SAP HANA DBA's Guide to the Actifio Virtual Data Pipeline



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Contents

Preface	1
The ActifioNOW Customer Portalv	,
Actifio Support Centersv	,
Chapter 1 - SAP HANA DBA's Introduction to Actifio Copy Data Management	
Actifio Data Virtualization1	
Capturing Data2	
Replicating Data2	
Accessing Data3	}
Introduction to Actifio SAP HANA Administration5	ì
SAP HANA Backup Methods6	;
References7	,
Chapter 2 - Preparing the SAP HANA 1.0 Database9)
Creating the Database User Account9)
Get the SQL Port ID 11	
Adding SAP HANA Hdbuserstore Key in SAP HANA 1.0 (single container system)11	
Chapter 3 - Preparing a HANA 2.0 Database13	}
Creating the System Database and Tenant Database Users13	}
Creating the System Database User Account from HANA STUDIO13	}
Creating the User under the Tenant DB15	i
Getting the Instance and SQL Port Numbers16	i
Creating the SAP HANA Hdbuserstore Key16	;
Creating the SAP HANA Hdbuserstore Key for the System Database and Each Tenant Database in a Single Node S tem	
Creating the SAP HANA Hdbuserstore Key for the System Database and each Tenant Database in a Scale-Out Mul Node SAP HANA System	ti-
Chapter 4 - Adding a SAP HANA Database Host and Discovering the Database)
Adding the Host from the Domain Manager19)
Discovering the HANA Database Application from the Application Manager21	
Finding the Discovered HANA Database in the Application Manager	:
Chapter 5 - Configuring the SAP HANA Backup Method23	}
Ensure that the Disk Preference on the Host is Set Correctly24	Ļ

Ensure that the Backup Capture Method in the Application Settings is Set Correctly	26
Chapter 6 - Protecting the HANA Database	29
Chapter 7 - Protecting SAP HANA Database Logs	31
Setting up the Log Mode and Log Backup in HANA Studio Setting up the Log Backup in Actifio AGM	
Chapter 8 - Restoring and Recovering an SAP HANA Database	37
Chapter 8 - Restoring and Recovering an SAP HANA Database	base as a Vir-
Mount and Refresh from Block-Based LVM Snapshot with CBT to a Target SAP HANA Data	base as a Vir- 37
Mount and Refresh from Block-Based LVM Snapshot with CBT to a Target SAP HANA Data tual Application	base as a Vir- 37 38

Preface

The information presented in this guide is intended for users who are familiar with basic Actifio processes and procedures as described in *Getting Started with Actifio Copy Data Management* and who are qualified to administer SAP HANA databases.

Your Actifio appliance's Documentation Library contains detailed, step-by-step, application-specific instructions on how to protect and access your data. Each guide is in PDF format and may be viewed online, downloaded, or printed on demand. The following guides will be of particular interest:

- Introducing Actifio Copy Data Management
- Connecting Hosts to Actifio Appliances

The ActifioNOW Customer Portal

During the configuration and initialization of your Actifio appliance your Actifio representative provided you with a user name and password for the ActifioNOW customer portal.

From the customer portal you can obtain detailed reports about your Actifio appliance as well as search the portal's knowledge base for answers to specific questions.

To log into the ActifioNOW customer portal:

- 1. Go to: https://now.actifio.com
- 2. When prompted, enter the user name and password provided by your Actifio representative.

Actifio Support Centers

To contact an Actifio support representative, you can:

- Send email to: support@actifio.com
- Call:

From anywhere: +1.315.261.7501

US Toll-Free: +1.855.392.6810

Australia: 0011 800-16165656

Germany: 00 800-16165656

New Zealand: 00 800-16165656

UK: 0 800-0155019

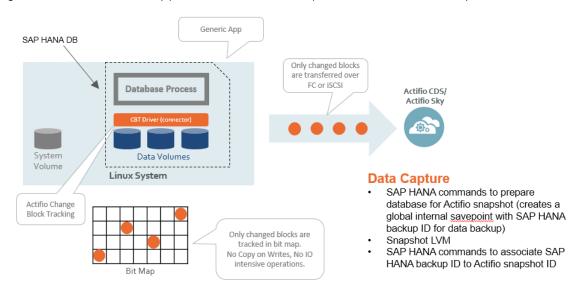
1 SAP HANA DBA's Introduction to Actifio Copy Data Management

This chapter introduces Actific concepts and the procedures used to capture and access databases. It includes:

Actifio Data Virtualization on page 1 Capturing Data on page 2 Replicating Data on page 2 Accessing Data on page 3 Introduction to Actifio SAP HANA Administration on page 5 SAP HANA Backup Methods on page 6 References on page 7

Actifio Data Virtualization

An Actific appliance is a highly scalable copy data management platform that virtualizes application data to improve the resiliency, agility, and cloud mobility of your business. It works by virtualizing data in much the same way other technologies have virtualized servers and networks. This enables you to capture data from production systems, manage it in the most efficient way possible, and use virtual copies of the data however they are needed.



SAP HANA for LVM with Linux Change Block Tracking

Application data is captured at the block level, in application native format, according to a specified SLA. A Golden copy of that data is created and stored once, and is then updated incrementally with only the changed blocks of data in an "incremental forever" model. Unlimited virtual copies of the data can be made available instantly for use, without proliferating physical copies and taking up additional storage infrastructure.

Capturing Data

Capturing data consists of four simple steps:

- 1. Add servers that host databases.
- 2. Discover the database.
- 3. Define Actific Policy Templates and Resource Profiles according to your RPOs and RTOs.
- 4. Assign Actific Policy Templates and Resource Profiles to discovered databases.

The Actifio Connector

The Actific Connector is used to capture selected databases. The Actific Connector is a small-footprint, lightweight service that can be installed on either virtual or physical servers.

Specifically, the Actifio Connector:

- Discovers the application to which data and log volumes will be added.
- Uses Linux changed block tracking to capture data at block level in incremental forever fashion.
- Identifies changes to database data for Actifio's incremental forever capture strategy.

Replicating Data

Data can be replicated to a second Actifio appliance or to the cloud for recovery, disaster recovery, or test/ development purposes.

Data replication has traditionally been an inhibitor to efficient data management in a geographically distributed environment. Actifio replication addresses these issues with a global deduplication and compression approach that:

- Drives down overall network usage.
- Eliminates the need for a dedicated WAN accelerator/optimizer.
- Does not require storage array vendor licenses as data is sent from one Actifio appliance to another.
- Is heterogeneous from any supported array to any supported array: Tier 1 to Tier 2 and/or Vendor A to Vendor B.
- Preserves write-order, even across multiple LUNs.
- Is fully integrated with VMware Site Recovery Manager (SRM) and Actifio Resiliency Director.
- Encrypts data using the AES-256 encryption standard. Authentication between Actific appliances is performed using 1024-bit certificates.

Replication is controlled by Actifio Policy Template policies:

- Production to Mirror policies have several options to replicate data to a second Actifio appliance.
- Dedup Backup to Dedup DR policies use a fixed, Actifio proprietary replication engine to replicate data to a second Actifio appliance. In addition, Dedup Backup to Dedup DR policies allow you to replicate data to two locations.
- Production to Vault policies use a fixed, Actifio proprietary replication engine to replicate data to the cloud.

Accessing Data

The Actifio appliance can instantly present a copy of the database rolled forward to a specific point of time. The roll forward operation is performed from the Actifio Desktop (user interface).

Access options include:

Mounts LiveClones Restores Workflows

Mounts

The Actifio mount function provides instant access to data without moving data. Captured copies of databases can be rolled forward via the Actifio user interface and mounted on any database server. Application Aware mounts are described in To mount the database image as a virtual application (an application aware mount) to a new target: on page 37.

LiveClones

The LiveClone is an independent copy of data that can be refreshed when the source data changes. The advantage of LiveClones is that they are independent copies of data that can be incrementally refreshed and masked before being made available to users. This allows teams such as development and test to ensure they are working on the latest set of data without having to manually manage the data and not access or interfere with the production environment.

Restores

The restore function reverts the production data to a specified point in time. Restore operations actually move data. Typically restore operations are performed to restore a database to a valid state after a massive data corruption or storage array failure. The amount of time required to complete a restore operation depends on the amount of data involved. Restores are described in Chapter 8, Restoring and Recovering an SAP HANA Database.

Workflows

While SLAs govern the automated *capture* of a production database, Workflows automate *access* to the captured database.

Workflows are built with captured data. Workflows can present data as either a direct mount or as a LiveClone:

- Direct mounts (standard or application aware) work well for data that does not need to be masked prior to being presented. A mounted copy of data can be refreshed manually or on automatically on a schedule. Direct mounts allow you to instantly access captured data without actually moving the data.
- A LiveClone is a copy of your production data that can be updated manually or on a scheduled basis. You can mask sensitive data in a LiveClone prior to making it available to users.

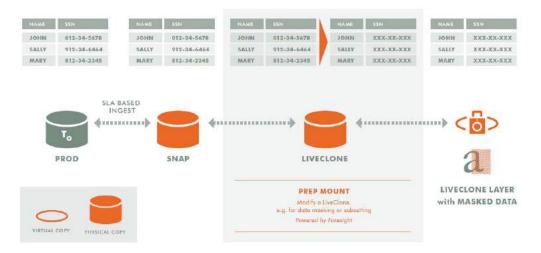
Combining Actifio's automated data capture and access control with Workflows and their optional data masking capabilities allows you to create self-provisioning environments. Now, instead of having to wait for DBAs to update test and development environments, users can provision their own environments almost instantly.

For example, an Actific administrator can create an SLA Template Policy that captures data according to a specified schedule. Optionally, the administrator can mark the captured production data as sensitive and only accessible by users with the proper access rights.

After access rights have been defined and data has been captured, the administrator can create a Workflow that:

- Makes the captured data available as a LiveClone or as a direct mount
- Updates the LiveClone or mountable data on a scheduled or on-demand basis
- (Optional) Automatically applies scripts to the LiveClone's data after each update. This is useful for masking sensitive data.

Once the Workflow completes, users with proper access can provision their environments with the LiveClone or mountable data via the Actifio Desktop.



Workflow With Masked Social Security Data

Introduction to Actifio SAP HANA Administration

Actifio can virtualize and protect:

- **Single Container system (HANA 1.0) Dedicated**: In single-container system the system database and tenant database are perceived as a single unit and are therefore administered as one.
- **MDC: Multiple-Container Systems (HANA 2.0)**: Multiple isolated databases in a single SAP HANA system. These are referred to as multi-tenant database containers. A multiple-container system always has exactly one system database used for central system administration, and any number of multi-tenant databases (including zero), also called tenant databases.

Configurations	SAP Storage Snapshot API	SAP File-Based API (hdbsql): Actifio Block Mapping	SAP File-Based API (hdbsql): Actifio NFS Mapping
Single Container System (HANA 1.0)	Yes (preferred)	Yes	Yes
MDC: Multiple-Container Systems (HANA 2.0) with one tenant database	Yes (preferred)	Yes	Yes
MDC: Multiple-Container Systems (HANA 2.0) with more than one tenant database		Yes	Yes
Scale-Out MDC: Multiple-Container Systems (HANA 2.0) with one or more tenant databases			Yes
Scale-Out MDC Local HA (N Active Host + 1 or More Standby Nodes)			Yes

Actifio Support for SAP HANA Configurations

Notes

- SAP storage snapshot API leverages Actifio CBT with incremental-forever and instant mount
- SAP file-based API traditional backup with weekly full, daily incremental & copy-based restore
- NFS mapping is always to all HANA nodes
- HANA log backup is handled automatically in all options and integrated with database backup policies

SAP HANA Backup Methods

Actifio offers these methods of protecting SAP HANA databases:

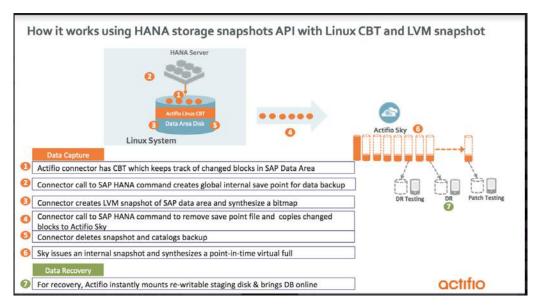
Block-Based LVM Snapshot with CBT Integrated with SAP HANA Database Storage Snapshot API

File-Based Backup Integrated with HANA Traditional Backup API

SAP HANA Log Backup

Block-Based LVM Snapshot with CBT Integrated with SAP HANA Database Storage Snapshot API

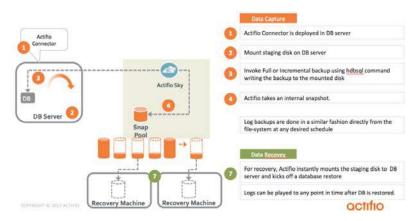
The SAP HANA database creates a database internal snapshot based on a system wide save point executed during the PREPARE step. The database internal snapshot is stored in the data volumes area.





File-Based Backup Integrated with HANA Traditional Backup API

This provides the full and incremental backups of the data area, which is in backup format. The recovery API recovers the data area by overwriting the data area. When the data area is backed up, the entire payload data from all server nodes of the SAP HANA database instance is backed up. This applies in both single-host and multi-host environments.



How it Works Using HANA File-Based (hdbsql API) Traditional Backup

SAP HANA Log Backup

Log backups start automatically if the parameters enable_auto_log_backup and log_mode = normal have been configured. During a log backup, the payload of the log segments is copied from the log area to the location specified by the parameter basepath_logbackup.

References

- 1. Category > Administration Guide: http://help.sap.com/hana_platform
- 2. Storage Snapshots: https://help.sap.com/saphelp_hanaplatform/helpdata/en/ac/ 114d4b34d542b99bc390b34f8ef375/content.htm
- 3. 1642148 FAQ: SAP HANA Database Backup & Recovery: https://launchpad.support.sap.com/#/notes/1642148/E
- 4. Create a homogeneous copy of an SAP HANA database by recovering an existing database to a different database:

```
https://help.sap.com/saphelp_hanaplatform/helpdata/en/ea/
70213a0e114ec29724e4a10b6bb176/content.htm?frameset=/en/ca/
c903c28b0e4301b39814ef41dbf568/frameset.htm&current_toc=/en/00/
0ca1e3486640ef8b884cdf1a050fbb/plain.htm&node id=773&show children=false
```

2 Preparing the SAP HANA 1.0 Database

Prerequisites

- All the configured services (see SAP Note 1697613 and SAP Note 1649519) such as nameserver, indexserver, etc. must be running. You can check this in the Overview of SAP HANA studio -> Operational State: All Services are started.
- Make sure log_mode for database is set to normal. (Check under HANA Studio configuration tab.)
- Use a SAP HANA hdbuserstore key to execute Backup and Recovery instead of a user name and password to communicate with HANA database using the SAP HANA Secure User Store. For HANA 1.0 userstore key needs to be created for a single container under database.

Preparing the HANA 1.0 database requires:

Creating the Database User Account on page 9

Get the SQL Port ID on page 11

Adding SAP HANA Hdbuserstore Key in SAP HANA 1.0 (single container system) on page 11

Creating the Database User Account

Make sure to create this user account under a single container database. Make sure to provide BACKUP ADMIN and CATALOG READ to back up the user created under database.

Naming Convention for Database User Account

Actifio standard naming convention is DATABASE BACKUP USERNAME: Choose a database user name based on company's standard. Make sure to create this user account under SYSTEMDB.

For example if the DATABASE BACKUP USERNAME is ACTBACKUP then this must be created under SYSTEMDB.

Procedure

To create the user:

1. From SAP HANA Studio go to System > Security > Users > New User.

		hemand	
⊿ 🗁 NODE-1 or	saphana1		
4 📑 NR1 (S)	STEM) NR1		
🐣 Bac	kup		1
þ 🗁 Cat	alog		
p 😂 Cor	tent		
Þ 🗁 Pro	visioning		
🔺 🗁 Sec	urity		
8	Security		
4	New User		
	0 · ·		
	New Restricted	Jser	
	Refresh		F5
	🛛 🥸 Find User		
	Filters		
	VICOLOC ALITO HI		277050

- 2. Assign a user name and a password.
- 3. Select Force password change on next logon to No.
- 4. Click on the System Privilege tab and assign privilege by selecting BACKUP ADMIN and CATALOG READ.

ser User Parameters		🥗 Select System Privileges 😑 🗖	×
New User User Name*: ACTBACKUP	Disable ODBC/JDBC access	Enter search string to find a system privilege.	•
Authentication		Matching items:	
Password Password*: Force password change on next logon: Kerberos External ID*:	Confirm*:	ADAPTER ADMIN AGENT ADMIN AUDIT ADMIN AUDIT ADMIN AUDIT OPERATOR BACKUP ADMIN	
Valid From:	Valid Until:	CATALOG READ	
Session Client: Granted Roles System Privileges Object Privileg	es Analytic Privileges Package Privile		
System Privilege	Grantor	CREATE STRUCTURED PRIVILEGE	

You will get a User Created message and the System Privileges will show the user has been granted BACKUP ADMIN and CATALOG READ privileges.

ser User Parameters				
Disable ODBC/JDBC access				
Authentication				
Password Password*:	Confirm*:		SAML Configure	SAP Log
Force password change on next Kerberos External ID*:	logon: 🔿 Yes 🔘 No		X509 Configure	SAP Ass
Valid From: Dec 15, 2017 1:32:	35 PM GMT-08:00 💿 🌆 Valid Until:			
	ject Privileges Analytic Privileges Pack	age Privilege	es Application Privileges P	rivileges on Us
+ X		Y 24 -	Details	
System Privilege	Grantor			
	SYSTEM			
BACKUP ADMIN	or or erri			

Get the SQL Port ID

For a HANA 1.0 single container system, get the SQL PORT from HANA Studio. At System > Landscape, get the value of SQL Port for indexserver. In the example below, 32015 is the SQL port, and the instance number here is 20.

MODE-1 on saphana1	Overview	Landscap	e Alerts	Performance	Volumes	Configuratio	n System In	formation Diagnosis F	les Trace Configuration		
A 🐻 NR1 (SYSTEM) NR1	Services	Hosts Re	distributi	on System Rep	lication	Host <all></all>		Service: <all< td=""><td>× 🛛 🕱</td><td></td><td>-</td></all<>	× 🛛 🕱		-
a Backup	Active	Host	Port	Service	Detail	Start Time	Process ID	Used Memory (MB)	Effective Allocation Limit (MB)	Physical Memory on Host (MB)	SQL Por
5 😂 Catalog		saphana1	32010	compileserver		Dec 12, 20	12346	1,724	386,045	516,908	
p Content p Provisioning		saphana1	32000	daemon		Dec 12, 20	12243	0	0		
p provisioning		saphana1	32001	indexserver	master	Dec 12, 20	12370	25,813	410.134	516,908	32015

Adding SAP HANA Hdbuserstore Key in SAP HANA 1.0 (single container system)

To communicate with HANA database, use a SAP HANA hdbuserstore key instead of a user name and password. Create the hdbuserstore key using the SAP HANA Secure User Store.

Hdbuserstore Key Naming Convention

For SYSTEMDB set the key name = DATABASE BACKUP USERNAME.

For example:

DATABASE BACKUP USERNAME = ACTBACKUP

Set SYSTEMDB key name = ACTBACKUP

Procedure

To create the SAP HANA hdbuserstore key:

- 1. Open the putty window to the HANA database server and login to <sid>adm by su to <sid>adm.
- 2. cd exe
- 3. Create entries in the hdbuserstore by calling:

./hdbuserstore SET <key_name> <server>:<port> <DB_user_name> <DB_user_password>

The <port> is the SQL port of the systemdb or tenant database, see above.

For example:

- DATABASE Backup username from above: ACTBACKUP
- KEY NAME: ACTBACKUP (same as database backup username)
- SQL Port from above: 32015
- Hostname : saphana3

./hdbuseratore SET ACTBACKUP saphana3:32015 ACTBACKUP <database backup user password
***********************</pre>

4. Check the keystore: ./hdbuserstore list

3 Preparing a HANA 2.0 Database

Prerequisites

- All the configured services (see SAP Note 1697613 and SAP Note 1649519) such as nameserver, indexserver, etc. must be running. You can check this in the Overview of SAP HANA studio -> Operational State: All Services are started.
- Make sure log_mode for database is set to normal. (Check under HANA Studio configuration tab.)
- Use a SAP HANA hdbuserstore key to execute Backup and Recovery instead of a user name and password to communicate with HANA database using the SAP HANA Secure User Store. For HANA 2.0 userstore key needs to be created for SYSTEMDB and all tenant db.
- Create the database user account and hdbuserstore key names in accordance with the company's naming convention. Make sure to create this user account under SYSTEMDB and all tenant databases.

This includes:

Creating the System Database and Tenant Database Users on page 13

Getting the Instance and SQL Port Numbers on page 16

Creating the SAP HANA Hdbuserstore Key on page 16

Creating the System Database and Tenant Database Users

Creating the System Database User Account from HANA STUDIO on page 13

Creating the User under the Tenant DB on page 15

Creating the System Database User Account from HANA STUDIO

Naming convention for database user account

Choose a database user name based on company's standard. Make sure to create this user account under single container database. Make sure to provide BACKUP ADMIN, CATALOG READ, and DATABASE ADMIN the to backup user created under database.

Procedure

To create the system database user account:

- 1. Create the USER under SYSTEMDB
 - o Assign a User Name and a Password.
 - o Select Force password change on next logon to No.
 - Click on the System Privilege tab and assign privileges by selecting BACKUP ADMIN, CATALOG READ, and DATABASE ADMIN
 - o From SAP HANA Studio SYSTEMDB, go to System > Security > Users > New User.



2. Deploy the newly created user by clicking the green arrow in the top right corner



You will get a User Created message and the System Privileges will show the user has been granted BACKUP ADMIN, CATALOG READ, and DATABASE ADMIN privileges.

User Parameters	2.16.216.106.00		
ACTBACKUP			
Disable ODBC/JDBC access			
Authentication			
Password Password*: 0	Confirm*:	C SAML	SAP Logon Ticket
Force password change on ne			
External ID*:		Cardina	SAP Assertion Ticket
alid From: Feb 9, 2019 10:38:3	4 PM GMT-05:00 0 1 Valid Until:		
ession Client:			
and a lot of provided by CARPORT PURCHASE Contractions	ct Privileges Analytic Privileges Package Privileges	and the second	on Users
and a state of the second of the second s	ct Privileges Analytic Privileges Package Privileges	Application Privileges Privileges	on Users
X stem Privilege	Grentor	and the second	on Users
stem Privliege BACKUP ADMIN	Grantor SYSTEM	and the second	on Users
stem Privõege	Grentor	and the second	i on Users

Creating the User under the Tenant DB

To create the tenant database user account:

- 1. Create the USER under TENANTDB
 - o Assign a User Name and a Password.
 - o Select Force password change on next logon to No.
 - Click on the System Privilege tab and assign privileges by selecting BACKUP ADMIN, CATALOG READ, and DATABASE ADMIN
 - o From SAP HANA Studio SYSTEMDB, go to TENANTDB > Security > Users > New User.

 Backup Catalog Content Revisioning 	Valid From: Session Client:	
Constant Security Constant Security Constant Security Constant Security Constant Security	Granted Roles	
New Us	er stricted User	
NFL@NFL (SYSTEM) 172.16.216.106.00		The second se
NFL@NFL (SYSTEM) 172.16.216.106.00	Select System Pri	/leges

2. Deploy the newly created user by clicking the green arrow in the top right corner



You will get a User Created message and the System Privileges will show the user has been granted BACKUP ADMIN and CATALOG READ privileges.

CREATE STRUCTUR CREDENTIAL ADMIN

EXPORT

TION ROOT KEY ADMIN

ITZ.16.216.106.00	1 b 0
ser, User Parametera	
ACTBACKUP	
Disable ODBC/JDBC access	
Authentication	
Password Confirm*:	SAML SAP Logon Ticket
Force password change on next logon: 🔅 tes 🔅 No	
External ID*:	Carifornia Carifornia
Valid Frem. Feb 9, 2019 10:41:11 PM GMT-05:00 01 Valid Uniti:	
Granted Roles System Privileges Object Privileges Analytic Privileges Package Privileges A	
4 X System Privilege Grantor	🌱 🔯 - Details
C BACKUP ADMIN SYSTEM	

Getting the Instance and SQL Port Numbers

SYSTEMDB: From SYSTEMDB go to System > Landscape and get the value of SQL port for the nameserver. In the example below, 30013 is the SQL port, and the instance number is 00.

vorvie	Lands	cape Ale	rts Per	formance Volu	imes C	configuration System information	tion Diag	nosis	File	s Trace Configuration			
Service	Hosts	Redistri	bution	System Replica	tion	iost: <all></all>	• Sen	rice:	<a < th=""><th>•</th><th>ж</th><th></th><th>1</th></a <>	•	ж		1
Active	Host		Port	Service	Detail	Start Time	Process I	DIU	s Pe	Effective Allocation Lim	it (MB)	Physical Memory on Host (MB) SQL F	Port
8	saphana-	autovm6	30006	webdispatcher		Mar 13, 2019 11:00:42 PM	15286	1.		1	6,850	40,074	
8	saphana-	autovm6		sapstartsrv				11					
	saphana-	autovm6	30000	daemon		Mar 7, 2019 4:45:08 PM		110	0		0		-
	saphana-	autovm6	30001	nameserver	master	Mar 13, 2019 10:59:46 PM	14989	1.		1	0,340	40,07 3001	3)
	saphana-	autovm6	30010	compileserver		Mar 13, 2019 11:00:39 PM	16243	1.		1	6,619	40,074	-
	saphana-	autovim6	30002	p/eprocessor		Mar 13, 2019 11:00:39 PM	15245	1.			6.876	40.074	

TENANT DB: From HANA Studio. At tenantdb-System > Landscape, get the value of SQL Port for indexserver. The <port> is the SQL port of the specific tenant database, i.e. 3<instance>15

In the example below, 30015 is the SQL port, and the instance number here is 00.

vervie	w Landscape Ale	rts Per	formance Volu	mes Co	ofiguration	System in	formation	Diagnosis I	Files	Trace Co	onfigura	tion			
	Redistribution				Service										
ctive	Host ^	Port	Service	Detail	Start Time	Process II	C Memo	ary		Used Mr	Peak U	Effe	Physic	SQL Port	
	saphana-autovm6	30006	webdispatcher		Mar 13,	15286	D			1,564	1,564	1	40,		
	saphana-autovm6	30007	xsengine		Mar 13,	15485	D			2,746	3,260	1	40,		
	saphana-autovm6	30000	daemon		Mar 7, 2					0		0			
	saphana-autovm6	30001	nameserver	master	Mar 13,	14989	n	1		4,925	4,925	2	40,_		
	saphana-autovm6	30010	compileserver		Mar 13,	15243	nr -	1	_	1,333	1,333	1	40,		
	saphana-autovm6	30002	preprocessor		Mar 13,	15245	n			1,590	1,590	1	40,-		
	saphana-autovm6	30003	indexserver	master	Mar 13	15432	ñ		-1	8,792	9,047	2	40.	30015	

Creating the SAP HANA Hdbuserstore Key

Use a SAP HANA hdbuserstore key to execute Backup and Recovery instead of a user name and password to communicate with HANA database using the SAP HANA Secure User Store. For HANA 2.0 userstore key needs to be created for SYSTEMDB and all tenant db.

This includes:

Creating the SAP HANA Hdbuserstore Key for the System Database and Each Tenant Database in a Single Node System on page 16

Creating the SAP HANA Hdbuserstore Key for the System Database and each Tenant Database in a Scale-Out Multi-Node SAP HANA System on page 17

Hdbuserstore Key Naming Convention

For SYSTEMDB set the key name = DATABASE BACKUP USERNAME.

For TENANTDB set the key name = DATABASE BACKUP USERNAME<TENANT DB NAME>.

For example:

DATABASE BACKUP USERNAME = ACTBACKUP across SYSTEMDB and all TENANT DB

Set SYSTEMDB key name = ACTBACKUP

For tenant TDB, set TENANTDB key name = ACTBACKUPTDB

For tenant SDB, set TENANTDB key name = ACTBACKUPSDB

Creating the SAP HANA Hdbuserstore Key for the System Database and Each Tenant Database in a Single Node System

- 1. Open the putty window to the HANA database server and login to <sid>adm by su to <sid>adm.
- 2. cd exe
- 3. Create entries in hdbuserstore by calling:
 - # ./hdbuserstore SET <key_name> <server>:<port> <DB_user_name> <DB_user_password>
 The <port> is the SQL port of the systemdb or tenant database.
- 4. Check the keystore: ./hdbuserstore list

Example

Creating a SYSTEMDB hdbuserstore key:

```
./hdbuserstore SET ACTBACKUP saphana3:30013 ACTBACKUP <database backup user password *************
```

Where:

- SYSTEM DB DATABASE (Backup username from above): ACTBACKUP
- KEY NAME (same as DATABASE backup username): ACTBACKUP
- SQL Port (for systemdb from above): 30013
- Hostname: saphana3

Example

Creating a TENANTDB hdbuserstore key:

```
./hdbuserstore SET ACTBACKUPTBD saphana3:30015 ACTBACKUP <database backup user
password ********************</pre>
```

Where:

- TENANT DB DATABASE Backup username from above: ACTBACKUP
- KEY NAME (systemdb key name postfix tenant db name): ACTBACKUPTDB
- SQL Port (for tenant db from above): 30015
- Hostname: saphana3

Creating the SAP HANA Hdbuserstore Key for the System Database and each Tenant Database in a Scale-Out Multi-Node SAP HANA System

For a three node scale-out system with server 1, server 2, and server 3:

- 1. Open the putty window to each HANA database server and login to <sid>adm by su to <sid>adm.
- 2. cd exe
- 3. On each of the HANA scale-out nodes, create entries in Hdbuserstore by running the command below:

./hdbuserstore SET <key_name> "<server 1>:<port>;<server 2>:<port>;<server
3>:<port>" <DB_user_name> <DB_user_password>

Where the <port> is the SQL port of the systemdb or tenant database.

4. Check the keystore: ./Hdbuserstore list

Example, SYSTEMDB hdbuserstore key

Where:

- SYSTEM DB DATABASE Backup username from above: ACTBACKUP
- KEY NAME: ACTBACKUP (same as DATABASE backup username)
- SQL Port for systemdb from above: 30013
- Hostname : saphana1, saphana 2, saphana 3

./hdbuseratore SET ACTBACKUP "saphana1:30013; saphana2:30013; saphana3:30013" ACTBACKUP <database backup user password ****************</pre>

Example, TENANTDB (TDB) hdbuserstore key

TENANT DB DATABASE Backup username from above: ACTBACKUP

KEY NAME: ACTBACKUPTDB (systemdb key name postfix tenant db name)

SQL Port for tenant db from above: 30015

Hostname : saphana1, saphana2, saphana3

./hdbuseratore SET ACTBACKUPTDB "saphana1:30015; saphana2:30015; saphana3:30015"
ACTBACKUP <database backup user password **************</pre>

4 Adding a SAP HANA Database Host and Discovering the Database

Before you can protect a SAP HANA database, you must add the host and discover the database. This requires:

- 1. Adding the Host from the Domain Manager on page 19
- 2. Discovering the HANA Database Application from the Application Manager on page 21
- 3. Finding the Discovered HANA Database in the Application Manager on page 22

Adding the Host from the Domain Manager

Add the host to Domain Manager. If the host is already added then edit the host and make sure to set the Disk Preference correctly.

1. From the AGM Domain Manager, Hosts tab, click +Add Host.

	Ades	Orpa	missione LDAP	1000	Storage Pools					
		Но	osts							+ ADD HO
		170	thes							
	-	0,04	e bu search		Q					III. 23 +
		0	NAME	•	FRIENDLY PATH	APPLIANCE	18	TYPE	OS RELEASE	VIRTUAL MACHINE
		0	172.16.12.29		172.16.12.29	sapskydev	172.16.12.29	ESX Server		
		0	172.16.8.102		172,16.8.102	sapskydev	172.16.8.102	ESX Server		
Deplocent		0	172.17.136.138		172.17.136.138	sapskydee	172.17.136.138	ESX Server		
Dorsen Manager		.0	172.17.137.30		172,17,137,30	sapskydev	172.17.137.30	ESX Server		
BLA Architect		0	172.17.4.174		172.17.4.174	Motkydev	172.17.4.174	ESX Server		

- 2. On the Add Host page:
 - o Name: Provide the HANA database server name.
 - o IP Address: Provide the HANA database server IP and click the + sign on the right corner.
 - o Appliances: Select the check box for the appliance.
 - o Host Type: Make sure this is Generic.
 - o Click Add at bottom right to add the host.

The Host will get added.

- 3. Right-click the host and select Edit.
- 4. On the Edit Host page: Select the disk preference:
 - o For block-based backup with CBT: select Block
 - o For file-based backup with Full+Incremental file system backup: select NFS

and the second	Organizations 💌		
Appliances Users Roles Organizations LDAP Hosts St	torage Pools		
SAPAHAN-AUTOVM4.sqa.actifio.com	Edit Host		
IP 172.16.216.104			
FRIENDLY PATH SAPHANA-AUTOVM4	Name *	SAPAHAN-AUTOVM4.sqa.actifio.con	
UNIQUE NAME e21a8a21-e519-42c0-8efb-9a4ac64b0f75_6778 OS RELEASE Red Hat Enterprise Linux			
OS VERSION 3.10.0 514.26.2.e17.x86_64	Friendly Name	SAPHANA-AUTOVM4	
OS TYPE Linux	IP Address *	00	
DISK BLOCK PREFERENCE		172.16.216.104 192.168.122.1	
		÷	
	Description		
	Appliances *	type to search Q	
		APPLIANCE	IP
		saphana-remote	172.16.200.3
		😼 sky-hana	172.16.201.4
	Host Type	Generic •	
	Tox type		
	Disk Preference	NES * Block NES	
Select save at the bottom of Edit Host			

Select save at the bottom of Edit Host page

Discovering the HANA Database Application from the Application Manager

To discover the HANA database:

- 1. From the AGM Application Manager, Applications tab, select Add Application in the upper right corner.
- 2. On the Add Application page, select Discover connector supported applications and Using existing host, then select the HANA database host. If you have many hosts, you can use the search feature or use the filter to see only hosts that are managed by a specific Actifio appliance.

APPLICATION MANAGER	R Filter by Applian	es 👻 Organizations 👻		
Applications Consistence	y Groups Logical Groups Acti	ve Images Workflows		
Add Applicatio	205			
Application Type	Host Selec	lan		
	upported Applications () Using e			
Out of band Generic				
	te stage			
Available Hosts (4)				
		Appliance		
autovm	Host	sky-hana v	Clear Filters	
	Select one Host	· · · · · · · · · · · · · · · · · · ·		
Host	IP	Friendly Path		Appliance
	Friendly Path			
SAPAHAN-AUTOVM4.s	qa.actifio 172.16.216.104	SAPHANA-AUTOVM4		sky-hana
SAPHANA-AUTOVM3.S	QA.ACTI 172.16.216.103	SAPHANA-AUTOVM3		sky-hana
SAPHANA-AUTOVM2.s	qa.actifio 172.16.216.102	SAPHANA-AUTOVM2		sky-hana
SAPHANA-AUTOVM1.s	qa.actifio 172.16.216.101	saphana-autovm1		sky-hana

3. Select the host and click Add Applications in the bottom right corner. This will run the discovery on the HANA database host and will discover all HANA databases running on it.

Add Applications				
Application Type	Host Selectio			
Out of band Generic Appli	cation O Using IP ad	ddress		
vallable Hosts (4)				
		Appliance		
autovm	Host	sky-hana		
Host	IP	Friendly Path	Appliance	
	tilio 172.16.216.104	SAPHANA-AUTOVM4		
SAPHANA-AUTOVM3.SQA.A	ACTI 172.16.216.103	SAPHANA-AUTOVM3	sky-hana	
SAPHANA-AUTOVM2.sqa.ac	tifio 172.16.216.102	SAPHANA-AUTOVM2	sky-hana	
SAPHANA-AUTOVM1.sqa.ao	tifio 172.16.216.101	saphana-autovm1	sky∘hana	

Finding the Discovered HANA Database in the Application Manager

To find the newly-discovered database, go to the AGM Application Manager Applications tab. All applications known to the AGM of all types are listed. Use the Type application filter on left pane to show only SAP HANA databases.

APPLICATION M	ANAGER		F	ilter b	y Appliances 🔻	0	rganizations 💌					Am
Applications C	Consistency G	roups	Lo	gical C	roups Active Image	s N	Norkflows					
🛛 clear a	ll filters		Ap	plic	ations						Ì	+ ADD APPLICATION
APPLICATION NAM	46	•	a hide	filters	O Type: SAP HANA							
HOST NAME		•			- Harold Constraints of Constraints							
FRIENDLY PATH		•	type	to sea	arch		Q					
SLA STATUS		•	0		APPLICATION	٥	TEMPLATE 0	PROFILE	¢	FRIENDLY PATH	HOST NAME	APPLIANCE
 Managed Unmanaged 			0	•	ha6		HANABackup	LocalProfile		saphana-autovm10	saphana-autovm10	SAk-SKY-upgrade
TYPE		-		0	has		HANADBTemplate1	LocalProfile		saphana-autovm11	saphana-autovm11	saphanasky
elect: ALL NONE			0	0	ipl		TESTSAPHANATEMPL	LocalProfile		saphana-autovm5	saphana-autovm5	SAk-SKY-upgrade
CIFS	Group			0	md1		SAPHANALogSmart	LocalProfile		md1_cluster	md1_cluster	SAk-SKY-upgrade
Exchange				•	nfl		SAPHANALogSmart	LocalProfile		saphana-autovm6	saphana-autovm6	SAk-SKY-upgrade
FileSystem Generic LVM			0	0	pgt		SAPHANALogSmart	LocalProfile		saphana6	saphana6	SAk-SKY-upgrade
Hyper-V NAS				0	sl1					Hana-Sles	Hana-Sles	saphana-remote
					2.2							
C) Oracle												
SAP HANA			1									
SQL Databas	e :	-										
SQL Instance												
System State	2											

The new HANA database will appear in the list as unmanaged (the red shield icon).

5 Configuring the SAP HANA Backup Method

You can back up the database:

- Using Block-Based Database Storage Snapshots with CBT
- Using File-Based Traditional Backup and Recovery in NFS

Setting	Block-Based LVM Snapshot with CBT	File-Based Backup in NFS
Percentage of Reserve Space in Volume Group	This is needed for LVM snapshot temporary space. Recommended value is 20%	Not applicable
Backup Capture Method	Use Changed block tracking based backup	Use full+incremental filesystem backup
Force Full Filesystem Backup	Not applicable	Use for an ad hoc full backup
Database Filesystem Staging Disk Size in GB	Not applicable	Use the default calculation: (database size * 1.5)+ 10%. The disks will grow dynamically.
Log Backup Staging Disk Size in GB	backup SLA plus 20% buffer. Defaul	fault calculation and the log disk will not
Retention of Production DB Logs in Days	destination. Based on this setting th (CURRENT_TIMESTAMP, - the # day	IA log backup from basepath_logbackup le last data backup id will be selected /s set) and the log will be purged older ue is 0 days. With default value all logs ged.
HANA DB User Store Key	This is the SAP HANA hdbuserstore earlier. This field is mandatory.	key for the system database created in
Script Timeout	This value is applied to internal back connector. Default value is recomme	

File-based backup also requires that the CLI command DB dump schedule be configured. See Actifio CLI Reference.

Whichever method you select, you must:

Ensure that the Disk Preference on the Host is Set Correctly on page 24 Ensure that the Backup Capture Method in the Application Settings is Set Correctly on page 26

Ensure that the Disk Preference on the Host is Set Correctly

Choose between:

Setting Disk Preference for Block-Based Database Storage Snapshots with CBT on page 24 Setting Disk Preference for File-Based Traditional Backup and Recovery in NFS on page 25

Setting Disk Preference for Block-Based Database Storage Snapshots with CBT

To set disk preference for block-based database storage snapshots with CBT:

1. From AGM Domain Manager, Hosts tab, right-click the host and select Edit.

DOMAIN MANAGER		- ()	Filter by	Appliance	es 🔻	Organization	•		
Appliances Users I	Roles	Orga	nizations	LDAP	Hosts	Storage Pools			
FILTER BY		Ho	osts						
HOST NAME		+ hid	e filters						
filter by host name		sapl	hana6			0			
IP ADDRESS		8	NAME		0	FRIENDLY PAT	n c	APPLIANCE	ö
filter by IP address		E.	saphann	5		saphana6		sapskydev	
os	~			Edit					
Enter OS like Linux				Edit Org	anizatio	0.0			
туре					anneactic	113			
select: ALL NONE				Delete					

2. In the Edit Host pane, set Disk Preference to *Block* and click Save at the bottom of the page.

DOMAIN MANAGER Filter by Appliances • O)rganizations 💌			America/New_York 👤 admin 🛔
Appliances Users Roles Organizations LDAP Hosts Si	torage Pools			
saphana7	Edit Host			
IP 172.16.137.137 FRIENOLY PATH sephana7 UNIQUE NAME 44d76c07.9148.4ba0.87fa-aee6a7e0f374_6778	Name *	saphana7		
OS RELEASE Red Hat Enterprise Linux OS VERSION 3.10.0-514.26.2.el7.x86_64	Friendly Name	saphana7		
OSTYPE Linux DISK BLOCK	IP-Address *	0 0		
PREFERENCE		172 16 137 137 * 162 168 122 1		
		- 8		
	Description			
	Appliances*	type to search	۹	SHOW SELECTED (1)
			IP	
		A hana-remote	172.16.201.177	1
		😪 sky-hana	172.16.201.44	
	Host Type	Genanc +		
	Disk Preference	Block +		
	Enable Auto Discovery	00		

Setting Disk Preference for File-Based Traditional Backup and Recovery in NFS

To set disk preference for File-Based Traditional Backup and Recovery in NFS:

1. From AGM Domain Manager, right-click the host and select Edit.

DOMAIN MANAGER			Filter by	Applian	ces 🔻	Organizatio	ons 🔻			
Appliances Users	Roles	Orga	anizations	LDAP	Hosts	Storage Pool	ls			
FILTER BY		Н	osts							
HOST NAME		e his	de filters							
filter by host name		sap	hana6			0				
IP ADDRESS			NAME		0	FRIENDLY P	ATH	ö	APPLIANCE	ö
filter by IP address		E.	saphan	6		saphana6			sapskydev	
os				Edit						
Enter OS like Linux					anizatio	005				
туре					tornizoer.					
select: ALL NONE				Delete						

2. In the Edit Host pane, set Disk Preference to *NFS* and click Save at the bottom of the page.

	rganizations 💌 orage Pools			America/New_York 👤 admin	4 0
saphana7	Edit Host				n Î
IP 172.16.137.137 FRENDUY PATH sophina 7 UNIQUE NAME 44076037.9148.4ba0.6376 aee6a7e07374_6778 OSTRICEASE: Red His Enterprise Linux OS VERSION 3.10.0514.26.2.et/7.86.64	Name * Friendly Name	saphana? Saphana?			
OSTYPE Linux DESK BLOCK PREFERENCE	IP-Address_*	172 16 137 137 192 168 122 1			
ta V	Description Appliances*	type to search	٩	SHOW SELECTED (1)	
慶 (1) (1)		APPLIANCE Ahna-remote Sky-hana	IP 172.16.201.177 172.16.201.44		
	Host Type	Generic +			
	Disk Preference	NFS •			
ня	Enable Auto Discovery Use Oracle Database	0			

Ensure that the Backup Capture Method in the Application Settings is Set Correctly

Choose between:

Setting Backup Capture Method for Block-Based Database Storage Snapshots with CBT on page 26 Setting Backup Capture Method for File-Based Backup and Recovery in NFS on page 27

Setting Backup Capture Method for Block-Based Database Storage Snapshots with CBT

To set the backup capture method for block-based database storage snapshots with CBT:

1. Go to the Application Manager. In the Applications tab, right-click the application and select Manage SLA. At the top of the page, click the blue Details & Settings link.



2. Set the Backup Capture Method to Use Changed block tracking based backup and click Save Changes. For details on the other settings, see Configuring the SAP HANA Backup Method on page 23.

Application Det	ails & Settings	
📄 Select options that w	ill revert back to default.	
Qa1		
APPLICATION TYPE	SAPHANA	
HOST	SAPHANA-AUTOVM1.sqa.actifio.com	
HOST IP ADDRESS	172.16.216.101	
PATH	Saphana-autovm1	
OPERATING SYSTEM	Linux	
APPLIANCE	Sky-hana	
APPLIANCE IP ADDRESS	172.16.201.44	
PROTECTED DATA	100.00 GB	
Settings		
	ERVE SPACE IN VOLUME GROUP 20	
Must have a minimum	value of 1 and a maximum of 100.	
BACKUP CAPTURE M	ETHOD	
Use Changed block	tracking based backup	
O Use full+increment	al filesystem backup	
	Cancel Save Changes	. :

Setting Backup Capture Method for File-Based Backup and Recovery in NFS

To set the backup capture method for file-based backup and recovery in NFS:

1. Go to the Application Manager. In the Applications tab, right-click the application and select Manage SLA. At the top of the page, click the blue Details & Settings link.



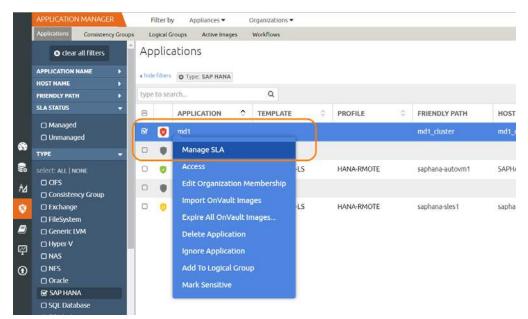
2. Set the Backup Capture Method to Use full+incremental filesystem backup and click Save Changes. For details on the other settings, see Configuring the SAP HANA Backup Method on page 23.

Application Det	ans & Sectings	
5	ill revert back to default.	
291		
APPLICATION TYPE	SAPHANA	
HOST	SAPHANA-AUTOVM1.sqa.actifio.com	
HOST IP ADDRESS	172.16.216.101	
PATH	Saphana-autovm1	
OPERATING SYSTEM	Linux	
APPLIANCE	Sky-hana	
APPLIANCE IP ADDRESS	172.16.201.44	
PROTECTED DATA	100.00 GB	
	ERVE SPACE IN VOLUME GROUP 20 Value of 1 and a maximum of 100.	
BACKUP CAPTURE M Use Changed block Use full+increment	tracking based backup	
	Cancel Save Char	nges

6 Protecting the HANA Database

To protect the database:

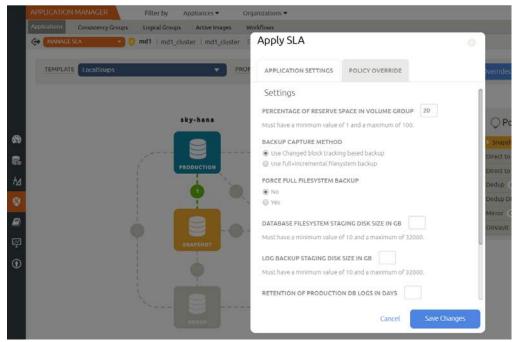
1. Right-click the HANA database and select Manage SLA.



2. On the Manage SLA page, select your desired template from Choose a template and profile, then click Apply SLA.



3. On the Apply SLA page, fill in the required field based on type of backup as detailed in Configuring the SAP HANA Backup Method on page 23. Click Save Changes.



The database will be protected when the snapshot job runs according to the schedule in the template. After the first successful snapshot job, the database will appear in the Application Manager as protected, with a green shield icon.

7 Protecting SAP HANA Database Logs

There are two parts to configuring protection of SAP HANA database logs:

Setting up the Log Mode and Log Backup in HANA Studio on page 31

Setting up the Log Backup in Actifio AGM on page 33

Setting up the Log Mode and Log Backup in HANA Studio

- 1. In SAP HANA HDB studio, make sure log backup is set correctly under DATABASE (SYSTEMDB FOR HANA 2.0) Backup Configuration page
 - o Destination Type is File.
 - o Destination is set to a local file system mount path.
 - o Backup Interval is set to required RPO.
 - o Automatic Log Backup is enabled.

Backint Settings	
· Michael Stating	
File-Based Data Backup Settings	Log Backup Settings
The default destination is used unless you specify a different destination. If you specify a new destination, ensure that the directory already exists before you start a data backup. For improved data safety, we recommend that you specify an external backup destination.	Destination Type: SFile B Backint Destination: /home/pgtlogbackup
Destination: /usr/sap/PGT/HDB00/backup/data	Backup Interval: 8 10 Minutes
You can specify the maximum size of service-specific data backup files. It a data backup exceeds the specified size, it is split across multiple files, to which the system writes sequentially. By default, data backups are not split across multiple files.	If you disable automatic log backup, the log area will continue to fill. A full area will cause the database to hang. If Decomposition of the second secon

2. Check under Database configuration: DATABASE (SYSTEMDB FOR HANA 2.0) - Configuration page. In the filter, type basepath.

overview candscape veriorman	ce volumes configuration 5	ystem Information Diagnosis I	Files Trace Configuratio	in
Filter: basepath				
Name	Default	System	Database - PGT	Host - saphana6
🔻 🔝 global.ini		*		
[] persistence		\$		
basepath_catalogbackup	\$(DIR_INSTANCE)/backu	/home/pgtlogbackup	D	
basepath_databackup	\$(DIR_INSTANCE)/backu	/usr/sap/PGT/HDB00/		
basepath_databackup_ets	S(DIR_INSTANCE)/backu			
basepath_datavolumes	\$(DIR_GLOBAL)/hdb/data	/hana/data/PGT		
basepath_datavolumes_es	\$(DIR_GLOBAL)/hdb/data_es			
basepath_datavolumes_ets	\$(DIR_GLOBAL)/hdb/data			
basepath_export	\$(DIR_INSTANCE)/work			
basepath_filedownload_rdsync	\$(DIR_GLOBAL)/hdb/data			
basepath fileupload rdsync	S(DIR GLOBAL)/hdb/data			
basepath_logbackup	\$(DIR_INSTANCE)/backu	/home/pgtlogbackup)	
basepath_logbackup_ets	\$(DIR INSTANCE)/backu			

- 3. Verify basepath_logbackup is set correctly:
 - o Set the basepath_catalogbackup to same as basepath_logbackup.

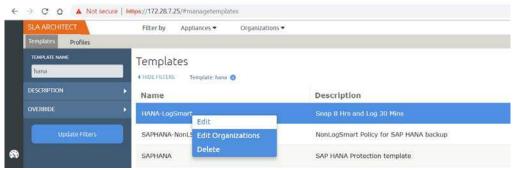
- o Open the basepath_catalogbackup edit page.
- o Set the New Value to same as basepath_logbackup and click Save. This will ensure the backup of catalog with log backup for point in time recovery.

basepath_catal global.ini [persis		
Default Value: System	\$(DIR_INSTANCE)/backup/log	
Active Value New Value:	/home/pgtlogbackup /home/pgtlogbackup	Restore Default
		Restore Default for All
?		Cancel Save

Setting up the Log Backup in Actifio AGM

To enable and set up the HANA database log backup:

1. From the SLA Architect page, edit the template created for HANA database protection:



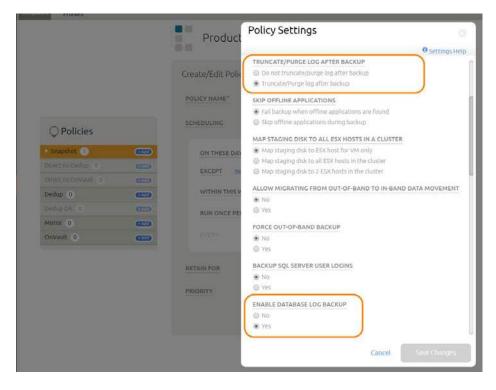
2. Click the Production to Snapshot "+".

SLA ARCI	TITECI	Filter by	Appliances 🔻	Organizations 👻	
Templates	Profiles				
	TEMPLATE*	HANA-LogSmart		ALLOW OVERRIDES ON POLICY SETTINGS?* VES VES NO	
1	DESCRIPTION	Snap 8 Hrs and Lo	g 30 Mins		
	-				
		1	PRODUCTION	міляов	
			-	ò	
			-		
				9 10	
		100.00			
		T	SNAPSHOT	OMVAULT	
		T	SHAPSHOT	ONVAULT	

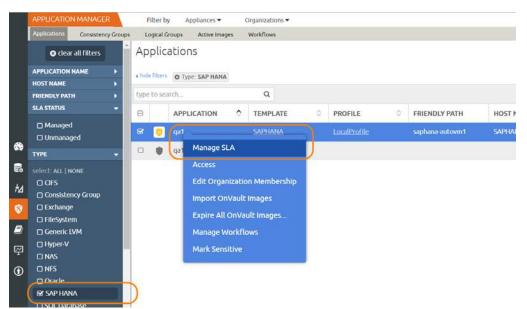
3. Select Advanced Policy Settings.

Create/Edit Policy POLICY NAME* SCHEDULING Windowed	
SCHEDULING Windowed	
Q Policies	
Snapshot 1 ON THESE DAYS Evendar	
Direct to Dedup 0 EXCEPT Never ×	
Direct to OnVault 0	
Dedup 0 WITHIN THIS WINDOW 19:00 T	07:00
Dedup DR 0 COM RUN ONCE PER WINDOW	
Mirror 0 (7A33)	
Onvault • CALL CALL CALL CALL CALL CALL CALL CA	
	lay(s) 🔻

- 4. Set the log policy options (you will have to scroll to see them all):
 - o Truncate/Purge Log After Backup: Select this.
 - o Enable Database Log Backup: Select this.
 - o RPO (Minutes): Enter the desired frequency of log backup
 - o Log Backup Retention Period (in Days): the SLA to retain the backup of log for point in time recovery.
 - o Replicate Logs (Uses StreamSnap Technology): Select this to enable StreamSnap replication of log backup to a DR site.



5. From Application Manager, select the HANA database. You can use the SAP HANA checkbox to filter the list. Select Manage SLA.



6. At the top of the screen, select Details & Settings.

	APPLICATION MANAGER Filterby	Appliances Organizations	
	Applications Consistency Groups Logical Groups		
	G+ MANAGESEA	Application Details & Settings	
	TEMPLATE	PROF PROF Use full+incremental filesystem backup	wendes
		PORCE FULL FILESYSTEM BACKUP No Ves	() Po
ෂ		DATABASE FILESYSTEM STAGING DISK SIZE IN CB Must have a minimum value of 10 and a maximum of 32000.	Snapsha
80	1	PRODUCTION	Direct to I
₩		LOG BACKUP STACING DISK SIZE IN CB Must have a minimum value of 10 and a maximum of 32000.	Direct to C Dedup
		RETENTION OF PRODUCTION DB LOGS IN DAYS	Dedup DR
		Must have a minimum value of 0 and a maximum of 100.	OnVault
ø	The second se	SIKAPSHOT	
۲		Must have a minimum value of 600 and a maximum of 345600.	
		Cancel Save Changes	

7. Set the Retention of Production DB Logs in Days. This value is used to purge the HANA log backup from basepath_logbackup destination. Based on this setting the last data backup id will be selected (CURRENT_TIMESTAMP - the # days set) and the log will be purged older then the data backup id. Default value is 0 days. With the default value, all logs prior to last data backup are purged.

8 Restoring and Recovering an SAP HANA Database

This section includes:

Mount and Refresh from Block-Based LVM Snapshot with CBT to a Target SAP HANA Database as a Virtual Application on page 37

Restoring and Recovering a SAP HANA Database on page 38

Mount and Refresh from Block-Based LVM Snapshot with CBT to a Target SAP HANA Database as a Virtual Application

To mount the database image as a virtual application (an application aware mount) to a new target:

1. From Application Manager > Protected Application > Access, from the latest snapshot, choose Mount.

APPLICATION MANAGER Filter by Appliances Organizations	America/hiew_York 🙎 admin 🔺
Applications Consistency Groups Logical Groups Active Images Workflows	
ACCESS 0 941 SAPHANA-AUTOVM1.sqa.actifio.com saphana-autovm1 Details & Settings	TWELDE TABLE
Jump to: 💼 (2019-03-08	2019-03-08 11 vie.07 Snapshot image
anne and a second se	NAME Image_0164184
2098087	STATUS Avoitable TRANSPORT SAN Based, Out Of Bare Storage
	IMAGE SIZE 110.01GB
	EXPIRES ON 2019-03-09 11:48-59
2019/03-00	APPLIANCE Sky-Hana
	RECOVERY 03-08 11-46 To 03-08 12 RANCE
	CATALOG STATE None
2019-03-09	Mount -
	Curtant Moore
	Live Clone
Stupshot Dedup Remote Dedup Remote Shipshot OnVault	MQL ^{CORE}
	Expire Drisco

- 2. On the Mount page, from Target, choose the desired target HANA server from the dropdown.
- 3. Under Application Options:
 - o Select Create New Virtual Application.
 - o Choose a point in time on the slider bar for a database protected with log roll-forward to recover to.
 - o Target Database SID > Provide the target HANA database name.
 - SAP DB User Store-Key > Provide the hdbuserstore key for the target database (HANA 2.0: SYSTEMDB).
 - o Mount Location> Specify a Mount Point to mount to new target.
 - o Manage New Application> To reprotect, click and enable Manage New Application.
 - o Template > Choose a template to protect the database.
 - o Profile> Choose a profile.
- 4. Click Submit.

Restoring and Recovering a SAP HANA Database

Depending on how you protected the database, you need the procedure for:

Recovering from Block-Based LVM Snapshot with CBT on page 38

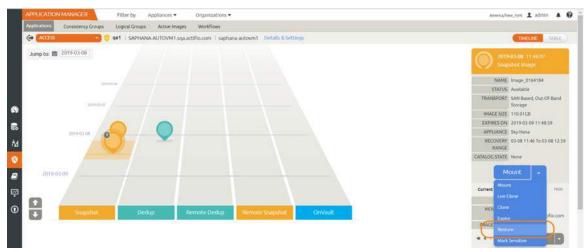
Recovering from a File-Based Backup with NFS on page 39

Recovering from Block-Based LVM Snapshot with CBT

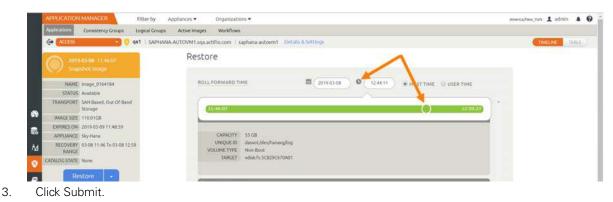
Use this procedure to restore and recover the source HANA database. This procedure uses physical recovery of the source data area.

To recover back to the source:

1. From the Application Manager > Protected Application > Access, from the latest snapshot to recover, choose Restore.



2. On the Restore page choose point in time on the slider bar for database protected with log to recover to desired point in time.



Recovering from a File-Based Backup with NFS

You have two options:

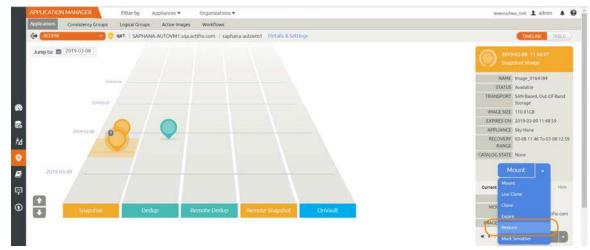
Recovering Back to the Source: Use this procedure to restore and recover the source HANA database. This procedure overwrites the source data.

Recovering to a New Target: Use this procedure to restore and recover to a new target server.

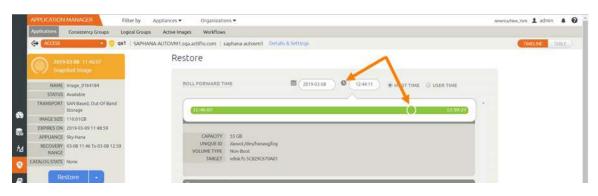
When you are finished, you must bring up the database, as detailed in Bringing up the HANA Database on page 41.

Recovering Back to the Source

- 1. From Application Manager > Protected Application > Access.
- 2. Select the latest snapshot to recover, and choose Restore.



3. For a database protected with logs, on the Restore page, choose a date and then a point in time on the slider.



Notes

- HANA 1.0: EXCLUDE and INCLUDE db list do not apply
- HANA 2.0
 - o Only one out of EXCLUDE and INCLUDE is applicable at a time.
 - o Complete HANA recovery leave EXCLUDE AND INCLUDE empty
 - o INCLUDE LIST: For recovering one or more database out of n database: provide comma separated list of database under INCLUDE

o EXCLUDE LIST: For excluding one or more database during recovery out of n database: provide comma separated list of database under EXCLUDE

2019-03-11	12:48:34	HOST TIME	O USER TIME
INCLUDE DB LIST			
ngs			
		Cancel	Submit
	- (3.3.) -		INCLUDE DB LIST

4. Click Submit. This will start the source database physical recovery using HANA recover commands.

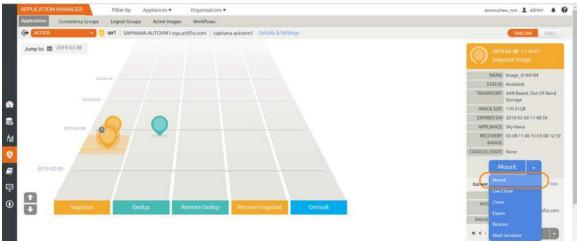
Recovering to a New Target

Before You Begin:

- Make sure target HANA server is set up as same as source HANA server (OS version, CPU and memory, HANA version)
- Make sure HANA database on target server is configured same as source i.e. global.ini, nameserver.ini

To recover:

1. From Application Manager > Protected Application > Access, select the latest snapshot to recover, and choose Mount.





On the Mount page, specify a mount location to mount to new target.

PPLICATION MANAGER	Filter by Appliances	 Organizations 	America/New_York 1 admin 🔺
Consistency G	roups Logical Groups Active	nages Workflows	
Access	😏 🦁 nfl 🛛 saphana-autovmő 🗍	saphana-autovmii Details & Settings	THICKNE TABLE
2019-05-11 053	N N	ount	
NAME image_0292	156	TARGET. LABEL	
STATUS Available TRANSPORT NPS		saphane-autovmő 👻	
IMAGE SIZE 450.18CB			
EXPIRES ON 2019-03-1	O MOUNT LOCATION	Mapping Options	
APPLIANCE SAMSKY-U RECOVERY 03-11 05:5	Enter the full path at which you want to mount the volume.		
RANGE	If the path exists as an empty	STORAGE POOL*	.per_pool000 (4390 💌
More Details	folder, the Actific Connector will use it. If it does not exist, the	MOUNT LIDEATION	
More Detwis	Actifio Connector will create it. If it exist as a file or as a folder that	SCALE-OUT NODE LIST	
Mount	is not empty, then the job will fail. If there are multiple volumes to		
	be mounted, the Actifio		
100		Advanced NFS Settings	

- 3. Enter scale-out information:
 - o For non-scale out HANA: leave SCALE-OUT NODE LIST empty
 - o For scale out HANA environment: Provide colon-separated list of target HANA servers

2019-65-11 G	ENGIN PLAN	ount		
NAME Image.01 STATUS Available TRAARDOOM NTS IMAGE SZE SOS ISCO SORIES ON 2019-03- APPLANCE SASSIC CATALOG STATE Hone Hore Details Mount.	13 05 58 37 Jaggrade	TARCET* Sechara escoured Mapping Options STORACE POOL* MOUNT LOCATION SCALE-OUT NODE LIST	► LAST. ■	
	_	 Advanced NFS Settings 	Canori	Submit

4. Click Submit. This will mount the backup image to target server. In case of scale out, the image will be mounted to all nodes as NFS shared volume.

Bringing up the HANA Database

To bring up the HANA database from the mounted image, modify and configure this script:

1. Configure /act/custom_apps/saphana/dump/restoreDumpToNewTarget.conf parameter

```
DBSID=<source database sid>
DBPORT="HDB<instance #>" ex:for instane# 00 this will be "HDB00"
HANABACKUPPATH=<mount path from mount operation>
DBUSER=<userstore key or HANA 2.0: systemdb userstore key>
HANAVERSION="<HANA version: 1.0 or 2.0>"
# optional if rollforward is required
LOGMOUNTPATH="<mounted log backup mount point>"
RECOVERYTIME="2019-03-04 03:11:36"
# do not change below
EXCLUDE DB LIST="null"
INCLUDE DB LIST="null"
For example:
DBSID=ipl
DBPORT="HDB01"
HANABACKUPPATH=/iplmnt
DBUSER=ACTBACKUP
HANAVERSION="2.0"
# optional if rollforward is required
LOGMOUNTPATH="/iplmnt_archivelog"
RECOVERYTIME="2019-03-04 03:11:36"
# do not change below
```

2. cd /act/custom apps/saphana/dump/

EXCLUDE_DB_LIST="null" INCLUDE DB LIST="null"

3. Run ACT_HANADB_newtargetdumprestore.sh:

./ACT_HANADB_newtargetdumprestore.sh

or

/act/custom_apps/saphana/dump/ACT_HANADB_newtargetdumprestore.sh