## IBM Db2 DBA's Guide to Actifio Copy Data Management

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Actifio VDP 10.0

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### 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 IBM Db2 databases.

#### 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.

### Introducing the Actific Virtual Data Pipeline for IBM Db2 Databases

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

Actifio Data Virtualization on page 1 Capturing Data on page 3 Replicating Data on page 3 Accessing Data on page 4

#### Actifio Data Virtualization

An Actifio 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.

Db2 is a is a family of relational database management systems within IBM's Information Management division that is centered on several relational database management system offerings. This section explains how to protect Db2 application consistent database data with Actifio VDP in Linux and AIX environments.

Db2 backup API used by Actifio:

- Linux CBT and LVM snapshot: Db2 database deactivate and activate API with Linux CBT and LVM snapshot
- IBM Spectrum Scale (GPFS) snapshot on AIX: Db2 database deactivate and activate API with GPFS snapshot on AIX.
- File-based backups: Db2 database API "Db2 backup db online" file-based backups provide full and incremental backups of the database in backup format. On recovery the restore db API recovers the database by physically overwriting the data area.
- Db2 log backup: Logs are flushed using "Db2 archive log for database". During a log backup, the payload of the log segments is copied from the log area to the location specified by the parameter logarchmeth1.



#### Db2 with Actifio Volume-Based Backup with Linux CBT



#### **Db2 with Actifio GPFS Snapshot on AIX**



Db2 with Actifio File-Based Full+Incremental Backup

#### Capturing Data

Capturing data consists of four steps:

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

#### The Actifio Connector

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

Specifically, the Actifio Connector:

- Creates a generic 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. VDP 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 Actifio 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 Global Manager (AGM). Procedures for accessing databases images are described in Chapter 5, Accessing a Db2 Database as a Standard Mount or as a Refreshable Virtual Database.

Access options include:

Mounts LiveClones Restores Workflows

#### Mounts

The Actifio VDP 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.

#### LiveClones

The LiveClone is an independent copy of a snapshot image of data. LiveClones can be mounted and masked before being made available to users. A LiveClone can be refreshed incrementally from any snapshot when the source data changes (if the LiveClone data has been masked, the masking remains), allowing development and test teams to always work on the best set of data without having to manually manage the data and not access or interfere with the production data.

#### 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.

#### 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 VDP'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 AGM.



Workflow With Masked Social Security Data

## **2** Adding a Db2 Database Host and Discovering the Instance

#### **Before You Begin**

Each database must be using Automatic Storage Mode, or else only instances will be discovered.

Each database must be in Archive log mode. To learn if the database is in Circular mode or Archive log mode, run the command #"db2 get db cfg for <database name>| grep LOGARCHMETH1"

If the database is in Circular mode, then change the logging to Archive mode before continuing. To set the LOGARCHMETH1 parameter: db2 update db cfg for <dbname> LOGARCHMETH1 using 'DISK:<location>'

#### Overview

Before you can protect a Db2 database, you must add the host and discover the database. This requires:

- 1. Adding the Host to AGM on page 7
- 2. Discovering the Db2 Instance Application from the App Manager on page 9
- 3. Finding the Discovered Db2 Instance in the App Manager on page 9

#### Adding the Host to AGM

Add the host to AGM. If the host is already added then edit the host and make sure to set the Staging Disk Format correctly.

actifio	Dashboa	ırd	Backup & Recover 🗸	Test	: Data Management 🗸	App	o Manager 🗸	SLA Architect	<ul> <li>Manage -</li> </ul>	Report	Monitor 🗸			Y	👤 admin 🔺	8
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Enter OS like Linux			vca5.5c1		VCA5.5C1		CDS139-C2		172.17.139.150		vCenter			No		
OS TYPE	•		agvc		agvc		CDS139-C2		172.24.1.160		vCenter		Microsoft Windows Se	No		

1. From the Manage, Hosts list, click +Add Host.

- 2. On the Add Host page:
  - o Name: Provide the database server name.
  - o **IP Address**: Provide the database server IP and click the + sign on the right corner.
  - o Appliances: Select the check box for the Actifio Appliance that will manage the data.
  - o **Host Type**: Make sure this is Generic.
- 3. Click Add at bottom right to add the host. The Host is added.

- 4. Right-click the host and select **Edit**.
- 5. On the Edit Host page, select the staging disk format:
  - o **Block**-based staging disks are the most useful for both backup/recovery and TDM usage. Actifio changed-block tracking (CBT) is only available on block-based staging disks, and virtual databases can only be mounted to block-based staging disks.
  - o **NFS** staging disks permit only traditional file-based backup with Full+Incremental file system backup. Select NFS only if Block is not an option in your network.

actific	<b>)</b> D	ashboard	Backup & Recover 🗸	Test Data Management	<ul> <li>App Manager -</li> </ul>	SLA Architect	Manage +	Report	Monitor 🗸		🝸 👤 admin 🌲 😯
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UN	IQUE NAME	db2-autovm2	2_1670893_null		renie	002-0	conne.				
(	OS RELEASE	Red Hat Ente	erprise Linux Server release 7	.5	Friendly Name	db2-ai	itovm2				
(	OS VERSION	3.10.0-862.el	7.x86_64								
	OS TYPE	Linux			IP Address *			0			
ST	FORMAT	BLOCK				172.1	6.216.132	Û			
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							APPLIANCE			IP	
							sky905			172.17.202.11	
							caf-source			172.17.206.77	
							sky9_caf_auto			172.17.206.76	
					Host Type	Gene	ic	٣			
					Staging Disk Format	Block		×			
					Epable Auto Discour	Block NFS			J		

6. Select **Save** at the bottom of Edit Host page.

#### Discovering the Db2 Instance Application from the App Manager

To discover and protect the Db2 database application:

1. From the App Manager, Applications list, select **Add Application** in the upper right corner.

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect	• Manage •	Report	Monitor 🗸		T	👤 admin	🌓 🕄
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(Cr	Connectors red	quired) Postgre	SQL SAP ASE	SAF	HANA	SAP IQ	SAI	P MaxDB	Consistency Groups All Apps			

#### Finding the Discovered Db2 Instance in the App Manager

To find the newly-discovered instance and its databases, go to the AGM App Manager Applications page. All applications known to the AGM of all types are listed. Use the Type application filter on left pane to show only Db2 instances and databases. The new Db2 instance will appear in the list as unmanaged (the red shield icon).

actifio	Dashboa	ard	Backup	p & Recover 🖌 🛛 T	ist Dati	a Management 🗸	App Ma	nager 🗸	SLA Architec	t 🗸 Manage 🗸	Report	t Monitor 🗸				▼ 👤 admin	<b>≜ 0</b>
🙁 clear all filter	i	Ap	plica	ations												+ ADD APPI	LICATION
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ТҮРЕ	•		۲	SYSTST		172.27.53.30		stcent760	ib22			weekly10c		Db2 Database		DB2	
Select: ALL   NONE			٥	db2inst2		172.16.201.253		OracleDB	Nike			weekly10c		Db2 Instance		DB2Instance	
Systems  Hyper-V VM			8	PRODDB1		172.27.53.30		stcent760	jb22			weekly10c		Db2 Database		DB2	
System State			0	ACTDB2		172.27.53.30		stcent760	ib22			weekly10c		Db2 Database		DB2	
Databases			۲	JFS2DB5		172.27.58.14		ndmlpar4				weekly10c		Db2 Database		DB2	
Db2 Database			0	JFS2DB2		172.27.58.14		ndmlpar4				weekly10c		Db2 Database		DB2	
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MariaDB Instance			0	JFS2DB3		172.27.58.14		ndmlpar4				weekly10c		Db2 Database		DB2	

## **3** Configuring the SLA, Including the Backup Method

After the instance is prepared and discovered as explained in Chapter 2, Adding a Db2 Database Host and Discovering the Instance, you must configure the Actifio SLA for the instance, including the backup method.

The procedures for developing SLAs are detailed in the AGM online help. This chapter provides additional information of value to the Db2 DBA.

Protection is set for the entire Db2 Instance. You can include/exclude specific databases during the process using a Database Inclusion Rule from the Manage SLA page.

The backup method is limited by the staging disk format set in Adding the Host to AGM on page 7:

- **Block**-based staging disks are the most useful for both backup/recovery and TDM usage. Actifio changed-block tracking (CBT) is only available on block-based staging disks, and virtual databases can only be mounted to block-based staging disks. Block-based staging disks can be used for both volume-level and full+incremental file-based backups.
- **NFS** staging disks permit only traditional file-based backup with Full+Incremental file system backup. Select NFS only if Block is not an option in your network.

You choose between two very different backup methods in the Application Details & Settings:

- Use volume level backup: Use volume level LVM snapshots with CBT on Linux to a block-based staging disk. This option enables you to create application-aware virtual databases from the snapshot images. The production instance/database must be present on the LVM volume. GPFS on AIX will use volume-level GPFS snapshots with low-splash backups.
- **Use full+incremental backup**: This is the traditional file-based backup and recovery. This "file dump" method does not support the creation of virtual databases. You can select this for both Block and NFS staging disks, but if you can use block-based staging disks you probably should.

**Note:** With one exception, protection is set for the entire Db2 instance. You can include/exclude specific databases during the process using a Database Inclusion Rule from the Manage SLA pages. The exception: A virtual database can be protected individually.

Whichever method you select involves these steps:

Ensuring that the Staging Disk Format is Set Correctly on page 12 Configuring the Backup Capture Method and Other SLA Settings on page 13 Setting the Schedule for Dumps on page 15

#### Ensuring that the Staging Disk Format is Set Correctly

To check the staging disk format:

1. From Manage, Hosts list, right-click the host and select **Edit**.

actifio	Dashboar	d Backup & Reco	wer 🗸 T	'est Data Manage	ement 🗸	App Manager	ר א א	A Architect 🗸	Manage +	Report	Monitor	•			Y	👤 admin 🌲 😢
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OS RELEASE	•		1587986	Sybase 2		Sybase_2		sky9_caf_auto		172.17.205.10				SUSE Linux Ente		
Enter OS like Linux			1972173	j-sybi <b>Edit</b>				caf-source		172.16.202.58		Generic		Red Hat Enterp	rise	No
OS TYPE	•		1972171	j-sybi Edit (	Organiza	tions		caf-source		172.27.13.223		Generic		Red Hat Enterp	rise	No
Enter OS like Linux			1587980	syba: Dele	te			sky9_caf_auto		172.17.205.254	1	Generic		SUSE Linux Ente	erpri	No
ТҮРЕ	•		2111599	sybase auto1		sybase auto1		sky905		172.17.205.10		Generic		SUSE Linux Ente	erpri	No

2. Halfway down the Edit Host page, the Staging Disk Format is either NFS or Block:

- o **Block**-based staging disks are the most useful for both backup/recovery and TDM usage. Actifio changed-block tracking (CBT) is only available on block-based staging disks, and virtual databases can only be mounted to block-based staging disks.
- o **NFS** staging disks permit only traditional file-based backup with Full+Incremental file system backup. Select NFS only if Block is not an option in your network.

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸		<b>T</b> 1	admin	<b>\$ (?</b>
		Sybase_2	E	dit Host								
FRIENDLY PA UNIQUE NA OS RELEA OS VERSIN OS TY STAGING D FORM	IP 172.17.205. TTH Sybase_2 ME 37e31e43-d ASE SUSE Linux I ON 4.4.21-69-de IPE Linux ISK BLOCK MAT	10 4e5-4a54-b9cd-01106e907a3 interprise Server 12 SP2 fault	10_6778	Name * Friendly Name IP Address *	Sybase_2 Sybase_2 172.17.1	105.10	0					
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					□ A	VPLIANCE			IP 172.27.63.98			
					ar	egsky9 y10sp1			172.27.34.96 172.17.205.90			
					□ sł	y905			172.17.202.11			
			(	Host Type Staging Disk Format	Block		•	)				
			(	Cashle Auto Discour	NFS			)				

3. If the staging disk format is set incorrectly, change it now and click **Save** before continuing.

**Note:** System databases on a root partition can be backed up as LVM Snapshots and later mounted as virtual databases, but they cannot be used in a traditional Restore operation as the root partition cannot be unmounted. This will need manual restore and recovery from a standard mount back to the same host.

#### Configuring the Backup Capture Method and Other SLA Settings

To configure the database SLA settings:

1. In the App Manager, Applications list, right-click the database and select Manage SLA.

actifio	Dashboar	d I	Backup	& Recover	<ul> <li>Test Data</li> </ul>	Management 🛩	App Man	ager 🖌 🦷 SLA A	rchitect 🗸	Manage 🗸	Report	Monitor 🗸				7 3	admin	۹ ۹	
🙁 clear all filters	Î	Ap	plica	ations												E	+ add af	PLICATIO	ON
APPLICATION NAME	•																		
HOST NAME	•	< hide	filters	O Applicat	ion Type: Db2 Da	atabase O Applic	ation Type:	Db2 Instance											
TEMPLATE NAME	•					0								CI SHOW S	ELECTED (1)		111 25		4
PROFILE NAME	•	- spe				~													
FRIENDLY PATH	•	Ξ		APPLICAT	non 🗘	HOST IP	0	HOST NAME	0	GROUP		APPLIANCE	0	TYPE	0	APP	TYPE	4	2
SLA STATUS	-	_		opfsi1		172 27 58 13		ndmInar3				weekly10c		Db2 Instance		DB2I	nstance		
		<u> </u>	×	99.5.1		112221.50.15		nampars				weeklytoe		DDE inseince		DDL	in people c		_
Unmanaged		Ø	8	db2irsc		172.16.201.253		OracleDBNike				weekly10c		Db2 Instance			nstance		
туре	•		0	SYSTET	Manage SLA			stcent76db22				weekly10c		Db2 Database		DB2			٦
Select: ALL   NONE			0	db2insl	Access			OracleDBNike				weekly10c		Db2 Instance		DB2I	nstance		
Systems Hyper-V VM			0	PRODE	Edit Organiz	ation Membersh	nip	stcent76db22				weekly10c		Db2 Database		DB2			
Gustem State				ACTOR	import Onva	utcimages		chcont76db33				unakhd0c		Dh2 Database		002			

2. At the top of the Manage SLA page, select the **Details & Settings** link:

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸		Y	👤 admir	n 🌲
G MANAGE SLA	- 0	inst4   DB2_test_delete	DB2_test_delete Details &	& Settings								
TEMPLATE dem	iotemplate		PROFILE LocalProfile		•	Can	icel Changes		Apply SLA			
Database Inc	clusion Rule	2	caf-source		sky91	af-remote	<	Policies	5			
RUL	E All Databases						► S	inapshot 🕧				
TOTAL DATABASE	ES 0		/···· 🗧 -·				Dir	ect to Dedup	0			
DATABASES INCLUDE	D 0	1	PRODUCTION			AIRROR	Dir	ect to OnVaul	t ()			
INELIGIBLE DATABASE	ES 0		- i i i i i i i i i i i i i i i i i i i				On	Vault Replicat	ion ()			
			Y				Dee	dup ()				
					>		Dee	dup DR 0				
Ed	K.	i i i		<b>0</b> _ 10			Mir	ror 0				
		T	ENABENOT	ONVAULT				Dovault (1)				

This opens the details and settings for this specific instance. Of particular importance is **Backup Capture Method**:

- o **Use volume level backup**: Use volume level LVM snapshots with CBT on Linux to a blockbased staging disk. This highly-efficient option enables you to create application-aware virtual databases from the snapshot images
- Use full+incremental backup: This is traditional file-based backup and recovery. This "file dump" method does not support creation of virtual databases. If you are required to use NFS staging disks, then you must use this backup method. You can select this method for use with Block staging disks, which also support the better volume-level backup method.

e   OracleDRNike Details & Settings			
Application Details & Settin	ngs	Settings Help	
Settings			
CONNECTOR OPTIONS			
PERCENTAGE OF RESERVE SPACE IN VOLUME GROUP	20		
BACKUP CAPTURE METHOD	Use volume level backup Use full+incremental backup		
FORCE FULL FILESYSTEM BACKUP	💮 Yes 💿 No		
DATABASE FILESYSTEM STAGING DISK SIZE IN GB			

3. Fill in the details and setting according to the backup method that you need:

Setting	Block-Based LVM Snapshot with CBT on Linux	Block-Based GPFS Snapshot on AIX	File-Based Backup and Recovery, Block <i>or</i> NFS
Use Staging Disk Granularity as Minimum Staging Disk Size	Not applicable	Not applicable	Use this for applications that are under the size of the granularity setting and that tend to periodically grow. This option is useful to avoid frequent costly full backups. Because the staging disk is thin provisioned, there is no initial cost to use a staging disk that is larger than required for immediate use. The default values are 0 for No and the Staging Disk Granularity setting for Yes.
Staging Disk Granularity	Maximum size of each application. The defau	n staging disk when n ult value is 1000GB.	nultiple staging disks are used for an
Last Staging Disk Minimum Size	Minimum size of the la disks. This value is also The default value is 25	st staging disk create o used for additional ( 50GB.	ed for an application with multiple staging disks allocated to accommodate growth.
Connector Options	Use this only under the	e direction of Actifio S	Support.
Percentage of Reserve Space in Volume Group	20% is recommended temporary space. Not applicable for pro databases.	for LVM snapshot tecting virtual	Not applicable
Backup Capture Method	Use volume le	vel backup	Use full+incremental filesystem backup
Force Full Filesystem Backup	Not appl	icable	Set to Yes if you want an on-demand full backup
Database Filesystem Staging Disk Size in GB	Not appl	icable	Use the default calculation: (database size * 1.5)+ 10%. Disks will grow dynamically.
Log Backup Staging Disk Size in GB	By default Actifio calc plus 20% buffer. Defau Providing a value will a dynamically. This will b	ulates this as daily log It is recommended. override the default o become a fixed size.	g generation * retention of log backup SLA calculation and the log disk will not grow
Retention of Production DB Logs in Days	This value is used to p Based on this setting I this is set to 4 days, th The default value is 2 d	urge the log backup ogs older than <value en 96 hours of logs a days.</value 	from basepath_logbackup destination. >> * 24 hours will be purged. For example, if re kept.
Script Timeout	The timeout value (in called by connector. T	seconds) is applied to The default value is 17	o internal backup and recovery scripts 2800 (48 hours).

#### Table 1: Db2 Details & Settings

File-based backup requires the dump schedule to be configured. See Setting the Schedule for Dumps.

#### Setting the Schedule for Dumps

The database dump schedule is set by the Actifio CLI policy parameter dumpschedule. The default value of dumpschedule="FIIIIII":

- The string must be seven characters either an 'F' or an 'I'
- Each position within the string represents a weekday, starting with Sunday.
- F represents a full db dump
- I represents an incremental db dump

For example, "FIIIIII" results in:

- Sunday: Full backup
- Monday through Saturday: Incremental backups
- The following Sunday: Full backup again

To check the dump schedule, run this CLI command from the appliance:

udsinfo lspolicyoption -filtervalue appid=<appid> | grep dumpschedule If this does not return any value, then the dumpschedule is set to default.

To modify the dump schedule run this CLI command from the Actifio appliance:

udstask mkpolicyoption -appid <appid> -name "dumpschedule" -value "FIIIIII"

Replace <appid> with the application id of the Db2 application.

Replace "FIIIIII" as needed. To run full backups on Tuesday, set dumpschedule to "IIFIIII"

## **4** Protecting the Db2 Instance and its Logs

After the SLA is configured as detailed in Chapter 3, Configuring the SLA, Including the Backup Method, you can configure a VDP backup method for the Db2 instance.

This chapter includes:

Protecting an IBM Db2 Instance on page 17 Protecting IBM Db2 Database Logs on page 19

**Note:** With one exception, protection is set for the entire Db2 instance. You can include/exclude specific databases during the process using a Database Inclusion Rule from the Manage SLA page. The exception is that virtual databases can be protected separately from the instance when created.

#### Protecting an IBM Db2 Instance

Database instance protection can be done from either the Primary node or from HADR nodes. To protect from the Db2 HADR node, the node must be read-enabled: ensure that the parameter DB2\_HADR\_ROS=ON.

To protect the Db2 instance:

1. From the App Manager, Applications list, right-click the instance and select Manage SLA.

actifio	Dashb	oard	Backu	p & Recover 🗸	Test Data	Management 🗸	Арр Ма	nager 🖌 🛛 SL	A Architect 🗸	Manage 🗸	Report	Monitor 🗸				Y 1
🙁 clear all filter	rs	Âp	plic	ations												+
APPLICATION NAME																
HOST NAME		< hid	le filters	O Applicatio	on Type: Db2 Dal	tabase O Applica	ation Type:	Db2 Instance								
TEMPLATE NAME						0								C SHOW SEL	ECTED (1	
PROFILE NAME						-										
FRIENDLY PATH				APPLICATI	ion 0	HOST IP	$\diamond$	HOST NAM	E Ô	GROUP		APPLIANCE	0	TYPE	¢	APP
SLA STATUS			8	gpfsi1		172.27.58.13		ndmlpar3				weekly10c		Db2 Instance		DB2I
Managed Unmanaged		Ø	0	db2inac		172.16.201.253		OracleDBNi	æ			weekly10c		Db2 Instance		DB2I
ТУРЕ			۲	SYSTST 🕴	Manage SLA			stcent76db2	2			weekly10c		Db2 Database		DB2
Select: ALL   NONE			0	db2insl 4	Access			OracleDBNi	(e			weekly10c		Db2 Instance		DB2I
Systems Hyper-V VM			٥	PRODE	dit Organiza	tion Membersh	ip	stcent76db2	2			weekly10c		Db2 Database		DB2
System State			8	ACTDB	mport OnVai	ilt Images		stcent76db2	2			weekly10c		Db2 Database		DB2

2. On the Manage SLA page, select a template and a resource profile, then click **Apply SLA**.

TEMPLATE zSample1   PROFILE Minio  Cancel Changes  Apply	
Database Inclusion Rule     caf-source     none     O Policies       RULE All Databases     Snapshot ①	

3. Above where you selected the template and the profile, click **Details & Settings**. On the Details & Settings page, make sure that the backup capture method matches the type of backup set in Chapter 3, Configuring the SLA, Including the Backup Method. Click **Apply SLA** or **Save Changes**. The instance appears in the App Manager with a green shield icon.

A	pplication Details & Settir	ngs	Settings Help	0
S	ettings			^
4	CONNECTOR OPTIONS			
F	PERCENTAGE OF RESERVE SPACE IN VOLUME GROUP	20		
	BACKUP CAPTURE METHOD	<ul> <li>Use volume level backup</li> <li>Use full+incremental backup</li> </ul>		
F	ORCE FULL FILESYSTEM BACKUP	⊖ Yes ⊛ No		
	DATABASE FILESYSTEM STAGING DISK SIZE IN GB			
Ľ	OG BACKUP STAGING DISK SIZE IN 5B			
F	RETENTION OF PRODUCTION DB			
3	SCRIPT TIMEOUT	172800		
L.	JSE BUFFERED BLOCK COPY	🔘 Yes 💿 No		×

The instance will be protected when the snapshot job succeeds according to the schedule in the template.

4. You can include or exclude specific databases during backup. From the App Manager, select the Db2 instance. You can use the Db2 Instance checkbox to filter the list. Select **Manage SLA**.

actifio	Dashboar	rd	Backup	a Recover 🗸	Test Data	Management 🗸	App Man	ager 🖌 🦷 SLA Ar	chitect 🗸	Manage 🗸	Report	Monitor 🗸				🖌 👤 admin	A 🛛	
<ul> <li>clear all filters</li> </ul>	Î	Ap	plica	ations												+ ADD APP	LICATIO	И
APPLICATION NAME	•																	
HOST NAME	•	< hide	e filters	O Application 1	ype: Db2.Da	atabase O Applic	ation Type: I	0b2 Instance										
TEMPLATE NAME	•					Q								□ SHOW SELECT	ED (1)	III 25 ¥	0	ŧ.
PROFILE NAME	- • I																	-
FRIENDLY PATH	•	Ξ		APPLICATION	ं	HOST IP	0	HOST NAME	¢	GROUP		APPLIANCE	$\diamond$	TYPE	\$	APP TYPE	0	
SLA STATUS	•			apfsi1		172 27 58 13		ndmlpar3				weeklv10c		Db2 Instance		DR2Instance		^
Managed		-	•	34				mannipars				incently rote		D DE MIDEANCE		DEMOLONE		
Unmanaged		Ø	0	db2inac		172.16.201.253		OracleDBNike				weekly10c		Db2 Instance		DB2Instance		
ТҮРЕ	•		۲	SYSTST Ma	nage SLA			stcent76db22				weekly10c		Db2 Database		DB2		
Select: ALL   NONE			0	db2insl Acc	ess			OracleDBNike				weekly10c		Db2 Instance		DB2Instance		

5. Under Database Inclusion Rule, click **Edit**. If you do not see the Database Inclusion settings, you have selected a database, not an instance.

actifio	Dashboard Backup & Recover 🗸	Test Data Management 🗸 🛛 App Manager	✓ SLA Architect ✓	Manage 🖌 Report	Monitor 🗸		🝸 👤 admin 🌲 😧
CH MANAGE SLA	- Alabara i a sara						
TEMPLATE Sn dd	Manage Members	hip					
Database Inclu	Eligible Databases INCLUSION RULE: Includ All eligible databases includ Instance. Databases a Exclut snapshotj automatically.	o All o All o Selected de Selected de Selected option will be include	ate is applied to this DB2 id in data capture (or	Ineligible Database Ineligible databases cann Management for one of t • The database is a memb • The database was create	IS not be included in DB2 Instance the following reasons: er of a consistency group d by an app-aware mount		
RULE	All De type to search		0 (1)	type to search	۹		
TOTAL DATABASES	1		· (1)		DATABASES	٥	
DATABASES INCLUDED	1	DATABASES	0				
DATABASES EXCLUDED	SYSTST						
Edit					No Databases Found		

6. Select an Inclusion Rule (Include All, Include Selected, or Exclude Selected) and then select the databases to include or exclude, then click **Save**.

#### Protecting IBM Db2 Database Logs

To enable and set up the Db2 database log backup:

1. From the SLA Architect Templates page, right-click the template for Db2 instance protection and click **Edit**.

actifio	Dashboard	1	Backup & Recover 🗸	Test Data Manageme	nt 🗸 🛛 App Mani	ager •	<ul> <li>SLA Architect -</li> </ul>	ſ	Manage 🗸	Report	Monitor 🗸				Y.	👤 adm	in 4	1 8	
FILTER BY		Но	sts					C									<b>+</b> AD	D HOS	т
HOST NAME	•																		
filter by host name		< hide		0									□ SHOW S	ELECTED (1)	đ	111 2	25 🗸	0	ŧ
IP ADDRESS	-	P	NAME Ô	FRIENDLY P	APPLIANCE	ô	IP	ċ	TYPE	ô	OS RELE	VIRTU	AL MACH	OS TYPE	•	OS VE	RSIO	N Ó	
filter by IP address	_	M	hpvm5 :tifio.com	hpvm5.sga.actifi	stskinnvskv3		172.16.159.170		Generic		B.11.31	No		HPUX		U			
OS RELEASE			hpgavm18	Edit			172.16.159.72		Generic		B.11.31	No		HPUX		U			
OS TYPE	•			Edit Organi	zations	<b>,</b>			Generic							Ť			

2. Click the arrow beside the Snapshot policy to open up the details, then click **Edit Policy**.

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect +	Manage 🗸	Report	Monitor -	T	👤 admin	
TEMPLATE	auto-slt-	6afe2a1347034:	ALLOW OVERRIDES ON	POLICY SETTINGS?	* ® YES 🗍 NO			Save Template			
	C	РАВОИСТЮ РАВОИСТО ВНАРБНОТ	о О - - - - - - - - - - - - - - - - - -		OX		P Shaps Shaps Simp Gafe Schull FRE TIME V REPEA EXPIR	olicies blesnap-6- 223.374/398/30/27/864acbc2c EDULING: Windowed QUENCY: Evryday WINDOW: 00.00 to 23.59 TVAULE: Once per window EAFTER: 1 hous SULCY ID: 19831 Edit Policy			

3. Near the bottom, select **Advanced Policy Settings**.

actifio	Dashboard	Backup & Recover 🗸	Test Data Managemer	nt 🗸 App Manager 🗸	SLA Architect +	Manage 🗸	Report	Monitor 🗸
			Production To	Snapshot				
		Crea	te/Edit Policy					
		POL	ICY NAME*					
⊖ Polic	ies	SCH	EDULING Wir	ndowed 🔻				
Snapshot 0		• Add	ON THESE DAYS Everyda	ay.				
Direct to Dec	dup ()	• Add	EXCEPT Never X					
Direct to On	Vault 0	Add						
OnVault Rep	lication 0	(Add	WITHIN THIS WINDOW	19:00 то	07:00			
Dedup 0		TAM	RUN ONCE PER WINDOW					
Dedup DR		(T.1.1)						
Mirror 0		(Mdd		<b>O</b> 24 <b>O</b>				
OnVault 0								
		RET		2 🕀 Day(	(s) 🔻			
		SLA	COMPLIANCE Defa	ult				
		PRIC	Me	dium 🔻				
				Adv	anced Policy Settings			

- 4. Set the log policy options (you will have to scroll to see them all):
  - o Enable Truncate/Purge log after backup.
  - o Set Enable Database Log Backup to Yes.
  - o For **RPO (Minutes)**, enter the desired frequency of log backup.
  - o Set Log Backup Retention Period (in Days) for point in time recovery.
  - o Set **Replicate Logs (Uses StreamSnap Technology)** to **Yes** if you want to enable StreamSnap replication of log backup to a DR site.
  - o Set **Send Logs to OnVault Pool** to **Yes** if you want the database logs to be sent to an OnVault Pool, enabling for point-in-time recoveries from OnVault on another site.

	Product	Policy Settings
	Croate/Edit Poli-	TRUNCATE/PURGE LOC AFTER BACKUP
	PERCENTRAINE."	SOP OFFLIRE APPLICATIONS Full hackog where offline applications are found
Condicion	SCHEDUDING	D Rap offliver applications during backup:
Contra .		MAP STACING DISK TO ALL ESX HOSTS IN A CLUSTER
Contraction (C)	ON THESE DAD	Map staging disk to ESA hast for VM only ID Man standard disk to all the heads in the elector.
	EXCOPT 38	(2) Mild staging data to 2 tax holds in the dutter.
	The second se	ALLOW MIGRATING FROM OUT-OF-BAND TO IN-BAND DATA MOVEMENT
Dedus 0		# htt
	BUN ONCE HE	© tes
Matter D	10	FORCE OUT-OF-BAND BACKUP
CONVAUX 0		* 10 0 m
	Instance on	BACKUP SQL SERVER LISER LOGINS
	PRORITY	Q test
		DIABLE DATABASE LOG BADRUP
		)
		Cancel Services

- 5. Click Save Changes.
- 6. From the App Manager Applications list, select the Db2 instance. You can use the Db2 Instance checkbox to filter the list. Right-click it and select **Manage SLA**.
- 7. At the top of the screen, select **Details & Settings**.
- 8. Set the **Retention of Production DB Logs** in days. This value is used to purge the Db2 logs from the production destination. Based on this setting the log will be purged older then the # of days specified. Default value is 0 days. With the default value, all logs prior to last log backups are purged.
- 9. Click Save.

### 5 Accessing a Db2 Database as a Standard Mount or as a Refreshable Virtual Database

This section describes:

Mounting a Db2 Database as a Standard Mount on page 21 Mount a Virtual Database from a Block-Based Volume Snapshot Image to the Source or to an Existing Db2 Instance on page 23

Refreshing a Virtual Db2 Database using an Actifio Workflow on page 25

#### Mounting a Db2 Database as a Standard Mount

This is the procedure for a standard mount. To make a virtual database (application aware mount), see the procedure in Mount a Virtual Database from a Block-Based Volume Snapshot Image to the Source or to an Existing Db2 Instance on page 23.

To mount the database image as a standard mount:

1. From the App Manager Applications list, right-click the protected database and select Access.

			_				_	_									
actifio	Dashboar	ď	Backup	p & Reco	over 🗸 👘	Test Data Manageme	ent 🗸 🌔	App Manag	jer 🗸 🔰 SLA A	Architect 🗸	Manage 🗸	Report Mon	itor 🗸		Y 1	admin	• 😲
🙁 clear all filters	Î	Ap	plic	atior	าร										+	ADD APPI	LICATION
APPLICATION NAME	•																
HOST NAME	•	< hide	efilters	O SL	A: Managed	Application Type	e: Db2 Da	atabase O	Application Typ	e: Db2 Instar	nce						
TEMPLATE NAME	•					Q								SHOW S	ELECTED (1)	II 25 ₩	0 4
PROFILE NAME	•																
FRIENDLY PATH	•	Ξ		APPL	ICATION		0	ID	TEMPLATE	0	PR 🗘	FRIENDLY PATH	HOST NAME 🗘	APPLI 🗘	TYPE	0	APPLI
SLA STATUS	•		0	D30				1879655				DB2_test_delete	DB2_test_delete	caf-source	Db2 Database		240607
Managed	_	Ø	0	inst2	~			1879651	HANA_CBT		LocalP	DB2_test_delete	DB2_test_delete	caf-source	Db2 Instance		240605
ТУРЕ	•		۲	D31	Manage	SLA		1879653				DB2_test_delete	DB2_test_delete	caf-source	Db2 Database		240606
Select: ALL   NONE				(	Access												
					Edit Org	ganization Memb	ership										
Hyper-V VM System State					Import	OnVault Images											
					Manage	Expirations											
Databases					Manage	Workflows											
Db2 Database					Add To	Logical Group											
MariaDB Database					Mark Se	nsitive											
MariaDB Instance MMSOL Database																	

Note: You can use the Managed SLA Status filter to show only protected databases.

2. Select a snapshot image and choose Mount.

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager +	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸		🝸 👤 admin 🌲 😲
ACCESS	- 0	inst2   DB2_test_delete	DB2_test_delete Detai	ls & Settings						TIMELINE TABLE
Jump to: 🗃 2019-1	2019-11-13								$\bigcirc$	2019-11-15 15:40:52 Snapshot Image
	2019-11-14									NAME Image_0240779
2019-1 2019-11-16 2019-11-17	1.5								TRAM IMA EXPIP REC CATALOI POO	STATUS         Available           Storage         Storage           ESIZE         6601CB           BES ON         2019-11-17 16:05:51           LUANCE         GA-Source           OVERY         11-15 11:35 To 11-15 11:59           RANCE         LAREL           STATE         Noc Applicable           NAME         Art_per_pool000
		Deduc	Demote Deduc	Demote Council at	Ontrolt					Live Clone
Supplementation	DSHOL	Dedup	Remote Dedup	cemoce snapsnoc	Onvault					Restore
										Replicate
			75 DAYS		90	DAYS			105 DAYS	Mark Sensitive
Snapshot Dedup Remote Dedup Remote Snapshot OnVault										

- 3. On the Mount page, from **Target**, choose the desired target Db2 server from the dropdown.
- 4. Under Application Options, **disable** Create New Virtual Application.
- 5. Under Mapping Options, select a local or external **Storage Pool** and enter a **Mount Location**.

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸	1	7 👤 admin	<b>A</b> 😯
ACCESS	• •	inst1   db2_auto1   d	db2_auto1 Details & Settings							TIMELINE	TABLE
2020 Snap NAME STATUS TRANSPORT	04-07 15:10:46 ishot Image Image_0135467 Available SAN Based, Out-	Of-Band	Mount	LABEL							
IMAGE SIZE EXPIRES ON	Storage 66.01GB 2020-04-07 16:22	2-50	✓ Application Option	ns							
RECOVERY RANGE	Sky10sp1 04-07 16:10 To 0	4-07 17:19	CREATE NEW VIRTUAL	APPLICATION		)		Database Options * are mandatory			
CATALOG STATE	None		type to search		Q			SHOW SELECTED (3)			
M	ount -		SELECT ITEM     DB1	5							
			☑ D82								
			• Mapping Options								
			STORAGE POOL*		act_per_po	xol000 (482G ▼					

6. Click **Submit**. You can monitor the job progress from the Monitor, Jobs page.

#### Mount a Virtual Database from a Block-Based Volume Snapshot Image to the Source or to an Existing Db2 Instance

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

1. From the App Manager Applications list, right-click the protected database and select Access.

actifio Dashboard Backup & Recover - Test Data Management - App Manager -SLA Architect 🗸 Manage 🗸 Report Monitor 🗸 Y 👤 admin 🔺 😮 clear all filters Applications APPLICATION NAME hide filters
 O SLA: Managed
 O Application Type: Db2 Database
 O Application Type: Db2 Instance HOST NAME TEMPLATE NAME Q SHOW SELECTED (1) III 25 v 🖸 🛓 PROFILE NAME ○ PR... ○ FRIENDLY PATH ○ HOST NAME ○ APPLI... ○ TYPE APPLICATION Ó ID TEMPLATE APPLI... Ξ FRIENDLY PATH SLA STATUS 🗆 🦁 D30 1879655 DB2 test delete DB2 test delete caf-source Db2 Database 240607 🗹 Ma 🗹 🦁 inst2 🗆 🦁 D31 Manage SLA 879653 DB2 test delete DB2 test delete caf-source Db2 Database 240606 түре Access elect: ALL | NONE Hyper-V VM Import OnVault Image System State Manage Expiration: Manage Workflow: Db2 Database Db2 Instance 🗆 MariaDB Database MariaDB Instance MySQL Database MySQL Instance 1 - 3 of 3 applications 141 44 1 of 1 page 👞 📷

Note: You can use the Managed SLA Status filter to show only protected databases.

#### 2. Select a snapshot image and choose Mount.



3. On the Mount page, from Target, choose the desired target Db2 server from the dropdown.

**Note:** Be sure that the target instance does not have any databases with the same name as any of the source databases or the new target database name selected for the source database(s) during mount.

- 4. Under Application Options, enable Create New Virtual Application.
- 5. At Included Databases, Select Items, choose one or more databases to virtualize:
  - o A single database will be managed as standalone virtual copy.
  - o Multiple databases will be managed as a consistency group.

a a tufu a									
	Dashboard	Backup & Recover 🗸	Test Data Ma	anagement 🗸	App Manager 🗸	SLA Architect	l • Manage •	Report	Monitor 🗸
ACCESS	- 💙 i	nst2   DB2_test_delet	e   DB2_test_d	elete Details &	Settings				
201 Sna	9-11-15 15:40:52 pshot Image		Mount						
NAME	Image_0240779		TARGET*		LABEL				
STATUS	Available		DB2_test_	delete 🔻					
TRANSPORT	SAN Based, Out-O Storage	f-Band							
IMAGE SIZE	66.01GB		<ul> <li>Applica</li> </ul>	ation Options	5				
EXPIRES ON	2019-11-17 16:05:	51							
APPLIANCE	Caf-Source		CREATE	NEW VIRTUAL AI	PPLICATION		)		
RECOVERY	11-15 11:35 To 11-	15 11:59	INCLUD	ED DATABASES					Database Options * are mandatory
LABEL	. Snap1		type t	o search		Q			SHOW SELECTED (1)
CATALOG STATE	Not-Applicable								
POOL NAME	Act_per_pool000		=	SELECT ITEMS					
N	Nount -			D30					Detabase Options *
				D31					
			ROLL FO	RWARD TIME		2019-11	-15 0 11:5	9:23	● HOST TIME
			TARGET	INSTANCE NAME				-	

- 6. Click each selected database to specify the target database details for the new virtual copy.
- 7. For a database protected with log roll-forward, choose a target point in time.
- 8. NAME OF CONSISTENCY GROUP: This option will appear if more than one database is selected. Provide a unique name to manage the selected databases as a virtual copy.
- 9. TARGET Db2 INSTANCE NAME: From the dropdown, select a target Db2 instance to attach the selected database as a virtual copy.
- 10. Manage New Application:
  - o To protect the new virtual database, enable Manage New Application.
  - o Choose a template and a resource profile to protect the database.
- 11. In Advanced Options:
  - o Enter the Home Directory of the database (optional).
  - o **Overwrite Existing Database**, indicate when to overwrite a database on the target server that has the same name as the new database(s) being mounted: Yes, No, or Only if it's Stale.
- 12. Under Mapping Options:
  - o Storage Pool: The image will be mounted in the Snapshot Pool unless you select a different one.
  - o Mount Location: specify a target mount point to mount the new virtual database to.
- 13. Click Submit.

#### Refreshing a Virtual Db2 Database using an Actifio Workflow

You can use a workflow to automate the process of mounting and refreshing a Db2 instance's databases from a snapshot.

- 1. From the AGM App Manager, right-click the Db2 Instance and select **Manage Workflows**.
- 2. In the upper right corner of the Workflows: Application Dashboard page, click **+ Add Workflow**.

٥	ctifio	Dashboard	Backup & Recover 🗸	Test Data Management	<ul> <li>App Manager +</li> </ul>	SLA Architect 🗸	Manage 🛩	Report	Monitor 🗸			Y	1 admin	A 😯
	NNAGE WORKFLOWS 🔷	🕕 ASE1   S)	baseASE-vm1   SybaseA	ASE-vm1 Details & Setti	igs									
W	orkflows: Appli	cation Da	ashboard								* Specified time is in the time	zone of the app	+ ADD V	NORKFLOW
												1	<b>3</b> III 25	* C ±
	WORKFLOW NAME		APPLIANCE		TYPE	:	SCHEDULE TYP	E	Р	PREVIOUS RUN STATUS	CURRENT STATUS		NE	T RUN TIME

- 3. Specify:
  - o Workflow Name: Enter a name for this workflow.
  - o Workflow Type: Select Direct Mount.
  - o Schedule Type: Choose Scheduled or On Demand based on your requirement. For a scheduled workflow, specify the frequency as well.

#### Add Workflow : Configure

WORKFLOW NAME *	WORKFLOW TYPE * DIRECT MOUNT	APPLIANCE localhost.localdom	v	
IMAGE				

- o Source Image: Select based on requirements.
- o Mount Label: (Optional) Specify a mount label for the mounted image.
- o Hosts: Select the target host or hosts where the virtual Db2 Instance databases copy will be created.

**Note:** Be sure that the target instance has no databases with the same name as any of the source databases or the new target database name selected for the source database(s) during the mount.

	Direct Mount Settings	
	SOURCE IMAGE	Latest from any snapshot policy 🔻
	MOUNT LABEL	
	HOSTS *	
	db2	
	□ <b>но</b> ѕт	IP
	□ db2-autovm1	172.16.216.131
	□ db2-autovm3	172.16.216.133
0	Mount Location: Specify a mount point to m the target.	ount the data volumes and log volumes of

- o Pre-Script (optional): Specify a prescript name to be run before refresh.
- o Post-Script (optional): Specify a postscript name to be run at the end of refresh. Pre- and Post- scripts are detailed in **Network Administrator's Guide to Actifio VDP**.
- o Create New Virtual Application: Enable Create New Virtual Application.

MOUNT LOCATION	/wfMnt
Script Options	
PRE-SCRIPT	TIME OUT (SECONDS)
POST-SCRIPT	TIME OUT (SECONDS)

- o Select Items: Select the databases to refresh on target and specify the target dbname from 'Database Options' for each database.
- o TARGET INSTANCE NAME: If target instance is visible, then select it, otherwise specify the target instance name.

type	to search	Q		SHOW SELECTED (1)
	SELECT ITEMS			
	AUS		Clear	Database Options
	ENG			
	IND			
	TEST1			
	TEST2			
TARGE	T INSTANCE NAME *	db2inst1	3	
MANA	GE NEW APPLICATION			
TEMPL	ATE	Choose a template	3	
PROFIL	.E *	Choose a profile		
► Adv	vanced Options			
REMO	/E MOUNTED IMAGE AFTER DONE	$\bigcirc$		
0 M 0 Te	anage New Application: En	able <b>Manage New Applica</b> te	tion.	

- o Profile: Choose a profile.
- 4. Click **Add**. This will create an on-demand or scheduled workflow to create or refresh the Db2 Instance's databases virtual copy.

# **6** Restoring and Recovering a Db2 Instance Back to the Source

This section describes:

- Recovering a Db2 Instance from a Volume-Based Snapshot on page 27
- Recovering a Single Db2 Database from a Volume-Based Snapshot on page 29
- Recovering from a Full+Incremental Snapshot on page 31
- Recovering to a New Target from a Full+Incremental Snapshot on page 32

#### Recovering a Db2 Instance from a Volume-Based Snapshot

Use this procedure to restore and recover the source Db2 database. This procedure uses physical recovery of the source data area.

**Note:** System databases on a root partition backed up as LVM Snapshots can be mounted as virtual databases, but they cannot be used in a traditional Restore operation as the root partition cannot be unmounted. This will need manual restore and recovery from a simple mount back to the same host.

**Note:** If multiple instances share the same volume/filesystem(s), then restoring back to the source is not supported. To restore such applications, mount the image to the host and use the procedure to perform single database recovery detailed in Recovering a Single Db2 Database from a Volume-Based Snapshot on page 29.

**Note:** If there are nested mountpoints under the production volumes being backed up, then restore and migrate operations back to the source will fail as the production volumes are busy and cannot be unmounted. To overcome this limitation, use the appliance CLI to set this configuration parameter in /act/config/connector.conf on the host:

udstask chconnectorconfig -host <HOSTID> -param UnmountNestedVolumesForRestore -value true

To recover back to the source:

1. From the App Manager Applications list, right-click the protected database and select **Access**. You can use the Managed SLA Status filter to show only protected databases.

actifio	Dashboa	rd	Backuj	p & Reco	cover 👻 🛛 Test Data Management 🗸	App Manag	er 🗸 🔰 SLA Archite	et 🗸	Manage 🗸	Report Monito	¥f ❤		🍸 👤 a	dmin	<b>≜ (?</b>
🙁 clear all filters	Î	Ap	plic	atior	ns								+ ^	DD APPI	LICATION
APPLICATION NAME	•														
HOST NAME	•	< hide	e filters	O SL	LA: Managed O Application Type: Db2 D	latabase O	Application Type: Db2	Instan	ce						
TEMPLATE NAME	•	type			Q							SHOW SE	LECTED (1)	25 🗸	0 1
PROFILE NAME	•														
FRIENDLY PATH	•	Ξ		APPL	LICATION	ID	TEMPLATE	0	PR 0	FRIENDLY PATH 0	HOST NAME 🔅	APPLI 🗘	TYPE	¢	APPLI
SLA STATUS	•		•	D30		1879655				DB2_test_delete	DB2_test_delete	caf-source	Db2 Database		240607
Managed				112									-		
Unmanaged			<b>V</b>	IIISUZ		1879651	HANA_CBI		LocalP	DB2_test_delete	DB2_test_delete	car-source	Db2 Instance		240605
ТҮРЕ	•		۲	D31	Manage SLA	1879653				DB2_test_delete	DB2_test_delete	caf-source	Db2 Database		240606
Select: ALL   NONE				(	Access										
Systems					Edit Organization Membership										
Hyper-V VM				_	Import OnVault Images										
System State				_											
U VM				_	Manage Expirations										
Databases				_	Manage Workflows										
Db2 Database					Add To Logical Group										

#### 2. Select a snapshot image and choose **Restore**.



3. On the Restore page choose a point in time for the protected database to recover to.

actifio	Dashboard	Backup & Recover 🗸	Test	Data Management 🗸	App Manager 🗸	SLA	Archite	ect 🗸	Mai	nage 🗸	Rep	oort M	lonitor 🗸		٦	1	, admin
ACCESS	🔹 🦁 in:	st2   DB2_test_dele	te   DB2	_test_delete Details	& Settings												MELINE
2019-1 Snapsh	1-15 15:40:52 hot Image		Resto Use this	D <b>re</b> page to initiate a rest	ore operation. A n	estore v	/ill take	e the e	xisting	) datat	ase offi	line and o	verwrite their data files.				
NAME In STATUS A TRANSPORT S S	mage_0240779 Wailable iAN Based, Out-Of-I itorage	Band	ROL	L FORWARD TIME		20	19-11-1 (	5 Nove	© ( mber 2	11:59: 019	23	HOST T	IME 🔘 USER TIME				
IMAGE SIZE 6 EXPIRES ON 2	6.01GB 019-11-17 16:05:51			pe to search		Q, Su	Mo	Tu	We	Th I	<b>ir Sa</b> 1 2			D (2)			
APPLIANCE C	Caf-Source			SELECT ITEMS			4		6								
RECOVERY 1 RANGE	11-15 11:35 To 11-1	5 11:59				10				14	5 16						
CATALOG STATE N	Not-Applicable						18	19		21 2	2 23						
POOL NAME A	Act_per_pool000		RES	TORE WITH RECOVERY		24		26		28 2	9 30						
										с	lose	Cance	el Submit				

- 4. Enable **Restore With Recovery** to apply recovered logs.
- 5. Click Submit.

#### Recovering a Single Db2 Database from a Volume-Based Snapshot

To restore a single LVM backup image to its source:

1. From the App Manager Applications list, right-click the protected database and select **Access**.



2. Select the latest snapshot to recover, and choose Mount.

actifio	Dashboard	Backup & Recover +	Test Data Management +	App Manager +	SLA Architect +	Monitor ~	Manage +	Report
ACCESS	🔹 🕕 🗇 db2pro	ad   db2-autovm2   db	2-autovm2 Details & Settings					
() 2015 Solo	9-09-27 12:49:49 pshot Image	Mou	INT					
NAME	image_3158389	17	URGET	LABEL				
STATUS	Available SAN Based, Out-Of-Ba Storage	nd	db2-autovm2 🔻					
IMAGE SIZE	257.41GB		Application Options					
EXPIRES ON	2019-09-27 14:05:47		CREATE MENTINE ADDRESS	1700				
RECOVERY	Sky-7.0.X 09-27 12:49 To 09-27	13:34	INCLUDED DATABASES	ATTOM:			Detebe	e Options * are mandatory
CATALOG STATE	None		type to search	Q				SHOW SELECTED (5)
POOL NAME	Act_per_posi000		SELECT ITEMS					
			Ø AUS					
		-	Mapping Options					
			STORAGE POOL*		act, per, pool000	0 <i>2</i> 410 🔻		
			MOUNT LOCATION		/db2mnt			
							Cancel	Submit

- 3. Provide a mount point under mount location, for example: /db2mnt. The database backup will be mounted under /db2mnt and log backup will be mounted under /db2mnt\_archivelog
- 4. Log into the database server as root. On the server, change directory to /act/custom\_apps/ db2/restore.
- 5. Get the JobID of the mount from /var/act/log/UDSAgent.log. To find the jobid, run:

```
grep "mount -t " /var/act/log/UDSAgent.log | grep -w "<mountPoint from Step 3>"|tail -1
For example:
```

```
# grep "mount -t " /var/act/log/UDSAgent.log | grep -w "/db2mnt" |tail -1
2019-11-18 23:59:19.740 GEN-INFO [22488] Job_0404207 Spawning cmd: mount -t ext4 /dev/
act403764_DBDump_1574101677612/act_staging_vol /db2mnt 2>&1
```

6. ARCHIVELOG\_MNT will be equals to <mountPoint provided in Step 3>\_archivelog.

#cd /act/custom\_apps/db2/restore

7. Run the script from command line (as root) act\_db2\_lvm\_customdb\_recovery.sh on target with arguments;

#/act/custom\_apps/db2/restore/act\_db2\_lvm\_customdb\_recovery.sh
JOBID=Job\_0348096 SOURCE\_INSTANCE=db2ts DB\_NAME=NCR UNTIL\_TIME=2019-10-17-14.45.45.000
ARCHIVELOG\_MNT=/db2mnt\_archivelog TARGET\_MNT=/db2mnt

#### Arguments to the Script

SOURCE\_INSTANCE = <Db2 Instance name> DB\_NAME=<Db2 Database name to be recovered (Single)> TARGET\_MNT = <Db2 Database image mountpoint name> ARCHIVELOG\_MNT= <Archive Log backup mount point name> UNTIL\_TIME = <Recovery Time(Format: "YYYY-MM-DD-HH.MI.SS")> JOBID = <Database mount Job name>

8. Connect to Db2 instance and confirm that the databases are recovered and online.

db2 connect to <dbname>

db2 'select db\_status FROM SYSIBMADM.SNAPDB'

9. Unmount the mounted dump snapshot image.

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸	🝸 👤 admin 🌲 😧
ACCESS	- 0	one   Sybase_2   Syba	se_2 Details & Settings	-					TIMELINE TABLE
Jump to: 💼 2020-	01-31 2020-01-30 01-31								2020-01-31 17:28-44 Snapshot Image NAME Image. STATUS Available TRANSPORT SAR Based, Out-Of-Band Sorage IMAGE SIZE 1.61 GB EXPIRES ON 2020-02:02 17:45:29
2020-02-01									APPILACE Style_studies RECOVERY 10-131722 To 01-31 17:38 RANCE CATALOC STATE Not Applicable POOL NAME Act_per_pool000 Mount • Current Active Mounts (1) Hide
★ Sna	pshot	Dedup	Remote Dedup R	emote Snapshot	OnVault				NAME Image_1648398 MOUNTED Sybase_2 HOST IMAGES Unmount IMAGES Unmount & Delete Actions
Pasachat	L	ATEST		15 DWS	_			30 DAYS	

#### Recovering from a Full+Incremental Snapshot

Use this procedure to restore and recover the source Db2 database. This procedure overwrites the source data.

To recover back to the source, overwriting the source data:

1. From the App Manager Applications list, right-click the protected database and select **Access**.

Note: You can use the Managed SLA Status filter to show only protected databases.

actifio	Dashboa	ard	Backu	p & Recover 🗸	Test Data Management 🗸	App Manag	jer 🗸 🔰 SLA Arch	nitect 🗸	Manage 🗸	Report Monito	f v		Υ.	👤 admir
⊗ clear all filters	L i	Ap	oplic	ations										+ ADD #
APPLICATION NAME	•													
HOST NAME	•	< his	de filters	O SLA: Manag	ed O Application Type: Db2 I	Oatabase 0	Application Type: D	b2 Instan	ce					
TEMPLATE NAME	•	typ	e to se	arch	Q							SHOW SE	LECTED (1)	111 25
PROFILE NAME	•	-												
FRIENDLY PATH	•	-		APPLICATIO	N Ç	ID	TEMPLATE	Ŷ	PR ♀	FRIENDLY PATH O	HOST NAME 😳	APPLI 🗘	TYPE	4
SLA STATUS	-		۲	D30		1879655				DB2_test_delete	DB2_test_delete	caf-source	Db2 Database	2
Managed	_	Ø	1	inst2		1879651	HANA_CBT		LocalP	DB2_test_delete	DB2_test_delete	caf-source	Db2 Instance	
ТҮРЕ	•		۲	D31 Mana	ige SLA	1879653				DB2_test_delete	DB2_test_delete	caf-source	Db2 Database	2
Select: ALL   NONE				Acce	is									
Systems				Edit	Organization Membership									
Hyper-V VM				Impo	rt OnVault Images									

#### 2. Select a snapshot image and choose **Restore**.

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸	Ŧ	👤 admin 🌲 😮
ACCESS	- 🦁	inst2   DB2_test_delete	DB2_test_delete Deta	ls & Settings					(	TIMELINE TABLE
Jump to: 🗰 2019-	2019-11-13								2019-1 Snapst	1-15 15:40:52 not Image
	2019-11-14								NAME In	mage_0240779
									STATUS A	wailable
2019-	11-15								TRANSPORT S	AN Based, Out-Of-Band torage
									IMAGE SIZE 6	6.01GB
2010-11-16									EXPIRES ON 2	019-11-17 16:05:51
									APPLIANCE C	af-Source
									RECOVERY 1 RANGE	1-15 11:35 To 11-15 11:59
2010 11 17									LABEL S	nap1
2019-11-17									CATALOG STATE N	lot-Applicable
									POOL NAME A	ict_per_pool000
									Mot	unt -
1									Live Clon	e
🔸 🛛 Sna	pshot	Dedup	Remote Dedup		OnVault				C Restore	
									Replicate	
									Manage B	Expirations (44 4
Casachat			75 DAYS		90 DA	vs			105 DAYS Mark Sen	sitive
Dedup Remote Dedup										

- 3. For a database protected with logs, on the Restore page, choose a date and then a point in time.
- 4. Use **Select Items** to choose one or more databases to restore.
- 5. Click **Submit**. This will start the source database physical recovery using Db2 recover commands.

#### Recovering to a New Target from a Full+Incremental Snapshot

To restore a Db2 dump-based backup image to a new target:

1. From the App Manager Applications list, right-click the protected database and select **Access**.

Note: You can use the Managed SLA Status filter to show only protected databases.

2. Select the latest snapshot to recover, and choose Mount.



3. Provide a mount point under mount location, for example: /db2mnp.

OCTIFIO Deshboard Backu	p & Recover - Test Data Management -	App Manager +	SLA Architect + Mon	itor - Manage -	Report	▼ 1 admin ♠ 🖯
Ge 🗛 🔁 😳 🗇 Zinst1   dbi	2-subsym1   db2-subsym1   Details & Settings					TIMELINE
2019-11-13 15:07:33 Snacohot Image	Mount					
NAME image_3555726	TARGET*	LABIL				
STATUS Available	du2-autom1 💌					
TRANSPORT SAN Besed, Out-Of-Bond Storage						
IMAGE SIZE 45.00GB	<ul> <li>Application Options</li> </ul>					
EXPIRES ON: 2019-11-13 15:40:38	INCLUDED DATABASES			Caraba	a Options 7 and mandatoos	
APPLIANCE Sep-7.0.X	INCLUDED DATABASES			CIRC/POR	se upoblik - ere mansacory	
RECOVERY 11-13 15:07 To 11-13 15:10 RANCE	type to search	Q,			SHOW SELECTED (2)	
CATALDGSTATE None	SELECT ITEMS					
POOLNAME Act.per_position Mount	21 MIL					
	Mapping Options					
	STORAGE POOL*		art.par.pos000 (2410	3		
	MOUNT LOCATION		Ath2mod			
				Canad	( Alleria	

- 4. The database backup will be mounted under /db2mnp and the log backup will be mounted under /db2mnp\_archivelog
- 5. JobID of the mount can be get form /var/act/log/UDSAgent.log. Run the below command, which will output some lines where we can see the jobid.

grep "mount -t " /var/act/log/UDSAgent.log | grep -w "<mountPoint provided in step2>"|tail -1
For example:

```
# grep "mount -t " /var/act/log/UDSAgent.log | grep -w "/db2mnp" |tail -1
2019-11-18 23:59:19.740 GEN-INFO [22488] Job_0404207 Spawning cmd: mount -t ext4 /dev/
act403764_DBDump_1574101677612/act_staging_vol /db2mnp 2>&1
```

- 6. ARCHIVELOG\_MNT will be equal to <mountPoint provided in Step 3>\_archivelog. See Step 4.
- 7. Login to the database server as root. On the server, change the directory to

/act/custom\_apps/DB2/dump
#cd /act/custom\_apps/DB2/dump

8. Run the script from command line (as root) ACT\_DB2\_dumprestore\_newTarget.sh on target with arguments;

#/act/custom\_apps/db2/dump/ACT\_DB2\_dumprestore\_newTarget.sh
SOURCE\_INSTANCE=db2inst1 TARGET\_MNT=/db2mnp DB\_LIST=NZL,IND ARCHIVELOG\_MNT=/
db2mnp\_archivelog SOURCE\_LOGARCHMETH1=/db2logbackup UNTIL\_TIME=2019-11-13-09.37.41.000000

#### Arguments to the Script

SOURCE\_INSTANCE = < Db2 Instance name > DB\_LIST=<Comma separated database list to restore> TARGET\_MNT = <Mount point specified during mount> ARCHIVELOG\_MNT= <Archive Log backup mount point name> UNTIL\_TIME = < Recovery Time (Format: "YYYY-MM-DD-HH.MI.SS")> SOURCE\_LOGARCHMETH1= <Db2 Source database archivelog location>

9. Connect to the Db2 instance and confirm that the databases are recovered and online.

db2 connect to <dbname>

db2 'select db\_status FROM SYSIBMADM.SNAPDB'

10. Unmount the mounted dump snapshot image.



## 7 Migrating a Db2 Instance for Instant Access or Recovery

A Mount and Migrate operation allows you to restore a database with near-zero downtime by first mounting it locally, and then migrating it to the original location or to a new location. Users have normal access to the database while it is mounted, and the migration step is very fast.

Once you have protected a Db2 instance, you can mount it and migrate it:

Mount and Migrate Back to the Source Instance on page 35 Mount and Migrate to a New Instance on page 37

#### Mount and Migrate Back to the Source Instance

To mount a database from an image and migrate the mounted image back to the source:

- 1. From the App Manager Applications list, right-click the protected database and select **Access**. You can use the Managed SLA Status filter to show only protected databases.
- 2. Mount the image as a standard mount as detailed in Mounting a Db2 Database as a Standard Mount on page 21.

If under mount location, you use the mount point: /db2gj, then:

- o The database backup will be mounted under /db2gj
- o The log backup will be mounted under /db2gj\_archivelog
- 3. Disable the application SLA to ensure no new jobs interfere with this job.
- 4. Once the mount job is completed, run this script with parameters in Arguments to the Script.

/act/custom\_apps/db2/clone/ACT\_DB2\_mountrecover.sh TARGET\_MNT=<TARGET\_MNT>
TARGET\_INSTANCE=<TARGET\_INSTANCE> TARGET\_DBNAME\_LIST=<TARGET\_DBNAME\_LIST>
[UNTIL\_TIME=<UNTIL\_TIME>] JOBID=<JOBID>

#### Example

/act/custom\_apps/db2/clone/ACT\_DB2\_mountrecover.sh TARGET\_MNT=/db2gj TARGET\_INSTANCE=db2prod TARGET\_DBNAME\_LIST=ENG,TEST1,IND UNTIL\_TIME="2020-02-12-04.14.41" JOBID=Job\_12332

5. Once the mountrecover script is completed, run the ACT\_DB2\_lvm\_migrate\_newtarget script with parameters in Arguments to the Script.

/act/custom\_apps/db2/restore/ACT\_DB2\_lvm\_migrate\_newtarget.sh SOURCE\_INSTANCE=<SOURCE\_INSTANCE> TARGET\_DBNAME\_LIST=<comma seperated DB LIST> JOBID=<JOBID> DATAVOL\_DISK\_MAPPING=<Actifio Mountpoint>:<prod equivalent lvm device name> ARCHIVELOG\_LOC=<PROD Archivelog location>

#### Arguments to the Script

SOURCE\_INSTANCE = <DB2 instance name>

TARGET\_DBNAME\_LIST=<comma separated list of database names>

JOBID = <Simple mount job-id>

ARCHIVELOG\_LOC = <Log backup mount point name> [Mount point should be in local storage ] DATAVOL\_DISK\_MAPPING = Colon separated list of <Actifio\_mount\_point>:production host lvm
device name>

#### Example

/act/custom\_apps/db2/restore/ACT\_DB2\_lvm\_migrate\_newtarget.sh SOURCE\_INSTANCE=db2prod TARGET\_DBNAME\_LIST=TEST1,TEST2 JOBID=Job\_4488748 ARCHIVELOG\_LOC=/db2gj\_archivelog DATAVOL\_DISK\_MAPPING=/db2gj/db2/data:/dev/mapper/vg00-vol\_data,/db2gj/db2/log:/dev/mapper/ vg01-vol\_log

- 6. Once the above script has completed successfully,
  - a. Go to AGM and perform Unmount+Delete.
  - b. Re-enable the Db2 instance's SLA to trigger the scheduled jobs.



#### Mount and Migrate to a New Instance

To mount a database image as a virtual database and the migrate it to a new target:

1. Perform the Application Aware mount as detailed in Mount a Virtual Database from a Block-Based Volume Snapshot Image to the Source or to an Existing Db2 Instance on page 23.

#### Note: Enable both Create New Virtual Application and Manage New Application.

2. Once the mount is completed, run the ACT\_DB2\_1vm\_migrate\_newtarget script with the parameters in Arguments to the Script:

/act/custom\_apps/db2/restore/ACT\_DB2\_lvm\_migrate\_newtarget.sh SOURCE\_INSTANCE=<SOURCE\_INSTANCE> TARGET\_DBNAME\_LIST=<comma separated DB LIST> JOBID=<JOBID> DATAVOL\_DISK\_MAPPING=<Actifio mountpoint>:cpred equivalent lvm device name> ARCHIVELOG\_LOC=<PROD Archivelog location>

#### Arguments to the Script

SOURCE\_INSTANCE = <DB2 instance name>
TARGET\_DBNAME\_LIST=<comma separated list of database names>
JOBID = <Simple mount job-id>
ARCHIVELOG\_LOC = <Log backup mount point name> [mount point should be in local storage ]
DATAVOL\_DISK\_MAPPING = Colon separated list of <Actifio\_mount\_point>:point>:point

#### Example

/act/custom\_apps/db2/restore/ACT\_DB2\_lvm\_migrate\_newtarget.sh SOURCE\_INSTANCE=db2prod TARGET\_DBNAME\_LIST=TEST1,TEST2 JOBID=Job\_4488748 ARCHIVELOG\_LOC=/db2gj\_archivelog DATAVOL\_DISK\_MAPPING=/db2gj/db2/data:/dev/mapper/vg00-vol\_data,/db2gj/db2/log:/dev/mapper/ vg01-vol\_log

3. Once the script completes successfully, go to AGM and perform an Unmount+Delete.

