MySQL DBA's Guide to Actifio Copy Data Management



Actifio VDP 9.0

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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 MySQL 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.

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 Actifio Copy Data Management for MySQL Databases

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.

MySQL is the world's most popular open source database, used by high profile web properties including Facebook, Twitter, YouTube, and many more. This DBA guide explains how to protect MySQL application consistent database data with Actifio VDP in a Linux environment.

MySQL Backup API used by Actifio VDP

Linux CBT and LVM snapshot: MySQL "FLUSH TABLES WITH READ LOCK" and "UNLOCK TABLES" API

File-based backups: MySQL "mysqldump" API. This provides the full backup of the database in backup format. On recovery, the restore db API recovers the database by physically overwriting the data area.

MySQL log backup: During a log backup, VDP physically copies all the MySQL binary logs. The MySQL "purge binary logs BEFORE" API is used to purge the binary logs.



How It Works: MySQL with Linux CBT and LVM Snapshot



How It Works: MySQL with File-Based Traditional Backup

2 Adding a MySQL Database Host and Discovering the Database

Prerequisites

- The MySQL database must be residing under LVM and it must not be the boot volume. Run (mysql -e "select @@datadir") to get the database data path.
- For best results, the LVM volume from which the MySQL volumes are provisioned should have at least 20% free space.
- Install the Actifio Connector on the MySQL server host (see Connecting Hosts to Actifio Appliances.)
- For best results, create a backup user with all privileges.

```
mysql> create user identified by 'actpassword';
mysql> grant all privileges on *.* to 'actuser';
```

Backup username/password must be configured with host configuration. If there are multiple MySQL instances running on a server, then the backup username/password must be common for all MySQL instance running on that server.

• MySQL binary logging (log_bin) must be on to take log backup. To configure the binary log option, shut down the MySQL server and edit the config file (my.cnf or my.ini). Within the [mysqld] section of the configuration file, add the log-bin option.

```
[mysqld]
log_bin = /log1/mysql3306/mysql3306-bin.0000
```

Adding a MySQL Database Host and Discovering the Database

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

- 1. Adding the Host from the Domain Manager on page 4
- 2. Discovering the MySQL Database from the Application Manager on page 6
- 3. Finding the Discovered MySQL Database in the Application Manager on page 7

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 all the configurations correctly.

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

	DOMAIN MANAGER	Filter by	Appliances T	Organizations •								America/	Nex.	rock 👤 admin 🐥 🏟	Ð
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- 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.

DOMAIN M	IANAGER		Filter by	Applia	ices 🕈	Organizations				America/New_York 1 admin
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			-							
Hos	t Туре		Generic							
 Appl 	lication Disc	overy Cre	dentials							
► Coor	nector Setti	ngs								

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

Applanes Viete Viete Viete Viete Viete Import jenkin_memoce Import Import </th <th>DOMAIN MANAGER Filter by Appliances *</th> <th>Organizations *</th> <th></th> <th>America/New_Yook 1 admin 🔺 💡</th>	DOMAIN MANAGER Filter by Appliances *	Organizations *		America/New_Yook 1 admin 🔺 💡
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6. Select **Save** at the bottom of Edit Host page.

Discovering the MySQL Database from the Application Manager

To discover the MySQL database:

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

	APPLICATION MANAGER		F	ilter by	/ Appliances ♥	Organizatio	on≰ ▼						America/New_York	1 admin 🔺 🚱
8	Applications Consistency Clear all filters APPLICATION NAME HOST NAME	Groups	Ap	plica	ations	ages Workflows Database O Type:	MySQL Instance		+ ADD APPLICATION + ADD VIRTUAL MACHINES					
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	SLA STATUS		8		mysqld_5467			mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Insta	MYSQLInsta	yes
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14	CT ALL INONE			0	REM8			mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	yes
8	CIFS	14		0	mysqld_5459			mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Insta	MYSQUInsta	yes
8	Db2 Database			0	BUG2	mysql_strea	Remote_Pro	mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	yes

2. On the Add Application page, select **Discover connector supported applications** and **Using existing host**, then select the MySQL database host. If you have many hosts, you can use the search feature or use the filter to see only hosts that are managed by a specific Actifio Appliance.

APPLICATION MANAGER	Filter by Appliances *	Organizations •		America/New_York 1 admin 🔺 💡
Applications Consistency Gro	oups Logical Groups Active Im	ages Workflows		
Add Applications	s			
Application Type	Host Selection orted Applications III Using existin	ng host		
Out of band Generic Appl	lication 🔅 Using IP add	ress		
Available Hosts (74)				
1		Appliance		
wards	Select one •	All •	Clear Filters	
Host	IP	Friendly Path	Appliance	
mysql_jenkin_remote	172.17.204.123	mysql_jenkin_remote	DB2-Remote	
mysql_jenkins	172.17.204.123	mysql_jenkins	D82-Local	
mysol-dev-1	172.16.216.221	mysal-dev-1	DB2-Remote	

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 MySQL databases running on it.

Application Type Discover connector suppo Out of hand Generic Appl	rted Applications Using exis	n ting host Starss		
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anable Hoscs (74)				
		Appliance		
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Host	IP	Friendly Path	Appliance	
mysql_jenkin_remote	172,17.204,123	mysql_jenkin_remote	DB2-Remote	
mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	
mysql-dev-1	172.16.216,221	mysql-dev-1	DB2-Remote	
sybase_auto2	172.16.200.131	sybase_auto2	DB2-Remote	
Sybase_auto2_remote	172.16.200.81	Sybase_auto2_remote	DB2-Local	
remote-rhei-2	172.16.201.207	remote-rhel-2	DB2-Remote	
remote-rhei-1	172.16.200.87	remote-rhel-1	DB2-Remote	
Remote_suse_db_2	172.16.200.221	Remote_suse_db_2	D82-Remote	
remote_suse_db_1	172.16.201.160	remote_suse_db_1	DB2-Remote	
172.27.59.50	172.27.59.50	172.27.59.50	DB2-Local	

Finding the Discovered MySQL 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 the left pane to show only MySQL database instances. The new MySQL instance will appear in the list as unmanaged (the red shield icon).

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	MySQL Database	3			DB2LT						DB2-Local	MySQL Data	MYSQL	no		
	MySQL Instance	Ļ			mysqld_5432			mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Insta	MYSQLinsta	yes		

3 Configuring the MySQL Backup Method

After the database is prepared and discovered as explained in Chapter 2, Adding a MySQL 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 9
- Ensuring that the Backup Capture Method is Set Correctly on page 11
- Ensuring that the Disk Preference on the Host is Set Correctly on page 12
- Setting the Schedule for Dumps on page 14

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		Hiter b	w.	Appliances • Organizations •							America/New_York	1 admin
	Applications Consistency Group	s t	ogical	Groups	Active Images Workflows								
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	APPLICATION NAME >		P	01	ype: MySQL Database O Type: MySQL In	stance							
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	SLA STATUS	1	0	mys	HI 5467		mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Insta	MYSQLInsta	yes
8	Managed Unmaged	N	0	RM	Manage SLA	!	mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	yes
20	T		0	my	Access		mysql_jenkins	172.17.204.123	mysql_Jenkins	DB2-Local	MySQL Insta	MYSQLInsta	yes
М	ALLINONE		0	RE	Edit Organization Membership		mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	yes
8	Consistency Group	٥	•	my	Import OnVault Images Manage Expirations		mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Insta	MYSQLInsta	yes
	Db2 Database			BU	Delete Application	2_Pro	mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	yes
ø	Db2 Instance	0	0	WE		Pro	mysgl jenkins	172.17.204.123	mysal jenkins	DB2-Local	MySQL Data	MYSQL	yes

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.

Application Deta	ils & Settings	O Settings Help
Application Name	: Mysqld_5467	
APPLICATION TYPE	MYSQLInstance	
HOST	MysqL Jenkins	
HOST IP ADDRESS	172.17.204.123	
PATH	Mysql jenkins	
OPERATING SYSTEM	Linux	
APPLIANCE	D82-Local	
APPLIANCE IP ADORESS	172.16.201.174	
Settings		Reset All to Default
CONNECTOR OPTIONS		
PERCENTAGE OF RESERVE SP VOLUME CROUP	ACE IN 20	
BACKUP CAPTURE METHOD	Use volume level backup Use tull+incremental backup	Reset to Default
		Cancel Save Changes

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	File-Based Backup and Recovery, Block <i>or</i> NFS
Percentage of Reserve Space in Volume Group	This is needed for LVM snapshot temporary space. Recommended value is 20%	Not applicable
Backup Capture Method	Use Volume Level Backup	Use full+incremental filesystem backup
Force Full Filesystem Backup	Not applicable	Use for an ad hoc full backup
Database Filesystem Staging Disk Size in GB	Not applicable	Use the default calculation: (database size * 1.5)+ 10%. The disks will grow dynamically.
Log Backup Staging Disk Size in GB	By default Actifio calculates this as daily log ge plus 20% buffer. Default is recommended. Providing a value will override the default calcu dynamically. This will become a fixed size	eneration * retention of log backup SLA ulation and the log disk will not grow
Retention of Production DB Logs in Days	This value is used to purge the log backup from Based on this setting the last data backup id v (CURRENT_TIMESTAMP, - the # days set) and data backup id. Default value is 0 days. With d backup will be purged.	m basepath_logbackup destination. vill be selected I the log will be purged older than the efault value all logs prior to last data
Script Timeout	The timeout value is applied to internal backup connector. The default value is recommended	o and recovery scripts called by

File-based backup also requires the dump schedule to be configured. See Setting the Schedule for Dumps on page 14.

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**.

	APPLICATION MANAGER	F	iter b	6.9	Appliances • Organizations •							America/New_York	1 admin
	Applications Consistency Groups	. 10	ogical G	roups	Active Images Workflows								
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	PROFILE NAME												nalisis ka
	FRIENDLY PATH	Θ		APP	LICA C TEMPLATE PROF	LE C	FRIENDL	HOST IP	HOST NA C	APPLIAN 0	TYPE 0	APP TYPE 0	PROTECTA
	SLA STATUS	1	0	mys	H 5467		mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Insta	MYSQLInsta	yes
-	Managed			-	Manage SLA								- 18
	Unmy ed			RIV		1	mysql_Jenkins	172.17.204.123	mysql_jenkins	DBS-Focal	MySQL Data	MYSQL	yes
- 20	1.		0	my	Access		mysql_jenkins	172.17.204.123	mysql_Jenkins	DB2-Local	MySQL Insta	MYSQLInsta	yes.
ħ4	Summer State		-	REA	Edit Organization Membership		marel leoklor	172 17 204 122	mural leaking	DB2 Local	Micol Data	MARCH	1005
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	Consistency Group			my	Manada Evolutions		mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Insta	MYSQLinsta	362
	Db2 Database	0		BU	Manage Expirations	Pro	mysal jenkins	172 17 204 123	mysal lenkins	DB2-Local	MySOL Data	MYSOL	ves
	Db2 Instance				Delete Application							A CONTRACTOR OF	1000
φ	Exchange		0	WF	Ignore Application	Pro	mysql_jenkins	172.17.204.123	mysql_jenkins	DBZ-Local	MySQL Data	MYSQL	yes

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

APPLICATION MANAGER Filter by A	opliances 👻 Organizations 👻		America/New_York	1 admii
Consistency Groups Logical Groups MANAGESLA State State	Active images Workflows nysqLjenkins mysqLjenkins Details & Settings			
TEMPLATE Choose a template	PROFILE Chocon a potitie	AudySIA.		
Database Inclusion Rule		○ Policies		
RULE All Databases		Snapshot 0		
TOTAL DATABASES 1		Direct to Dedup 0		
DATABASES INCLUDED 1	PRODUCTION	Direct to OnVault (0)		
INELICIBLE DATABASES 0		OnVault Replication 0		
Names and Antibut and Antib		Printee 10		

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

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

Application Deta	ils & Settings	O Settings Help 🔘
Application Name	Mysqld_5467	
APPLICATION TYPE	MYSQUInstance	
HOST	Mysql Jenkins	
HOST IP ADDRESS	172.17.204.123	
PATH	Mysqi_jenkins	
OPERATING SYSTEM	Linux	
APPLIANCE	DB2-Local	
APPLIANCE IP ADDRESS	172.16.201.174	
Settings		Reset All to Default
CONNECTOR OPTIONS		
PERCENTAGE OF RESERVE SP VOLUME GROUP	ACE IN 20	
BACKUP CAPTURE METHOD	Use volume level backup Use full+incremental backup	Reset to Default
-	1. Sec.	Construction of the second sec

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 12
- Disk Preference: LVM Snapshot with Change Block Tracking on Linux on page 13

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**.

1	DOMAIN MANAGER	Filter by	Appliances	Organizations •								Atte	rica/New	York 1	admin	
, M	Appliances Users Roles	Organizations	LDAP IN	Storage Pools	Storage Arrays Web	Certificate										
	FILTER BY	Hosts	-	-											+ ^	DD HO
	HOST NAME	-	/													
	filter by host name	+ hide filters	-	0								OW SELECTED (1)	0	6 m	25 -	1.44
	IP ADDRESS	- Search		4								W SELECTED (I)		× 100	2.5 *	1.6.8
	filter by IP address	B	ID	NAME 0	FRIENDLY PATH	APPLIANCE	٥.	IP	0	TYPE	9	OS RELEASE	0	VIRTU	JAL MA	ACHINE
	05		2261398	mysql_jenin_remote	mysql_jenkin_rem	DB2-Remote		172.17.204.123		Generic		3.10.0-327.el7.3	86	No		
8	For GS like Linux	8	2239973	mysql_jenkins	mysql_jenkins	DB2-Local		172.17.204.123		Generic		3.10.0-327.el7.a	86			
2	туре	• 0	1931910	mysql ev Edit		DB2-Remote		172.16.216.221		Generic				No		
М	select: ALL NONE	0	1926914	sybase_aut Edit O	rganizations	DB2-Remote		172.16.200.131		Generic		3.10.0-327.el7.	86	No		
ø	U vCenter		1839092	Sybase: Delete		DB2-Local		172.16.200.81		Generic		3.10.0-327.el75	86	No		

2. Set Staging Disk Format to NFS or to Block.

DOMAIN MANAGER Filter by Appliances Or	ganizations 🔻		America/New_Y
Appliances Users Roles Organizations LDAP	rage Pools Storage Arrays W	eb Certificate	
remote-rhel-2	Edit Host		
IP 172.16.201.207			
FRIENDLY PATH remote-thei-2	Name *	remote-rhel-2	
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	10 Address 1		
OS TYPE, Linux STACING DISK, BLOCK	IP Address	٥	
FORMAT		172.16.201.207	
	Description		
	Appliances*	bute to search Q	
			10
			1P
		DB5_Bugg	172.16.200.113
		DB2-Remote	172.16.200.243
		DB2-Local	172.16.201.174
	Host Type	Generic •	
	Staging Disk Format	Block +	
		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 14.

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**.

DOMAIN	MANAGER		Filter by	Appliance	Organizations *								Anv	etica/Nerie	york 1	admin	
Appliances	Users	Roles	Organizations	LDAP	Storage Pools	Storage Arrays Web	Certificate										
	FILTER BY		Hosts	-	-											+ A	DD HO
HOST NAM				/													
filter by h	iost name		4 hide filters		0							D 98	W SELECTED (1)	0	t. m.	25.4	(rt
IP ADDRES					line and								IN SCOLLES (I)	~	e 111		
filter by B	P address		8	ID	NAME 0	FRIENDLY PATH C	APPLIANCE	8	1P	0	TYPE	9	OS RELEASE	8	VIRTU	AL MA	ACHINE
05				2261398	mysql_jenin_remote	mysql_jenkin_rem	DB2-Remote		172.17.204.123		Generic		3.10.0-327.el7.	86	No		
First OS	like Linux		8	2239973	mysql_jenkins	mysgl_jenkins	DB2-Local		172.17.204.123		Generic		3.10.0-327.el7a	8 6			
TYPE			a	1931910	mysql ev Edit		DB2-Remote		172,16,216,221		Generic				No		
	INONE		0	1926914	sybase_aut Edit O	rganizations	DB2-Remote		172.16.200.131		Generic		3.10.0-327.el7>	86	No		
U vCenb	er		0	1839092	Sybase: Delete		DB2-Local		172.16.200.81		Generic		3.10.0-327.el73	86	No		

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

DOMAIN MANAGER Filter by Appliances Org	janizations 🔻		America/New_Y
Appliances Users Roles Organizations LDAP House Stor	rage Pools Storage Arrays W	/eb Certificate	
mysql_Jenkin_remote	Edit Host		
IP 172.17.204.123 FRIENDLY PATH myscal, lenkin, remote UNIQUE NAME myscal, lenkin, remote OS RELEASE 3.100-327.el7.x86_64 OS VERSION #1 SMP Thu Oct 29.17.29.29 EDT 2015 OS TYPE Linux STACING DISK BLOCK FORMAT SALARA	Name * Friendly Name IP Address *	mysqLjenkin_remote mysqLjenkin_remote 172.17.204.123	
	Description Appliances*	type to searchQ	
		APPLIANCE DB2 Brad	IP 172.16.200.113
		DB2-Remote	172,16.200.243
		DB2-Local	172.16.201.174
	Host Type	Block NFS	
	Staging Disk Format	Block	

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

Setting the Schedule for Dumps

File-based traditional backups require a database dump schedule. 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 MySQL application.

Replace "FIIIIII" as needed.

Example

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

4 Protecting a MySQL Database

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

This chapter includes:

Protecting a MySQL Database on page 15

Protecting MySQL Database Logs on page 17

Protecting a MySQL Database

To protect the database:

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

	APPLICATION MANAGER	Filter by	Appliances Organizations							America/New_Yo	rk 1 admin 🖇
1	Applications Consistency Group	is Logical Group	s Active Images Workflows								
	C clear all filters	Applicati	ons						+ ADD APPLICAT	TON + ADE	VIRTUAL MACE
	APPLICATION NAME	sen o	Type: MySQL Database O Type: MySQL Ins	tance							
	TEMPLATE NAME	Gype to search.	۹						SHOW SE	LECTED (1)	III 25 - C
		E AF	PPLICA 0 TEMPLATE 0 PROFIL	E 0	FRIENDL 0	HOST IP	HOST NA 0	APPLIAN 0	TYPE 0	АРР ТҮРЕ	PROTECTA
-	SLA STATUS -	1 0 m	n=14 \$467		mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Insta	MYSQLInsta	yes
83	Managed Utoma	O RM	Manage SLA		mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	yes
	-	0 0 00	Access		mysql_jenkins	172.17.204.123	mysql_]enkins	DB2-Local	MySQL Insta	MYSQLInsta	yes
M	ALL INONE		Edit Organization Membership		mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	yes
۲	Consistency Group	0 0 m	Import Onvault Images Manage Expirations		mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Insta	MYSQLInsta	yes
	Db2 Database	🗆 🦁 BU	Delete Application	Pro	mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	yes
ø	Db2 Instance Exchange	0 🦁 W	Ignore Application	Pro	mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	yes

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 MySQL Backup Method. Click **Apply SLA** or **Save Changes**.

Application Deta	ils & Settings	O Settings Help
Application Name	Mysqld_5467	
APPLICATION TYPE	MYSQUinstance	
HOST	Mysql_jenkins.	
HOST IP ADDRESS	172.17.204.123	
PATH	Mysql jenkins	
OPERATING SYSTEM	Linux	
APPLIANCE	D82-Local	
APPLIANCE IP ADORESS	172.16.201.174	
Settings		Reset All to Default
CONNECTOR OPTIONS		
PERCENTAGE OF RESERVE SP VOLUME GROUP	ACE IN 20	
BACKUP CAPTURE METHOD	Use volume level backup Use full+incremental backup	Reset to Default

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 MySQL Instance. You can use the MySQL Instance checkbox to filter the list. Select **Manage SLA**.

	APPLICATION MANAGER	Filter by Appliances Organizations	America/New_York 1 admin 🔺 😝
	Applications Consistency Gro	ups Logical Groups Active Images Workflows	
	clear all filters	Applications	+ ADD APPLICATION + ADD VIRTUAL MACHINES
	HOST NAME	Type: MySQL Database O Type: MySQL Instance	
	TEMPLATE NAME	hipe to search . Q	C) SHOW SELECTED (1) III 25 - C A
	PROFILE NAME		
	FRIENDLY PATH	APPLICA., C TEMPLATE PROFILE C FRIENDL., C HOST IP C HOST NA., C APPLIAN	○ TYPE ○ APP TYPE ○ PROTECTAB
	SLA STATUS	mysqLjenkins 172.17.204.123 mysqLjenkins DB2-Local	MySQLInsta MYSQLInsta yes
8	Managed Unmaged	RM Manage SLA mysqLjenkins 172.17.204.123 mysqLjenkins DB2-Local	MySQL Data MYSQL yes
	T	O my Access mysql_lenkins 172.17.204.123 mysql_lenkins DB2-Local	MySQLInsta MYSQLInsta yes
M	ALL INONE	Edit Organization Membership mysql_jenkins 172,17.204.123 mysql_jenkins DB2-Local	MySQL Data MYSQL yes
8	Consistency Group	mporc Onvault images mysqLjenkins 172.17.204.123 mysqLjenkins DB2-Local Manage Expirations	MySQL Insta MYSQLInsta yes

5. Under Database Inclusion Rule, click Edit.

MANAGE SLA	Manage Membership					
TEMPLATE DB2	Eligible Databases	led 💌)	Ineligible Datab Ineligible databases Management for one	ases cannot be included in DB2 Instance e of the following reasons:	
Database Inc	All databases selected below will be ex- to this DB2 instance. Databases added is capture (or snapshot) automatically.	cluded from data capture (to this instance after select	r shapshot) if a policy template is applied ing this option will be included in data	The database is a m The database was o type to search.	winder of a consistency group prested by an app-aware mount	
	type to search	Q, 🗋 5	IOW SELECTED (2)	1945 Contractor		
TOTAL DATABASE	8	DATABASES	0	U	DATABASES	ų.
DATABASES INCLUDED DATABASES EXCLUDED						
NELIGIBLE DATABASE	□ AUS					
					No Databases Found	
Edit	175 IND					

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 MySQL Database Logs

To enable and set up the MySQL database log backup:

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

DOMAIN MANAGER		Filter by	Appliance	Organizations *								Atte	Hica/New	yor 1	admin	
Appliances Users	Roles	Organizations	LOAP	Storage Pools	Storage Arrays Web 0	Certificate										
FILTER BY		Hosts	-	-											+ AL	DD H
HOST NAME			/													
filter by host name		+ Nide filters		0							D 98	W SELECTED (1)	0	s mi	25.4	
IP ADDRESS				~								AN ACCECTED (1)	~			
filter by IP address		B	ID	NAME 0	FRIENDLY PATH	APPLIANCE	0	1P	0	TYPE	0	OS RELEASE	0	VIRTU	AL MA	CHIN
05			2261398	mysql_jenin_remote	mysql_jenkin_rem	DB2-Remote		172.17.204.123		Generic		3.10.0-327.el7.>	86	No		
For OS like Linux		8	2239973	mysqLjenkins	mysql_jenkins	DB2:Local		172.17.204.123		Genetic		3.10.0-327.el7.	¢86	No		
туре		0	1931910	mysql ev Edit		DB2-Remote		172,16,216,221		Generic				No		
select ALC NONE		0	1926914	sybase_aut Edit Or	ganizations	DB2-Remote		172.16.200.131		Generic		3.10.0-327.el7>	86	No		
D vCenter		0	1839092	Sybase Delete		DB2-Local		172.16.200.81		Generic		3.10.0-327.el73	86	No		

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

SLA ARCHITECT	Filter by	Appliances 👻	Organizations 🗢		
Tempidies Profiles					
TEMPLATE -	Logsmart Snap		ALLOW OVERHIDES ON PO	LICY SETTINGST. * YES ID NO	Save Template
DESCRIPTION	Description				
	ſ	PEODUCTION	0		Policies control contro control control control control control c
	0		9 10	ò	Edit Policy

3. Near the bottom, select **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.

	Prod	Policy Settings
	Create/Edit i	Televice Attyrunce Log AFTER BACKUP
	POSICY MARK	SKIP GRPLINE APPLICATIONS
C. B. Handler	ECHEDUCHIC	(i) Ship office applications during barlists
Q/Poucies		MAP STACING DISK TO ALL ESK HOSTS IN A CLUSTER
A search to a	OR THESE	and the start starting status for the start for starting
		O they shaping disk in all FDC funds in the sharing
	(emp)	of the sub-box of the instantial terms
Deductio)	WITHIN T	ALLOW MICHARINE FROM DUT OF BAND TO IN BAND DATA MOVEMENT
		0 W
Average 10	- TUN ONG	
	(III)	* NO
		Q 110
		BACKUP SOL SERVER USER LODINS
	PROPERTY	0.777
		ENABLE DATABASE LOC BACKUP
		60 MG
		* 105

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

	APPLICATION MANAGER	Filter by Appliances • Organizations •			America/News_York 1 admin 🔺 😝
	Applications Consistency Group	25 Logical Groups Active Images Workflows			
		Applications			+ ADD APPLICATION + ADD VIRTUAL MACHINES
	APPLICATION NAME				
	HOST NAME	• Type MySQL Database O Type MySQL Instance			
	TEMPLATE NAME	Appello scards			D SHOW SELECTED (1) III 25 - 11 4
	PROFILE NAME				
	FRIENDLY PATH	APPLICA O TEMPLATE O PROFILE O	FRIENDL., O HOST IP	HOST NA C APPLIAN C	TYPE O APP TYPE O PROTECTAB
	SLA STATUS -	8 mys=1d 5467	mysql_jenkins 172.17.204.1	23 mysql_jenkins DB2-Local	MySQLInsta MYSQLInsta yes
8	Managed	8 RM Manage SLA	mysql_jenkins 172.17.204.1	23 mysql_jenkins DB2-Local	MySQL Data MYSQL yes
	Ter -	C O my Access	mysql_jenkins 172.17.204.1	23 mysql_Jenkins DB2-Local	MySQLInsta MYSQLInsta yes
М	ALL INONE	Edit Organization Membership	mysql_jenkins 172.17.204.1	23 mysql_jenkins DB2-Local	MySQL Data MYSQL yes
۲	Consistency Group	Import OnVault Images	mysql_jenkins 172.17.204.1	23 mysqi_jenkins DB2-Local	MySQLInsta MYSQLInsta yes
-	A CONTRACTOR OF		1. 1. 1. Sales and 3.	255 0.000000 22200 02	7210773 707707

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 MySQL 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 MySQL Instance. Select **Manage SLA**.

PPUCATION MANAGE	Filter by Ap	oliances Organizations			America
MANAGE SLA	Manage Membersh	Artive Images Workflows			
	Manage Membersh	þ			
TEMPEATE DB2	Eligible Databases	Selected 🔹	Ineligible Ineligible da	Databases atabases cannot be included in DB2 Instance	
	All databases selected below wi	i be excluded from data capture (or snapsh	ot) if a policy template is applied • The data	nt for one of the following reasons: abue is a member of a consistency group	
Database Inc	capture (or snapshot) automatic	ally.	the design of the design	abase was created by an app-aware mount	
1000	type to search	Q, 🛛 SHOW SE	LECTED (2)	score a	2
TOTAL DATABASE	Θ	DATABASES	0	DATABASES	v.
DATABASES INCLUDEL DATABASES EXCLUDEL	🖾 TEST				
INELICIBLE DATABASE	🗆 AUS				
	ENG ENG			No Databases Found	
Edi	E ND				

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

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 and Recovering a MySQL Database

This section describes:

Mount and Refresh from Block-Based Volume Snapshot to a Target MySQL Instance as a Virtual Application on page 21

Restoring and Recovering a MySQL Database on page 24

- o Recovering from Volume based Snapshot on page 24
- o Recovering from a Full+Incremental Backup on page 26

Mount and Refresh from Block-Based Volume Snapshot to a Target MySQL 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.

APPULATION MANAGE	<u>ا</u>	F	itter by	Appliances 🕈	Organizati	ons 🕶							America/New_York	x 💶 admin	
Applications Consistence	y Groups	LO	gical G	roups Active Im	eges Workflows										
Clear all filters	Î	Ap	plica	ations							+ ADD APP	LICATIC	DN + ADD	VIRTUAL MA	CHINE
APPLICATION NAME															
HOST NAME	•	+ hide	fitters	O Six Managed	O Type: MySQL C	atabase O Type	MySQL instance								
TEMPLATE NAME	•	time	hisia	erh.	0						CT 594	nw set t	ECTED (2)	111 25 -	11
PROFILE NAME	•	itte.			-								cereo (a)		
FRIENOLY PATH		Ξ		APPLICA., 0	TEMPLATE O	PROFILE 0	FRIENDL 0	HOST IP	HOST NA 0	APPLIAN 0	TYPE	0	АРР ТҮРЕ 0	PROTEC	TAB
SLA STATUS		0		BUG2	mysgl strea	Remote Pro	mysgl jenkins	172.17.204.123	mysgl jenkins	DB2-Local	MySQL Dat	a	MYSOL	ves	
Managed		-	-	100	10.17.2							_			
Unmanaged	-1	8		DB1			mysql_jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Dat		MYSQL		
TYPE				D82	Manage SL	A	al_jenkins	172.17.204.123	mysql_Jenkins	DB2-Local	MySQL Dat	a.,	MYSQL	no	
Select: ALL NONE				DB3	Access		Jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Dat	a	MYSQL	no	
DOIS					Edit Orano	Instion Member	bio								





- 3. On the Mount page, from Target, choose the desired target MySQL 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 by	Appliances Organizations	
Consistency Groups Logical Gro	ips Active Images Workflows	
🕞 🚺 mysqld_541	1 mysqLjenkins mysqLjenkins Details & Settlings	
2019-10.07 10/2027	Mount	
Sistepshot image		
NAME image 1977312	TARGET.* LABEL	
STATUS Available	mysqt jenkins 👻	
TRANSPORT SAN Based, Out Of Band Storage		
IMAGE SIZE 11.00CB	 Application Options 	
EXPIRES ON: 2019-10-09 15:38:09		
APPLIANCE DE2-Local RECOVERY 10.07 16 32 To 10.07 16 37	CREATE NEW VIRTUAL APPLICATION	
RANGE	INCLUDED DATABASES	Database Optinos * are mandatory
SATALOG STATE None	type to search Q	SHOW SELECTED (1)
POOL NAME: Act_per_pool000	G SELECT ITEMS	
Mount -		ر مەمىيە مەمىيە مەمىي
	S DB7	Database Options
	DB8	
	ROLL FORWARD TIME	2019-19-07 0 16:37:34 # HOST TIME @ USER TIME
	MYSOL TARGET SERVER PORT *	
	MYSQL TARGET OS USER NAME *	
	MYSQL TARGET SERVER BASE DIRECTORY *	
	MANACE NEW ADDI ICATION	

Selecting a Single Database

APPLICATION M	IANAGER Filter by	Appliances 🕈 🛛 O	ganizations *		
Applications	Consistency Groups Logical G	roups Active Images 1	Vorkflows		
ACCESS	💙 🦁 mysqld_S	411 mysql_jenkins mysq	Jenkins Details & Settle	igs .	
-	A CONTRACTOR OF THE OWNER	Mount			
	0-07 15/32/27 IOC Imaige	0.015.010.000			
COLOR INVESTOR		TARGET*		LABEL	
NAME In	nage_1977312	distance of the second s	A 100 100 100 100 100 100 100 100 100 10		
TRANSPORT S	AN Reced Out Of Rand	uixed [*] is	nkns V		
St	torage				
IMAGE SIZE 1	1.00GB	▼ Appli	ation Options		
EXPIRES ON 2	019-10-09 15:38:09				
APPLIANCE D	B2-Local	CREAT	E NEW VIRTUAL APPLICAT		
RANGE	0-07 16:32 10 10:07 16:37	INCLU	DED DATABASES		Database Options * are mandatory
CATALOG STATE N	one	type	to search	Q,	SHOW SELECTED (2)
POOL NAME A	ct_per_pool000				
Mot	int -	E	SELECTTIEMS		
		8			Database Options
		8	DB8		Database Options *
		ROLL	ORWARD TIME	III (2019-10-07) €	(163734) # HOST TIME @ USER TIME
		NAME	OF CONSISTENCY GROUP	1 I I I I I I I I I I I I I I I I I I I	
		MYSQ	TARGET SERVER PORT *		
		MYSO	TARGET OS USER NAME		
		MYSQ	TARGET SERVER BASE DI	RECTORY *	

Selecting Multiple Databases

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

APPLIGATION MANAGER Filter	by Appliances▼ Organizations▼	Ame	nisa/New_York 1 admin 🔺 🚱
Applications Consistency Groups Logical	Groups Active Images Workflows		
G ACCESS 🔹 🔮 mysqld	.5411 mysql_jenkins mysql_jenkins Details & Settings		TIMELINE TABLE
2019-10-07 15:32:27 Snapshot Image	Mount		
NAME Image_1977312 STATUS Available TRANSPORT SAN Based, Out Of Band Storage	TARCET* LABEL		
IMAGE SIZE 11.00GB	 Application Options 		
EXPIRES ON 2019-10-09 15:38:09 APPLIANCE DB2-Local RECOVERY 10-07 16:37 PANYS	CREATE NEW VIRTUAL APPLICATION	Database Options * are mandatory	
CATALOG STATE None	type to search		
POOL NAME Act_per_pool000			
S Mount -	DB7	Database Onlines	
8	DB8		
ee L	ROLL FORWARD TIME	■ 2019-10-07 • 1637:34 • HOST TIME © USER TIME	
	MYSQL TARGET SERVER PORT *		
•	MYSQL TARGET OS USER NAME *		
	MYSQL TARGET SERVER BASE DIRECTORY *		
	MANAGE NEW APPLICATION		
.acar	TEMPLATE *	Myset_CBT_purge	
	PROFILE *	Remote 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.

MySQL TARGET SERVER PORT: Enter the port number on the target server where a new MySQL Instance will get created for the new child databases.

MySQL TARGET OS USER NAME: Enter the name of the operating system user on the target server where a new MySQL Instance will get created.

MySQL TARGET SERVER BASE DIRECTORY: Enter the path to the base directory where the configuration files for MySQL Instance on the target server are stored.

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.
- (Optional) Under Advanced Options, enter login credentials (username and password) for the target MySQL Instance that will be created. If you do not specify anything, empty database credentials will be used. For the directory path, enter the path to the messages directory for the MySQL Instance on the target server.
- 9. Under Mapping Options, Mount Location, select a storage pool and specify a target mount point to mount the new virtual database to.
- 10. Click **Submit**.

Restoring and Recovering a MySQL Database

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

Recovering from Volume based Snapshot on page 24

Recovering from a Full+Incremental Backup on page 26

Recovering from Volume based Snapshot

Use this procedure to restore and recover the source MySQL 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.

Applications Consistency Groups Logical Groups	Active Images Workflows	
🔆 🔁 😯 mysqld_5411 m	sqLjenkins i mysqLjenkins Details & Settings	TIMELINE TAILL
2019 10 07 15 92 27	Restore	
Snapshot image	Use this page to initiate a restore operation. A restore will take the existing databases offline and overwrite their data file	5
NAME Image_1977312		
STARUS Available	ROLL FORWARD TIME BUSER TIME USER TIME	
TRANSPORT SAN Based, Out-Of-Band Storage	P	
IMAGE SIZE: 11.00GB	(6.3210) (6.3210	
EXPIRES ON 2019-10-09-15-38-09		2)
APPLIANCE DB2-Local	SELECT ITEMS	
RECOVERY 10-07 16:32 To 10-07 16:37 RANCE		
CATALOG STATE None		
PODLNAME Act_per_pool000		
Restore -	RESTORE WITH RECOVERY	
		_
	Cancel Submit	

- 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 MySQL 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 MANAGE	R	F	iter b	Appliances ¥	Organizatio	ons 💌						America/New_Yo	ĸ 1 admin 🔺 🗧
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Select: ALE NONE				DB3	Access		Jenkins	172.17.204.123	mysql_jenkins	DB2-Local	MySQL Data	MYSQL	no
DIGES				100 100 100 100	Edit Organi	zation Members	bio						

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

Consistency Groups Logical Groups Active Images Workflows	
CCCSS Mysqld_5411 mysql_jenkins mysql_jenkins Details & Settings	TIMELONE TABL
hump to: 📾	2019-40-07: 15:32:27 Snaeshot Image
and total	NAME_Image_1977312
	STATUS Available
(AP(2-15)A)	TRANSPORT SAN Based, Out-Of-Ban Storage
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- 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 MySQL recover commands.