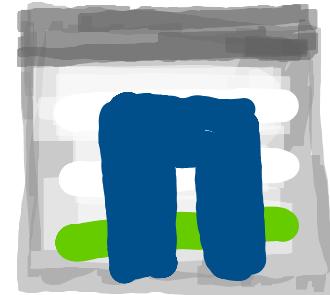
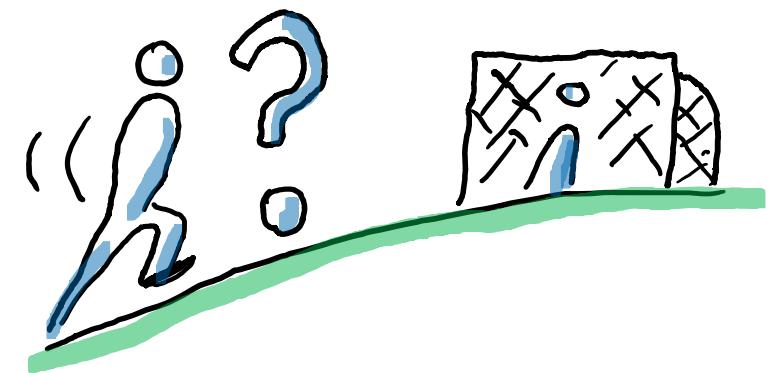


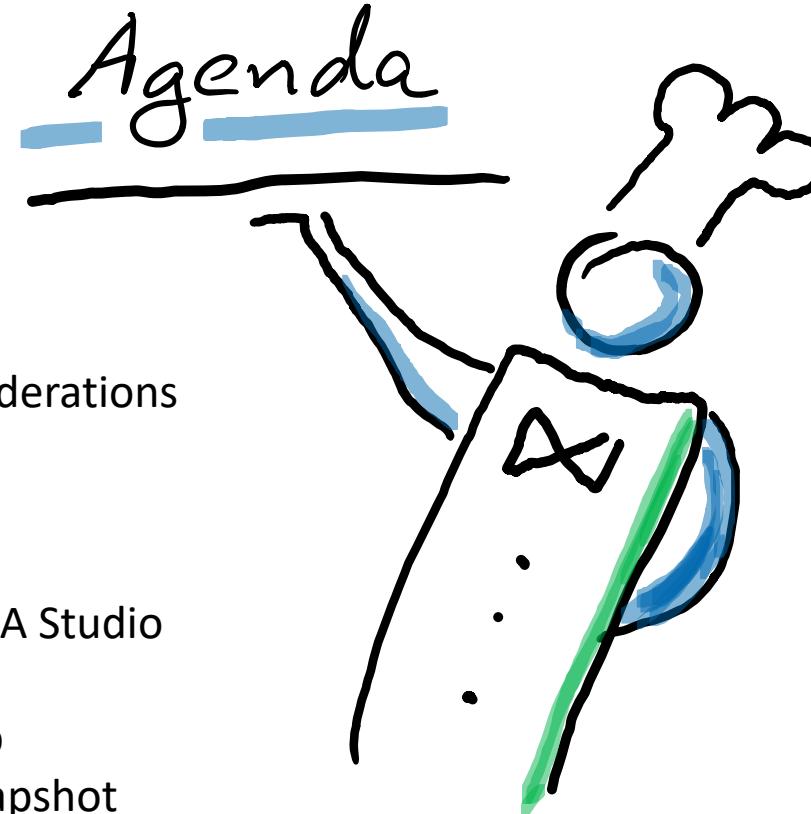


on



## Part II Backup





- Performance Considerations
- Backup Options
- Backup Parameter
- Volume Design
- NSG Setup for HANA Studio
- Azure CLI for ANF
- Configure azacsnap
- Revert an older Snapshot
- Backup to Blob

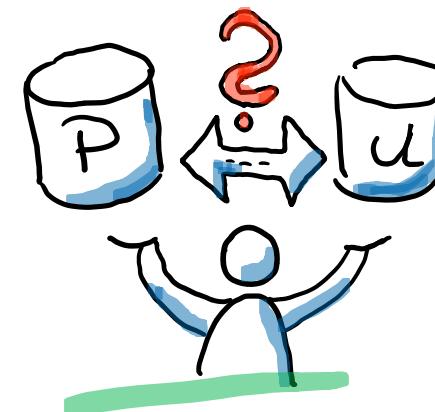
# Sizing Considerations

min KPI's from SAP

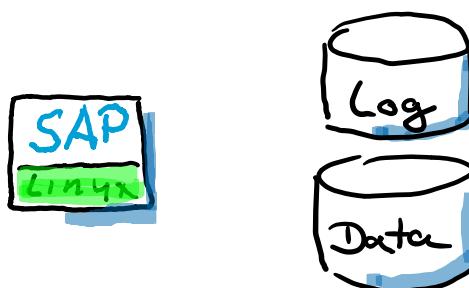
250 MB/s Log Volume write

400 MB/s Data Volume read

**no KPI's for Log-Backup, Backup and shared**



CP Premium



$$64\text{MB/s} \times 4\text{TB} = 256\text{MB/s}$$

$$64\text{MB/s} \times 6.25\text{TB} = 400\text{MB/s}$$

CP Ultra



$$128\text{MB/s} \times 2\text{TB} = 256\text{MB/s}$$

$$128\text{MB/s} \times 3.2\text{TB} = 400\text{MB/s}$$

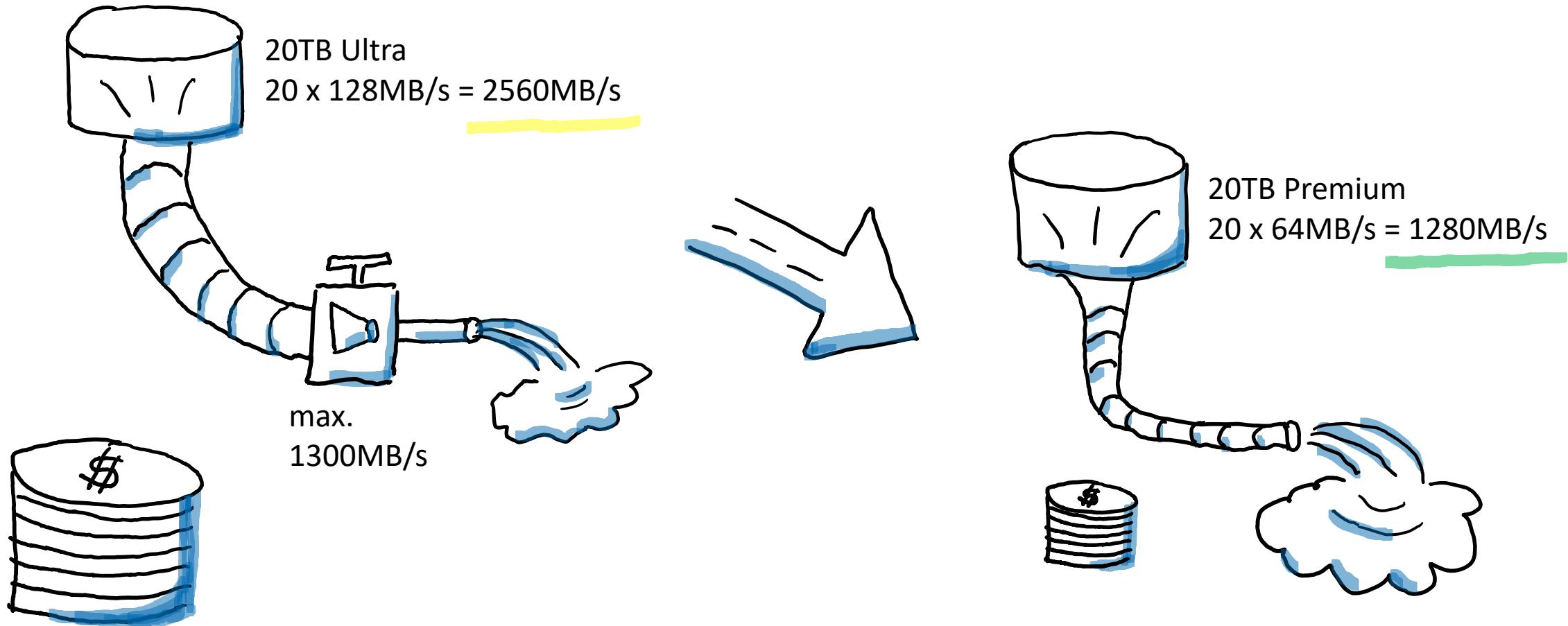
$$64\text{MB/s} \times 10.25\text{TB Premium}$$



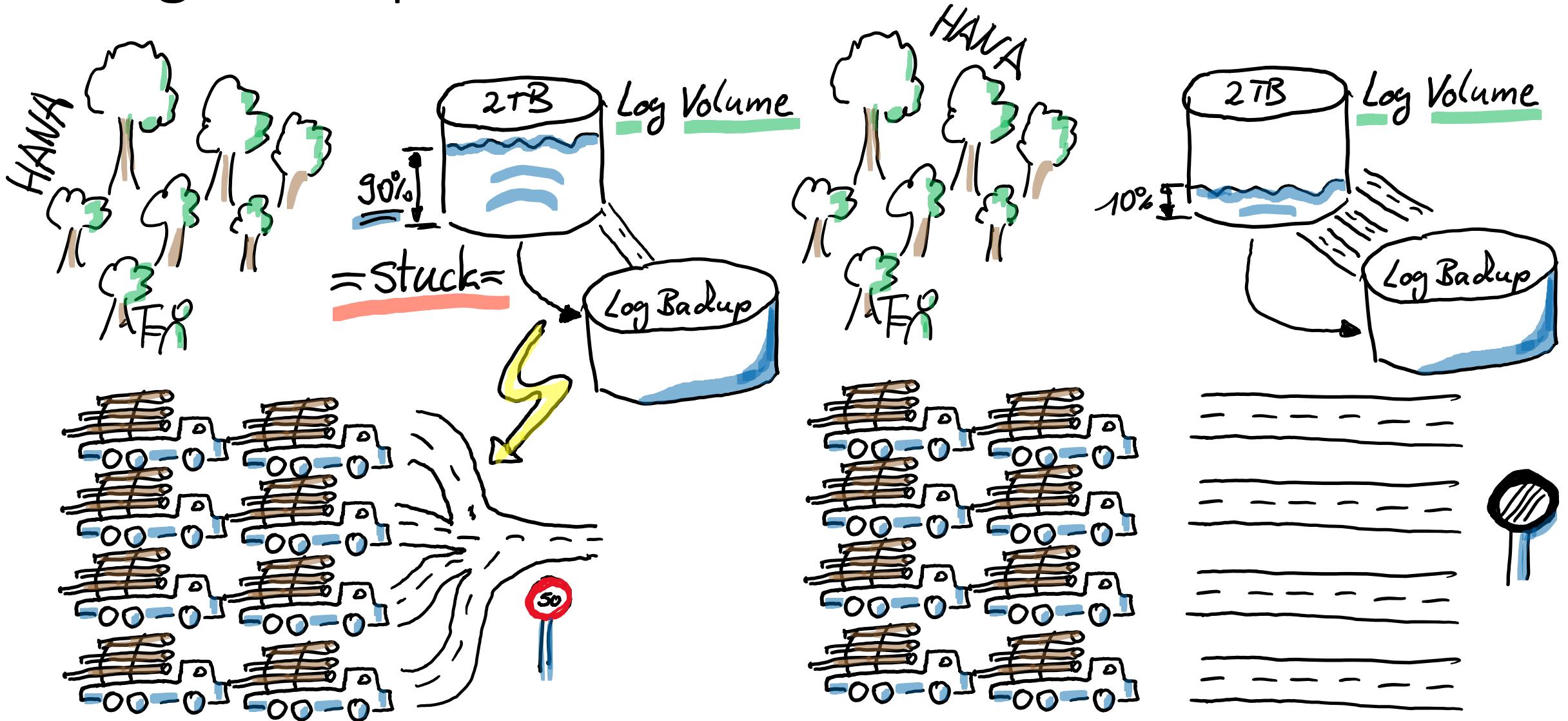
$$128\text{MB/s} \times 5.2\text{TB Ultra}$$



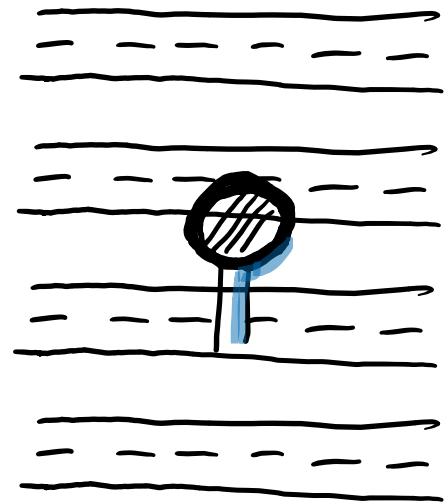
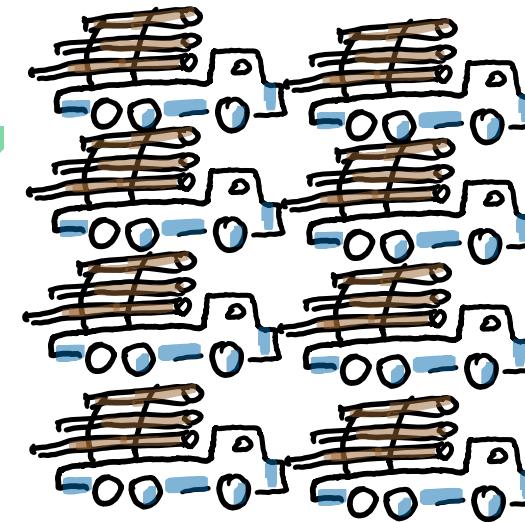
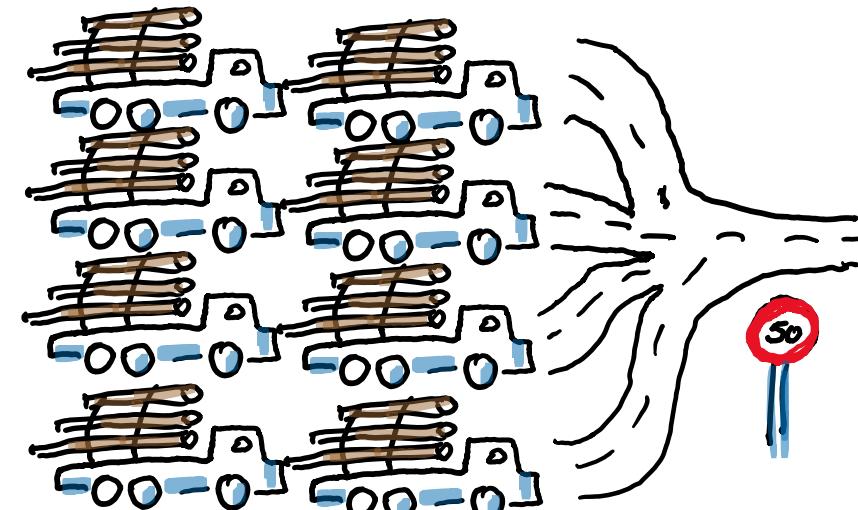
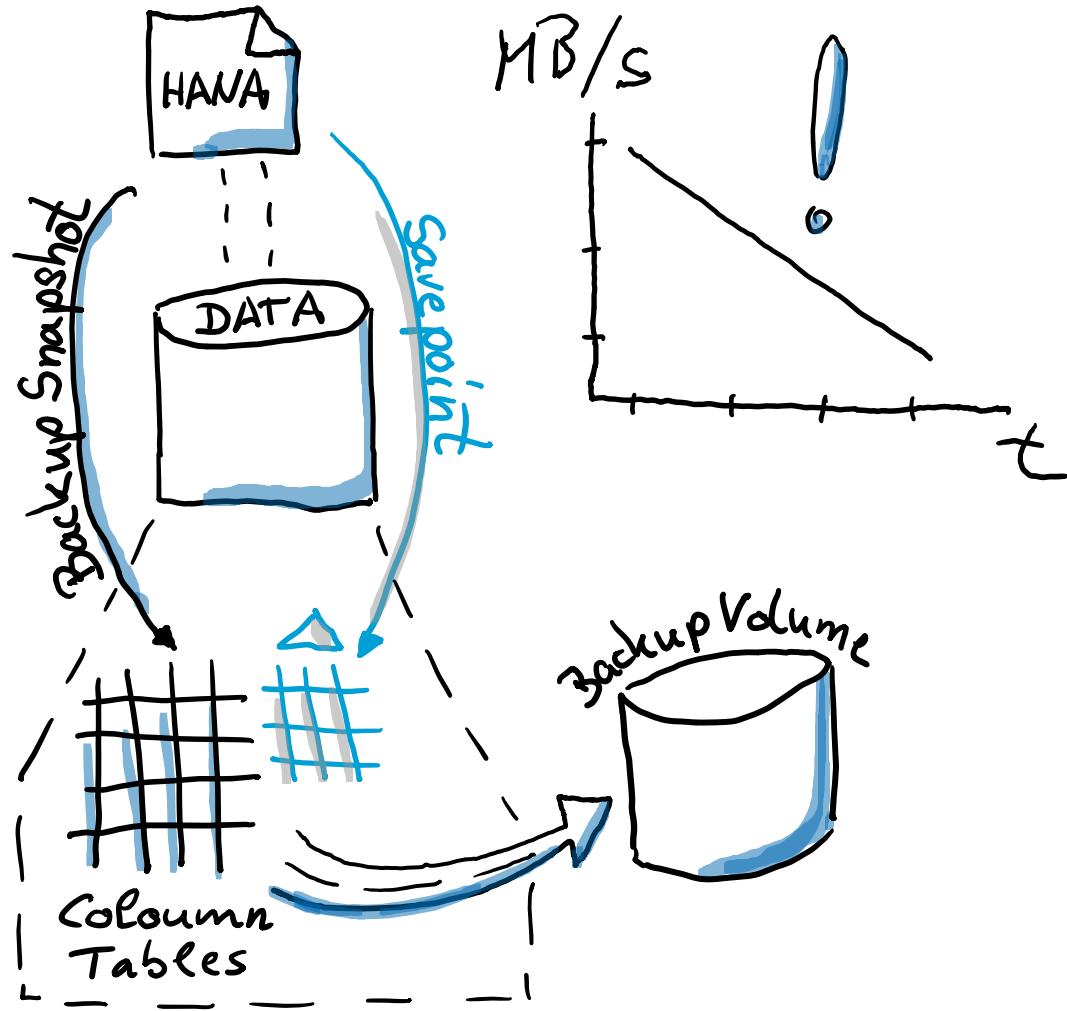
# Performance Considerations



# Log Backup Performance

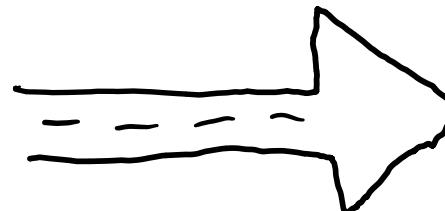
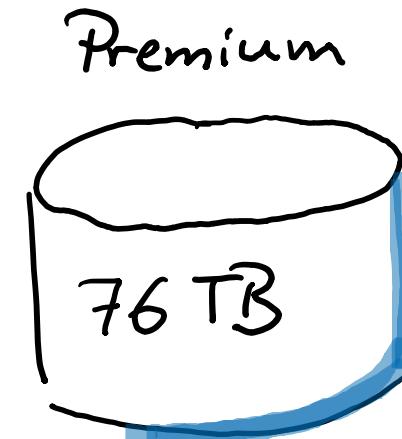


# Data Backup Performance



# Data Backup Performance

Customer Case 76 TB Backup Volume



$$76 \times 64 \text{ MB/s} = 4.86 \text{ GB/s}$$

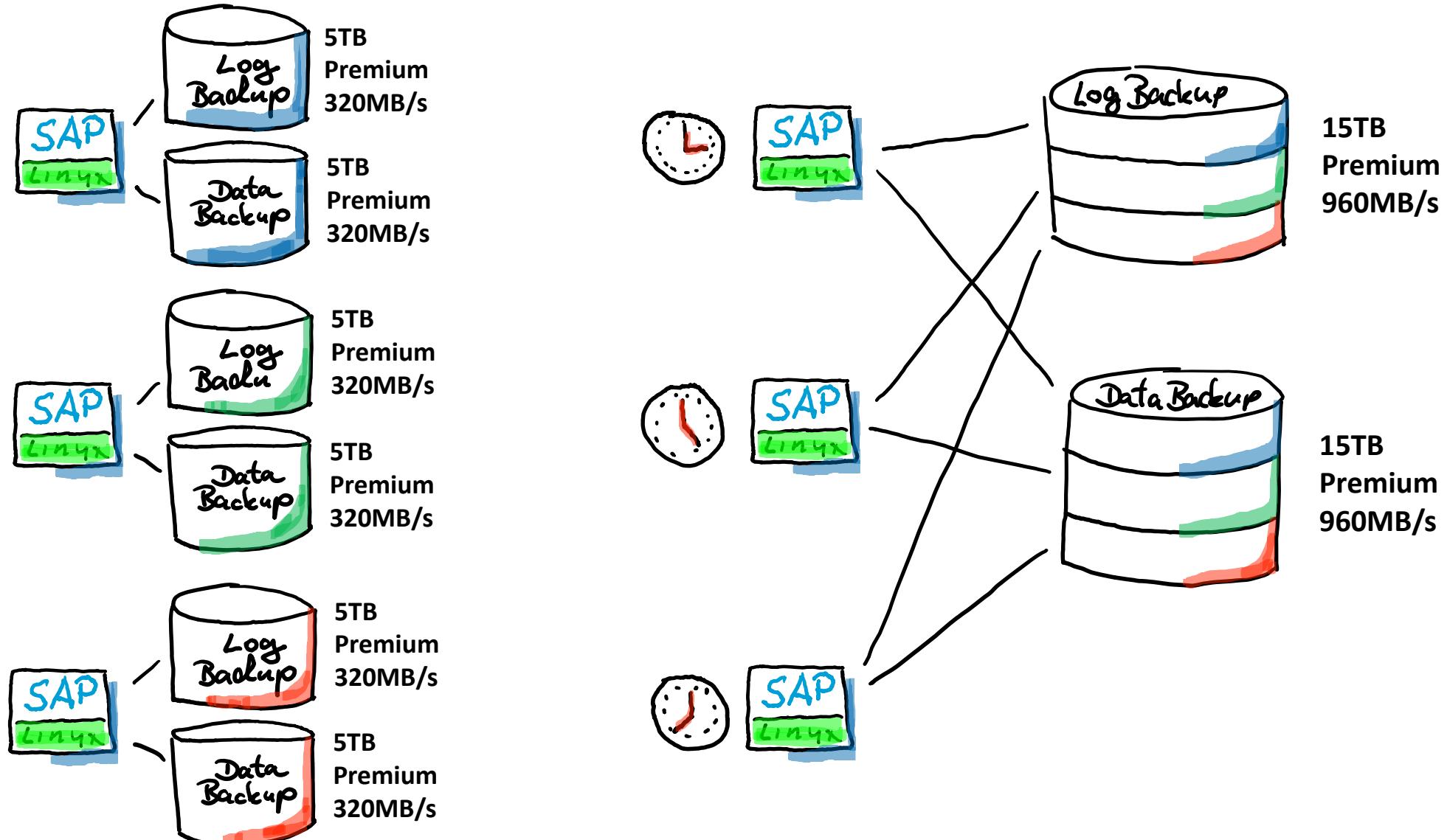
≈ 460 \$/Day

$$80 \times 16 \text{ MB/s} = 1280 \text{ MB/s}$$

≈ 250 \$/Day

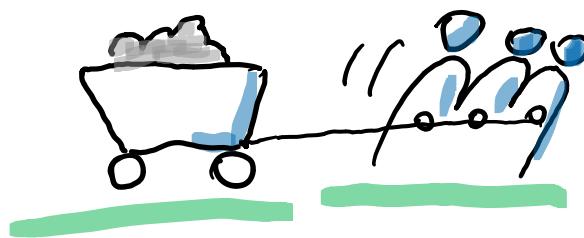
saving 70k \$/Year

# Consolidating Backup Volumes



# Backup - Options

Default NFS Backup

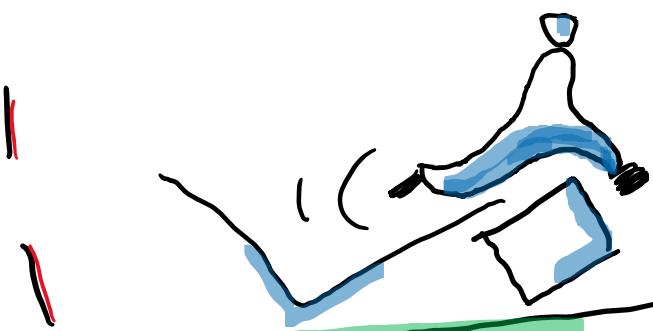


GitHub NetApp Script

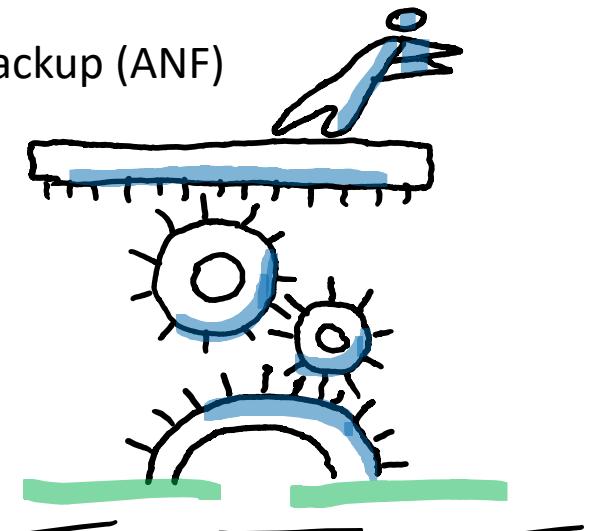


<https://github.com/netapp/ntaphana>

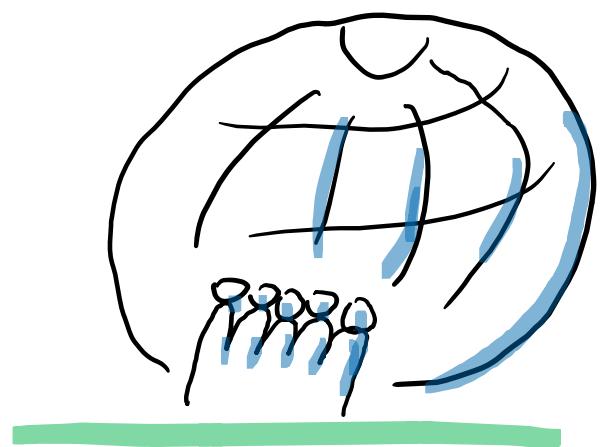
azacsnap (private preview)



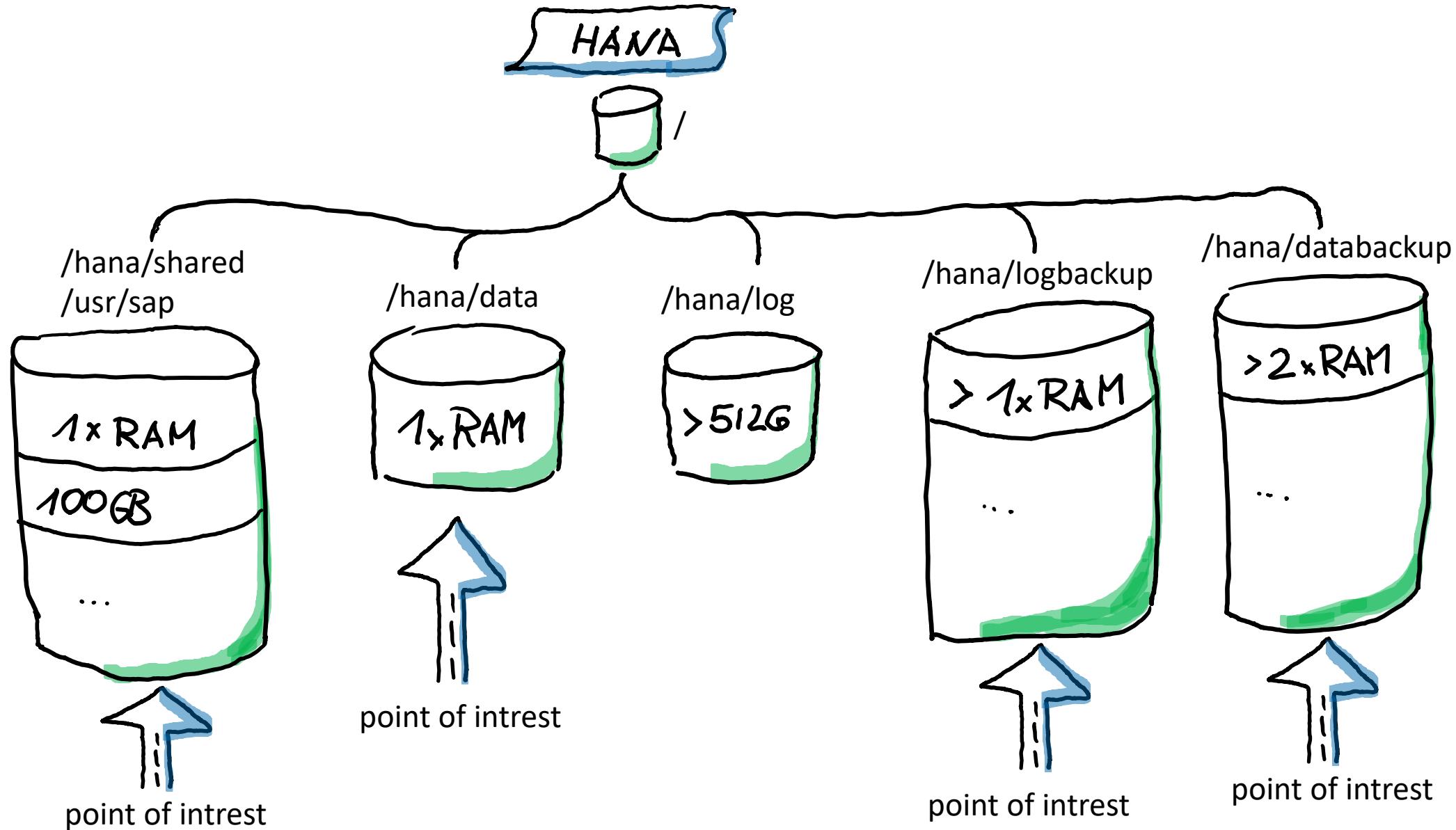
az backup (ANF)



Commvault IntelliSnap >=11.21



# Volume Design Single Node

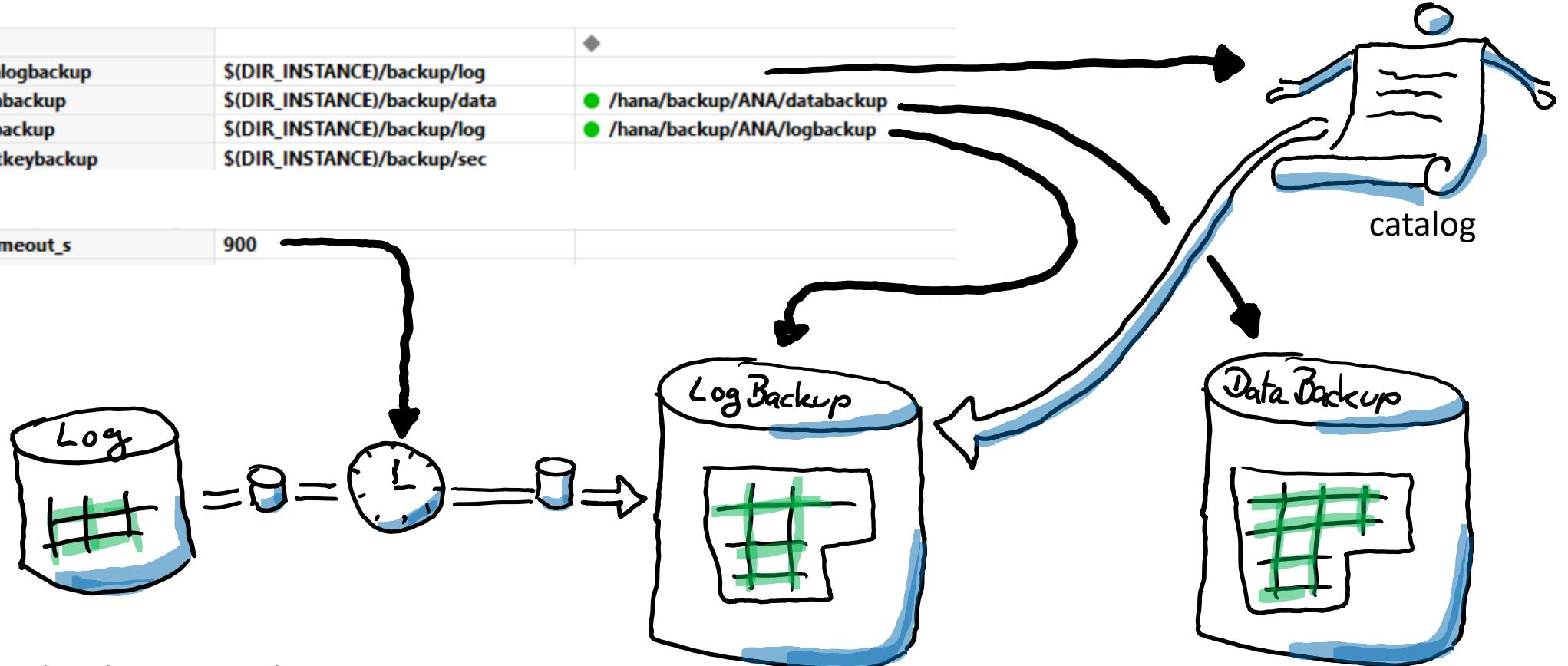


# Backup Parameter

`$(DIR_INSTANCE) = /hana/shared/<SID>/HDB<ID>/backup/`

persistence	
basepath_catalogbackup	<code>\$(DIR_INSTANCE)/backup/log</code>
basepath_databackup	<code>\$(DIR_INSTANCE)/backup/data</code>
basepath_logbackup	<code>\$(DIR_INSTANCE)/backup/log</code>
basepath_rootkeybackup	<code>\$(DIR_INSTANCE)/backup/sec</code>

log_backup_timeout_s	900
----------------------	-----



/hana/log/SID/mnt0001/  
→ hdb0001 → SYSTEMDB  
→ hdb0002 → XS Engine  
→ hdb0003 → TenantDB

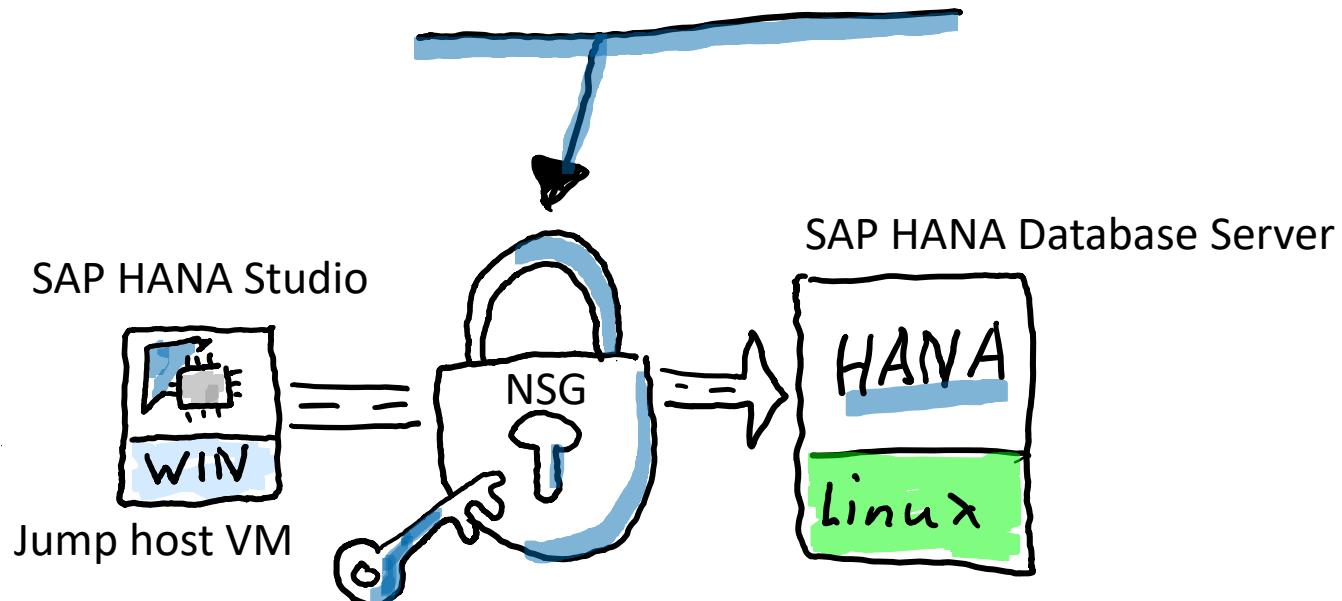
/hana/backup/SID/logbackup  
→ SYSTEMDB  
→ DB\_SID

/hana/backup/SID/databackup  
→ SYSTEMDB  
→ DB\_SID

# NSG Setup for HANA Studio

## Inbound security rules

Priority	Name	Port	Protocol	Source	Destination	Action
1010	⚠ ssh	22	TCP	Any	Any	✓ Allow
1020	HANA_Studio	1128,1129,30013,30015,50013,50015	TCP	Any	Any	✓ Allow



The Port number must be set to the right HANA ID number  
 3<00>13, 3<00>15 for ID = 00  
 3<20>13 and 3<20>15 for the ID=20

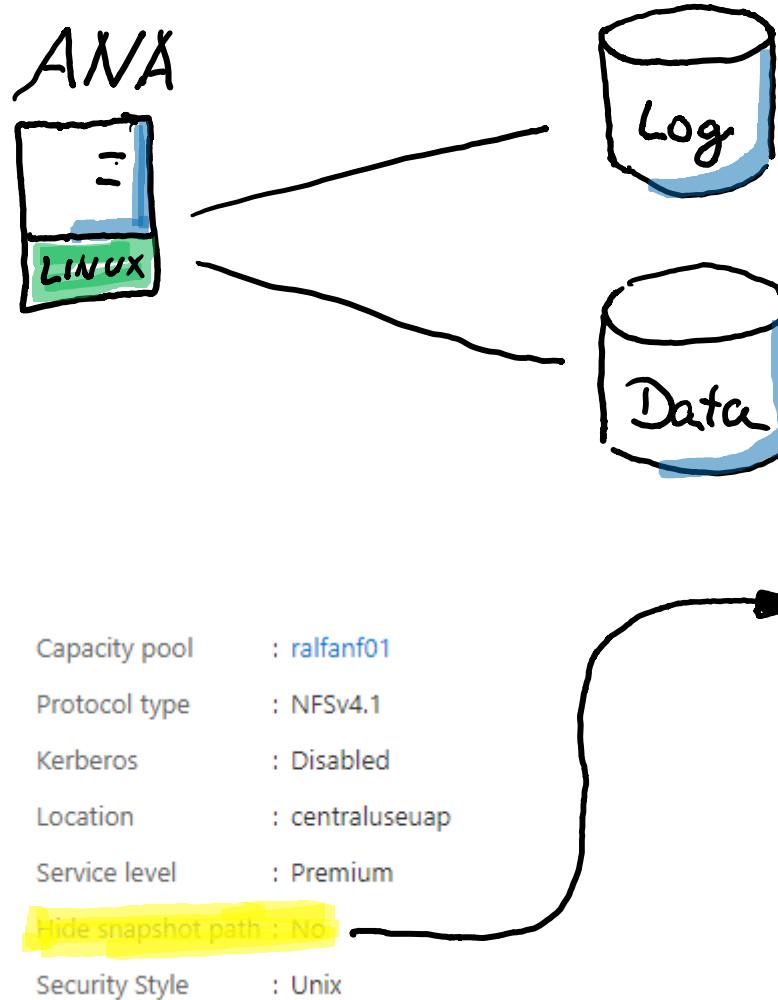
# Azure CLI for ANF – List Volume

```
az login

az netappfiles volume show -g ralfAFSrg --account-name ralfanftest01 --pool-name ralfanf01 --volume-name
raldanfdata01
Command group 'netappfiles' is in preview. It may be changed/removed in a future release.
{
    ...
    "rules": [
        {
            "allowedClients": "0.0.0.0/0",
            ...
            "nfsv41": true,
            ...
            "ipAddress": "10.4.2.5",
            ...
        "serviceLevel": "Premium",
        ...
        "usageThreshold": 1099511627776,
    }
```



# SnapShot Directory



The SnapShot folder is located in the same volume where also the data files persist. It is a **read only** hidden directory.  
**Backup the data within a snapshot to protect the customer data!!!**  
 A single SnapShot is always a **full view** of the data – not a **delta!!!**

```
ralfafsvm01:/hana/data/ANA/mnt00001 # ls -la
total 16
drwxr-x--- 5 anaadm sapsys 4096 Oct  5 09:06 .
drwxr-x--- 3 anaadm sapsys 22 Sep 24 08:48 ..
drwxr-x--- 2 anaadm sapsys 4096 Oct  7 13:06 hdb00001
drwxr-xr-- 2 anaadm sapsys 4096 Oct  7 13:06 hdb00002.00003
drwxr-xr-- 2 anaadm sapsys 4096 Sep 24 11:13 hdb00003.00003
-rw-r--r-- 1 anaadm sapsys 21 Oct  7 13:28 nameserver.lck
```

```
ralfafsvm01:/hana/data/ANA/mnt00001 # cd .snapshot
ralfafsvm01:/hana/data/ANA/mnt00001/.snapshot # ls -l
total 20
drwxr-x--- 5 anaadm sapsys 4096 Oct  5 09:06 hana_hourly_2020-10-07T082Z
drwxr-x--- 5 anaadm sapsys 4096 Oct  5 09:06 hana_hourly_2020-10-07T167Z
drwxr-x--- 5 anaadm sapsys 4096 Oct  5 09:06 hana_hourly_2020-10-07T128Z
drwxr-x--- 5 anaadm sapsys 4096 Oct  5 09:06 hana_hourly_2020-10-07T049Z
drwxr-x--- 5 anaadm sapsys 4096 Oct  5 09:06 hana_hourly_2020-10-07T175Z
```

# When you Revert older Snapshots

When you revert a volume with an older Snapshot all newer taken snapshots will be deleted!!!  
The recovery order should always start with the newest snapshot!!!



Demo00001 (ralfanftest01/ralfanf01/Demo00001) | Snapshots

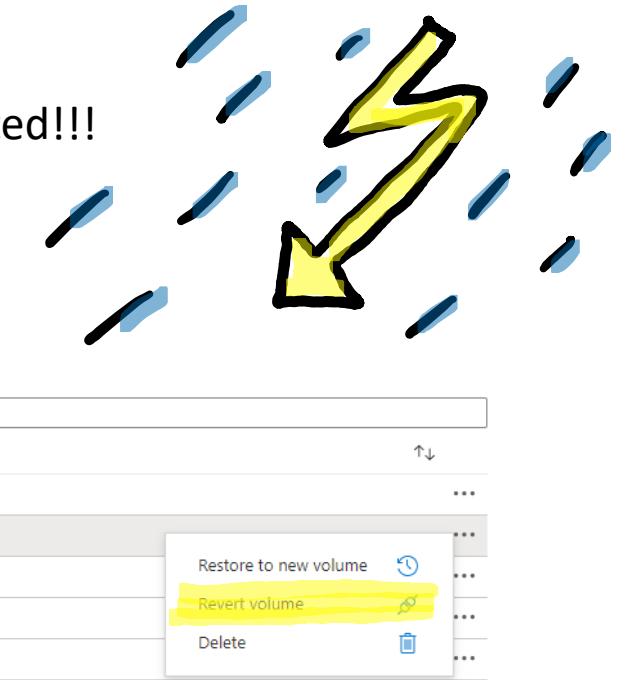
Search (Ctrl+ /) Add snapshot Refresh

Overview Activity log Access control (IAM) Tags

Settings Properties Locks

Search snapshots

Name
snapshot0001
snapshot0002
snapshot0003
snapshot0004
snapshot0005



Demo00001 (ralfanftest01/ralfanf01/Demo00001) | Snapshots

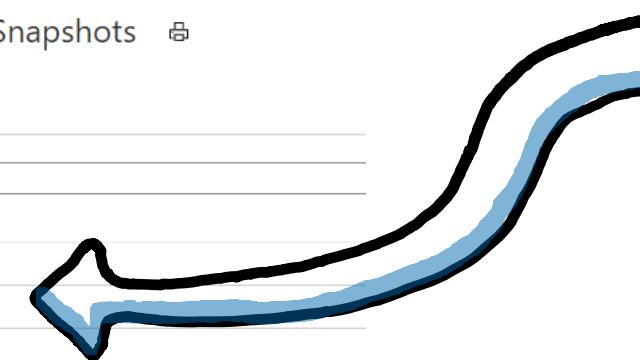
Search (Ctrl+ /) Add snapshot Refresh

Overview Activity log Access control (IAM) Tags

Settings

Search snapshots

Name
snapshot0001
snapshot0002



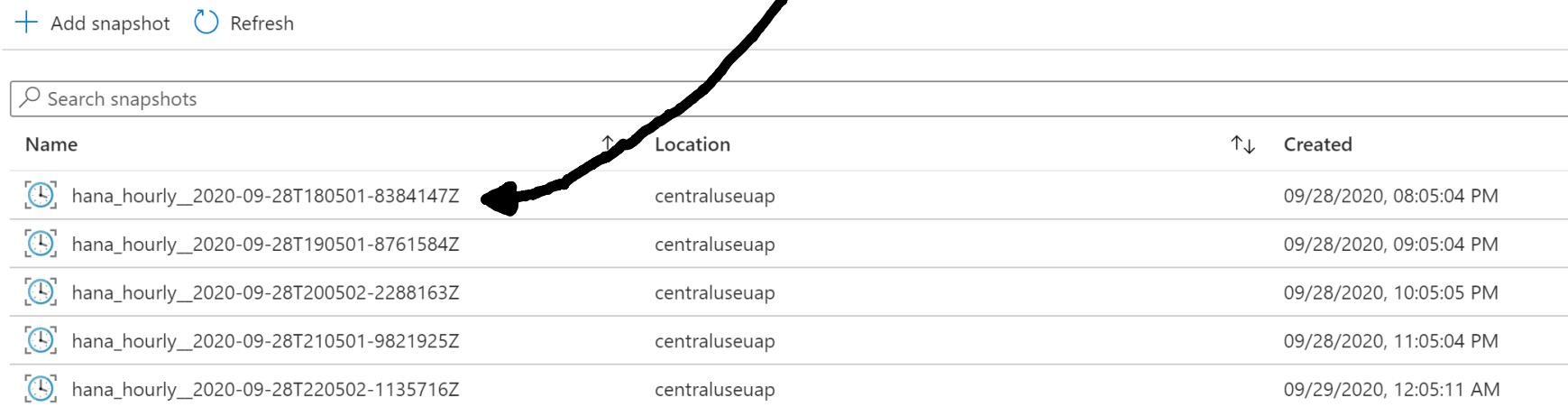
# Azure CLI for ANF – List SnapShots

```
az login
```

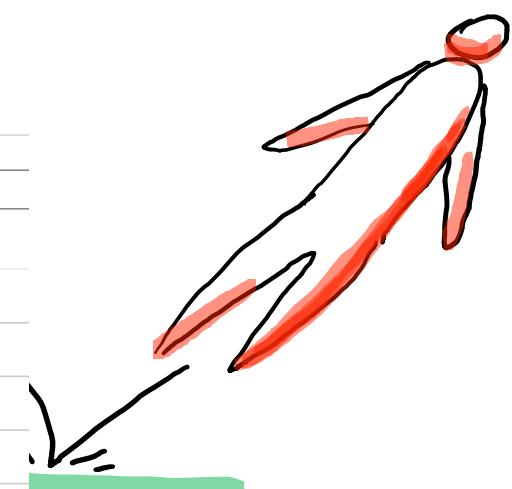
```
az netappfiles snapshot list -g ralfAFSrg --account-name ralfanftest01 --pool-name ralfanf01 --volume-name raldanfdata01
```

Command group 'netappfiles' is in preview. It may be changed/removed in a future release.

```
[  
 {  
   "created": "2020-09-28T18:05:04+00:00",  
   "id": "/subscriptions/SUB-  
ID/resourceGroups/ralfAFSrg/providers/Microsoft.NetApp/netAppAccounts/ralfanftest01/capacityPools/ralfanf0  
1/volumes/ralfanfdata01/snapshots/hana_hourly_2020-09-28T180501-8384147Z",  
   "location": "centraluseuap",  
   "name": "ralfanftest01/ralfanf01/ralfanfdata01/hana_hourly_2020-09-28T180501-8384147Z",  
   "provisioningState": "Succeeded",
```



Name	Location	Created
hana_hourly_2020-09-28T180501-8384147Z	centraluseuap	09/28/2020, 08:05:04 PM
hana_hourly_2020-09-28T190501-8761584Z	centraluseuap	09/28/2020, 09:05:04 PM
hana_hourly_2020-09-28T200502-2288163Z	centraluseuap	09/28/2020, 10:05:05 PM
hana_hourly_2020-09-28T210501-9821925Z	centraluseuap	09/28/2020, 11:05:04 PM
hana_hourly_2020-09-28T220502-1135716Z	centraluseuap	09/29/2020, 12:05:11 AM



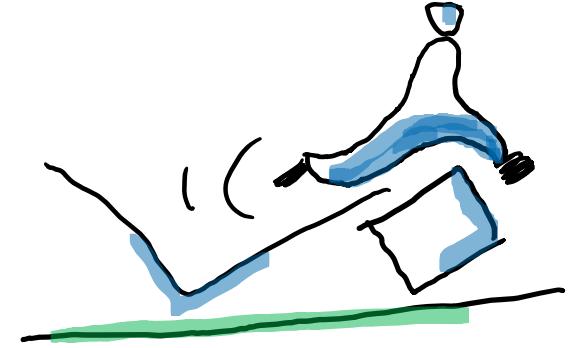


# Configure azacsnap to create a Application aware SnapShot

Log-in to the Azure Portal and start the CLI

Create a service principal using Azure CLI per the following example

```
user@Azure> az account show
user@Azure> az account set -s <subscription name or id>
user@Azure> az ad sp create-for-rbac --sdk-auth
{
    "clientId": "00aa000a-aaaa-0000-00a0-00aa000aaa0a",
    "clientSecret": "00aa000a-aaaa-0000-00a0-00aa000aaa0a",
    "subscriptionId": "00aa000a-aaaa-0000-00a0-00aa000aaa0a",
    "tenantId": "00aa000a-aaaa-0000-00a0-00aa000aaa0a",
    "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"
}
```



save the output to [/tmp/azureauth.json](#)

# Configure azacsnap

Install and setup the azacsnap tool

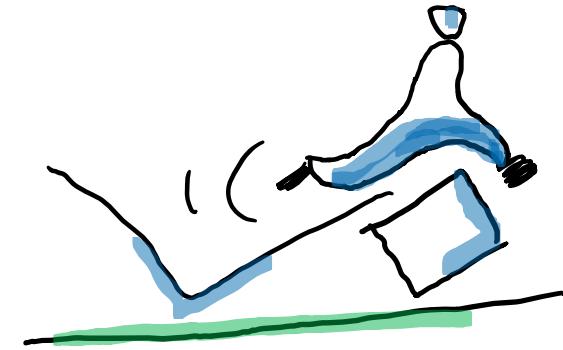
```
su - (this is a root task)
chmod 755 azacsnap_installer_v5.0_Preview_Build_20200916.21051.run
./azacsnap_installer_v5.0_Preview_Build_20200916.21051.run -I

su - azacsnap
mv /tmp/azureauth.json ./bin/
hdbuserstore Set AZACSNAP ralfafsvm01:30013 system <PASSWORD>

cd bin/
azacsnap -c configure --configuration new
azacsnap -c test --test hana
azacsnap -c test --test storage

azacsnap -c backup --volume data --prefix hana_hourly --retention 5 --trim

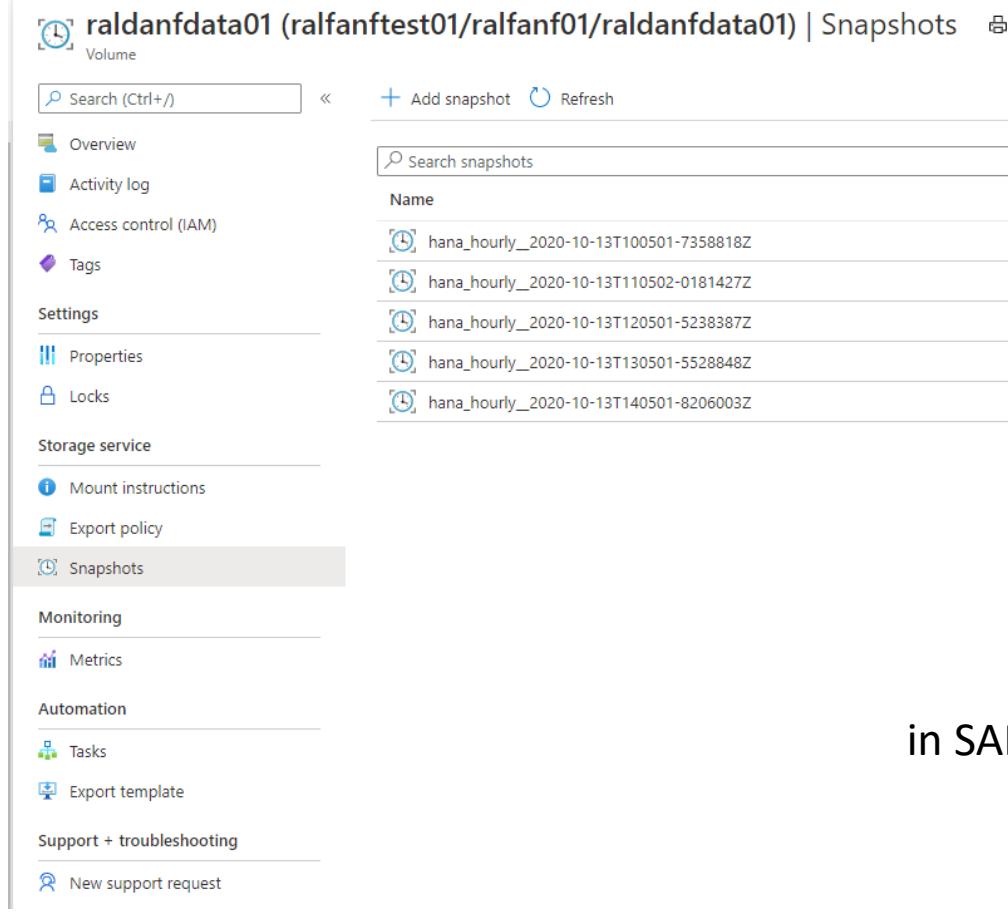
crontab -e
5 * * * * ( . ~/.profile ; cd /home/azacsnap/bin ; ./azacsnap -c backup --volume=data
--prefix=hana_hourly --retention=5 --trim --configfile=azacsnap.json)
```



# Configure azacsnap

After the azacsnap is scheduled for a while we will see the snapshots coming

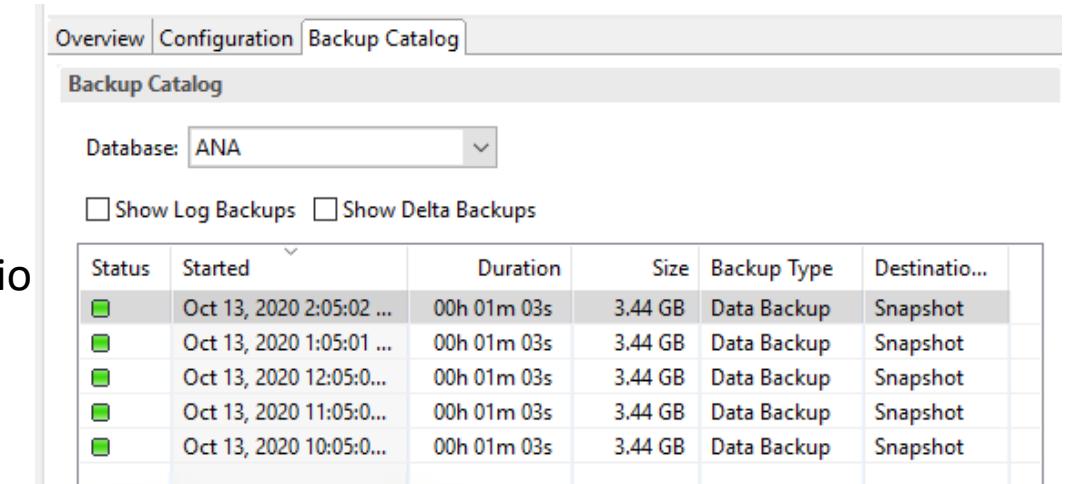
In Azure



The screenshot shows the Azure Storage Snapshots blade for the volume 'raldanfdata01'. The left sidebar includes links for Overview, Activity log, Access control (IAM), Tags, Properties, Locks, Mount instructions, Export policy, and Snapshots (which is selected). The main area displays a table of snapshots with columns for Name and Location. The snapshots listed are:

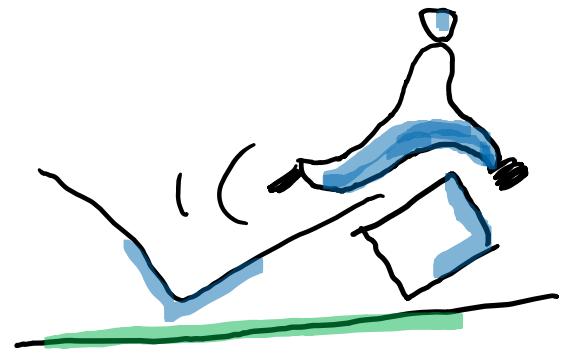
Name	Location
hana_hourly_2020-10-13T100501-7358818Z	centraluseuap
hana_hourly_2020-10-13T110502-0181427Z	centraluseuap
hana_hourly_2020-10-13T120501-5238387Z	centraluseuap
hana_hourly_2020-10-13T130501-5528848Z	centraluseuap
hana_hourly_2020-10-13T140501-8206003Z	centraluseuap

in SAP HANA Studio



The screenshot shows the SAP HANA Studio interface with the 'Backup Catalog' tab selected. The 'Database' dropdown is set to 'ANA'. Below it are checkboxes for 'Show Log Backups' and 'Show Delta Backups', both of which are unchecked. The main area is a table of backup entries with columns for Status, Started, Duration, Size, Backup Type, and Destination. The data is as follows:

Status	Started	Duration	Size	Backup Type	Destinatio...
Green	Oct 13, 2020 2:05:02 ...	00h 01m 03s	3.44 GB	Data Backup	Snapshot
Green	Oct 13, 2020 1:05:01 ...	00h 01m 03s	3.44 GB	Data Backup	Snapshot
Green	Oct 13, 2020 12:05:0...	00h 01m 03s	3.44 GB	Data Backup	Snapshot
Green	Oct 13, 2020 11:05:0...	00h 01m 03s	3.44 GB	Data Backup	Snapshot
Green	Oct 13, 2020 10:05:0...	00h 01m 03s	3.44 GB	Data Backup	Snapshot



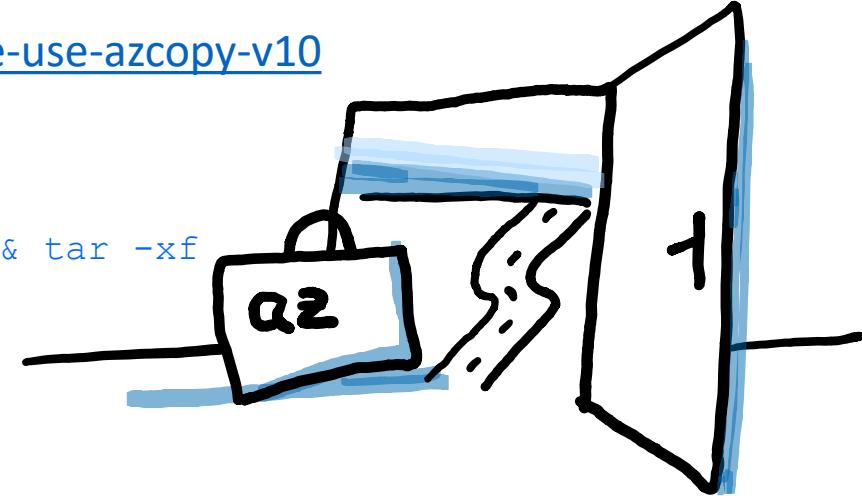


# Backup a SnapShot to Azure Block Blob

Install and setup the azcopy tool

Reference <https://docs.microsoft.com/en-us/azure/storage/common/storage-use-azcopy-v10>

```
su -  
wget -O azcopy_v10.tar.gz https://aka.ms/downloadazcopy-v10-linux && tar -xf  
azcopy_v10.tar.gz --strip-components=1  
  
cp azcopy /home/azacsnap/bin  
chown azacsnap:sapsys /home/azacsnap/bin/azcopy
```



# Backup a SnapShot to Azure Block Blob

## Create the Azure BlockBlob container

### Create storage account

Basics Networking Data protection Advanced Tags Review + create

Azure Storage is a Microsoft-managed service providing cloud storage that is highly available, secure, durable, scalable, and redundant. Azure Storage includes Azure Blobs (objects), Azure Data Lake Storage Gen2, Azure Files, Azure Queues, and Azure Tables. The cost of your storage account depends on the usage and the options you choose below.

[Learn more about Azure storage accounts](#)

#### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \*

SAP HANA solution lab subscription

Resource group \*

ralfAFSrg

[Create new](#)

#### Instance details

The default deployment model is Resource Manager, which supports the latest Azure features. You may choose to deploy using the classic deployment model instead. [Choose classic deployment model](#)

Storage account name \* 

ralfazblobacc 

Location \*

(US) Central US EUAP

Performance 

Standard  Premium

Account kind 

StorageV2 (general purpose v2)

Replication 

Read-access geo-redundant storage (RA-GRS)



### Create storage account

Basics Networking Data protection Advanced Tags Review + create

#### Network connectivity

You can connect to your storage account either publicly, via public IP addresses or service endpoints, or privately, using a private endpoint.

Connectivity method \*

Public endpoint (all networks)

Public endpoint (selected networks)

Private endpoint

All networks will be able to access this storage account.

[Learn more about connectivity methods](#)

#### Network routing

Determine how to route your traffic as it travels from the source to its Azure endpoint. Microsoft network routing is recommended for most customers.

Routing preference \* 

Microsoft network routing (default)

Internet routing

The current combination of storage account kind, performance, replication, and location does not support 'Internet routing'.



# Backup a SnapShot to Azure Block Blob

## Create the Azure BlockBlob container

Create storage account + 1 step

Basics Networking Data protection **Advanced** Tags Review + create

**Security**

Secure transfer required (Enabled)  Disabled  Enabled

Minimum TLS version (Version 1.2)

Infrastructure encryption (Disabled)  Enabled

Sign up is currently required to enable infrastructure encryption on a per-subscription basis. [Sign up for infrastructure encryption](#)

**Blob storage**

Allow Blob public access (Enabled)  Disabled  Enabled

Blob access tier (default) (Hot)  Cool  Hot

NFS v3 (Disabled)  Enabled

Sign up is currently required to utilize the NFS v3 feature on a per-subscription basis. [Sign up for NFS v3](#)

**Data Lake Storage Gen2**

Hierarchical namespace (Disabled)  Enabled

**Azure Files**

Large file shares (Disabled)  Enabled

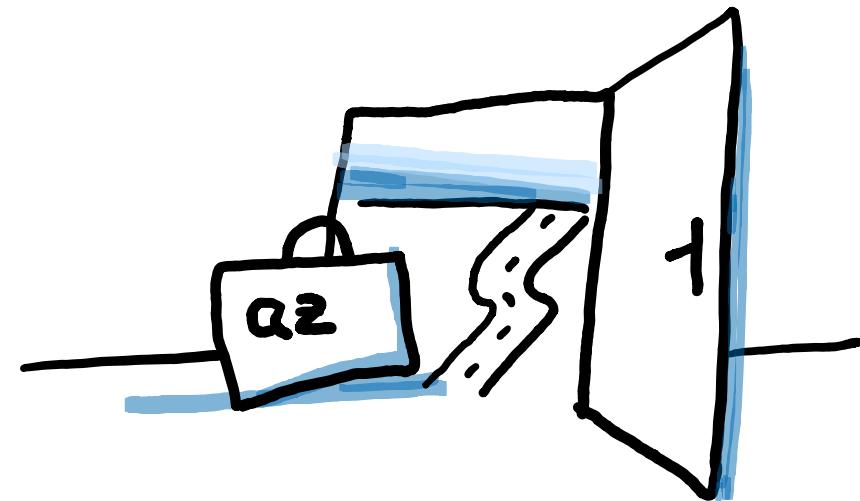
The current combination of storage account kind, performance, replication and location does not support large file shares.

**Tables and Queues**

Customer-managed keys support (Disabled)  Enabled

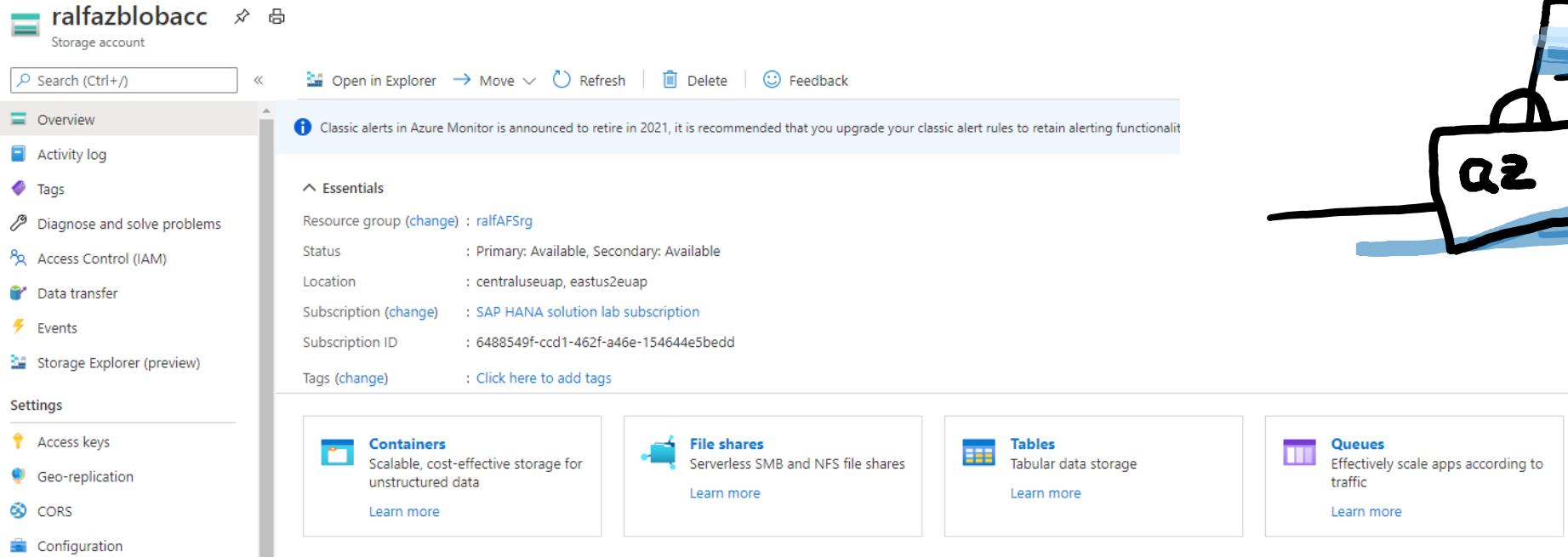
Sign up is currently required to enable customer-managed keys support for tables and queues on a per-subscription basis. [Sign up for CMK support](#)

**Create**



# Backup a Snapshot to Azure Block Blob

Create the Azure BlockBlob container

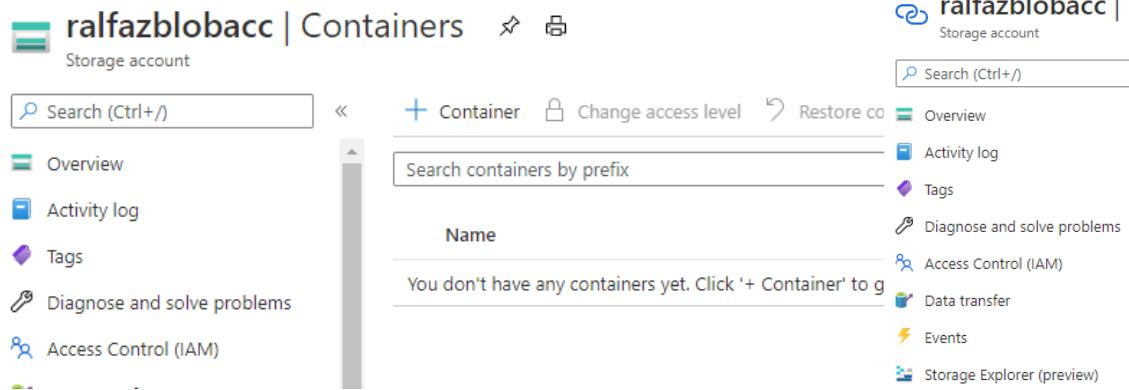


The screenshot shows the Azure Storage Account Overview page for the account 'ralfazblobacc'. The left sidebar contains navigation links: Overview, Activity log, Tags, Diagnose and solve problems, Access Control (IAM), Data transfer, Events, Storage Explorer (preview), Settings (Access keys, Geo-replication, CORS, Configuration), and Container Registry. The main content area displays the account's details under 'Essentials': Resource group (ralfAFSrg), Status (Primary: Available, Secondary: Available), Location (centraluseuap, eastus2euap), Subscription (SAP HANA solution lab subscription), Subscription ID (6488549f-ccd1-462f-a46e-154644e5bedd), and Tags (Click here to add tags). Below this, there are four cards: 'Containers' (Scalable, cost-effective storage for unstructured data, Learn more), 'File shares' (Serverless SMB and NFS file shares, Learn more), 'Tables' (Tabular data storage, Learn more), and 'Queues' (Effectively scale apps according to traffic, Learn more).



# Backup a Snapshot to Azure Block Blob

## Create the Azure BlockBlob container



ralfazblobacc | Containers

Storage account

Search (Ctrl+ /)

+ Container Change access level Restore co

Search containers by prefix

Name

You don't have any containers yet. Click '+ Container' to g...

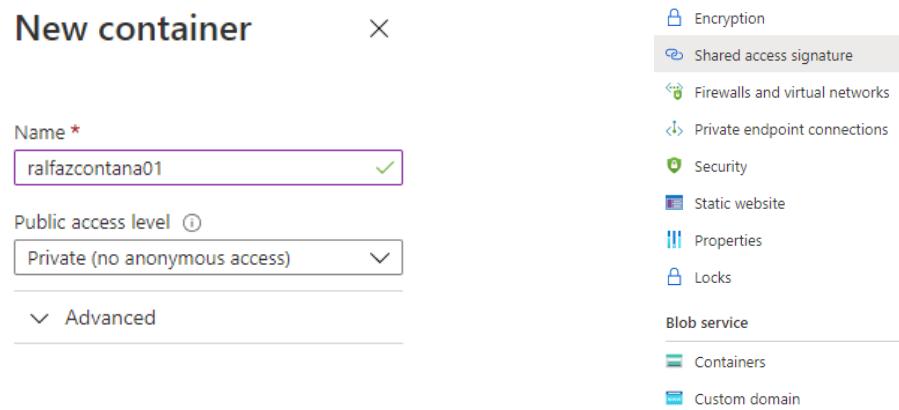
Overview

Activity log

Tags

Diagnose and solve problems

Access Control (IAM)



New container

Name \*

ralfazcontana01

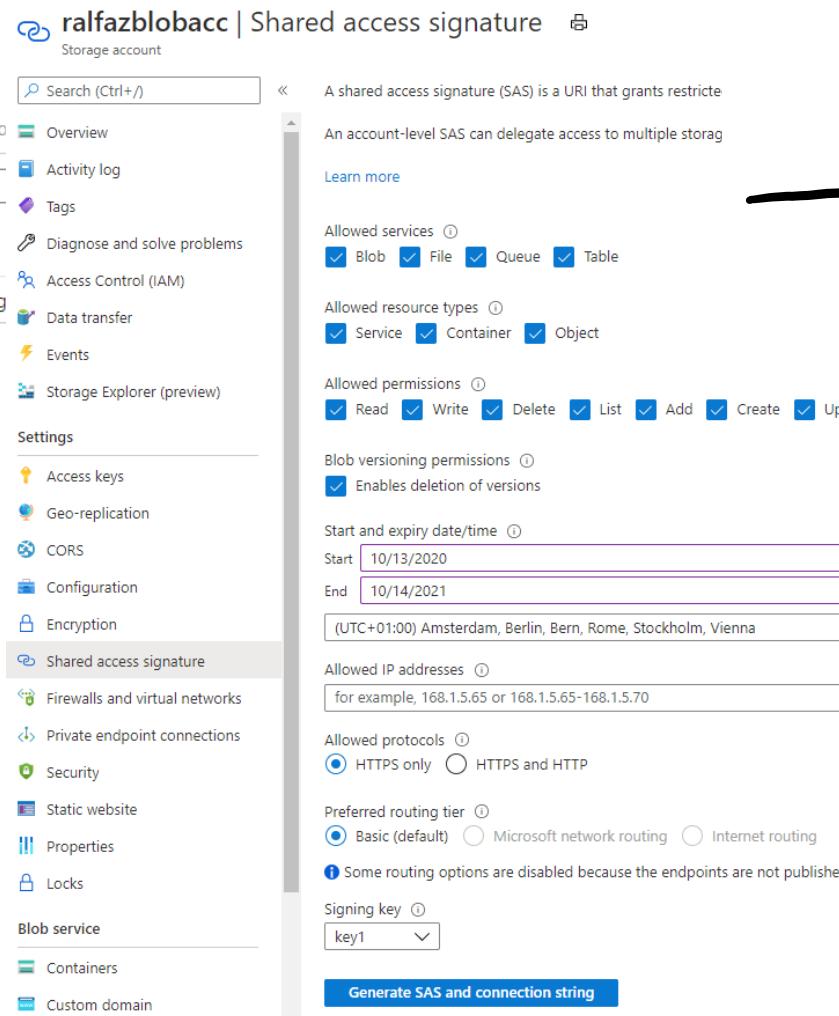
Public access level

Private (no anonymous access)

Advanced

Containers

Custom domain



ralfazblobacc | Shared access signature

Storage account

Search (Ctrl+ /)

Overview

Activity log

Tags

Diagnose and solve problems

Access Control (IAM)

Data transfer

Events

Storage Explorer (preview)

Settings

Access keys

Geo-replication

CORS

Configuration

Encryption

Shared access signature

Firewalls and virtual networks

Private endpoint connections

Security

Static website

Properties

Locks

Blob service

Containers

Custom domain

A shared access signature (SAS) is a URI that grants restricted access to your storage account resources.

An account-level SAS can delegate access to multiple storage services.

Learn more

Allowed services

Blob  File  Queue  Table

Allowed resource types

Service  Container  Object

Allowed permissions

Read  Write  Delete  List  Add  Create  Update  Process

Blob versioning permissions

Enables deletion of versions

Start and expiry date/time

Start 10/13/2020

End 10/14/2021

(UTC+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna

Allowed IP addresses

for example, 168.1.5.65 or 168.1.5.65-168.1.5.70

Allowed protocols

HTTPS only  HTTPS and HTTP

Preferred routing tier

Basic (default)  Microsoft network routing  Internet routing

Some routing options are disabled because the endpoints are not published.

Signing key

key1

Generate SAS and connection string



# Backup a SnapShot to Azure Block Blob

Now create the SAS token to automate the azcopy process

## Generate SAS and connection string

### Connection string

```
BlobEndpoint=https://ralfazblobacc.blob.core.windows.net/;QueueEndpoint=https://ralfazblobacc.queue.core.windows.net/;FileEndpoint=https://ralfazblobacc.file.core.wi
```

### SAS token ①

```
?sv=2019-12-12&ss=bfqt&srt=sco&sp=rwdlacupx&se=2021-10-13T22:25:11Z&st=2020-10-13T14:25:11Z&spr=https&sig=KiSGkZPq%2FCjMMh%2BrshtVfjaKv%2B21p6
```

### Blob service SAS URL

```
https://ralfazblobacc.blob.core.windows.net/?sv=2019-12-12&ss=bfqt&srt=sco&sp=rwdlacupx&se=2021-10-13T22:25:11Z&st=2020-10-13T14:25:11Z&spr=https&sig=KiSGkZPq%2FCjMMh%2BrshtVfjaKv%2B21p6H0odGUAtBKWZw%3D
```

### File service SAS URL

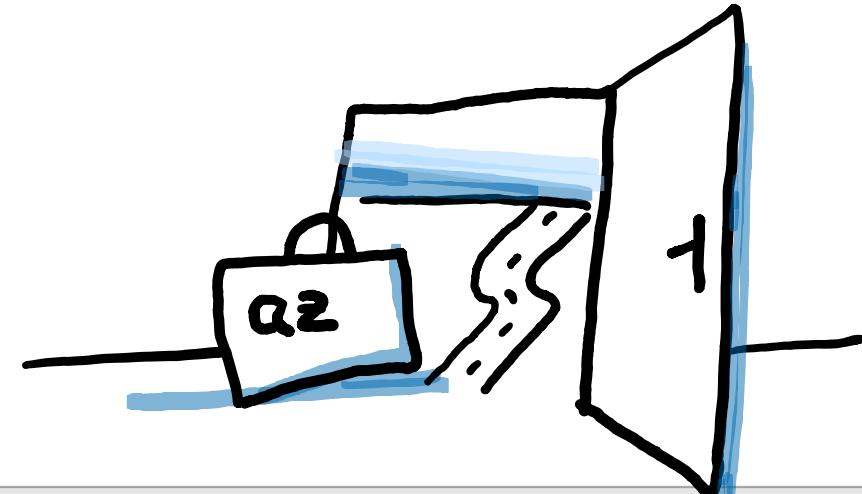
```
https://ralfazblobacc.file.core.windows.net/?sv=2019-12-12&ss=bfqt&srt=sco&sp=rwdlacupx&se=2021-10-13T22:25:11Z&st=2020-10-13T14:25:11Z&spr=https&sig=KiSGkZPq%2FCjMMh%2BrshtVfjaKv%2B21p6H0odGUAtBKWZw%3D
```

### Queue service SAS URL

```
https://ralfazblobacc.queue.core.windows.net/?sv=2019-12-12&ss=bfqt&srt=sco&sp=rwdlacupx&se=2021-10-13T22:25:11Z&st=2020-10-13T14:25:11Z&spr=https&sig=KiSGkZPq%2FCjMMh%2BrshtVfjaKv%2B21p6H0odGUAtBKWZw%3D
```

### Table service SAS URL

```
https://ralfazblobacc.table.core.windows.net/?sv=2019-12-12&ss=bfqt&srt=sco&sp=rwdlacupx&se=2021-10-13T22:25:11Z&st=2020-10-13T14:25:11Z&spr=https&sig=KiSGkZPq%2FCjMMh%2BrshtVfjaKv%2B21p6H0odGUAtBKWZw%3D
```



## SAS Token

```
?sv=2019-12-12&ss=bfqt&srt=sco&sp=rwdlacupx&se=2021-10-13T22:35:15Z&st=2020-10-13T14:35:15Z&spr=https&sig=OH3PG2PHAsV%2BE6tIHLAGAqE7%2FlgwOyn7Y9asb3cJlcY%3D
```



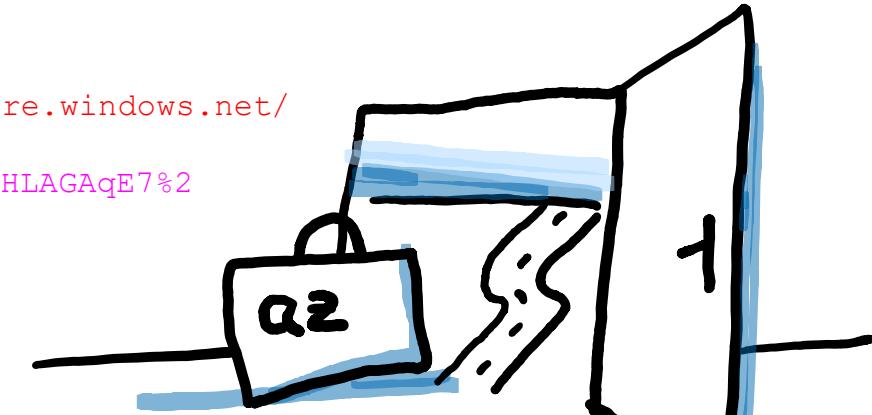
# Backup a SnapShot to Azure Block Blob

now copy the SnapShot folder to the created BlobStorage

```
./azcopy sync '/hana/data/ANA/mnt0001/.snapshot' 'https://ralfazblobacc.blob.core.windows.net/ralfazcontana01?sv=2019-12-12&ss=bfqt&srt=sco&sp=rwdlacupx&se=2021-10-13T22:35:15Z&st=2020-10-13T14:35:15Z&spr=https&sig=0H3PG2PHAsV%2BE6tlHLAGAqE7%2F1gW0yn7Y9asb3cJ1cY%3D' --recursive=true --delete-destination=true
```

INFO: Any empty folders will not be processed, because source and/or destination doesn't have full folder support

```
Job a0f62194-16b9-e249-5860-171778a2322b has started  
Log file is located at: /home/azacsnap/.azcopy/  
30.9 %, 40 Done, 0 Failed, 10 Pending, 50 Total, 2-sec  
Throughput (Mb/s) : 201.2967  
Job a0f62194-16b9-e249-5860-171778a2322b Summary  
Files Scanned at Source: 50  
Files Scanned at Destination: 0  
Elapsed Time (Minutes): 18.0028  
Number of Copy Transfers for Files: 50  
Number of Copy Transfers for Folder Properties: 0  
Total Number Of Copy Transfers: 50  
Number of Copy Transfers Completed: 50  
Number of Copy Transfers Failed: 0  
Number of Deletions at Destination: 0  
Total Number of Bytes Transferred: 38086431007  
Total Number of Bytes Enumerated: 38086431007  
Final Job Status: Completed
```



A screenshot of the Azure Storage Explorer interface showing a container named "ralfazcontana01". The "Overview" tab is selected. The container contains five blob items, each represented by a yellow folder icon and a unique name starting with "hana\_hourly\_". The names are: hana\_hourly\_2020-10-13T100501-7358818Z, hana\_hourly\_2020-10-13T110502-0181427Z, hana\_hourly\_2020-10-13T120501-5238387Z, hana\_hourly\_2020-10-13T130501-5528848Z, and hana\_hourly\_2020-10-13T140501-8206003Z.



# Backup a SnapShot to Azure Block Blob

now copy the SnapShot folder to the created BlobStorage

```
azacsnap@ralfafsvm01:/hana/data/ANA/mnt00001/.snapshot> ls -l
total 20
drwxr-x--- 5 anaadm sapsys 4096 Oct  8 14:28 hana_hourly_2020-10-14T080501-6096928Z
drwxr-x--- 5 anaadm sapsys 4096 Oct  8 14:28 hana_hourly_2020-10-14T090502-3217390Z
drwxr-x--- 5 anaadm sapsys 4096 Oct  8 14:28 hana_hourly_2020-10-14T100502-2249356Z
drwxr-x--- 5 anaadm sapsys 4096 Oct  8 14:28 hana_hourly_2020-10-14T110502-2034264Z
drwxr-x--- 5 anaadm sapsys 4096 Oct  8 14:28 hana_hourly_2020-10-14T120501-6591136Z

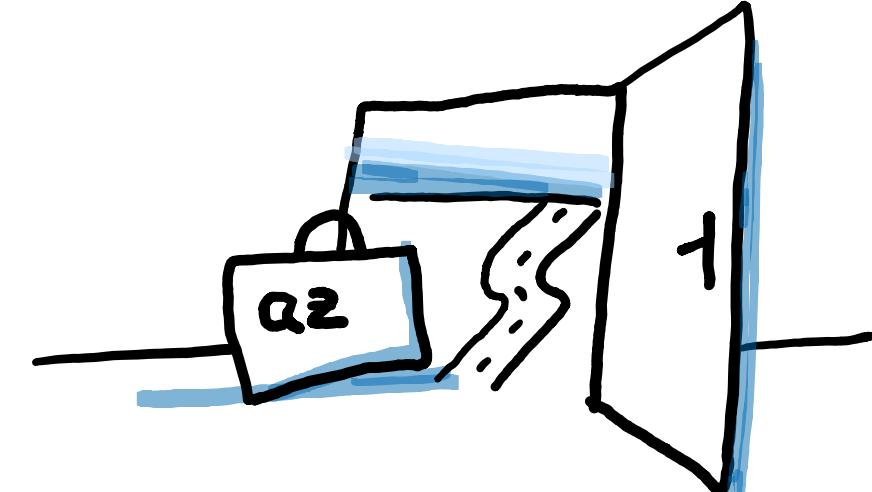
azacsnap@ralfafsvm01:/hana/data/ANA/mnt00001/.snapshot> ls -t | sed '$!d'      showing the newest Snapshot
hana_hourly_2020-10-14T120501-6591136Z

azacsnap@ralfafsvm01:/hana/data/ANA/mnt00001/.snapshot> ls -tr | sed '$!d'      showing the oldest snapshot
hana_hourly_2020-10-14T080501-6096928Z
```

```
azacsnap@ralfafsvm01:~/bin> cat backup_to_blob.sh
#!/bin/bash
#!/bin/bash
SID=ANA
cd /home/azacsnap/bin
./azcopy sync "/hana/data/$SID/mnt00001/.snapshot" 'https://ralfazblobacc.blob.core.windows.net/ralfazcontana01?sv=2019-12-12&ss=bfqt&srt=sco&sp=rwdlacupx&se=2021-10-13T22:35:15Z&st=2020-10-13T14:35:15Z&spr=https&sig=0H3PG2PHAsV%2BE6t1HLAGAqE7%2FIgwOyn7Y9asb3cJlcY%3D' --recursive=true --delete-destination=true
```

```
azacsnap@ralfafsvm01:~/bin> cat backup_Daily_snap_to_blob.sh
#!/bin/bash
SID=ANA
LASTSNAP=$(ls -t /hana/data/$SID/mnt00001/.snapshot | grep hana_daily | sed '$!d')
cd /home/azacsnap/bin
./azcopy copy "/hana/data/$SID/mnt00001/.snapshot/$LASTSNAP" 'https://ralfazblobacc.blob.core.windows.net/ralfazcontana01?sv=2019-12-12&ss=bfqt&srt=sco&sp=rwdlacupx&se=2021-10-13T22:35:15Z&st=2020-10-13T14:35:15Z&spr=https&sig=0H3PG2PHAsV%2BE6t1HLAGAqE7%2FIgwOyn7Y9asb3cJlcY%3D' --recursive=true
```

```
azacsnap@ralfafsvm01:~/bin> crontab -
5 * * * * (. ~/profile ; cd /home/azacsnap/bin ; ./azacsnap -c backup --volume=data --prefix=hana_hourly --retention=5 --trim --configfile=azacsnap.json)
10 * * * * /home/azacsnap/bin/backup_to_blob.sh
```

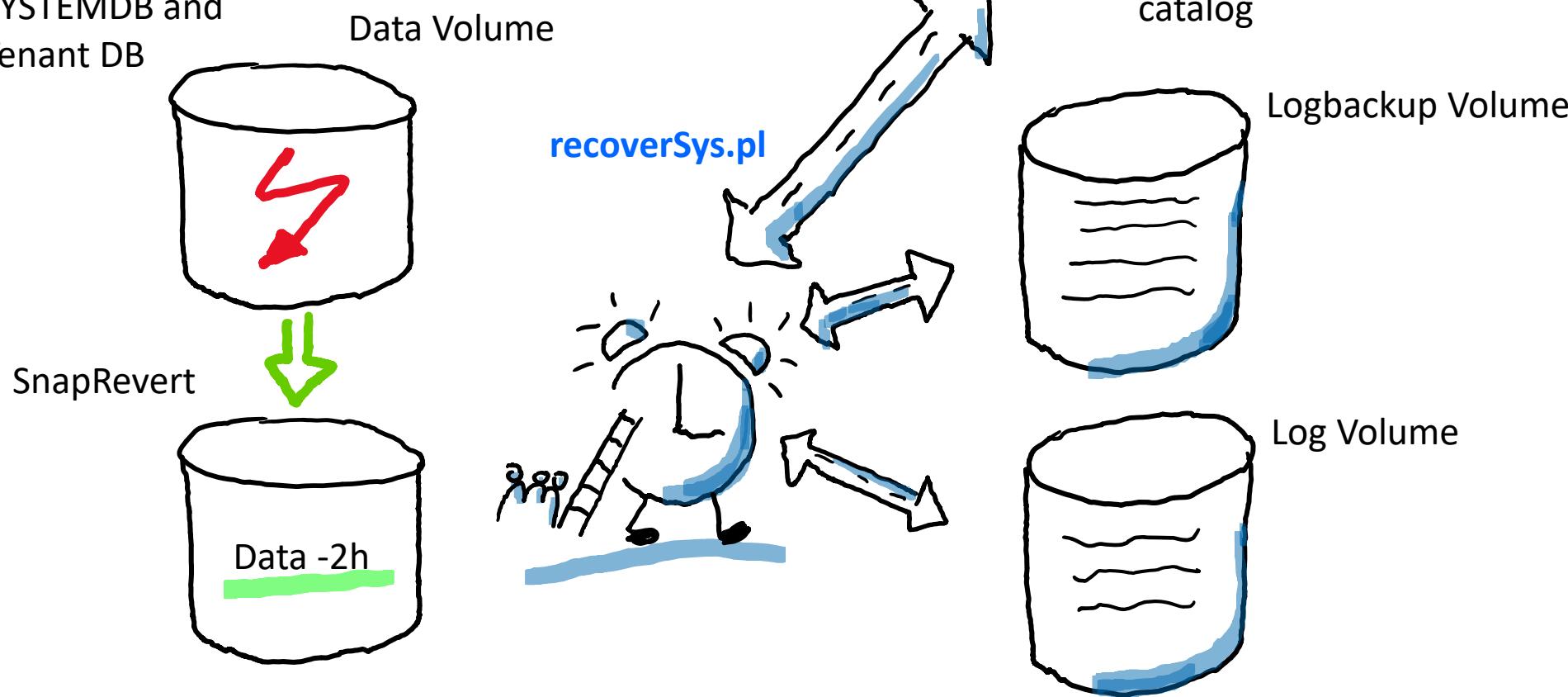


# Recovery Process SYSTEMDB

**Volume or Logical issue:**

Full recovery

SYSTEMDB and  
Tenant DB



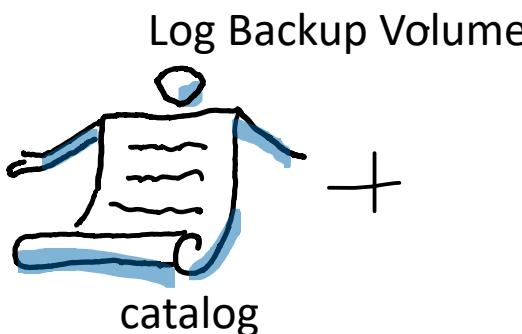
```
ralfafsvm01:~ # ls -l /usr/sap/ANA/HDB00/backup/log/SYSTEMDB
total 832
-rw-r----- 1 anaadm sapsys 24576 Oct  5 08:06 log_backup_0_0_0_0.16015608
-rw-r----- 1 anaadm sapsys 24576 Oct  5 08:06 log_backup_0_0_0_0.16011961
-rw-r----- 1 anaadm sapsys 24576 Oct  5 08:06 log_backup_0_0_0_0.16051086
-rw-r----- 1 anaadm sapsys 24576 Oct  5 08:08 log_backup_0_0_0_0.16012858
```

# CRR – Cross Region Replication

West US



PRD



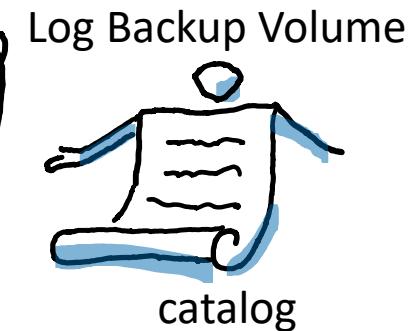
East US



DR

△ replication

10min



azacSnap 60min



Data Volume

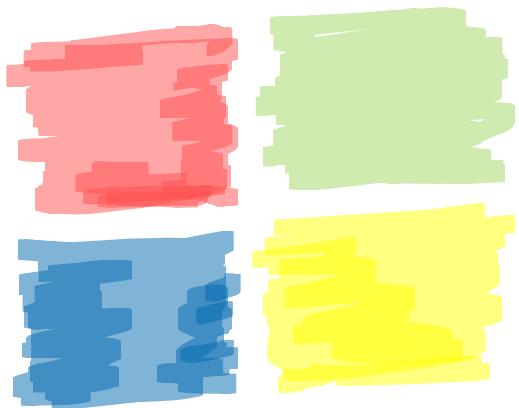
```
ralfafsvm01:/hana/data/ANA/mnt00001/.snapshot # ls -l
total 20
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T050501-5148Z
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T060501-6316Z
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T070501-7900Z
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T080501-6028Z
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T090502-3390Z
```

△ replication

60min

Data Volume

```
ralfafsvm01:/hana/data/ANA/mnt00001/.snapshot # ls -l
total 20
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T050501-5148Z
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T060501-6316Z
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T070501-7900Z
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T080501-6028Z
drwxr-x--- 5 anaadm sapsys hana_hourly_2020-10-14T090502-3390Z
```



Thank You

