SAP IQ DBA's Guide to Actifio Copy Data Management

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Actifio VDP 10.0

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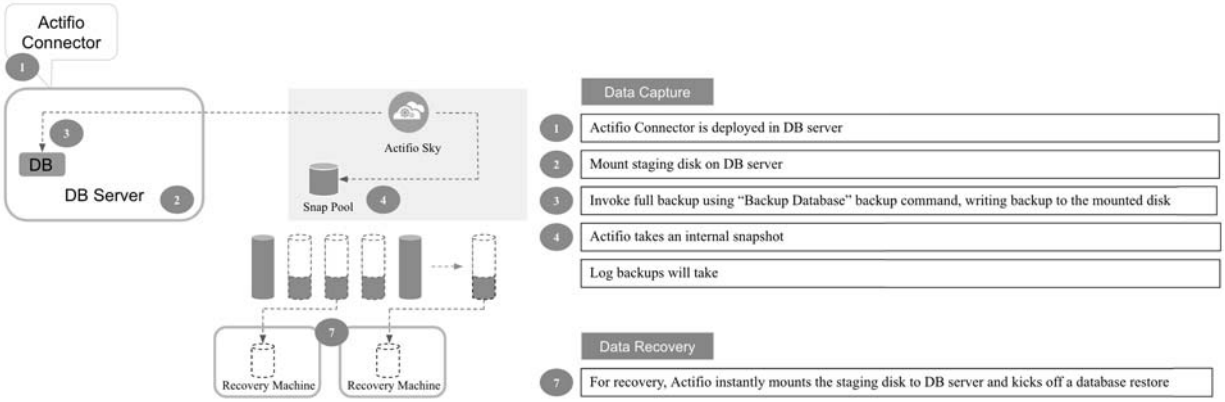
1 SAP IQ DBA's Introduction to Actifio Copy Data Management

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.

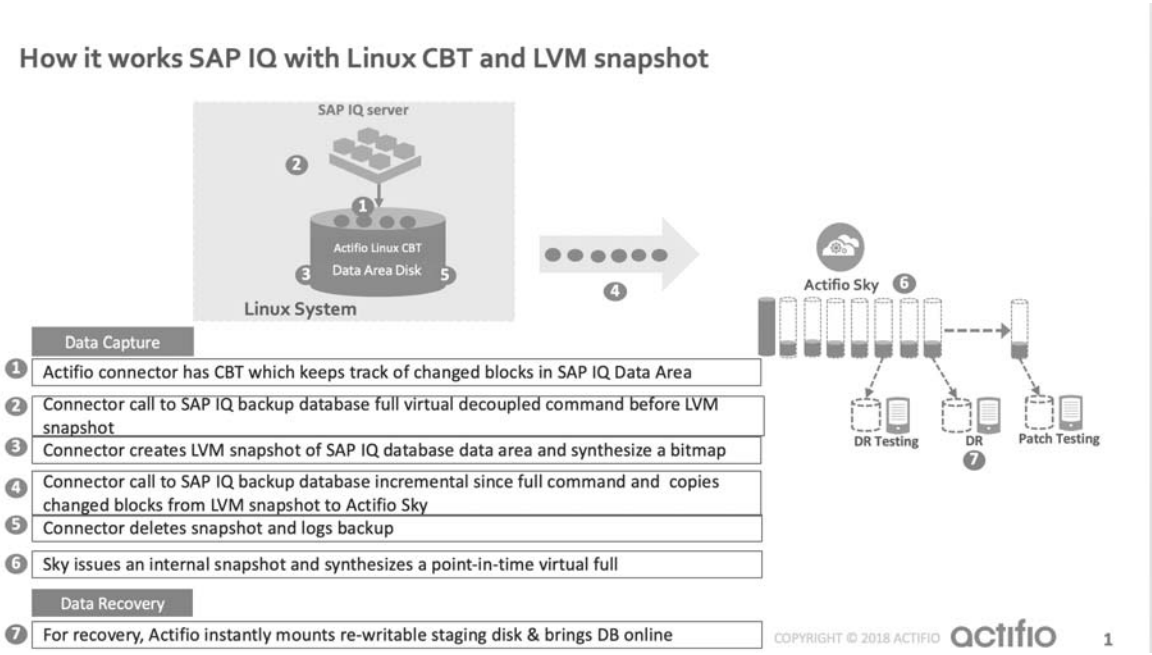
SAP IQ (formerly Sybase IQ) is a is a family of relational database management systems within SAP Information Management division that is centered on several relational database management system offerings. This DBA Guide explains how to protect SAP IQ application consistent database data with Actifio VDP in a Linux environment.

Actifio VDP uses these SAP IQ backup APIs:

- **File-based backups**: SAP IQ "dump database" File-based backups API: This provides the full and incremental backups of the database in backup format. On recovery, the restore db API will recover the database by physically overwriting the data area.
- **Log backup**: SAP IQ PITR log backup: During a PITR log backup the SAP IQ API "BACKUP DATABASE POINT IN TIME RECOVERY LOGS ONLY TO '$TARGET_MOUNTPOINT' command is used for log backup. OS level commands are used for logs purging.



SAP IQ with File-Based Backup



SAP IQ with Volume-Based Backup

2 Preparing an SAP IQ Database for Protection

This section details the steps involved in preparing an SAP IQ database for Actifio protection and management:

Before You Begin on page 3
Adding an SAP IQ Database Host and Discovering the Database on page 3

Before You Begin

Before you begin, on the SAP IQ server:

- SAP IQ PITR logging must be ON to take log backup. To configure PITR log option, you need these SAP IQ API:
  - ALTER DBSPACE IQ_SYSTEM_LOG RENAME '/<pitr_log_location>'
  - SET OPTION PUBLIC.IQ_POINT_IN_TIME_RECOVERY_LOGGING = 'ON'

  After enabling pitr logging, a database full backup is needed.
- The utility database needs to start by specifying the username and password, and dbname should be `utility_db`. For example: `start_iq -n utility_db -su act,passwd`
- Backup username/password should be the same as the utility_db username/password.

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

- Install the Actifio Connector on the SAP IQ server host (see ***A Network Administrator's Guide to Actifio VDP***.)

Adding an SAP IQ Database Host and Discovering the Database

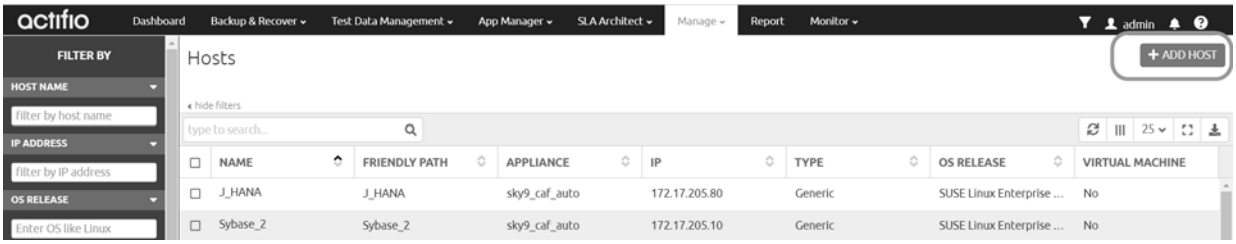
Before you can protect an SAP IQ database, you must add the host and discover the database:

1. Adding the Host from the AGM on page 4
2. Discovering the SAP IQ Database Application from the App Manager on page 5
3. Finding the Discovered SAP IQ Database in the App Manager on page 6

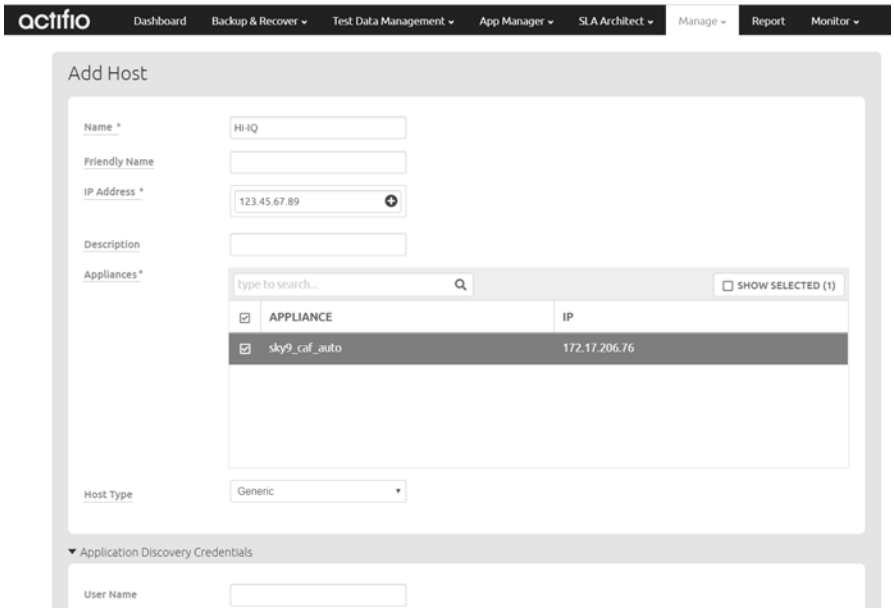
Adding the Host from the AGM

To add the host:

1. From the Manage, Hosts list, in the upper right corner, click **+Add Host**.

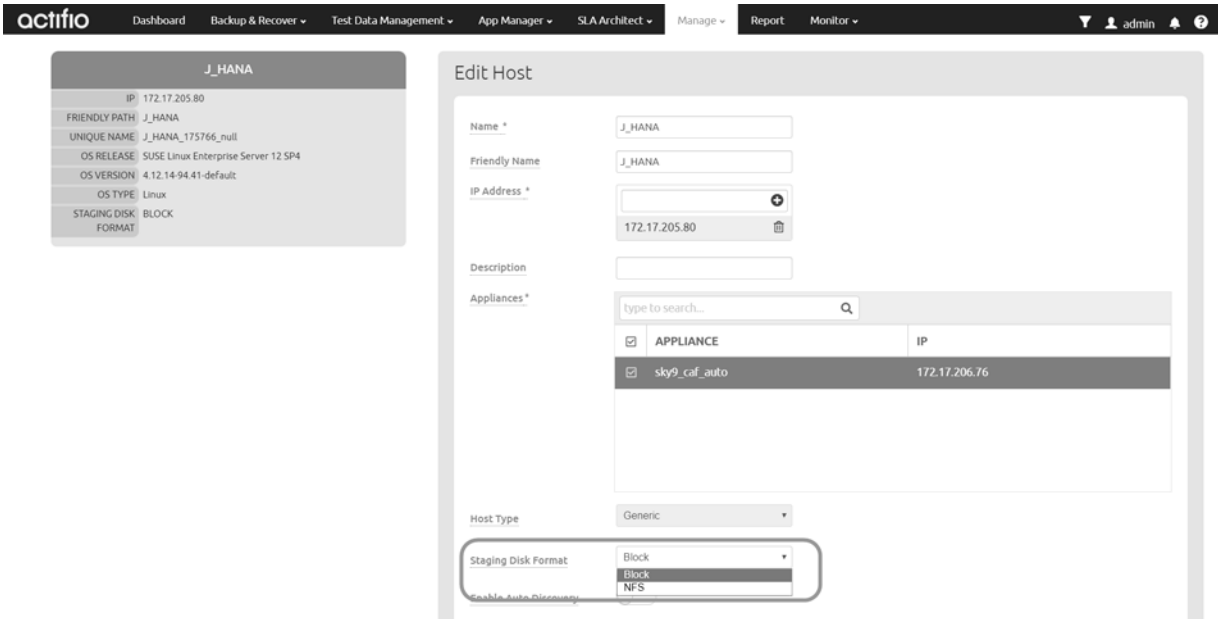


2. On the Add Host page:
   - **Name**: Provide the SAP IQ database server name.
   - **IP Address**: Provide the SAP IQ database server IP and click the **+** sign on the right corner.
   - **Appliances**: Select the check box for the Actifio Appliance.
   - **Host Type**: Make sure this is **Generic**.
   - Provide **Application Discovery Credentials** to discover SAP IQ databases, including the utility database.



3. Click **Add** at bottom right to add the host. The Host will be added.
4. Right-click the host and select **Edit**.

5. On the Edit Host page: Set the staging disk format to either **Block** or **NFS**.

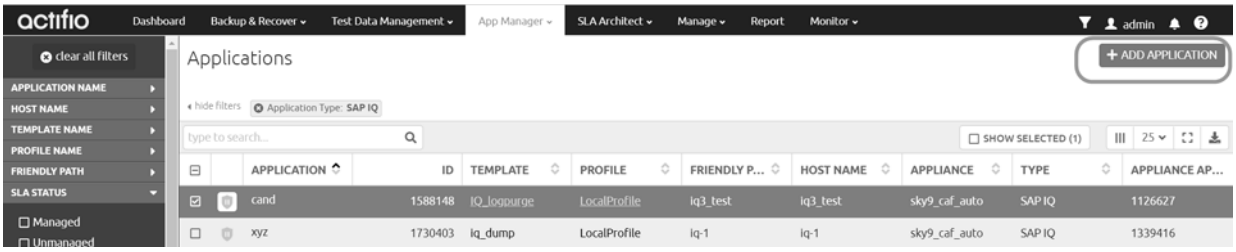


6. Select **Save** at the bottom of Edit Host page.

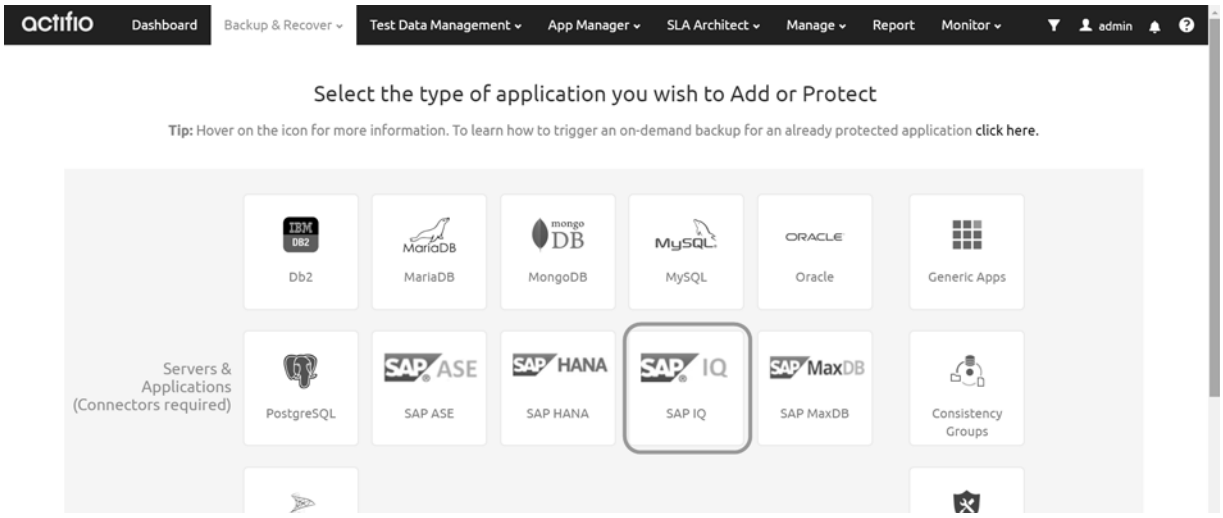
Discovering the SAP IQ Database Application from the App Manager

To discover the SAP IQ database:

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



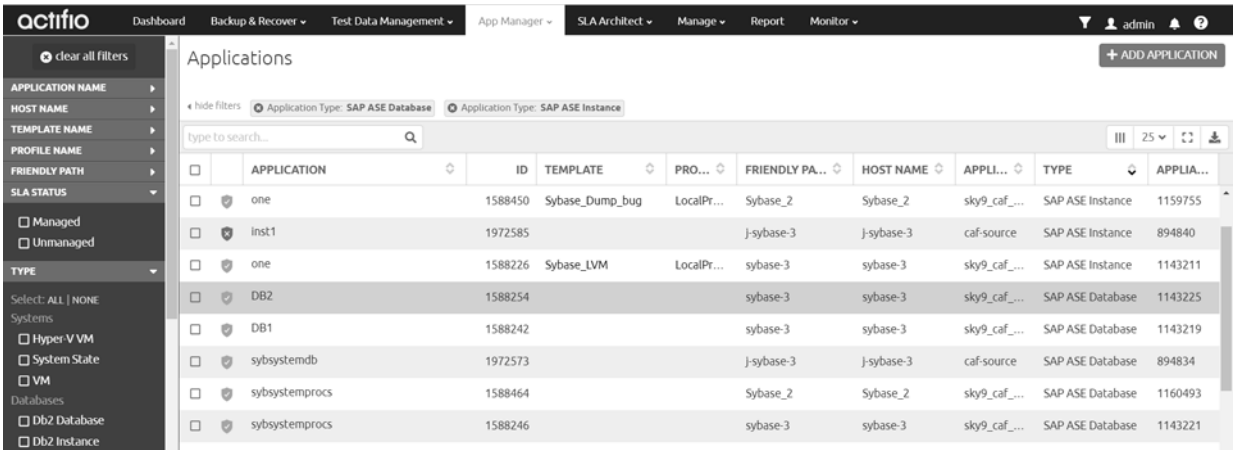
2. The Onboarding Wizard opens. Select **SAP IQ**.



3. Select the host and click **Next** in the bottom right corner. Discovery may take a while. Then follow the Onboarding Wizard to completion.

Finding the Discovered SAP IQ Database 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 left pane to show only SAP IQ databases.



3 Configuring the Backup Method

After the database is prepared and discovered as explained in Chapter 2, Preparing an SAP IQ Database for Protection, you can configure an Actifio backup method for the database.

- Using block-based volume level LVM snapshots with CBT on Linux. This option enables you to create application-aware virtual databases from the snapshot images.
- Using file-based traditional backup and recovery. This "file dump" method does not support the creation of virtual databases, and it requires Setting the Schedule for Dumps on page 12.

Whichever method you select involves these steps:

SAP IQ Application Details & Settings on page 7

Ensuring that the Backup Capture Method is Set Correctly on page 8

Ensuring that the Staging Disk Format on the Host is Set Correctly on page 10

Setting the Schedule for Dumps on page 12

Table 1: SAP IQ Application Details & Settings

Setting	Block-Based LVM Snapshot with CBT on Linux	File-Based Backup and Recovery, Block *or* NFS
Use Staging Disk Granularity as Minimum Staging Disk Size	For applications that are under the size of granularity setting that tend to periodically grow this new option is useful to avoid frequent costly FULL backups. Because the staging disk is thin provisioned, there is no initial cost to use a staging disk that is larger than required for immediate use. The values are 0 for No and the Staging Disk Granularity setting for Yes.	
Staging Disk Granularity	Maximum size of each staging disk when multiple staging disks are used for an application. The default value is 1000GB.	
Last Staging Disk Minimum Size	Minimum size of the last staging disk created for an application with multiple staging disks. This value is also used for additional disks allocated to accommodate growth. The default value is 250GB.	
Connector Options	Use this only under the direction of Actifio Support.	
Percentage of Reserve Space in Volume Group	Needed for LVM snapshot temporary space. Recommended value is 20%	Not applicable
Backup Capture Method	Use volume level backup	Use full+incremental filesystem backup

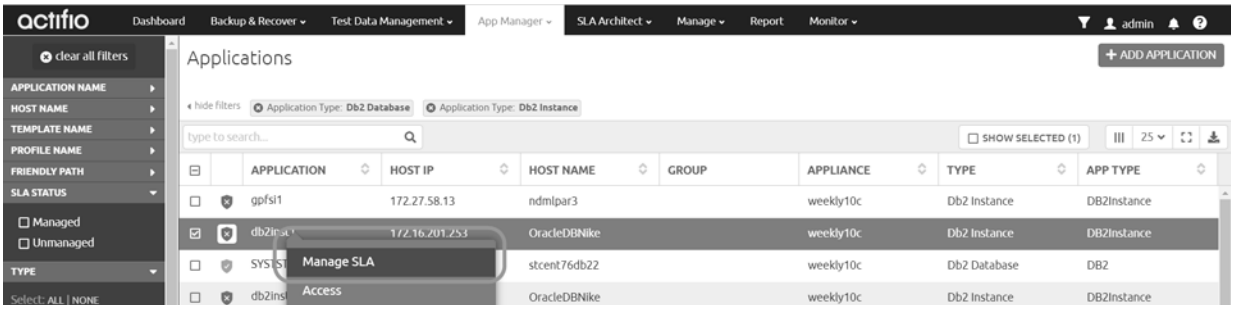
Table 1: SAP IQ Application Details & Settings

Setting	Block-Based LVM Snapshot with CBT on Linux	File-Based Backup and Recovery, Block *or* NFS
Force Full Filesystem Backup	Not applicable	Use for an on demand 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 generation * retention of log backup SLA plus 20% buffer. Default is recommended. Providing a value will override the default calculation and the log disk will not grow dynamically. This will become a fixed size	
Retention of Production DB Logs in Days	This value is used to purge the log backup from basepath_logbackup destination. Based on this setting the last data backup id will be selected (CURRENT_TIMESTAMP, - the # days set) and the log will be purged older than the data backup id. Default value is 0 days. With default value all logs prior to last data backup will be purged.	
Script Timeout	The timeout value is applied to internal backup and recovery scripts called by connector. The default value is recommended.	

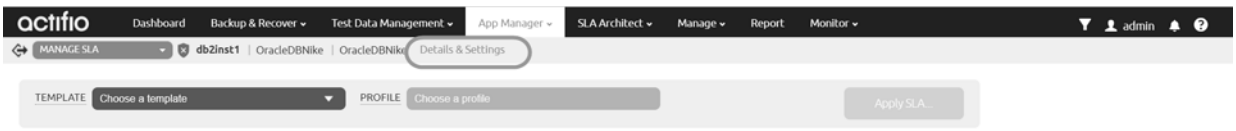
Ensuring that the Backup Capture Method is Set Correctly

Backup capture settings depend upon the backup capture method that you need. 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**.



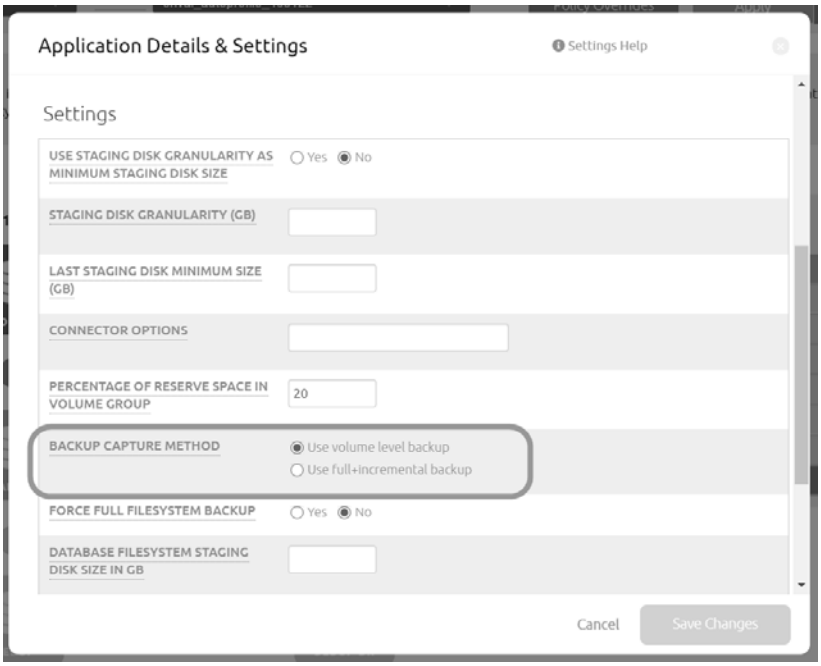
2. At the top of the Manage SLA page, select the **Details & Settings** link:



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

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



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

Ensuring that the Staging Disk Format on the Host is Set Correctly

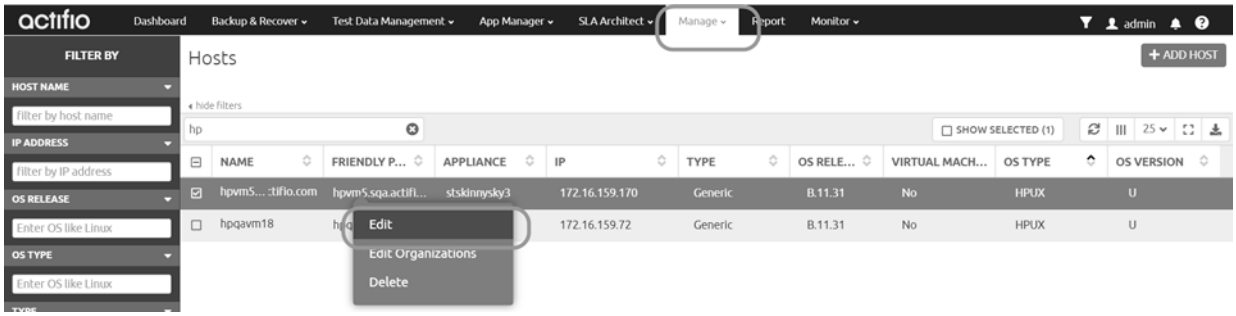
Choose between:

- Staging Disk Format: File-Based Traditional Backup and Recovery in NFS/Block on page 10
- Staging Disk Format: LVM Snapshot with Change Block Tracking on Linux on page 11

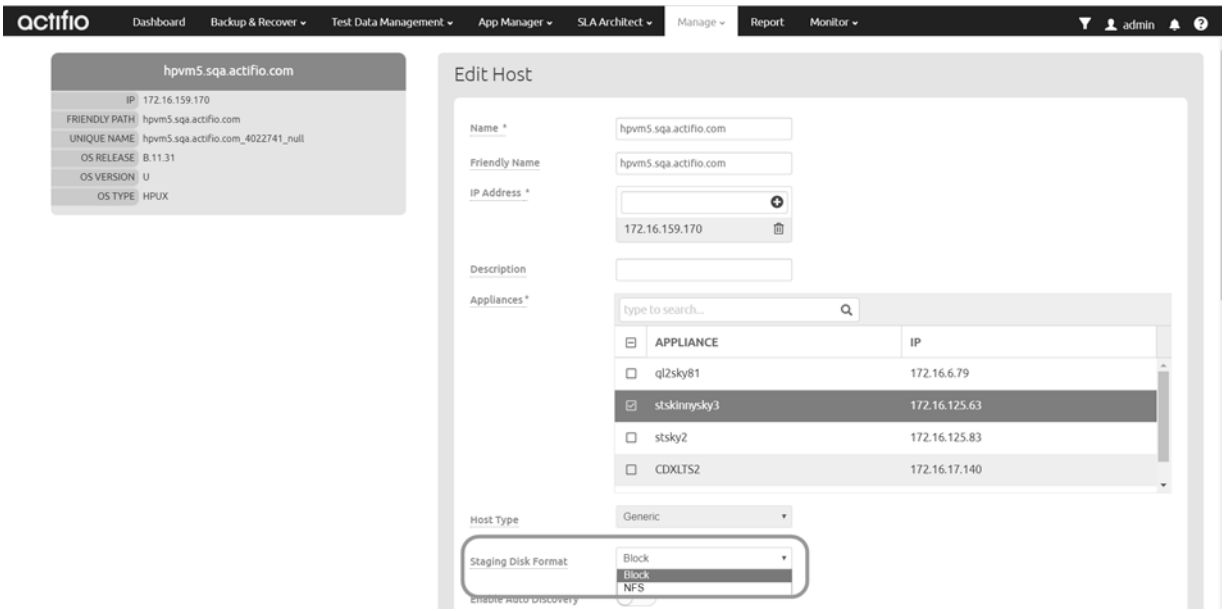
Staging Disk Format: File-Based Traditional Backup and Recovery in NFS/Block

To set the staging disk format for storage snapshots:

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



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



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

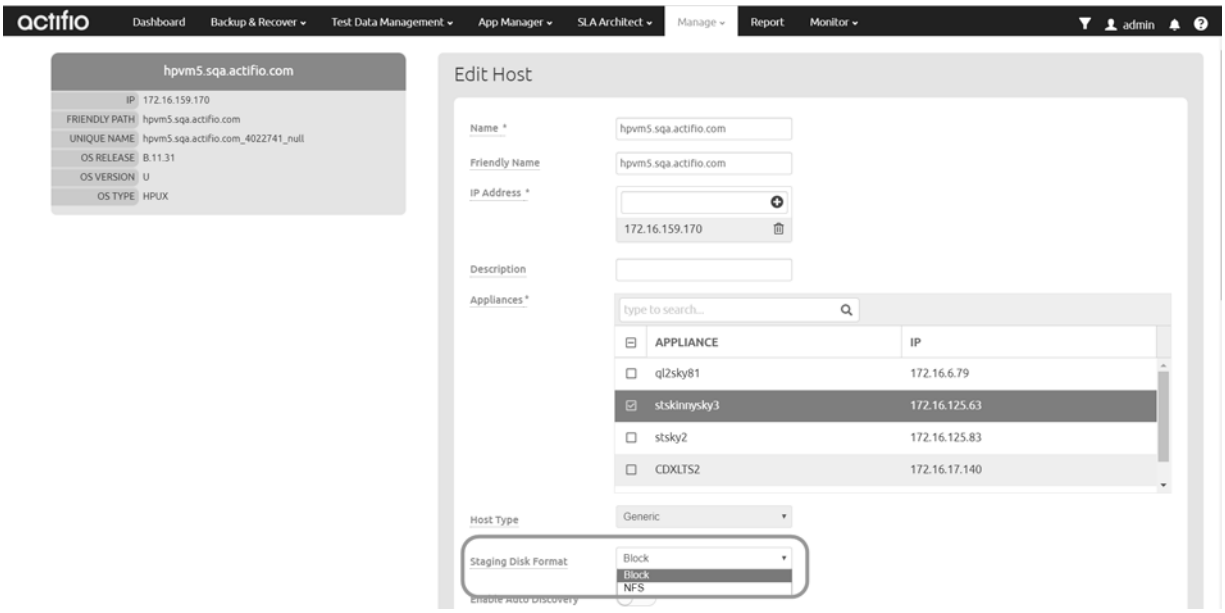
Note: *File-based backup also requires the DB dump schedule be configured. See* Setting the Schedule for Dumps *on page 12.*

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

To set the staging disk format for storage snapshots:

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

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



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 Actifio Appliance:

```
udsinfo lspolicyoption -filtervalue appid=<appid> | grep dumpschedule
```

If this does not return any value, then the dumpschedule is set to default.

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

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

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

Replace "FIIIIII" as needed.

Example

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

For more information, refer to the ***Actifio CLI Reference***.

4 Protecting an SAP IQ Database and its Logs

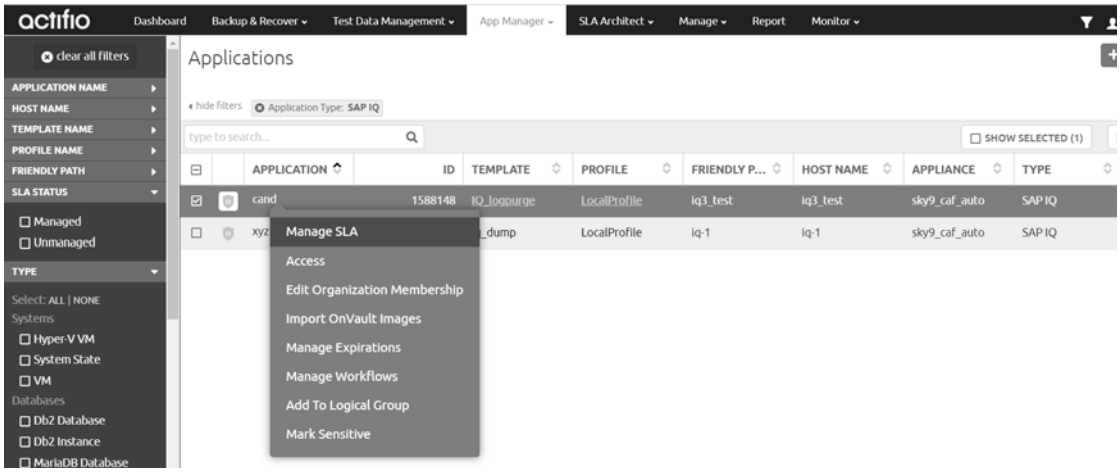
Protecting an SAP IQ database includes both:

Protecting an SAP IQ Database on page 13
Protecting SAP IQ Database Logs on page 14

Protecting an SAP IQ Database

To protect the database:

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



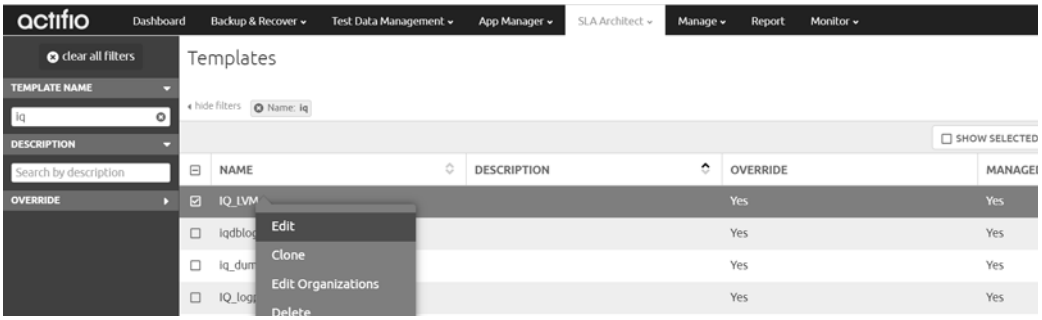
2. On the Manage SLA page, select a template and a resource profile, then click **Apply**.

3. Click **Apply** or **Save Changes**. The database will be protected when the job runs according to the schedule in the template. The database appears in the Application Manager with a green shield icon, and it is protected after the first successful snapshot job.

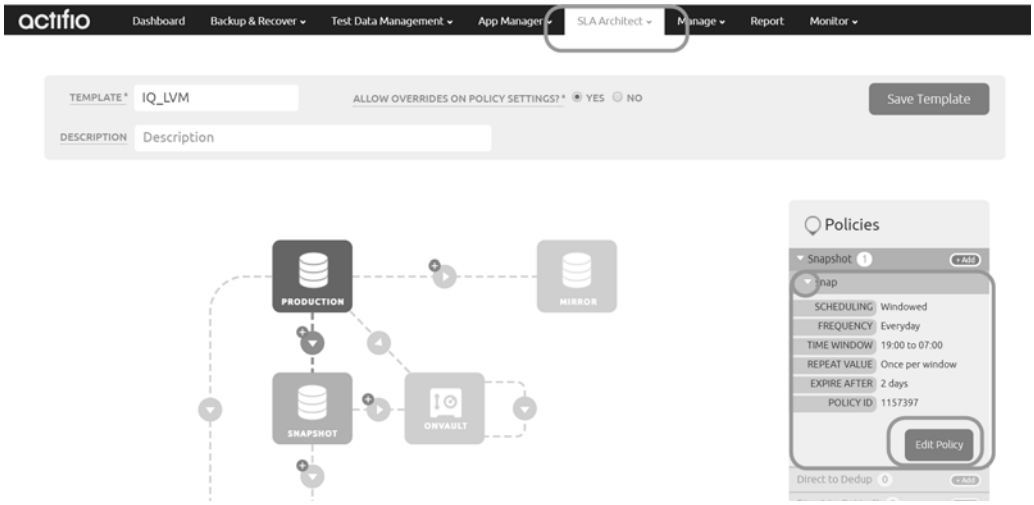
Protecting SAP IQ Database Logs

To enable and set up the SAP IQ database log backup:

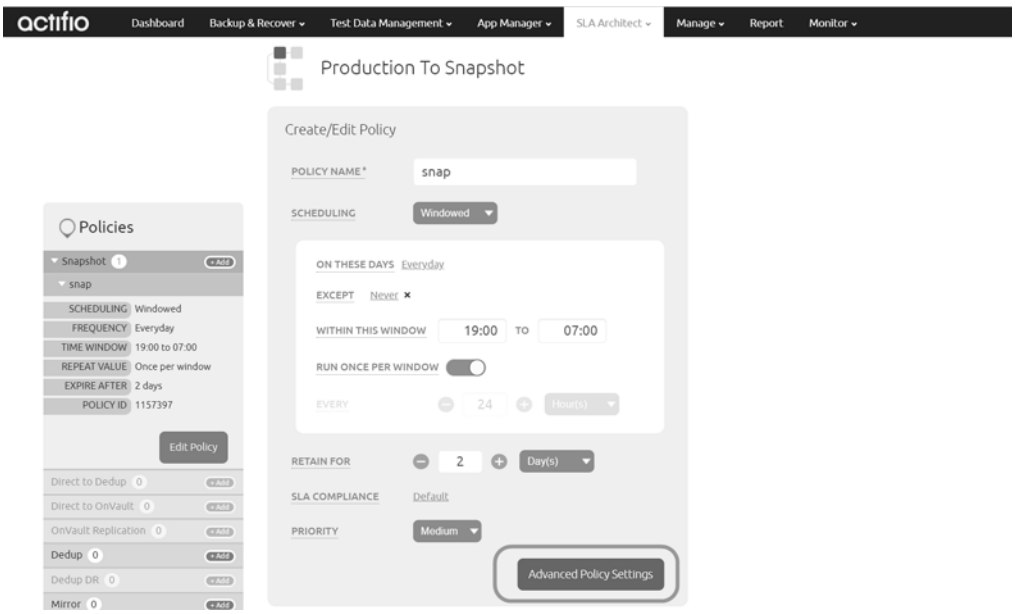
1. From the SLA Architect, Templates list, right-click the template for SAP IQ database protection and click **Edit**.



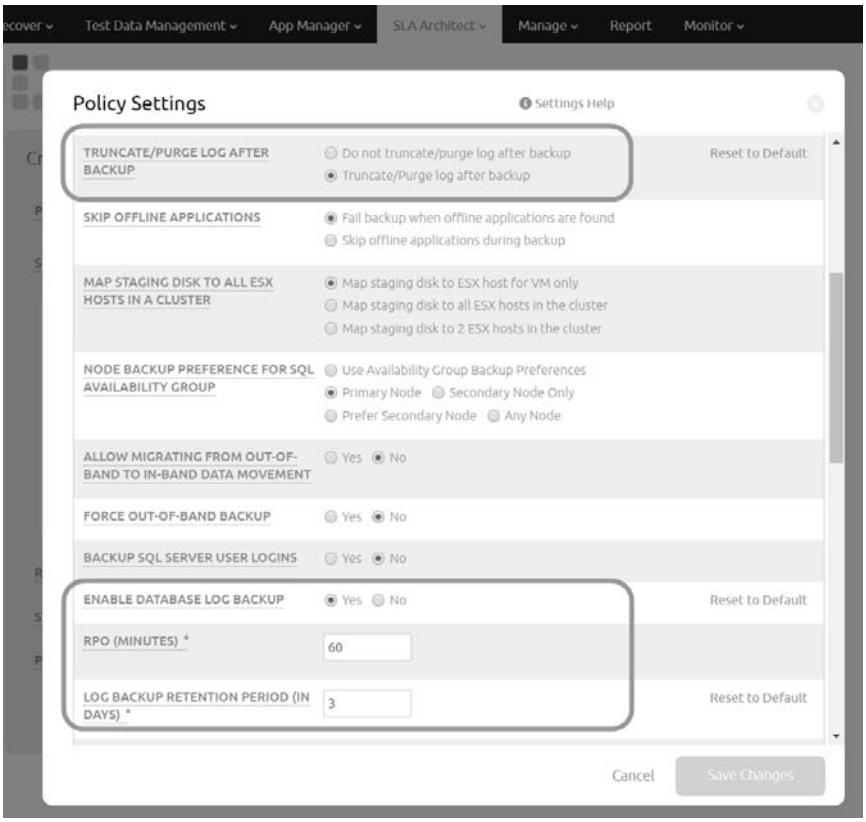
2. Click the arrow beside the Snapshot policy to open up the details, then click **Edit Policy**.



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



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



5. Click **Save Changes**.

5 Restoring, Accessing, or Recovering an SAP IQ Database

This section describes:

Mount and Refresh from Block-Based Volume Snapshot to a Target Server as a Virtual Database on page 17

Restoring and Recovering an SAP IQ Database to the Source

- Recovering from a Block-Based Volume Snapshot to the Source on page 19
- Recovering from a File-Based Full+Incremental Backup to the Source on page 21

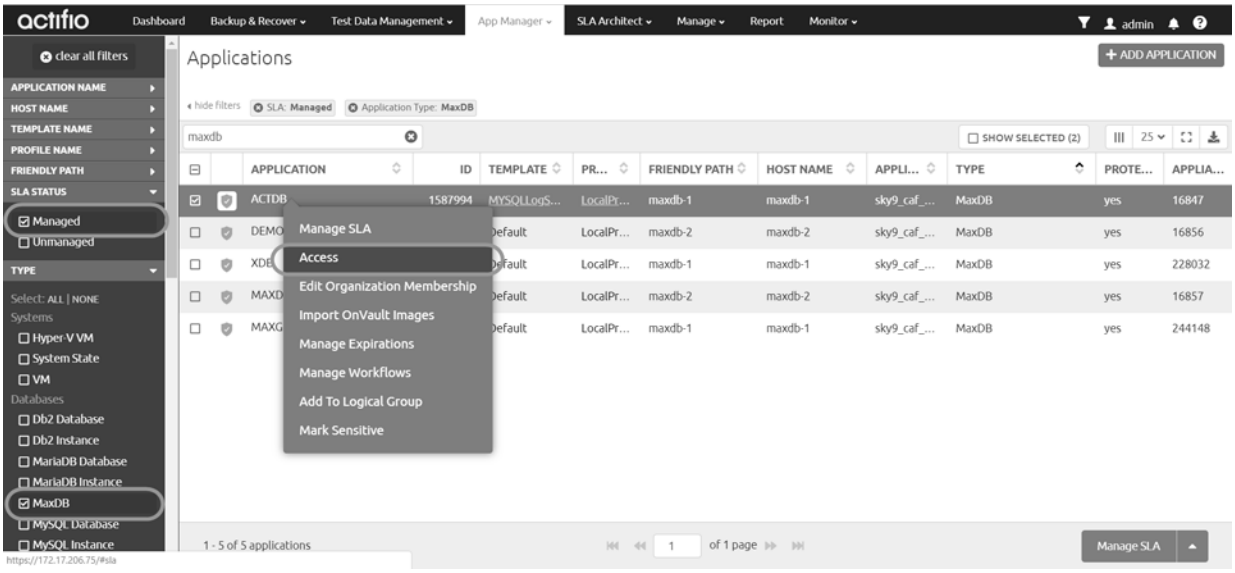
Restoring an SAP IQ Database to a New Target

- Restoring from a Block-Based Volume Snapshot to a New Target on page 22
- Restoring from a File-Based Full+Incremental Backup to a New Target on page 24

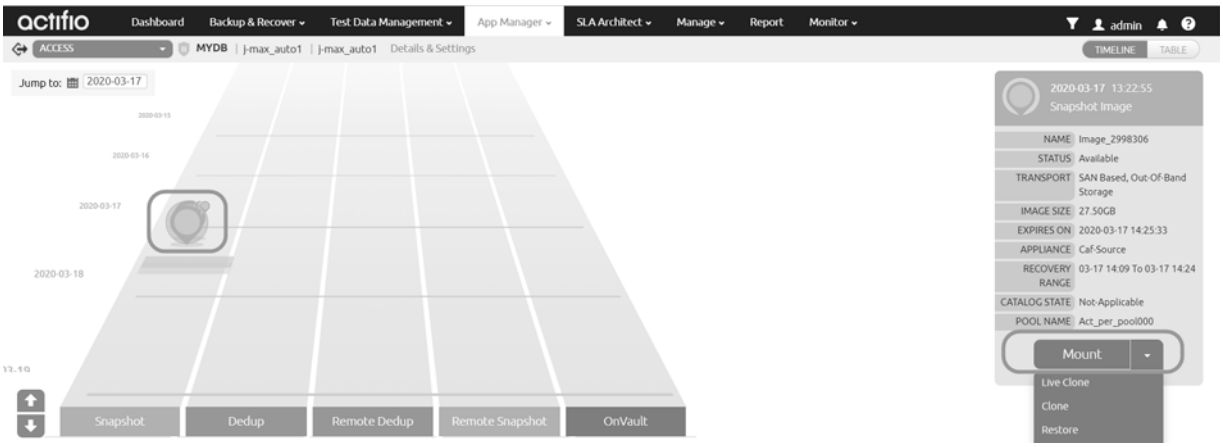
Mount and Refresh from Block-Based Volume Snapshot to a Target Server as a Virtual Database

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

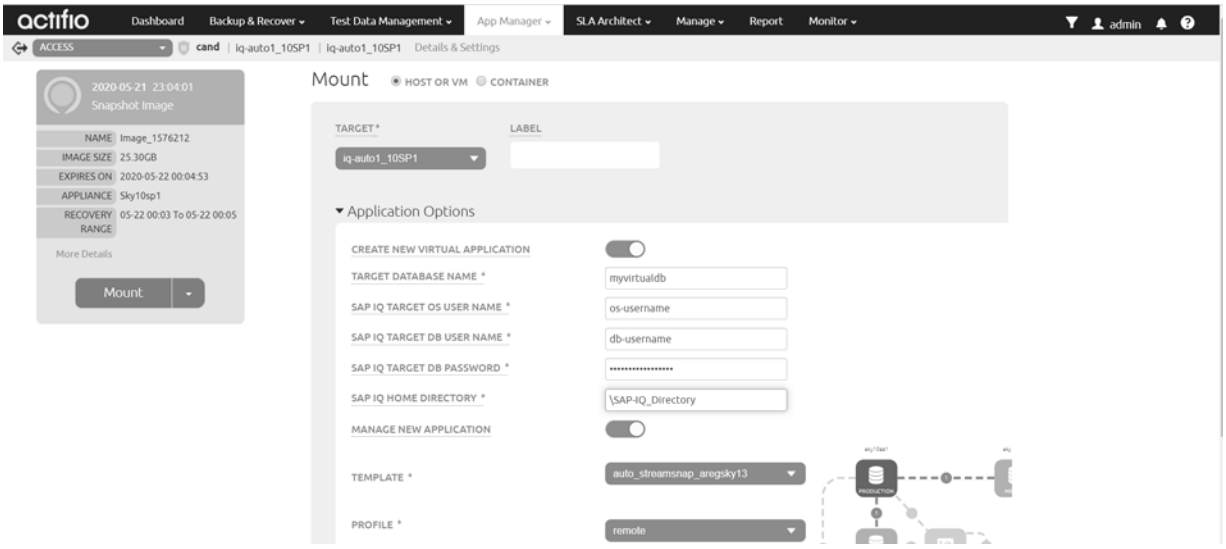
1. From the App Manager Applications list, right-click the protected database and select **Access**. You can use the Managed SLA Status filter to show only protected databases.



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



3. If you see a choice to select Host or VM or Container, then the appliance is attached to Kubernetes storage and the Containers feature is configured. Select **Host or VM**.
4. On the Mount page, from Target, choose the desired target SAP IQ server from the dropdown.
5. Under Application Options, enable **Create New Virtual Application**.



6. For a database protected with log roll-forward, choose a target point in time.
7. Fill in:

   TARGET DATABASE NAME: The name of the target SAP IQ database
   SAP IQ TARGET OS USER NAME: OS user for target SAP IQ database
   SAP IQ TARGET DB USER NAME: dbm user for target SAP IQ
   SAP IQ TARGET DB PASSWORD: dbm user password for target SAP IQ
   SAP IQ HOME DIRECTORY: Specify the directory path of SAP IQ binaries
8. Manage New Application:
   - To protect the new virtual database, enable **Manage New Application**.
   - Choose a template and a resource profile to protect the database.
9. Under Mapping Options:
   - Storage Pool: The image will be mounted in the Snapshot Pool unless you select one.
   - Mount Location: specify a target mount point for the new virtual database.
10. Click **Submit**.

Restoring and Recovering an SAP IQ Database to the Source

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

Recovering from a Block-Based Volume Snapshot to the Source on page 19
Recovering from a File-Based Full+Incremental Backup to the Source on page 21

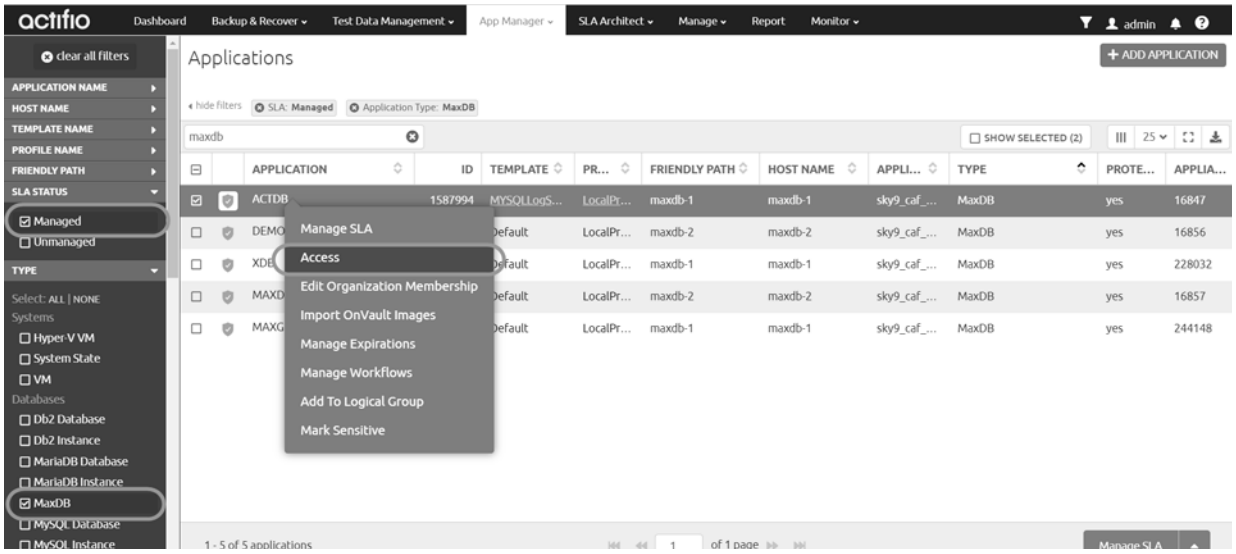
Recovering from a Block-Based Volume Snapshot to the Source

Use this procedure to restore and recover the source database from a volume-based LVM snapshot image. This procedure uses physical recovery of the source data area.

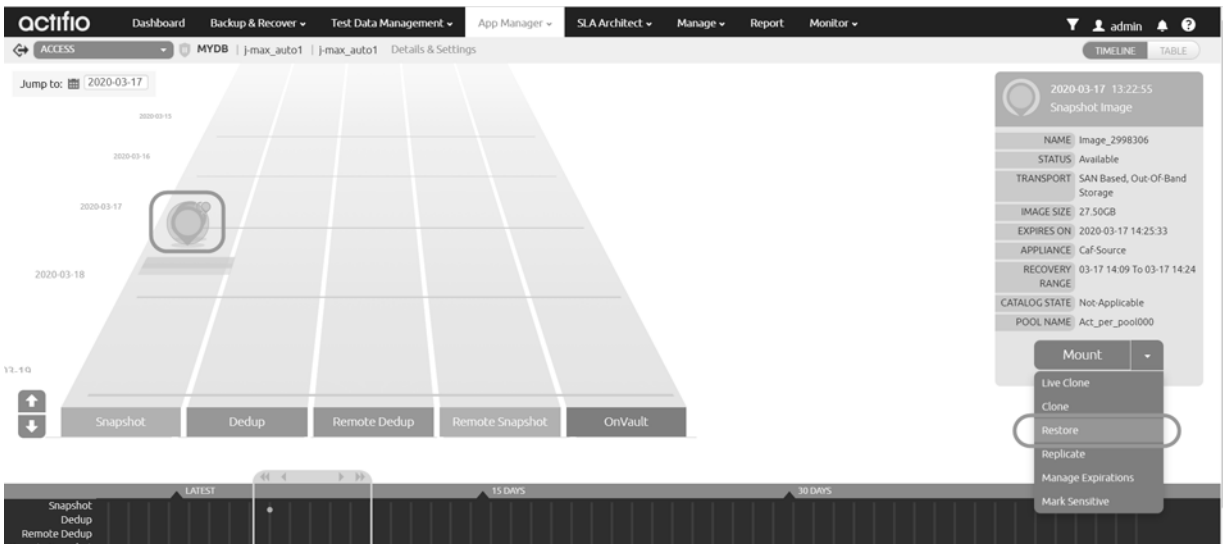
Note: *System databases on a root partition backed up as LVM Snapshots can be mounted as virtual databases, but they cannot be used in a traditional Restore operation as the root partition cannot be unmounted. This will need manual restore and recovery from a simple mount back to the same host.*

To recover a block-based image back to the source:

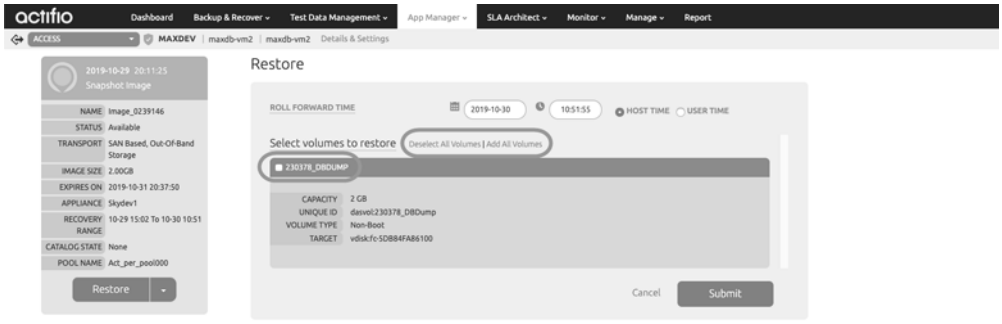
1. From the App Manager Applications list, right-click the protected database and select **Access**. You can use the Managed SLA Status filter to show only protected databases.



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



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



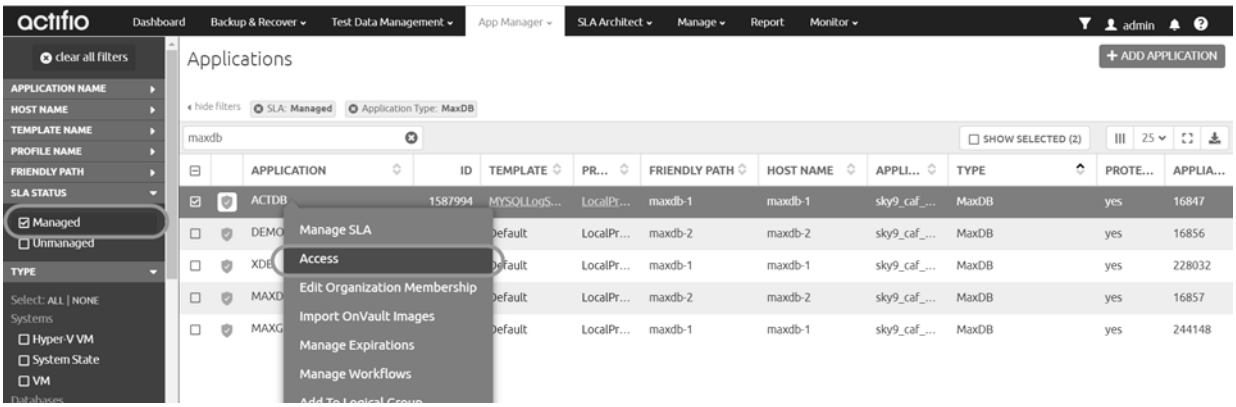
4. Select one or more volumes to restore and click **Submit**.

Recovering from a File-Based Full+Incremental Backup to the Source

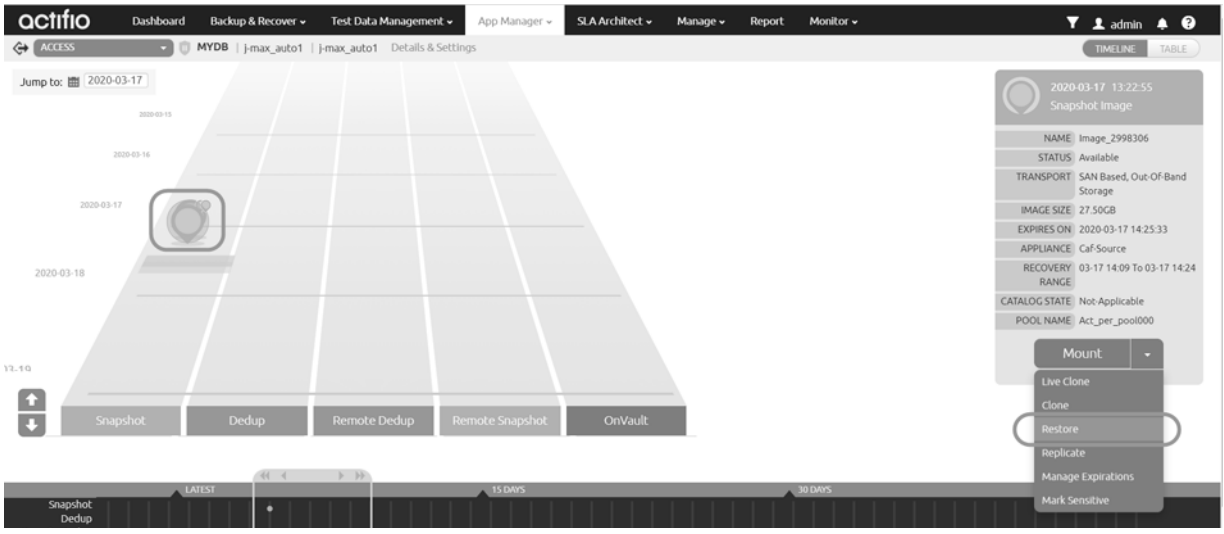
Use this procedure to restore and recover the source database from a traditional file-based full+incremental backup image. This procedure overwrites the source data. To recover a volume-base backup with CBT, see Recovering from a Block-Based Volume Snapshot to the Source on page 19.

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

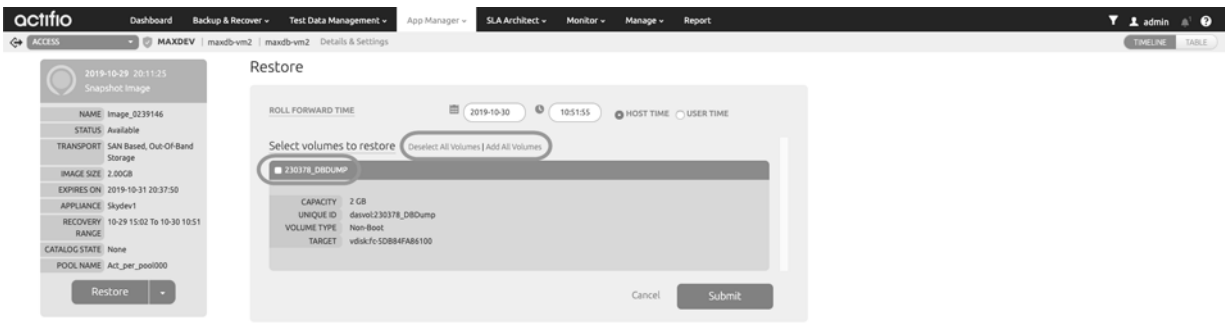
1. From the App Manager Applications list, right-click the protected database and select **Access**. You can use the Managed SLA Status filter to show only protected databases.



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



3. For a database with multiple volumes, select some or all volumes to restore.



4. Click **Submit**. This will start the source database physical recovery.

Restoring an SAP IQ Database to a New Target

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

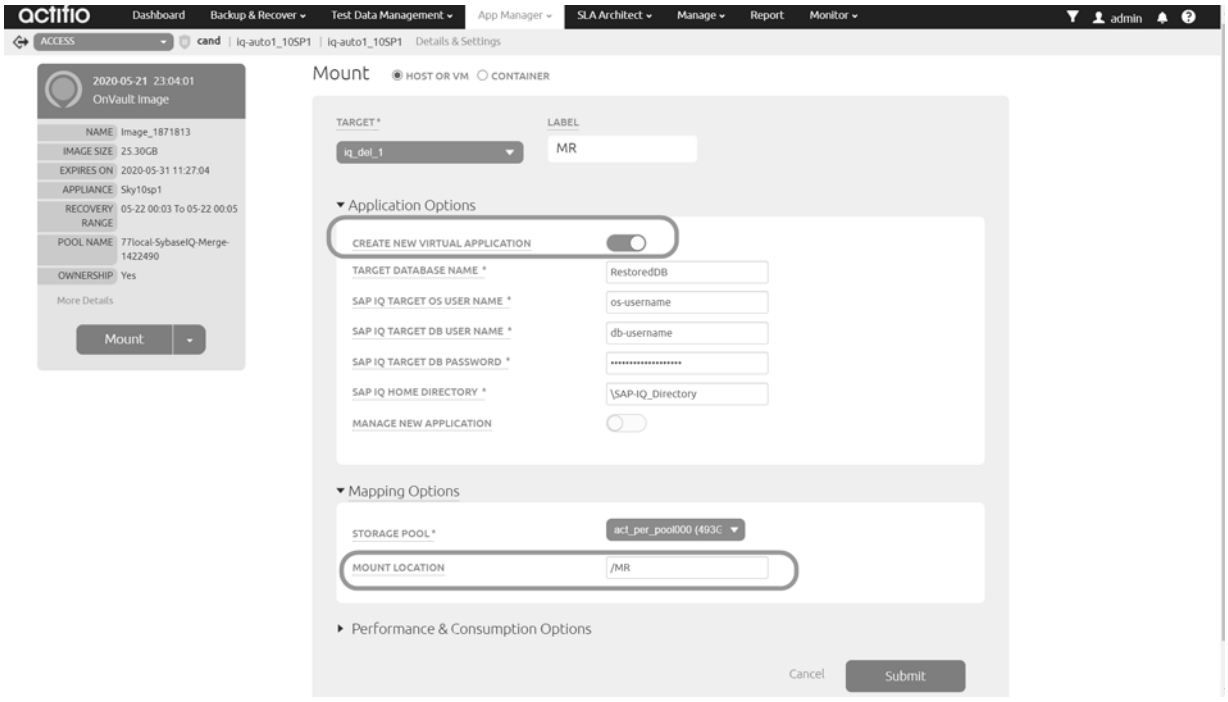
Restoring from a Block-Based Volume Snapshot to a New Target on page 22
Restoring from a File-Based Full+Incremental Backup to a New Target on page 24

Restoring from a Block-Based Volume Snapshot to a New Target

To restore a block-based Volume Level backup image to a new target:

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

3. Create a new virtual application and provide a target mount point under Mount Location, for example, /MR. The database backup will be mounted under /MR and the log backup will be mounted under /MR_archivelog.



4. Once the new application aware mount has been completed, run this script.

```
/act/custom_apps/sybaseiq/lvm_migrate/ACT_SYBASEIQ_lvm_migrate_newTarget.sh
DATAVOL_DISK_MAPPING=<Actifio_Mount>:<Production_LVM_device> newDBNAME=<newDBNAME>
DBA_USER=<DBA_USER> DBA_PASSWD=<DBA_PASSWD> JOBID=<AppAware mount JOBID> [
NSTMNT_CHECK=TRUE ] [ PORTNO=<port_number> ] [ DBFILE_LOC=<new location for
DB_catalog,dblog and iqmsg files> ]
```

Arguments to the Script

DATAVOL_DISK_MAPPING = Comma separated list of <Actifio_mount_point>:<equivalent target host lvm device name>

newDBNAME = Target database name

DBA_USER = Target instance db username

DBA_PASSWD = Target instance password

JOBID = App-Aware mount Job ID

NSTMNT_CHECK = Specify TRUE to continue migration if nested mounts are involved.

PORTNO = Port number on which the target database needs to start. By default SAP IQ starts the database at random available port

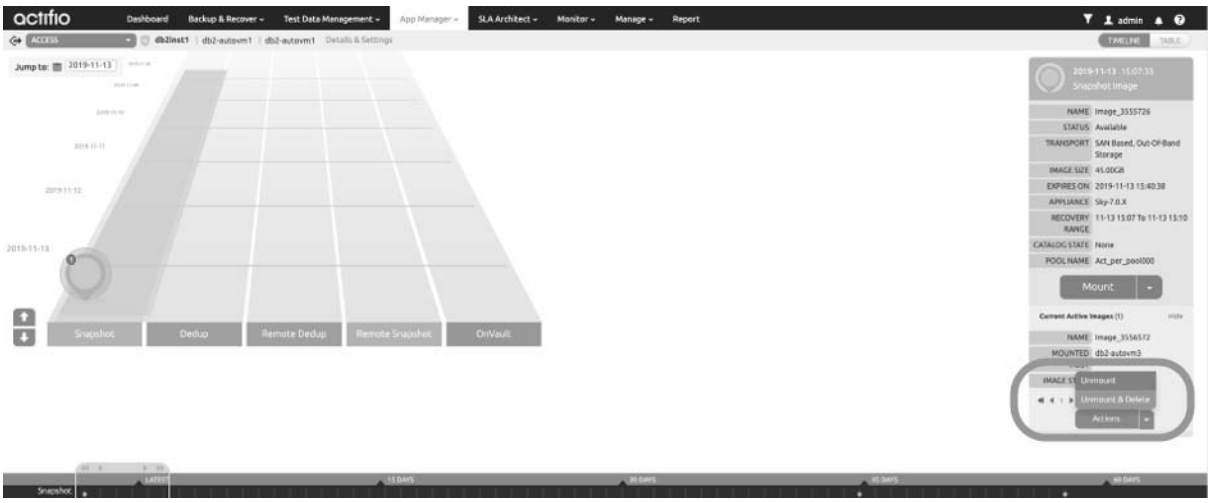
DBFILE_LOC = Location for Target db catalog file, dblog and iqmsg file. By default catalog file and iqmsg files will be on same location, dblog file will create at the catalog file's locations.

Note: *At the time of migration, the database should be up and running, and target lvm devices must be empty.*

Example:

```
/act/custom_apps/sybaseiq/lvm_migrate/ACT_SYBASEIQ_lvm_migrate_newTarget.sh
DATAVOL_DISK_MAPPING=/mr/iqlog:/dev/mapper/vg3-log,/mr/iqdata:/dev/mapper/vg3-data
newDBNAME=MR DBA_USER=act DBA_PASSWD=passwd JOBID=Job_123456 NSTMNT_CHECK=TRUE
PORTNO=2700 DBFILE_LOC=/home/sybaseiq/chdb
```

5. From AGM, unmount the mounted snapshot image.

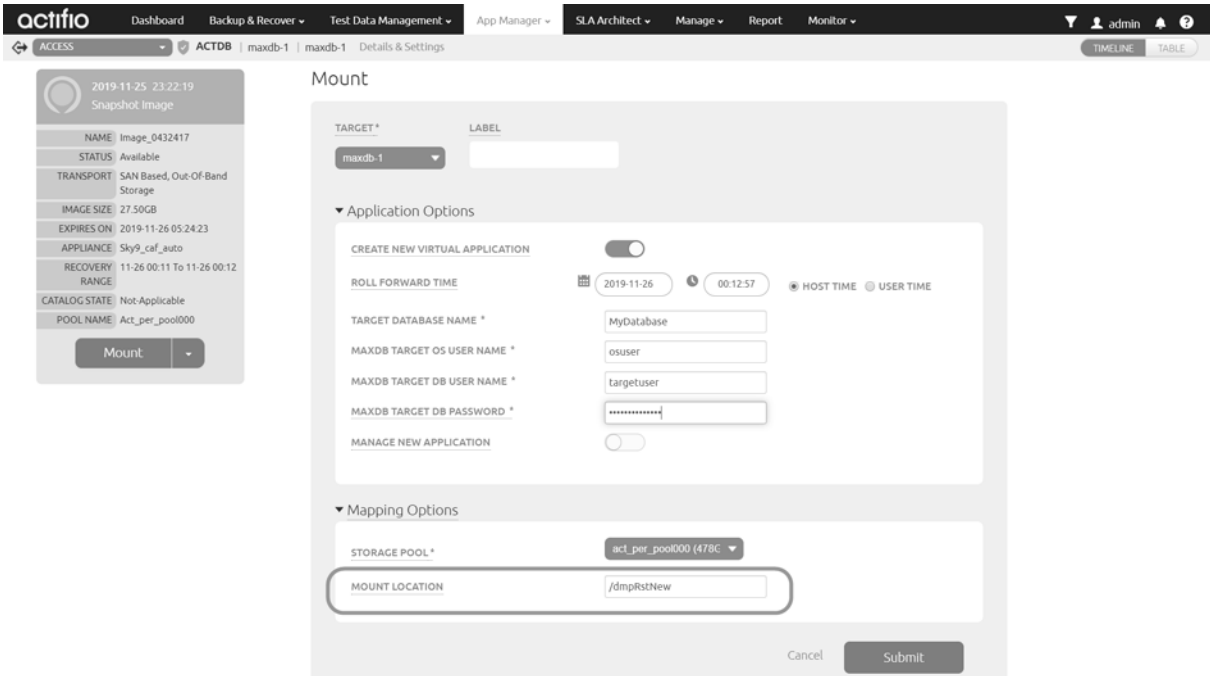


Restoring from a File-Based Full+Incremental Backup to a New Target

To restore a traditional File-Based full+incremental backup image to a new target:

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

3. Provide a target mount point under mount location, for example: /iqmnh. The database backup will be mounted under /iqmnh and the log backup will be mounted under /iqmnh_archivelog.



4. Create a directory structure at the mount point identical to the one at the source.
5. Log into the database server as root. On the server, change the directory to /act/custom_apps/sybaseiq/dump:

   ```
   #  cd /act/custom_apps/sybaseiq/dump
   ```

6. On the target, from command line (as root), run the script ACT_SYBASEIQ_dumprestore_newTarget.sh with arguments:

```
# /ACT_SYBASEIQ_dumprestore_newTarget.sh OSUSER=sybaseiq TARGET_MNT=/bkp/iqmnh
SRC_DB_DBA_USER=act SRC_DB_DBA_PWD=passwd SYBIQ_HOME=/home/sybaseiq VERSION=IQ-16_1
ACT_NAME=cand CATALOG_DB_FILE=/data1/cand/cand.db LOG_BKP_MNTPT=/bkp/iqmnh_archivelog
```

Note: CATALOG_DB_FILE=/data1/cand/cand.db *Here cand.db: cand is the database name.*

Arguments to the Script:

OSUSER = <SYBASE IQ OSUSER name>

ACT_NAME=<SYBASE IQ Source Database name>

TARGET_MNT = <Mount point specified during mount>

LOG_BKP_MNTPT= <Archive Log backup mount point name>

SYBIQ_HOME=<SYBASE IQ Home Location >

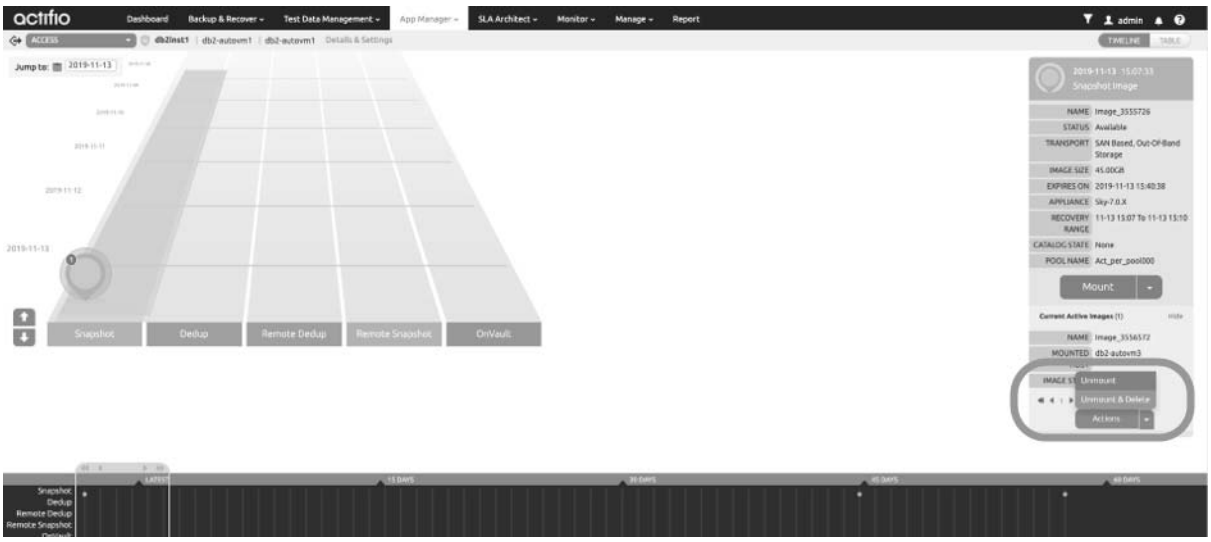
SRC_DB_DBA_USER=<Utility Database user name>

SRC_DB_DBA_PWD= <Utility Database password >

VERSION=<SYBASE IQ Home version >

CATALOG_DB_FILE = <Catalog database file location >

7. Connect to the IQ Database and confirm databases are recovered and online.

```
dbisql -c "uid=<username>;pwd=<password>;eng=<engine name>;dbn=<database name>;"
-nogui
```

8. Unmount the mounted dump snapshot image.