapeipdb01pr:30213 AZACSNAP Azacsnap@321
azacsnap@eds-eip-db01-use2-pr:~/bin> hdbuserstore list
DATA FILE       : /home/azacsnap/.hdb/eds-eip-db01-use2-pr/SSFS_HDB.DAT
KEY FILE        : /home/azacsnap/.hdb/eds-eip-db01-use2-pr/SSFS_HDB.KEY

KEY AZACSNAPKEY
  ENV : sapeipdb01pr:30213
  USER: AZACSNAP
azacsnap@eds-eip-db01-use2-pr:~/bin> azacsnap -c configure --configuration new
Building new config file
Add comment to config file (blank entry to exit adding comments):
Add database to config? (y/n) [n]: y
HANA SID (e.g. H80): EHP
HANA Instance Number (e.g. 00): 02
HANA HDB User Store Key (e.g. `hdbuserstore List`): AZACSNAPKEY
HANA Server's Address (hostname or IP address): sapeipdb01pr
Add ANF Storage to database section? (y/n) [n]: y
Add DATA Volume to ANF Storage section of Database section? (y/n) [n]: y
Full ANF Storage Volume Resource ID (e.g. /subscriptions/.../resourceGroups/.../providers/Microsoft.NetApp/netAppAccounts/.../capacityPoo
ls/Premium/volumes/...): /subscriptions/94d6ed7c-2ce4-4292-b7a1-aa60e5aab40a/resourceGroups/sap-rg-anf-use2-pr/providers/Microsoft.NetApp
/netAppAccounts/sap-anf-use2-pr/capacityPools/sap-anf-pool-ultra-use2-pr/volumes/EHP-data-mnt00001
Service Principal Authentication filename (e.g. auth-file.json): auth-file.json
Add DATA Volume to ANF Storage section of Database section? (y/n) [n]: n
Add OTHER Volume to ANF Storage section of Database section? (y/n) [n]: n
Add ANF Storage to database section? (y/n) [n]: n
Add HLI Storage to database section? (y/n) [n]: n
Add database to config? (y/n) [n]: n

Editing configuration complete, writing output to 'azacsnap.json'.
azacsnap@eds-eip-db01-use2-pr:~/bin>
```

The configuration will successfully end and a file “azacsnap.json” will be created.

```
azacsnap@eds-eip-db01-use2-pr:~/bin> ls
auth-file.json  azacsnap  azacsnap.json  logs  security
azacsnap@eds-eip-db01-use2-pr:~/bin>
```

```
azacsnap@eds-eip-db01-use2-pr:~/bin> cat azacsnap.json
{
  "version": "5.0.1",
  "logPath": "./logs",
  "securityPath": "./security",
  "comments": [],
  "database": [
    {
      "hana": {
        "serverAddress": "sapeipdb01pr",
        "sid": "EHP",
        "instanceNumber": "02",
        "hdbUserStoreName": "AZACSNAPKEY",
        "savePointAbortWaitSeconds": 600,
        "hliStorage": [],
        "anfStorage": [
          {
            "dataVolume": [
              {
                "resourceId": "/subscriptions/94d6ed7c-2ce4-4292-b7a1-aa60e5aab40a/resourceGroups/sap-rg-anf-use2-pr/providers/Microsoft.
NetApp/netAppAccounts/sap-anf-use2-pr/capacityPools/sap-anf-pool-ultra-use2-pr/volumes/EHP-data-mnt00001",
                "subscription": "94d6ed7c-2ce4-4292-b7a1-aa60e5aab40a",
                "resourceGroupName": "sap-rg-anf-use2-pr",
                "accountName": "sap-anf-use2-pr",
                "poolName": "sap-anf-pool-ultra-use2-pr",
                "volume": "EHP-data-mnt00001",
                "authFile": "auth-file.json"
              }
            ],
            "otherVolume": []
          }
        ]
      }
    }
  ]
}azacsnap@eds-eip-db01-use2-pr:~/bin>
```

```
}azacsnap@eds-eip-db01-use2-pr:~/bin> ls -l
total 73012
-rw------- 1 azacsnap sapsys      623 Jun 29 11:24 auth-file.json
-rwx------ 1 azacsnap sapsys 74754661 Jun 29 10:39 azacsnap
-rw-r----- 1 azacsnap sapsys     1098 Jun 29 18:26 azacsnap.json
drwxr-x--- 2 azacsnap sapsys       45 Jun 29 18:19 logs
drwxr-x--- 2 azacsnap sapsys        6 Jun 29 18:19 security
```

```
azacsnap@eds-eip-db01-use2-pr:~/bin> azacsnap -c test --test storage
BEGIN : Test process started for 'storage'
BEGIN : Storage test snapshots on 'data' volumes
BEGIN : 1 task(s) to Test Snapshots for Storage Volume Type 'data'
PASSED: Task#1/1 Storage test successful for Volume
END   : Storage tests complete
END   : Test process complete for 'storage'
azacsnap@eds-eip-db01-use2-pr:~/bin>
```

```
azacsnap@eds-eip-db01-use2-pr:~/bin> azacsnap -c test --test hana
BEGIN : Test process started for 'hana'
BEGIN : SAP HANA tests
PASSED: Successful connectivity to HANA version 2.00.055.00.1615413201
END   : Test process complete for 'hana'
azacsnap@eds-eip-db01-use2-pr:~/bin>
```

```
azacsnap@eds-eip-db01-use2-pr:~/bin> azacsnap -c backup --volume data --prefix hana_test  --retention=1
azacsnap@eds-eip-db01-use2-pr:~/bin>
```

```
azacsnap@eds-eip-db01-use2-pr:~/bin> azacsnap -c details
List snapshot details called with snapshotFilter ''
#, Volume, SnapshotName
#1, EHP-data-mnt00001, hana_test__2021-06-29T195709-9865544Z
azacsnap@eds-eip-db01-use2-pr:~/bin>
```

8 Setup automatic snapshot backup

AzAcSnap backup is scheduled in the target server under cronjobs of the respective AzAcSnap user. In our scenario azacsnap is the username and the EH2 and EIQ instances are chosen for reference which belongs to the Quality Datamart servers EQ2 and EIQ respectively. Cronjobs are split amongst all nodes to spread the load equally. Hana cleanup cronjob is setup on the 4th node of EQ2 and EIQ for their respective databases.

EIQ

```
azacsnap@eiqdb01cusqa:~/bin> crontab -l
# Data Volume Snapshots - taken daily.
00 23 * * 1,3,5 (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume data --prefix hana_EHQ --retention=2)
# Other Volume Snapshots - taken every 15 minutes,
15,30,45 * * * * (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume other --prefix logs_EHQ --retention=4)
```

EQ2

```
azacsnap@eq2db01cusqa:~/bin> crontab -l
# Data Volume Snapshots - taken daily.
00 23 * * 1,3,5 (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume data --prefix hana_EH2 --retention=2)
# Other Volume Snapshots - taken every 15 minutes,
0,15,30,45 * * * * (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume other --prefix logs_EH2 --retention=4)
azacsnap@eq2db01cusqa:~/bin>
```

EIP

```
azacsnap@eipdb01use2pr:~/bin> crontab -l
# Data Volume Snapshots - taken daily.
0 23 * * * (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume data --prefix hana_EIP --retention=2)
# Other Volume Snapshots - taken every 15 minutes,
15,30,45 * * * * (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume other --prefix logs_EIP --retention=4)
azacsnap@eipdb01use2pr:~/bin>
```

8.1 Scope of Servers

Datamart VMs	Local path	Blob Container	Path
eiqdb01cusqa	/hana/data/EHQ/mnt00001	https://sapstordbbackupcusqa.blob.core.windows.net/eiq	/data/mnt00001
eiqdb02cusqa	/hana/data/EHQ/mnt00002		/data/mnt00002
eiqdb03cusqa	/hana/data/EHQ/mnt00003		/data/mnt00003
eiqdb04cusqa	/hana/backup/EHQ/log/DB_EIQ		/log/DB_EIQ

	/hana/backup/EHQ/log/DB_EQ4		/log/DB_EQ4
	/hana/backup/EHQ/log/SYSTEMDB		/log/SYSTEMDB
eq2db01cusqa	/hana/data/EH2/mnt00001	https://sapstordbbackupcusqa.blob.core.windows.net/eh2	/data/mnt00001
eq2db02cusqa	/hana/data/EH2/mnt00002		/data/mnt00002
eq2db03cusqa	/hana/data/EH2/mnt00003		/data/mnt00003
eq2db04cusqa	/hana/backup/EH2/log/DB_EQ2		/log/DB_EQ2
	/hana/backup/EH2/log/SYSTEMDB		/log/SYSTEMDB
eipdb01use2pr	/hana/data/EHP/mnt00001	https://sapstordbbackupuse2pr.blob.core.windows.net/eip	/data/mnt00001
eipdb02use2pr	/hana/data/EHP/mnt00002		/data/mnt00002
eipdb03use2pr	/hana/data/EHP/mnt00003		/data/mnt00003
eipdb04use2pr	/hana/backup/EHP/log/DB_EIP		/log/DB_EIP
	/hana/backup/EHP/log/SYSTEMDB		/log/SYSTEMDB
eipdb01cusdr	/hana/data/EHP/mnt00001	https://sapstordbbackupcusqa.blob.core.windows.net/dr-eiq	/data/mnt00001
eipdb02cusdr	/hana/data/EHP/mnt00002		/data/mnt00002
eipdb03cusdr	/hana/data/EHP/mnt00003		/data/mnt00003
eipdb04cusdr	/hana/log/EHP/mnt00001		/data/log/
	/hana/log/EHP/mnt00002		/data/log/
	/hana/log/EHP/mnt00003		/data/log/

9 Storage to Blob

In the BHF SAP subscription has the following storage accounts created for Azscnap snapshot data and log blob movement.

S.No	Environment	Storage account
1	Development	sapstordbbackupsuse2dv
2	Quality	sapstordbbackupcusqa
3	Production	sapstordbbackupuse2pr

Note: Development does not have any Scale out HANA servers and hence it is out of scope.

The snapshots taken by AzAcSnap are moved to blob using a shell script that is scheduled in the Datamart servers as below. For reference only EIP server is shown here. The script is attached here for reference.

AzAcSnap blob movement script.txt

Job Schedules:

Data volume snapshots are executed every day at 23:00 UTC. Snapshot is then moved to blob every day at 3:00 UTC.

Log volume snapshots are executed every 15 minutes daily and the snapshot is moved to blob every 15 minutes.

EIQ

```
azacsnap@eiqdb01cusqa:~/bin> crontab -l
# Data Volume Snapshots - taken daily.
00 23 * * 1,3,5 (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume data --prefix hana_EHQ --retention=2)
# Other Volume Snapshots - taken every 15 minutes,
15,30,45 * * * * (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume other --prefix logs_EHQ --retention=4)
```

```
eiqdb01cusqa:~ # crontab -l
#Data Volume Snapshots mnt00001 to blob
00 3 * * 2,4,6 sh /hana/backup/scripts/eiqsnapshottoblobmnt00001.sh

#AZ Sync script for Systemdb
*/15 * * * * sh /hana/backup/scripts/EIQSYSTEMDB.sh
eiqdb01cusqa:~ #
```

```
eiqdb02cusqa:~ # crontab -l
#Data Volume Snapshots mnt00002 to blob
00 3 * * 2,4,6 sh /hana/backup/scripts/eiqsnapshottoblobmnt00002.sh


#AZ Script for DB_EQ4
*/15 * * * * sh /hana/backup/scripts/DB_EQ4.sh
eiqdb02cusqa:~ #
```

```
eiqdb03cusqa:~ # crontab -l
#Data Volume Snapshots mnt00003 to blob
00 3 * * 2,4,6 sh /hana/backup/scripts/eiqsnapshottoblobmnt00003.sh

#AZ Script for DB_EIQ
*/15 * * * * sh /hana/backup/scripts/DB_EIQ.sh

eiqdb03cusqa:~ #
```

```
eiqdb04cusqa:~ # crontab -l
#HANALOGCleanup
0 22 * * * sh /hana/backup/scripts/logEIQDel.sh
0 22 * * * sh /hana/backup/scripts/logEQ4Del.sh
0 22 * * * sh /hana/backup/scripts/logEIQSYSDBDel.sh
eiqdb04cusqa:~ #
```

EQ2

```
azacsnap@eq2db01cusqa:~/bin> crontab -l
# Data Volume Snapshots - taken daily.
00 23 * * 1,3,5 (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume data --prefix hana_EH2 --retention=2)
# Other Volume Snapshots - taken every 15 minutes,
0,15,30,45 * * * * (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume other --prefix logs_EH2 --retention=4)
azacsnap@eq2db01cusqa:~/bin>
```

```
eq2db01cusqa:~ # crontab -l
#Data Volume Snapshots mnt00001 to blob
00 3 * * 2,4,6 sh /hana/backup/scripts/eq2snapshottoblobmnt00001.sh
eq2db01cusqa:~ #
```

```
eq2db02cusqa:~ # crontab -l
#Data Volume Snapshots mnt00002 to blob
00 3 * * 2,4,6 sh /hana/backup/scripts/eq2snapshottoblobmnt00002.sh


#AZ Sync script for DB_EQ2
*/15 * * * * sh /hana/backup/scripts/DB_EQ2.sh

eq2db02cusqa:~ #
```

```
eq2db03cusqa:~ # crontab -l
#Data Volume Snapshots mnt00003 to blob
00 3 * * 2,4,6 sh /hana/backup/scripts/eq2snapshottoblobmnt00003.sh


#AZ Sync script for Systemdb
*/15 * * * * sh /hana/backup/scripts/EQ2SYSTEMDB.sh

eq2db03cusqa:~ #
```

```
eq2db04cusqa:~ # crontab -l
#HANALOGCleanup
0 22 * * * sh /hana/backup/scripts/logEQ2Del.sh
0 22 * * * sh /hana/backup/scripts/logEQ2SYSDBDel.sh
eq2db04cusqa:~ #
```

EIP

```
azacsnap@eipdb01use2pr:~/bin> crontab -l
# Data Volume Snapshots - taken daily.
0 23 * * * (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume data --prefix hana_EIP --retention=2)
# Other Volume Snapshots - taken every 15 minutes,
15,30,45 * * * * (. /home/azacsnap/.profile ; cd /home/azacsnap/bin ; azacsnap -c backup --volume other --prefix logs_EIP --retention=4)
azacsnap@eipdb01use2pr:~/bin>
```

```
eipdb01use2pr:~ # crontab -l
#Data Volume Snapshots mnt0001 to blob
0 3 * * * sh /hana/backup/scripts/snapshottoblobmnt00001.sh
eipdb01use2pr:~ #
```

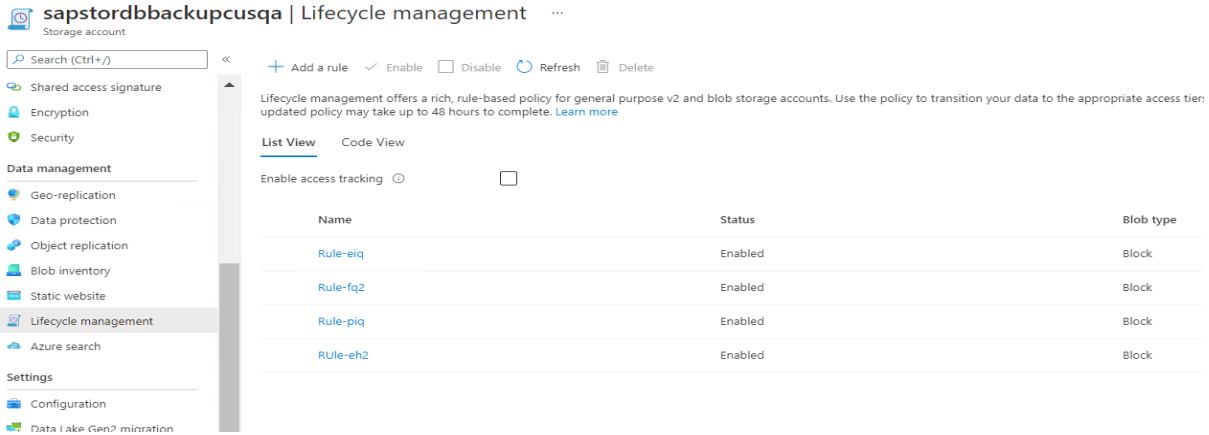
```
eipdb02use2pr:~ # crontab -l
#Data Volume Snapshots mnt0002 to blob
0 3 * * * sh /hana/backup/scripts/snapshottoblobmnt00002.sh

#AZ Sync script for DB_EIP
*/15 * * * * sh /hana/backup/scripts/DB_EIP.sh
eipdb02use2pr:~ #
```

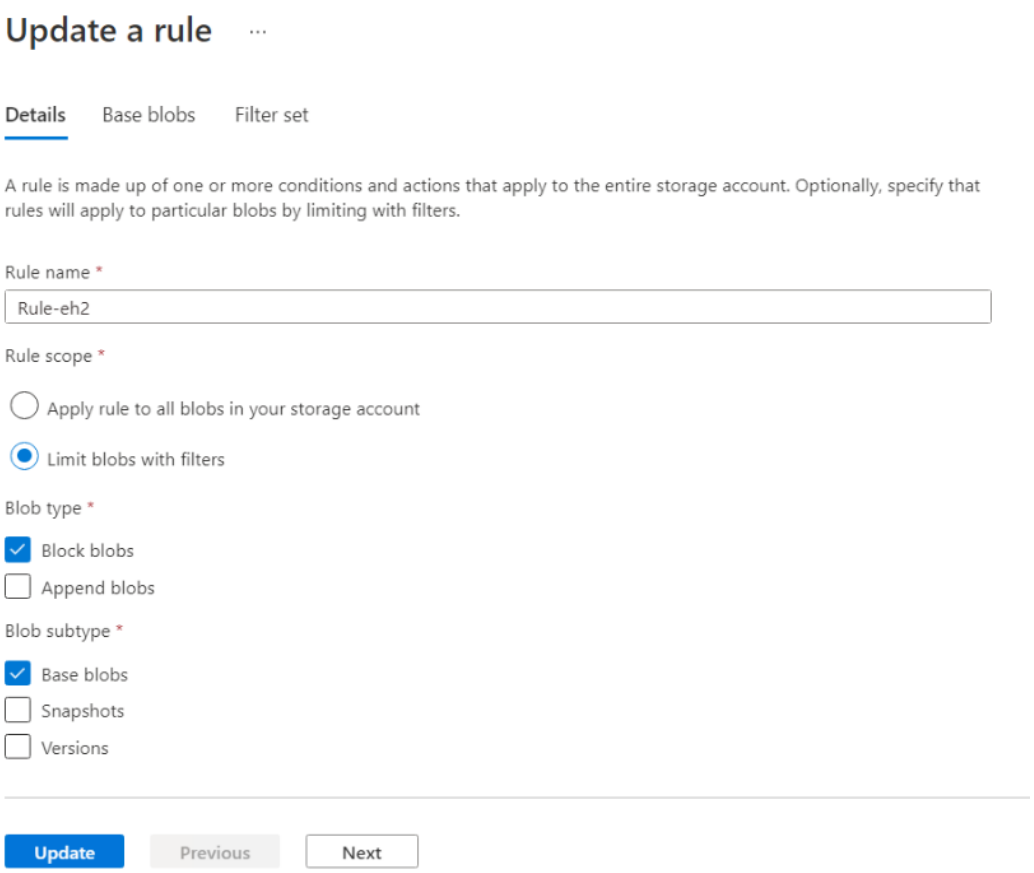
```
eipdb03use2pr:~ # crontab -l
#Data Volume Snapshots mnt0003 to blob
0 3 * * * sh /hana/backup/scripts/snapshottoblobmnt00003.sh

#AZ Sync script for Systemdb
*/15 * * * * sh /hana/backup/scripts/SYSTEMDB.sh
eipdb03use2pr:~ #
```

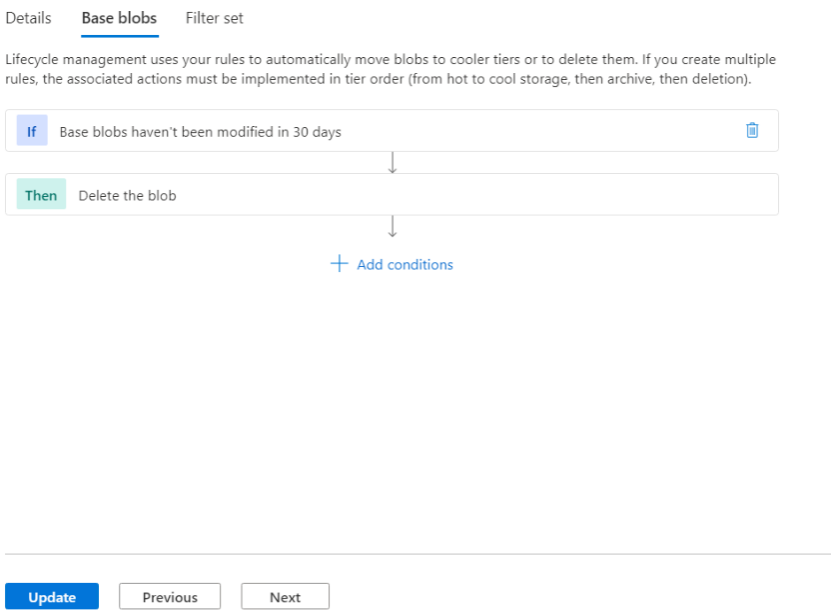
```
eipdb04use2pr:~ # crontab -l
#HANALOGCleanup
0 22 * * * sh /hana/backup/scripts/logdeletionDB_EIP.sh
0 22 * * * sh /hana/backup/scripts/logdeletionSYSTEMDB.sh
eipdb04use2pr:~ #
```

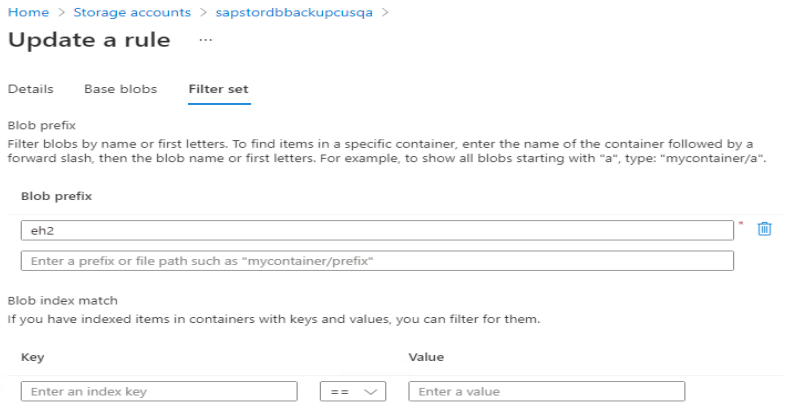
10 Blob Lifecyle

The Blob retention is 30days for both Data and Log. From the storage account, navigate to Lifecycle Management of the containers and choose EQ2 and set the retention policies as shown below.




Update a rule
Details
Base blobs
Filter set
A rule is made up of one or more conditions and actions that apply to the entire storage account. Optionally, specify that rules will apply to particular blobs by limiting with filters.
Rule name *
Rule-eh2
Rule scope *
Apply rule to all blobs in your storage account
Limit blobs with filters
Blob type *
Block blobs
Append blobs
Blob subtype *
Base blobs
Snapshots
Versions
Update
Previous
Next


Details
Base blobs
Filter set
Lifecycle management uses your rules to automatically move blobs to cooler tiers or to delete them. If you create multiple rules, the associated actions must be implemented in tier order (from hot to cool storage, then archive, then deletion).
If
Base blobs haven't been modified in 30 days
Then
Delete the blob
Add conditions
Update
Previous
Next



11 HANA Log Cleaner

We have scheduled the cron job on the EIQ/EQ2/EIP(Node 4) to delete the log backup files older than 2 weeks.

```
eipdb04use2pr:~ # crontab -l
#HANALOGCleanup
0 22 * * * sh /hana/backup/scripts/logdeletionDB_EIP.sh
0 22 * * * sh /hana/backup/scripts/logdeletionSYSTEMDB.sh
eipdb04use2pr:~ # cat /hana/backup/scripts/logdeletionDB_EIP.sh
find /hana/backup/EHP/log/DB_EIP/ -type f -mtime +14 -delete
eipdb04use2pr:~ # cat /hana/backup/scripts/logdeletionSYSTEMDB.sh
find /hana/backup/EHP/log/SYSTEMDB/ -type f -mtime +14 -delete
eipdb04use2pr:~ #
```

12 Backup Schedule

Environment	Backup	Type	Tool	Backup Policy	Retention period	
					Local Disk in days	Blob in days
Non Prod (QA)	Snapshot	HANA DATA Disks(mnt00001,mnt00002,mnt003)	AZACSNAP	MON, WED, FRI - 11 PM UTC	2	30
		HANA LOG Disks (mnt00001,mnt00002,mnt003)	AZACSNAP	every 15 minutes	4	30
		HANA SHARED / HANA BACKUP	Azure Net App	MON, WED, FRI - 11 PM UTC	10	
	DB	HANA DB	AZACSNAP	MON, WED, FRI - 11 PM UTC	2	30
	DB	HANA DB(Copy to Blob)	Azcopy	TUE, THUR, SAT - 3 AM UTC		
	Log Files	/hana/backup/log	Azcopy	every 15 minutes	14	30
	Log Cleanup	Log files cleanup	find mytype to del	Daily @ 10 PM UTC	14	
Prod	Snapshot	HANA DATA(mnt00001,mnt00002,mnt003)	AZACSNAP	Daily @ 11 PM UTC	2	30
		HANA LOG(mnt00001,mnt00002,mnt003)	AZACSNAP	every 15 minutes	4	30
		HANA SHARED / HANA BACKUP	Azure Net App	Daily @ 11 PM UTC	7	
	DB	HANA DB	AZACSNAP	Daily @ 11 PM UTC	2	30
	DB	HANA DB(Copy to Blob)	Azcopy	Daily @ 3 AM UTC		
	Log Files	/hana/backup/log	Azcopy	every 15 minutes	14	30
	Log Cleanup	Log files cleanup	find mytype to del	Daily @ 10 PM UTC	14	

DR	Snapshot	HANA DATA(mnt00001,mnt00002,mnt003)	AZACSNAP	Daily @ 11 PM UTC	2	30
		HANA LOG(mnt00001,mnt00002,mnt003)	AZACSNAP	every 15 minutes	4	30
		HANA SHARED / HANA BACKUP	Azure Net App	Daily @ 11 PM UTC	7	
	DB	HANA DB	AZACSNAP	Daily @ 11 PM UTC	2	30
	DB	HANA DB(Copy to Blob)	Azcopy	Daily @ 3 AM UTC		
	Log Files	/hana/backup/log	Azcopy	every 15 minutes	14	30
	Log Cleanup	Log files cleanup	find mytype to del	Daily @ 10 PM UTC	14	