MariaDB DBA's Guide to Actifio GO

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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 GO* and who are qualified to administer MariaDB 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 Actific Copy Data Management for MariaDB Databases

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.

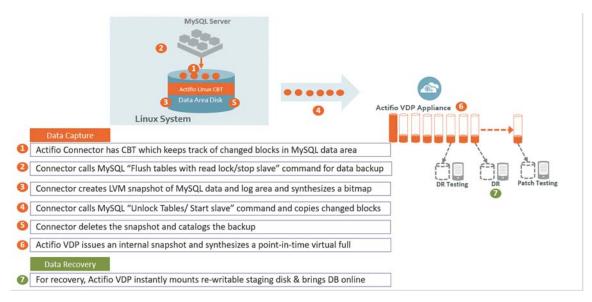
This DBA guide explains how to protect MariaDB application consistent database data with Actifio VDP in a Linux environment.

MariaDB Backup API used by Actifio VDP

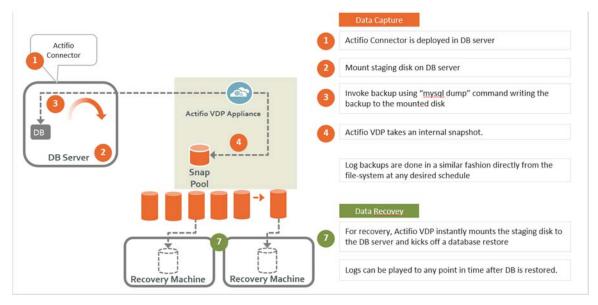
Linux CBT and LVM snapshot: MariaDB "FLUSH TABLES WITH READ LOCK" and "UNLOCK TABLES" API

File-based backups: MariaDB "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.

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



How It Works: MariaDB with Linux CBT and LVM Snapshot



How It Works: MariaDB with File-Based Traditional Backup

2 Adding a MariaDB Database Host & Discovering the Database

Prerequisites

- The MariaDB 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.
- The LVM volume from which the MariaDB volumes are provisioned should have at least 20% free space.
- Install the Actifio Connector on the MariaDB server host (see Network Administrator's Guide to Actifio VDP.)
- Create a backup user with the privileges RELOAD, SELECT, LOCK TABLES, and SUPER (or) REPLICATION CLIENT. Backup username/password must be configured with host configuration.

To create the backup user:

```
create user actuser identified by 'actpasswd';
GRANT SELECT on *.* TO actuser;
GRANT RELOAD on *.* TO actuser;
GRANT LOCK TABLES on *.* TO actuser;
GRANT SUPER on *.* TO actuser;
GRANT REPLICATION CLIENT on *.* to actuser;
SHOW GRANTS FOR CURRENT_USER;
```

Note: If there are multiple MariaDB instances running on a server, then the backup username/ password must be common for all MariaDB instance running on that server.

• MariaDB binary logging (log_bin) must be on to take log backup. To configure the binary log option, shut down the MariaDB 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 MariaDB Database Host and Discovering the Database

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

- 1. Adding the Host on page 4
- 2. Discovering the MariaDB Instance from the App Manager on page 6
- 3. Finding the Discovered Instances and Databases in the App Manager on page 7

Adding the Host

Add the host to AGM. If the host is already added then edit the host and make sure to set all the configurations correctly.

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

actifio	Dashboa	rd	Backup & Recover 🗸	Test	Data Management 🗸	Арр	Manager 🗸	SLA Architect	 Manage - 	Report	Monitor 🗸				Υ.	L adm	in 🌲	1 😯
FILTER BY	Î	Но	sts													(+ AD	d host
HOST NAME	•															_		
filter by host name			e filters e to search		Q										a	m 3	5	0 4
IP ADDRESS	•				~										N.	111		
filter by IP address			NAME	¢	FRIENDLY PATH	0	APPLIANCE	0	IP	0	TYPE	Ŷ	OS RELEASE	0	VIRT	UAL M	ACHIN	.E
OS RELEASE	•		Vca5.5c2		VCA5.5C2		CDS139-C2	5KY8.0-226	172.17.139.151		vCenter				No			
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 S	5e	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 **Staging Disk Format**:
 - 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**

actifio	Dashboard	Backup & Recover 🗸	Test Data Management	👻 App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸		🝸 👤 admin	۹
	IP 172.16.216.	db2-autovm2		Edit Host							
UNIQUE N OS RELE OS VERS	AME db2-autovm AME db2-autovm AME Red Hat Ent ANN 3.10.0-862.4 YPE Linux DISK BLOCK	12 12_1670893_null terprise Linux Server release	7.5	Name * Friendly Name IP Address *	db2-auto db2-auto 172.16.2	vm2	0				
				Description Appliances*		search PPLIANCE 9y905 If-source y9_caf_auto		٩	IP 172.17.202.11 172.17.206.77 172.17.206.76		
				Host Type Staging Disk Forma	Block		v)			

6. In Application Discovery Credentials, enter the username/password that you set up in Prerequisites on page 3.

	Host Type	
	Generic 👻	
	Staping Disk Format	
	Block v	
	Enable Auto Discovery	
	Use Oracle Database Authentication	
	Must be imabled for hosts running Microsoft Windows.	
	▶ Ports	
0	Application Discovery Credentials	
	User Name	
	actuser	
	Password	
	annual contract of the second s	
C C		
	Password Filepath	
	Connector Settings	
	Discovered Applications	
	Organizations	
		Cancel Save

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

Discovering the MariaDB Instance from the App Manager

To discover the MariaDB instance:

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

actifio	Dashboa	urd	Bac	ckup & Recover 🗸	Test Data Management 🗸	App Manager +		SLA Architect 🗸	м	anage 🖌 🛛 R	eport	Monitor 🗸			۲.	admin	4 ¹	?
FILTER BY	Â	A	ppl	lications										(+ ADD AF	PLICAT	ION
APPLICATION NAME	•																	_
HOST NAME	•	•	hide filt	ters														
TEMPLATE NAME	•	ty	rpe to	search	Q												25 🗸	*
PROFILE NAME	•						~		0		~				•	-		
FRIENDLY PATH	•			APPLICATIO	м 0	TEMPLATE	0	PROFILE	~	FRIENDLY	Ŷ	HOST NAME	GROUP	APPLIANCE	٥	TYPE		٥
SLA STATUS	•			C/										CDS139-C2		File Sys	<i>l</i> em	- 1
Managed Unmanaged				SanjanaConG	rp									rdsrc		Applica	cionGro	que
TYPE	•			/act/mnt/Job	_2554:oint_155803176436	8 Snapshot		LocalProfile		LinX6.8-VM	1	linx6.8-vm1	aw-fs2	SKY8.0-226		File Sys	æm	
Select: ALL NONE				🔋 👌 floop_des	iktop					c\ClusterSt	ora	floop_desktop		SKY8.0-226		Microso	ft Hype	e
Systems				Mailboy Data	hace 00/00/82010					W260E40.2	44	W260510 211		CVV0 0 224		Exchan	-	

2. On the Add Application page, select **MariaDB**, then select the MariaDB 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.

	actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸	Y	💄 admin	٠
--	---------	-----------	--------------------	------------------------	---------------	-----------------	----------	--------	-----------	---	---------	---

Select the type of application you wish to Add or Protect

Tip: Hover on the icon for more information. To learn how to trigger an on-demand backup for an already protected application click here.

	IBM DB2 Db2	MorioDB MariaDB	● DB MongoDB	MysqL	ORACLE	Generic Apps
Servers & Applications (Connectors required)	PostgreSQL	SAP ASE	SAP HANA	SAP IQ	SAP MaxDB	Consistency Groups
	SQL Server					R All Apps

3. Select the host and click **Next** in the bottom right corner. This will run the discovery on the MariaDB host and will discover all MariaDB instances and databases running on it.

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸		🝸 👤 admin
		Generic App	o (LVM) Onboardi	ng Disc	tover S	2 elect	3 Manage	4 Configure	5 Finish	
		Select the logical vo	lumes to be protected and pr	rovide an application	name					
		Application Name *	MyNewDb2			Host Name	sybase-qavm1			
						os	Linux			
		Select the Logical Vo	lumes to be captured *							
		type to search	۵.)						show selected (1)	
			OLUME NAME		SOU	RCE PATH				
		syb_log/syb			/syb_				A	
		syb_home/s	yb_home		/syb_	_home				
		syb_data/sy	b_data		/syb_	_data				
		Generic LVM script n	ame genlvmscript.sh		LVM snaj	pshot reserve :	space * 20	%		

Finding the Discovered Instances and Databases in the App Manager

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

actifio	Dashboa	ard	Backu	ip & Recover → Te	st Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🖌 🛛 Repor	t Monitor -		Υ.	L admin 🌲 😲
🙁 clear all filter	rs í	A	pplic	ations								+ ADD APPLICATION
APPLICATION NAME	•											
HOST NAME	•		ide filters	Application Type:	MariaDB Database	Application Type: Maria	DB Instance					
TEMPLATE NAME	•				٩							25 🗸 🛓
PROFILE NAME	•											
FRIENDLY PATH	•			APPLICATION O	ID	TEMPLATE 🗘	PROFILE 0	FRIENDLY P 0	HOST NAME 🗘	APPLIANCE 🗘	ТҮРЕ 🗘	APPLIANCE A
SLA STATUS	•		0	LVMNT2	1782897			maria_2	maria_2	sky9_caf_auto	MariaDB Datab	1444878
Managed Unmanaged			0	BUG1	1772546			maria-1	maria-1	sky9_caf_auto	MariaDB Datab	1417057
ТҮРЕ	•		۲	DIR333	1677033			maria_2	maria_2	sky9_caf_auto	MariaDB Datab	1258410
Select: ALL NONE			0	DB99	1879781			j-maria-1	j-maria-1	caf-source	MariaDB Datab	419465
Systems Hyper-V VM			٥	CGDB32	1879757	onvault_slt_325	onval_autoprofi	j-maria-1	j-maria-1	caf-source	MariaDB Datab	327947
System State			0	CGDB12	1879755	onvault_slt_325	onval_autoprofi	j-maria-1	j-maria-1	caf-source	MariaDB Datab	327945
Databases			٥	FMO2	1682621			maria-1	maria-1	sky9_caf_auto	MariaDB Datab	1262606
🗖 Db2 Database			0	DIR222	1677168			maria_2	maria_2	sky9_caf_auto	MariaDB Datab	1258508
Db2 Instance			8	DIR222	1664892	Maria_CBT	LocalProfile	maria-1	maria-1	sky9_caf_auto	MariaDB Datab	1246958
MariaDB Databas			•	DINELL	1004892	Maria_CD1	Locaterofile	India.1	India-1	skys_car_auto	Mariabo Datab	1240330
MariaDB Instance				AUTODB2	1880661					caf-source	MariaDB Datab	211912
MySQL Database			0	LVMNT1	1782855			maria_2	maria_2	sky9_caf_auto	MariaDB Datab	1444641

3 Configuring the MariaDB Backup Method

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

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

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

Whichever method you select involves these steps:

- Application Details & Settings on page 10
- 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

Table 1: Application Details & Settings

Setting	Block-Based LVM Snapshot with CBT on Linux	File-Based Backup and Recovery, Block <i>or</i> NFS
Use Staging Disk Granularity as Minimum Staging Disk Size	periodically grow this new option Because the staging disk is thin pr disk that is larger than required fo	e size of granularity setting that tend to is useful to avoid frequent costly FULL backups. ovisioned, there is no initial cost to use a staging r immediate use. aging Disk Granularity setting for Yes.
Staging Disk Granularity	Maximum size of each staging dis application. The default value is 10	k when multiple staging disks are used for an 100GB.
Last Staging Disk Minimum Size		lisk created for an application with multiple ed for additional disks allocated to It value is 250GB.
Connector Options	Use this only under the direction o	f Actifio Support.
Percentage of Reserve Space in Volume Group	20% is recommended for LVM snapshot temporary space. Not applicable for protecting virtual databases.	Not applicable
Backup Capture Method	Use volume level backup	Use full+incremental filesystem backup
Database Filesystem Staging Disk Size in GB	Not applicable	Size of the database dump staging disk in GB. Use the default calculation: (database size * 1.5)+ 10%. Disks will grow dynamically.
Log Backup Staging Disk Size in GB	SLA plus 20% buffer. Default is reco	default calculation and the log disk will not grow
Retention of Production DB Logs in Days	Based on this setting the last data - the # days set) and the log will b	backup from basepath_logbackup destination. backup id will be selected (CURRENT_TIMESTAMP, be purged older than the data backup id. Default all logs prior to last data backup will be purged.
Script Timeout	The timeout value is applied to int connector. The default value is rea	ernal backup and recovery scripts called by commended.

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

actifio Dash	board	В	ackup	& Recover	 Test D 	ata Management	App	Manager	 SLA Archite 	•ct v	Manage 🗸	Report Monitor	•		🝸 👤 adır	in 🌲 🤇	3)
clear all filters	Î	Арр	olica	tions											+ ADD	APPLICATI	101
APPLICATION NAME																	
HOST NAME		hide f	filters	SLA: Ur	managed	Application Type	MariaDB D	latabase	O Application Ty	pe: Ma	riaDB Instance						
TEMPLATE NAME						Q										25 🛩	L
PROFILE NAME																	-
FRIENDLY PATH		Ξ		APPLICA	TION		>	ID	TEMPLATE	¢	PRO 🗘	FRIENDLY PA 🗘	HOST NAME 🗘	APPLI 🗘	TYPE 🗘	APPLIA.	
SLA STATUS 🔫		Ø	0	mariadb_	2410		187	79809				j-maria_2	j-maria_2	caf-source	MariaDB Instance	566562	
Managed Unmanaged	I.		0	mariadb_	Manage	SLA		3338				maria_2	maria_2	sky9_caf	MariaDB Instance	1157318	8
ТУРЕ •			0	mariadb_	Access			9795				j-maria_2	j-maria_2	caf-source	MariaDB Instance	566555	
Select: ALL NONE			0	mariadb_		anization Mem		7166				maria_2	maria_2	sky9_caf	MariaDB Instance	1258506	6
					Import C	nVault Images						1 2	Level A			507544	

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 🗸	١	🖌 👤 admin 🗳	¢ 😯
CHANAGE SLA	• •	mariadb_3410 j-maria_	2 j-maria_2 Details & Seti	ings							
TEMPLATE Che	oose a template		PROFILE Choose a	profile							
Database In	clusion Rul	e					(Policies			

This opens the 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

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 simple mount back to the same host.

Application Details & Settin	ngs	O Settings Help	0
Settings		Reset All to Default	î
USE STAGING DISK GRANULARITY AS MINIMUM STAGING DISK SIZE	🔿 Yes 💿 No		
STAGING DISK GRANULARITY (GB)			
LAST STAGING DISK MINIMUM SIZE			
CONNECTOR OPTIONS			
PERCENTAGE OF RESERVE SPACE IN VOLUME GROUP	20		
BACKUP CAPTURE METHOD	 Use volume level backup Use full+incremental backup 		
DATABASE FILESYSTEM STAGING DISK SIZE IN GB			
LOG BACKUP STAGING DISK SIZE IN GB			-

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:

- Staging Disk Format: File-Based Traditional Backup and Recovery in NFS/Block on page 12
- Staging Disk Format: LVM Snapshot with Change Block Tracking on Linux on page 13

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

To set staging disk format for storage snapshots:

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

actifio	Dashboa	ırd	Backup & Recover 🗸	Test	Data Management 🗸	Арр	Manager 🗸	SLA Architect 🗸	Manage +	Report	Monitor 🗸			Y 1	admin 🐥	8
🙁 clear all filter	s	Но	osts												+ ADD I	HOST
HOST NAME	•															
filter by host name		4 hid	e filters O Host Type: 0	Generic												
IP ADDRESS	•	j-m			ø								SHOW SELECTED (2)	Q I	I 25 ♥ []	: *
filter by IP address			NAME	٥	FRIENDLY PATH	\diamond	APPLIANC	e û	IP	0	TYPE	0	OS RELEASE	VIRT	UAL MACHIN	IE
DS RELEASE	•	₽	j-maria-1		j-məria-1		caf-source		172.17.202.7		Generic		Red Hat Enterprise Lin	No		
Enter OS like Linux			j-maria_2		j-n Edit		ource		172.16.201.214		Generic		Red Hat Enterprise Lin	No		
OS TYPE	-		j-maria_auto1		j- <mark>n</mark> Edit Organiz	ations	ource		172.17.202.7		Generic		Red Hat Enterprise Lin	No		
Enter OS like Linux	_		j-max_auto1		j- <mark>n</mark> Delete		ource		172.16.201.191		Generic		Red Hat Enterprise Lin	No		
FYPE Select: All NONE	Ť		j-mysql-1		j-mysql-1		caf-source		172.17.204.123		Generic		Red Hat Enterprise Lin	No		
Generic			j-mysql-2		j-mysql-2		caf-source		172.17.205.128		Generic		Red Hat Enterprise Lin	No		
vCenter ESX Server			maria-1		maria-1		sky9_caf_a	ito	172.17.202.7		Generic		Red Hat Enterprise Lin	No		

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

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage +	Report	Monitor 🗸		T 1
		J_HANA		Edit Host						
UNIQUE N OS RELE OS VERS	ION 4.12.14-94. YPE Linux NSK BLOCK	75766_null Enterprise Server 12 SP4		Name * Friendly Name IP Address *	J_HANA J_HANA 172.17.2	205.80	0			
				Description Appliances*	type to	search		Q		
						PPLIANCE y9_caf_auto			IP 172.17.206.76	
				Host Type	Generic		٣			
				Staging Disk Format	Block		•			
				Enable Auto Discove	ery					

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

Staging Disk Format: LVM Snapshot with Change Block Tracking on Linux

To set staging disk format for storage snapshots:

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

actifio	Dashboa	rd I	Backup & Recover 🗸	Test	Data Management 🗸	App N	Aanager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸			Y	1 ac	lmin -	4 (?
🙁 clear all filter	s î	Но	sts													+ ^	NDD HO	OST
HOST NAME	•																	
filter by host name		< hide	filters O Host Type:	Generic														
P ADDRESS	-	j-m			Θ							SHOW SELECTED (2		g	Ш	25 🗸	0	*
filter by IP address		Ξ	NAME	٥	FRIENDLY PATH	0	APPLIANCE	0	IP	0	TYPE	\$ OS RELEASE	\diamond	V	IRTU/	AL MAC	HINE	
DS RELEASE	•	Ø	j-maria-1		j-məria-1		caf-source		172.17.202.7		Generic	Red Hat Enterprise I		N				
Enter OS like Linux			j-maria_2		j-n Edit		ource		172.16.201.214		Generic	Red Hat Enterprise I	.in	N	0			
OS TYPE	•		j-maria_auto1		j-n Edit Organiz	ations	ource		172.17.202.7		Generic	Red Hat Enterprise I	.in	N	0			
Enter OS like Linux	_		j-max_auto1		j-n Delete		ource		172.16.201.191		Generic	Red Hat Enterprise I	.in	N	0			
ТҮРЕ	•		j-mysql-1		j-mysgl-1		caf-source		172.17.204.123		Generic	Red Hat Enterprise I	.in	N	0			

^{2.} Set Staging Disk Format to **Block**.

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸		T 1
		J_HANA		Edit Host						
UNIQUE N OS RELI OS VER OS STAGING	IP 172.17.205. PATH J_HANA AME J_HANA_17 EASE SUSE Linux SION 4.12.14-94.4 TYPE Linux DISK BLOCK	5766_null Enterprise Server 12 SP4		Name * Friendly Name IP Address *	J_HANA J_HANA 172.17.	205.80	0			
				Description Appliances *	type to	search		Q		
						PPLIANCE			IP 172.17.206.76	
				Host Type	Generic		٣			
				Staging Disk Formal	Block		*			
				Enable Auto Discove	ery					

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

4 Protecting a MariaDB Instance and its Logs

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

This chapter includes:

Protecting a MariaDB Database on page 15 Protecting MariaDB Database Logs on page 17

Protecting a MariaDB Database

To protect the database:

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

actifio	Dashboa	rd	Backup	o & Recover	👻 Test I	Data Manag	ement 🗸	App Ma	nager 🖌 🛛 SLA	Architect 🗸	Manage 🗸	Report	Monitor 🗸				▼ 👤 admin 4	. 0
 clear all filters 	Î	Ap	plica	ations													+ ADD APPL	ICATION
APPLICATION NAME	•																	
HOST NAME	•	< hid	e filters	O Applica	ation Type: D	2 Database	O Appl	ication Type:	Db2 Instance									
TEMPLATE NAME	•					c									SHOW SELE	CTED (1)	25 ₩	0 4
PROFILE NAME	•																	
FRIENDLY PATH	•	Ξ		APPLICA	ATION	O HOS	T IP	0	HOST NAME	0	GROUP		APPLIANCE	0	TYPE	0	APP TYPE	0
SLA STATUS	•		8	gpfsi1		172	27.58.13		ndmlpar3				weekly10c		Db2 Instance		DB2Instance	
Managed Unmanaged		Ø	0	db2ina.		172	16.201.25	-	OracleDBNik	e			weekly10c		Db2 Instance		DB2Instance	
ТҮРЕ	•		۲	SYSTST	Manage S	SLA			stcent76db2	2			weekly10c		Db2 Database		DB2	
Select: ALL NONE			8	db2insl	Access				OracleDBNik	e			weekly10c		Db2 Instance		DB2Instance	
Systems			8	PRODE	Edit Orga			hip	stcent76db2	2			weekly10c		Db2 Database		DB2	
System State			8	ACTDB	Import O	nVault Im	iges		stcent76db2	2			weekly10c		Db2 Database		DB2	





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

Application Details & Settin	gs	Settings He	lp	
Settings			Reset All to Default	
USE STAGING DISK GRANULARITY AS MINIMUM STAGING DISK SIZE	🔿 Yes 💿 No			
STAGING DISK GRANULARITY (GB)				
LAST STAGING DISK MINIMUM SIZE (GB)				
CONNECTOR OPTIONS				
PERCENTAGE OF RESERVE SPACE IN VOLUME GROUP	20			
BACKUP CAPTURE METHOD	 Use volume level backup Use full+incremental backup 			
DATABASE FILESYSTEM STAGING DISK SIZE IN GB				
LOG BACKUP STAGING DISK SIZE IN				
		Cancel	Save Changes	

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

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

actifio	Dashboa	rd	Backu	p & Recover 🗸	Test Data	Management 🗸	App Mar	ager 🖌 SLA	Architect 🗸	Manage 🗸	Report	Monitor 🗸				▼ 👤 admin 🎝	₽ (2)
⊗ clear all filters	Î	Ap	oplic	ations												+ ADD APPL	ICATION
APPLICATION NAME	•																
HOST NAME	•	+ hi	de filters	O Application T	pe: Db2 D	tabase O Appli	cation Type:	Db2 Instance									
TEMPLATE NAME	•					Q								SHOW SEL	ECTED (1) 25 🗸	n +
PROFILE NAME	•					-										,	
FRIENDLY PATH	•			APPLICATION	0	HOST IP	\diamond	HOST NAME	\diamond	GROUP		APPLIANCE	\diamond	TYPE	\diamond	APP TYPE	0
SLA STATUS	•		0	gpfsi1		172.27.58.13		ndmlpar3				weekly10c		Db2 Instance		DB2Instance	
Managed Unmanaged		Ø	0	db2ir.ac		172.16.201.25		OracleDBNike				weekly10c		Db2 Instance		DB2Instance	
ТҮРЕ	•		۲	SYSTST Mai	age 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 a database, not an instance.

actifio Dashbo	ard Backup & Recover 🗸 Test	Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor -		▼ 3
CH MANAGE SLA	Manage Membership								
Database Inclusio	Eligible Databases INCLUSION RULE: Include All All eligible databases Instance. Databases Instance. Databases Instance databases Instance databases Include Selecte Instance databases	d short i d opt or	f a policy template is n will be included in d		Ineligible d Manageme • The data	nt For one of abase is a memt abase was creat	25 not be included in DB2 Instance the following reasons: ber of a consistency group ed by an app-aware mount		
RULE All DATABASES 1	type to search	Q D SH	IOW SELECTED (1)				DATABASES	0	
DATABASES INCLUDED 1		DATABASES		•			DATADASES	Ŷ	
DATABASES EXCLUDED 0 INELIGIBLE DATABASES 0									
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 MariaDB Database Logs

To enable MariaDB database log backup:

1. From the SLA Architect Templates list, right-click the template for MariaDB database protection and click **Edit**.

actifio	Dashboar	rd	Backup & Recover 🗸	Test (Data Management 🗸	App	Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸				Y 1	admin		2
clear all filters	Î	Но	sts													+	ADD HO	эsт
HOST NAME	•	l																
filter by host name		< hide	G Host Type:	Generic														
P ADDRESS	•	j-m			0								SHOW SELECTED	2)	Ø	II 25	r 🖸	*
filter by IP address		⊡	NAME	٥	FRIENDLY PATH	٥	APPLIANCE	e ô	IP	0	TYPE	0	OS RELEASE	\diamond	VIR	TUAL MA	CHINE	
S RELEASE	•	ø	j-maria-1		j-məria-1		caf-source		172.17.202.7		Generic		Red Hat Enterprise					
Enter OS like Linux			j-maria_2		j-n Edit		ource		172.16.201.214		Generic		Red Hat Enterprise	Lin	No			
DS TYPE	-		j-maria_auto1		j-n Edit Organiz	ations	ource		172.17.202.7		Generic		Red Hat Enterprise	Lin	No			
Enter OS like Linux	_		j-max_auto1		j-n Delete		burce		172.16.201.191		Generic		Red Hat Enterprise	Lin	No			

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

actifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor -	🝸 👤 admir	n 🌲	?	
TEMPLATE *	Maria_CB	8T	ALLOW OVERRIDES ON	POLICY SETTINGS?	• YES ONO			Save Template				
DESCRIPTION	Descripti	on										
								○ Policies				
					9		ſ	Snapshot 1				
		PRODU	CTION		MIRROR			SCHEDULING Windowed				
		2	Ö					FREQUENCY Everyday TIME WINDOW 19:00 to 07:00				
				2				REPEAT VALUE Once per window EXPIRE AFTER 2 days				
		SNAPS						POLICY ID 1513401				
		0					U	Edit Policy	J			

3. Near the bottom of the Create/Edit Policy page, select **Advanced Policy Settings**.

actifio	Dashboard	Backup & Recover 🗸	Test Data Manaç	gement 🗸 🛛 A	App Manager 🗸	SLA Architect 🗸	Manage 🗸	Report	Monitor 🗸	
			Production	n To Snap	shot					
		Crea	ate/Edit Policy							
		POL	LICY NAME*	snap						
⊖ Poli	cies	SCH	EDULING	Windowed	D					
T Snapshot	1	(Rdd)	ON THESE DAYS	veryday						
= snap			EXCEPT Never ×							
SCHEDU	ILING Windowed		CALEFT MENER	-						
	ENCY Everyday		WITHIN THIS WIND	ow 19:	от 00:	07:00				
	DOW 19:00 to 07:0									
	ALUE Once per wi	ndow	RUN ONCE PER WI	NDOW)					
	FTER 2 days									
POLI	CY ID 1157397				24 🕀 🖪					
	Edit	Policy	AIN FOR	Q 2	Day(s)					
Direct to De	edup (0)	(11)		Default						
Direct to O	hVault 0	SLA	COMPLIANCE	Default						
OnVault Re	plication 0	PRIC	ORITY	Medium 🔻						
Dedup 0										
Dedup DR		6773			Advan	ced Policy Settings	1			
Mirror 0		C .M3								

- 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.
 - o Set Log Staging Disk Growth Size to a percent value that reflects your anticipated usage.

ctifio	Dashboard	Backup & Recover 🗸	Test Data Management 🗸 🔋 App I	Manager 🗸	SLA Architect +	Manage 🗸	Report	Monitor 🗸	
			Policy Settings	Unmap	staging disks arter ea	O Settings He	łp	G	
		¢	TRUNCATE/PURGE LOG AFTER BACKUP		truncate/purge log af te/Purge log after bac			Reset to Default	
0.000			SKIP OFFLINE APPLICATIONS		kup when offline app fline applications durir		nd		d,
 Policies Snapshot 1 snap 	5		MAP STAGING DISK TO ALL ESX HOSTS IN A CLUSTER	◯ Map st	aging disk to ESX host aging disk to all ESX ho aging disk to 2 ESX ho	osts in the cluste			I
SCHEDULING FREQUENCY TIME WINDOW	Everyday 19:00 to 07:00		NODE BACKUP PREFERENCE FOR SQ AVAILABILITY GROUP	Primar	ailability Group Backu y Node 🔘 Secondary Secondary Node 🔘 A	Node Only			I
REPEAT VALUE EXPIRE AFTER POLICY ID	2 days	low	ALLOW MIGRATING FROM OUT-OF- BAND TO IN-BAND DATA MOVEMENT	🔘 Yes 🖲	No				
	Edit P	olicy	FORCE OUT-OF-BAND BACKUP	🔘 Yes 🌘	No				
	0	(7.60)	BACKUP SQL SERVER USER LOGINS	🔘 Yes 🌘	NO				
		CTD	ENABLE DATABASE LOG BACKUP	🖲 Yes 🌐	No			Reset to Default	
OnVault Replicat							Cancel	Save Changes	

- 5. Click Save Changes.
- 6. From the App Manager, Applications list, right-click the MariaDB Instance and select **Manage SLA**.

actifio	Dashboa	rd	Bad	kup & I	Recover	🗸 🛛 Test Data	Management 🗸	App Ma	nager 👻 SLA	Architect	🗸 🛛 Manage 🗸	Report	Monitor 🗸				🝸 👤 admin	۹
🙁 clear all filter	s î	A	Appli	cati	ions												+ ADD AP	PLICATION
APPLICATION NAME	•																	
HOST NAME	•	•	hide filte	ers C	Applica	tion Type: Db2 Da	tabase O App	plication Type	Db2 Instance									
TEMPLATE NAME	•						Q								SHOW SEL	ECTED (1)	111 25	 C 2
PROFILE NAME	•																	
RIENDLY PATH	•	6	3	A	PPLICA	TION 0	HOST IP	0	HOST NAME	0	GROUP		APPLIANCE	0	TYPE	¢	APP TYPE	0
LA STATUS	•	C	. 8	g	pfsi1		172.27.58.13		ndmlpar3				weekly10c		Db2 Instance		DB2Instance	
Managed Unmanaged		6	2 🔇	d	b2inat*	<	172.16.201.2	53	OracleDBNik	2			weekly10c		Db2 Instance		DB2Instance	
TYPE	•	0	- 0	S	YSTST	Manage SLA		J	stcent76db22				weekly10c		Db2 Database		DB2	
Select: ALL NONE		C	. 8	d	b2insl	Access			OracleDBNik	2			weekly10c		Db2 Instance		DB2Instance	
iystems Hyper-V VM		1		P	RODE	Edit Organiza	tion Member	ship	stcent76db22				weekly10c		Db2 Database		DB2	
System State		0		A	стов	Import OnVa			stcent76db22				weekly10c		Db2 Database		DB2	
Databases		C	- 0	JE	FS2DE	Manage Expir			ndmlpar4				weekly10c		Db2 Database		DB2	
Db2 Database		0		JF	FS2DE	Ignore Applic			ndmlpar4				weekly10c		Db2 Database		DB2	
e ouz instance		Ι.			-													

- 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 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 Restoring, Accessing, or Recovering a MariaDB Database

This section describes:

Mount and Refresh from Block-Based Volume Snapshot to a Target MariaDB Instance as a Virtual Application on page 19

Restoring and Recovering a MariaDB Database on page 21

- o Recovering from Volume-Based Snapshot on page 21
- o Recovering from a Full+Incremental Backup on page 23

Mount and Refresh from Block-Based Volume Snapshot to a Target MariaDB 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 App Manager, Applications list, right-click the database and select Access.

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

clear all filters	Ap	plic	ations								1	+ 10	D APPI	LICATION
APPLICATION NAME														
HOST NAME	+ hid	e filters	O SLA Managed O Application Type: Db2	Database C	Application Type: D	b2 Instan	ice.							
TEMPLATE NAME			ichQ							SHOW SE	ECTED (1)	111	25 -	04
PROFILE NAME											100 (1)			
RIENOLY PATH	Θ		APPLICATION 0	ID	TEMPLATE	0	PR 0	FRIENDLY PATH	HOST NAME 🗘	APPLI 🌻	TYPE		0	APPLI.
SLA STATUS 👻	0		D30	1879655				DB2 test delete	DB2 test delete	caf-source	Db2 Databas			240607
Managed		-		10000100						0.000000000				10.00010
Unmanaged				1879651				DB2_test_delete	DB2_test_delete		Db2 Instance			240605
			D31 Manage SLA	1879653				DBZ test delete	DB2 test delete	caf-source	Db2 Databas			240606

2. Select a snapshot image and choose Mount.



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

actifio	Dashboard	Backup & Recover 🗸	Test Data	Management 🗸	App Manager +	SLA Architect 🗸	Manage 🗸	Report	Monitor -
ACCESS	🔹 🦁 ins	t2 DB2_test_delete	DB2_test	delete Details 8	Settings				
	-11-15 15:40:52 ishot Image	M	lount						
NAME	Image_0240779		TARGET *		LABEL				
STATUS	Available		DB2_te	t_delete ▼					
TRANSPORT	SAN Based, Out-Of-E Storage	Band							
IMAGE SIZE	66.01GB		🔻 Appli	cation Option	s				
EXPIRES ON	2019-11-17 16:05:51								
APPLIANCE	Caf-Source		CREAT	E NEW VIRTUAL A	PPLICATION				
RECOVERY RANGE	11-15 11:35 To 11-15	5 11:59	INCLU	DED DATABASES					Database Options * are mandatory
LABEL	Snap1		type			Q			SHOW SELECTED (1)
CATALOG STATE	Not-Applicable								
POOL NAME	Act_per_pool000		Ξ	SELECT ITEMS					
м	ount -			D30					Database Options *
				D31					
			ROLL	FORWARD TIME		2019-11-15	0 11:593	23	HOST TIME USER TIME
			TARG	ET INSTANCE NAMI	E.*				
			MANA	GE NEW APPLICAT	10N				

- 6. Click each selected database to specify the target database details for the new virtual copy.
- 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 MARIADB DATABASE NAME: From drop down select target instance to attach the selected database as virtual copy.

Manage New Application: To protect the new virtual database, click and enable Manage New Application. Choose a template and a resource profile to protect the database.

- 8. (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. (Optional) Snatch Port by Stopping Existing Instance specifies whether to stop the existing instance and snatch the port if the target port is already in use by an existing instance.
- 10. Under Mapping Options:
 - o Storage Pool: Select a local or external storage pool for the mounted database.
 - o Mount Location: Specify a target mount point to mount the new virtual database to.
- 11. Click Submit.

Restoring and Recovering a MariaDB Database

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

Recovering from Volume-Based Snapshot on page 21 Recovering from a Full+Incremental Backup on page 23

Recovering from Volume-Based Snapshot

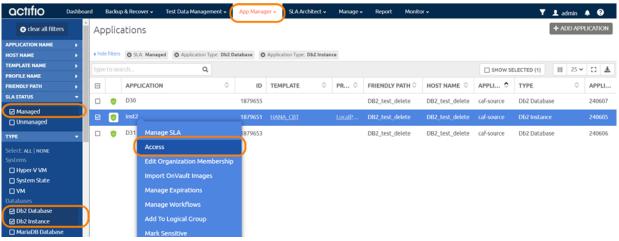
Use this procedure to restore and recover the source MariaDB database. This procedure uses physical recovery of the source data area.

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.

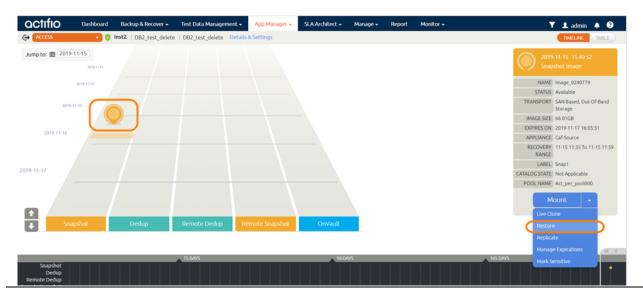
To recover back to the source:

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 a snapshot image and choose Restore.



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

OCTITIO Dashboard Backup	& Recover 🗸 Test Data Management 🖌 🛛 App Manager 🗸 SLA Architect 🗸 Manage 🖌 Report Monitor 🗸	🝸 👤 admin 🌲 🚱
🗘 🗛 🗘 🗘 ACCESS	32_test_delete DB2_test_delete Details & Settings	TIMELINE TABLE
2019-11-15 15:40:52 Snapshot Image	Restore Use this page to initiate a restore operation. A restore will take the existing database offline and overwrite their data files.	
NAME Image_0240779 STATUS Available TRANSPORT SAN Based, Out-OF-Band Storage	ROLL FORWARD TIME	
IMAGE SIZE 66.01GB EXPIRES ON 2019-11-17 16:05:51	type to search Q 1 2	
APPLIANCE Caf-Source RECOVERY 11-15 11:35 To 11-15 11:59 RANGE	SELECT ITEMS 3 4 5 6 7 8 9 ID D30 D3 D3	
LABEL Snap1 CATALOG STATE Not-Applicable	2 0.00 10 11 12 13 16 2 D31 17 18 19 20 21 22 23	
POOL NAME Act_per_pool000 Restore	RESTORE WITH RECOVERY 24 25 26 27 28 29 30 Close Cancel Submit	

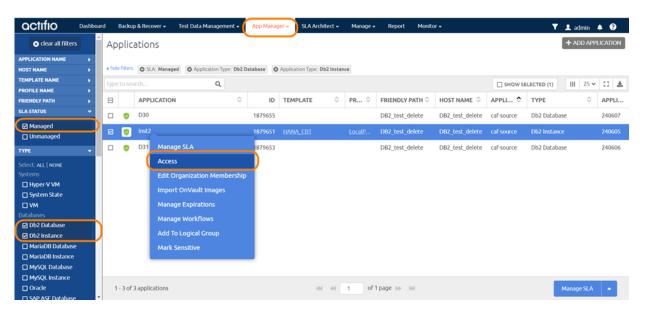
- 4. Enable **Restore With Recovery** to apply recovered logs.
- 5. Click **Submit**.

Recovering from a Full+Incremental Backup

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



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



- 3. For a database protected with logs, on the Restore page, choose a date and 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.

6 Converting Existing Generic Applications to the New Framework

Actifio VDP 10.0.2 introduced a new, more robust framework for database applications running on Linux. In earlier versions, databases were captured using the generic application framework. In most cases, it is worth recapturing the database using the new framework.

The new DB Application framework provides these benefits:

- No manual intervention needed for discovery, protection and recovery
- Application aware discovers the database as an application
- No more need to configure pre and post scripts like with Generic applications.
- Automated protection for databases as well as logs under a single application
- Automated point in time recovery
- App Aware mount capability for LVM snapshot-based protection

To switch from Generic Application protection to the new DB App Framework:

- 1. Disable the protection schedule on the Generic Application.
- 2. Under AGM Application tab, look for the database instance name as a discovered application. If it's not discovered, run a discovery on the host as described in Discovering the MariaDB Instance from the App Manager.
- 3. Apply the SLA to the discovered database instance as detailed in Chapter 4, Protecting a MariaDB Instance and its Logs.
- 4. Let the generic app backup images expire on their own schedule while you build your new repository of backup images using new database allocation framework.