SAP ASE DBA's Guide to Actifio Copy Data Management

actifio

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 SAP ASE 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

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

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

Actifio Data Virtualization on page 1

Capturing Data on page 3

Replicating Data on page 3

Accessing Data on page 4

Introduction to Actifio SAP ASE Administration on page 5

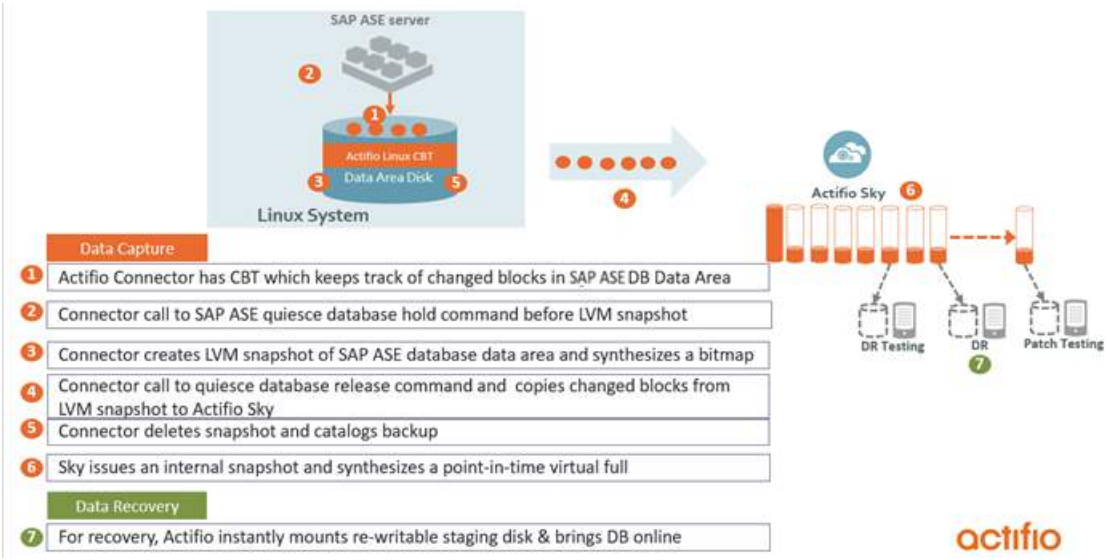
Actifio Data Virtualization

An Actifio Appliance is a highly scalable copy data management platform that virtualizes application data to improve the resiliency, agility, and cloud mobility of your business. It works by virtualizing data in much the same way other technologies have virtualized servers and networks. This enables you to capture data from production systems, manage it in the most efficient way possible, and use virtual copies of the data however they are needed.

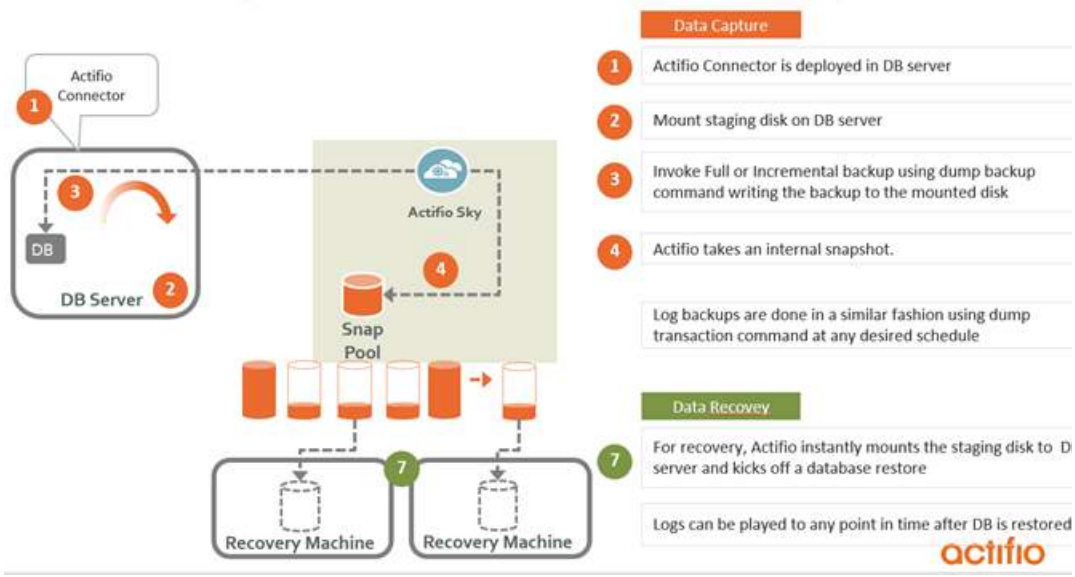
SAP ASE (formerly Sybase ASE) is a is a family of relational database management systems within SAP Information Management division that is centered on several relational database management system offerings. This DBA Guide explains how to protect SAP ASE application consistent database data with Actifio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

Actifio VDP uses these SAP ASE backup APIs:

- **Linux CBT and LVM snapshot**: SAP ASE "quiesce database hold and quiesce database release" API with Linux CBT and LVM snapshot
- **File-based backups**: SAP ASE "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**: During a log backup the "dump transaction" API called to dump logs to an Actifio log staging disk.



SAP ASE with Linux Change Block Tracking



SAP ASE with File-Based Backup

Capturing Data

Capturing data consists of four simple steps:

1. Add servers that host databases.
2. Discover the databases.
3. Define Actifio Policy Templates and Resource Profiles according to your RPOs and RTOs.
4. Assign Actifio Policy Templates and Resource Profiles to discovered databases. The jobs will run on schedule defined in the policy template.

The Actifio Connector

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

Specifically, the Actifio Connector:

- Uses Linux changed block tracking to capture data at block level in incremental forever fashion.
- Identifies changes to database data for VDP's incremental forever capture strategy.

Replicating Data

Data can be replicated to a second Actifio Appliance or to the cloud for recovery, disaster recovery, or test/development purposes.

Data replication has traditionally been an inhibitor to efficient data management in a geographically distributed environment. VDP replication addresses these issues with a global deduplication and compression approach that:

- Drives down overall network usage.
- Eliminates the need for a dedicated WAN accelerator/optimizer.
- Does not require storage array vendor licenses as data is sent from one Actifio Appliance to another.
- Is heterogeneous from any supported array to any supported array: Tier 1 to Tier 2 and/or Vendor A to Vendor B.
- Preserves write-order, even across multiple LUNs.
- Is fully integrated with VMware Site Recovery Manager (SRM) and Actifio Resiliency Director.
- Encrypts data using the AES-256 encryption standard. Authentication between Actifio Appliances is performed using 1024-bit certificates.

Replication is controlled by Actifio Policy Template policies:

- Production to Mirror policies have several options to replicate data to a second Actifio Appliance.
- Dedup Backup to Dedup DR policies use a fixed, Actifio-proprietary replication engine to replicate data to a second Actifio Appliance. In addition, Dedup Backup to Dedup DR policies allow you to replicate data to two locations.
- Production to Vault policies use a fixed, Actifio-proprietary replication engine to replicate data to the cloud.

Accessing Data

The Actifio Appliance can instantly present a copy of the database rolled forward to a specific point of time. The roll forward operation is performed from the Actifio Global Manager (AGM). Accessing protected data is discussed in Chapter 5, Accessing, Recovering, or Restoring an SAP ASE Database.

Access options include:

- Mounts
- LiveClones
- Restores
- Workflows

Mounts

The VDP mount function provides instant access to data without moving data. Captured copies of databases can be rolled forward via the Actifio user interface and mounted on any database server. Application Aware mounts are described in Mount and Refresh from Block-Based Volume Snapshot to a Target SAP ASE instance as a Virtual Application on page 21.

LiveClones

The LiveClone is an independent copy of data that can be refreshed when the source data changes. The advantage of LiveClones is that they are independent copies of data that can be incrementally refreshed and masked before being made available to users. This allows teams such as development and test to ensure they are working on the latest set of data without having to manually manage the data and not access or interfere with the production environment.

Restores

The restore function reverts the production data to a specified point in time. Restore operations actually move data. Typically restore operations are performed to restore a database to a valid state after a massive data corruption or storage array failure. The amount of time required to complete a restore operation depends on the amount of data involved. Restores are described in Restoring and Recovering an SAP ASE Database on page 24.

Workflows

While SLAs govern the automated *capture* of a production database, Workflows automate *access* to the captured database.

Workflows are built with captured data. Workflows can present data as either a direct mount or as a LiveClone:

- Direct mounts (standard or application aware) work well for data that does not need to be masked prior to being presented. A mounted copy of data can be refreshed manually or on automatically on a schedule. Direct mounts allow you to instantly access captured data without actually moving the data.
- A LiveClone is a copy of your production data that can be updated manually or on a scheduled basis. You can mask sensitive data in a LiveClone prior to making it available to users.

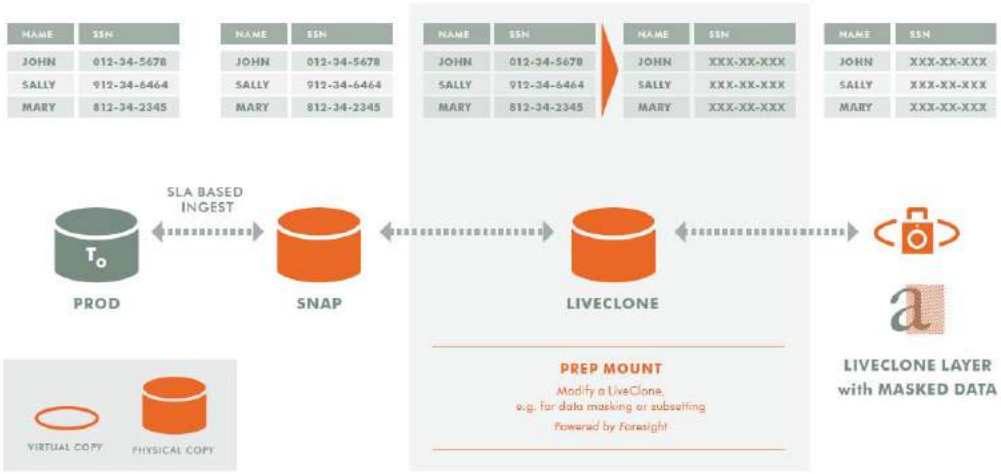
Combining VDP's automated data capture and access control with Workflows and their optional data masking capabilities allows you to create self-provisioning environments. Now, instead of having to wait for DBAs to update test and development environments, users can provision their own environments almost instantly.

For example, an Actifio administrator can create an SLA Template Policy that captures data according to a specified schedule. Optionally, the administrator can mark the captured production data as sensitive and only accessible by users with the proper access rights.

After access rights have been defined and data has been captured, the administrator can create a Workflow that:

- Makes the captured data available as a LiveClone or as a direct mount
- Updates the LiveClone or mountable data on a scheduled or on-demand basis
- (Optional) Automatically applies scripts to the LiveClone's data after each update. This is useful for masking sensitive data.

Once the Workflow completes, users with proper access can provision their environments with the LiveClone or mountable data via the AGM.



Workflow With Masked Social Security Data

Introduction to Actifio SAP ASE Administration

Actifio Benefits: SAP ASE Platform

Activity	Actifio Benefits
Backup	Manual and/or scheduled online backups (incremental forever full snapshots).
Test/Dev Copy	Multiple point in time copies and instant Test/Dev refresh.
	Accelerate and automate Test/Dev provisioning.
	Migration of SAP ASE from a physical to a virtualized environment.
Recovery	Recovery of a database to its most recent state.
	Recovery of a database to a specific point in time of data backup, or log backup.
	Recovery to the original host or an alternate host.
Backup Catalog view	Actifio Global Manager (AGM)

SAP ASE Configurations Support

SAP ASE Primary and Standby protection can be set from Primary or the Standby. Protection is at the database level residing on protected LVM. Transaction log protection is from Primary database only.

2 Preparing an SAP ASE Database for Protection

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

Before You Begin on page 7

Adding an SAP ASE Database Host and Discovering the Database on page 8

Before You Begin

Before you begin, on the SAP ASE server:

- To enable transaction log backup, TRUNCATE ON CHKPT FALSE must be set at the database level for each database of SAP ASE instance.
- The SAP ASE database must reside under LVM and it must not be the boot volume.
- The LVM volume from which the SAP ASE volumes are provisioned should have at least 20% free space.
- A database backup user account must be created with backup privilege (oper_role/sa_role). Backup username/password must be configured with host configuration. Create the user without a password to run the quiesce command on the source with sa_role/or with quiesce privileges. To create the user, run:

```
isql -Usa -P<password> -S<SAP ASE_Server_Name>
1>sp_addlogin actuser, '<password>'
2>go
1>grant role sa_role to actuser
2>go
To set the password to null, run the below command.
1>sp_configure "minimum password length", 0
2>go
1>sp_modifylogin actuser, "min passwd length", "0"
2>go
3>exit
isql -Uactuser -P'<password>' -S<server_name>
> sp_password '<password>', NULL
>go
>sp_configure "minimum password length", 8
>go
```

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

- Install the Actifio Connector on the SAP ASE server host (see ***Connecting Hosts to Actifio Appliances***.)

Adding an SAP ASE Database Host and Discovering the Database

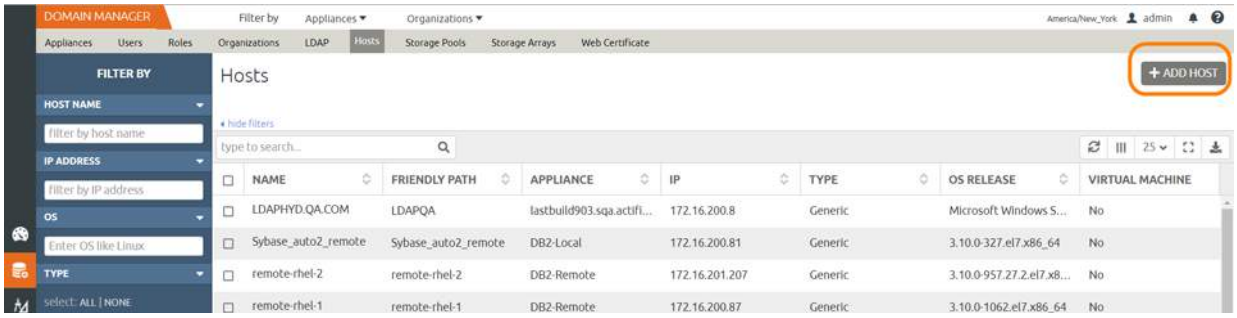
Before you can protect an SAP ASE database, you must add the host and discover the database. This requires:

1. Adding the Host from the Domain Manager on page 8
2. Discovering the SAP ASE Database Application from the Application Manager on page 9
3. Finding the Discovered SAP ASE Database in the Application Manager on page 10

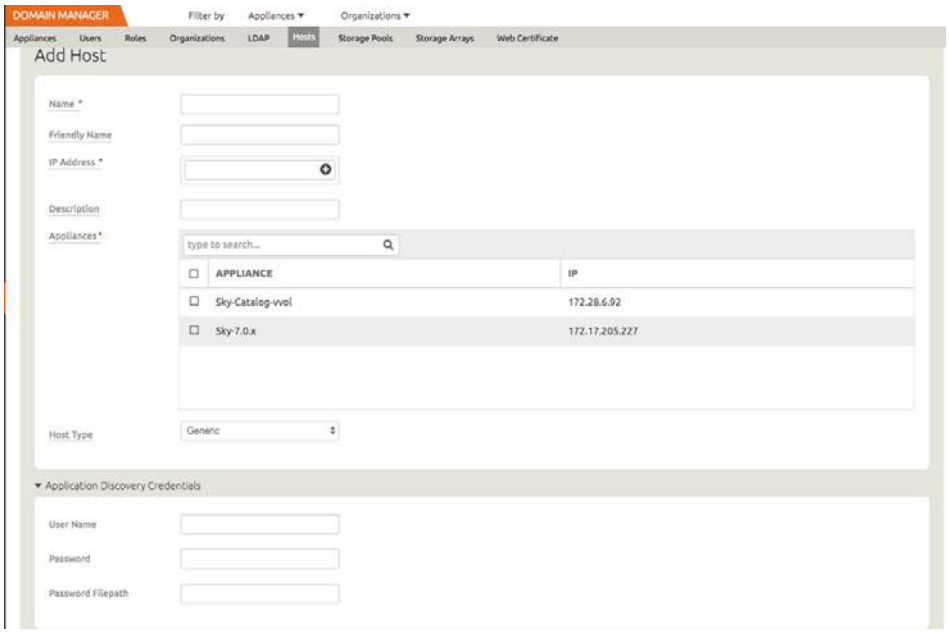
Adding the Host from the Domain Manager

Add the host to Domain Manager. If the host is already added, then edit the host and make sure to set the Disk Preference correctly as detailed in Ensuring that the Disk Preference on the Host is Set Correctly on page 14.

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

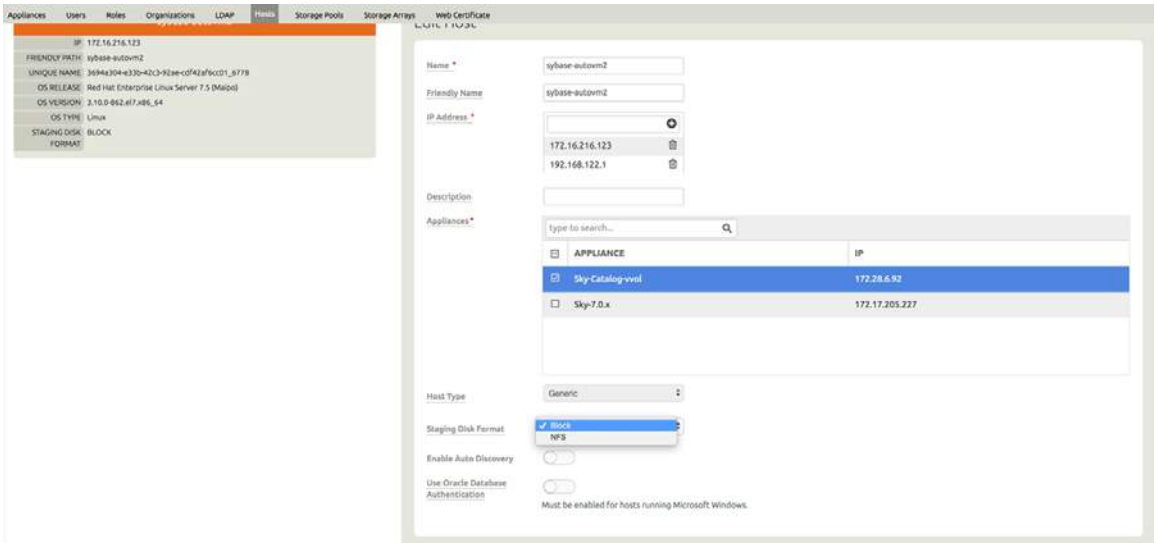


2. On the Add Host page:
   - **Name**: Provide the SAP ASE database server name.
   - **IP Address**: Provide the SAP ASE database server IP and click the + sign on the right corner.
   - **Appliances**: Select the check box for the Actifio Appliance.
   - **Host Type**: Make sure this is Generic.
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



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: Select the disk preference:
    - For block-based backup with CBT, select **Block**.
    - For file-based backup with Full+Incremental file system backup: select **Block** or **NFS**.

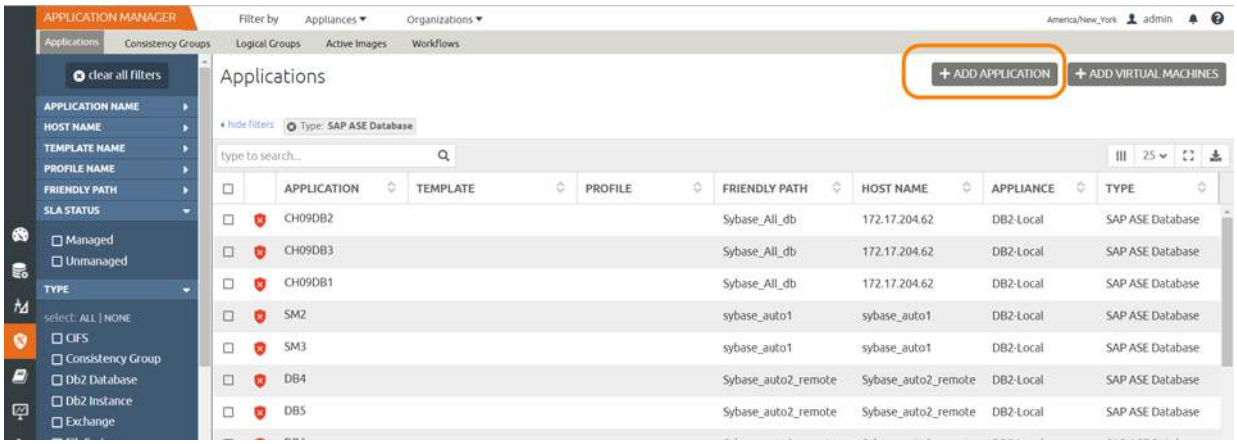


6. Select **Save** at the bottom of Edit Host page.

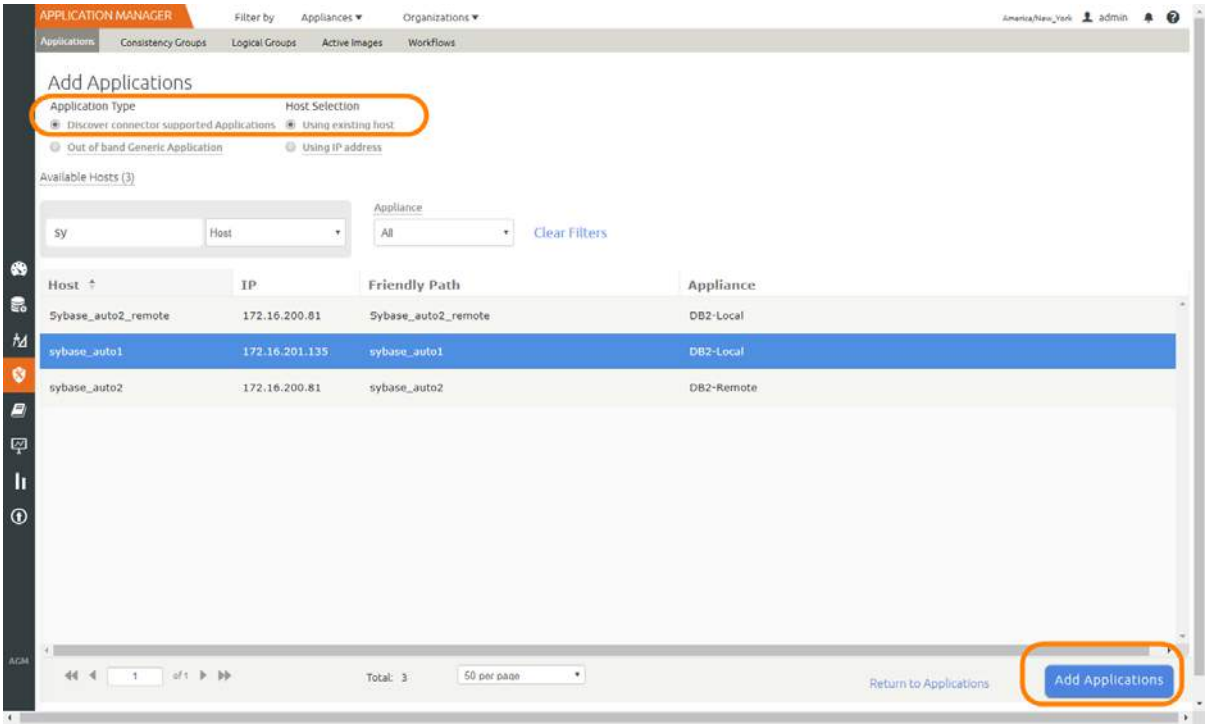
Discovering the SAP ASE Database Application from the Application Manager

To discover the SAP ASE database:

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



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

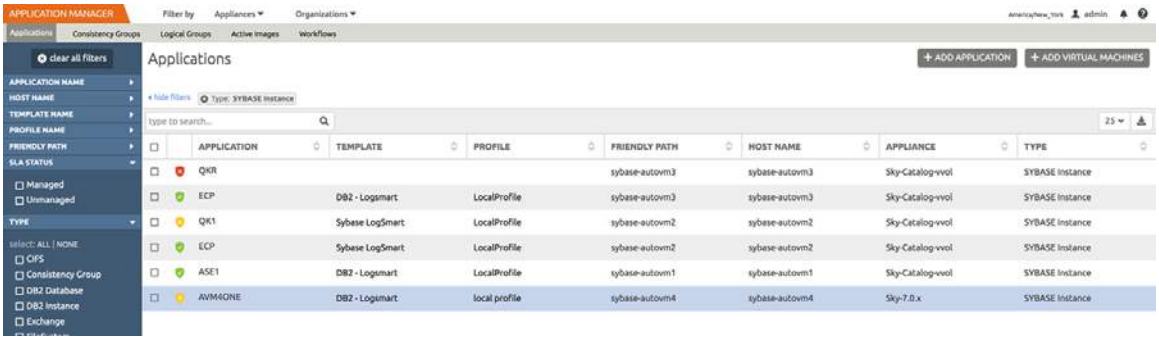


3. Select the host and click **Add Applications** in the bottom right corner. This will run the discovery on the SAP ASE database host and will discover all SAP ASE databases running on it.

Finding the Discovered SAP ASE Database in the Application Manager

To find the newly-discovered database, go to the AGM Application Manager Applications tab. All applications known to the AGM of all types are listed. Use the Type application filter on left pane to show only SAP ASE databases.

The new SAP ASE instance will appear in the list as unmanaged (the red shield icon).



3 Configuring the Backup Method

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

- Using Block-Based LVM Snapshots with CBT on Linux
- Using File-Based Traditional Backups and Recovery

Whichever method you select involves three steps:

Configuring SLA Settings on page 11

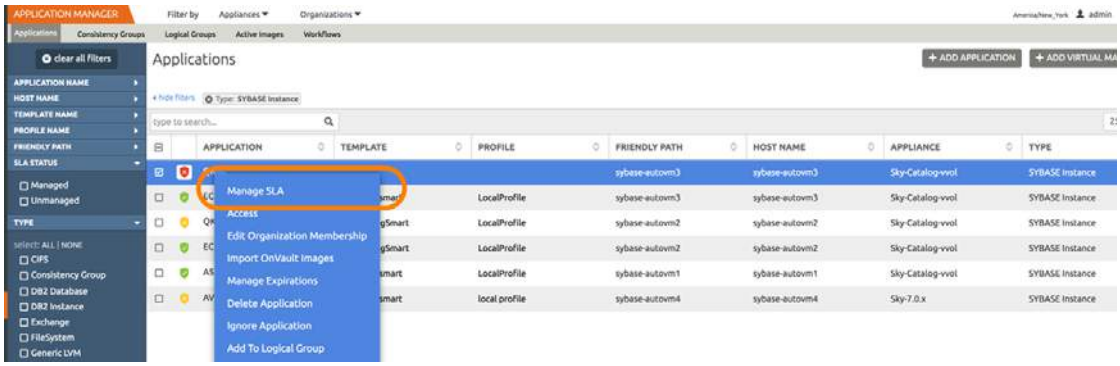
Ensuring that the Backup Capture Method is Set Correctly on page 13

Ensuring that the Disk Preference on the Host is Set Correctly on page 14

Configuring SLA Settings

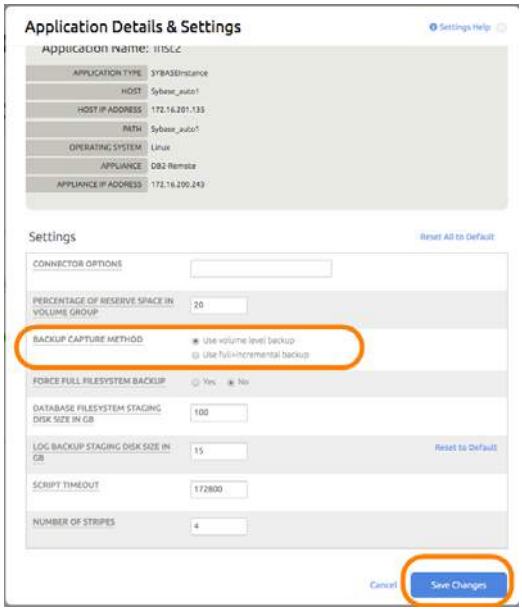
To configure the database SLA settings:

1. In the AGM Application Manager, 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 specific details and settings for this database. Of particular importance is Backup Capture Method.



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

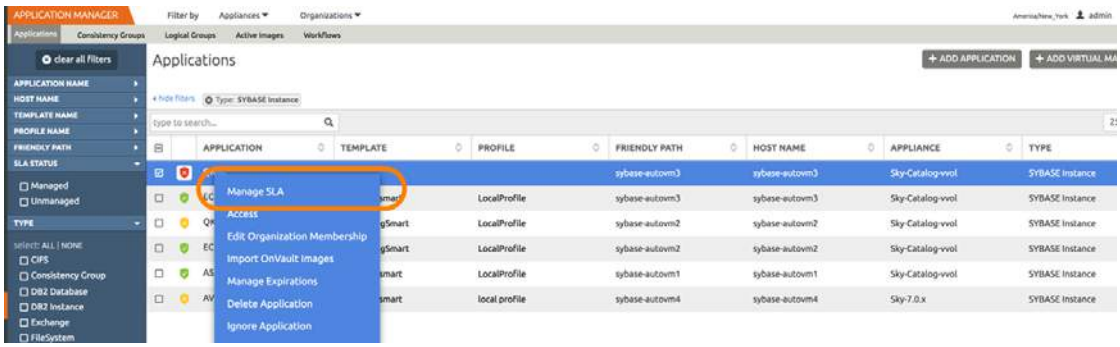
SLA Settings for Each Backup Method

Setting	Linux CBT and LVM Snapshot	File-Based Traditional Backup & Recovery
Percentage of Reserve Space in Volume Group	20% is recommended for LVM snapshot temporary space.	Not applicable
Backup Capture Method	Use volume level backup	Use full+incremental backup
Force Full File System Backup	Not applicable	Use for an on-demand 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, VDP calculates this as (daily log generation * retention of log backup SLA) + 20% for a buffer. If you provide a value, then it will override the default calculation and the log disk will not grow dynamically. This will become a fixed size. Use the default value unless instructed by Actifio Support.	
Script Timeout	This value is applied to internal backup and recovery scripts called by the Actifio Connector. Use the default value unless instructed by Actifio Support.	
Number of Stripes	Number of stripes used by the backup server. Default value is 4.	

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:

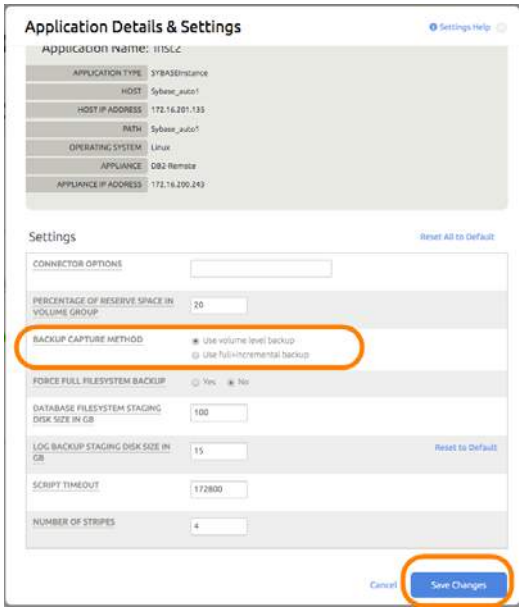
1. In the AGM Application Manager, right-click the database and select **Manage SLA**.



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

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

- SAP ASE Traditional Backup and Recovery API "File-based" Backups: **Use full+incremental backup**
- LVM Snapshot with Change Block Tracking: **Use volume level backup**



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

Ensuring that the Disk Preference on the Host is Set Correctly

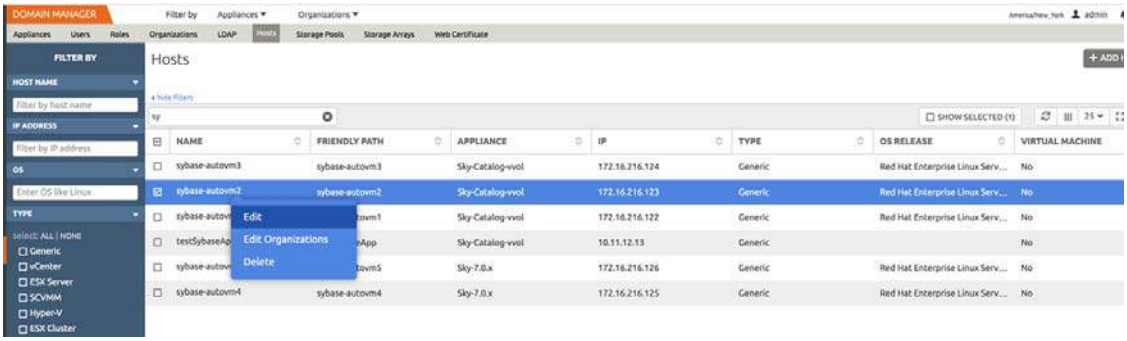
Choose between:

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

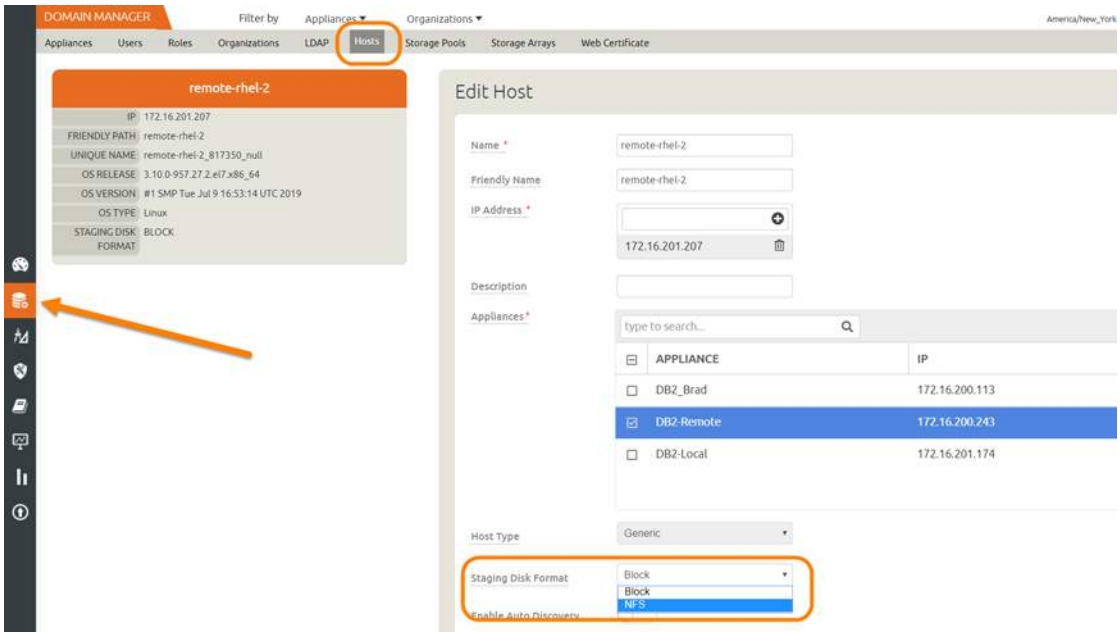
Disk Preference: File-Based Traditional Backup and Recovery in NFS/Block

To set disk preference for storage snapshots:

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



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



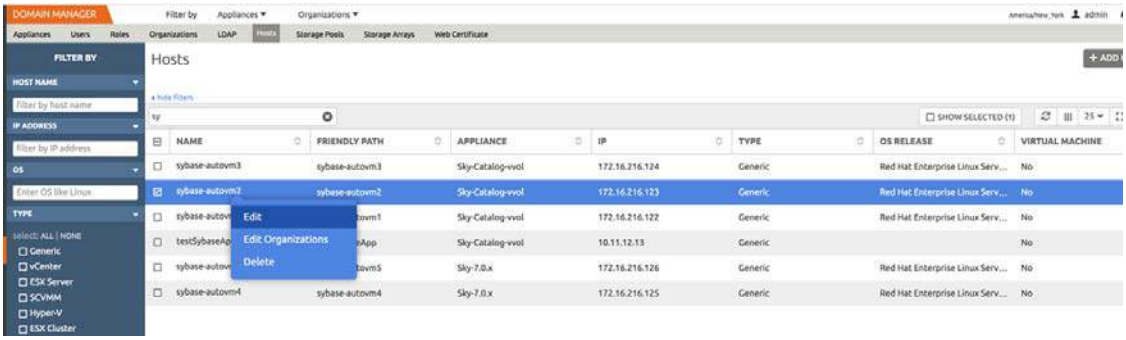
3. Then click **Save** at the bottom of the page.

Note: *File-based backup also requires the DB dump schedule be configured. See* Setting the Schedule for Dumps on page 16.

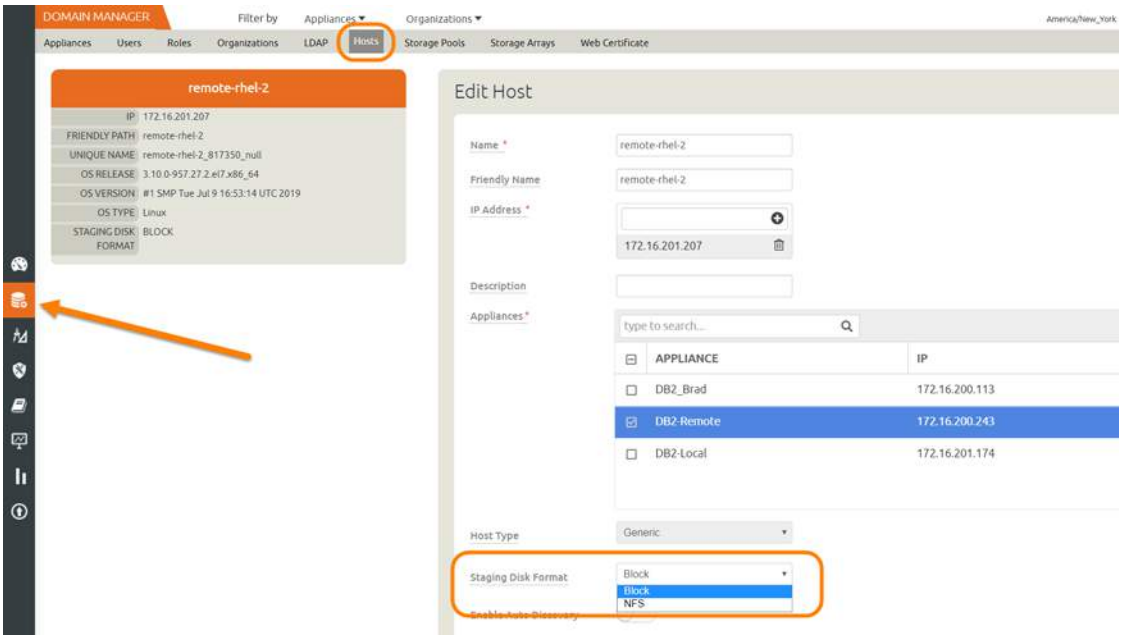
Disk Preference: LVM Snapshot with Change Block Tracking on Linux

To set disk preference for storage snapshots:

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



2. Set Disk Preference 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 SAPHANA 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 ASE Database and its Logs

Protecting an SAP ASE database includes both:

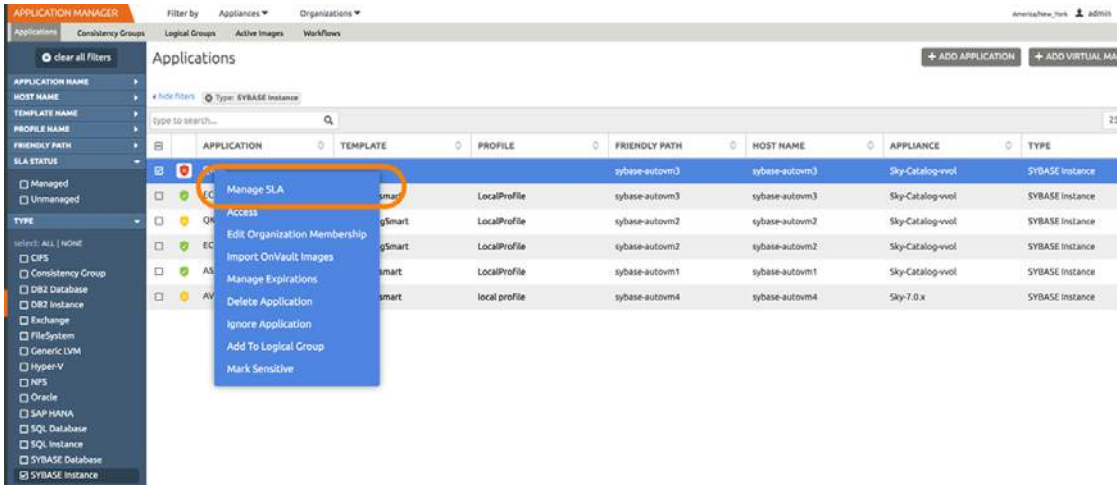
Protecting an SAP ASE Database on page 17

Protecting SAP ASE Database Logs on page 19

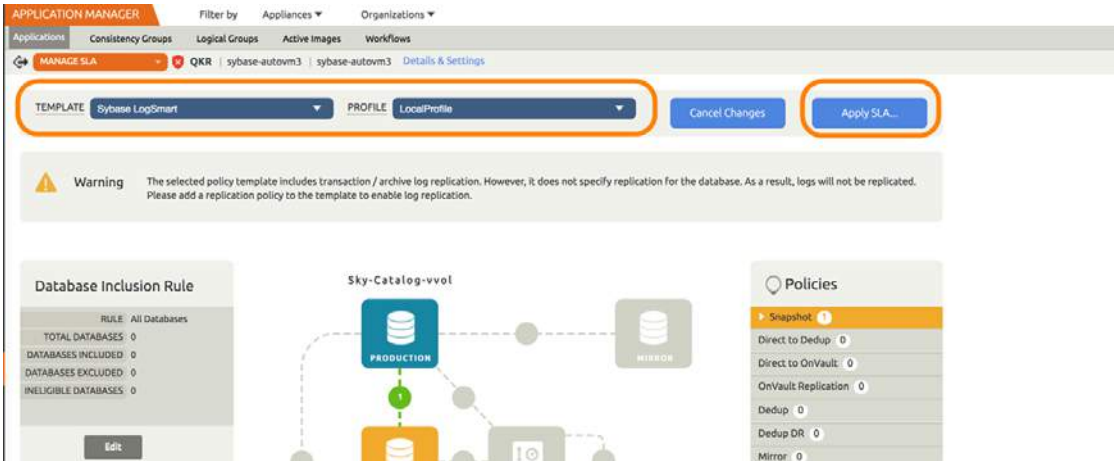
Protecting an SAP ASE Database

To protect the database:

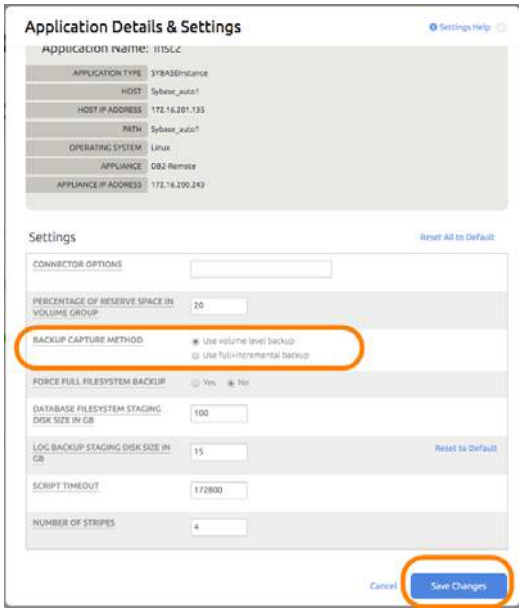
1. From the AGM Application Manager, right-click the database and select **Manage SLA**.



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

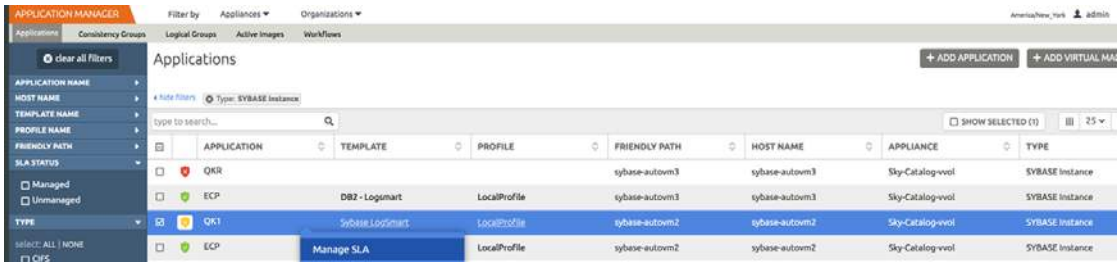


3. On the Apply SLA page, make sure that the backup capture method matches the type of backup set in Chapter 3, Configuring the Backup Method. Click **Apply SLA** or **Save Changes**.

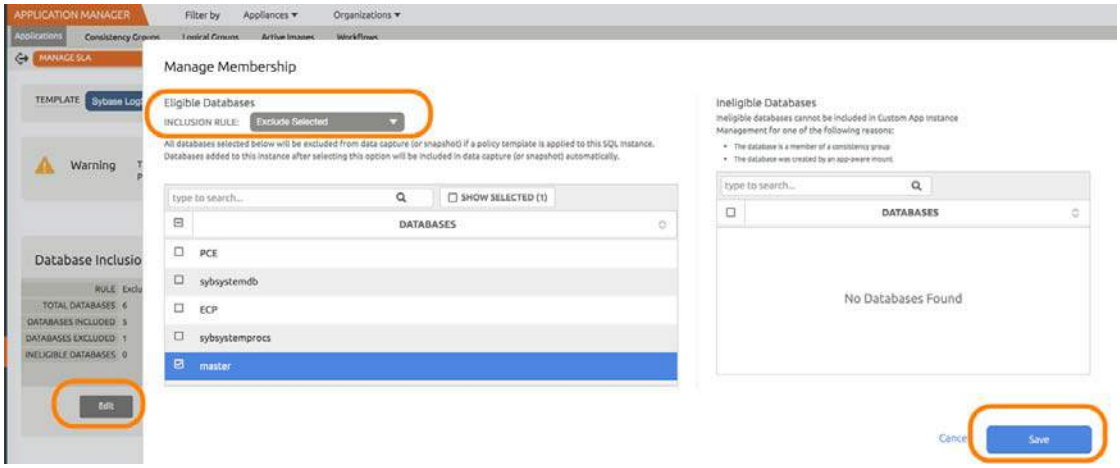


The database will be protected when the snapshot job runs according to the schedule in the template. After the first successful snapshot job the database appears in the Application Manager with a green shield icon.

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



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

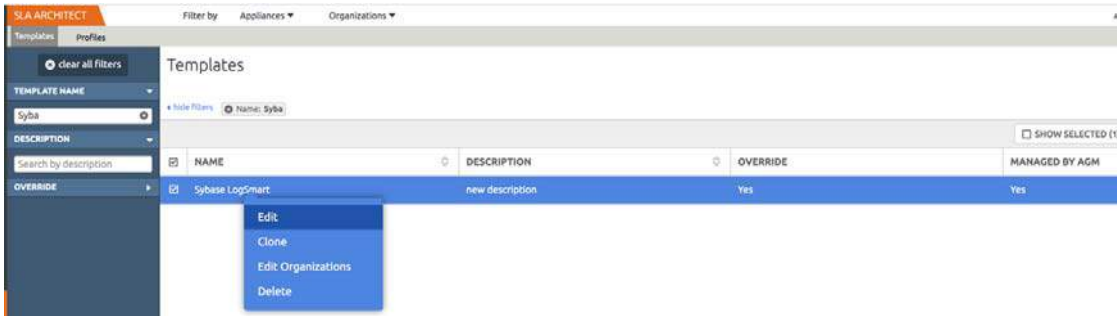


6. Select an Inclusion Rule (Include All, Include Selected, or Exclude Selected). Select the databases to include or exclude, then click **Save**.

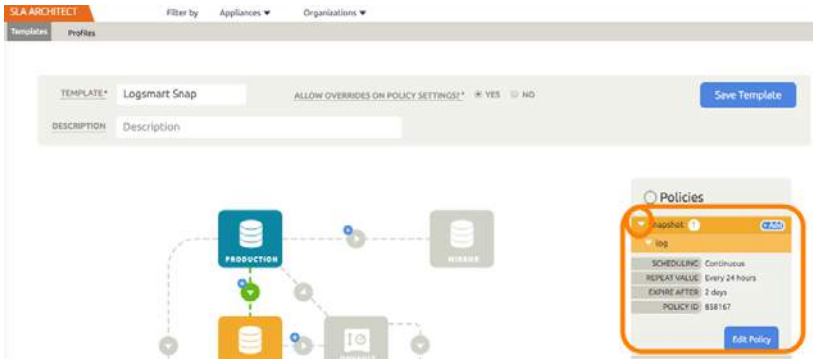
Protecting SAP ASE Database Logs

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

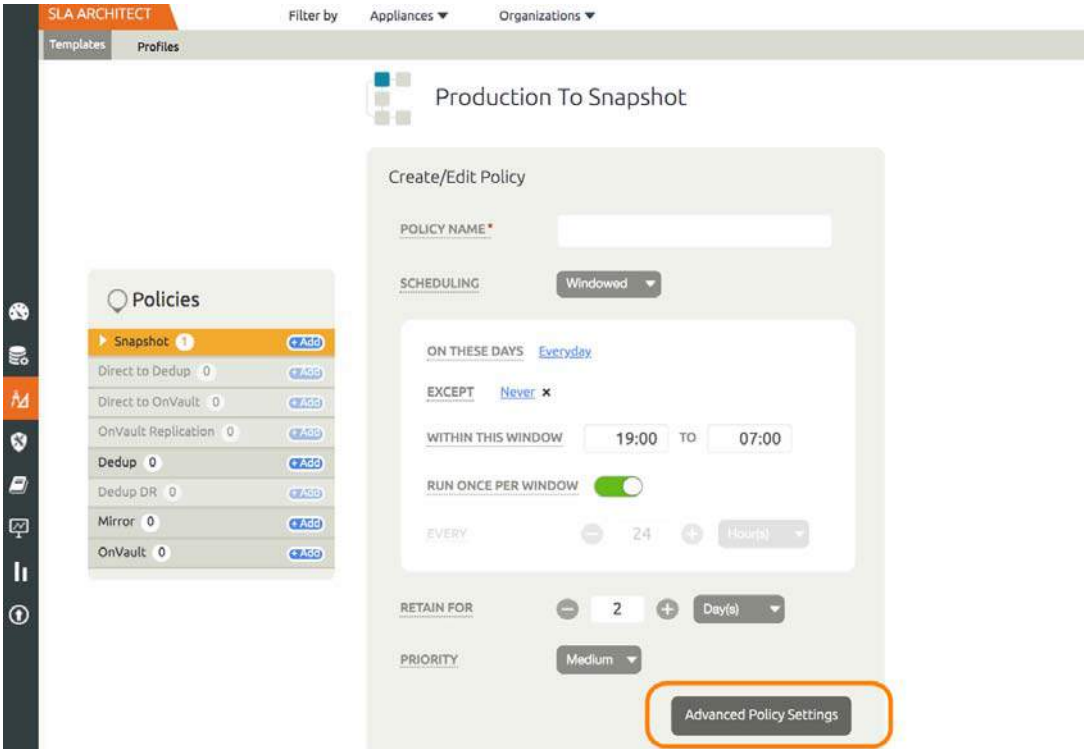
1. From the AGM SLA Architect page, right-click the template for SAP ASE database protection and click **Edit**.



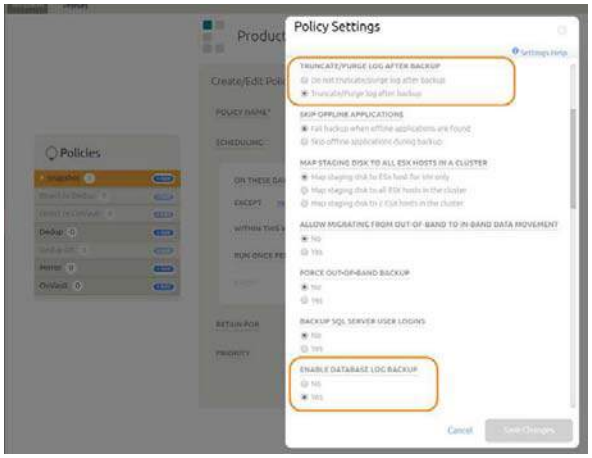
2. Click the arrow beside the Snapshot policy to open up the details, then click **Edit Policy**.



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

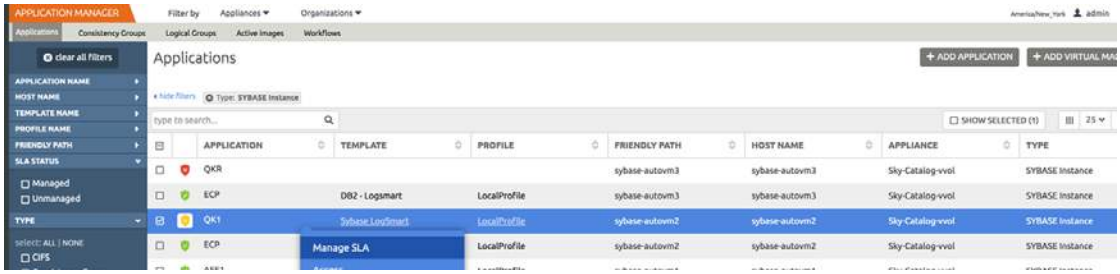


4. Set the log policy options (you will have to scroll to see them all):
    - Enable **Truncate/Purge log after backup**.
    - Set **Enable Database Log Backup** to **Yes**.
    - For **RPO (Minutes)**, enter the desired frequency of log backup.
    - Set **Log Backup Retention Period (in Days)** for 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.

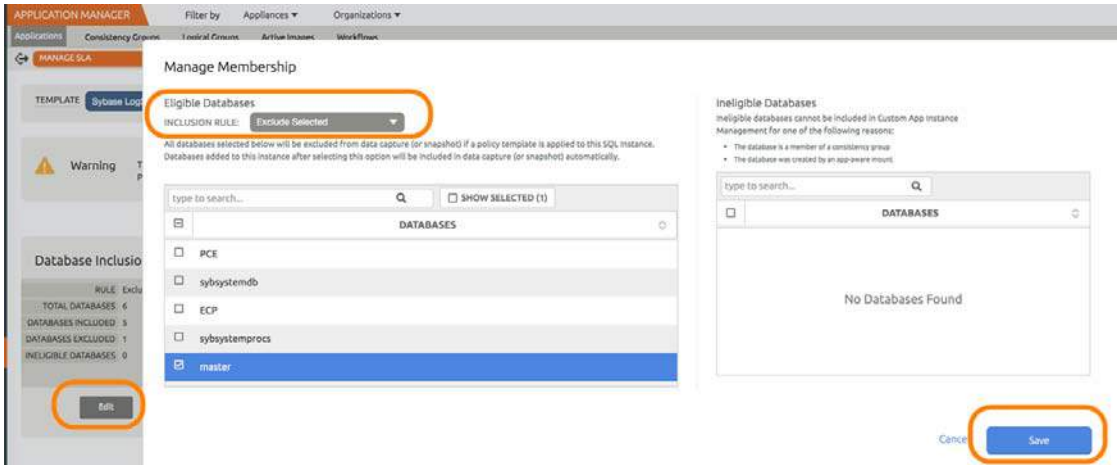


5. Click **Save Changes**.

6. Include or exclude database logs to match the database settings. From the Application Manager, select the SAP ASE Instance. You can use the SAP ASE Instance checkbox to filter the list. Select **Manage SLA**.



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



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

5 Accessing, Recovering, or Restoring an SAP ASE Database

There are two ways to access a protected database:

Mount and Refresh from Block-Based Volume Snapshot to a Target SAP ASE instance as a Virtual Application on page 21

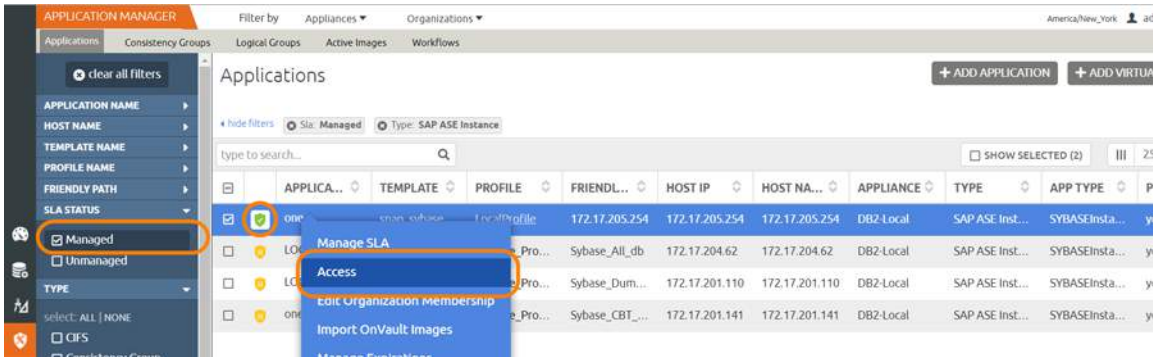
Restoring and Recovering an SAP ASE Database on page 24

Mount and Refresh from Block-Based Volume Snapshot to a Target SAP ASE instance as a Virtual Application

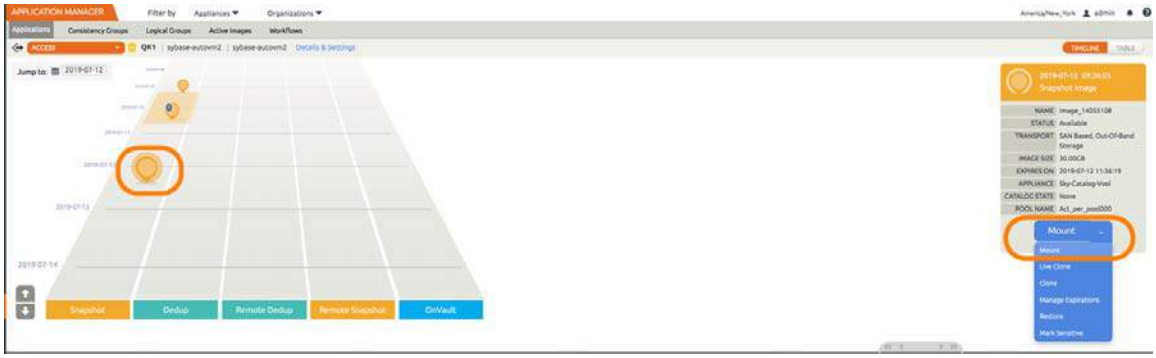
To mount the database image as a virtual application (an application aware mount) to a new target:

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.*

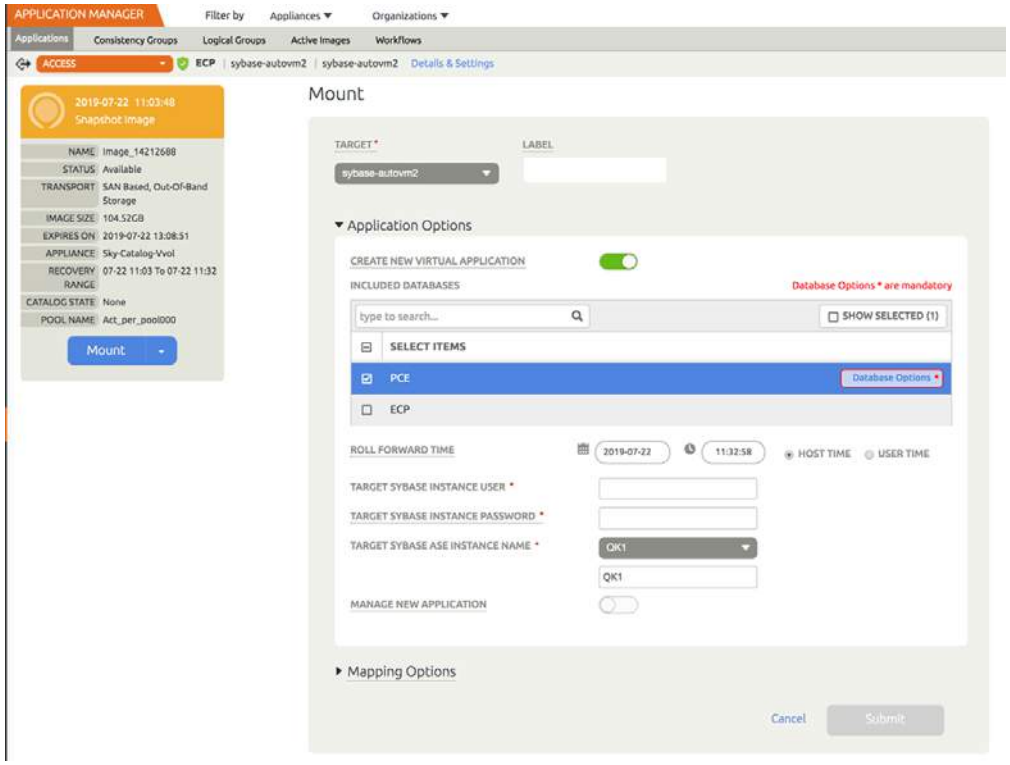


2. Select a snapshot image and choose **Mount**.

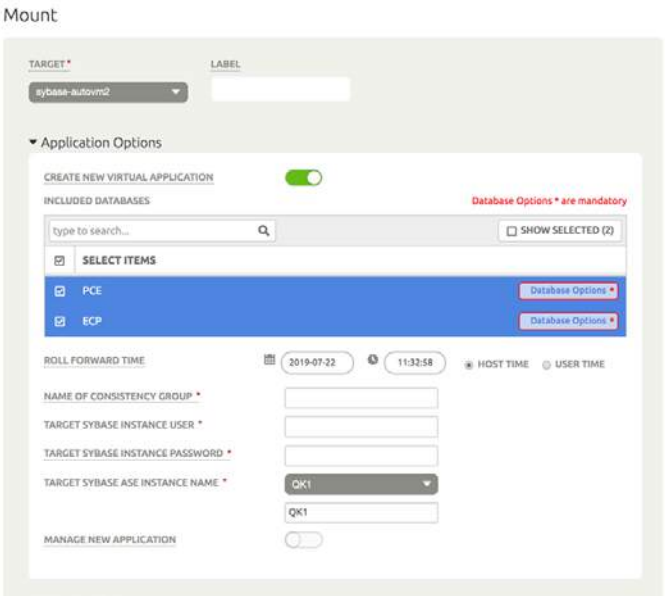


3. On the Mount page, from Target, choose the desired target SAP ASE server from the dropdown.

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

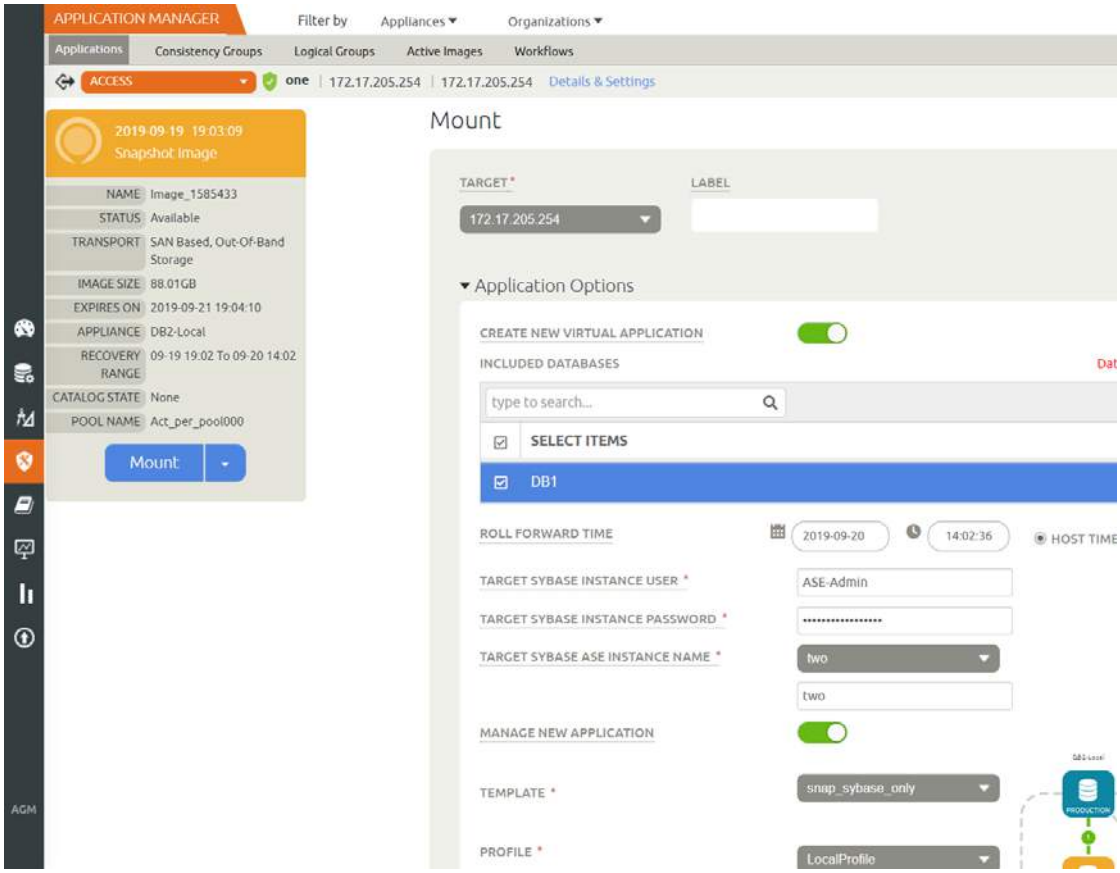


Selecting a Single Database



Selecting Multiple Databases

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 appears if more than one database is selected. Provide a unique name to manage the selected databases as a virtual copy.

   TARGET SAP ASE INSTANCE NAME: From the drop down, select a target SAP ASE instance to attach the selected database as a 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. Under Mapping Options, Mount Location, specify a target mount point to mount the new virtual database to.

9. Click **Submit**.

Restoring and Recovering an SAP ASE Database

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

Recovering from a Volume-Based Snapshot on page 24

Recovering from a Full+Incremental Backup on page 26

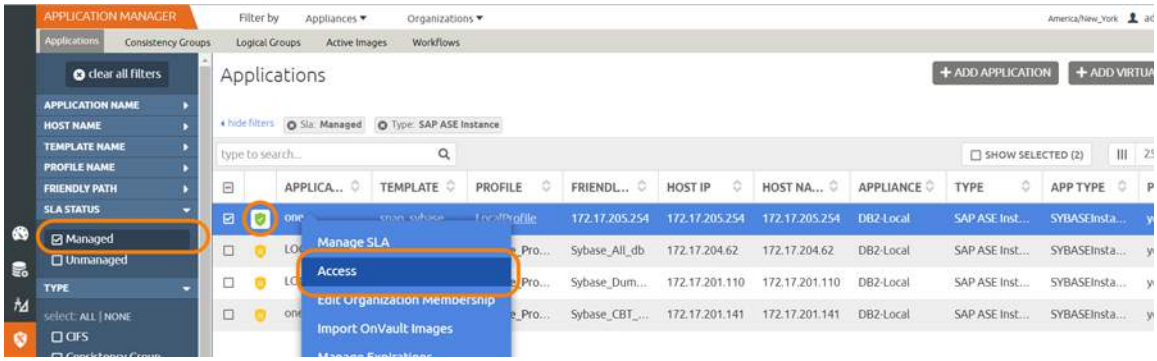
Recovering from a Volume-Based Snapshot

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

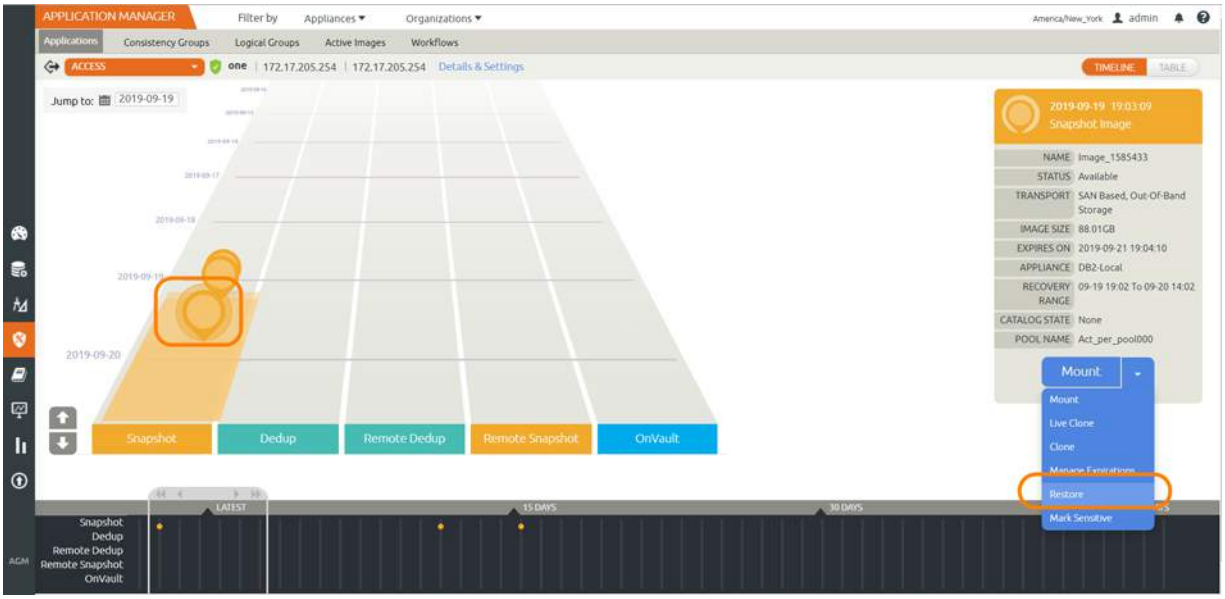
To recover back to the source:

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

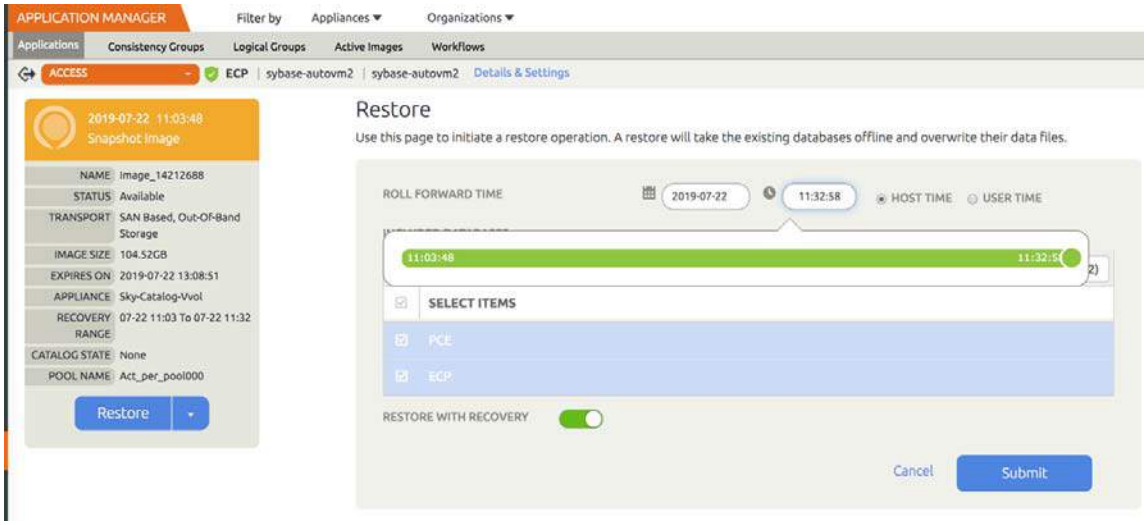
> ***Note:*** *You can use the Managed SLA Status filter to show only protected databases.*



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.



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

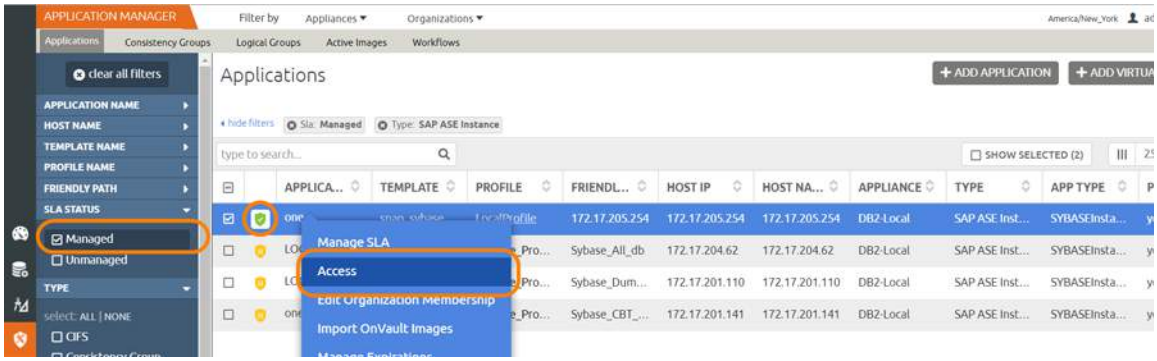
Recovering from a Full+Incremental Backup

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

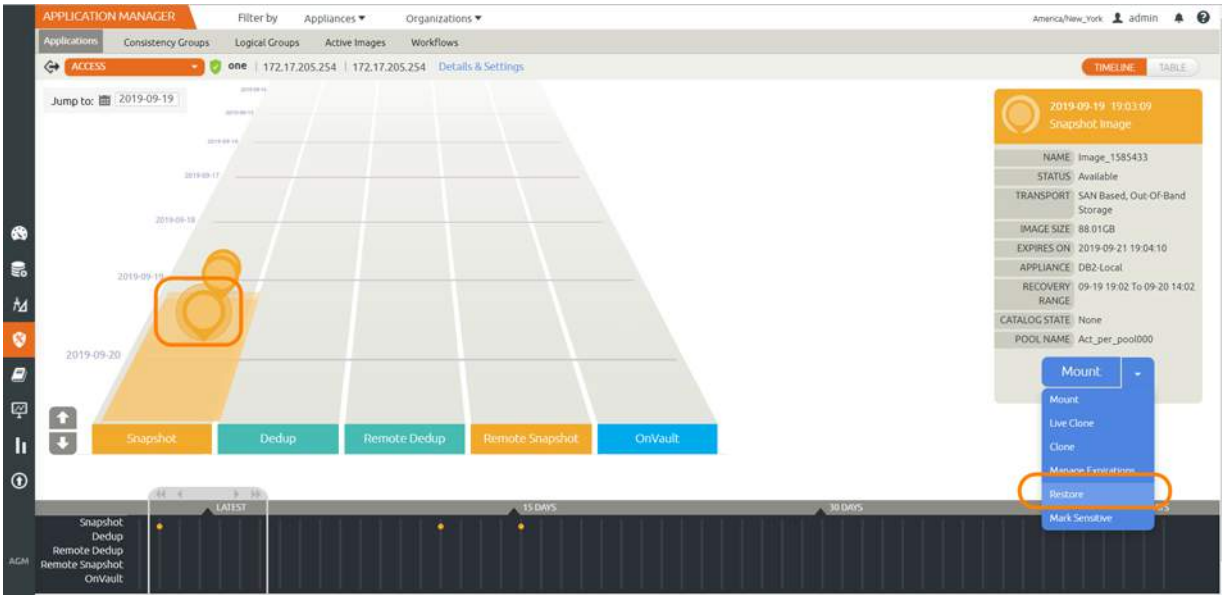
To recover back to the source:

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. 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 using SAP ASE recover commands.