IBM Db2 DBA's Guide to Actifio Copy Data Management



Actifio VDP 9.0

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Contents

The ActifioNOW Customer Portal	v
Actifio Support Centers	v
Chapter 1 - Introducing the Actifio Virtual Data Pipeline for IBM Db2 Databases	1
Actifio Data Virtualization	1
Capturing Data	3
Replicating Data	3
Accessing Data	4
Chapter 2 - Adding a Db2 Database Host and Discovering the Database	7
Adding the Host from the Domain Manager	7
Discovering the Db2 Database from the Application Manager	9
Finding the Discovered Db2 Database in the Application Manager	9
Chapter 3 - Configuring the Backup Method	
Configuring SLA Settings	11
Ensuring that the Backup Capture Method is Set Correctly	13
Ensuring that the Disk Preference on the Host is Set Correctly	14
Disk Preference: File-Based Traditional Backup and Recovery in NFS/Block	14
Disk Preference: LVM Snapshot with Change Block Tracking on Linux	15
Disk Preference: GPFS on AIX	16
Setting the Schedule for Dumps	17
Chapter 4 - Protecting the Db2 Database	
Protecting an IBM Db2 Database	19
Protecting IBM Db2 Database Logs	21
Chapter 5 - Restoring, Accessing, or Recovering a Db2 Database	
Mount and Refresh from Block-Based Volume Snapshot to a Target Db2 Instance as a Virtual A 25	pplication
Restoring and Recovering a Db2 Database	
Recovering from Volume based Snapshot	28
Recovering from a Full+Incremental Backup	30

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.

Full documentation is in the AGM online help, and on ActifioNOW. The following guides will be of particular interest:

- Connecting Hosts to Actifio Appliances
- Network Administrator's Guide to Actifio VDP

The ActifioNOW Customer Portal

During the configuration and initialization of your Actific Appliance your Actific representative provided you with a user name and password for the Actific NOW customer portal.

From the customer portal you can obtain detailed reports about your Actific 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

Introducing the Actifio Virtual Data Pipeline for IBM Db2 Databases

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 3 Replicating Data on page 3 Accessing Data on page 4

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.

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 GPFS Snapshot on AIX



Db2 with Actifio File-Based Backup

Capturing Data

Capturing data consists of four simple 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 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:

- 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 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 Global Manager (AGM). Procedures for accessing databases images are described in Chapter 5, Restoring, Accessing, or Recovering a Db2 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 as 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 Database

Before You Begin

The 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 from the Domain Manager on page 7
- 2. Discovering the Db2 Database from the Application Manager on page 9
- 3. Finding the Discovered Db2 Database in the Application Manager on page 9

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.

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		Roles	Organ	nizations l	DAP Hosts	Storage Pools	Storage Arra	ys Web Cert	ificate	
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620	Dashboard			NAME 🗘	FRIE ¢	APPLI 0	IP ¢	ТҮРЕ 🗘	OS RE 🗘	VIRTUAL
8	Domain Manager			atmlpar	atmlpar	Sky-7.0.x	172.27.3	Generic	2	No
旭	SLA Architect			db2-a:ovm1	db2-auto	Sky-7.0.x	172.16.2	Generic	Red Hat	No
۲	Application Manager			db2-a:ovm2	db2-auto	Sky-7.0.x	172.16.2	Generic	Red Hat	No

- 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 appliance.
 - 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 **disk preference**:
 - o For block-based backup with CBT or GPFS: select Block
 - o For file-based backup with Full+Incremental file system backup: select Block or NFS

Appliances Users Roles Organizations UDAP Hosts Storage Poc	ls Storage Arrays	Web Certificate	America/New_York
0621112	Edit Host		
P. 17.2.16.200.144 PRIENCY 0201112 PURDLE 42766/Ib-3495-4/66-8695-663949825665_6778 NAME DS: Red Hat Enterprise Linux Server 7.5 (Maipo) RELEASE VIESON 31.10-862.47.366_64 VIESON 31.10-862.47.366_64 VIESON 31.00-862.47.366_64 VIESON 31.00-862.47	Name * Priendly Name IP Address * Description Appliances*	D821112 D821112 0821112 0 172.16.200.144 192.168.122.1 Cype to search Cype to s	1P 17216200243 17236201074
	Host Type Staging Disk Pormat Discovery Use Oracle Database ArthenBitation	Generic 5 V Block 8 NFS 8	

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

Discovering the Db2 Database from the Application Manager

To discover the Db2 database application:

1. From the AGM Application Manager, Applications tab, select **Add Application** in the upper right corner.

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Consistency Group	1 La	akal G	roups Active Images	Workflo	43								-	_			
O clear all filters	Ap	plic	ations										+ ADD APS	LICATION	F ADD	VIRTUAL	MACHINE
APPLICATION NAME >	- 002												_		-		
HOST NAME	1,540	files	Q Type: DB2 Instance														
	type	të siti	rth	Q												10 25 -	del.
PROFILE NAME	_																
FRIEHOLY PATH			APPLICATION	0	TEMPLATE	0	PROFILE	0	FRIENDLY PATH	0	HOST NAME	0	APPLIANCE	0	TYPE		
ALA STATUS 👻			db2dtw						db2-autoum2		db2-autoum2		Sky70x		DB2 Inst	ince	
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	100		db finald		DB1 Longenati		Internet manufilities		all a successful and a		distances and		Wheel Wolfson		Print Land	1000	

2. On the Add Application page, select **Discover connector supported applications** and **Using existing host**, then select the Db2 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.

PUCATION MANAGER Filter by Appliances V Organizations V	
plications Consistency Groups Logical Groups Active Images Workflows	
Id Applications	
pplication Type Host Selection	
Discover connector supported Applications * Using existing host	
Out of band Generic Application Using IP address	
ailable Hosts (7)	
Appliance	
DB () Host () DB2-Local () Clear Filters	

3. Select the host and click **Add Applications** in the bottom right corner. This will run the discovery on the database host and will discover all Db2 databases running on it.

APPLICATION MANAGER	r by Appliances 🎔 Organiza	ations 🔻		America/New_York 1 admin 🗍 🥹
Add Applications Application Type * Discover connector supporter © Dut of band Generic Application	Host Selection Applications on 6 Using IP address	mages worknows		
DB Hosts (7)	Appliance DB2-Locel	Clear Filters		
Host	Ib	Friendly Path	Appliance	
suse_db2_1	172.16.201.160	suse_db2_1	DB2-Local	
rhel7db2-1	172.16.200.87	rhel7db2-1	DB2-Local	
Brad_RH7.5_D8211.1	172.16.200.239	Brad_RH7.5_DB211.1	DB2-Local	
0821112	172.16.200.144	D821112	DB2-Local	
0821111	172.16.201.167	D821111	=D92-Local	
082105_2	172.16.201.205	DB2105_2	D82-Local	
D82105_1	172.16.202.33	D82105_1	D82-Local	
44 4 1 1 of 1 > >>	Total: 7	per page 4		Resum to Applications

Finding the Discovered Db2 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 Db2 database instances. The new Db2 instance will appear in the list as unmanaged (the red shield icon).

APPLICATION MANA	GER	Filte	r by Appliances	•	Organizations 🔻								Az	nerica/New
Applications C	onsister	icy Gro	oups Logical G	roups	Active Images W	Vorkflows								
 clear all filters 	A	pplic	cations										+ ADD APPLIC	ATION -
APPLICATION NAM	E F													
HOST NAME		hide fi	Recs OType: DB	2 Instance										
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PROFILE NAME	• 10	(Separate												
FRIENDLY PATH	• •	1	APPLICATION	0	TEMPLATE	0	PROFILE	. 0	FRIENDLY PATH	HOST NAME	APPLIANCE	.0	TYPE	0
SLA STATUS	•		inst1		DB2_CBT_ALL_New		Remote_Profile		suse_db2_1	suse_db2_1	DB2-Local		D82 Instance	
Managed			Instit		DD2 DUMD ALL		Demote Drofile		shal7db2.5	chal7db2.4	DB2.1 acal		DD2 instance	
Unmanaged		1.9	HISC F		DOS_DOWL_ALL		Remote_Prome		metrooz-1	metrope-1	Docrocal		Dos marende	
TYPE		0	db2inst1						s_cbt_11_source_(172.16	s_cbt_11_source_(172.16	DB2-Remote		DB2 Instance	
			the second s											

3 Configuring the Backup Method

After the database is prepared and discovered as explained in Chapter 2, Adding a Db2 Database Host and Discovering the Database, you can configure a VDP backup method for the database.

Whichever method you select involves these steps:

Configuring SLA Settings on page 11 Ensuring that the Backup Capture Method is Set Correctly on page 13 Ensuring that the Disk Preference on the Host is Set Correctly on page 14 Setting the Schedule for Dumps on page 17

Configuring SLA Settings

To configure the database SLA settings:

1. In the AGM Application Manager, right-click the database and select **Manage SLA**.

	APPLICATION MANAGER		Filte	rby	Appliances 🔻	Or	rganizations 🔻							20	America/Ne	w_York
	Applications Consistency Grou	ps	Logica	al Grou	ps Active Imag	es W	Vorkflows									
	🙁 clear all filters	A	ppl	icat	ions								+	ADD APPLICATION	+	ADD
	HOST NAME	- 43	ide filt	ers {	Sla: Managed	O Type:	Db2 Database	O Type: D	b2 Instance							
	TEMPLATE NAME	a	itovini	2			0							T SHOW SELEC	TED (1)	
	PROFILE NAME		2001111	-			Ű								100 (1)	
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ła	туре 👻	0	1) E	Access						db2-autovm2	db2-autovm2		Sky-7.0.x		Dł
	select: ALL NONE	C	3	, ,	Edit Organi	zation	Membership				db2-autovm2	db2-autovm2		Sky-7.0.x		Dt
	Cars	C		, .	Import On\	/ault Im	ages		local profile		db2-autovm2	db2-autovm2		Sky-7.0.x		Dt

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



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

000000000000000000000000000000000000000	1001	
Аррисаціон мате	THELE	
APPLICATION TYPE	SYBASEInstance	
HOST	Sybase_auco1	
HOST IP ADORESS	172.16.201.135	
PATH	Sybase_auto*	
OPERATING SYSTEM	Linux	
APPLIANCE	092 Remote	
APPLIANCE IF ADDRESS	172.16.200.243	
Settings		Reset All to Defaul
CONNECTOR OPTIONS		
PERCENTAGE OF RESERVE SI VOLUME GROUP	ACE IN 20	
BACKUP CAPTURE METHOD	 Use volume level backup Use full-incremental backup)
FORCE FULL FILESYSTEM BAI	XLIP Xes & No.	
DATABASE FILESYSTEM STAD DISK SIZE IN G8	100	
LOG BACKUP STAGING DISK S	22E IN 15	Reset to Defa-
SCRIPT TIMEOUT	172800	
NUMBER OF STRIPES	4	
		_

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

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	
Percentage of Reserve Space in Volume Group	This is needed for LVM snapsho Recommended value is 20%	t temporary space.	Not applicable	
Backup Capture Method	Use Volume Level Backup	Jse Volume Level Backup Use fu filesys		
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	By default Actifio calculates this plus 20% buffer. Default is recor Providing a value will override th dynamically. This will become a f	as daily log generation mmended. e default calculation and ixed size	* retention of log backup SLA d the log disk will not grow	
Retention of Production DB Logs in Days	This value is used to purge the la Based on this setting the last dat - the # days set) and the log will b is 0 days. With default value all la	og backup from basepa a backup id will be selec be purged older than the ogs prior to last data ba	th_logbackup destination. cted (CURRENT_TIMESTAMP, e data backup id. Default value ckup will be purged.	
Script Timeout	The timeout value is applied to in connector. The default value is re	nternal backup and reco acommended.	very scripts called by	

File-based backup also requires the dump schedule to be configured. See Setting the Schedule for Dumps on page 17.

Ensuring that the Backup Capture Method is Set Correctly

Backup capture settings depend upon the backup capture method that you need. It is important to be certain that you have set the right backup method for your needs:

1. In the AGM Application Manager, right-click the database and select **Manage SLA**.

APPLICATI	ON MANAGER		Filter by	e.	Appliances *	s - 3	Organizations 🔻								At	terica/Net	N_YOR
Applications	Consistency Grou	ps L	Logical G	roups	Active In	ages	Workflows										
😢 de	ear all filters	Ap	oplic	atio	ons									+	ADD APPLICATION	+	NDE
APPLICATIO	IN NAME																
HOST NAME	. ,	4.56	de filters	0	Sla: Managed	O Typ	e: Db2 Database	O Type 0	Ib2 Instance								
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FRIENDLY P	ATH >	Θ		AP	PLICATION	0	TEMPLATE	0	PROFILE	¢	FRIENDLY PATH	¢	HOST NAME	\$	APPLIANCE	0	T
	•	2		TE	ST						db2-autovm2		db2-autovm2		Sky-7.0.x		t
Manag	ed	-									dh2 subsum2		dh'f automati		Clay 7.0 m		
🐻 🔲 Unmar	aged		•	1	Manage	SLA					dbz-aucovinz		doz-autovinz		SKy-7.0.X		4
TYPE	-		0	Eħ	Access						db2-autovm2		db2-autovm2		Sky-7.0.x		D
select ALL	NONE			IN	Edit Orga	inizatio	n Membership				db2-autovm2		db2-autovm2		Sky-7.0.x		D

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

APPLICATION MANAGER Filter by	Appliances Organizations		America/New_York 1 adm
Applications Consistency Groups Logical Groups	Active Images Workflows		
CAMANAGE SLA	auto2_remote Sybase_auto2_remote Details & Settings		
TEMPLATE Choose a template	PROFILE Choose a profile	Apply SLA	
Database Inclusion Rule			
RULE All Databases		Snapshot 0	
TOTAL DATABASES 7	, <mark>S</mark> ()	Direct to Dedup 0	

This opens the specific details and settings for this database. Check the Backup Capture Method:

- o Db2 Traditional Backup and Recovery API "file-based" backups: Use full+incremental backup
- o LVM Snapshot with Change Block Tracking: Use volume level backup
- o GPFS on AIX: Use volume level backup

ADDUCATION MATTE	10512			
Approvident	. IIISLL			
APPLICATION TYPE	SYBASEIns	ance		
HOST	Sybase_aut	D5		
HOST IP ADDRESS	172.16.201	135		
РАТИ	Sybase_aut	5		
OPERATING SYSTEM	Linux			
APPLIANCE	082 Remot			
APPLIANCE IF ADDRESS	172.16.200	243		
Settings			Repet All to 1	betas
CONNECTOR OPTIONS				
PERCENTAGE OF RESERVE SI VOLUME GROUP	ACEIN	20		
BACKUP CAPTURE METHOD		 Use volume level backup Use full+incremental backup 		
FORCE FULL PILESYSTEM BA	CICLIP .	O Ves 🛞 No		
DATABASE FILESYSTEM STAC DISK SIZE IN G8	ang	100		
LOG BACKUP STAGING DISK S GB	122E (N	15	Reset to	Defa
SCRIPT TIMEDUT		172800		
NUMBER OF STRIPES		4		
				-

3. Click **Save** at the bottom of the page if you had to change anything.

Ensuring that the Disk Preference on the Host is Set Correctly

Choose between:

- Disk Preference: File-Based Traditional Backup and Recovery in NFS/Block on page 14
- Disk Preference: LVM Snapshot with Change Block Tracking on Linux on page 15
- Disk Preference: GPFS on AIX on page 16

Disk Preference: File-Based Traditional Backup and Recovery in NFS/Block

To set disk preference for storage snapshots:

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

D				F	Filter by	Appliance		Organizations 🔻								Arte	rica/Ne	w_York
A	ppliances	Users	Roles	Organ	nizations	LDAP	Hosts	Storage Pools	Storag	Arrays Web Certific	ate							
	F	ILTER BY		Ho	sts		-											
	IOST NAME																	
I	filter by ho	st name		4 hid	efilters			0										a
	ADDRESS			UUE				0							-	SHOW SELECTED (1)	12	
1	filter by IP	address		Ξ	NAME		0	FRIENDLY PATH	C	APPLIANCE	0	IP	0	TYPE	0	OS RELEASE	0	VIRT
, .	is-				db2-autov	m1		dh' autovint		Sky 70 x		172.16.216.131				Red Hat Enterprise L		No
	Enter OS III	ke Linux	-		atmlpar		C	a Edit		0.x		172.27.36.87		Generic		2		No
•	YPE				db2-autov	m3		d Edit Organiz	ation	0.x		172.16,216.133		Generic		3.10.0-862.el7.x86_6	4	No
9	elect: ALL []	NONE			db2-autov	rm2		Delete		.0.x		172,16.216.132		Generic		Red Hat Enterprise Li	in	No

2. Set Disk Preference to NFS or to Block.

DOMAIN MANAGER Filter by Appliances Org	ganizations 🔻		Ameri
Appliances Users Roles Organizations LDAP	rage Pools Storage Arrays V	Neb Certificate	
remote-rhel-2	Edit Host		
IP 172.16.201.207			
FRIENDLY PATH remote-rhel-2	Name *	remote-rhel-2	
UNIQUE NAME remote-rhei-2_817350_null		recorded control	
OS RELEASE 3.10.0-957.27.2.e(7.x86_64	Friendly Name	remote-rhel-2	
OS VERSION #1 SMP Tue Jul 9 16:53:14 UTC 2019	ID address *		
OSTYPE UNUX	IP AGUITESS.	0	
FORMAT		172.16.201.207 🔟	
	Description		
	Appliances*		
	Copposition 2	type to search Q	
		APPLIANCE	IP .
		DB2_Brad	172.16.200.113
		DB2-Remote	172.16.200.243
		DB2-Local	172.16.201.174
		Generic	
	must type		
	Staging Disk Format	Block +	
	and the second sec	Block	

3. Then click **Save** at the bottom of the page.

Note: File-based backup also requires the DB dump schedule be configured. See Setting the Schedule for Dumps on page 17.

Disk Preference: LVM Snapshot with Change Block Tracking on Linux

To set disk preference for storage snapshots:

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

DOMAININ	MANAGER		F	Filter by	Appliance	05 -	Organizations •								Atter	rica/Ne	w_York
Appliances	Users	Roles	Organ	nizations	LDAP	Hosts	Storage Pools	Storag	e Arrays Web Certil	icate							
(FILTER BY		Но	sts		-											
HOST NAME																	
filter by h	ost name		4 hide	e filters			0									6	a 1
IP ADDRESS			Upe				•							-	J SHOW SELECTED (1)	2	
filter by IP	address		8	NAME		0	FRIENDLY PATH	0	APPLIANCE	0	IP	0	TYPE	0	OS RELEASE	0	VIR
os				db2-autor	em1		dh' autoent		Sty 70 x		172.16.216.131				Red Hat Enterprise Li	in	
Enter OS1	like Linux	-		atmlpar		C	a Edit		0.x		172.27.36.87		Generic		Z		No
TYPE			0	db2-autov	rm3		d Edit Organiz	ation	0.x		172.16.216.133		Generic		3.10.0-862.el7.x86_64	4	No
select: ALL				db2-autov	rm2		Delete		.0.x		172.16.216.132		Generic		Red Hat Enterprise Li	in	No

2. Set Disk Preference to **Block**.

)rganizations 👻		America/New_33
Appliances Users Roles Organizations LDAP	torage Pools Storage Arrays W	eb Certificate	
remote-thel-2	Edit Host		
IP 172.16.201.207 PRIENDLY PATH remote-rhel 2 UMQUE NAME remote-rhel 2, 817350, mult OS REELES 110.0-937.22.47.86, 64 OS VERSION IR1 SMP Tue Jul 9 16.53:14 UTC 2019 OS TYPE Unix STACING DISK ROCK FORMAT	Name * Friendly Name IP Address * Description Appliances*	remote-thel-2 re	IP 172.16.200.113 172.16.200.243 172.16.201.174
	Host Type	.Generic •	
	Staging Disk Format	Block • Block NFS	

3. Then click **Save** at the bottom of the page.

Disk Preference: GPFS on AIX

To set disk preference for storage snapshots:

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

DOMAIN M	ANAGER		F	Filter by	Appliance		Organizations 🔻								Atter	rica/N	lew_York
Appliances	Users	Roles	Organ	nizations	LDAP	Hosts	Storage Pools	Storag	Arrays Web Certifi	cate							
F	ILTER BY		Но	sts		-											
HOST NAME																	
filter by ho	st name		4 hids	eTilters			0										a .
IP ADDRESS			ODE				0								I SHOW SELECTED (1)		
filter by IP.	address		8	NAME		0	FRIENDLY PATH	C	APPLIANCE	¢	IP	0	TYPE	0	OS RELEASE	0	VIR
os		-		db2-auto	vm1		tmontus. "Ib		Sky 70 x		172 16 216 131				Red Hat Enterprise Li	in	
Enter OS III	ke Linux	-		atmlpar		C	a Edit		0.x		172.27.36.87		Generic		2		No
TYPE			0.	db2-auto	vm3		d Edit Organiza	ation	.0.x		172.16,216.133		Generic		3.10.0-862.el7.x86_64	4	No
select: ALL [NONE			db2-auto	vm2		Delete		0.x		172.16.216.132		Generic		Red Hat Enterprise Li	in	No

2. Set Disk Preference to **Block**.

DOMAIN MANAGER Filter by Appliances O)rganizations 🔻		America/%
Appliances Users Roles Organizations LDAP (Hosts) Si	torage Pools Storage Arrays W	eb Certificate	
remote-rhel-2	Edit Host		
(#) 172.16.201.207 FRIENDLY PATH : remote-thel-2 UNIQUE NAME : remote-thel-2,817350_null OS RELEXER: 31.0.9572.247.366_54 OS VERSION #1 SMP Tue-Jul 9.1653.14 UTC 2019 OS TYPE : Linux STAGRICENE, BLOCK FORMAT	Name * Friendly Name IP Address * Description Appliances*	remote-thel-2 re	IP
		DB2_Brad DB2-Remote	172.16.200.113 172.16.200.243
	Host Type	Generic •	172.16.201.174
	Staging Disk Format	Block • Block NFS	

3. Then click **Save** at the bottom of the page.

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 Appliance:

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

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

Replace "FIIIIII" as needed.

Example

To run full backup on Saturday and Tuesday, set dumpschedule="IIFIIIF"

4 Protecting the Db2 Database

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

This chapter includes:

Protecting an IBM Db2 Database on page 19

Protecting IBM Db2 Database Logs on page 21

Protecting an IBM Db2 Database

To protect the database:

1. From the AGM Application Manager, right-click the database and select Manage SLA.

	APPLICATION MANAGER	Filter	by Appliance	s Organizations							Atte	rica/New_York
	Applications Consistency Gro	ups Logical	Groups Active	Images Workflows								
	Clear all filters	Appli	cations							+	ADD APPLICATION	+ ADD
	HOST NAME	A hide filte	O Sla: Manage	d Type: Db2 Database	O Type: Di	b2 Instance						
	TEMPLATE NAME	autovm2		0							T SHOW SELECTED	(1)
	PROFILE NAME											
	FRIENDLY PATH	8	APPLICATIO	N O TEMPLATE	0	PROFILE	¢	FRIENDLY PATH	HOST NAME	\$	APPLIANCE	0 T)
-	SLA STATUS 👻	2 0	TEST					db2-autovm2	db2-autovm2		Sky-7.0.x	Di
	🗹 Managed			2.00				A CONTRACTOR OF	The second second second		100 C	
20	Unmanaged		Manage	e SLA				db2-autovm2	db2-autovm2		Sky-7.0.x	Dt
ħ4	туре 🗸	0 0	E Access					db2-autovm2	db2-autovm2		Sky-7.0.x	Dt
	select: ALL NONE	0 0	IN Edit Or	ganization Membership				db2-autovm2	db2-autovm2		Sky-7.0.x	Dt
-	CIFS	0.0	dt Import	OnVault Images		local profile		db2-autovm2	db2-autovm2		Sky-7.0.x	Dt

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



3. On the Apply SLA page, make sure that the backup capture method matches the type of backup set in Chapter 3, Configuring the Backup Method. Click **Apply SLA** or **Save Changes**.

apprecision been	a seconda	A CONTRACTOR
Application Name	INSLE	
APPLICATION TYPE	SYBASEInstance	
HOST	Sybase_auto1	
HOST IP ADDRESS	172.16.201.135	
PATH	Sybeen_auto*	
OPERATING SYSTEM	Linux	
APPLIANCE	002 Remote	
APPLIANCE IF ADORESS	172.16.200.243	
Settings		Reset All to Gefault
CONNECTOR OPTIONS		
PERCENTAGE OF RESERVE SI VOLUME GROUP	ACE IN 20	
BACKUP CAPTURE METHOD	 Use volume level backup Use full+incremental backup 	
FORCE FULL PILESYSTEM BAD	CUP O Yes 🗶 No	
DATABASE FILESYSTEM STAG DESK SIZE IN G8	100	
LOG BACKUP STACING DISK 5 GB	28 m 15	Reset to Defaul
SCRIPT TIMEOUT	172800	
NUMBER OF STRIPES	4	
		_

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 appears in the Application Manager with a green shield icon.

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

	APPLICATION MANAGE	R	F	Alter by	e ::	Appliances 🔻		Organizations 🔻							Ameri	ica/New,	York 1 adi
	Applications Consister	cy Group	L	ogical G	roups	Active Ima	ges	Workflows									
	🙁 clear all filters	i	Ap	plic	atio	ns								+	ADD APPLICATION	+ A	dd Virtuai
	APPLICATION NAME	•															
	HOST NAME	•	4 hide	efilters	05	ila: Managed	O Typ	e: Db2 Database	O Type C	0b2 instance							
	TEMPLATE NAME	•	auto	wm2				0							T SHOW SELECTED	m	111 25
	PROFILE NAME	•														1.1	
	FRIENDLY PATH	•	Ξ		APF	LICATION	Ô	TEMPLATE	Ô	PROFILE	¢	FRIENDLY PATH	HOST NAME	ò	APPLIANCE	0	TYPE
-	SLA STATUS			0	TES	Ť						db2-autovm2	db2-autovm2		Sky-7.0.x		Db2 Datab
	Managed				AI							db7.autourp7	db7-autoam7		Shu7.0 x		Db2 Datab
50	Unmanaged		u.	•		Manage Sl	A					d02-adcovinz	doz-adcovinz		3Ky-7.0.K		DD2 Datas
旭	туре	•		0	Eħ	Access						db2-autovm2	db2-autovm2		Sky-7.0.x		Db2 Datat
-	select: ALL NONE			0	IN	Edit Organ	izatio	n Membership				db2-autovm2	db2-autovm2		Sky-7.0.x		Db2 Datab
	□ ars		-	-		Import On	Vault	mages		to and a section		aller and a set	- Alter and a second				The basis

5. Under Database Inclusion Rule, click **Edit**.



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 AGM SLA Architect page, right-click the template for Db2 database protection and click **Edit**.

	IANAGER		F	Filter by Applia	ices •	Organizations 🔻								Amer	ica/Ni	w_Yo
Appliances	Users	Roles	Organ	nizations LDAP	Hosts	Storage Pools	Storag	e Arrays Web Certif	icate							
F	ILTER BY		Ho	osts	-											
HOST NAME																
filter by ho	ost name		4 hid	efilters									1.1			a
IP ADDRESS			db2			U								J SHOW SELECTED (1)		9
filter by IP	address		Ξ	NAME	0	FRIENDLY PATH	0	APPLIANCE	0	IP	0	TYPE	0	OS RELEASE	0	v
os				db2-autowm1		dh' autovm1		Sky 70 x		172.16.216.131		Generic		Red Hat Enterprise Li	n	
Enter OS II	ke Linux			atmlpar		a Edit		0 x		172.27.36.87		Generic		Z		N
TYPE				db2-autovm3		d Edit Organiza	ation	0.x		172.16.216.133		Generic		3.10.0-862.el7.x86_64	4	Ň
			_			Delete										

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

ANCHITELT	Filter by	Appliances ¥	Organizations 💌	
Profiles				
TEMPLATE	Logsmart Snap		ALLOW OVERHIDES ON POLICY SETTINGS?* * VES D NO.	Save Template
DESCRIPTION	Description			
		8		Policies
		NASSOCTION	0	SCHEDULING Continuous REPEAT VALUE Conty 24 hours CONRELATTER 2 days POLICY ID 858167
	Ó		- 3 - 10	Edit Policy

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

A ARCHITECT	Filter by	Appliances Organizations
plates Profiles		
		Production To Snapshot
		Create/Edit Policy
		POLICY NAME*
○ Policies		SCHEDULING Windowed V
Snapshot 1		ON THESE DAYS Everyday
Direct to Dedup 0	(1255)	And the second
Direct to OnVault 0	(1155)	EXCEPT Never ×
OnVault Replication 0	(1400)	WITHIN THIS WINDOW 19:00 TO 07:00
Dedup (0)	CLASS	
Dedup DR 0	(1156)	
Mirror 0	CTATE	
OnVault 0	CTA50	EVENT O ZA O DECENT
		RETAIN FOR 2 C Day(e) PRIORITY Medium Advanced 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.



5. Click Save Changes.

6. From Application Manager, select the Db2 Instance. You can use the Db2 Instance checkbox to filter the list. Right-click it and select **Manage SLA**.

	APPLICATION MANAGE	R	Filter by Appliances •	Organizations 🔻							America	(New_Y	lork 1 adri
	Applications Consistent	cy Group	s Logical Groups Active Im	ages Workflows									
	🙁 clear all filters	i	Applications							+	ADD APPLICATION	+ AD	d virtual
	APPLICATION NAME												
	HOST NAME	•	+ hide-filters O Sla: Managed	O Type: Db2 Database	O Type: D	b2 Instance							
	TEMPLATE NAME	•	autown2	0								a l	111 25
	PROFILE NAME	•											
	FRIENDLY PATH	•	APPLICATION	C TEMPLATE	ō.	PROFILE	٢	FRIENDLY PATH	HOST NAME	Ö	APPLIANCE	¢	TYPE
-	SLA STATUS	-	🖻 🦁 TEST					db2-autovm2	db2-autown2		Sky-7.0.x	1	Db2 Datab
20	Managed		🗆 🦁 👫 Manage S	LA				db2-autovm2	db2-autovm2		Sky-7.0.x		Db2 Datab

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. You can include or exclude specific database logs during backup. From the Application Manager, select the Db2 Instance. Select **Manage SLA**.
- 10. Under Database Inclusion Rule, click **Edit**.

MANAGE SLA	Maaaaa Mambaashir					
	Manage Membership					
TEMPLATE DB2	Eligible Databases			Ineligible Datab	ases	
	INCLUSION RULE Exclude Se	sociod 👻		Ineligible databases Management for on	cannot be included in DB2 Instance e of the following reasons:	
	All databases selected below will be to this DB2 instance. Databases add	excluded from data capture (or s ed to this instance after selecting	 The database is a m The database was in 	winber of a consistency group yeated by an app-aware mount		
Database Inc	capture (or snapshot) automatically.			Thomas to conside	0	
0.000	type to search	Q, D SHO	W SELECTED (2)	type to search.		2
TOTAL DATABASE:	Θ	DATABASES	0	U	DATABASES	Q;
DATABASES INCLUDED	🖾 TEST					
NELIGIBLE DATABASE	🗆 AUS					
	🗆 ENG				No Databases Found	
	Timera anna			1 A		

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

5 Restoring, Accessing, or Recovering a Db2 Database

This section describes:

Mount and Refresh from Block-Based Volume Snapshot to a Target Db2 Instance as a Virtual Application on page 25

Restoring and Recovering a Db2 Database on page 28

- o Recovering from Volume based Snapshot on page 28
- o Recovering from a Full+Incremental Backup on page 30

Mount and Refresh from Block-Based Volume Snapshot to a Target Db2 Instance as a Virtual Application

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

1. From the AGM Application Manager, right-click the protected database and select Access.

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

Applications Consistency Fromme					Arenian	en for I somer + O
Considency & outs	Logical Groups Active Images V	Norkflows				
⊘ clear all filters	Applications				+ ADD APPLICATION +	ADD VIRTUAL MACHINES
APPLICATION NAME						
HOST NAME	« Inde filters O Siz. Managed O Type:	Db2 Database O Type: Db2 Instance				
TEMPLATE NAME	autovm2	0			SHOW SELECTED (1)	III 25 - 17 🛦
PROFILE NAME						
FRIENDLY PATH +	E APPLICATION 0	TEMPLATE O PROFILE	FRIENDLY PATH 0	HOST NAME	APPLIANCE O	TYPE
SLA STATUS ~	8 0 111		db2-autovm2	db2 autowm2	Sky 7.0 x	Db2 Database
🔁 Managed	Manade SLA			1000		
Unmanaged			db2-autovm2	db2-autovm2	Sky-7.0.x	Ob2 Database
TYPE -	C O C Access		db2-autovm2	db2-autovm2	Sky-7.0.x	Db2 Database
Line all target	Edit Organization M	Membership	db2-autovm2	db2-autovm2	Sky-7.0.x	Db2 Database

2. Select a snapshot image and choose Mount.



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

APPLICATION MANAGER Filter	y Appliances Organizations		
Applications Consistency Groups Logical	Groups Active Images Workflows		
🤃 🖓 (ACCESS	db2-autovm2 db2-autovm2 Details & Se	ottings	
2019-09-27 03-19.49 Soupshot Image	Mount		
NAME Image 3158389	TARGET *	LABEL	
STATUS Available	db2-autovro2		
TRANSPORT SAN Based, Out-Of-Bend Storage			
IMAGE SIZE 257.41GB	 Application Option 	1S	
EXPIRES ON 2019-09-27 04:35:47			
APPLIANCE Sky-7.0.X	CREATE NEW VIRTUAL	APPLICATION	
RECOVERY 09-27 03:19 To 09-27 04:04 RANGE	INCLUDED DATABASES		Database Options * are mandatory
CATALOG STATE None	type to search	Q	SHOW SELECTED (1)
POOL NAME Act_per_pool000			
Mount	E SELECT TEM	>	
	TEST2		
lu l	Ø IND		test2 Database Options *
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GM (D AUS		
	ROLL FORWARD TIME	圖 (2019-09-27)	04.04.59 • HOST TIME © USER TIME

Selecting a Single Database

db2prod	4h2.autoum2 dh2.autoum2 Datails & Sattions	
	auzonauoviniz uuzonauoviniz uesain ersettiinga	
2019-09-27 03:19:49	Mount	
Shapshot mage	TARGET* LABEL	
NAME_Image_3158389		
STATUS Available	db2-autovm2	
Storage		
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EXPIRES ON 2019-09-27 04:35:47		
APPLIANCE Sky-7.0.X	CREATE NEW VIRTUAL APPLICATION	
RECOVERY 09-27 03:19 To 09-27 04:04 RANGE	INCLUDED DATABASES	Database Options * are mandator
TALOG STATE None	type to search	SHOW SELECTED (2)
POOLNAME Act_per_pool000		
Mount	 SELECT TEMS 	
	TEST2	
	IND IND	
	TEST1	
	ENG ENG	Database Options *
	Energy and the second s	

Selecting Multiple Databases

6. Click each selected database to specify the target database details for the new virtual copy.

Contraction of the second s				-	-
ACCES OF BEZERGE CD2-autovin.	db2-autown2 Oncars & Settings				1114
0 2019-09-27 03 19:49	Mount				
- maintaine man	TANGET*	LABEL			
MANU Image_3158389	(diated)				
TRANSPORT SAN Based, Out-Of-Band	Construction of the local division of the lo				
MAGE SZE 257 41GB					
EXPRES ON 2019-09-27-04.35-47	CONTRACTOR AND ADDRESS AND	-			
APPLIANCE Sky-7.0.X RECOVERY 05-27.02.19.To 09-27.04.04	CHEATE NEW VIHITUAL APPLICATION		Database Ordines * are mandation		
RANCE	The bound				
PODLNAME Act per posi000	type to search	ų	L) SHOW SELECTED (0)		
	SELECT ITEMS				
	TEST2				
	(80)		Detabase Options		
	TEST1				
	ENG				
	🖾 AUS				
	ROLL FORWARD TIME	III (2019-09-27 0 0	8439 8 HOST TIME () USER TIME		
	TARGET INSTANCE NAME *	storgicate			
	MANAGE NEW APPLICATION	db2prod			
	TEMPLATE *	Local snape	🖻 ya 🚺 - 🚺		
	MORE *	Choose a profile			

7. Choose a target point in time for a database protected with log roll-forward.

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.

TARGET Db2 INSTANCE NAME: From drop down select target Db2 instance to attach the selected database as virtual copy.

Manage New Application

- o To protect the new virtual database, click and enable Manage New Application.
- o Choose a template and a resource profile to protect the database.
- 8. Under Mapping Options, Mount Location, specify a target mount point to mount the new virtual database to.
- 9. Click **Submit**.

Restoring and Recovering a Db2 Database

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

Recovering from Volume based Snapshot on page 28

Recovering from a Full+Incremental Backup on page 30

Recovering from Volume based Snapshot

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

To recover back to the source:

1. From the AGM Application Manager, right-click the protected database and select Access.

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



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.

APPLICATION	Filter b	y Appliances •	Organizations *			America/New_York 🙎 a
Applications 6	onsistency Groups Logical C	croups Active Imag	pes Workflows			
C+ ACCESS	apsprod	db2-autovm2 dl	b2-autovm2 Details & Settings			TIMELINE
2019-09	27 03:19:49	Res	tore			
Snapshi	st image	Use th	his page to initiate a restore ope	ration. A restore will take the existing datat	bases offline and overwrite their data file	5.
NAME Im	age_3158389					
STATUS Av	ailable	R	OLL FORWARD TIME	2019-09-27 0 03-57	7.17	
TRANSPORT SA	N Based, Out-Of-Band prage	j.				
IMAGE SIZE 25	7.41GB		03:19:49		04:04:5	2
EXPIRES ON 20	19-09-27 04:35:47	1				(5)
APPLIANCE Sk	y-7.0.X		SELECT ITEMS			
RECOVERY 09 RANGE	-27 03:19 To 09-27 04:04					
CATALOG STATE No	ne					
POOLNAME AC	t_per_pool000					
Resto	re -					
		R	ESTORE WITH RECOVERY			
					Cancel	
2					Submic	

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

Recovering from a Full+Incremental Backup

Recovering Back to the Source: Use this procedure to restore and recover the source Db2 database. This procedure overwrites the source data.

Recovering Back to the Source

1. From the AGM Application Manager, right-click the protected database and select **Access**.

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

APPLICATION MANAG	ER	Filter	by Appliances •	Organizations 🕶							America/Net	w_York 1 a
Applications Consiste	ncy Groups	Logical	Groups Active Images	Workflows								
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2. Select a snapshot image and choose **Restore**.



- 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.