

D E L P H I X

Quick Start Guide for SAP ASE

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Quick Start Guide for SAP ASE

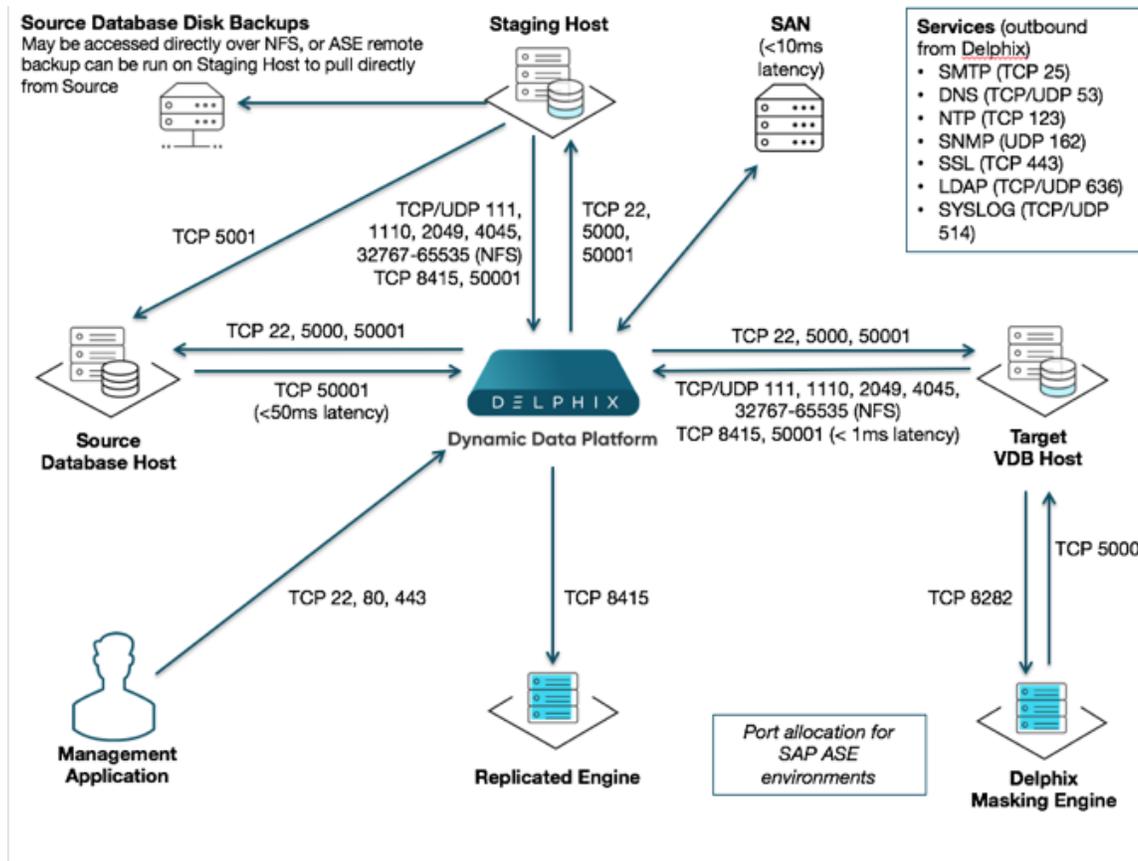
This quick start guide, which is excerpted from the larger User Guide, is intended to provide you with a focused overview of working with SAP ASE database objects in the Delphix Dynamic Data Platform. It does not cover advanced configuration options. It assumes you have already setup the Delphix Engine.

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Overview

In this guide, we will walk through configuring SAP ASE Source and Target environments, creating a dSource, and provisioning a VDB.

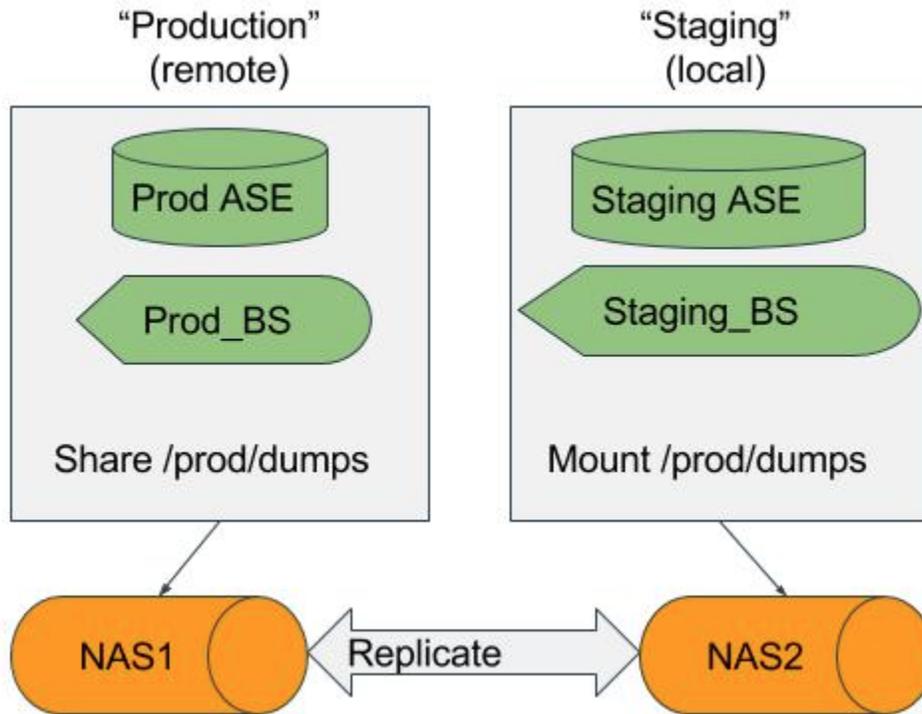
The following diagram describes the platform topology for SAP ASE environments. It illustrates the required and recommended ports to open from Delphix to remote services, to the Delphix Engine, and to the Target Environments. A detailed list can be referred to in the [Network and Connectivity Requirements for SAP ASE Environments](#) section of the manual.



Delphix stays in sync with source databases by monitoring the ASE backup server log. When it sees a new database dump or transaction log has been created, it attempts to load it into the ASE staging instance.

Validated sync Mode	SnapShot for FULL BACKUP	SnapShot for TLOGS	Point-in-Time Restore
truncate log on chkpt = true	Yes	No	No
truncate log on chkpt = false	No	Yes	No
truncate log on chkpt = true + Log Sync	Yes	No	No
truncate log on chkpt = false + LogSync	No	Yes	Yes

Before proceeding with setting up environments, decide where the databases will be located relative to the ASE staging instance. In the following diagram, we have two ASE hosts (production and staging).



If the database dumps (or transaction logs) are available locally to the staging Backup Server, Delphix considers them "local". Whereas if they are available to a Backup Server on production, they are "remote". If the files will be local to the staging server, there are many options to get them from the production host to the staging host including but not limited to:

- Sharing the directory on the production host over NFS to the staging host.
- Using Network Attached Storage (NAS) to replicate the files.
- Using scp to copy the files from one host to the other.

If the files are only available on the production host, Delphix will login to the ASE staging instance and issue the "LOAD DATABASE" command using the remote server syntax (for example LOAD DATABASE pubs2 FROM "/dumps/pubs2.full.9_5_16" AT Prod_BS).

Source Host Requirements

There must be an operating system user, such as delphix_os, that meets the following requirements:

- The \$SYBASE environment variable is defined for non-interactive shells (such as via the .bashrc configuration file).
 1. Set the PermitUserEnvironment configuration parameter to "yes" in the sshd_config file
 2. Add the variable to the user's .ssh/environment file

3. Restart the SSH daemon

- To test this requirement:

```
ssh delphix_user@ase_hostname env | grep SYBASE
```

- Can login to the source host via SSH (TCP port 22)
- Delphix requires superuser permission to run **pargs** in order to discover Solaris ASE instances. For more information, see [Sudo Privilege Requirements for SAP ASE Environments](#).
- Designating the Delphix operating system user's primary group to be the same as the ASE instance's means the file system permissions can be more restrictive and is a better security practice than granting world read access to the toolkit or the backup files. If the target host is used to host the staging databases, consider the following:
 - If you don't add the Delphix operating system user to the ASE instance owner's group, greater permissions will need to be **granted to the backup files to ensure read access to the dumps and/or transaction logs**. Delphix looks for the backup files on the staging host (unless a "remote" backup server is used in which case, the remote host is used which is often the source environment).
 - If you sync Delphix with a dSource by asking ASE to create a new backup, the ASE instance owner will need the **write permission to the toolkit** (or the mount point if you use the CLI to specify a directory other than the toolkit). Delphix will issue the "DUMP DATABASE" command to write to staging database's "temp" directory which is mounted on the staging host.
 - Has **write permission for the mount-point directory** (by default the toolkit directory but can be a separate mount point specified in the command line interface).
- There must be a directory on the source host where you can install the Delphix platform toolkit, for example: /var/opt/delphix/Toolkit
 - The delphix_os user must own the directory
 - The directory must have permissions 0770, for example, -rwxrwx---. However, you can also use more permissive settings.
 - The directory should have 256MB of available storage.

Source Database Requirements

When adding a source ASE environment to Delphix, you may use a single login to discover the ASE instances and link the source databases OR you may use a single login to discover all of the ASE instances and separate logins to link each dSource.

- Delphix uses a single database user for the discovery of all ASE instances and their databases for each environment added to Delphix.

- The discovery database user (delphix_disc for example) must have SELECT privileges on the following tables for each ASE instance on the source host:
 - **sysdatabases**
 - **sysservers**
 - **syslisteners**
 - **sysconfigures**
 - **syscurconfigs**
- Another user must be specified when linking each dSource (delphix_link for example) that has SELECT privileges on the above tables.
 - If you will select New Full Backup when linking, this user must also have privileges to take a new full database dump of the source database. For more information about linking options, see [Linking an SAP ASE Data Source](#).
 - The link database user can be different for each instance and database on the source host.

 If the source database is resized and trunc log on chkpt is disabled, take a transaction log dump immediately after the resize operation completes. If trunc log on chkpt is enabled, take a full database dump immediately after the resize operation completes. If multiple resizing operations are performed without taking transaction log dumps between each operation it may be necessary to manually sync the dSource with a new full database dump for Delphix to be able to continue ingesting source database dumps.

Target Host Requirements

- The operating system on the target environment must be the same as, or binary compatible with, the operating system on the source environment.
- As the Delphix Engine uses NFSv3 for mounting target host filesystems, the prerequisite packages to support NFSv3 client communication are required for normal operation, and the required services to support NFS client communications (including file locking) must be running. This includes:
 - i. portmapper / rpcbind
 - ii. status daemon (rpc.statd)
 - iii. NFS lock manager (rpc.lockd/lockmgr)
- The SAP ASE major version on the target environment must be the same as the version on the source environment. However, EBF/SP version on target environment can be different. If the target is used as a staging server, the ASE major version must be the same. The only caveat is for ASE 15.7 - where the source and staging patch levels must both be either any version below SP64 or both be any version above SP100.
- There must be an operating system user, such as delphix_os, that meets the following requirements:
 1. Set the PermitUserEnvironment configuration parameter to "yes" in the sshd_config file
 2. Add the variable to the user's .ssh/environment file

3. Restart the SSH daemon

- The \$SYBASE environment variable is set for non-interactive shells (such as via the .bashrc configuration file). Set the variable as follows:
- To test this requirement:

```
ssh delphix_user@ase_hostname env | grep SYBASE
```

- Can login to the target host via Secure Shell (SSH)
- Can login to ASE instances using isql with LANG=C set
- Designating the Delphix operating system user's primary group to be the same as the ASE instance's means the file system permissions can be more restrictive and is a better security practice than granting world read access to the toolkit or the backup files. If the target host is used to host the staging databases, consider the following:
 - If you don't add the Delphix operating system user to the ASE instance owner's group, greater permissions will need to be **granted to the backup files to ensure read access to the dumps and/or transaction logs**. Delphix looks for the backup files on the staging host (unless a "remote" backup server is used in which case, the remote host is used which is often the source environment).
 - If you sync Delphix with a dSource by asking ASE to create a new backup, the ASE instance owner will need **write permission to the toolkit** (or the mount point if you use the CLI to specify a directory other than the toolkit). Delphix will issue the "DUMP DATABASE" command to write to staging database's "temp" directory which is mounted on the staging host.
 - Has **write permission for the mount-point directory** (by default the toolkit directory but can be a separate mount point specified in the command line interface).
- The following permissions are usually granted via sudo authorization of the commands. See [Sudo Privilege Requirements for SAP ASE Environments](#) for further explanation of this requirement, and [Sudo File Configuration Examples for SAP ASE Environments](#) for example file configurations.
 1. Permission to run **mount** and **umount** as super-user.
 2. On Solaris, permission to run **pargs** on Solaris
 3. On AIX, permission to run the **nfso** command as super-user.
 4. (Optional) On AIX and Linux, permission to run **ps** as super-user.
 5. Disable **tty** for the delphix_os user for mount and umount.
- There must be a directory on the source host where you can install the Delphix platform toolkit, for example: /var/opt/delphix/Toolkit
 - The delphix_os user must own the directory
 - The directory must have permissions 0770, for example, -rwxrwx--. However, you can also use more permissive settings.
 - The directory should have 1GB of available storage
 - Avoid using the home directory of the delphix_os user

- If you intend to use the LogSync feature, it is recommended to make the toolkit directory as short as possible to keep the full path to the transaction log file names under ASE's 127 character limit. For example, create the toolkit directory as /tk. Alternatively, link the dSource using the command line interface and specify the "**mountBase**" parameter to mount the staging database's devices under a directory following your own naming convention.

Target Database Requirements

- There must be a database user, such as delphix_db, with the **sa_role** on each instance on the target environment
 - The database user such as delphix_db for any staging instances must also have the **sybase_ts_role**
 - If the target host will be used as a staging target environment (see [Managing SAP ASE Environments Overview](#)), at least one of the following two options must be configured:
 - You must use **sp_addserver** to add the staging ASE instance's Backup Server to **syservers** on the source ASE instance (so that remote database dump/load works)
- OR
- Full and transaction dump files from the source database must be available locally to the staging database (over NFS, replication, scp, etc.)

Specific ASE Tuning Recommendations

- In ASE 15.7 SP60 and higher, there is a configuration parameter named "**enable large pool for load**". ASE automatically tunes the caches for recovery on reboot, but does not do this for load database and load transaction recovery, since it could impact other databases on a production server. Delphix recommends that the staging ASE instance be separate from the ASE production instance and ASE instances hosting VDBs so enabling this parameter should have *a beneficial impact on performance for the ASE staging instance*.
- Specify the "**relaxed**" strategy for replacing the cache in the default data cache (**sp_cacheconfig 'default data cache', relaxed**) in the ASE staging instance. Since the mount/unmount process invalidates the pages anyway, the page chain is really just unneeded overhead on the staging server.
- Staging and target ASE instances should have disk mirroring disabled.

sp_configure "disable disk mirroring" – run value should be 1, which is the default. If it is 0, change it using

sp_configure "disable disk mirroring", 1 – this parameter is static so the ASE instance must be restarted for this change to take effect.

- Delphix will mirror the number of devices used on the source database for the staging database (dSource) and each VDB created from that source database. The number of devices parameter should be scaled appropriately based on the max number of virtual databases that will be provisioned to the ASE instance. This parameter can be changed using: **sp_configure "number of devices", <max devices>**.

i ASE 15.7.0 SP100 and later releases support the shrink command. In some cases, Delphix must increase the number of devices used for databases if this command is used. Delphix creates a minimum of the same number of devices as the source database for the staging database (dSource) and each VDB and will add more devices for every 4TB of fragment holes. See SAP ASE issue [CR#79 9273](#) for additional details.

To support multiple VDBs and the staging databases, you may need to increase the parameter **number of alarms**.

i Delphix uses ASE operations which use alarm structures such as **MOUNT** and **UNMOUNT**. The number of alarms limits the number of these operations which can be run concurrently. Various ASE instance failures can occur if the available alarm structures are exhausted. The amount of memory consumed by increasing the number of alarm structures is small. Delphix recommends that the **number of alarms** value is increased to at least 4096.

Adding SAP ASE Source and Target Environments

Follow the steps below to add both source and target environments for SAP ASE.

1. Login to the **Delphix Management** application.
2. Click **Manage**.
3. Select **Environments**.
4. Click the **Plus** icon next to **Environments**.
5. In the **Add Environment** dialog, select **Unix/Linux**.
6. Select **Standalone Host**.
7. Enter the **Host IP** address.
8. Enter a **Name** for the environment.
9. Enter the **SSH** port.
10. The default value is **22**.
11. Enter a **Username** for the environment.
12. Select a **Login Type**.

13. For **Password**, enter the password associated with the user in Step 10.
14. For **Password Login**, click **Verify Credentials** to test the username and password.
15. Enter a **Toolkit Path**.
16. The toolkit directory stores scripts used for Delphix Engine operations. It must have a persistent working directory rather than a temporary one. The toolkit directory will have a separate sub-directory for each database instance. The toolkit path must have 0770 permissions.
17. Click the **Discover SAP ASE** checkbox.
18. Enter the database **Username** for an ASE instance on the environment.
19. Enter the database **Password** associated with the database user in Step 15.
20. Click **Submit**.

ASE Manual Discovery

When an environment is added, Delphix discovers your ASE instances. Manual discovery allows users to add instances that were not automatically discovered. This feature is currently only supported via the CLI.

This topic describes how to use CLI commands to manually add ASE repositories to an SAP ASE environment. Discovery is the process by which the Delphix platform identifies data sources and data dependencies on a remote environment. ASE repository discovery is done automatically when an environment is added to the Delphix platform or when an already added environment is refreshed. In some cases, automatic discovery does not discover all of the repositories in an SAP ASE environment. These repositories may be added using manual discovery.

Unlike automatically discovered instances, manually discovered instances are not automatically deleted if the environment is refreshed when the instance isn't running. Manually discovered instances are not updated during an environment refresh either. So for example, if you upgrade ASE to a new version or change the listener port, you must manually update the repository.

To manually discover an ASE repository you will need to:

- Add the environment to Delphix
- Use CLI to manually discover a repository

Creating an ASE Environment

Please refer to [Adding an SAP ASE Environment](#) for detailed steps.

Manually discovering a repository

 In the following example, we are using **sc-dev3.dc2** as our example environment.

1. Log into CLI and cd to repository menu:

```
$ ssh delphix_admin@sc-dev3.dc2
Password:
sc-dev3.dc2> cd repository
sc-dev3.dc2 repository>
```

2. Add (manually discover) an ASE repository instance:

 The values used in the following code block are specific to the example instance we are adding.

```
sc-dev3.dc2 repository> create
sc-dev3.dc2 repository create *> ls
Properties
  type: ASEInstance
  credentials: (unset)
  dbUser: (unset)
  environment: (required)
  installationPath: (required)
  instanceName: (required)
  instanceOwner: (required)
  ports: (required)
  version: (unset)
sc-dev3.dc2 repository create *> set credentials.password=sybase
sc-dev3.dc2 repository create *> set dbUser=sa
sc-dev3.dc2 repository create *> set environment=sc-rhel64-sybase-ase-0
sc-dev3.dc2 repository create *> set installationPath=/opt/sybase/15-7
sc-dev3.dc2 repository create *> set instanceName=ASE1570_S1
sc-dev3.dc2 repository create *> set instanceOwner=sybase
sc-dev3.dc2 repository create *> set ports=5100
sc-dev3.dc2 repository create *> ls
Properties
  type: ASEInstance
  credentials:
    type: PasswordCredential (*)
    password: ***** (*)
  dbUser: sa (*)
  environment: sc-rhel64-sybase-ase-0 (*)
  installationPath: /opt/sybase/15-7 (*)
  instanceName: ASE1570_S1 (*)
  instanceOwner: sybase (*)
  ports: 5100 (*)
  version: (unset)
sc-dev3.dc2 repository create *> commit
`ASE_INSTANCE-22
sc-dev3.dc2 repository>
```

Updating a repository

Adding onto the above, the following example illustrates updating an ASE instance's version after upgrading ASE:

```
sc-dev3.dc2> repository
sc-dev3.dc2 repository> select ASE1570_S1
sc-dev3.dc2 repository 'ASE1570_S1'> update
sc-dev3.dc2 repository 'ASE1570_S1' update *> set version="15.7 SP138"
sc-dev3.dc2 repository 'ASE1570_S1' update *> ls
Properties
  type: ASEInstance
  credentials:
    type: PasswordCredential
    password: *****
  dbUser: sa
  installationPath: /opt/sybase/15-7
  instanceOwner: sybase
  linkingEnabled: true
  ports: 5100
  provisioningEnabled: true
  servicePrincipalName: (unset)
  staging: false
  version: 15.7 SP138 (*)
sc-dev3.dc2 repository 'ASE1570_S1' update *> commit
```

 Be careful when setting the version string. Make sure that it matches output as displayed by the "select @@version" query all the way out to the patch level (PL). For example "15.7 SP138" or "16.0 SP02 PL01".

Linking an SAP ASE Data Source

Prerequisites

Ensure that you have correctly set up the source and target environments, as described in [Managing SAP ASE Environments](#).



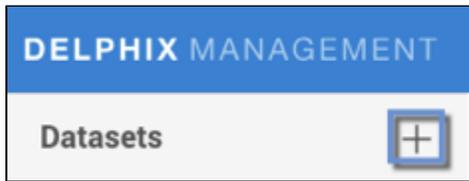
Dump file requirements

- Database and transaction log dumps that the Delphix platform will use must be taken using native ASE format.
- Dump devices are not supported. Database and transaction dump the Delphix platform will use must be taken to filesystem files.
- If ASE dump compression is being used, the dumps must be generated using the compression = compress_level syntax. The older compress::compress_level syntax is supported in Delphix version 4.3.4 or higher.

Procedure

1. Login to the **Delphix Management** application.
2. Click **Manage**.

3. Select **Datasets**.
4. Click the Plus icon.

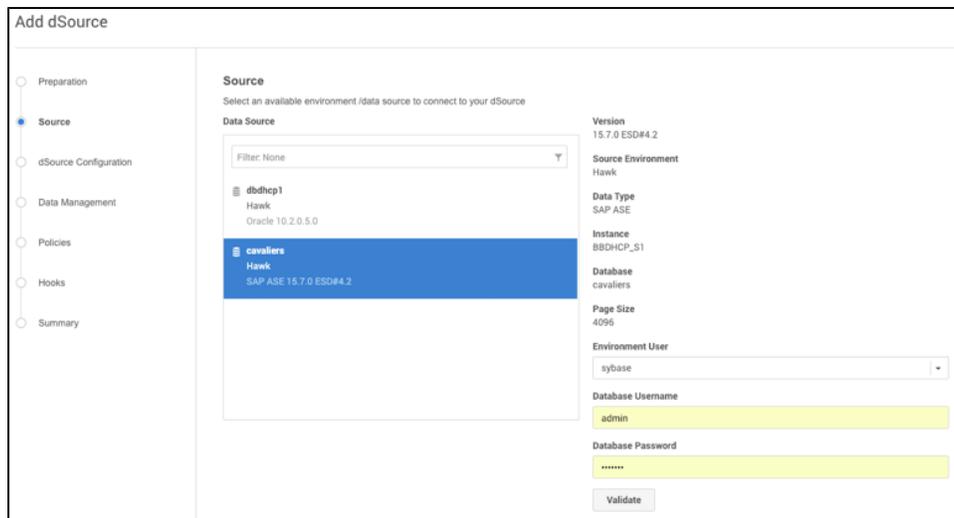


5. Select **Add dSource**.
6. Alternatively, on the **Environment Management** screen, you can click the **Add dSource** link next to a database name to start the dSource creation process.
7. In the **Add dSource** wizard, from the Requirements tab select **Next**.

i Changing the Environment User

If you need to change or add an environment user for the source database, see [Managing SAP ASE Environment Users](#).

8. Select a **data source**.
9. Enter your **login credentials** for the source database.
10. Click **Validate**.



11. Click **Next**.
12. In the dSource configuration tab select:

dSource Name

Target Group

Adding a dSource to a database group lets you set Delphix Domain user permissions for that database and its objects, such as snapshots. For more information, see the topics under [Users, Permissions, and Policies](#).

13. Click **Next**.
14. From the Data management tab select **Initial Load** option and enter any additional settings needed. There are three different options for the initial load of the dSource:
 - a. **New Full Backup** – Lets Delphix create a new full backup file and load it. Note that when Delphix creates the backup, it is dumped to Delphix storage, not the Backup Location specified in the next step. It will dump to the staging database's NFS mounted "temp" directory on the server hosting the staging ASE instance. This means that this option will work under two scenarios:
 - i. If the source ASE instance resides on the same server as the staging ASE instance, the staging database's NFS mounted "temp" directory will be present for the source database to write to in response to the "DUMP DATABASE" command.
 - ii. If the source and staging ASE instances are configured to allow remote access to the backup servers and the dSource is linked using the "Remote Server" option as described below. Delphix will then issue the "DUMP DATABASE" command and append the "AT <staging_backup_server_name>" clause so that the dump is written to the staging backup server.
 - b. **Most Recent Existing Full Backup** – Find the most recent existing full backup file in the **Backup Location** and load it. *Choosing this option can delay completion of the dSource link as Delphix attempts to find and catalog every single backup listed in the source database's backup server log file.*
 - c. **Specific Existing Full Backup** – Specify which existing backup files in the **Backup Location** you want to load. *Choosing this option is much faster because Delphix will skip directly to loading the desired backup and only start to search for and catalog backups in the background after the linking of the source database have completed.*

 When using a dump taken with the deprecated compression syntax, select the Specific Existing Full Backup option for Initial Load and, for each stripe, type compress::<file name> into the text box.

1. Enter the **Backup Location**. This is the directory where the database backups are stored. Delphix recursively searches this location, so the database backups or transaction logs can reside in any subdirectories below the path entered.
2. Select the **Staging Environment** and **ASE instance** name.

3. Enable or disable **Validated Sync Mode**. Validated Sync Mode (also known as ValidatedSync) is the background process that monitors the ASE Backup Server's log file for a new database or transaction log dumps. When Delphix detects a new dump is available it attempts to load it into the staging ASE database.
4. Enable or disable **LogSync**. LogSync copies the transaction logs to Delphix storage which enables provisioning VDBs from a specific point in time in rather than just a particular backup.

 **LogSync support limitations**

Due to ASE CR 800569, Delphix can only support transaction logs generated in intervals greater than one minute apart in ASE versions 16.0 SP02 through ASE 16.0 SP02 PL04. This ASE bug inadvertently removed the second and millisecond precision from the dump header sequence dates preventing Delphix from knowing what order to apply the transaction logs in when there are multiple transaction logs dumped within the same minute.

5. Select **Backup Location Type**.
6. Click **Advanced** to edit Source of **Production Dump**, **External Data Directory**, **Retention policies**, or **Dump Password**.

 **External Data Directory**

The External Data Directory feature is not currently used with ASE dSources and is targeted for removal in a future release of Delphix.

 Remote Server should be selected when database dumps are not accessible on the Staging Environment. This options can be used with any of the initial load selections (**New Full Backup**, **Most Recent Existing Full Backup** or **Specific Existing Full Backup**). If selected, fill out additional settings as needed:

1. Enter the Remote Server Name. This is the name of the backup server used when the dump was created.
2. Select the Remote Host and Remote User that the backup server is located on.
3. As noted, the interfaces file on both the staging and remote environments must be modified to point at each other's backup servers.

 **Caution**

The Create Dump Password sets a dump password for the dSource. Select this only if the dump password option was used to create a password on the database dump or transaction log dump files. Setting this option causes Delphix to add the "**WITH passwd=**" clause to the "**LOAD**" commands.

7. Click **Next**.
8. Specify any **Pre and Post Scripts**.
9. Review the **dSource Configuration** and **Data Management** information.
10. Click **Submit**.

The Delphix platform will initiate two jobs, **DB_Link** and **DB_Sync**, to create the dSource. You can monitor these jobs by clicking Actions in the top menu bar, or by selecting **System > Event Viewer**. When the jobs have successfully completed, the database icon will change to a dSource icon on the **Environments > Databases** screen, and the dSource will be added to the list of **My Datasets** under its assigned group.

 **Dataset details**

After you have created a dSource, you can view and edit information about it in the Dataset Details view by selecting the dataset from the dataset list. The center of the screen will show information about the status, Timeflow, and configuration of the dSource.

Provisioning an SAP ASE VDB

Prerequisites

- You must have already linked a dSource from a source database, as described in [Linking an SAP ASE Data Source](#), or have already created a VDB from which you want to provision another VDB.
- You must have already set up target environments as described in [Adding an SAP ASE Environment](#).
- Ensure that you have the required privileges on the target environment, as described in [Requirements for SAP ASE Target Hosts and Databases](#).

- If you are provisioning to a target environment that is different from the one in which you set up the staging database, you must make sure that the two environments have compatible operating systems, as described in [Requirements for SAP ASE Target Hosts and Databases](#). For more information on the staging database and the validated sync process, see [Managing SAP ASE Environments Overview](#).

Procedure

1. Login to the **Delphix Management** application.
2. Click **Manage**
3. Select **Datasets**.
4. Select a **dSource**.
5. Select a **means of provisioning**.
6. Click **Provision**.

The **Provision VDB** panel will open, and the **Instance** and **Database Name** fields will auto-populate with information from the dSource.

7. Select whether to enable **Truncate Log on Checkpoint** database option for the VDB.
8. Click **Next**.
9. Select a **Target Group** for the VDB.

Click the green **Plus** icon to add a new group, if necessary.

10. Select a **Snapshot Policy** for the VDB.

Click the **Plus** icon to create a new policy, if necessary.

11. Click **Auto VDB Restart** to enable VDBs to be automatically restarted when staging/target host gets rebooted, if necessary.
12. Specify any **Hooks** to be used during the provisioning process.

For more information, see [Customizing SAP ASE Management with Hook Operations](#).

13. If your Delphix Engine system administrator has configured the Delphix Engine to communicate with an SMTP server, you will be able to specify one or more people to notify when the provisioning is done. You can choose other Delphix Engine users or enter email addresses.
14. Click **Submit**.

When provisioning starts, the VDB will appear in the **Datasets** panel. Select the VDB and navigate to the **Status** tab to see the progress of the job. When provisioning is complete, more information can be seen on the **Configuration** tab.

Automatic VDB Restart on Target Server After Reboot

The Delphix platform now automatically detects whether a target server has been rebooted, and proactively restarts any VDB on that server that was previously up and running. This is independent of the data platform. It is done as if you realized a target server was restarted and issued a start command from the Delphix platform. This feature is compatible with Self-Service ordering dependencies and is limited to non-clustered VDBs.

To enable automatic restart, complete the following steps:

- a. When provisioning a new VDB in the VDB Provisioning wizard, check the **Auto VDB Restart** box.

Once the VDB has been provisioned, you will be able to turn **Automatic VDB Restart** on.

- a. In the **Datasets** panel, select the VDB.
- b. Select the **Configuration** tab.
- c. Select the **Source** sub-tab.
- d. Select **Database edit**.

Next Steps

Congratulations! You have provisioned your first virtual database!

Now, perform some simple functional tests with your application. You can connect your app to the VDB using standard TNS/JDBC techniques. Delphix has already registered the VDB for you on the target listener.

We suggest the following next steps:

- a. Drop a table and use the VDB Rewind feature to test the recovery of your VDB.
- b. Take a snapshot of your dSource and refresh your VDB to quickly get fresh production data.
- c. Provision a new VDB from your VDB to test sharing data quickly with other teams.
- d. Mask your new VDB to protect sensitive data. Provision new VDBs from that masked VDB to quickly provide safe data to development and QA teams.

Appendix

ASE Setup Checklist

UNIX Systems Administrator Tasks

Operating System User

- - [SYBASE environment variable defined for non-interactive logins](#)
 - [Sudo permissions](#)

File permissions

- - [Toolkit directory created with correct permissions](#)
 - Permission to read the ASE Backup Server log file of the source database

Operating System

- - [Target host kernel parameters](#)
 - [Ensure NFSv3 client software is up and running](#)

Network Administrator Tasks

- - [Allow connectivity to specific ports](#)

DBA Tasks

Source ASE instance

- - Grant SELECT to sysdatabases, sysusers and syslisteners

Target and Staging ASE instances

- - Grant sa_role and sybase_ts_role

Engine Administrator Tasks

- - [Linking an ASE dSource](#)
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- [Provisioning an ASE VDB](#)