Dell EMC Avamar for Sybase ASE

Version 19.2

User Guide

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Preface

As part of an effort to improve the product lines, revisions of the software and hardware are periodically released. Therefore, some functions that are described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features.

Contact the technical support professional when a product does not function correctly or does not function as described in this document.

Note: This document was accurate at publication time. To find the latest version of this document, go to Online Support (https://support.EMC.com).

Purpose

This guide describes how to install Avamar in a Sybase environment, and how to back up and restore Sybase Adaptive Server Enterprise (ASE) databases.

Audience

This document is intended for the following users:

- System administrators who are responsible for installing software and maintaining servers and clients on a network
- Sybase database administrators (DBAs) who are responsible for backing up and maintaining Sybase databases

Readers of this document must be familiar with the following topics:

- Sybase terminology and concepts, especially those related to Sybase database backup and recovery
- Backup and recovery procedures
- Disaster recovery procedures

Revision history

The following table presents the revision history of this document.

Revision history

Table 1 Revision history

Revision	Date	Description
01	November 15, 2019	GA release of Avamar 19.2

Related documentation

The following Dell EMC publications provide additional information:

- *E-LAB Navigator* at https://elabnavigator.emc.com/eln/elnhome
- *Avamar Administration Guide*
- *Avamar and Data Domain System Integration Guide*
- *Avamar Backup Clients User Guide*
- *Avamar for Windows Server User Guide*
- *Avamar Operational Best Practices Guide*

- *Avamar Product Security Guide*
- *Avamar Release Notes*

The following additional documentation may be useful:

- Sybase Adaptive Server Enterprise (ASE) documentation
- Sybase ASE backup and recovery documentation

Special notice conventions used in this document

These conventions are used for special notices.

DANGER Indicates a hazardous situation which, if not avoided, results in death or serious injury.

WARNING Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE Addresses practices that are not related to personal injury.

Note: Presents information that is important, but not hazard-related.

Typographical conventions

These type style conventions are used in this document.

Table 2 Typographical conventions

Bold	Used for names of interface elements, such as names of windows, dialog boxes, buttons, fields, tab names, key names, and menu paths (what the user specifically selects or clicks)
Italic	Used for full titles of publications that are referenced in text
`Monospace`	Used for: • System code • System output, such as an error message or script • Pathnames, filenames, prompts, and syntax • Commands and options
Monospace italic	Used for variables
`Monospace bold`	Used for user input
[ ]	Square brackets enclose optional values
|	Vertical bar indicates alternate selections - the bar means “or”
{ }	Braces enclose content that the user must specify, such as x or y or z
...	Ellipses indicate nonessential information that is omitted from the example

Where to get help

The Avamar support page provides access to licensing information, product documentation, advisories, and downloads, as well as how-to and troubleshooting information. This information may resolve a product issue before contacting Customer Support.

To access the Avamar support page:

1. Go to https://www.dell.com/support/home/us/en/19.
2. Type a product name in the **Enter a Service Tag, Serial Number, Service Request, Model, or Keyword** search box.
3. Select the product from the list that appears. When you select a product, the **Product Support** page loads automatically.
4. (Optional) Add the product to the **My Products** list by clicking **Add to My Saved Products** in the upper right corner of the **Product Support** page.

Documentation

The Avamar product documentation provides a comprehensive set of feature overview, operational task, and technical reference information. To supplement the information in product administration and user guides, review the following documents:

- Release notes provide an overview of new features and known limitations for a release.
- Technical notes provide technical details about specific product features, including step-by-step tasks, where necessary.
- White papers provide an in-depth technical perspective of a product or products as applied to critical business issues or requirements.

Knowledgebase

The Knowledgebase contains applicable solutions that you can search for either by solution number (for example, KB000xxxxxx) or by keyword.

To search the Knowledgebase:

1. Go to https://www.dell.com/support/home/us/en/19.
2. Under the **Support** tab, click **Knowledge Base**.
3. Type either the solution number or keywords in the search box. Optionally, you can limit the search to specific products by typing a product name in the search box and then selecting the product from the list that appears.

Online communities

Go to Community Network at http://community.EMC.com for peer contacts, conversations, and content on product support and solutions. Interactively engage online with customers, partners, and certified professionals for all products.

Live chat

To engage Customer Support by using live interactive chat, click **Join Live Chat** on the **Service Center** panel of the Avamar support page.

Service Requests

For in-depth help from Customer Support, submit a service request by clicking **Create Service Requests** on the **Service Center** panel of the Avamar support page.

> **Note:** To open a service request, you must have a valid support agreement. Contact a sales representative for details about obtaining a valid support agreement or with questions about an account.

To review an open service request, click the **Service Center** link on the **Service Center** panel, and then click **View and manage service requests**.

Enhancing support

It is recommended to enable ConnectEMC and Email Home on all Avamar systems:

- ConnectEMC automatically generates service requests for high priority events.
- Email Home sends configuration, capacity, and general system information to Customer Support.

Comments and suggestions

Comments and suggestions help to continue to improve the accuracy, organization, and overall quality of the user publications. Send comments and suggestions about this document to DPAD.Doc.Feedback@emc.com.

Please include the following information:

- Product name and version
- Document name, part number, and revision (for example, 01)
- Page numbers
- Other details to help address documentation issues

CHAPTER 1

Introduction

This chapter includes the following topics:

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Architecture

The Avamar Plug-in for Sybase ASE (Sybase plug-in) is software that works with the Avamar server and client software. The Sybase plug-in provides deduplication backup and recovery for Sybase Adaptive Server Enterprise (ASE) data. A Sybase ASE server is the only type of Sybase database server that the Sybase plug-in supports.

You must install the Sybase plug-in on an Avamar client host that is a Sybase ASE server. The Sybase plug-in works with Sybase ASE server software and the components of an Avamar system to back up and restore Sybase databases and transaction logs. The Sybase plug-in serves as a backup module. An Avamar server or (optionally) Data Domain system serves as a backup storage device.

You must deploy the Sybase plug-in in an Avamar client or server system in a network environment. The Avamar server stores and manages client backups in a deduplicated format. The Sybase server host is an Avamar client that accesses the Avamar server for backup and restore services.

An Avamar server can optionally use a Data Domain system as a storage device for backup and restore operations. Data Domain system support on page 18 provides details.

You can use the Avamar Administrator or the AUI to remotely administer an Avamar system from a supported Windows or Linux computer.

Note: The Avamar AUI is only supported in stand-alone Windows and Linux environments only.

Stand-alone configuration

You can deploy the Sybase plug-in in a stand-alone configuration on one of the supported operating systems.

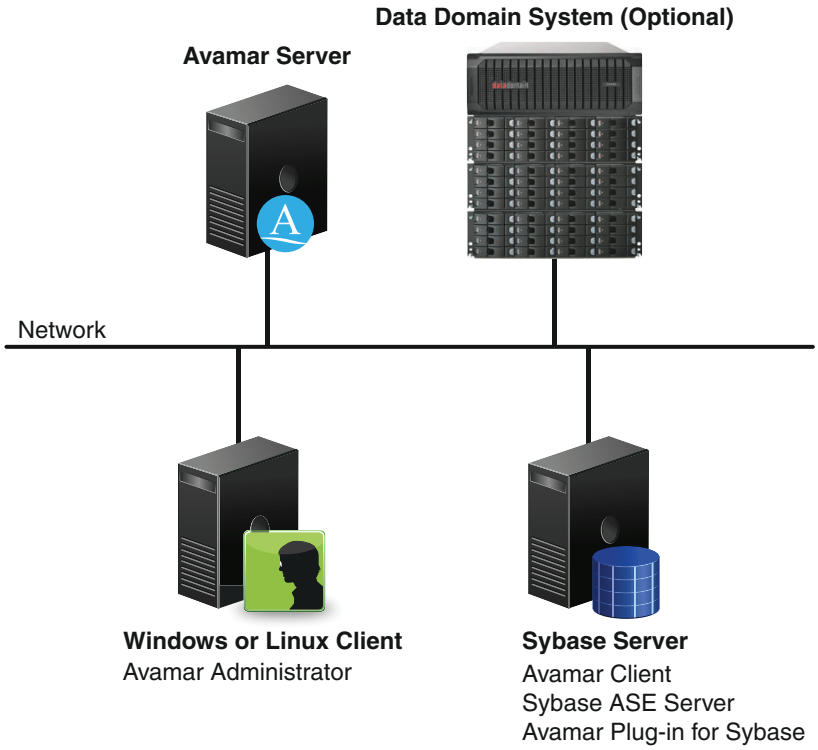
Preparing to install the Avamar Plug-in for Sybase provides details on system requirements, including supported operating systems.

You must install the following software on the Sybase server host:

- Platform-specific Avamar client
- Sybase ASE server
- Avamar Plug-in for Sybase

The following figure shows a stand-alone configuration that uses the Sybase plug-in to back up or restore Sybase data to or from an Avamar server or a Data Domain system.

Figure 1 Avamar Plug-in for Sybase in a stand-alone configuration



High-availability cluster configurations

You can also deploy the Sybase plug-in in a high-availability active/passive cluster configuration on a Solaris operating system. This type of cluster comprises multiple hosts (nodes) connected by a SCSI bus attached to a shared storage system. If a failure occurs on the primary node, the cluster software can automatically switch the failed application service to a surviving host in the cluster.

You configure the backup or restore operations for the virtual cluster host. The operations run on the active node in an active/passive cluster environment.

NOTICE If a backup or restore operation is running during a failover, the operation fails. You must restart a failed backup or restore manually on the new active node.

The *E-LAB Navigator* at https://elabnavigator.emc.com/eln/elnhome provides details about the supported cluster versions.

Solaris Cluster configurations

The Sybase plug-in supports two-node active/passive Solaris Cluster configurations on Solaris.

In an active/passive Solaris Cluster configuration, the resource group is online on the active node until a failover occurs. Then the resource group comes online on the passive node. You can run backups and restores from the active node.

Veritas Cluster Server configurations

The Sybase plug-in supports two-node active/passive Veritas Cluster Server (VCS) configurations on Solaris. In an active/passive VCS configuration, the service group is online on the active node until a failover occurs. Then the service group comes online on the passive node. You can run backups and restores from the active node.

Data Domain system support

The Sybase plug-in supports backups to and restores from a Data Domain system. The Sybase plug-in stores the backup data on the Data Domain system, and stores backup metadata on the Avamar server. The Avamar server manages the backups.

Before you can store backups on a Data Domain system, you must add the Data Domain system to the Avamar configuration by using Avamar Administrator or the AUI. Then you select the Data Domain system in the plug-in options when you perform an on-demand backup or when you create a dataset for a scheduled backup. You can also use the command line interface (CLI) to perform backups to a Data Domain system.

If you specify a Data Domain system as the backup destination, then the Sybase plug-in backs up all the Sybase data to that destination. You cannot back up part of the data to a Data Domain system and another part of the data to an Avamar server during a single backup.

You must store the full backup for a client and all subsequent incremental and cumulative backups on either the Avamar server or a single Data Domain system. The Sybase plug-in does not support the following scenarios:

- Full backup on a Data Domain system and incremental/cumulative backups on an Avamar server
- Full backup on the Avamar server and incremental/cumulative backups on a Data Domain system
- Full backup on one Data Domain system and incremental/cumulative backups on another Data Domain system

If you change the device on which backups for a client are stored, you must perform a full backup before you perform any further incremental or cumulative backups.

The steps to restore backups are the same whether you restore from the Avamar server or a Data Domain system. The restore process determines the location of the backup and restores the backup.

The *Avamar and Data Domain System Integration Guide* provides more information about Data Domain systems in an Avamar environment, including detailed steps to add a Data Domain system to the Avamar configuration.

Multiple Sybase versions and instances on the same host

The Sybase plug-in supports the use of other Avamar plug-in software on the same host.

The Sybase plug-in supports multiple Sybase versions on the same Sybase server host. The plug-in also supports multiple Sybase instances as long as the Sybase instances use different names. For example, the Sybase plug-in does not support the following scenario on the same host:

- Sybase ASE 15.5 has an instance named TESTSYBASE1.
- Sybase ASE 15.7 has an instance named TESTSYBASE1.

Note: The Sybase plug-in supports the scenario where both 32-bit and 64-bit versions of Sybase are installed on the same host on 64-bit Linux or 64-bit Windows. You must install the 32-bit Sybase plug-in package on the 64-bit Linux or the 64-bit Sybase plug-in installer on 64-bit Windows.

Backup

The Sybase plug-in supports specific features for Sybase backups:

- Backup processes describes the processes in Sybase plug-in backups to an Avamar server.

- The Sybase plug-in also supports backups to a Data Domain system as described in Data Domain system support on page 18.
- Multi-streaming describes how to backup or restore multiple databases in parallel to improve performance.
- Multi-striping describes how to backup multiple parts of each database in parallel to improve backup and restore performance.

Complete backup protection

For the complete protection of a Sybase ASE server system, a viable backup strategy must include regular backups of the Sybase database data, transaction logs, and database configuration files.

You require the backups for the following reasons:

- Without database backups, you cannot restore a database at all.
- Without transaction logs, you can restore a database only to the time of the last consistent backup, but you cannot recover the database to an arbitrary point-in-time after that backup.
- Without the configuration files, you cannot recover the database setup.

To prepare a Sybase server environment for disaster recovery, perform regular scheduled backups of Sybase server instances, databases, and transaction logs.

Perform the following additional tasks to prepare for disaster recovery:

- Keep up-to-date printouts of the Sybase system tables.
- Keep up-to-date printouts of the scripts for disk init and create databases.
- Do not store user databases or any databases other than master, tempdb, model, and sybsystemdb on the master device.
- Back up the master database after performing actions such as initializing database devices, creating or altering databases, or adding a new server login.

The appropriate Sybase documentation provides more details.

Basic backup features

The Sybase plug-in supports online backups, scheduled and on-demand backups, full, cumulative, and incremental backups, and truncation backups.

The details of the supported backup types are as follows:

- Online backups—The Sybase plug-in backs up an online Sybase ASE database without requiring any down time.
  NOTICE The Sybase plug-in does not perform offline backups of Sybase data.
- Scheduled and on-demand backups—The Sybase plug-in supports both scheduled backups that run automatically and on-demand backups that you initiate.
- Full, cumulative, and incremental backups—The Sybase plug-in can back up all the Sybase databases on a server, specific databases, or specific transaction logs, with truncation of the logs.
- Truncation backups—The Sybase plug-in can truncate the logs of one or more Sybase databases. A truncation backup is a tool for ad-hoc database management only.

NOTICE The Sybase plug-in does not back up any type of temporary Sybase database.

Scheduled backups compared with on-demand backups

The Sybase plug-in supports scheduled backups and on-demand (manual) backups.

The Avamar server automatically runs a scheduled backup according to Avamar policy settings that you configure for a group of one or more Avamar clients.

You can run an on-demand backup by using one of the following methods:

- You can use the Avamar Administrator or the AUI to specify the required backup options and start the backup.
- You can manually run the `avsybase` command with the required command line options on the Sybase server host.

Full, cumulative, and incremental backups

The Sybase plug-in performs Sybase full-level, cumulative-level, and incremental-level backups. A single backup process can back up databases or logs on only one Sybase server at a time.

Full backups

A full backup backs up all the data in one or more databases on a Sybase server:

- A full backup can back up all the databases on the Sybase server, including the transaction logs for each database.
- A full backup can back up one or more databases on the Sybase server, including the transaction logs for each database.

With a regular type of Sybase database, the database data and log data are stored in separate Sybase devices.

The Sybase plug-in supports full backups of the following non-regular types of Sybase databases in the same way as full backups of a regular Sybase database:

- In-memory database—A database that only exists in memory and never writes data to a disk.
- Relaxed-durability database—A database that only commits transactions when the database is shut down.
- Mixed log and data database—A database that stores the database data and log data in the same Sybase device.
- Read-only database—A database that can only be read. You cannot commit new data to a read-only database.

Sybase documentation provides details on all the supported types of databases.

By default, the Sybase plug-in truncates the logs of mixed log and data databases after a full backup to prevent the logs from becoming completely full. The Sybase plug-in does not truncate the logs of regular databases after a full backup but truncates the logs after an incremental backup. Incremental backups provides details.

Full backups of different types of Sybase databases

The following table shows the default result of a full backup performed through either the CLI or Avamar Administrator for the different types of Sybase databases.

Table 3 Default result of full backup for different database types

Type of Sybase database	Default result of full backup
Regular database (separate data and log files)	Backs up database, does not truncate logs
In-memory database	Backs up database, truncates logs
Relaxed-durability database	Backs up database, truncates logs
Mixed log and data database	Backs up database, truncates logs
Read-only database	Backs up database, does not truncate logs

Cumulative backups

A cumulative backup is a backup of a database that backs up all pages in a database that have changed since the last full backup.

During a cumulative backup, the Sybase plug-in can back up:

- All changed pages for all databases on the Sybase server, including both data pages and log pages.
- All changed pages for one or more databases on the Sybase server, including both data pages and log pages.

With regular Sybase databases, the database data and log data are stored on separate Sybase devices. The Sybase plug-in supports cumulative backups of the following non-regular types of Sybase databases in the same way that cumulative backups of regular Sybase databases are supported:

- In-memory databases — Databases that only exist in memory and never write data to a disk.
- Relaxed-durability databases — Databases that only commit transactions when the database is shut down.
- Mixed log and data databases — Databases that store the database data and log data on the same Sybase device.
- Read-only databases — Databases that can only be read. You cannot commit new data to a read-only database.

Sybase documentation provides details on all the supported types of databases.

The Sybase plug-in does not truncate the logs of any databases after a cumulative backup. A cumulative backup cannot be performed on the master database.

Cumulative backups of different types of Sybase databases

The following table shows the default result of a cumulative backup performed through either the CLI or Avamar Administrator for the different types of Sybase databases.

Table 4 Default result of cumulative backup for different database types

Type of Sybase database	Default result of incremental backup
Regular database (data and log are in separate Sybase devices)	Backs up changed pages, does not truncate logs
In-memory database	Backs up changed pages, does not truncate logs

Table 4 Default result of cumulative backup for different database types (continued)

Type of Sybase database	Default result of incremental backup
Relaxed-durability database	Backs up changed pages, does not truncate logs
Mixed log and data database	Backs up changed pages, does not truncate logs
Read-only database	Backs up changed pages, does not truncate logs

Incremental backups

During an incremental backup, the Sybase plug-in backs up one or more transaction logs, not the Sybase databases. An incremental backup backs up the transaction log in a single database and, by default, truncates the inactive portion of the log after the backup.

NOTICE If a full backup of the database has not been performed previously, the Sybase plug-in performs a full backup of the database instead of an incremental backup.

The Sybase plug-in does not support an incremental backup in the following cases:

- A full backup of the database has not been performed previously.
- The database is an in-memory, relaxed-durability, mixed log and data, or read-only database.
- The first page of the database is in the bounds of a data-only disk fragment.
- The truncate log on checkpoint option is selected.
- Unlogged writes have occurred on the database.
- A truncation backup (truncate_only or no_log) was performed on the database.

Sybase documentation provides details on all the supported database types and the cases where an incremental (log) backup is not supported.

NOTICE If the Sybase plug-in does not support an incremental backup, then the Sybase plug-in promotes the incremental backup to a full backup.

Incremental backups of different types of Sybase databases

The following table shows the default result of an incremental backup performed through either the CLI or Avamar Administrator for the different types of Sybase databases.

Table 5 Default result of incremental backup for different database types

Type of Sybase database	Default result of incremental backup
Regular database (data and log are in separate Sybase devices)	Backs up logs, truncates logs
In-memory database	Backs up database, truncates logs
Relaxed-durability database	Backs up database, truncates logs
Mixed log and data database	Backs up database, truncates logs
Read-only database	Backs up database, does not truncate logs

Truncation backups

The Sybase plug-in can perform a truncation backup to truncate the logs of one or more databases without performing a log backup.

By default, the Sybase plug-in performs a full database backup after a truncation backup because the truncated portion of the logs might not have been backed up. If the truncated database was lost before the next regular backup, those log transactions would not be recoverable. To skip the full backup after a log truncation, you can use the CLI option `--no-backup`.

Note: Do not include a truncation backup as part of a regular on-demand backup or scheduled backup that is performed through Avamar Administrator, the AUI, or through cron jobs. A truncation backup is a tool for ad-hoc database management only.

The Sybase plug-in supports two types of truncation backups, truncate_only and no_log:

- A truncate_only backup or regular truncation backup truncates the log without performing a log backup. Use a truncate_only backup for mixed log and data databases where the data and transaction logs are stored in the same file. You cannot perform transaction log backups on mixed log and data databases. However, the logs of such databases must be truncated before the logs become full.
- A no_log backup is similar to a regular truncation backup except the no_log backup does not log the truncation. By default, truncation operations are logged. If the log is full, a regular truncation backup or truncate_only backup fails. Use a no_log backup only as a last resort when the transaction log is full.

Backup names

The following sections describe the naming conventions for backups created by the Sybase plug-in.

Full backups

For a full backup, the Sybase plug-in creates a backup file on the Avamar server with the following naming convention:

Sybase_server_name/*db_name*/f-0

where:

- *Sybase_server_name* is the Sybase server instance name.
- *db_name* is the name of the backed-up database.

A full backup file name always ends in f-0, where the letter f indicates a full backup and the sequence number 0 indicates the first in a sequence of backups of the database. A backup cycle or sequence consists of a full backup, followed by one or more cumulative or incremental backups.

For example, the first full backup in a sequence of backups of database db1 on Sybase server server1 creates the following backup file:

server1/db1/f-0

Cumulative backups

For a cumulative backup, the Sybase plug-in creates a backup file on the Avamar server with the following naming convention:

Sybase_server_name/*db_name*/c-*n*

where c-*n* indicates an cumulative backup with the sequence number *n*, starting from 1.

For example, the first cumulative backup in a sequence of backups of database db1 on Sybase server server1 creates the following backup file:

```
server1/db1/c-1
```

The sequence number 1 indicates the first cumulative backup after a full backup of the database. Subsequent cumulative backups of the database create the following backup files:

```
server1/db1/c-2
server1/db1/c-3
```

When the next full backup of database db1 is performed, the file sequence is reset to f-0. Subsequent cumulative backups are then performed against the new full backup.

Incremental backups

For an incremental backup, the Sybase plug-in creates a backup file on the Avamar server with the following naming convention:

Sybase_server_name/*db_name*/i-*n*

where i-*n* indicates an incremental backup with the sequence number *n*, starting from 1.

For example, the first incremental backup in a sequence of backups of database db1 on Sybase server server1 creates the following backup file:

```
server1/db1/i-1
```

The sequence number 1 indicates the first incremental backup after a full backup of the database. Subsequent incremental backups of the database create the following backup files:

```
server1/db1/i-2
server1/db1/i-3
```

When the next full backup of database db1 is performed, the file sequence is reset to f-0. Subsequent incremental backups are then performed against the new full backup.

Exclusion of temporary databases from backups

A Sybase server can have one or more system-defined or user-defined temporary databases. The data in the temporary databases comprises intermediate results and is not necessarily persistent data. There is no need to back up temporary databases.

> **NOTICE** The Sybase plug-in does not back up or restore any temporary databases. The Sybase plug-in excludes both user-defined temporary databases and system-defined temporary databases during a backup.

During a backup, the Sybase plug-in automatically detects any temporary databases and excludes them from the backup.

Restore and recovery

The Sybase plug-in supports specific features for Sybase restore and recovery.

Data backed up by the Sybase plug-in is always online and available for recovery. You can quickly restore and recover data from Sybase backups by using the Sybase plug-in.

- Restore processes describes the processes in Sybase plug-in restores from an Avamar server.
- The Sybase plug-in also supports restores from a Data Domain system as described in Data Domain system support on page 18.
- Multi-streaming describes how to use multiple sessions to improve the restore performance.

Basic restore and recovery features

The Sybase plug-in restores data into an existing database. The Sybase plug-in does not create a Sybase server or database that does not exist.

The Sybase plug-in restores a database only if the database exists on the destination Sybase server with the same storage layout as the backed-up database. If a database does not exist on the server, you must manually create the database before starting the restore. A database restore completely overwrites the current contents of a database.

In this guide, restore and recovery of a Sybase database have the following meanings:

- Restore is the process of retrieving individual data files from a backup and copying the files to a disk.
- Recovery is the process of applying transaction logs to the restored data to make the data consistent with a given point-in-time.

The Sybase plug-in supports the following basic restore and recovery features:

- Automatic restore to a specified time—The Sybase plug-in can restore a Sybase database to the latest backup time or to a specified point-in-time.
- Restore to a specified database—The Sybase plug-in can restore a Sybase database to the original database or to an alternate database:
  - A restore to the original database completely overwrites the database contents.
  - If required, a restore can be performed to an alternate database. The data and log allocation for the alternate database must be at least as large as for the original database.
- Granular restore—The Sybase plug-in can restore individual databases on the Sybase server. A single restore operation can restore databases on only one Sybase server at a time. The Sybase plug-in cannot restore more than one Sybase server during a single restore.
- Sybase server restore—The Sybase plug-in can restore an entire Sybase server. The restore of an entire server includes all the databases that are backed up from the server except the master database.

  For example, a Sybase server has databases A, B, and C. The Sybase plug-in backs up the databases during a full backup of the server. If database D is created on the server after the backup, the subsequent restore of the Sybase server does not restore database D because the database was not included in the backup.
- Disaster recovery—The Sybase plug-in can perform disaster recovery of the entire Sybase server. Disaster recovery provides details.

You must restore the Sybase master database separately in Sybase server master-recovery mode.

NOTICE The Sybase plug-in does not restore any type of temporary Sybase database.

Restore methods

When you perform restore browsing, search the previously created backups for specific backups to be restored.

You can run a restore as an on-demand restore by using one of the following methods:

- You can use Avamar Administrator or the AUI to specify the required restore options and restore either one or more Sybase databases or the whole Sybase server.
- You can manually run the `avsybase` command with the required command line options to restore one Sybase database or the whole Sybase server.

With a regular type of Sybase database, the database data and log data are stored in separate Sybase devices.

The Sybase plug-in supports restores of the following nonregular types of Sybase databases in the same way as restores of a regular Sybase database:

- In-memory database—A database that only exists in memory and never writes data to a disk.
- Relaxed-durability database—A database that only commits transactions when the database is shut down.
- Mixed log and data database—A database that stores the database data and log data in the same Sybase device.
- Read-only database—A database that can only be read. You cannot commit new data to a read-only database.

Sybase documentation provides details on all the supported types of databases.

Restore to a specified time

By default, the Sybase plug-in restores a database to the time of the latest backup by using the most recent database, cumulative, and transaction log backups. You do not need to specify the transaction log backups for the restore because the Sybase plug-in locates and applies the log backups automatically.

After a database restore is complete, the Sybase plug-in brings the database online.

For example, if you performed a database backup and three log backups for the db1 database on the Sybase server named server1, the following backups would exist for the database:

- server1/db1/i-3
- server1/db1/i-2
- server1/db1/i-1
- server1/db1/f-0

In this case, when you restore the db1 database, the Sybase plug-in first restores the database backup, server1/db1/f-0, and then restores the log backups in order from the oldest log backup to the most recent log backup:

1. server1/db1/i-1
2. server1/db1/i-2
3. server1/db1/i-3

By default, the Sybase plug-in restores a database to the latest time contained in the last transaction log backup, which might not be the current time. To restore a database to the current time, perform a transaction log backup of the database (if possible) prior to performing the database restore. The log backup contains the most recent logs, and can be used during the database restore.

NOTICE If the Sybase plug-in does not support transaction log backups for a specific type of database, such as a mixed log and data database, you can only restore the database to the time of the last backup.

As another example, if you performed a database backup, a cumulative backup, and two log backups for the db1 database on the Sybase server named server1, the following backups may exist for the database:

- server1/db1/i-2
- server1/db1/c-1
- server1/db1/i-1
- server1/db1/f-0

In this case, when you restore the db1 database, the Sybase plug-in first restores the full database backup server1/db1/f-0, and then restores the cumulative and log backups in the following order:

1. server1/db1/c-1
2. server1/db1/i-2

To restore a database to a point-in-time between the last log (incremental) backup of one backup cycle (cycle #1) and the first full backup of the next backup cycle (cycle #2), you must perform a point-in-time recovery by using the first log backup created after the full backup of cycle #2. If such a log backup does not yet exist, you must run the log backup before you can perform the point-in-time recovery. The first log backup of cycle #2 contains all the transaction logs since the last log backup of cycle #1.

Unless you specify a point-in-time recovery when you restore a log backup, the Sybase plug-in automatically applies the log backup to the preceding full backup only.

For example, two consecutive backup cycles of database db1 contain the following sequence of backups:

- Backup cycle #1:
  - Full backup, f-0, performed at time t1
  - Log backup, i-1, performed at time t2
  - Log backup, i-2, performed at time t3
- Backup cycle #2:
  - Full backup, f-0, performed at time t4
  - Log backup, i-1, performed at time t5

You cannot use the Sybase plug-in to automatically restore to a point-in-time between t3 and t4. You must use special procedures. You also cannot restore to the point-in-time unless the backup i-1 of cycle #2 exists. (Create the i-1 backup of cycle #2 if it does not yet exist.)

To restore the database db1 to a point-in-time between times t3 and t4:

1. Restore backups f-0, i-1, and i-2 of cycle #1. Leave the database offline.
2. Perform a point-in-time recovery by using backup i-1 of cycle #2 with the `--postfix` and `--postfix-only` options.

Restoring the database db1 to a point-in-time between t3 and t4 on page 114 provides details.

Restore and recovery from the Cloud

For Elastic Cloud Storage (ECS), when backups are in the Cloud and absent on Active tier, direct read from ECS for Sybase enables common restore scenarios by using the plugin restore operations with DD 6.1 and above. When the user performs restores of backups in the ECS, Avamar plug-in for Sybase transparently restores data from ECS without performing a recall operation first.

For other Cloud providers, a two step process is in place for restoring and recovering data:

- Recall data from the Cloud
- Restore and recover data

Refer to *Restore operations for cloud tier* in the *Avamar Data Domain System Integration Guide* for more information.

Year 2038

The Avamar subsystem supports backup retention until February 2106. However, for older releases, the Avamar subsystem does not start after January 2038 due to the signed 32-bit integer

time format of UNIX and Linux operating systems, and therefore cannot restore backup data after this date.

Newer Avamar releases offer support for longer retention periods:

- For Avamar 19.1 and later, the Avamar server subsystem uses an unsigned 32-bit integer and continues to start until 2106.
- For Avamar 19.1 and earlier, the Avamar client and plug-ins subsystem uses a signed 32-bit integer and retains data until 2038.
- For Avamar 19.2 and later, the Avamar client and plug-ins subsystem uses an unsigned 32-bit integer and retains data until 2106.
- Backup retention after 2038 is successful when all Avamar subsystems use unsigned 32-bit integers.

Therefore, with both Avamar 19.2 and later, and an Avamar 19.2 or later client, backup retention succeeds after 2038.

Avamar 19.2 and later clients also support restoring backups where the retention time is after 2038, and where the local (server and client) time is after 2038. Earlier client releases do not support this.

For backups of Windows or Linux clients, do not assign a retention period for a date after February 7, 2106.

Concurrent backups and restores

The Sybase plug-in supports a maximum of six concurrent backups or restores. You can start each backup or restore from either Avamar Administrator, the AUI, or the CLI.

The Sybase plug-in supports concurrent backups or restores for the following configurations:

- Multiple Sybase server instances of the same Sybase version on the same Sybase server host

  Note: If concurrent backups or restores are launched for databases on the same Sybase server instance, an operation started after the first one might fail because the Sybase plug-in does not support such concurrent database operations.
- Multiple Sybase versions on the same Sybase server host

Each concurrent backup or restore can run multiple data sessions to or from the Avamar server or the Data Domain system.

Note: The recommended maximum number of concurrent data sessions is 10.

Multi-streaming provides details about running multiple data sessions.

You can specify multiple database names in the same `avsybase` command for a backup or restore initiated from the CLI as described in Command options.

Password-protected database backups and restores

The Sybase plug-in supports password-protected Sybase database backups and restores of those backups. You can specify a password that the Sybase server uses with the Sybase `dump` or `load` command option `with passwd=` to implement a password-protected backup or restore the backup.

If you specify a password for a Sybase database backup, you must specify the same password to restore the backup. If the password does not match the one used for the backup, the restore fails with an error message.

Backup describes how to use the AUI to specify the password for a password-protected database backup.

Restore and Recovery describes how to use the AUI to specify the password for the restore of a password-protected database backup.

Command options describes how to use the `avsybase` command options to specify the password for a password-protected database backup or restore.

Database backup and restore verification

The Sybase plug-in supports database backup and restore verification at the header or a full verification.

You can specify the following types of database backup or restore verification:

- No verification—Specifies to not perform verification during the backup or restore. By default, the Sybase plug-in does not perform verification if you do not specify a verification level.
- No verification—Specifies to use the Sybase `dump` or `load` command option `with verify=full` to verify both the header information and rows structure for full verification of the backup data.
- Header verification—Specifies to use the Sybase `dump` or `load` command option `with verify=header` to verify the page header information only.
- Verifyonly verification—(Restore from the CLI only) Specifies to use the Sybase `load` command option `with verify=verifyonly` to verify minimal header information without restoring the database as described in Common options on page 94.

Backup describes how to use Avamar Administrator to specify the verification level for a backup.

Restore and Recovery describes how to use Avamar Administrator to specify the verification level for a restore.

Command options describes how to use the `avsybase` command options to specify the verification level for a backup or restore.

Database consistency checks

The Sybase plug-in supports the following types of Sybase database consistency checks for a backup or restore operation:

- `dbcc checkalloc`
- `dbcc checkcatalog`
- `dbcc checkdb`
- `dbcc checkdb skip ncindex`
- `dbcc checkstorage`

The Sybase documentation provides details about database consistency checks.

The Sybase plug-in performs the Sybase database consistency check before starting the backup or after completing the restore. You can specify the type of database consistency check to perform by using either the AUI settings or the appropriate option in the `avsybase` command. If you do not specify the type of consistency check, the Sybase plug-in does not perform a database consistency check during a backup or restore.

Note: If the consistency check of a database fails before a backup, the Sybase plug-in does not back up the database.

Backup describes how to use the AUI to specify database consistency checks for a backup.

Restore and Recovery describes how to use the AUI to specify database consistency checks for a restore.

Command options describes how to use the `avsybase` command options to specify database consistency checks for a backup or restore.

You can also perform a database consistency check as a separate manual operation outside of a backup or restore by running the `avsybase` command with the appropriate option as described in Command options.

Preprocessing and postprocessing scripts

The Sybase plug-in supports the following scripts:

- A preprocessing script that is run at the start of a backup or restore.
- A postprocessing script that is run at the end of a backup or restore.

You must store the scripts in a directory that is named `scripts`, which are located under the directory that is specified by the `--sysdir` option.

If you do not specify `--sysdir`, you must store scripts in the following default directory:

- On AIX and Linux: `/usr/local/avamar/etc/scripts`
- On HP-UX and Solaris: `/opt/AVMRclnt/etc/scripts`
- On Windows: `C:\Program Files\avs\etc\scripts`

When you run a backup or restore, you can specify either script or both scripts for the operation. The backup or restore does not fail if either script fails.

NOTICE You cannot specify more than one preprocessing script and one postprocessing script for a single backup or restore operation.

Backup describes how to use the AUI to specify a preprocessing or postprocessing script for a backup.

Restore and Recovery describes how to use the AUI to specify a preprocessing or postprocessing script for a restore.

Command options describes how to use the `avsybase` command options to specify a preprocessing or postprocessing script.

Internationalization (I18N)

The Sybase plug-in provides I18N capability to operate in a non-English environment or locale without the Sybase plug-in itself being localized. After you configure the I18N support as described in Configuring internationalization (I18N) support on page 53, the Sybase plug-in can process and display in Avamar Administrator the non-ASCII data passed to it from the operating system, Avamar server, and Sybase software.

Multi-streaming

Multi-streaming is a feature that enables a single backup or restore to use multiple sessions (data streams) to the Avamar server or Data Domain system to improve the backup or restore performance.

The multi-streaming setting specifies the maximum number of backup or restore sessions to run concurrently. The default value is 1, and the Sybase plug-in backs up or restores only one database at a time.

You can specify a greater multi-streaming value (for example, with the `--max-streams` option of the `avsybase` command) to back up or restore multiple databases concurrently. The Sybase plug-

in enforces a maximum multi-streaming value of 10 for backups and restores only when you specify multi-streaming in the AUI.

NOTICE If you set the multi-streaming value too high, the system might not have sufficient resources to perform the backup or restore. The Sybase plug-in always tries to run a backup or restore at the specified multi-streaming value.

The Sybase plug-in starts database backups or restores until the number of running backups or restores equals the specified multi-streaming value. When a database backup or restore completes, the Sybase plug-in starts another operation in its place and continues performing the maximum number of operations until all the databases on the server are backed up or restored.

If the multi-streaming value is greater than the number of databases on the server:

- A backup of the whole Sybase server backs up all the databases on the server concurrently.
- A restore of the whole Sybase server restores all the databases on the server concurrently, except for the master database.

Despite the multi-streaming option setting during a backup or restore, the Sybase plug-in creates two cache files for each database: a file cache and a hash cache.

Backup describes how to specify backup multi-streaming.

Restore and Recovery describes how to specify restore multi-streaming.

Multi-striping

Multi-striping is a feature that enables the backup or restore of each database to be broken up into multiple stripes (data streams) to the Avamar server or Data Domain system. Multi-striping improves the backup and restore performance of large databases.

Multi-streaming does not handle large databases optimally. A single large database occupies and holds onto one stream (assuming that it is a single-stripe), even if other streams are available. However, with multi-striping, large databases can be broken into stripes that backup in parallel. This ensures performance advantages similar to multi-streaming, even if it is for a single database.

Both multi-streaming and multi-striping use multiple `avtar` processes. Therefore, they are not allowed to be used together, otherwise far too many `avtar` processes are generated, and can impact performance.

The multi-striping setting specifies the fixed number of backup stripe sessions to run concurrently for each database in the backup. The default value is 1, and the Sybase plug-in backs up or restores each database as a single stripe. You can specify a greater multi-striping value (for example, with the `--stripes` option of the `avsybase` command) to back up or restore multiple stripes concurrently. The Sybase plug-in enforces a maximum multi-striping value of 10 for backups and restores. The number of stripes is specified only during backup. During restore, the plugin automatically looks up and uses the same number of stripes.

If you set the multi-striping value too high, the system might not have sufficient resources to perform the backup or restore. The Sybase plug-in always uses the specified number of stripes, for each database.

Backup describes how to specify backup multi-striping.

Restore and Recovery describes how restore multi-striping works.

Client logs and caches

The default location of the client logs and cache files is the `var/clientlogs` directory. The `var/clientlogs` directory provides full access to nonroot users.

To use existing caches created by a previous Sybase plug-in release, manually move the caches from the `var` directory to the `var/clientlogs` directory.

Consider the following:

- If you do not move the old cache files, the Sybase plug-in creates cache files in the `var/clientlogs` directory, which might have some performance impact on the initial backups after an upgrade to this Sybase plug-in release.
- If you do not remove or move the old cache files, the `avagent` process deletes the old cache files in six months.

Sybase ASE 15.7.*x* support

The Sybase plug-in supports the features of Sybase ASE release 15.7.*x*, including Sybase database compression, the shrink log feature, and the threaded kernel option. The Sybase documentation describes the Sybase ASE 15.7.*x* features.

If you enable Sybase database compression or the threaded kernel option with Sybase ASE 15.7.*x*, you do not need to perform any additional configurations or procedures for the Sybase plug-in backups and restores.

You can have the Sybase plug-in perform a shrink log operation during a Sybase 15.7.*x* database backup by specifying the `--shrink-log` option of the `avsybase` backup command as described in Backup options on page 98.

Cumulative dump/load support

The Sybase plug-in supports cumulative dump/load commands for backup/restore when the underlying Sybase ASE version supports it. This feature is supported starting with 15.7 SP100, and in all versions of SAP ASE 16.0.

The Sybase plug-in cannot perform cumulative dumps in a shared-disk cluster system. However, the plug-in can load a cumulative dump that has been taken in a non-cluster environment and into a database in a shared-disk cluster.

Sybase ASE network password encryption

The Sybase plug-in supports proprietary, RSA, and EPEP password encryption for Sybase login passwords on all supported platforms.

Software processes

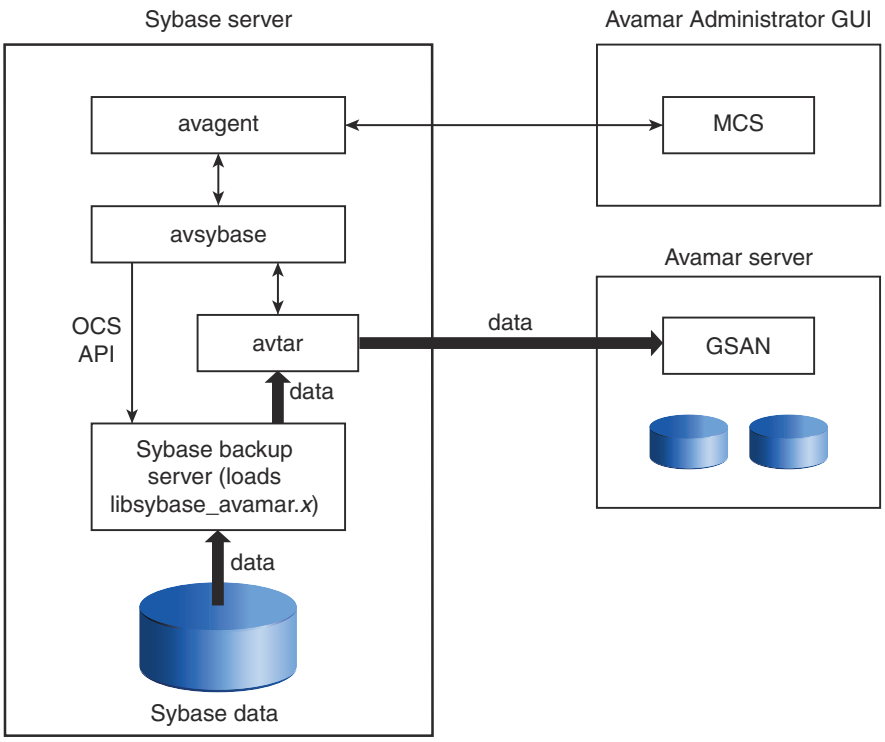
The Sybase plug-in uses specific processes during the supported backup and restore operations.

Backup processes

The following illustration and steps describe how the Sybase server, Avamar server, and Sybase plug-in processes interact during a scheduled backup or on-demand backup that is initiated from the Avamar Administrator or the AUI.

NOTICE When you start an on-demand backup from the CLI with the `avsybase` command, the backup has a similar workflow but does not include the `avagent` process. The CLI backup obtains information from the `avsybase` command options, not from an Avamar Management Console Server (MCS) workorder.

Figure 2 Backup workflow



A scheduled backup or on-demand backup that is initiated from the Avamar Administrator or the AUI includes specific process interactions.

1. The `avagent` process on the Sybase server (Avamar client) performs the following actions:
   a. Polls the Avamar Administrator MCS service, which gives `avagent` a backup workorder:
      - The backup workorder is an XML message with details about the backup to perform, including a list of Sybase databases or transaction logs to back up and information that is required to connect to the Sybase server.
      - For an on-demand backup, after you browse and provide the backup options in Avamar Administrator, the MCS creates and queues the workorder for processing.
      - A scheduled backup creates the workorder by using the dataset that is specified in the backup policy. Scheduling backups on page 61 provides details.
   b. Starts the Sybase plug-in binary, `avsybase`, and passes the workorder to the `avsybase` process.

2. For each database to be backed up, the `avsybase` process uses the Sybase Open Client/Server (OCS) API to issue a `dump` command to the Sybase server.
   The number of `dump` commands issued concurrently depends on the multi-streaming configuration. Each `dump` command specifies the database to be backed up. In addition, the `avsybase` process keeps track of the multi-striping value specified, and extends each `dump` (or `load`) command to specify multiple stripes for each database.
3. For each received `dump` command, the Sybase server starts a process to load the libsybase_avamar.*x* library.
4. For each issued `dump` command, the `avsybase` process starts an `avtar` process. If multi-striping is enabled, the `avsybase` process starts an `avtar` process for each stripe instead.
5. Each process started by the Sybase server connects to a single `avtar` processes and passes the backup data to the `avtar` process through the libsybase_avamar.*x* library interface.
6. Depending on the backup destination, the `avtar` process writes the backup data to the Avamar server or a Data Domain system.

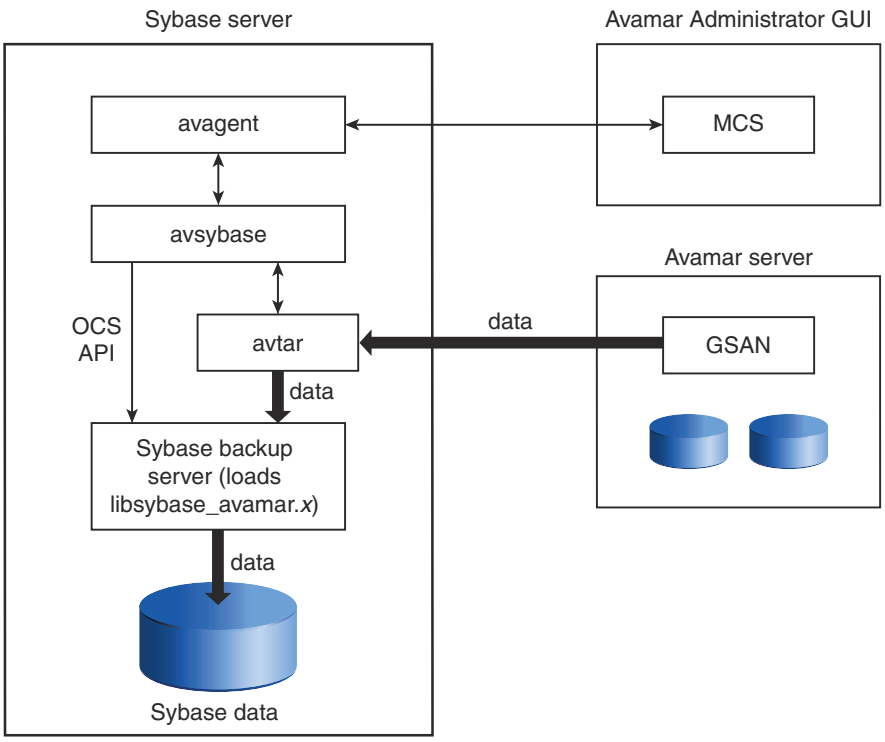
The first backup to the Avamar server or Data Domain system backs up all the specified data, which achieves the least data deduplication. Subsequent backups achieve improved deduplication rates as more and more redundant data blocks are identified.

Restore processes

The following figure and steps describe how the Sybase server, Avamar server, and Sybase plug-in processes interact during a restore initiated from the Avamar Administrator or the AUI.

NOTICE When you start a restore from the CLI with the `avsybase` command, the restore has a similar workflow but does not include the `avagent` process. The CLI restore obtains information from the `avsybase` command options, not from an MCS workorder.

Figure 3 Restore workflow



A restore initiated from the Avamar Administrator or the AUI includes specific process interactions.

1. The `avagent` process on the Sybase server (Avamar client) performs the following actions:
   a. Polls the Avamar Administrator MCS service, which gives `avagent` a restore workorder:
      - The restore workorder is an XML message with details about the restore to perform, including a list of Sybase databases to restore and information that is required to connect to the Sybase server.
      - After you browse and provide the restore options in the Avamar Administrator or the AUI, the MCS creates and queues the workorder for processing.
   b. Starts the Sybase plug-in binary, `avsybase`, and passes the workorder to the `avsybase` process.
2. For each backup to be restored, the `avsybase` process uses the Sybase OCS API to issue a `load` command to the Sybase server.

   The number of `load` commands issued concurrently depends on the multi-streaming configuration. Each `load` command specifies the backup (database and transaction log) to be restored and places the database in offline mode if it is not already offline.

   In addition, the `avsybase` process keeps track of whether multi-striping was enabled for the backup, and automatically re-uses the striping configuration used during backup. This results in each `load` command specifying multiple stripes.

   Note: More than one `load` command can be issued per database because each database can have multiple backups (database and transaction log) to be restored.
3. For each received `load` command, the Sybase server starts a process that loads the libsybase_avamar.*x* library.

4. For each issued `load` command, the `avsybase` process starts an `avtar` process. If multi-striping was enabled, the `avsybase` process starts an `avtar` process for each stripe instead.
5. The `avtar` process reads the backup data from the Avamar server or a Data Domain system.
6. Each process started by the Sybase server connects to a single `avtar` process and reads the backup data from the `avtar` process through the libsybase_avamar.*x* library interface.

NOTICE The Sybase server cannot create a database during a restore. If a database was lost, you must first create the database before you start the database restore. Keep records of all the databases and their sizes on the Sybase system. Sybase documentation describes how to restore lost databases.

CHAPTER 2

Installation and Configuration

This chapter includes the following topics:

- Preparing to install the Avamar Plug-in for Sybase 38
- Installing, upgrading, and uninstalling the software on HP-UX 40
- Installing, upgrading, and uninstalling the software on IBM AIX 42
- Installing, upgrading, and uninstalling the software on Linux 46
- Installing upgrading, and uninstalling the software on Solaris 49
- Installing, upgrading, and uninstalling the software on Windows 51
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Preparing to install the Avamar Plug-in for Sybase

Review the system requirements for the Avamar Plug-in for Sybase ASE, and ensure that the environment meets the requirements before you install the plug-in. You also must download the Avamar file system client and plug-in installation package from the Avamar server, install the file system client, and register the client with the Avamar server.

System requirements

The environment must meet client compatibility requirements before you install Avamar client software.

See the *E-lab Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection for client compatibility requirements and supported operating systems and application versions.

The Avamar file system client and the plug-ins that you install on the host must have the same version number.

Sybase server requirements

Ensure that you meet the following requirements on the Sybase server host:

- You have operating system root privileges on the Sybase server host.
- Sybase server (both database server and backup server) software is installed and functioning correctly.
- All the backup patches required by Sybase are installed.

  On a Sybase ASE 15.5 system with Sybase SDK installed, the Sybase SDK 15.5 ESD#11 or later has been installed as required for Sybase SDK bug 589847.
- The Avamar server is operational and present on the same network as the Sybase server. To verify the network connectivity, you can open a command shell and type the following command:

  ```
  ping Avamar_server
  ```

  where *Avamar_server* is the network hostname (as defined in DNS) or IP address of the Avamar server.

Cluster system requirements

In a cluster system on Solaris, ensure that you meet the pre-installation requirements for a Solaris Cluster or Veritas Cluster Server (VCS) as described in the *Avamar Backup Clients User Guide*. Sybase must also be configured for the particular type of cluster.

User Account Control setting on Microsoft Windows

The User Account Control (UAC) feature limits application software to standard user privileges. You must provide administrator privileges for certain tasks, such as installing software. UAC is enabled by default.

If you start an Avamar client or plug-in installer without administrator privileges on a Windows computer with UAC enabled, then the software does not install correctly.

You can disable or bypass UAC. The installation procedures in this chapter provide one method to bypass UAC. The Microsoft documentation provides other methods and additional information.

Downloading the software

In a supported cluster, you must download the Avamar Plug-in for Sybase ASE installation package to each node that requires the software to be installed.

Procedure

1. Log in to the Sybase server host with the necessary privileges to perform an installation.
2. Open a web browser and type the following URL:

   `https://Avamar_server`

   where *Avamar_server* is the DNS name or IP address of the Avamar server.

   The **Avamar Web Restore** page appears.
3. Click **Downloads**.

   The **Downloads** list appears.
4. Click **+** next to the platform heading for the Sybase server.
5. Click **+** next to the operating system heading for the Sybase server.
6. Click the link for the Avamar Plug-in for Sybase ASE installation package as listed in the following table.

Table 6 Sybase plug-in installation packages

Operating system	Package name
HP-UX	`AvamarSybase-hpux11iv3-itan-`*`version`*`.depot` For example: `AvamarSybase-hpux11iv3-itan-7.2.100-218.depot`
IBM AIX	`AvamarSybase-aix6-ppc-`*`version`*`.bff` For example: `AvamarSybase-aix6-ppc-7.2.100-218.bff`
Red Hat Enterprise Linux, SUSE Linux Enterprise Server[1]	`AvamarSybase-linux-`*`type`*`-x86-`*`version`*`.rpm` (32-bit) or `AvamarSybase-linux-`*`type`*`-x86_64-`*`version`*`.rpm` (64-bit) where *type* is rhel4 or sles11 For example: `AvamarSybase-linux-rhel4-x86_64-7.2.100-218.rpm`
Oracle Solaris	`AvamarSybase-solaris10-`*`type`*`-`*`version`*`.pkg` where *type* is sparc or x86_64 For example: `AvamarSybase-solaris10-x86_64-7.2.100-218.pkg`
Microsoft Windows[2]	`AvamarSybase-windows-x86-`*`version`*`.msi` (32-bit) or `AvamarSybase-windows-x86_64-`*`version`*`.msi` (64-bit) For example: `AvamarSybase-windows-x86_64-7.2.100-218.msi`

[1]On Linux, the install package bitness must match the bitness of the Sybase server that is supported by Sybase and will be used for backups and restores. Obtain the package from the download link for “Linux for x86 (32 bit)” or “Linux for x86 (64 bit)”. For 32-bit Sybase on 64-bit Linux, obtain the 32-bit package from either download link.

[2]On Windows, the install package bitness must match the bitness of the Windows operating system. The 64-bit installer contains 32-bit and 64-bit libraries to match Sybase server installations of either bitness. Obtain the package from the download link for “Windows (32 bit)” or “Windows (64 bit)”. Each only runs on the corresponding bitness of Windows system.

7. Download the correct installation package for a 64-bit operating system:

- To support a 32-bit Sybase backup server on a 64-bit operating system, download and install the 32-bit Avamar Plug-in for Sybase ASE installation package for Linux, and the 64-bit package for Windows.
- To support a 64-bit Sybase backup server on a 64-bit operating system, download and install the 64-bit Avamar Plug-in for Sybase ASE installation package.
- To support the coexistence of 32-bit and 64-bit Sybase backup servers on the same 64-bit Linux or 64-bit Windows system, download and install the 32-bit Avamar Plug-in for Sybase ASE installation package for 64-bit Linux and the 64-bit package for 64-bit Windows.

Note: The 32-bit Avamar Plug-in for Sybase ASE installation package for 64-bit Linux contains both the 32-bit and 64-bit Sybase libraries. The 64-bit Avamar Plug-in for Sybase ASE installation package for 64-bit Windows contains both the 32-bit and 64-bit Sybase libraries.

8. Save the Avamar Plug-in for Sybase ASE installation package to a temporary directory.

Note: On a Solaris VCS cluster node only, download the correct Avamar Cluster Client for Solaris package to the same directory as the Avamar Plug-in for Sybase ASE installation package. Follow the download instructions in the VCS cluster chapter of the *Avamar Backup Clients User Guide*.

Installing the Avamar file system client

Avamar file system clients include the Avamar agent and an Avamar file system plug-in. The Avamar agent is required for backups and restores with the Sybase plug-in. You can use the file system plug-in to back up operating system and application binary files, which are required for disaster recovery.

Install and register the Avamar file system client on each Sybase host computer:

- For HP-UX, IBM AIX, Linux, and Solaris systems, follow the instructions in the *Avamar Backup Clients User Guide*.
- For Windows systems, follow the instructions in the *Avamar for Windows Server User Guide*.
- In a cluster environment, install the client software in the same directory on each node in the cluster, and register each node in the cluster with the Avamar server.

You must install the 64-bit Avamar client package on a 64-bit operating system.

Installing, upgrading, and uninstalling the software on HP-UX

You can install, upgrade, and uninstall the Avamar Plug-in for Sybase on HP-UX.

Installing the Avamar Plug-in for Sybase on HP-UX

You can install the Avamar Client for HP-UX in either the default installation directory or an alternate directory. After you have installed the Avamar Client for HP-UX, you must install the Avamar Plug-in for Sybase in the same directory as the Avamar client.

About this task

You can specify an alternate location for the `var` directory during the Avamar Client for HP-UX installation by using the `-x ask=true` option with the `swinstall` command as described in the *Avamar Backup Clients User Guide*. When you install the Sybase plug-in, the plug-in installation automatically uses the same location for the `var` directory that you specified during the Avamar Client for HP-UX installation.

Procedure

1. Log in to the Sybase server host as root.
2. Type the following command to change to the temporary directory that contains the Avamar Plug-in for Sybase installation package:

   cd *tmp*

   where *tmp* is the pathname of the temporary directory
3. Install the Avamar Plug-in for Sybase in the default directory or an alternate directory:
   - To install the Avamar Plug-in for Sybase in the default directory, type the following command:

     swinstall -s /*tmp*/AvamarSybase-hpux11iv3-itan-*version*.depot *

     where *version* is the Avamar software version.
   - To install the Avamar Plug-in for Sybase in an alternate directory, type the following command:

     swinstall -s /*tmp*/AvamarSybase-hpux11iv3-itan-*version*.depot hpuxsybase,2=/*alternate_path*

     where:
     - *version* is the Avamar software version.
     - *alternate_path* is the pathname of the alternate directory where you installed the Avamar Client for HP-UX.
4. Create a symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`, that points to the correct Avamar Plug-in for Sybase library file in the *`Avamar_installation_dir`*`/lib` directory:
   - For Sybase ASE 15.0.*x*, points to 32-bit library file `libsybase_avamar32.so`
   - For Sybase ASE 15.5 or later, points to 64-bit library file `libsybase_avamar.so`
5. Register the Avamar Plug-in for Sybase:
   a. Type the following command to register the Avamar Plug-in for Sybase installed in the default directory:

      /usr/local/avamar/bin/avregister

      The following output appears in the command shell:

```
=== Client Registration and Activation
This script will register and activate the client with the
Administrator server.

Enter the Administrator server address (DNS text name or numeric IP
address, DNS name preferred): server_name

Enter the Avamar server domain [clients]: domain/client
avagent.d Info: Stopping Avamar Client Agent (avagent)...
avagent.d Info: Client Agent stopped.
avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log
avagent.d Info: Client activated successfully.
avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 18347
avagent.d Info: Client Agent started.
Registration Complete.
```

b. Type the following command to register the Avamar Plug-in for Sybase installed in an alternate directory:

```
alternate_path/bin/avregister
```

where *alternate_path* is the pathname of the alternate directory.

Upgrading the Avamar Plug-in for Sybase on HP-UX

You must complete the required steps to upgrade the Avamar Plug-in for Sybase on HP-UX.

Procedure

1. Uninstall the Sybase plug-in. Uninstalling the Avamar Plug-in for Sybase on HP-UX on page 42 provides instructions.
2. Uninstall the Avamar file system client. The *Avamar Backup Clients User Guide* provides instructions.
3. Download and install the new version of the Avamar file system client. The *Avamar Backup Clients User Guide* provides instructions.

   Note: The versions of the Avamar file system client and Sybase plug-in must be the same.

4. Download the Sybase plug-in installation package. Downloading the software on page 39 provides instructions.
5. Install the new version of the Sybase plug-in. Installing the Avamar Plug-in for Sybase on HP-UX on page 40 provides instructions.

Uninstalling the Avamar Plug-in for Sybase on HP-UX

You can uninstall the Avamar Plug-in for Sybase on HP-UX by using the `swremove` command.

Procedure

1. Log in to the Sybase server host as root.
2. Type the following command to uninstall the Avamar Plug-in for Sybase:

   ```
   swremove hpuxsybase
   ```

3. Delete the symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`.

Installing, upgrading, and uninstalling the software on IBM AIX

You can install, upgrade, and uninstall the Avamar Plug-in for Sybase on IBM AIX.

Installing the Avamar Plug-in for Sybase on IBM AIX

You can install the Avamar Client for AIX in either the default installation directory or an alternate directory. After you have installed the Avamar Client for AIX, you must install the Avamar Plug-in for Sybase in the same directory as the Avamar client.

About this task

You can specify an alternate location for the `var` directory during the Avamar Client for AIX installation by setting the VARDIR environment variable as described in the *Avamar Backup Clients User Guide*. When you install the Sybase plug-in, the plug-in installation automatically uses the

same location for the `var` directory that you specified during the Avamar Client for AIX installation.

Procedure

1. Log in to the Sybase server host as root.
2. Type the following command to change to the temporary directory that contains the Avamar Plug-in for Sybase installation package:

   cd *tmp*

   where *tmp* is the pathname of the temporary directory.
3. Install the Avamar Plug-in for Sybase in the default directory or an alternate directory:
   - To install the Avamar Plug-in for Sybase in the default directory, type the following command:

     installp -d /tmp/AvamarSybase-aix6-ppc-*version*.bff all

     where *version* is the Avamar software version.
   - To install the Avamar Plug-in for Sybase in an alternate directory, type the following command:

     installp -R *alternate_path* -d /tmp/AvamarSybase-aix6-ppc-*version*.bff all

     where:
     - *alternate_path* is the pathname of the alternate directory where you installed the Avamar Client for AIX.
     - *version* is the Avamar software version.
4. Create a symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`, that points to the Avamar Plug-in for Sybase library file in the *`Avamar_installation_dir`*`/lib` directory.
   - For 32-bit Sybase backup servers, the symbolic link should point to the 32-bit library file `libsybase_avamar.so`.
   - For 64-bit Sybase backup servesr, the symbolic link should point to the 64-bit library file `libsybase_avamar64.so`.
5. Register the Avamar Plug-in for Sybase:
   - Type the following command to register the Avamar Plug-in for Sybase installed in the default directory:

     /usr/local/avamar/bin/avregister

     The following output appears in the command shell:

```
=== Client Registration and Activation
This script will register and activate the client with the
Administrator server.

Enter the Administrator server address (DNS text name or numeric IP
address, DNS name preferred): server_name

Enter the Avamar server domain [clients]: domain/client
avagent.d Info: Stopping Avamar Client Agent (avagent)...
avagent.d Info: Client Agent stopped.
avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log
avagent.d Info: Client activated successfully.
avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 18347
```

```
avagent.d Info: Client Agent started.
Registration Complete.
```

- Type the following command to register the Avamar Plug-in for Sybase installed in an alternate directory:

  ***alternate_path*/bin/avregister**

  where *alternate_path* is the pathname of the alternate directory.

Upgrading the Avamar Plug-in for Sybase on IBM AIX

You must complete the required steps to upgrade the Avamar Plug-in for Sybase on IBM AIX.

About this task

You must upgrade the Sybase plug-in before you upgrade the Avamar file system client.

Note: The versions of the Avamar file system client and Sybase plug-in must be the same.

Procedure

1. Log in to the Sybase server host as root.
2. Download the Avamar Plug-in for Sybase installation package. Downloading the software on page 39 provides instructions.
3. Type the following command to change to the temporary directory that contains the Avamar Plug-in for Sybase installation package:

   cd *tmp*

   where *tmp* is the pathname of the temporary directory.

4. Upgrade the Avamar Plug-in for Sybase in the default directory or an alternate directory:
   - To upgrade the Avamar Plug-in for Sybase in the default directory, type the following command:

     installp -d /tmp/AvamarSybase-aix6-ppc-*version*.bff all

     where *version* is the Avamar software version.
   - To upgrade the Avamar Plug-in for Sybase in an alternate directory, type the following command:

     installp -R *alternate_path* -d /tmp/AvamarSybase-aix6-ppc-*version*.bff all

     where:
     - *alternate_path* is the pathname of the alternate directory.
     - *version* is the Avamar software version.
5. Download the Avamar file system client. The *Avamar Backup Clients User Guide* provides instructions.
6. Upgrade the Avamar file system client in the default directory or an alternate directory:
   - To upgrade the Avamar file system client in the default directory, type the following command:

     installp -d /*tmp*/AvamarClient-*platform*-*version*.bff all

     where:
     - *platform* is the AIX system type.
     - *version* is the Avamar software version.
   - To upgrade the Avamar file system client in an alternate directory, type the following command:

installp -R *alternate_path* -d /*tmp*/AvamarClient-*platform*-*version*.bff all

where:

- *alternate_path* is the pathname of the alternate directory.
- *platform* is the AIX system type.
- *version* is the Avamar software version.

7. Create a symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`, that points to the Avamar Plug-in for Sybase library file in the *`Avamar_installation_dir`*`/lib` directory.
   - For 32-bit Sybase backup servers, the symbolic link should point to the 32-bit library file `libsybase_avamar.so`.
   - For 64-bit Sybase backup servesr, the symbolic link should point to the 64-bit library file `libsybase_avamar64.so`.
8. Register the Avamar Plug-in for Sybase:
   - Type the following command to register the Avamar Plug-in for Sybase installed in the default directory:

     /usr/local/avamar/bin/avregister
   - Type the following command to register the Avamar Plug-in for Sybase installed in an alternate directory:

     ***alternate_path*/bin/avregister**

     where *alternate_path* is the pathname of the alternate directory.

Uninstalling the Avamar Plug-in for Sybase on IBM AIX

You can uninstall the Avamar Plug-in for Sybase on IBM AIX by using the `installp` command.

Procedure

1. Log in to the Sybase server host as root.
2. View all the Avamar packages installed on the system.
   - To view the Avamar packages installed in the default directory, type the following command:

     lslpp -la | grep Avamar
   - To view the Avamar packages installed in an alternate directory, type the following command:

     lslpp -R *alternate_path* -la | grep Avamar

     where *alternate_path* is the pathname of the alternate directory.
3. Uninstall the Avamar Plug-in for Sybase from the default directory or an alternate directory:
   - To uninstall the Avamar Plug-in for Sybase from the default directory, type the following command:

     installp -u AvamarSybase-aix6-ppc
   - To uninstall the Avamar Plug-in for Sybase from an alternate directory, type the following command:

     installp -R /*alternate_path* -u AvamarSybase-aix6-ppc

     where*alternate_path* is the pathname of the alternate directory.

4. Delete the symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`.

Installing, upgrading, and uninstalling the software on Linux

You can install, upgrade, and uninstall the Avamar Plug-in for Sybase on Linux.

Installing the Avamar Plug-in for Sybase on Linux

You can install the Avamar Client for Linux in either the default installation directory or an alternate directory. After you have installed the Avamar Client for Linux, you must install the Avamar Plug-in for Sybase in the same directory as the Avamar client.

About this task

You can specify an alternate location for the `var` directory during the Avamar Client for Linux installation as described in the *Avamar Backup Clients User Guide*. When you install the Sybase plug-in, the plug-in installation automatically uses the same location for the `var` directory that you specified during the Avamar Client for Linux installation.

Procedure

1. Log in to the Sybase server host as root.
2. Type the following command to change to the temporary directory that contains the Avamar Plug-in for Sybase installation package:

   cd *tmp*

   where *tmp* is the pathname of the temporary directory.
3. Install the Avamar Plug-in for Sybase in the default directory or an alternate directory:
   - To install the Avamar Plug-in for Sybase in the default directory, type the following command:

     rpm -ivh AvamarSybase-linux-*package-version*.rpm

     where *package-version* is the package type and Avamar software version.
   - To install the Avamar Plug-in for Sybase in an alternate directory, type the following command:

     rpm -ivh --relocate /usr/local/avamar=/*alternate_path* AvamarSybase-linux-*package-version*.rpm

     where:
     - *alternate_path* is the pathname of the alternate directory where you installed the Avamar Client for Linux.
     - *package-version* is the package type and Avamar software version.
4. Create a symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`, that points to the Avamar Plug-in for Sybase library file, `libsybase_avamar.so`, in the *`Avamar_installation_dir`*`/lib` directory.

   If both 32-bit and 64-bit Sybase backup servers are running on the same 64-bit Linux system, create separate symbolic links that point to the correct library file in the *`Avamar_installation_dir`*`/lib` directory:
   - For a 32-bit backup server, create a link that points to the 32-bit library file `libsybase_avamar.so`.

- For a 64-bit backup server, create a link that points to the 64-bit library file `libsybase_avamar64.so`.

5. Register the Avamar Plug-in for Sybase:
   - Type the following command to register the Avamar Plug-in for Sybase installed in the default directory:
     /usr/local/avamar/bin/avregister

     The following output appears in the command shell:

     ```
     === Client Registration and Activation
     This script will register and activate the client with the
     Administrator server.

     Enter the Administrator server address (DNS text name or numeric IP
     address, DNS name preferred): server_name

     Enter the Avamar server domain [clients]: domain/client
     avagent.d Info: Stopping Avamar Client Agent (avagent)...
     avagent.d Info: Client Agent stopped.
     avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log
     avagent.d Info: Client activated successfully.
     avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log
     avagent Info <5417>: daemonized as process id 18347
     avagent.d Info: Client Agent started.
     Registration Complete.
     ```

   - Type the following command to register the Avamar Plug-in for Sybase installed in an alternate directory:
     ***alternate_path*/bin/avregister**

     where *alternate_path* is the pathname of the alternate directory.

Upgrading the Avamar Plug-in for Sybase on Linux

You can upgrade the Avamar Plug-in for Sybase on Linux by using the `rpm-Uvh` command.

Before you begin

The versions of the Avamar file system client and Avamar Plug-in for Sybase must be the same. You cannot relocate the Sybase plug-in or `var` directory to a different directory during the upgrade.

Procedure

1. Log in to the Sybase server host as root.
2. Upgrade the Avamar Client for Linux. The *Avamar Backup Clients User Guide* provides instructions.
3. Type the following command to change to the temporary directory that contains the Avamar Plug-in for Sybase installation package:

   cd *tmp*

   where *tmp* is the pathname of the temporary directory.
4. Type the following command to upgrade the Avamar Plug-in for Sybase in the default directory:

   rpm -Uvh AvamarSybase-linux-*package-version*.rpm

   where *package-version* is the package type and Avamar software version.

   The `rpm -Uvh` command automatically uninstalls the earlier version of the Avamar Plug-in for Sybase and then installs the new version.

5. Create a symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`, that points to the Avamar Plug-in for Sybase library file, `libsybase_avamar`.so, in the *`Avamar_installation_dir`*`/lib` directory.

   If both 32-bit and 64-bit Sybase backup servers are running on the same 64-bit Linux system, create separate symbolic links that point to the correct library file in the *`Avamar_installation_dir`*`/lib` directory:

   - For a 32-bit backup server, create a link that points to the 32-bit library file `libsybase_avamar.so`.
   - For a 64-bit backup server, create a link that points to the 64-bit library file `libsybase_avamar64.so`.

6. Type the following command to register the Avamar Plug-in for Sybase:

   `/usr/local/avamar/bin/avregister`

   The following output appears in the command shell:

```
=== Client Registration and Activation
This script will register and activate the client with the
Administrator server.

Enter the Administrator server address (DNS text name or numeric IP
address, DNS name preferred): server_name

Enter the Avamar server domain [clients]: domain/client
avagent.d Info: Stopping Avamar Client Agent (avagent)...
avagent.d Info: Client Agent stopped.
avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log
avagent.d Info: Client activated successfully.
avagent Info <0000>: Logging to /usr/local/avamar/var/avagent.log
avagent Info <5417>: daemonized as process id 18347
avagent.d Info: Client Agent started.
Registration Complete.
```

Uninstalling the Avamar Plug-in for Sybase on Linux

You can uninstall the Avamar Plug-in for Sybase on Linux by using the `rpm -e` command.

Procedure

1. Log in to the Sybase server host as root.
2. Type the following command to view all the Avamar packages installed on the system:

   `rpm -qa | grep Av`

   For example, the following output appears in the command shell:

   `AvamarSybase-`*`version`*

   `AvamarClient-`*`version`*

   where *version* is the Avamar software version.

3. Type the following command to uninstall the Avamar Plug-in for Sybase:

   `rpm -e AvamarSybase-version`

4. Delete the symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`.

Installing upgrading, and uninstalling the software on Solaris

You can install, upgrade, and uninstall the Avamar Plug-in for Sybase on Solaris.

Note: When using Avamar Cluster Client for Solaris on VCS, Avamar Client and Avamar Sybase plugin packages should be installed before doing cluster configurations. If they are not, Solaris Sybase ASE plugin will not be visible in the Avamar Administrator backup window.

Installing the Avamar Plug-in for Sybase on Solaris

You can install the Avamar Client for Solaris in either the default installation directory or an alternate directory. After you have installed the Avamar Client for Solaris, you can install the Avamar Plug-in for Sybase. The Sybase plug-in installation process automatically installs the Avamar Plug-in for Sybase in the same directory as the Avamar Client for Solaris.

About this task

You can use the following instructions to install the Avamar Plug-in for Sybase on a stand-alone Solaris system or on each node in a cluster.

Procedure

1. Log in to the Sybase server host as root.
2. Type the following command to change to the temporary directory that contains the Avamar Plug-in for Sybase installation package:

   cd *tmp*

   where *tmp* is the pathname of the temporary directory.

3. Type the following command to install the Avamar Plug-in for Sybase:

   pkgadd -d AvamarSybase-solaris*version-package-version*.pkg

   where `AvamarSybase-solaris`*`version-package-version`*`.pkg` is the file name of the Avamar Plug-in for Sybase installation package that you downloaded.

   The command displays installation activity.

4. Perform the following additional procedures in a cluster system on Solaris:
   - In a Solaris Cluster system, configure the resource groups on each node according to instructions in the Solaris Cluster chapter of the *Avamar Backup Clients User Guide*.
   - In a VCS system, install the Avamar Cluster Client for Solaris on each node, starting with the active VCS node first, according to instructions in the VCS chapter of the *Avamar Backup Clients User Guide*. Depending on the Solaris operating system, use the correct installation package.
5. Create a symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`, that points to the Avamar Plug-in for Sybase library file in the *`Avamar_installation_dir`*`/lib` directory.
   - For 32-bit Sybase backup servers, the symbolic link should point to the 32-bit library file `libsybase_avamar.so`.
   - For 64-bit Sybase backup servesr, the symbolic link should point to the 64-bit library file `libsybase_avamar64.so`.
6. Register the Avamar Plug-in for Sybase:
   a. Type the following command to register the Avamar Plug-in for Sybase installed in the default directory:

/opt/AVMRclnt/bin/avregister

The following output appears in the command shell:

```
=== Client Registration and Activation
This script will register and activate the client with the
Administrator server.

Enter the Administrator server address (DNS text name or numeric IP
address, DNS name preferred): server_name

Enter the Avamar server domain [clients]: domain/client
avagent.d Info: Stopping Avamar Client Agent (avagent)...
avagent.d Info: Client Agent stopped.
avagent Info <0000>: Logging to /opt/AVMRclnt/var/avagent.log
avagent.d Info: Client activated successfully.
avagent Info <0000>: Logging to /opt/AVMRclnt/var/avagent.log
avagent Info <5417>: daemonized as process id 11269
avagent.d Info: Client Agent started.
Registration Complete.
```

b. Type the following command to register the Avamar Plug-in for Sybase installed in an alternate directory:

***alternate_path*/bin/avregister**

where *alternate_path* is the pathname of the alternate directory.

Upgrading the Avamar Plug-in for Sybase on Solaris

You must complete the required steps to upgrade the Avamar Plug-in for Sybase on a stand-alone Solaris system or on each node in a cluster.

Procedure

1. Uninstall the Avamar Plug-in for Sybase. Uninstalling the Avamar Plug-in for Sybase on Solaris provides instructions.
2. Uninstall the Avamar file system client. The *Avamar Backup Clients User Guide* provides instructions.
3. Download the Avamar file system client and the Avamar Plug-in for Sybase installation packages. Downloading the software provides instructions.

   Note: The versions of the Avamar file system client and Avamar Plug-in for Sybase must be the same.

4. Install the new version of the Avamar file system client. The *Avamar Backup Clients User Guide* provides instructions.
5. Install the new version of the Avamar Plug-in for Sybase. Installing the Avamar Plug-in for Sybase on Solaris provides instructions.

Uninstalling the Avamar Plug-in for Sybase on Solaris

You must complete the required instructions to uninstall the Avamar Plug-in for Sybase on a stand-alone Solaris system or on each node in a cluster.

Procedure

1. Log in to the Sybase server host as root.
2. If you are uninstalling in a cluster configuration, run the correct cluster configuration script:

- For a Solaris Cluster configuration, run the `suncluster-configure.sh` script to remove the Avamar agent resource from the Solaris Cluster resource group.
- For a VCS configuration, run the `avclusuninstall` script.

The *Avamar Backup Clients User Guide* provides details.

3. Type the following command to view all the Avamar packages installed on the system:

   `pkginfo | grep AVMR`

   A list of all the Avamar packages installed on the system appears, including the AVMRsybase package that is the Avamar Plug-in for Sybase package.
4. Note the package names.
5. Type the following command to uninstall a software package:

   `pkgrm` *`package_name`*

   where *package_name* is one of the Avamar software packages.
6. Type **`y`** and press **Enter** when prompted to remove the package.
7. Repeat steps as required to remove the Avamar software packages.
8. Delete the symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`.
9. In a VCS system, uninstall the Avamar Cluster Client for Solaris according to instructions in the VCS chapter of the *Avamar Backup Clients User Guide*.

Installing, upgrading, and uninstalling the software on Windows

You can install, upgrade, and uninstall the Avamar Plug-in for Sybase on Windows.

Installing the Avamar Plug-in for Sybase on Windows

You can install the Avamar Client for Solaris in either the default installation directory or an alternate directory. After you have installed the Avamar Client for Solaris, you can install the Avamar Plug-in for Sybase ASE. The Sybase plug-in installation process automatically installs the Avamar Plug-in for Sybase ASE in the same directory as the Avamar client.

About this task

You can use the following instructions to install the Avamar Plug-in for Sybase ASE on a stand-alone Windows system or on each node in a cluster.

Procedure

1. Log in to the Sybase server host as an administrator.
2. Go to the temporary directory that contains the Avamar Plug-in for Sybase ASE installation package that you downloaded in Downloading the software.
3. Start the Avamar Plug-in for Sybase ASE installation by using the correct method:
   - If UAC is disabled, double-click the installation package to open it.
   - If UAC is enabled, open a command prompt as an administrator, change directory to the location of the installation package, and then type the following command:
     `msiexec /i AvamarSybase-windows-`*`package-version`*`.msi`

     where *package-version* is the package type and Avamar software version.

The welcome page appears.

4. Follow the instructions in the wizard to install the Avamar Plug-in for Sybase ASE.
5. Click **Finish** when the installation completes.
6. Copy the Avamar Plug-in for Sybase ASE library file, `libsybase_avamar.dll`, from the *`Avamar_installation_dir`*`\bin` directory to the Sybase ASE library directory, `%SYBASE%\%SYBASE_ASE%\lib`.

Upgrading the Avamar Plug-in for Sybase on Windows

You must complete the required steps to upgrade the Avamar Plug-in for Sybase on Windows.

Procedure

1. Ensure that the environment meets all the system requirements for the new version. Preparing to install the Avamar Plug-in for Sybase provides details.
2. Upgrade the Avamar Client for Windows by running the Windows client installation wizard for the new version on the client computer. The *Avamar for Windows Server User Guide* provides instructions.

   Note: The versions of the Avamar file system client and Avamar Plug-in for Sybase must be the same.

3. Upgrade the Avamar Plug-in for Sybase by running the plug-in installation wizard for the new version on the client computer. Installing the Avamar Plug-in for Sybase on Windows on page 51 provides instructions.

Uninstalling the Avamar Plug-in for Sybase on Windows

You must complete the required steps to uninstall the Avamar Plug-in for Sybase on Windows.

Procedure

1. Uninstall the Avamar Plug-in for Sybase by using **Programs and Features**.
2. Remove the library file `libsybase_avamar.dll` from the Sybase ASE library directory, `%SYBASE%\%SYBASE_ASE%\lib`.
3. Uninstall the Avamar Client for Windows by using **Programs and Features**.

Performing post-installation tasks

You must perform the required post-installation tasks that apply to your particular system after a successful installation of the Avamar Plug-in for Sybase.

Excluding Sybase device files from file system backups

To optimize the performance of file system backups and save storage space on your system, you can exclude the Sybase device files or directories (containing the Sybase database data and logs) from the file system backups.

NOTICE To ensure that the Sybase database data and logs are adequately protected, set up regular Sybase plug-in backups, as described in the remainder of this guide.

You can determine the files or directories of the Sybase devices by using the `sp_helpdevice` command or Sybase Central GUI.

To exclude the files or directories of the Sybase devices from a file system backup, create a dataset that excludes the required files or directories, and then assign the dataset to the

appropriate Avamar client or group. The *Avamar Administration Guide* provides details on how to create and use a dataset in a backup.

Configuring internationalization (I18N) support

I18N support provides the Sybase plug-in capability to process non-ASCII data in a non-English locale.

The extent of the I18N support is dependent on the following support:

- I18N support provided by the operating system on the Sybase host
- I18N support provided by the Avamar client and server software
- I18N support provided by the Sybase server software

For example, if the Avamar software does not support non-ASCII data in a specific parameter, the Sybase plug-in cannot support non-ASCII data in that parameter. The Avamar client and server documentation and Sybase ASE documentation provide more details on I18N support.

NOTICE On UNIX and Linux, this Sybase plug-in release supports UTF-8 encoding only.

In an I18N environment, the Sybase plug-in supports non-ASCII data in the following parameters for backup, restore, and browse operations:

- Sybase username and password
- Sybase ASE protected password
- Sybase database name

NOTICE Due to an Avamar limitation, you cannot specify non-ASCII values for these parameters in the `avsybase.cmd` file or option file for either CLI or GUI operations. Command Line Interface on page 87 provides details about the `avsybase.cmd` file and option file. Non-ASCII characters might not be rendered correctly in the Sybase plug-in log files and the standard output from CLI operations.

Requirements for I18N support

Ensure that all the following I18N requirements are met:

- The Sybase host runs a supported internationalized version of the operating system, properly confiugred to operate in the non-English locale.
- The Sybase ASE server software provides the required I18N support. The Sybase database is configured with the required non-ASCII character set. The Sybase ASE documentation provides more details.
- Supported internationalized Avamar client and server software is installed.

The *Avamar Release Notes* provides details on I18N support limitations of the Avamar client and server software.

Configuring I18N support

Complete the required settings to configure I18N support for backup, restore, and browse operations with the Sybase plug-in:

- You can set both the LC_ALL and LANG environment variables to the proper locale value for the Sybase Open Client Library (OCL) session and for the file system operating system. The variable value must match a *vendor_locale* value in the `locales.dat` file on the Sybase host:
  - `$SYBASE/locales/locales.dat` on UNIX or Linux
  - `%SYBASE%\locales\locales.dat` on Windows

  Each entry in the `locales.dat` file has the following format:

```
locale = vendor_locale, syb_language, syb_charset
```

where *vendor_locale*, *syb_language*, and *sybcharset* are the local, language, and character set values supported by the Sybase ASE server software.

Example 1 shows an environment variable setting to configure I18N support in a Japanese locale on Linux.

On UNIX or Linux, you can optionally set the LC_ALL and LANG environment variables in the `avsybase` script file. On these platforms, if LC_ALL and LANG are set to a default value of POSIX that is invalid for the I18N environment as defined in the Sybase I18N classification, Sybase plug-in operations might fail with an error stating that the language or locale is not supported.

On Windows, the LC_ALL and LANG environment variables are not set by default. Before you run CLI operations with the `avsybase` command on Windows, you can set the environment variables with the `set` command on the operating system command line:

```
set LANG=value
```

```
set LC_ALL=value
```

Before you run GUI operations with Avamar Administrator on Windows, set the `--syb-language` option instead of the LC_ALL and LANG environment variables.

- Instead of setting the LC_ALL and LANG environment variables, you can optionally set the `--syb-language` option of the `avsybase` command to specify the proper locale for the Sybase OCL session. Set the `--sybase_language` option to the proper *vendor_locale* value from the `locales.dat` file entry. The Sybase plug-in uses the `--syb-language` option value to set the LC_ALL and LANG variables during its operations.

  Setting the `--syb-language` option is especially recommended on Windows, where LC_ALL and LANG are not set when the Sybase plug-in runs. You can set the `--syb-language` option value in the `avsybase.cmd` file, described in Using an option file or by using the **More** button in one of the following dialog boxes in Avamar Administrator:

  - **Backup Command Line Options**
  - **Restore Command Line Options**

  Backup and Restore and Recovery describe how to use the **More** button in the dialog boxes for browse, backup, and restore operations.

  Example 2 shows the `--syb-language` option setting to configure I18N support in a Japanese locale on Windows.

Example 1 I18N configuration in a Japanese locale on Linux

A Linux system with a Japanese locale includes the following entry in the `$SYBASE/locales/locales.dat` file:

```
[linux]
locale = ja_JP.UTF-8, japanese, utf8
```

To configure the I18N support for Sybase plug-in operations in this Japanese locale, the LC_ALL and LANG environment variables are set to `ja_JP.eucJP` as the proper locale value for the Sybase OCL session.

Example 2 I18N configuration in a Japanese locale on Windows

Example 2 I18N configuration in a Japanese locale on Windows (continued)

A Windows system with a Japanese locale includes the following entry in the `%SYBASE%\locales\locales.dat` file:

```
[NT]
locale = japanese, japanese, sjis
```

To configure the I18N support for Sybase plug-in operations in this Japanese locale, the `syb-language` option of the `avsybase` command is set to `japanese` as the proper locale value for the Sybase OCL session. The following `avsybase` command is used for full backups with the Sybase plug-in:

```
avsybase --operation=backup --brtype=full --syb-language=japanese --
flagfile="C:\Program Files\var\sybflags.txt"
```

CHAPTER 3

Backup

This chapter includes the following topics:

- Backup feature support 58
- Performing on-demand backups 58
- Scheduling backups 61
- Monitoring backups 64
- Cancel backups 65
- Reviewing backups 65
- Enforcement of backups to Data Domain 67

Backup feature support

Backup on page 18 describes the Avamar Plug-in for Sybase (Sybase plug-in) backup features, including the supported types of backups and the backup limitations. You can use the Sybase plug-in to perform online backups of Sybase databases and transaction logs in both stand-alone systems and cluster systems.

The Avamar Plug-in for Sybase (Sybase plug-in) allows you to perform backups from Avamar Administrator, the AUI, or from the CLI by using the `avsybase` command.

- Performing on-demand backups
- Scheduling backups

You can also perform on-demand backups from the CLI by using the `avsybase` command as described in On-demand backups with the avsybase command on page 102.

Performing on-demand backups

An on-demand backup is a user-initiated backup of specific data that you select. Perform an on-demand backup for the first backup of the client immediately after you install the Avamar client software, and before system maintenance, software installations, or software upgrades.

Procedure

1. In the AUI navigation pane on the left, click ≫, and then click **Asset Management**.

   The **Asset Management** window is displayed.
2. In the domain tree, select the domain that contains the Sybase server host.

   A list of Avamar clients is displayed in the pane under the domains list.
3. Select the Sybase server host. If the Sybase server is installed in a cluster, select the virtual server host.

   You can only view clients in the domain for the login account. To view all clients, log in to the root domain.
4. Click **Backup**.

   The **Backup wizard** is displayed. In the **Plugin** pane, a list of plug-ins that are installed on the Sybase server are displayed.
5. In the **Plugin** pane, perform the following steps:

   a. Select the Sybase plug-in for the platform.

   b. In the **Sybase installation directory** field, type the full pathname of the Sybase installation directory for the server that you want to back up. For example, `/sybase`.

   c. In the **Sybase server name** field, type the Sybase server name, which is not the hostname. For example, `SERVER1`.

   d. In the **OCS library directory** field, type the full pathname of the Sybase OCS library directory. For example, `/sybase/OCS-15_0/lib`.

   e. In the **Sybase username** field, type the Sybase username.

   f. In the **Sybase user password** field, type the Sybase user password.

   g. Click **SUBMIT**.

h. Browse to and select one or more databases for the backup.

- To back up all the databases on the server or the logs of all the databases, select the checkbox next to the Sybase server name.
- To back up specific databases or the logs of specific databases:

  a. Double-click the Sybase server name. All the databases of the Sybase server is displayed in the right pane.

  b. Select the check boxes next to the databases that you want to include in the backup.

i. Click **NEXT**.

The **Basic Configuration** window is displayed.

6. In the **Basic Configuration** window, perform the following steps:

   a. Select the backup retention policy settings:

   - To automatically delete this backup from the Avamar server after a specific amount of time, select **Retention Period**. Specify the number of days, weeks, months, or years for the retention period.
   - To automatically delete this backup from the Avamar server on a specific calendar date, select **End date** and browse to that date on the calendar.
   - To keep this backup for as long as this client remains active in the Avamar server, select **No end date**.

   b. In the **Avamar encryption method** list, select the encryption method to use for data transfer between the client and the Avamar server during the backup.

   The encryption technology and bit strength for a client/server connection depends on several factors, including the client operating system and Avamar server version. The *Avamar Product Security Guide* provides additional information.

   c. In the **Optionally select a proxy to perform backup** list, select the proxy.

   The default setting is **Automatic**, which enables the Avamar server to choose the best proxy for this operation.

   d. Click **NEXT**.

   The **More Options** window is displayed.

7. (Optional) To view advanced configuration options, click **Show Advanced Options**.

   Plug-in Options provides more information about the advanced backup options.

8. Complete the settings in the **Sybase Information** section:

   a. In the **Sybase installation directory** field, type the full pathname of the Sybase installation directory for the server that you want to back up. For example, `/sybase`.

   b. In the **OCS library directory** field, type the full pathname of the Sybase OCS library directory. For example, `/sybase/OCS-15_0/lib`.

   c. In the **Sybase user name** field, type the Sybase username.

   d. In the **Sybase user password** field, type the Sybase user password.

   e. In the **Encryption method to Data Domain system** list, select the encryption method for data transfer between the client and the Data Domain system during the backup.

9. Complete the settings in the **Backup Type** section:

- To create a full copy of the selected databases, including both the data and transaction logs, select **Full backup**.
- To back up the transaction logs of the selected databases, select **Incremental backup**.
- To back up database pages that were changed since the last full backup, select **Cumulative backup**. This includes both data pages and log pages.
- To run a Sybase `dump transaction` command with the `no_truncate` option, which performs an incremental backup that does not truncate the logs afterwards, select **Incremental backup with no_truncate**.

  Note: Use this option in a disaster recovery situation only. Do not use this option in a regular on-demand backup.
- To run a Sybase `dump transaction` command with the `truncate_only` option, which truncates the logs, select **Log truncation with truncate_only option followed by full backup**. After the logs are truncated, the Sybase plug-in also performs a full backup of the database.

  Note: Do not use this option for a regular on-demand backup.
- To run a Sybase `dump transaction` command with the `no_log` option, which truncates the logs without logging the truncation, select **Log truncation with no_log option followed by full backup**. After the logs are truncated, the Sybase plug-in performs a full backup of the database.

  Note: Use this option in a disaster recovery situation only. Do not use this option for a regular on-demand backup.

10. Complete the setting in the **General Backup Options** section:

    a. In the **Maximum number of streams** menu, select the backup multistreaming value as the maximum number of databases to back up simultaneously. The default multistreaming value is 1. Multi-streaming provides details.

    Note: A maximum multistreaming value of 10 is enforced for GUI on-demand backups.

    b. In the **Number of stripes per db** menu, select the multistriping value to be used for all databases in the current backup.

    The default multistriping value is 1 and the maximum is 10 per database.

    c. To disable verification during the backup, in the **Backup data verification** field, select **No verification** (default value).

    d. To use the Sybase `dump` command option `with verify=full` to verify both the header information and rows structure, for full verification of the backup, in the **Backup data verification** field, select **Full verification**.

    e. To use the Sybase `dump` command option `with verify=header` to verify the page header information only, in the **Backup data verification** field, select **Header verification**.

    Database backup and restore verification on page 29 provides details.

    f. If required, in the **Protected backup password** field, type the password that the Sybase server uses with the Sybase `dump` command option `with passwd=` to implement a password-protected database backup. Password-protected database backups and restores provides details.

    g. (Advanced option) To write maximum information to log files, select **Enable debugging message**. Selecting this option creates very large log files.

11. Complete the setting in the **Promotion** section:
    a. To promote an incremental backup to full backup, select **If incr not allowed promote to full**.
    b. To promote an incremental backup to a cumulative backup, select **If incr not allowed promote to cumulative**.
12. If required, select one or more choices in the **Perform consistency checks before backup group** checkbox.

    You can select one or more types of database consistency checks to perform before the backup. Database consistency checks on page 29 provides more information about the database consistency checks.
13. If required, complete the settings in the **Pre and Postprocessing Options** group box:
    - In the **Preprocessing script** field, type the name of a preprocessing that runs immediately before the backup.
    - In the **Postprocessing script** field, type the name of a postprocessing that runs immediately after the backup.
14. To manually enter additional plug-in options as free text, perform the following steps:
    a. Toggle the **Show Free Form** field to **ON**.
    b. Click **+**.
    c. In the **Key** field, type the plug-in option name.

       For example, `[avsybase]syb-language`.
    d. In the **Value** field, type a value.
    e. To remove an option from the list, click **Delete**.

    Command Line Interface on page 87 provides details on the `avsybase` command options that the Sybase plug-in supports.

    NOTICE The Avamar software does not validate the option information that you type in the **Key** and **Value** fields.
15. Click **FINISH**.

    The following status message is displayed:

    ```
    Backup initiated.
    ```
16. To view status details for the backup, select **Actions** > **View Activity**.

Scheduling backups

Scheduled backups run automatically to ensure that backups occur on an ongoing basis. You can schedule backups to run daily, weekly, or monthly. The scheduled backup can include multiple clients or a single server.

About this task

You can schedule backups by using the Policy wizard to create a policy for a backup.

Perform the following steps within the **Policy** wizard. The *Avamar Administration Guide* provides more information about groups, group policy, datasets, schedules, and retention settings.

Procedure

1. Assign members to the new backup policy.
2. Assign a dataset to the new backup policy.

   To create a dataset, use the Policy wizard or select **Settings** > **Dataset** > **Add**.
3. Assign a schedule to the new backup policy.

   To create a schedule, use the Policy wizard or select **Settings** > **Schedule** > **Add**.
4. Assign a retention policy to the new backup policy.

   To create a retention policy, use the Policy wizard or select **Settings** > **Retention** > **Add**.
5. Enable scheduling for the backup policy.

Creating a dataset

A dataset specifies the data to include in a scheduled backup and the options to use for the backup. Create at least one dataset for scheduled backups on a client or group of clients. Create multiple datasets to segregate client data.

Procedure

1. In the AUI navigation pane on the left, click ≫, and then click **Settings**.

   The **Setting** pane is displayed.
2. Click the **Dataset** tab.
3. Click **ADD**.

   The **Create Dataset** window is displayed.
4. In the **Dataset Name** field, type a name for the dataset.

   The name can include alphanumeric characters (A-Z, a-z, 0–9) and the following special characters: period (.), hyphen (-), and underscore (_), and space. Do not use Unicode characters or the following special characters: ` ~ ! @ # $ % ^ & * ( ) = + [ ] { } | \ / ; : ' " < > , ?
5. From the **Plugins** list, select the Sybase plug-in for the platform.

   The Sybase plug-in options are displayed.
6. Click the **Options** tab, and then set the plug-in options:
   a. To view advanced options, select **Show Advanced Options**.
   b. In the **Sybase Information** section, perform the following steps:
      a. In the **Sybase installation directory** field, type the full pathname of the Sybase installation directory for the server to be backed up. For example, `/sybase`.
      b. In the **OCS library directory** field, type the full pathname of the Sybase OCS library directory. For example, `/sybase/OCS-15_0/lib`.
      c. In the **Sybase username** field, type the Sybase username.
      d. In the **Sybase user password** field, type the Sybase user password.
      e. In the **Encryption method to Data Domain system** list, select the encryption method for data transfer between the client and the Data Domain system during the backup.
   c. Select one or more **General Backup Options** backup options:

- In the **Maximum number of streams** menu, select the backup multistreaming value as the maximum number of databases to back up simultaneously. The default multistreaming value is 1. Multi-streaming provides details.

  Note: A maximum multistreaming value of 10 is enforced for GUI on-demand backups.

- In the **Number of stripes per db** menu, select the multistriping value to be used for all databases in the current backup. The default multistriping value is 1 and the maximum is 10 per database.
- To disable verification during the backup, in the **Backup data verification** field, select **No verification** (default value).
- To use the Sybase `dump` command option `with verify=full` to verify both the header information and rows structure, for full verification of the backup, in the **Backup data verification** field, select **Full verification**.
- To use the Sybase `dump` command option `with verify=header` to verify the page header information only, in the **Backup data verification** field, select **Header verification**. Database backup and restore verification on page 29 provides details.
- If required, in the **Protected backup password** field, type the password that the Sybase server uses with the Sybase `dump` command option `with passwd=` to implement a password-protected database backup. Password-protected database backups and restores provides details.
- (Advanced option) To write maximum information to log files, select **Enable debugging message**. Selecting this option creates very large log files.

d. Complete the setting in the **Promotion** section:

- To promote an incremental backup to full backup, select **If incr not allowed promote to full**.
- To promote an incremental backup to a cumulative backup, select **If incr not allowed promote to cumulative**.

e. If required, select one or more choices in the **Perform consistency checks before backup group** checkbox. You can select one or more types of database consistency checks to perform before the backup. Database consistency checks on page 29 provides more information about the database consistency checks.

f.

g. In the **Encryption method to Data Domain system** list, select the encryption method to use for data transfer between the client and the Data Domain system during the backup.

7. Click the **Source Data** tab and set the following plug-in options:

   a. In the **File/Folder Path**, type the file path.

   b. Click **ADD**.

8. Click **SUBMIT**.

Creating a backup policy

A backup policy is a collection of Avamar clients that use the same dataset, schedule, and retention settings to implement scheduled backups.

About this task

Member clients must all be in the same Avamar domain. When you create a backup policy, you define the dataset, schedule, and retention settings that apply for scheduled backups. These

settings comprise the backup policy, which controls backup behavior for all members of the backup policy unless you override these settings at the client level.

The *Avamar Administration Guide* provides information about creating and editing backup policies, schedules, or retention settings.

Enabling a scheduled backup for a backup policy

Scheduled backups occur only for enabled backup policies. Backup policies are disabled by default unless you select the **Enabled** check box on the first page of the **New Policy** wizard. If you did not enable the backup policy when you created it, use the menu options in the **Policy** window to enable backups.

Procedure

1. In the AUI navigation pane on the left, click ≫, and then click **Backup Policy**.

   The **Policy** page is displayed.
2. In the domain tree, select a domain or subdomain for the backup policy.

   To select a subdomain for the backup policy, toggle the **Include Sub-domain** switch to on.
3. Select a backup policy from the list.
4. To enable a backup policy, click **MORE ACTIONS** > **Enable Policy**.
5. To disable a backup policy, click **MORE ACTIONS** > **Disable Policy**.

Monitoring backups

You can monitor and view status information for backup and restore operations by using the **Activity Monitor**.

About this task

To access the **Activity Monitor**, open the navigation pane, and then click **Activity**. The **Activity Monitor** appears with a list of all activities.

> **Note:** The AUI **Activity Monitor** window has been optimized for at least 1366 pixels-wide screens. Display issues might occur for smaller screens. To properly display the AUI, ensure that your display is at least 1366 pixels wide.

The **Activity Monitor** provides you with options to filter the information that appears:

- Filter activities by duration—By default, the **Activity Monitor** displays the most recent 5,000 client activities. To select a different duration, in the **Filter activities by duration** drop-down list, select **Last 24 hours** or **Last 72 hours**.
- Filter activities by domain—By default, the **Activity Monitor** displays all activities regardless of domain. To display only the activities for a specific domain, in the **Filter activities by domain** drop-down list, select a domain or subdomain.
- Filter activities by status—By default, the **Activity Monitor** displays all activities regardless of status.
  To display only activities with a specific status, at the top of the **Activity Monitor**, select one of the following options:
  - Completed
  - Failed
  - Running
  - Waiting

To filter activities by client, start time, plug-in, or type, click in their respective column.

The **Activity Monitor** displays the date and time that an activity began, and the total number of bytes examined during an activity.

To view activity details, expand the **Details** pane, by clicking ≪.

Cancel backups

You can cancel a backup any time before it completes. The cancellation might take 5 minutes or longer. The backup might complete before the cancellation finishes.

Procedure

1. In the AUI navigation pane on the left, click ≫, and then click **Activity**.

   The **Activity Monitor** appears with a list of activities.
2. Select the backup from the list.
3. Click **CANCEL**.

   A confirmation dialog box is displayed.
4. Click **YES**.

Reviewing backups

Sybase backups are named according to their sequence, as described in Backup names.

At the end of each database backup, the Sybase plug-in software groups together the current backup with any previous backups required to restore the current database backup, creating a consolidated backup.

The consolidated backup always contains all of the backups required to restore a database to the time of the last backup.

You can use the `avtar --backups` command with the appropriate options to view all the backups of a client. The following example command displays all the backups:

```
# avtar --backups --server=Avamar_server_name --id=Avamar_server_username
--password=Avamar_server_password --account=Avamar_domain

Date       Time     Seq Label         Size  Plugin Working directory Targets
---------- -------- --- ------------- ----- ------ ---------------- -------
2014-10-21 11:51:02 65  MOD-1243672#0 1087K Sybase /var/avamar
2014-10-19 11:32:43 62  MOD-1259643#0 1057K Sybase /var/avamar
2014-10-19 11:32:04 60  MOD-1219815#0 1033K Sybase /var/avamar
```

where the columns are as follows:

- Date—Date of the backup.
- Time—Time of the backup.
- Seq—Sequence number of the backup, which is an integer assigned by the Avamar server that uniquely identifies the backup.
- Label—Optional string that describes the backup.
- Size—Amount of data that was backed up.
- Plugin—Type of Avamar plug-in that created the backup.
- Working directory—Current working directory of the `avtar` process that created the backup.
- Targets—Backup path, which is not set for Sybase plug-in backups.

You can also use the `avtar --list` command with the appropriate options to view the contents of a client backup. By default, the command displays the contents of the most recent backup.

The following example `avtar --list` command displays details on the databases included in the most recent full backup of a Sybase server named SERVER1. (Lines have been omitted for clarity.) Each set of lines that starts with `<dir type="database"` and ends with `</dir>` provides the details on a separate database in the backup, including the database name, size, ID, old time, and new time values:

```
# avtar --list --server=Avamar_server_name --id=Avamar_server_username
--password=Avamar_server_password --account=Avamar_domain

avtar Info <8745>: Backup from Linux host "/clients/SERVER1" (SERVER1) with plugin 1029 -
Linux Sybase
avtar Info <5538>: Backup #37 label "#0" timestamp 2014-01-17 11:18:27 EST, 0 files, 278.9 MB
avtar Info <12604>: Displaying alternate view
<browse_contents pid="Sybase" ack="false" msgver="5" pidnum="1029" maxelems="1"
incomplete="0" path="" mid="7005/7005/67" inprogress="false" wid="Browse">
:
<dir type="instance" name="SERVER1" selectable="true">
:
<dir type="database" newtime="2014-01-17 11:31:11 (1326817871)" oldtime="1969-12-31 19:00:00
(0)" dbid="1" name="master" size="26" selectable="true">
:
<file type="database" newtime="2014-01-17 11:31:11 (1326817871)" oldtime="1969-12-31 19:00:00
(0)" dbid="1" name="f-0" size="26" selectable="true" />
</dir>

<dir type="database" newtime="2014-01-17 11:31:21 (1326817881)" oldtime="1969-12-31 19:00:00
(0)" dbid="3" name="model" size="6" selectable="true">
:
<file type="database" newtime="2014-01-17 11:31:21 (1326817881)" oldtime="1969-12-31 19:00:00
(0)" dbid="3" name="f-0" size="6" selectable="true" />
</dir>
<dir type="database" newtime="2014-01-17 11:31:31 (1326817891)" oldtime="1969-12-31 19:00:00
(0)" dbid="31513" name="sybsystemdb" size="12" selectable="true">
:
<file type="database" newtime="2014-01-17 11:31:31 (1326817891)" oldtime="1969-12-31 19:00:00
(0)" dbid="31513" name="f-0" size="12" selectable="true" />
</dir>
<dir type="database" newtime="2014-01-17 11:31:39 (1326817899)" oldtime="1969-12-31 19:00:00
(0)" dbid="31514" name="sybsystemprocs" size="152" selectable="true">
:
<file type="database" newtime="2014-01-17 11:31:39 (1326817899)" oldtime="1969-12-31 19:00:00
(0)" dbid="31514" name="f-0" size="152" selectable="true" />
</dir>
<dir type="database" newtime="2014-01-17 11:31:51 (1326817911)" oldtime="1969-12-31 19:00:00
(0)" dbid="31515" name="sybmgmtdb" size="75" selectable="true">
:
<file type="database" newtime="2014-01-17 11:31:51 (1326817911)" oldtime="1969-12-31 19:00:00
(0)" dbid="31515" name="f-0" size="75" selectable="true" />
</dir>
<dir type="database" newtime="2014-01-17 11:32:00 (1326817920)" oldtime="1969-12-31 19:00:00
(0)" dbid="4" name="db1" size="400" selectable="true">
:
<file type="database" newtime="2014-01-17 11:32:00 (1326817920)" oldtime="1969-12-31 19:00:00
(0)" dbid="4" name="f-0" size="400" selectable="true" />
</dir>
<dir type="database" newtime="2014-01-17 11:32:16 (1326817936)" oldtime="1969-12-31 19:00:00
(0)" dbid="5" name="db2" size="400" selectable="true">
:
<file type="database" newtime="2014-01-17 11:32:16 (1326817936)" oldtime="1969-12-31 19:00:00
(0)" dbid="5" name="f-0" size="400" selectable="true" />
</dir>
<dir type="database" newtime="2014-01-17 11:32:29 (1326817949)" oldtime="1969-12-31 19:00:00
(0)" dbid="6" name="db3" size="6" selectable="true">
```

```
:
<file type="database" newtime="2014-01-17 11:32:29 (1326817949)" oldtime="1969-12-31 19:00:00
(0)" dbid="6" name="f-0" size="6" selectable="true" />
</dir>
```

Enforcement of backups to Data Domain

If the Avamar server is configured to enforce backups to a Data Domain system, the server rejects backups that are not destined for the Data Domain. This enforcement covers backups that you configure through the Avamar Administrator and the AUI, as well as from command-line interfaces and other tools.

These backups must have additional flags that indicate the storage target. The *Avamar and Data Domain System Integration Guide* provides more information about backup enforcement and the related client version requirements. Backup enforcement is disabled by default.

CHAPTER 4

Restore and Recovery

This chapter includes the following topics:

- Restore and recovery requirements 70
- Restoring a database to the original client 71
- Restoring a database to a different client 74
- Monitor restores 76
- Cancel restores 77
- Disaster recovery 77

Restore and recovery requirements

You can use the Avamar Plug-in for Sybase to perform restore and recovery of Sybase databases and transaction logs on both stand-alone systems and cluster systems.

The “destination” is the location to which the Avamar Plug-in for Sybase (Sybase plug-in) restores and recovers the Sybase data.

A backed-up (source) database is restored and recovered to a destination database, located on the destination Sybase server and destination host. The source database was backed up from the source Sybase server on the source host.

Any of the following objects can have the same or different names:

- Source and destination databases
- Source and destination servers
- Source and destination hosts

The restore operation restores the specified data from either an Avamar server or a Data Domain system. The Sybase plug-in automatically detects whether the backup is stored on the Avamar server or Data Domain system.

Review the following sections to ensure that you meet all the requirements before you perform a restore and recovery with the Sybase plug-in.

Software requirements for restore and recovery

To restore an instance or database to a Sybase server with the Sybase plug-in, the following software must be installed and running on the destination Sybase system:

- Sybase ASE server
- Avamar Client
- Avamar Plug-in for Sybase

If the destination host is different from the source host, then the destination host must be registered with the same Avamar server as the source host.

Requirements for recovery to same or alternate destination

The Sybase plug-in can restore a database only if it already exists on the destination Sybase server with the same storage layout as the source database. The Sybase plug-in can restore a Sybase server instance only if the instance already exists on the destination host.

For example, if a destination database does not yet exist on the destination server, you must manually create the database before starting the restore. Otherwise, the restore operation does not restore the database.

NOTICE A database recovery with the Sybase plug-in completely overwrites all the data in the destination database, whether or not the destination database is the same as the source database. Before you start a recovery, ensure that none of the data in the destination database is needed.

In a recovery to the same destination, all of the following conditions are true:

- The source and destination databases have the same names.
- The source and destination servers are the same.
- The source and destination hosts are the same.

In a relocated recovery to an alternate destination, any of the following conditions can be true:

- The source database is restored to a destination database with a different name.
- The destination server is a different server than the source server.
- The destination host is a different host than the source host where the backup occurred.

For example, you can perform a relocated recovery to recover a database to a different-named destination database on a different Sybase server on a different host. The destination database must already exist on the destination server and must have the same storage layout as the source database.

When you plan for a relocated recovery to an alternate destination, choose the host and database destinations that will be required for the recovery:

- For the host destination choice, determine if the source and destination hosts will be the same or different.
- For the database destination choice:
  - Determine if the source and destination databases will have the same or different names.
  - Determine if the source and destination servers will be the same or different.

Requirements for recovery to current time

To recover a database, the Sybase plug-in restores the last database backup and then restores the transaction log backups of that database, from the oldest to the newest log backup. Cumulative backups will also be automatically used during the recovery if they exist in the backup sequence.

The Sybase plug-in software recovers a database to the time of the most recent transaction log backup.

NOTICE If you want to recover a database to the current time, you must first perform a transaction log backup of the database before you start the database recovery operation.

Requirements for point-in-time recovery

You can perform a point-in-time recovery for a single database or all the databases on a Sybase server.

To recover the data to a specific point-in-time, you must specify the following items:

- Timestamp in Avamar format, *yyyy-mm-dd hh:mm:ss* (enclosed in quotes when specified with the `--pointintime` option), as the date and time to which the data will be recovered
- Label number of the backup to use for the recovery (required only for a CLI recovery with the `avsybase` command, not for a GUI recovery)

Point-in-time recovery with the avsybase command describes how you can determine the label number of a backup to use for a point-in-time recovery with the `avsybase` command.

Restoring a database to the original client

You can restore Sybase databases to the original directory on the original client.

Procedure

1. In the AUI navigation pane on the left, click ≫, and then click **Asset Management**.

   The **Asset Management** window is displayed.
2. In the domain tree, select the domain that contains the Sybase server.

   You cannot view clients outside the domain for the login account. To view all clients, log in to the root domain.

A list of Avamar clients is displayed in the pane below the domains list.

3. From the list of clients, select the client that runs the Sybase server.
4. (Optional) To locate backups by date:
   a. In the right pane, click **VIEW MORE**.
   b. Click **SEARCH**.
   c. In the **From** and **To** fields, specify the date range.
   d. Click **RETRIEVE**.
   e. In the list of backups, select a backup.

   The list of backups for the date range is displayed.
5. In the **Destination Client** pane, perform the following steps:
   a. Select **Restore to original client**.
   b. Click **NEXT**.

   The **Backup Content** pane is displayed.
6. In the **Backup Content** pane, perform the following steps:
   a. In the left pane, select the SQL instance from the tree.

      The **Backup Content** pane displays a list of databases within the backup.

   b. Select the databases that you want to restore.
   c. Click **NEXT**.

   The **Destination Location** pane is displayed.
7. In the **Destination Location** pane, perform the following steps:
   a. To restore databases to the same server and database names that are used in the source databases, select **Restore databases to original destinations (same server and database)**.
   b. Click **Next**.

   The **More Options** pane is displayed.
8. In the **More Options** pane, set the following plug-in options:
   a. To view advanced options, select **Show Advanced Options**.
   b. In the **Sybase Information** section, perform the following steps:
      a. In the **Sybase installation directory** field, type the full pathname of the Sybase installation directory for the server to be backed up. For example, `/sybase`.
      b. In the **OCS library directory** field, type the full pathname of the Sybase OCS library directory. For example, `/sybase/OCS-15_0/lib`.
      c. In the **Sybase username** field, type the Sybase username.
      d. In the **Sybase user password** field, type the Sybase user password.
      e. In the **Encryption method from Data Domain system** list, select the encryption method for data transfer between the client and the Data Domain system during the recovery.

   c. Select one or more **General Restore Options**:

- In the **Maximum number of streams** menu, select the backup multistreaming value as the maximum number of databases to back up simultaneously. The default multistreaming value is 1. Multi-streaming provides details.

  Note: A maximum multistreaming value of 10 is enforced for GUI on-demand backups.

- To disable verification during the restore, in the **Restore data verification** field, select **No verification** (default value).
- To use the Sybase `dump` command option `with verify=full` to verify both the header information and rows structure, for full verification of the restore, in the **Restore data verification** field, select **Full verification**.
- To use the Sybase `dump` command option `with verify=header` to verify the page header information only, in the **Restore data verification** field, select **Header verification**. Database backup and restore verification on page 29 provides details.
- If required, in the **Protected backup password** field, type the password that the Sybase server uses with the Sybase `dump` command option `with passwd=` to implement a password-protected database backup. Password-protected database backups and restores provides details.
- (Advanced option) To write maximum information to log files, select **Enable debugging message**. Selecting this option creates very large log files.
- For a point-in-time recovery, select the date and time from the graphical date picker in the **Point-in-time recovery timestamp** field as described in Requirements for point-in-time recovery.

d. If required, select one or more choices in the **Perform consistency checks before backup group** check box. You can select one or more types of database consistency checks to perform before the backup. Database consistency checks on page 29 provides more information about the database consistency checks.

e. If required, complete the settings in the **Pre and Postprocessing Options** group box:

- In the **Preprocessing script** field, type the name of a preprocessing script to be run immediately before the restore.
- In the **Postprocessing script** field, type the name of a postprocessing script to be run immediately after the restore.

f. To manually add other plug-in options as free text, perform the following steps:

a. Toggle the **Show Free Form** switch to on.

b. Click +.
This step adds a row to the list of plug-in options.

c. In the **Key** field, type the name of the configuration plug-in option.

d. In the **Value** field, type the value of the configuration plug-in option.

To delete a plug-in option, select the option and then click **Delete** in the **Action** column.

NOTICE The Avamar software does not check or validate the information that is typed in the **Show Free Form** section of the **More Options** pane. The values in the **Key** and **Value** fields override settings that are specified with the GUI controls for the options.

9. Click **NEXT**.

The **Summary** pane is displayed.

10. Review the provided information, and then click **FINISH**.

Restoring a database to a different client

You can restore Sybase databases to a different client.

About this task

NOTICE No error checking or validation is performed on free text entries in the Avamar Administrator or the AUI. In addition, free text entries override settings that are made by using the GUI controls (text boxes, check boxes, and radio buttons).

Procedure

1. In the AUI navigation pane on the left, click ≫, and then click **Asset Management**.

   The **Asset Management** window is displayed.
2. In the domain tree, select the domain that contains the Sybase server.

   You cannot view clients outside the domain for the login account. To view all clients, log in to the root domain.

   A list of Avamar clients is displayed in the pane below the domains list.
3. From the list of clients, select the client that runs the Sybase server.
4. (Optional) To locate backups by date:

   a. In the right pane, click **VIEW MORE**.

   b. Click **SEARCH**.

   c. In the **From** and **To** fields, specify the date range.

   d. Click **RETRIEVE**.

   e. In the list of backups, select a backup.

   The list of backups for the date range is displayed.
5. In the **Destination Client** pane, perform the following steps:

   a. Select **Restore to a different client**.

   b. In the domain tree, select the domain for the client.

   c. In the list of clients, select the destination client.

   The client is displayed in the **Destination Client** field.

   d. Click **NEXT**.

   The **Backup Content** pane is displayed.
6. In the **Backup Content** pane, perform the following steps:

   a. In the left pane, select the SQL instance from the tree.

   The **Backup Content** pane displays a list of databases within the backup.

   b. Select the databases that you want to restore.

   c. Click **NEXT**.

   The **Destination Location** pane is displayed.
7. In the **Destination Location** pane, perform the following steps:

a. To perform a relocated restore of databases to different server or database names than used for the source databases, select **Restore databases to different destinations (different server and database)**.

All the databases must be restored to the same destination server, either the source server or a different-named server.

For example, if you have a host that runs a Sybase production server with several production databases and you have backed up all the databases, you must select the proper restore destination choice based on the type of restore to be performed:

To perform any of the following restores of the production database backup, select **Restore databases to different destinations (different server and database)**:

- Restore to a testing database on the same production server on the same production host.
- Restore to a testing database on a testing server on the same production host.
- Restore to a testing database on a testing server on a testing host. In this case, you must also select the testing host through the **Restore Destination Client** box as described in step a.

b. In the **Restore Location** field, type the file path of the target location where you want to restore the data.

For example: E:/dbrestore_dir/

c. Click **Next**.

The **More Options** pane is displayed.

8. In the **More Options** pane, set the following plug-in options:

a. To view advanced options, select **Show Advanced Options**.

b. In the **Sybase Information** section, perform the following steps:

a. In the **Sybase installation directory** field, type the full pathname of the Sybase installation directory for the server to be backed up. For example, `/sybase`.

b. In the **OCS library directory** field, type the full pathname of the Sybase OCS library directory. For example, `/sybase/OCS-15_0/lib`.

c. In the **Sybase username** field, type the Sybase username.

d. In the **Sybase user password** field, type the Sybase user password.

e. In the **Encryption method from Data Domain system** list, select the encryption method for data transfer between the client and the Data Domain system during the recovery.

c. Select one or more **General Restore Options**:

- In the **Maximum number of streams** menu, select the backup multistreaming value as the maximum number of databases to back up simultaneously. The default multistreaming value is 1. Multi-streaming provides details.

  Note: A maximum multistreaming value of 10 is enforced for GUI on-demand backups.

- To disable verification during the restore, in the **Restore data verification** field, select **No verification** (default value).
- To use the Sybase `dump` command option `with verify=full` to verify both the header information and rows structure, for full verification of the restore, in the **Restore data verification** field, select **Full verification**.

- To use the Sybase `dump` command option `with verify=header` to verify the page header information only, in the **Restore data verification** field, select **Header verification**. Database backup and restore verification on page 29 provides details.
- If required, in the **Protected backup password** field, type the password that the Sybase server uses with the Sybase `dump` command option `with passwd=` to implement a password-protected database backup. Password-protected database backups and restores provides details.
- (Advanced option) To write maximum information to log files, select **Enable debugging message**. Selecting this option creates very large log files.
- For a point-in-time recovery, select the date and time from the graphical date picker in the **Point-in-time recovery timestamp** field as described in Requirements for point-in-time recovery.

d. If required, select one or more choices in the **Perform consistency checks before backup group** check box. You can select one or more types of database consistency checks to perform before the backup. Database consistency checks on page 29 provides more information about the database consistency checks.

e. If required, complete the settings in the **Pre and Postprocessing Options** group box:

- In the **Preprocessing script** field, type the name of a preprocessing script to be run immediately before the restore.
- In the **Postprocessing script** field, type the name of a postprocessing script to be run immediately after the restore.

f. To manually add other plug-in options as free text, perform the following steps:

a. Toggle the **Show Free Form** switch to on.

b. Click +.
This step adds a row to the list of plug-in options.

c. In the **Key** field, type the name of the configuration plug-in option.

d. In the **Value** field, type the value of the configuration plug-in option.

To delete a plug-in option, select the option and then click **Delete** in the **Action** column.

NOTICE The Avamar software does not check or validate the information that is typed in the **Show Free Form** section of the **More Options** pane. The values in the **Key** and **Value** fields override settings that are specified with the GUI controls for the options.

9. Click **NEXT**.

   The **Summary** pane is displayed.

10. Review the provided information, and then click **FINISH**.

Monitor restores

You can monitor and view status information for backup and restore operations in the **Activity Monitor**.

About this task

To access the **Activity Monitor**, open the navigation pane, and then click **Activity**. The **Activity Monitor** appears with a list of all activities.

Note: The AUI **Activity Monitor** window has been optimized for at least 1366 pixels-wide screens. Display issues might occur for smaller screens. To properly display the AUI, ensure that your display is at least 1366 pixels wide.

The **Activity Monitor** provides you with options to filter the information that appears:

- Filter activities by duration—By default, the **Activity Monitor** displays the most recent 5,000 client activities. To select a different duration, in the **Filter activities by duration** drop-down list, select **Last 24 hours** or **Last 72 hours**.
- Filter activities by domain—By default, the **Activity Monitor** displays all activities regardless of domain. To display only the activities for a specific domain, in the **Filter activities by domain** drop-down list, select a domain or subdomain.
- Filter activities by status—By default, the **Activity Monitor** displays all activities regardless of status.
  To display only activities with a specific status, at the top of the **Activity Monitor**, select one of the following options:
  - Completed
  - Failed
  - Running
  - Waiting

To filter activities by client, start time, plug-in, or type, click in their respective column.

The **Activity Monitor** displays the date and time that an activity began, and the total number of bytes examined during an activity.

To view activity details, expand the **Details** pane, by clicking .

Cancel restores

You can cancel a restore any time before it completes. The cancellation might take 5 minutes or longer. The restore might complete before the cancellation finishes.

Procedure

1. In the AUI navigation pane on the left, click , and then click **Activity**.

   The **Activity Monitor** appears with a list of activities.
2. Select the restore from the list.
3. Click **CANCEL**.

   A confirmation dialog box is displayed.
4. Click **YES**.

Disaster recovery

Disaster recovery involves the recovery of the entire Sybase server to the original host or an alternate host.

Complete backup protection provides information on how to prepare a Sybase server environment for disaster recovery.

Each Sybase server has a master database that stores the system schema for the server. During a disaster recovery, you must ensure that the Sybase server is in master-recover mode and then you must restore the master database before all other databases. After you restore the master

database, you must restart the Sybase server and then re-create and restore all the other databases on the Sybase server system.

Recovery of the master database

The master database might be lost or corrupted in the event of a disaster. The master database controls the operation of the Sybase server and stores information about all user databases and their associated database devices.

About this task

You must perform the following steps to recover only the Sybase master database when it is corrupted and cannot be repaired.

Procedure

1. Start the Sybase server in master-recover mode. The Sybase documentation provides details.
2. Perform a recovery of the master database by using the Sybase plug-in as you would for a regular database restore.

   After the master database is brought online during the recovery, errors from CT-LIBRARY are reported because the Sybase server is shut down automatically. However, the Sybase plug-in command `avsybase` should return the exit code 0, which indicates the success of the recovery.

Example 3 Master database recovery

The following example shows the output displayed during the master database recovery:

```
2012-01-05 21:48:57 avsybase Info <0000>: Database 'master' is now online.
2012-01-05 21:48:57 avsybase Info <0000>: Error in layer name: 'CT-LIBRARY'.
2012-01-05 21:48:57 avsybase Info <14423>: ct_results(): network packet layer:
internal net library error: Net-Library operation terminated due to disconnect
2012-01-05 21:48:57 avsybase Info <0000>: Error in layer name: 'CT-LIBRARY'.
2012-01-05 21:48:57 avsybase Info <14423>: ct_cmd_drop(): user api layer: external
error: The connection has been marked dead.
2012-01-05 21:48:57 avsybase Warning <0000>: Sybase OCS function call
'ct_cmd_drop()' failed.
2012-01-05 21:48:59 avsybase Info <0000>: Leaving the 'master' database offline.
2012-01-05 21:49:00 avsybase Info <0000>: Final summary: number of subworks - 1,
number of cancelled/aborted subworks - 0, number of entries in the snapview - 0,
exit code - 0.
2012-01-05 21:49:06 avsybase Info <0000>: Command 'avsybase' returned the exit code
0.
```

Recovery of the Sybase server

About this task

You must perform the following steps to recover the Sybase server after a disaster in which the whole Sybase system is completely lost.

Procedure

1. Reinstall the same operating system on the same host or a different host.
2. Reinstall the same Sybase ASE software into the same directory.

3. Re-create the Sybase ASE database server by using the same configuration (Sybase database server name and full path for all system database devices) and Sybase backup server.
4. Reinstall the same Avamar client and Avamar Plug-in for Sybase software.
5. Re-register with the same Avamar server and configure the Avamar Plug-in for Sybase software.
6. Use the Sybase plug-in to recover the Sybase master database, according to Recovery of the master database.
7. Restart the Sybase database server in the normal way. Ignore errors for user databases that have not been recovered.
8. Use the printout of database device allocations to re-create the user databases. The Sybase documentation provides details on the information that should be tracked for disaster recovery.
9. Use the Sybase plug-in to recover all of the other Sybase system and user databases, according to the information in the preceding sections of this chapter.

APPENDIX A

Plug-in Options

This appendix includes the following topics:

- How to set plug-in options 82
- Plug-in options 82

How to set plug-in options

Plug-in options enable you to control specific actions for on-demand backups, restores, and scheduled backups. The plug-in options that are available depend on the operation type and client plug-in type.

Specify plug-in options in the Avamar Administrator or the AUI for on-demand backup or restore operations, or when you create a dataset for a scheduled backup.

Command Line Interface on page 87 describes all the supported command line options for the `avsybase` command.

NOTICE No error checking or validation is performed on free text entries in the Avamar Administrator or the AUI. In addition, free text entries override settings that are made by using the GUI controls (text boxes, check boxes, and radio buttons).

Plug-in options

You can set plug-in options in the Avamar Administrator or the AUI for browse, backup, and restore operations with the Avamar Plug-in for Sybase (Sybase plug-in).

Browse options

The following table describes the plug-in options that you can set in the Avamar Administrator or the AUI, as required to prepare for Sybase plug-in backups and restores.

Table 7 Sybase browse options

Browse option	How to set the option value
OCS library directory	Type the full pathname of the Sybase OCS library directory, represented by `$SYBASE/$SYBASE_OCS/lib` on Linux or UNIX and `%SYBASE%\%SYBASE_OCS%\dll` on Windows. Do not type any environment variable but type the actual text of the full pathname. For example, type **`/sybase/OCS-15_0/lib`** instead of **`/sybase/OCS-15_0/lib`**.
Sybase installation directory	Type the full pathname of the Sybase installation directory for the server to be backed up or the destination server, represented by $SYBASE on Linux or UNIX and %SYBASE% on Windows. Do not type the environment variable $SYBASE or %SYBASE% but type the actual text of the full pathname. For example, type **`/sybase`** instead of **`$SYBASE`**.
Sybase server name	Type the Sybase server name, which is not the hostname. For example, type SERVER1.
Sybase username	Type the Sybase username.
Sybase user password	Type the Sybase user password.

Backup options

The following table describes the plug-in options that you can set in either the Avamar Administrator or the AUI

Note: You can view an option marked "(Advanced option)" in the following table only by selecting the **Show Advanced Options** check box.

Table 8 Sybase backup options

Backup option	How to set the option value
Backup data verification	Select the type of backup data verification from the menu: • No verification—(Default value) Do not perform verification during the backup. • Full verification—Use the Sybase `dump` command option `with verify=full` to verify both the header information and rows structure, for full verification of the backup. • Header verification—Use the Sybase `dump` command option `with verify=header` to verify the page header information only.
dbcc checalloc	(Advanced option) Select the checkbox to perform the **dbcc checkalloc** database consistency check before the backup.
dbcc checkcatalog	(Advanced option) Select the checkbox to perform the **dbcc checkcatalog** database consistency check before the backup.
dbcc checkdb	(Advanced option) Select the checkbox to perform the **dbcc checkdb** database consistency check before the backup.
dbcc checkdb skip ncindex	(Advanced option) Select the checkbox to perform the **dbcc checkdb skip ncindex** database consistency check before the backup.
dbcc checkstorage	(Advanced option) Select the checkbox to perform the **dbcc checkstorage** database consistency check before the backup.
Enable debugging messages	(Advanced option) Select the checkbox to enable the logging of debug messages.
Encryption method to Data Domain system	If you store the backup on a Data Domain system, select the encryption method for data transfer between the client and the Data Domain system during the backup.
Full backup	Select this option to create a full copy of the selected databases, including both the data and transaction logs.
Cumulative backup	Select this option to backup database pages that were changed since the last full backup. This option includes both data pages and log pages.
Incremental backup	Select this option to back up the transaction logs of the selected databases.
Incremental backup with no_truncate option	(Advanced option) Select this option to run a Sybase `dump transaction` command with the `no_truncate` option, which performs an incremental backup that does not truncate the logs afterwards. **NOTICE** Use this option in a disaster recovery situation only. Do not use this option in a regular on-demand or scheduled backup.
Log truncation with no_log option followed by full backup	(Advanced option) Select this option to run a Sybase `dump transaction` command with the `no_log` option, which truncates the logs without logging the truncation. After the logs are truncated, the Sybase plug-in also performs a full backup of the database. **NOTICE** Use this option in a disaster recovery situation only. Do not use this option in a regular on-demand or scheduled backup.
Log truncation with truncate_only option followed by full backup	(Advanced option) Select this option to run a Sybase `dump transaction` command with the `truncate_only` option, which truncates the logs. After the logs are truncated, the Sybase plug-in also performs a full backup of the database. **NOTICE** Do not use this option in a regular on-demand or scheduled backup.

Table 8 Sybase backup options (continued)

Backup option	How to set the option value
Promotion	Select whether incremental backups that are not allowed should be promoted to full or cumulative backups.
Maximum number of streams	Select the backup multi-streaming value from the menu, as the maximum number of databases to back up simultaneously. **NOTICE** A maximum multi-streaming value of 10 is enforced for GUI on-demand backups and scheduled backups.
Number of stripes per db	Select the backup multi-striping value from the menu, as the number of stripes to break up each database in the backup into. **Note:** The maximum multi-striping value is 10. You can either use multi-streaming or multi-striping, but not both.
OCS library directory	Type the full pathname of the Sybase OCS library directory, represented by `$SYBASE/$SYBASE_OCS/lib` on Linux or UNIX and `%SYBASE%\%SYBASE_OCS%\dll` on Windows. Do not type any environment variable but type the actual text of the full pathname. For example, type **`/sybase/OCS-15_0/lib`** instead of **`$SYBASE/$SYBASE_OCS/lib`**.
Postprocessing script	(Advanced option) Type the name of a postprocessing script to be run immediately after the backup.
Preprocessing script	(Advanced option) Type the name of a preprocessing script to be run immediately before the backup.
Protected backup password	(Advanced option) Type the password that the Sybase server uses with the Sybase `dump` command option `with passwd=` to implement a password-protected database backup.
Store backup on Data Domain system	Select the checkbox, and from the drop-down list, select the Data Domain system to use for backup through the DD Boost library. **NOTICE** This option is disabled if the Data Domain system has not been added on the Avamar server.
Sybase installation directory	Type the full pathname of the Sybase installation directory for the server to be backed up, represented by $SYBASE on Linux or UNIX and %SYBASE% on Windows. Do not type the environment variable $SYBASE or %SYBASE% but type the actual text of the full pathname. For example, type **`/sybase`** instead of **`$SYBASE`**.
Sybase username	Type the Sybase username.
Sybase user password	Type the Sybase user password.

Restore options

The following table describes the plug-in options that you can set in the Avamar Administrator or the AUI for Sybase plug-in restore and recovery operations.

Note: You can view an option marked "(Advanced option)" in the following table only by selecting the **Show Advanced Options** check box.

Table 9 Sybase restore options

Restore option	How to set the option value
dbcc checkalloc	(Advanced option) Select the checkbox to perform the **dbcc checkalloc** database consistency check after the restore.
dbcc checkcatalog	(Advanced option) Select the checkbox to perform the **dbcc checkcatalog** database consistency check after the restore.
dbcc checkdb	(Advanced option) Select the checkbox to perform the **dbcc checkdb** database consistency check after the restore.
dbcc checkdb skip ncindex	(Advanced option) Select the checkbox to perform the **dbcc checkdb skip ncindex** database consistency check after the restore.
dbcc checkstorage	(Advanced option) Select the checkbox to perform the **dbcc checkstorage** database consistency check after the restore.
Enable debugging messages	(Advanced option) Select the checkbox to enable the logging of debug messages.
Encryption method from Data Domain system	Select the encryption method for data transfer between the Data Domain system and the client during the restore.
Maximum number of streams	Select the restore multi-streaming value from the menu, as the maximum number of databases to restore simultaneously. **NOTICE** A maximum multi-streaming value of 10 is enforced for GUI restores.
OCS library directory	Type the full pathname of the Sybase OCS library directory, represented by `$SYBASE/$SYBASE_OCS/lib` on Linux or UNIX and `%SYBASE%\%SYBASE_OCS%\dll` on Windows. Do not type any environment variable but type the actual text of the full pathname. For example, type **`/sybase/OCS-15_0/lib`** instead of **`$SYBASE/$SYBASE_OCS/lib`**.
Point-in-time recovery timestamp	(Advanced option) For a point-in-time recovery, type the timestamp as described in Requirements for point-in-time recovery on page 71.
Postprocessing script	(Advanced option) Type the name of a postprocessing script to be run immediately after the restore.
Preprocessing script	(Advanced option) Type the name of a preprocessing script to be run immediately before the restore.
Protected backup password	(Advanced option) Type the same password that was used for a password-protected backup, which the Sybase server uses with the Sybase `load` command option `with passwd=` to restore the backup.
Restore data verification	Select the type of restore data verification from the menu: • No verification-(Default value) Do not perform verification during the restore. • Full verification-Use the Sybase `load` command option `with verify=full` to verify both the header information and rows structure for full verification of the backup data. • Header verification-Use the Sybase `load` command option `with verify=header` to verify the page header information only.
Sybase installation directory	Type the full pathname of the Sybase installation directory for the destination server, represented by $SYBASE on Linux or UNIX and %SYBASE% on Windows. Do not type the environment variable $SYBASE or %SYBASE% but type the actual text of the full pathname. For example, type **`/sybase`** instead of **`$SYBASE`**.

Table 9 Sybase restore options (continued)

Restore option	How to set the option value
Sybase username	Type the Sybase username.
Sybase user password	Type the Sybase user password.

APPENDIX B

Command Line Interface

This appendix includes the following topics:

- Overview of CLI operations 88
- Command options 90
- Browse operations with the avsybase command 101
- On-demand backups with the avsybase command 102
- Cumulative backups with the avsybase command 109
- Restore and recovery with the avsybase command 109

Overview of CLI operations

You can use the Avamar Plug-in for Sybase (Sybase plug-in) command, `avsybase`, and its options to perform the supported command line interface (CLI) operations.

NOTICE On Microsoft windows, use the command name `avsybase.exe`.

If the value of an `avsybase` command option contains any spaces, enclose the value in double quotation marks, for example, `--flagfile="C:\Program Files\var\sybflags.txt"`. Otherwise, the operation might fail.

You can browse for Sybase data to back up and perform backup and restore operations with the Sybase plug-in software by using the `avsybase` command with the `--operation` option and other supported options. Operation option provides details on the command options to use for each supported operation.

You can specify the `avsybase` command options for a backup or restore by typing the options after the `avsybase` command. Alternatively, you can list the command options in an option file, as described in Using an option file.

Launching the CLI

The `avsybase` binary is located in the `bin` subdirectory in the Avamar client installation directory.

Procedure

1. Open a command prompt.
2. Change to the appropriate directory to run the `avsybase` command.

   The default directory locations of the `avsybase` binary on the supported operating systems are as follows:

   - On AIX and Linux: `/usr/local/avamar/bin`
   - On HP-UX and Solaris: `/opt/AVMRclnt/bin`
   - On Windows: `C:\Program Files\avs\bin`

   Command options on page 90 includes a complete list of all the `avsybase` command options.

Using an option file

As an alternative to typing the command options after the `avsybase` command, you can set the command options in one of the following option files:

- The `avsybase.cmd` file that must be located in either of the following directories:
  - The Avamar `var` directory under the Avamar client installation directory. The default `var` directories are as follows:
    - On AIX and Linux: `/usr/local/avamar/var`
    - On HP-UX and Solaris: `/opt/AVMRclnt/var`
    - On Windows: `C:\Program Files\avs\var`
  - The directory specified with the `--vardir` option.

    NOTICE Use the `avsybase.cmd` file with caution. An option set in the `avsybase.cmd` file is applied to every `avsybase` process that runs on the system,

including all the browse, backup, and restore processes started through the CLI or Avamar Administrator.

- An option file that you create as a text file. Specify the option file pathname with the `--flagfile` option.

Perform the following actions for security reasons:

- Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.
- Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation.

You must list each option on a separate line in the option file as shown in the following example:

```
--debug
--logfile=/sybase/logs/sybase.log
```

NOTICE Due to an Avamar limitation, you cannot specify non-ASCII values for any options in the `avsybase.cmd` file or option file.

You can use the same option file for both backup and restore options, as required. You can also specify the command options after the `avsybase` command on the operating system command line, instead of listing the options in an option file.

If you set options in an option file, do not type the options after the `avsybase` command used for backups or restores. Command options provides details about any command options that you should and should not set in an option file.

For example, you can include all the following mandatory options for a backup or restore in the option file specified by `--flagfile=option_file_path` instead of specifying the options with the `avsybase` command:

```
--account=domain/client
--bindir=Avamar_binary_dir
--id=Avamar_server_username
--ocslibpath=OCS_libraries_path
--password=Avamar_server_password
--server=Avamar_server_name_or_IP_address
--sybase=Sybase_install_dir_path
--syblogin=Sybase_username
--sybpassword=Sybase_user_password
[--sybserver=]Sybase_server_name
```

Password encoding

You can use `avtar` to encode passwords that are entered through the command line or stored in script files, and then use the encoded string with the `--password` or `--sybpassword` option.

About this task

You must perform the required steps to encode passwords.

Procedure

1. Type the following command on the command line on the Avamar client (Sybase host):

   `avtar --encodepassword=`*`password`*

   where *password* is the password to encode.

   The command returns an encoded string on the command line.

> **NOTICE** Each time you run the `avtar --encodepassword=`*password* command, the command returns a different encoded string. For example, running the same command twice yields different encoded strings, and you can use either string as a valid encoded password for a backup or restore.

2. Use the encoded string on the `avsybase` command line as the password with the `--password` or `--sybpassword` option.

Help

The `--help` option enables you to view the descriptive version of command line help.

Use the `--help` option to display a complete list of supported options with a description of each option:

```
avsybase --help
```

Use the `--usage` option to view a basic list of available options without a description of each option:

```
avsybase --usage
```

Version information

Use the `--version` option to view the build version information for the Sybase plug-in:

```
avsybase --version
```

Command options

The Sybase plug-in supports specific options with the `avsybase` command for Sybase backup and restore operations.

About this task

For operations performed with Avamar Administrator, you can optionally specify the `avsybase` command options in Avamar Administrator:

Procedure

1. Click **More** in the **Backup Command Line Options** dialog box for an on-demand backup, in the **Restore Command Line Options** dialog box for a restore, or on the **Options** tab when you create a dataset for a scheduled backup.
2. For each option, type `[avsybase]`*`option_name`* in the **Enter Attribute** field and the option value in the **Enter Attribute Value** field. Click **+** to add the option, and click **-** to remove the option from the list.

   Specific options, such as `--ddr` or `--debug`, do not include an equal sign when you specify the options on the command line. When you specify one of these options in Avamar Administrator, set the option value to **True** in the **Enter Attribute Value** field.
   Use the **More** button to set only additional options that you cannot specify with the GUI controls.

   > **NOTICE** The Avamar software does not validate the option information you type in the **Enter Attribute** and **Enter Attribute Value** fields. In addition, the values in these fields override settings that you specify for the options with GUI controls (text boxes, checkboxes, radio buttons, and so forth) in Avamar Administrator.

Synopsis

Consider the following guidelines when you type the `avsybase` command and the command options:

- Replace a variable value in italicized font with an actual valid value.
- Required options are not enclosed in any brackets.
- Optional options are enclosed in square brackets [].
- Either/or choices are enclosed in curly brackets {}.
- If an option value contains any spaces, then enclose the value in double quotation marks, for example, `--flagfile="C:\Program Files\var\sybflags.txt"`.
- Specify the Sybase server name either as a separate item on the command line (without the `--sybserver` option) or as the `--sybserver` option value.
- Specify a database name either as a separate item on the command line (without the `--sybdb` option) or as the `--sybdb` option value. A database name specified as a separate item must also include the Sybase server name, for example, *Sybase_server_name/database_name*.
- Specify only one Sybase server name with the `--sybserver` option and only one database name with the `--sybdb` option.
- You can specify multiple database names as separate items (without the `--sybdb` option) in the `avsybase` command for a backup, restore, or print-headers operation.
- You can specify only one database name in the `avsybase` command for a check-db or list-times operation.

Note: When possible, specify the Sybase server name and any database names as separate items on the command line, without the `--sybserver` and `--sybdb` options. The `--sybserver` and `--sybdb` options will be deprecated in a future release. All the database names specified in the same `avsybase` command must include the same Sybase server name.

Perform the following actions for security reasons:

- Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.
- Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation.

The following synopsis describes the `avsybase` commands and options used for browse, backup, restore and recovery, and other miscellaneous operations with the Sybase plug-in.

```
avsybase --operation=browse
--account=domain/client --bindir=Avamar_binary_dir
--flagfile=option_file_path --id=Avamar_server_username
--ocslibpath=OCS_libraries_path --password=Avamar_server_password
--sybase=Sybase_install_dir_path --syblogin=Sybase_username
--sybpassword=Sybase_user_password {--sybserver=Sybase_server_name
| Sybase_server_name}
```

All the listed options are mandatory for a browse operation.

```
avsybase [--operation=backup]
--account=domain/client [--ase-password=backup_password]
[--ase-verify=verification_level] [--brtype=backup_type]
```

```
--bindir=Avamar_binary_dir [--dbcc-checkalloc | --dbcc-checkcatalog
| --dbcc-checkdb | --dbcc-checkdb-skip-ncindex | --dbcc-checkstorage]
[--ddr [--ddr-index=index_number]] [--debug]
[--expires=number_of_days_or_timestamp] --flagfile=option_file_path
--id=Avamar_server_username [--logfile=log_file_path]
[--max-streams=multi-streaming_value] [--stripes=multi-striping_value][--no-
backup] [--no-log]
[--no-truncate] [--no-truncate-mixed] --ocslibpath=OCS_libraries_path
--password=Avamar_server_password [--promotetofull | --promotetocumu]
[--retention-type=type] [--run-at-end=script_path]
[--run-at-start=script_path]
--server=Avamar_server_name_or_IP_address
[--shrink-log] --sybase=Sybase_install_dir_path
[Sybase_server_name[/database_name1]
[Sybase_server_name[/database_name2] ...]]
[--sybdb=Sybase_database_name] [--sybdebug=syblogs_debug_level]
[--syblanguage=vendor_locale] --syblogin=Sybase_username
[--syblogs=syblogs_dir_path] --sybpassword=Sybase_user_password
{--sybserver=Sybase_server_name | Sybase_server_name}
[--truncate-all] [--vardir=var_dir_path]
```

The default value of the `--operation` option is backup.

```
avsybase --operation=restore
--account=domain/client [--ase-password=backup_password]
[--ase-verify=verification_level] --bindir=Avamar_binary_dir
[--dbcc-checkalloc | --dbcc-checkcatalog | --dbcc-checkdb |
--dbcc-checkdb-skip-ncindex | --dbcc-checkstorage] [--debug]
--flagfile=option_file_path --id=Avamar_server_username
[--labelnum=label_number] [--leave-offline]
[--logfile=log_file_path] [--max-streams=multi-streaming_value]
--ocslibpath=OCS_libraries_path --password=Avamar_server_password
[--pointintime=date_and_time] [--postfix=backup_name
[--postfix_only]] [--restore-destination=restore_type]
[--run-at-end=script_path] [--run-at-start=script_path]
--server=Avamar_server_name_or_IP_address
--sybase=Sybase_install_dir_path
[Sybase_server_name[/database_name1]
[Sybase_server_name[/database_name2] ...]]
[--sybdb=Sybase_database_name] [--sybdebug=syblogs_debug_level]
[--syblanguage=vendor_locale] --syblogin=Sybase_username
[--syblogs=syblogs_dir_path] --sybpassword=Sybase_user_password
{--sybserver=Sybase_server_name | Sybase_server_name}
[--target=destination_Sybase_server_name[/database_name]]
[--vardir=var_dir_path]
```

```
avsybase --operation=check-db
--account=domain/client --bindir=Avamar_binary_dir
[--dbcc-checkalloc | --dbcc-checkcatalog | --dbcc-checkdb |
--dbcc-checkdb-skip-ncindex | --dbcc-checkstorage]
--flagfile=option_file_path --id=Avamar_server_username
--ocslibpath=OCS_libraries_path --password=Avamar_server_password
--server=Avamar_server_name_or_IP_address
--sybase=Sybase_install_dir_path
[Sybase_server_name[/database_name]] [--sybdb=Sybase_database_name]
--syblogin=Sybase_username --sybpassword=Sybase_user_password
{--sybserver=Sybase_server_name | Sybase_server_name}
```

```
avsybase --operation=list-times
--account=domain/client --bindir=Avamar_binary_dir
--flagfile=option_file_path --id=Avamar_server_username
[--labelnum=label_number] --password=Avamar_server_password
[--pointintime=date_and_time]
```

```
--server=Avamar_server_name_or_IP_address
[--sybdb=Sybase_database_name | Sybase_server_name/database_name]
{--sybserver=Sybase_server_name | Sybase_server_name}
```

```
avsybase --operation=print-headers
--account=domain/client --bindir=Avamar_binary_dir
--flagfile=option_file_path --id=Avamar_server_username
[--labelnum=label_number] --ocslibpath=OCS_libraries_path
--password=Avamar_server_password
--server=Avamar_server_name_or_IP_address
--sybase=Sybase_install_dir_path
[Sybase_server_name[/database_name1]
[Sybase_server_name[/database_name2] ...]]
--syblogin=Sybase_username --sybpassword=Sybase_user_password
{--sybserver=Sybase_server_name | Sybase_server_name}
```

Operation option

Except for a backup operation, you must always use the `--operation` option with the `avsybase` command to specify one of the supported operations listed in the following table.

Note: If you use the `--operation` option without specifying an operation, a backup is performed without error.

Table 10 Operations supported with avsybase command

Operation option	Description
`--operation=browse`	Returns information on all the databases on the Sybase server that are available for backup. With this option, use only certain other options, as described in Synopsis.
`--operation=backup`	Default value of the `--operation` option. Performs an on-demand backup of the specified Sybase database or server. With this option, use any of the options described in Common options on and Backup options on page 98.
`--operation=check-db`	Performs a database consistency check as a manual operation, separate from any backup or restore operation. With this option, use only certain other options, as described in Synopsis. You can optionally include any of the following options to specify the type of consistency checks to perform: • `--dbcc-checkalloc`—Specifies to perform a Sybase `checkalloc` check. • `--dbcc-checkcatalog`—Specifies to perform a Sybase `checkcatalog` check. • `--dbcc-checkdb`—Specifies to perform a Sybase `checkdb` check. • `--dbcc-checkdb-skip-ncindex`—Specifies to perform a Sybase `checkdb` check with the `skip_ncindex` option. • `--dbcc-checkstorage`—Specifies to perform a Sybase `checkstorage` check. If you do not include any of these five options, then the database consistency check performs a Sybase `checkdb` check by default. The Sybase documentation provides more details about database consistency checks. You can optionally specify a particular database for the consistency check. If you do not specify a database, then the consistency check occurs on every database of the Sybase server.

Table 10 Operations supported with avsybase command (continued)

Operation option	Description
`--operation=list-times`	Performs an operation to list the label numbers and the "old time" and "new time" values of a backup as used to verify the backup and provide details about the backup available for restore. The "old time" and "new time" values are obtained by doing a partial restore of the backup data. The list time values are based on when the backup was performed and might vary slightly from the actual times. Point-in-time recovery with the avsybase command describes how to use this option. **NOTICE** You must specify the Sybase server name in the `avsybase` command for the list-times operation. If you do not specify the server name, the list-times operation fails.
`--operation=print-headers`	Performs an operation to restore the header information of a backup and print this information, which includes (in Sybase native format) the sequence dates covered by a transaction log backup. The following example shows the header information: `avsybase Info <0000>: Log begins on page 76804; checkpoint RID=Rid pageid = 0x14f65; row num = 0x2d; previous BEGIN XACT RID=(Rid pageid = 0x12c04; row num = 0x1); sequence dates: (old=Mar 9 2013 8:10:50:963AM, new=Mar 9 2013 8:16:45:650AM); truncation page=85861; 10 pages deallocated; requires database with 102400 pages.` The highlighted "old" and "new" sequence dates indicate the exact time range covered by a transaction log backup and enable you to determine which log backup to use for a point-in-time recovery. Use this operation only if the list-times operation fails to provide an exact enough time range for a point-in-time recovery.
`--operation=restore`	Performs a restore or recovery of the specified Sybase database or server. With this option, use any of the options described in Common options and Restore and recovery options.

Common options

Common options are used for multiple operations with `avsybase` command . You can use specific options for `backup`, `restore`, `browse`, `check-db`, `list-times`, and `print-headers` operations as described in Synopsis.

The following common options are available for the `avsybase` command.

Table 11 Common options for both backups and restores with avsybase command

Common option	Description
`--account=`*domain/client*	Mandatory for backups and restores. Specifies the Avamar client to back up or restore from, with the following format: *domain/client* where *domain* is the Avamar domain to which the client belongs and client is the client computer name registered on the Avamar server.
`--ase-password=`*backup_password*	Optional. Specifies the password that the Sybase server uses with the Sybase `dump` or `load` command option `with passwd=` to implement a password-protected backup or restore. The same password used during a

Table 11 Common options for both backups and restores with avsybase command (continued)

Common option	Description
	password-protected backup must be specified for the restore of the backup.
`--ase-verify=`*verification_level*	Optional. Specifies the level of backup data verification. The *verification_level* value can be one of the following values: • `full`—Specifies to use the Sybase `dump` or `load` command option `with verify=full` to verify both the header information and rows structure for full verification of the backup data. • `header`—Specifies to use the Sybase `dump` or `load` command option `with verify=header` option to verify the page header information only. • `verifyonly`—(CLI restore only) Specifies to use the Sybase `load` command option `with verify=verifyonly` to verify minimal header information without restoring the database.
`--bindir=`*Avamar_binary_dir*	Mandatory for backups and restores. Specifies the full pathname of the directory location of the Avamar binaries.
`--dbcc-checkalloc` | `--dbcc-checkcatalog` | `--dbcc-checkdb` | `--dbcc-checkdb-skip-ncindex` | `--dbcc-checkstorage`	Optional. Specifies the type of database consistency check to perform before the start of a backup or after the end of a restore: • `dbcc-checkalloc`—Specifies to perform a Sybase `checkalloc` check. • `dbcc-checkcatalog`—Specifies to perform a Sybase `checkcatalog` check. • `-dbcc-checkdb`—Specifies to perform a Sybase `checkdb` check. • `dbcc-checkdb-skip-ncindex`—Specifies to perform a Sybase `checkdb` check with the `skip_ncindex` option. • `dbcc-checkstorage`—Specifies to perform a Sybase `checkstorage` check. If you do not include any of these five options, then the Sybase plug-in does not perform a database consistency check during the backup or restore. The Sybase documentation provides more details about database consistency checks.
`--debug`	Optional. Enables debugging messages to be printed for a browse, backup, or restore operation.
`--flagfile=`*option_file_path*	Recommended for backups and restores. Specifies the full pathname of an option file on the Avamar client that contains `avsybase` command options. You can optionally include any of the `avsybase` command options in the file. Each option must appear on a separate line. Perform the following actions for security reasons: 1. Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.

Table 11 Common options for both backups and restores with avsybase command (continued)

Common option	Description
	2. Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation.
`--id=`*Avamar_server_username*	Mandatory for backups and restores. Specifies the Avamar server username for authentication. You can specify the values for the `--id` and `--account` options at the same time by specifying `--id=`*user@domain/client*. **NOTICE** For security reasons, set this option in an option file specified with the `--flagfile` option and accessible only to the Sybase operating system user that performs the operation.
`--logfile=`*log_file_path*	Optional. Specifies the full pathname of the alternative log file to contain all messages that the Sybase plug-in and its spawned processes print to `stdout` and `stderr`: • If the log file does not already exist, the log file is created. • If the log file already exists, logging information is appended to the file. • If this option is not specified, CLI operations do not create a log file and logging is disabled. Logging information provides details about log files created for operations performed with Avamar Administrator. **Note:** To enable debugging messages, you must also specify the `--debug` option. Debugging is not enabled by default.
`--max-streams=`*multi_streaming_value*	Optional. Specifies the multi-streaming value, as the maximum number of databases that can be backed up or restored at the same time. The default value is 1. There is no enforced maximum value for CLI operations with the `avsybase` command. Software processes provides details.
`--ocslibpath=`*OCS_libraries_path*	Mandatory for backups and restores. Specifies the full pathname of the directory location of the OCS libraries on the Sybase server.
`--password=`*Avamar_server_password*	Mandatory for backups and restores. Specifies the password of the Avamar server account, which can be a password that was encoded with the `avtar --encodepassword` command. Perform the following actions for security reasons: 1. Encode the password that you specify with this option according to Password encoding. 2. Set this option in an option file specified with the `--flagfile` option and accessible only to the Sybase operating system user that performs the operation.
`--run-at-end=`*script_path*	Optional. Specifies the name of a postprocessing script to be run immediately after a backup or restore.
`--run-at-start=`*script_path*	Optional. Specifies the name of a preprocessing script to be run immediately before a backup or restore.

Table 11 Common options for both backups and restores with avsybase command (continued)

Common option	Description
`--server=`*Avamar_server_name_or_IP_a*ddress	Mandatory for backup, restore, list-times, and print-headers operations. Specifies the DNS hostname or IP address of the Avamar server.
`--sybase=`*Sybase_install_dir_path*	Mandatory for backups and restores. Specifies the full pathname of the Sybase installation root directory.
Sybase_server_name[/database_name1] [Sybase_server_name[/database_name2]...]	Mandatory for all operations with the `avsybase` command if you do not use the `--sybserver` option. Specifies the Sybase instance name of the Sybase server, which is not the Sybase hostname, and (except for a list-times operation) optionally a database name. If the Sybase server is in a cluster, specify the virtual server name. Instead of or in addition to using the `--sybserver` option, you can specify the Sybase server name separately (without the `--sybserver` option) in the command. For a backup or restore, you can optionally include a database name instead of using the `--sybdb` option, for example, *Sybase_server_name/database_name*. You can specify one or more database names in this format in the same backup or restore command. **Note:** When possible, specify the Sybase server name and any database names separately in the command instead of using the `--sybserver` and `--sybdb` options. You must separate multiple names with a space.
`--sybdb=`*Sybase_database_name*	Optional. Specifies a Sybase database name for the backup or restore. If you do not specify a database name, the whole Sybase server instance is backed up or restored. You can specify only one database name with the `--sybdb` option. Instead of or in addition to using the`--sybdb` option , you can specify one or more database names separately (without the `--sybdb` option) in the same backup or restore command. You must include the Sybase server name with each database name, for example, *Sybase_server_name/ database_name*.
`--sybdebug=`*syblogs_debug_level*	Optional. Specifies the debug level for the `libsybase_avamar.x` logs, which takes effect only if `--syblogs` is specified. The level can be either of the following levels: • 0—Default value. Specifies that entry and exit messages of read and write functions are not printed. • Positive number—Specifies that entry and exit messages of read and write functions are printed.
`--syb-language=`*vendor_locale*	Optional. Specifies the locale for the Sybase OCL session in an I18N environment. The locale must be a proper *vendor_locale* value from the `locales.dat` file entry, as described in Configuring I18N support.
`--syblogin=`*Sybase_username*	Mandatory for backups and restores. Specifies the Sybase username of the Sybase server account. Store this option in an option file.

Table 11 Common options for both backups and restores with avsybase command (continued)

Common option	Description
`--syblogs=`*syblogs_dir_path*	Optional. Specifies the full pathname of a directory for the `libsybase_avamar.x` logs. If you do not specify this option, the `libsybase_avamar.x` logs are not written.
`--sybpassword=`*Sybase_user_password*	Mandatory for backups and restores. Specifies the Sybase user password of the Sybase server account, which can be a password that was encoded with the `avtar --encodepassword` command. Perform the following actions for security reasons: 1. Encode the password that you specify with this option according to Password encoding. 2. Set this option in an option file specified with the `--flagfile` option and accessible only to the Sybase operating system user that performs the operation.
`--sybserver=`*Sybase_server_name*	Mandatory for all operations with the `avsybase` command unless you specify the Sybase server name separately (without the `--sybserver` option) in the command. Specifies the Sybase instance name of the Sybase server, which is not the Sybase hostname. If the Sybase server is in a cluster, specify the virtual server name. Instead of using the `--sybserver` option, you can specify the Sybase server name separately in the command and optionally include a database name, for example, *Sybase_server_name[/database_name]*.
`--vardir=`*var_dir_path*	Optional. Specifies the full pathname of the Avamar `var` directory. If this option is not set, the default location is the Avamar data directory in the home directory of the user that runs the `avsybase` command. **Note:** You cannot specify this option in the `avsybase.cmd` file, which must be stored in the directory specified by the `--vardir` option.

Backup options

Backup options for the `avsybase` command enable you to control the backup operations. Many of these options are the same as the plug-in options that you specify in the Avamar Administrator or the AUI when you perform an on-demand backup or create a dataset for scheduled backups.

The following `avsybase` options are available for backup operations. With these backup options, use the `--operation=backup` option from Operation option and any additional common options from Common options.

Table 12 Options for backups with avsybase command

Backup option	Description
`--brtype=`*backup_type*	Optional. Specifies the type of backup to perform. The *backup_type* value must be one of the following values: • `full`—Default value. Backs up the entire database, including the transaction log in the database. • `cumulative`—Backs up pages changed since the last full backup.

Table 12 Options for backups with avsybase command (continued)

Backup option	Description
	• `incremental`—Backs up only the transaction logs. • `truncate`—Performs a truncation backup. **NOTICE** You can create only a full backup for a database that does not support incremental (transaction log) backups, such as the master database with its data and log on the same device. If you try to perform an incremental backup of such a database, a full backup is performed instead.
`--ddr`	Optional. Specifies that the backup is performed by using the DD Boost library to save the data directly on a Data Domain system instead of an Avamar server.
`--ddr-index=`*index_number*	Optional. Specifies the index number (1, 2, 3, or so on) of the Data Domain system on which the backup is stored. An index number is assigned to the Data Domain system when the system is added to the Avamar server configuration. If you do not use this option or you specify `--ddr-index=0`, then the Avamar server assigns a Data Domain system for the backup.
`--expires=`*number_of_days_or_timestamp*	Optional. Specifies the backup expiration as a number of days from today or as an absolute timestamp.
`--label=`*name*	Specifies a label name for the backup.
`--no-backup`	Optional. Specifies to disable a database backup after a log truncation operation.
`--no-log`	Optional. Specifies to disable logging of a log truncation operation. **NOTICE** Use this option in a disaster recovery situation only.
`--no-truncate`	Optional. Specifies to disable log truncation after an incremental (log) backup. **NOTICE** Use this option in a disaster recovery situation.
`--no truncate-mixed`	Optional. Specifies to disable log truncation after a full backup for all database types. Log truncation after full backup on page 104 provides details.
`--promotetofull`	If incremental backups are not allowed, promote them to full.
`--promotetocumu`	If incremental backups are not allowed, promote them to cumulative.
`--retention-type=type`	Optional. Specifies the type of advanced retention to assign to the backup. The `type` value is a quoted string that can be either (a) one of the following values or (b) a combination of any of the final four values as follows: • `none`—Do not explicitly assign any retention type to the backup. Treat the backup as a normal on-demand backup. • `daily`—Designate the backup as a daily backup. • `weekly`—Designate the backup as a weekly backup.

Table 12 Options for backups with avsybase command (continued)

Backup option	Description
	• `monthly`—Designate the backup as a monthly backup. • `yearly`—Designate the backup as a yearly backup. For example, specify `daily,yearly` as the value for the type of advanced retention.
`--shrink-log`	Optional for a Sybase 15.7.*x* database backup only. Specifies to perform a shrink log operation during a database backup, which removes any hole that exists at the end of the database. Such a hole is created when the Sybase 15.7.*x* parameter `log off` is used to remove portions of a database log. The `--shrink-log` option is ignored for backups with Sybase 15.5 or earlier.
`--truncate-all`	Optional. Specifies to enable log truncation after a full backup for all database types except read-only databases. Log truncation after full backup on page 104 provides details.
`--stripes=multi-striping_value`	Optional. Specifies the multi-striping value, as the number of stripes to break up each database in the backup into. The default value is 1. There is no enforced maximum value for CLI operations with the `avsybase` command.

Restore and recovery options

Restore and recovery options for the `avsybase` command enable you to control restore operations. Many of these options are the same as the plug-in options that you specify in the Avamar Administrator or the AUI when you perform a restore.

The following `avsybase` options are available for the restore operation. With these restore and recovery options, use the `--operation=restore` option from "Operation option" and any additional common options from "Common options."

Table 13 Options for restore and recovery with avsybase command

Restore and recovery option	Description
`--label=`*name*	Specifies a label name for the backup to restore.
`--labelnum=`*label_number*	Mandatory for a point-in-time recovery only. Specifies the label number of the backup to restore for the point-in-time recovery.
`--leave-offline`	Optional. Specifies to not bring databases online after a restore.
`--pointintime=`*date_and_time*	Mandatory for a point-in-time recovery only. Specifies a date and time for a point-in-time recovery. The recovery process stops at the first date and time that is exactly at or after the specified date and time. Specify the date and time as a quoted string in the format "*yyyy-mm-dd hh:mm:ss*". For example, specify "2013-02-25 14:15:45" for the date February 25, 2013 and time 2:15:45 p.m.
`--postfix=`*backup_name*	Optional. Specifies the quoted name of the backup for recovery, such as "f-0" or "i-2":

Table 13 Options for restore and recovery with avsybase command (continued)

Restore and recovery option	Description
	• If used with the `--postfix-only` option, then only the named backup is restored. • If used without the `--postfix-only` option, then all the backups in a sequence are stored, ending with the named backup, for example, ending with the i-2 backup. **NOTICE** Use the `--postfix` option only in special cases, such as when the regular point-in-time recovery fails or you need to restore a particular backup individually.
`--postfix-only`	Optional. Specifies to restore only the backup specified by the `--postfix` option.
`--target=`*destination_Sybase_server_name [/database_name]*	Optional. Specifies the Sybase instance and (optionally) database on the destination host to which the data is restored in a relocated recovery, where *destination_Sybase_server_name* is the name of the destination instance and, if specified, *database_name* is the name of the destination database. If the `--target` option is not specified, the backup is restored to the original source instance.

Browse operations with the avsybase command

You can perform an on-demand browse operation by running the `avsybase` command (or `avsybase.exe` on Microsoft Windows) with the `--operation= browse` option and other supported options on the operating system command line.

Overview of CLI operations provides details on the `avsybase` command options and how to launch a browse operation with the `avsybase` command.

The browse operation returns a list of data on the Sybase host client that is available for backup. The command results appear as standard output in the command window. The following information appears for each entry:

- Name
- Date
- Size
- Type
- User

The data is sorted alphabetically by name.

Use the following browse command to return a list of all the databases on the Sybase host:

```
avsybase --operation=browse --flagfile=option_file_path
```

In this example, the option file specified by `--flagfile=`*option_file_path* contains all the mandatory options, which are not included with the `avsybase` command.

Perform the following actions for security reasons:

- Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.
- Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation.

If the other mandatory options are included with the `avsybase` command line, the browse command becomes as follows:

```
avsybase --operation=browse --flagfile=option_file_path
--account=domain/client --bindir=Avamar_binary_dir
--ocslibpath=OCS_libraries_path --sybase=Sybase_install_dir_path
Sybase_server_name
```

On-demand backups with the avsybase command

You can initiate an on-demand backup of Sybase data by running the `avsybase` command (or `avsybase.exe` on Microsoft Windows) with the `--operation= backup` option and other supported options on the operating system command line.

Overview of CLI operations provides details on the `avsybase` command options for Sybase backups and how to launch an on-demand backup with the `avsybase` command.

Instead of setting command options on the `avsybase` command line, you can use an option file to set the options as described in Using an option file.

Perform the following actions for security reasons:

- Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.
- Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation

A backup with the `avsybase` command can back up one or more specified databases or all the databases on a Sybase server.

A backup with the Avamar Administrator or the AUI can also back up one or more databases on a Sybase server. The following sections describe how to use the AUI to perform a backup:

- Performing on-demand backups
- Scheduling backups

Full backups with the avsybase command

A full backup backs up all the data in one or all of the databases on a Sybase server.

Full backups provides more information on Sybase full backups.

Full backup of Sybase server

You can perform a full backup with the `avsybase` command to back up all the databases on the Sybase server, including the transaction logs of each database.

The following example `avsybase` command performs a full backup of the whole Sybase server:

```
avsybase [--operation=backup] [--brtype=full]
--flagfile=option_file_path
```

The options `--operation` and `--brtype` are optional for a full backup. In this example, the option file specified by `--flagfile=`*option_file_path* contains all the mandatory options, which are not included with the `avsybase` command.

Perform the following actions for security reasons:

- Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.
- Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation.

If the other mandatory options are included with the `avsybase` command, the command for the full backup becomes as follows:

```
avsybase [--operation=backup] [--brtype=full]
--flagfile=option_file_path --account=domain/client
--bindir=Avamar_binary_dir --ocslibpath=OCS_libraries_path
--server=Avamar_server_name_or_IP_address
--sybase=Sybase_install_dir_path Sybase_server_name
```

For example, the following command performs a full backup of all the Sybase databases on the Sybase server named SYBASE_SERVER1 in the sybase domain and stores the backup on the Avamar server with the hostname avamar-1.example.com:

```
avsybase --operation=backup --brtype=full
--flagfile=/secure/options.txt --account=/sybase/host1
--bindir=/usr/local/avamar/bin --ocslibpath=/sybase/OCS-15_0/lib
--server=avamar-1.example.com --sybase=/sybase SYBASE_SERVER1
```

For example, the following command performs a full backup of all the Sybase databases on the Sybase server named SYBASE_SERVER1 in the sybase domain and stores the backup on the first Data Domain system that was added to the Avamar configuration. Use the `--ddr` option and (optional) `--ddr-index` option to specify a backup to a Data Domain system:

```
avsybase --operation=backup --brtype=full
--flagfile=/secure/options.txt --account=/sybase/host1
--bindir=/usr/local/avamar/bin --ocslibpath=/sybase/OCS-15_0/lib
--server=avamar-1.example.com --sybase=/sybase SYBASE_SERVER1 --ddr
--ddr-index=1
```

Full backup of specified databases

You can perform a full backup with the `avsybase` command to back up one or more specified databases on the Sybase server, including the transaction logs of the databases.

Note: You can specify only one database name with the `--sybdb` option. You can use only one `--sybdb` option per `avsybase` command. However, you can specify multiple database names separately in the command without using the `--sybdb` option.

The following example `avsybase` command performs a full backup of two specified databases:

```
avsybase [--operation=backup] [--brtype=full]
--flagfile=option_file_path Sybase_server_name/database_name1
Sybase_server_name/database_name2
```

In this example, the option file specified by `--flagfile=`*option_file_path* contains all the mandatory options, which are not included with the `avsybase` command.

The options `--operation` and `--brtype` are optional for a full backup.

For example, the following command performs a full backup of the Sybase databases db1, db2, and db3 on the Sybase server SYBASE_SERVER1 in the sybase domain. The command stores the backup on the first Data Domain system that was added to the Avamar configuration:

```
avsybase --operation=backup --brtype=full
--flagfile=/secure/options.txt --account=/sybase/host1
--bindir=/usr/local/avamar/bin --ocslibpath=/sybase/OCS-15_0/lib
--server=avamar-1.example.com --sybase=/sybase SYBASE_SERVER1/db1
SYBASE_SERVER1/db2 SYBASE_SERVER1/db3 --ddr --ddr-index=1
```

Log truncation after full backup

By default, the Sybase plug-in does not truncate the logs of regular databases (with database and log data stored in separate Sybase devices) after a full backup with the `avsybase` command. However, the software truncates the logs of non-regular databases (except read-only databases) after a full backup with the `avsybase` command to prevent the logs from becoming completely full.

The `avsybase` command options `--no-truncate-mixed` and `--truncate-all` are supported for full backups only, not for incremental backups:

- `--no-truncate-mixed`—Disables log truncation after a full backup for all database types.
- `--truncate-all`—Enables log truncation after a full backup for all database types except read-only databases.

These command options affect whether the logs are truncated after a full backup with the `avsybase` command:

- After a full backup of a regular database, the Sybase plug-in truncates the logs only if you use the `--truncate-all` option.
- After a full backup of an in-memory database, mixed log and data database, or relaxed-durability database, the Sybase plug-in always truncates the logs unless you use the `--no-truncate-mixed` option.
- After a full backup of a read-only database, the Sybase plug-in never truncates the logs, even if you use the `--truncate-all` option.

Cumulative backups with the avsybase command

A cumulative backup backs up all pages changed since the last full backup.

Cumulative backups on page 21 provides more information on Sybase cumulative backups.

Cumulative backup of Sybase server

You can perform a cumulative backup with the `avsybase` command that applies to all the databases on the Sybase server.

The following example `avsybase` command performs a cumulative backup of the whole Sybase server:

```
avsybase [--operation=backup] --brtype=cumulative
--flagfile=option_file_path
```

In this example, the option file specified by `--flagfile=`*`option_file_path`* contains all the mandatory options, which are not included with the `avsybase` command.

Perform the following actions for security reasons:

- Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.

- Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation.

If the other mandatory options are included with the `avsybase` command, the command for the cumulative backup becomes as follows:

```
avsybase [--operation=backup] --brtype=cumulative
--flagfile=option_file_path --account=domain/client
--bindir=Avamar_binary_dir --ocslibpath=OCS_libraries_path
--server=Avamar_server_name_or_IP_address
--sybase=Sybase_install_dir_path Sybase_server_name
```

For example, the following command performs a cumulative backup of all the Sybase databases on the Sybase server named SYBASE_SERVER1 in the sybase domain and stores the backup on the Avamar server with the hostname avamar-1.example.com:

```
avsybase --operation=backup --brtype=cumulative
--flagfile=/secure/options.txt --account=/sybase/host1
--bindir=/usr/local/avamar/bin --ocslibpath=/sybase/OCS-15_0/lib
--server=avamar-1.example.com --sybase=/sybase SYBASE_SERVER1
```

For example, the following command performs a cumulative backup of all the Sybase databases on the Sybase server named SYBASE_SERVER1 in the sybase domain and stores the backup on the first Data Domain system that was added to the Avamar configuration. Use the `--ddr` option and (optional) `--ddr-index` option to specify a backup to a Data Domain system:

```
avsybase --operation=backup --brtype=cumulative
--flagfile=/secure/options.txt --account=/sybase/host1
--bindir=/usr/local/avamar/bin --ocslibpath=/sybase/OCS-15_0/lib
--server=avamar-1.example.com --sybase=/sybase SYBASE_SERVER1 --ddr
--ddr-index=1
```

Cumulative backup of specified databases

You can perform a cumulative backup with the `avsybase` command that applies to one or more specified databases on the Sybase server.

Note: You can specify only one database name with the `--sybdb` option. You can use only one `--sybdb` option per `avsybase` command. However, you can specify multiple database names separately in the command without using the `--sybdb` option.

The following example `avsybase` command performs a cumulative backup of two specified databases:

```
avsybase [--operation=backup] --brtype=cumulative
--flagfile=option_file_path Sybase_server_name/database_name1
Sybase_server_name/database_name2
```

In this example, the option file specified by `--flagfile=`*option_file_path* contains all the mandatory options, which are not included with the `avsybase` command.

For example, the following command performs a cumulative backup of the Sybase databases db1, db2, and db3 on the Sybase server SYBASE_SERVER1 in the sybase domain. The command stores the backup on the first Data Domain system that was added to the Avamar configuration:

```
avsybase --operation=backup --brtype=cumulative
--flagfile=/secure/options.txt --account=/sybase/host1
--bindir=/usr/local/avamar/bin --ocslibpath=/sybase/OCS-15_0/lib
```

```
--server=avamar-1.example.com --sybase=/sybase SYBASE_SERVER1/db1
SYBASE_SERVER1/db2 SYBASE_SERVER1/db3 --ddr --ddr-index=1
```

Log truncation not performed after cumulative backup

The Sybase plug-in does not truncate the logs of any databases after a cumulative backup.

Incremental backups with the avsybase command

An incremental backup backs up the transaction logs of one or more databases on a Sybase server, not the whole databases.

Incremental backups provides more information about Sybase incremental backups.

The Sybase plug-in automatically promotes an incremental (log) backup to a full (database) backup in the following cases. The user can specify whether incremental backups are promoted to full or cumulative backups, through either the Avamar Administrator graphical interface or the avsybase CLI command.

- A full backup of a Sybase database has not been performed previously.
- An incremental backup is not supported for a particular type of database.
- The Sybase plug-in cannot determine the type of database, for example, if the database is offline.

Incremental backup of Sybase server

You can perform an incremental backup with the `avsybase` command to back up the transaction logs of all the databases on the Sybase server.

The following example `avsybase` command performs an incremental backup of the entire Sybase server:

```
avsybase [--operation=backup] --brtype=incremental
--flagfile=option_file_path
```

The `--operation` option is optional for an incremental backup.

In this example, the option file specified by `--flagfile=`*`option_file_path`* contains all the mandatory options, which are not included with the `avsybase` command.

Perform the following actions for security reasons:

- Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.
- Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation.

If the other mandatory options are included with the `avsybase` command, the command for the incremental backup becomes as follows:

```
avsybase [--operation=backup] --brtype=incremental
--flagfile=option_file_path --account=domain/client
--bindir=Avamar_binary_dir --ocslibpath=OCS_libraries_path
--server=Avamar_server_name_or_IP_address
--sybase=Sybase_install_dir_path Sybase_server_name
```

For example, the following command performs an incremental backup of the Sybase server named SYBASE_SERVER1 in the sybase domain by backing up the transaction logs of all the databases. The command stores the backup on the Avamar server with the hostname avamar-1.example.com:

```
avsybase --operation=backup --brtype=incremental
--flagfile=/secure/options.txt --account=/sybase/host1
--bindir=/usr/local/avamar/bin --ocslibpath=/sybase/OCS-15_0/lib
--server=avamar-1.example.com --sybase=/sybase SYBASE_SERVER1
```

Incremental backup of specified databases

You can perform an incremental backup with the `avsybase` command to back up the transaction logs of one or more specified databases on the Sybase server.

Note: You can specify only one database name with the `--sybdb` option. You can use only one `--sybdb` option per `avsybase` command. However, to back up the logs of more than one database at a time, you can specify multiple database names separately in the command without using the `--sybdb` option.

The following example `avsybase` command performs an incremental backup of two specified databases:

```
avsybase [--operation=backup] --brtype=incremental
--flagfile=option_file_path Sybase_server_name/database_name1
Sybase_server_name/database_name2
```

In this example, the option file specified by `--flagfile=`*option_file_path* contains all the mandatory options, which are not included with the `avsybase` command.

The `--operation` option is optional for an incremental backup.

For example, the following command performs an incremental backup of the databases db1 and db2 on the Sybase server SYBASE_SERVER1 in the sybase domain and stores the backup on the first Data Domain system that was added to the Avamar configuration:

```
avsybase --operation=backup --brtype=incremental
--flagfile=/secure/options.txt --account=/sybase/host1
--bindir=/usr/local/avamar/bin --ocslibpath=/sybase/OCS-15_0/lib
--server=avamar-1.example.com --sybase=/sybase SYBASE_SERVER1/db1
SYBASE_SERVER1/db2 --ddr --ddr-index=1
```

Log truncation after incremental backup

By default, the Sybase plug-in software truncates the logs of regular databases (with database and log data stored in separate Sybase devices) after an incremental backup with the `avsybase` command.

The `avsybase` command option `--no-truncate` is supported for incremental backups only, not for full backups. When you specify the `--no-truncate` option, the Sybase `dump transaction` command uses the `no_truncate` option. The transaction logs are backed up, but they are not truncated.

NOTICE Use the `--no-truncate` option only in a disaster recovery situation, not for a regular incremental backup. If the Sybase data device has been lost, you can use the `--no-truncate` option with a regular database to back up the transaction logs without truncating them. Then you can proceed to restore the lost data.

The Sybase plug-in software supports the `--no-truncate` option for regular Sybase databases only. Non-regular databases do not support transaction log backups.

Incremental and cumulative sequences

The Sybase plug-in allows incremental and cumulative backups to be mixed in any order in a backup sequence. Generally, incremental backups should be used more than cumulative backups, because only incremental backups support point-in-time recovery. If cumulative backups are present in a backup sequence, the Sybase plug-in determines the optimal set of backups to use when performing a recovery. This process is automatic. If there are no cumulative backups in a backup sequence, only incremental backups are used in addition to the full backup.

Truncation backups with the avsybase command

A truncation backup truncates the logs of one or more databases on a Sybase server without performing a log backup.

Truncation backups provides more information about truncation backups.

truncate_only truncation backup

You can perform a truncate_only truncation backup or regular truncation backup with the `avsybase` command to truncate the log of a database without performing a log backup.

Use a truncate_only backup for a mixed log and data database where the data and transaction log are stored in the same file. You cannot perform log backups on this type of database but you must still truncate the log before the log becomes full.

The following example `avsybase` command performs a truncate_only backup for the specified database and then performs a full database backup by default:

```
avsybase [--operation=backup] --brtype=truncate
--flagfile=option_file_path Sybase_server_name/database_name
```

The `--operation` option is optional for a truncation backup. In this example, the option file specified by `--flagfile=`*option_file_path* contains all the mandatory options that are not included with the `avsybase` command.

Log truncation with truncate_only option followed by full backup describes the equivalent backup option for a truncate_only backup with the AUI.

The following example `avsybase` command performs a truncate_only backup for the specified database without performing a full database backup afterwards:

```
avsybase [--operation=backup] --brtype=truncate --no-backup
--flagfile=option_file_path Sybase_server_name/database_name
```

no_log truncation backup

You can perform a no_log truncation backup with the `avsybase` command to truncate the log of a database without performing a log backup and without logging the truncation. Use a no_log backup only as a last resort when the transaction log is full.

The following example `avsybase` command performs a no_log backup for the specified database and then performs a full database backup by default:

```
avsybase [--operation=backup] --brtype=truncate --no-log
--flagfile=option_file_path Sybase_server_name/database_name
```

The `--operation` option is optional for a truncation backup. In this example, the option file specified by `--flagfile=`*option_file_path* contains all the mandatory options that are not included with the `avsybase` command.

Log truncation with no_log option followed by full backup describes the equivalent backup option for a no_log backup with the AUI.

The following example `avsybase` command performs a no_log backup for the specified database without performing a full database backup afterwards:

```
avsybase [--operation=backup] --brtype=truncate --no-log --no-backup
--flagfile=option_file_path Sybase_server_name/database_name
```

Cumulative backups with the avsybase command

A cumulative backup backs up all pages changed since the last full backup.

Cumulative backups on page 21 provides more information on Sybase cumulative backups.

Restore and recovery with the avsybase command

You can initiate a restore of Sybase data by running the `avsybase` command (or `avsybase.exe` on Microsoft Windows) with the `--operation= restore` option and other supported options on the operating system command line.

Overview of CLI operations provides details about the `avsybase` command options for restores and how to launch a restore with the `avsybase` command.

Instead of setting command options on the `avsybase` command line, you can use an option file to set the options as described in Using an option file.

Perform the following actions for security reasons:

- Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.
- Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation.

A restore with the `avsybase` command can restore one or more specified databases or all the databases on a Sybase server.

A restore with the AUI can also restore one or more databases on a Sybase server.

Restore to same destination with the avsybase command

You can use the `avsybase` command to restore either of the following types of data to the same destination:

- One or more source databases to the same-named destination databases on the source Sybase server and host.
- A source Sybase server to the source host.

Restore of specified databases to same destination

You can use the `avsybase` command to restore one or more specified databases to the source Sybase server.

Note: You can specify only one database name with the `--sybdb` option. You can use only one `--sybdb` option per `avsybase` command. However, to restore more than one database at a time, you can specify multiple database names separately in the command without using the `--sybdb` option.

The following example `avsybase` command restores two specified databases:

```
avsybase --operation=restore --flagfile=option_file_path
Sybase_server_name/database_name1 Sybase_server_name/database_name2
```

In this example, the option file specified by `--flagfile=`*option_file_path* contains all the mandatory options, which are not included with the `avsybase` command.

Perform the following actions for security reasons:

- Encode the passwords that you specify with the `--password` and `--sybpassword` options. Password encoding provides details.
- Set the credential-related options `--id`, `--password`, `--syblogin`, and `--sybpassword` in an option file that is accessible only to the Sybase operating system user that performs the operation.

If the other mandatory options are included with the `avsybase` command line, the command to restore the databases becomes as follows:

```
avsybase --operation=restore --flagfile=option_file_path
--account=domain/client --bindir=Avamar_binary_dir
--ocslibpath=OCS_libraries_path
--server=Avamar_server_name_or_IP_address
--sybase=Sybase_install_dir_path Sybase_server_name/database_name1
Sybase_server_name/database_name2
```

For example, the following command restores the databases db1, db2, and db3 on the Sybase server SYBASE_SERVER1 in the sybase domain by connecting to the Avamar server with the hostname avamar-1.example.com:

```
avsybase --operation=restore --flagfile=/secure/options.txt
--account=/sybase/host1 --bindir=/usr/local/avamar/bin
--ocslibpath=/sybase/OCS-15_0/lib --server=avamar-1.example.com
--sybase=/sybase SYBASE_SERVER1/db1 SYBASE_SERVER1/db2
SYBASE_SERVER1/db3
```

Restore of server instance to same destination

You can use the `avsybase` command to restore a source Sybase server to the source host.

The following example `avsybase` command restores the whole Sybase server:

```
avsybase --operation=restore --flagfile=option_file_path
```

To restore the whole Sybase server, you must not specify any databases in the command.

In this example, the option file specified by `--flagfile=`*option_file_path* contains all the mandatory options, which are not included with the `avsybase` command.

For example, the following command restores the Sybase server instance, SYBASE_SERVER1, in the sybase domain. The Avamar server that stores the backup data (or just the metadata) has the hostname avamar-1.example.com:

```
avsybase --operation=restore --flagfile=/secure/options.txt
--account=/sybase/host1 --bindir=/usr/local/avamar/bin
--ocslibpath=/sybase/OCS-15_0/lib --server=avamar-1.example.com
--sybase=/sybase SYBASE_SERVER1
```

Relocated recovery with the avsybase command

You can use the `avsybase` command to perform a relocated recovery.

Any of the following conditions can be true when you use the `avsybase` command to perform a relocated recovery:

- The source database is restored to a destination database with a different name.
- The destination server is different than the source server.
- The destination host is different than the source host where the backup occurred.

Before you start a relocated recovery, ensure that the destination database and server already exist and the destination database has the same storage layout as the source database.

For a relocated recovery to a different Sybase host, you must run the recovery on the destination host.

The command options must specify the proper values for the relocated recovery:

- The `--account` option must specify the source host.
- The `--sybdb` option or separate database name in the command must specify the source database for a database restore.
- The `--syblogin` and `--sybpassword` options must specify the Sybase username and password of the destination server.
- The `--sybserver` option or separate server name in the command must specify the source server.
- The `--target` option must specify the destination server and (if required) destination database. The `--target` option must have a single value only.

  For a relocated recovery of multiple databases, you can only specify a single destination server name (not multiple database names) with the `--target` option. For a relocated recovery of a single database, you can specify the destination server name and destination database name with the `--target` option, for example, `--target=`*destination_server_name/destination_database_name*.

NOTICE Perform the following actions for security reasons:

- Encode the password that you specify with the `--sybpassword` option according to Password encoding.
- Set the `--syblogin` and `--sybpassword` options in an option file that is accessible only to the Sybase operating system user that performs the operation.

Note: If the destination server is on a different host, you must run the `avsybase` command on the destination host, but you do not need to add any command options to specify the destination host.

For example, the following command restores the Sybase database named db1 to the original Sybase server instance, SYBASE_SERVER1, but with a new database name, db2:

```
avsybase --operation=restore --flagfile=/secure/options.txt
--account=/sybase/host1 --bindir=/usr/local/avamar/bin
--ocslibpath=/sybase/OCS-15_0/lib --server=avamar-1.example.com
--sybase=/sybase SYBASE_SERVER1/db1 --target=SYBASE_SERVER1/db2
```

For example, the following command restores the Sybase database named db1 from the source Sybase server, SYBASE_SERVER1, to the same-named database on the destination Sybase server, SYBASE_SERVER2. Both servers are on the same host, host1:

```
avsybase --operation=restore --flagfile=/secure/options.txt
--account=/sybase/host1 --bindir=/usr/local/avamar/bin
--ocslibpath=/sybase/OCS-15_0/lib --server=avamar-1.example.com
--sybase=/sybase SYBASE_SERVER1/db1 --target=SYBASE_SERVER2/db1
```

To perform a relocated recovery of a whole Sybase server instance, omit all the source and destination database names from the `avsybase` command. For example, the following command restores the whole server, SYBASE_SERVER1, to a different-named server, SYBASE_SERVER2:

```
avsybase --operation=restore --flagfile=/secure/options.txt
--account=/sybase/host1 --bindir=/usr/local/avamar/bin
--ocslibpath=/sybase/OCS-15_0/lib --server=avamar-1.example.com
--sybase=/sybase SYBASE_SERVER1 --target=SYBASE_SERVER2
```

To perform a relocated recovery of multiple databases, you can specify only a server name with the `--target` option. For example, the following command restores the databases db1 and db2 from the Sybase server SYBASE_SERVER1 to the same-named databases on the destination Sybase server, SYBASE_SERVER2:

```
avsybase --operation=restore --flagfile=/secure/options.txt
--account=/sybase/host1 --bindir=/usr/local/avamar/bin
--ocslibpath=/sybase/OCS-15_0/lib --server=avamar-1.example.com
--sybase=/sybase SYBASE_SERVER1/db1 SYBASE_SERVER1/db2
--target=SYBASE_SERVER2
```

Point-in-time recovery with the avsybase command

You can run a point-in-time recovery with the `avsybase` command for one or more databases on a Sybase server.

To recover Sybase data to a specific point-in-time, use the `--labelnum` and `--pointintime` options with the `avsybase --operation=restore` command:

- Use the option `--labelnum=`*label_number* to specify the label number of the backup to use for the point-in-time recovery.
- Use the option `--label=`*name* to specify the backup label to use for the recovery.
- Use the option `--pointintime=`*date_and_time* to specify a timestamp in Avamar format, *yyyy-mm-dd hh:mm:ss*, enclosed in quotes, as the date and time to which the data will be recovered.

Command options provides details about the `avsybase` command options.

Determine the label number of the backup to use for the point-in-time recovery

To determine the label number of the backup to use for the point-in-time recovery, you can use the `avsybase --operation=list-times` command:

```
avsybase --operation=list-times
--account=domain/client --bindir=Avamar_binary_dir
--flagfile=option_file_path --id=Avamar_server_username
[--labelnum=label_number] --password=Avamar_server_password
[--pointintime=date_and_time]
--server=Avamar_server_name_or_IP_address
[--sybdb=Sybase_database_name | Sybase_server_name/database_name]
{--sybserver=Sybase_server_name | Sybase_server_name}
```

Note: The `list-times` operation creates a temporary file named `avsybase-tmp-`*time-pid* in the `var` directory, for example, `avsybase-tmp-1350320641-2134`. The file

> contains `avtar` login information, such as hfsadd, hfsport, id, and other sensitive data. If the `list-times` operation does not automatically remove the file, delete the file manually after the operation is complete.

The `avsybase --operation=list-times` command produces the following type of output:

```
avsybase Info <0000>: Labelnum: 208
avsybase Info <0000>: Server: BUWINISK
avsybase Info <0000>: Database: master
avsybase Info <0000>: f-0 old time: 1969-12-31 19:00:00 (0) new time: 2015-02-15 07:44:34
(1297773874)
avsybase Info <0000>: Database: model
avsybase Info <0000>: f-0 old time: 1969-12-31 19:00:00 (0) new time: 2015-02-15 07:44:50
(1297773890)
avsybase Info <0000>: Database: sybsystemdb
avsybase Info <0000>: f-0 old time: 1969-12-31 19:00:00 (0) new time: 2015-02-15 07:45:02
(1297773902)
avsybase Info <0000>: Database: sybsystemprocs
avsybase Info <0000>: f-0 old time: 1969-12-31 19:00:00 (0) new time: 2015-02-15 07:49:48
(1297774188)
avsybase Info <0000>: Database: sybmgmtdb
avsybase Info <0000>: f-0 old time: 1969-12-31 19:00:00 (0) new time: 2015-02-15 07:50:52
(1297774252)
avsybase Info <0000>: Database: owensk
avsybase Info <0000>: i-1 old time: 2013-02-15 07:50:53 (1297774253) new time: 2015-02-15
07:51:00 (1297774260)
avsybase Info <0000>: Labelnum: 201
avsybase Info <0000>: Server: BUWINISK
avsybase Info <0000>: Database: master
avsybase Info <0000>: f-0 old time: 1969-12-31 19:00:00 (0) new time: 2015-02-15 07:36:31
(1297773391)
```

You can use the *Sybase_server_name/ database_name* option with the command to obtain the old time and new time values for a specific database backup. Alternatively, you can use the `--labelnum=`*label_number* option with the command to obtain the old time and new time values for a specific backup label. You can also use the `--pointintime` option to obtain the old time and new time values for only the backups since a specific time, rather than for all the backups that exist on the Avamar server.

From the `avsybase --operation=list-times` command output, you can determine the backup label number that includes backups that contain the required point-in-time. For an incremental backup to qualify as a suitable backup for the point-in-time recovery, the old time listed for the incremental backup must not be later than the point-in-time for recovery and the point-in-time for recovery must be earlier than the new time for the incremental backup.

For example, the following command restores a database backup labeled 582 to its original location and a point-in-time of March 15, 2013 at 2:15:45 p.m.:

```
avsybase --operation=restore --flagfile=/secure/options.txt
--account=/sybase/host1 --bindir=/usr/local/avamar/bin
--labelnum=582 --ocslibpath=/sybase/OCS-15_0/lib
--pointintime="2013-03-15 14:15:45" --server=avamar-1.example.com
--sybase=/sybase SYBASE_SERVER1
```

To restore a database to a point-in-time between the last log (incremental) backup of one backup cycle (cycle #1) and the first full backup of the next backup cycle (cycle #2), you must perform a point-in-time recovery by using the first log backup created after the full backup of cycle #2. If such a log backup does not yet exist, you must run the log backup before you can perform the point-in-time recovery. The first log backup of cycle #2 contains all the transaction logs since the last log backup of cycle #1.

Unless you specify a point-in-time recovery when you restore a log backup, the Sybase plug-in automatically applies the log backup to the preceding full backup only.

For example, two consecutive backup cycles of database db1 contain the following sequence of backups:

1. Backup cycle #1:
   - Full backup, f-0, performed at time t1
   - Log backup, i-1, performed at time t2
   - Log backup, i-2, performed at time t3
2. Backup cycle #2:
   - Full backup, f-0, performed at time t4
   - Log backup, i-1, performed at time t5

You cannot use the Sybase plug-in to automatically restore to a point-in-time between t3 and t4. You must use special procedures. You also cannot restore to the point-in-time unless the backup i-1 of cycle #2 exists. (Create the i-1 backup of cycle #2 if it does not yet exist.)

Restoring the database db1 to a point-in-time between t3 and t4

About this task

You must complete the required steps to restore the database db1 to a point-in-time between times t3 and t4.

Procedure

1. Restore backups f-0, i-1, and i-2 of cycle #1 by using the `--leave-offline` option that leaves the database offline and ready for the application of additional logs. For example, use the following command:

   ```
   avsybase --operation=restore --flagfile=file_path server1/db1 --
   labelnum=label_number --leave-offline
   ```

   where:

   - *file_path* is the full path of the Sybase plug-in options file for the restore.
   - *label_number* is the label number of the backup that includes f-0, i-1, and i-2 of cycle #1.

2. Perform a point-in-time recovery by using backup i-1 of cycle #2 with the `--postfix` and `--postfix-only` options. For example, use the following command:

   ```
   avsybase --operation=restore --flagfile=file_path server1/db1 --
   labelnum=label_number --pointintime=date_and_time --postfix="i-1" --
   postfix-only
   ```

   where:

   - *file_path* is the full path of the Sybase plug-in options file for the recovery.
   - *label_number* is the label number of backup i-1 of cycle #2.
   - *date_and_time* is the timestamp in Avamar format, *yyyy-mm-dd hh:mm:ss*, enclosed in quotes, as the date and time to which the data will be recovered.

Database restore verification with the avsybase command

You can use the `avsybase` command option `--ase_verify=`*verification_level* to specify the level of backup data verification during a restore, where *verification_level* can be one of the following values:

- `full`—Specifies to use the Sybase `load` command option `with verify=full` to verify both the header information and rows structure for full verification of the backup.
- `header`—Specifies to use the Sybase `load` command option `with verify=header` to verify the page header information only.
- `verifyonly`—Specifies to use the Sybase `load` command option `with verify=verifyonly` to verify minimal header information without restoring the database. This verification level applies only to CLI restores with the `avsybase` command.

APPENDIX C

Troubleshooting

This appendix includes the following topics:

- Logging information 118
- Configuration checklist 119
- Common problems and solutions 122

Logging information

An Avamar Plug-in for Sybase ASE (Sybase plug-in) operation started in the Avamar Administrator or the AUI writes its logging information to a file named `MOD-wid-pidnum-sybase.log` in the `var` directory (for example, `/var/avamar`), where *wid* is a unique number assigned by the `avagent` process and *pidnum* is the plug-in ID number. The first `avtar` process started by the operation creates a separate log file named `progress-MOD-wid-pidnum-sybase.log`. The `avagent` process also creates a separate log file named `MOD-wid-pidnum-sybase.alg`.

The Sybase plug-in logging for a Sybase backup or restore is not enabled automatically. To enable this logging, perform either of the following actions:

- Specify the **Enable debugging messages** option in Avamar Administrator for GUI on-demand backups and scheduled backups, as described in Performing on-demand backups.
- Specify the `--logfile` option with the `avsybase` command, as described in Command Line Interface.

You must enable debugging of Sybase plug-in backups or restores by specifying the debugging option, as described in Plug-In Options or Command Line Interface. For example, you can specify the `--debug` option with the `avsybase` command.

When debugging is enabled, the XML text of backup or restore workorders can be viewed in the logs and on the screen:

- A backup workorder is an XML message with details about the backup, including a list of Sybase databases or transaction logs for backup and information that is required to connect to the Sybase server.
- A restore workorder is an XML message with details about the restore, including a list of Sybase databases for restore and information that is required to connect to the Sybase server.

The first tag in a backup workorder is always the `snapup` tag. The following example is an abbreviated sample workorder for a Sybase plug-in backup:

```
<snapup pid="Sybase" time="1286978619" ack="false" type="work"
   msgver="4" pidnum="1029" work="backup" ticket="encrypted_value"
   key="1029-Sybase-MOD-1286978619164" sync="bg"
   sessionid="adb91da37081ac3f546c593a63ad59e1963d1a74"
   cid="b08955af212057a7408f5aefb36ae79252372206" mid="10472/10472/32"
   wid="MOD-1286978619164">
<targets>SYBSERVER/db1
</targets>
   <directives>
   <flag type="string" value="bu-sybserver.com" name="hfsaddr" />
   <flag type="string" value="27000" name="hfsport" />
   <flag type="string" value="backuponly" name="id" />
   <flag type="string" value="backuponly1" name="ap" />
   <flag type="string" value="/clients/sybserver.com" name="path" />
   </directives>
   <catalog>
   <flag type="pulldown" pidnum="1029" value="full" name="brtype" />
   <flag type="string" pidnum="1029"
   value="/space2/sybase/OCS-15_0/lib" name="ocslibpath" />
   <flag type="string" pidnum="1029" value="/space2/sybase"
   name="sybase" />
   <flag type="string" pidnum="1029" value="sa" name="syblogin" />
   </catalog>
   <free-form />
   </snapup>
```

The meanings of tags and values in the preceding example are as follows:

- pid—The plug-in name (not a process ID)
- pidnum—The plug-in ID number (not a process ID). Each Avamar plug-in has a unique ID number.
- ticket—A security ticket that enables the `avtar` process started by the plug-in to connect to the Avamar server GSAN. The ticket is always printed in an encrypted form.
- cid—The client ID of the backup client.
- mid—The message ID of the workorder.
- wid—A unique number assigned to the workorder by the `avagent` process.
- targets—The data to be backed up. In this example, the database db1 on the Sybase server SYBSERVER is to be backed up.
- directives—The options that are common to both the `avtar` process and the Sybase plug-in process. During backups with the `avsybase` command you specify these options on the command line.
- catalog—The options that are specific to the Sybase plug-in. During backups with the `avsybase` command, you specify these options on the command line.

  NOTICE The catalog section in this example is abbreviated for display purposes.

Configuration checklist

The following sections describe common configuration problems and their solutions.

Determining the Sybase ASE server version

Complete the required steps to determine the Sybase ASE server version and bitness.

About this task

The Avamar Plug-in for Sybase supports the Sybase versions that are described in the *E-LAB Navigator* at https://elabnavigator.emc.com/eln/modernHomeDataProtection

Procedure

1. Log in to the Sybase server as the Sybase operating system user.
2. Run the appropriate Sybase operating system command:
   - On UNIX or Linux, run the following command:

     ```
     sybusr::-> dataserver -v
     ```

     The following type of output is displayed in the command shell:

     ```
     Adaptive Server Enterprise/15.5/EBF 17211 SMP/P/Sun_svr4/ OS 5.8/
     ase155/2391/32-bit/FBO/Mon Nov 9 20:54:05 2009
     ```
   - On Windows, run the following command:

     ```
     C:\Users\Administrator> sqlsrvr -v
     ```

     The following type of output is displayed in the command shell:

     ```
     Adaptive Server Enterprise/15.5/EBF 18374 SMP ESD#3/P/X64/
     Windows Server/asear155/2531/64-bit/OPT/Fri Jan 14 02:06:35
     ```

Bitness of Avamar Plug-in for Sybase ASE and Sybase

The bitness of the Sybase software, Avamar software, and operating system must match.

Ensure that you download the correct software package for the platform and version of Sybase. Preparing to install the Avamar Plug-in for Sybase provides more information.

To determine the bitness of the Sybase ASE server, use the procedure described in Determining the Sybase ASE server version on page 119.

Requirements for libsybase_avamar.so and libsybase_avamar.dll

The library file `libsybase_avamar.so` (on Linux or Solaris) or `libsybase_avamar.dll` (on Windows) implements the Sybase stream device that Avamar requires for successful backup and restore operations.

The following requirements apply to the library file:

- The file must provide read and execute access to the Sybase user.
- The file must be located in the correct directory:
  - On UNIX or Linux, create a symbolic link in the `$SYBASE/$SYBASE_ASE/lib` directory to point to the library file in the Avamar binary directory, which is `/usr/local/avamar/bin` on AIX or Linux and `/opt/AVMRclnt/bin` on HP-UX or Solaris SPARC.
  - On Windows, copy the library file to the `%SYBASE%\%SYBASE_ASE%\lib` directory from the Avamar binary directory, which is `C:\Program Files\avs\bin` by default.
- The file must have the same bitness as the Sybase backup server. For example, a 64-bit Sybase ASE server for Solaris SPARC has a 32-bit backup server.

  To verify the bitness of the Sybase backup server, run the appropriate Sybase operating system command:

  - On Windows, run the following command:

    ```
    C:\Users\Administrator> bcksrvr -v
    ```

    The following type of output appears in the command shell:

    ```
    Backup Server/15.5/EBF 18374 ESD#3/P/X64/Windows Server/
    asear155/3231/64-bit/OPT/Fri Jan 14 00:07:25 2013
    ```

  - On UNIX or Linux, run the following command:

    ```
    sybusr::-> backupserver -v
    ```

    The following type of output appears in the command shell:

    ```
    Backup Server/15.5/EBF 17335/P/Sun_svr4/OS 5.8/ase155/ 2895/32-
    bit/OPT/Mon Nov 9 12:34:17 2009
    ```

Verifying the bitness of the library file

You can run the `file` command on both the symbolic link and actual library file to verify the bitness of the library file. For example, you can use the following procedure to verify the bitness on 64-bit RedHat Linux.

Procedure

1. Run the `file` command on the symbolic link:

   ```
   sybusr@bu-niu:~> file $SYBASE/$SYBASE_ASE/lib/libsybase_avamar.so
   ```

   The following type of output appears in the command shell:

```
/bigspace/avamar/sybase/15.0.3/opt/sybase/ASE-15_0/lib/
libsybase_avamar.so: symbolic link to '/usr/local/avamar/lib/
libsybase_avamar.so'
```

2. Run the `file` command on the actual library file:

   ```
   sybusr@bu-niu:~> file /usr/local/avamar/lib/libsybase_avamar.so
   ```

   The following type of output appears in the command shell:

   ```
   /usr/local/avamar/lib/libsybase_avamar.so: ELF 64-bit LSB shared
   object, x86-64, version 1 (SYSV), dynamically linked, not stripped
   ```

Avamar client and Avamar Plug-in for Sybase ASE installation

For all supported platforms, install the Avamar client before installing the Avamar Plug-in for Sybase ASE.

The versions of the Avamar client and Avamar Plug-in for Sybase ASE must be the same. Preparing to install the Avamar Plug-in for Sybase provides more information.

The following table includes the methods and commands to verify the installation of the Avamar client and Avamar Plug-in for Sybase ASE.

Table 14 Commands to verify the Avamar client and Sybase plug-in installation

For this platform	Perform the following actions
HP-UX	Use the `swlist` command: **`swlist | grep -i avamar`**
IBM AIX	Use the `lslpp` command: **`lslpp [-R relocated_directory] -L all | grep -i avamar`** **Note:** You must use the `-R` *relocated_directory* option if the Avamar software is installed in a relocated directory.
Microsoft Windows	Use the **Add/Remove Programs** application in the Windows Control Panel (or the equivalent application on newer Windows versions) to verify that the following software is installed: • Avamar for Windows (This is the Avamar client) • Avamar Backup Plug-in for Sybase (This is the Sybase plug-in)
Red Hat or SUSE Linux	Use the `rpm` command: **`rpm -qa | grep -i avamar`**
Sun Solaris	Use the `pkginfo` command: **`pkginfo | grep -i avamar`**

Ensure that you meet the following requirements on a 64-bit operating system:

- The 64-bit Avamar client package is installed before the Avamar Plug-in for Sybase ASE.
- The appropriate Avamar Plug-in for Sybase ASE package is installed:
  - To support a 32-bit Sybase server on a 64-bit operating system, either the 32-bit or 64-bit Avamar Plug-in for Sybase ASE package is installed.

- To support a 64-bit Sybase server on the 64-bit operating system, the 64-bit Avamar Plug-in for Sybase ASE package is installed. Copy the `libsybase_avamar.dll` file to the `%SYBASE%\%SYBASE_ASE%\lib` directory.

Avamar client and Avamar Plug-in for Sybase registration

To back up or restore Sybase data with the Avamar Plug-in for Sybase ASE software, the Avamar client must be registered with the Avamar server.

If one of the following conditions occurs, the registration process might fail:

- The Avamar MCS plug-in catalog does not support the Avamar Plug-in for Sybase ASE version.
- An administrator disables the Avamar Plug-in for Sybase ASE.

If the Avamar client is successfully registered, the Avamar Administrator or the AUI lists it in the Sybase databases. In addition, the `avagent.log` file contains information that verifies a successful registration. By default, the `avagent.log` file is located in `/var/avamar` on UNIX or Linux and in `C:\Program Files\avs\var` on Windows.

For example, the following information is displayed in the `avagent.log` file:

```
****** Current MCS name 'avamar-1.example.com' ******
2015-3-1 15:08:37 avagent Info <7452>: Registration of client
/clients/example.avamar.emc with MCS avamar-1.example.com:28001 successful.
2015-3-1 15:08:37 avagent Info <5928>: Registration of plugin 1002 Sybase
successful.
2015-3-1 15:08:37 avagent Info <5928>: Registration of plugin 1001 Unix
successful.
2015-3-1 15:08:37 avagent Info <5619>: Registration of client and plugins
complete.
2015-3-1 15:08:37 avagent Info <7150>: first work request delayed for 180
seconds.
2015-3-1 15:11:37 avagent Info <7151>: first work request delay finished.
```

Disk space for the Avamar var directory

The Avamar `var` directory must have sufficient disk space for log and other files. Backups and restores will fail if the `var` directory does not have enough space. Check the free space in the Avamar `var` directory by using the applicable method for the system.

The following example shows output from the `df -h` command on a Red Hat Linux system:

```
Filesystem Size Used Avail Use% Mounted on
/dev/mapper/VolGroup00 985G 310G 625G 34% /
```

A minimum of 100 MB of disk space is recommended for `avsybase` log files and other files.

Common problems and solutions

The following topics describe the most common problems and solutions for the Sybase plug-in.

Backup or restore failure with Sybase ASE15.5

On a Sybase ASE 15.5 system with Sybase SDK installed, a Sybase plug-in backup or restore might fail with a fatal signal due to Sybase bug 589847. If the required Sybase patch is not installed on

the system, the fatal signal occurs at the end of the backup or restore when the software unloads the Sybase OCS libraries.

If you encounter this problem on a Sybase ASE 15.5 system with Sybase SDK installed, ensure that the Sybase SDK 15.5 ESD#11 or later is installed on the Sybase system.

"Cannot open file f_cache.dat" error

If the user that runs a Sybase plug-in backup or restore does not have the required permissions for the Avamar `var` directory, the Avamar `activity.log` file contains `avtar` errors similar to the following errors:

```
2015-3-1 17:30:27 avtar Error <5064>: Cannot open file "/usr/local/avamar/var/
f_cache.dat"
2015-3-1 17:30:27 avtar Info <5065>: Creating new cache file /usr/local/
avamar/var/f_cache.dat (2,884,128 bytes)
2015-3-1-12:00:27.36745 [avtar] setslice64 failed requested 32, but wrote -1
2015-3-1-12:00:27.36800 [avtar] cache::clear_cache: Caught exception
12:Cannot allocate memory
2015-3-1 17:30:27 avtar Error <5803>: Error writing 32-byte header to cache
file /usr/local/avamar/var/f_cache.dat. Possibly out of disk space
```

For a backup or restore with the `avsybase` command, the user that initiates the `avsybase` command requires read, write, and execution permissions for the `var` directory. You can specify the `var` directory with the `--vardir` option. By default, the `var` directory is `/var/avamar` on UNIX or Linux and `C:\Program Files\avs\var` on Windows.

For a scheduled backup, an on-demand backup or restore with the Avamar Administrator or the AUI, the root user (UNIX or Linux), or SYSTEM user (Windows) requires access to the `var` directory. Typically, the root or SYSTEM user already has read and write access to the Avamar `var` directory.

You might encounter the permissions problem with the first backup after a new installation. Perform at least one backup with the `avsybase` program to ensure that the necessary files are created and have the proper permissions.

Failure of list-times operation

Point-in-time recovery with the `avsybase` command describes how you can use the `avsybase --operation=list-times` command to determine an incremental backup to use for a point-in-time recovery.

If the `avsybase --operation=list-times` command fails for any reason to provide the required “old time” and “new time” information for an incremental, you can use the `avsybase --operation=print-headers --labelnum=`*label_number* command to obtain the old time and new time values of specific backups.

You can also use the `avsybase --operation=print-headers --labelnum=`*label_number* command if the “old time” and “new time” information displayed in the GUI is determined to be inaccurate for any reason.

Hidden backups

At the end of each database backup, the Sybase plug-in performs a final step to group the current backup with any previous backups that are required to restore the current database backup, creating a consolidated backup, described in Reviewing backups.

If a backup fails in that final consolidation step, the backup becomes a hidden backup, which cannot be searched for and restored by standard methods. At the moment of this backup failure, the Sybase plug-in displays the following error message:

```
Backup failed. If transaction log truncation was performed during an
incremental backup of any Sybase database with data and log on
separate devices, the transaction log is now at risk of being lost.
Perform an immediate full backup of the impacted database to protect
the data. Consult the Avamar Plug-in for Sybase documentation for
more information.
```

If the failure occurs during a log backup, the original log on disk might be deleted by the Sybase server as part of the backup process. In that case, perform an immediate full database backup after the backup failure.

When the next backup is performed after a backup failure that created a hidden backup, the Sybase plug-in recognizes that the last backup failed in the consolidation step and promotes an incremental backup to a full backup.

You cannot view a hidden backup in the Avamar Administrator or the AUI or by using the standard `avtar --backups` command.

To view information about hidden backups, you must use the `avtar --backups --incpartials` command:

avtar –backups –incpartials --server=*Avamar_server_name* --id=*Avamar_server_username* --password=*Avamar_server_password* --account=*Avamar_domain*

The following example shows the output from the command:

```
Date      Time     Seq Label                    Size   Plugin Working dir Targets
--------- -------- --- ----------------------- ------ ------ ----------- -----------------
2012-02-1 08:29:15 55  SYBASE-MOD-129312530260 2525K  Sybase /var/avamar BWINK/owesk/i-1
2012-02-1 08:29:10 54  SYBASE-MOD-129312530260 24489K Sybase /var/avamar BWINK/symgtdb/f-0
2012-02-1 08:29:01 52  SYBASE-MOD-129312530260 969K   Sybase /var/avamar BWINK/sysysdb/f-0
2012-02-1 08:28:57 51  SYBASE-MOD-129312530260 925K   Sybase /var/avamar BWINK/model/f-0
2012-02-1 08:28:53 50  SYBASE-MOD-129312530260 7973K  Sybase /var/avamar BWINK/master/f-0
```

Completing a database recovery of a hidden backup

In the output from the `avtar --backups --incpartials` command, the lines that start with an asterisk (`*`) indicate hidden backups. You can use the command output to determine the label number (in the Seq column) of a hidden backup that you want to restore.

About this task

Use the following procedure to complete a database recovery that involves the restore of a hidden backup named i-2:

Procedure

1. Restore the required full and incremental backups that completed successfully for the database by using the `--leave-offline` option that leaves the database offline and ready for the application of additional logs. For example, use the following command:

   avsybase --operation=restore --flagfile=*file_path* --labelnum=*label_number* --leave-offline

   where:

   - *file_path* is the full path of the Sybase plug-in options file for the restore.

- *label_number* is the label number of the backup that includes the required full and incremental backups.

2. Restore the hidden backup by using the `--incpartials`, `--postfix`, and `--postfix-only` options. For example, use the following command:

   ```
   avsybase --operation=restore --flagfile=file_path
   --labelnum=label_number --postfix="i-2" --postfix-only
   ```

   where:

   - *file_path* is the full path of the Sybase plug-in options file for the restore.
   - *label_number* is the label number of the hidden backup.

Failure of point-in-time recovery

If you cannot perform the required point-in-time recovery by using the backup metadata obtained through methods that are outlined in Point-in-time recovery with the avsybase command, you can specify a particular incremental backup and time for the point-in-time recovery by using the `--postfix=`*backup_name* option, as described in Restore and recovery options.

For example, to determine the backup to use for a point-in-time recovery, you can obtain "old time" and "new time" values for specific backups by using the `avsybase --operation=list-times` command, the Avamar Administrator, or the AUI. However, the "old time" and "new time" values that you obtain with these methods are not accurate and might vary from the actual list times by a few minutes. As a result, the backup that you decide to use for a point-in-time recovery, based on these methods, might not include the required point-in-time. This could lead to a failure of the point-in-time recovery.

As an alternative method, you can use the `avsybase --operation=print-headers` command to obtain the actual "old time" and "new time" values of backups and determine the log backup that contains a specific point-in-time. Then you can run a point-in-time recovery with the `avsybase` command and `--postfix=`*backup_name* option to recover to the point-in-time in the particular backup. For example, the `--postfix="i-3"` option specifies that the log backups are recovered up to the i-3 backup.

Failure of cumulative backups after enabling incremental dumps on the Sybase server

For cumulative backups, the Sybase server requires that each database must be configured by using the `allow incremental dumps` parameter with the `sp_dboption` command. The Sybase plug-in verifies that this parameter is set and will print a warning to the log if the parameter is not set. However, if a full backup of a database has been performed without this parameter set and the parameter is subsequently enabled, cumulative backups will fail due to the way cumulative backups are processed internally by Sybase.

After the `allow incremental dumps` parameter is set for a database, a full backup must performed on the database before any cumulative backups are performed.

Unable to browse databases with Avamar Administrator

The **Browse for Files, Folder, or Directories** option in Avamar Administrator does not display Sybase databases.

To investigate the browse problem, use the following command to browse the Sybase server:

```
avsybase --operation=browse --flagfile=option_file_path
```

Browse operations with the avsybase command provides details about this command.

If a browse problem also exists with the CLI, the output from the `avsybase` command will contain the following message:

```
avsybase Info <7908>: browse returning with 0 items
```

A browse problem can exist for one of the following reasons:

- An `avsybase` command option is missing or used incorrectly, for example, `--ocslibpath`, `--sybase`, `--syblogin`, or `--sybpassword`. Command Line Interface provides details on the supported command options.
- The Sybase server is not up and running.
- The `libsybase_avamar.x` library is not copied or linked properly.

Restore with parallelism greater than one fails

With a Sybase ASE release earlier than 15.0.2, a Sybase plug-in restore with a parallelism value greater than 1 might fail with the following error:

`Error from server server_name: Msg 937, Level 14, State 1 Database 'database_name' is unavailable. It is undergoing LOAD DATABASE.` This issue is due to a Sybase ASE defect (CR 467447) that is fixed in Sybase ASE release 15.0.2 ESD 1 and later. To work around this issue, perform one of the following tasks:

- Ensure that the parallelism value is set to 1 during a Sybase restore.
- Upgrade the Sybase ASE server to release 15.0.2 ESD 1 or later.

Using Sybase ASE release 16.0 Service Pack 2 with 32-bit backup servers

By default, the 16.0 Service Pack 2 release of Sybase ASE supports 64-bit backup servers on Solaris SPARC and AIX platforms. If you wish to use the 32-bit backup server, you must configure Sybase appropriately. See the Sybase Adaptive Server Enterprise configuration guide for instructions.

Additionally, you must also guarantee that Sybase loads the 32 bit versions of the Avamar plug-in shared library. During installation of the Avamar plug-in, a symbolic link named `libsybase_avamar.so` is created in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`. If this link points to the 64-bit version of the library file, `libsybase_avamar64.so`, do the following:

1. Shut down the Sybase backup server.
2. Modify the symbolic link named `libsybase_avamar.so` in the Sybase ASE library directory, `$SYBASE/$SYBASE_ASE/lib`, so that it points to the 32-bit version of the Avamar Plug-in for Sybase library file, *Avamar_installation_dir*`/lib/libsybase_avamar.so`.
3. Restart the Sybase backup server.

GLOSSARY

A

active/active application cluster Type of cluster configuration where a group of linked virtual or physical hosts with shared storage, called cluster nodes, can access the database data from multiple nodes concurrently.

active/passive cluster Type of cluster configuration where the data server runs on the active physical node and other nodes are passive nodes that maintain data updates and wait to take over if the active node fails.

Adaptive Server Enterprise (ASE) server Only type of Sybase database server that the Avamar Plug-in for Sybase software supports for backups and restores.

administrator Person who normally installs, configures, and maintains software on network computers, and who adds users and defines user privileges.

Avamar Administrator A graphical management console software application that is used to remotely administer an Avamar system from a supported Windows or Linux client computer.

Avamar client A computer or workstation that runs Avamar software and accesses the Avamar server over a network connection. Avamar client software comprises a *client agent* and one or more *plug-ins*.

Avamar Plug-in for Sybase Avamar software that resides on a Sybase server and works with Avamar server software to back up and restore Sybase databases and transaction logs.

See also Sybase plug-in

Avamar server The server component of the Avamar client/server system. Avamar server is a fault-tolerant, high-availability system that efficiently stores the backups from all protected clients. It also provides essential processes and services required for data restores, client access, and remote system administration. Avamar server runs as a distributed application across multiple networked storage nodes.

B

backup (noun)

1. Duplicate of database or application data or an entire computer system stored separately from the original, which can be used to recover the original if it is lost or damaged.
2. Operation that saves data to backup storage for use during a recovery.

back up (verb) Make backup copies of data to the Avamar server for later restore in the case of data loss.

backup browsing Type of browsing that generates a list of objects to be backed up.

backup cycle Full backup and all the subsequent incremental (transaction log) backups that are dependent on that backup.

backup group See "group."

backup level See "level."

C

CLI backup On-demand backup that a user initiates through the operating system command line interface (CLI).

See also on-demand backup

client Sybase database server whose data can be backed up and restored with the Avamar Plug-in for Sybase software. This is equivalent to the "Avamar client."

client agent A platform-specific software process that runs on the client and communicates with the Management Console Server (MCS) and with any plug-ins installed on that client.

client registration The process of establishing an identity with the Avamar server. When Avamar recognizes the client, it assigns a unique client ID (CID), which it passes back to the client during *client activation*.

See also registration

CLI restore Restore that a user initiates through the operating system command line interface.

cluster nodes A group of linked virtual or physical hosts with shared storage in a cluster, which work together and represent themselves as a single host called a virtual cluster host.

D

database

1. A collection of data arranged for ease and speed of update, search, and retrieval by computer software.
2. An instance of a database management system (DBMS), which in a simple case might be a single file containing many records, each of which contains the same set of fields.

database administrator (DBA) Person who is typically responsible for installing, configuring, and maintaining database systems.

Data Domain system Disk-based deduplication appliances and gateways that provide data protection and disaster recovery (DR) in the enterprise environment.

dataset A policy that defines a set of files, directories, and file systems for each supported platform that are included or excluded in backups across a group of clients. A dataset is a persistent and reusable Avamar policy that can be named and attached to multiple groups.

DD Boost API that Avamar clients use to access a Data Domain system. The DD Boost API is installed automatically on the client computer when you install the Avamar client. It is also installed automatically on the Avamar server when you install Avamar.

disaster recovery

1. Restore and recovery of business operations and data in the event of hardware failure or software corruption.
2. Recovery of the entire Sybase server to the original host and a remote host.

DNS Domain Name Server. A dynamic and distributed directory service for assigning domain names to specific IP addresses.

domain A feature in Avamar Administrator that is used to organize large numbers of clients into named areas of control and management.

F

full backup Type of backup that backs up all the data in one or more Sybase databases, including the transaction logs for the databases.

G

granular restore Restore of one or more databases of a Sybase server.

group A level of organization in Avamar Administrator for one or more Avamar clients. All clients in an Avamar group use the same group policies, which include the *dataset*, *schedule*, and *retention policy*.

group policy In Avamar Administration, a group policy is defined as a *dataset*, *schedule*, and *retention policy* for all clients in an Avamar group.

GUI backup On-demand backup that a user initiates through the Avamar Administrator GUI.

See also on-demand backup

GUI restore Restore that a user initiates through the Avamar Administrator GUI.

H

high-availability system System of multiple computers configured as cluster nodes on a network that ensures the application services continue despite a hardware or software failure.

host Computer on a network.

I

incremental backup Type of backup that backs up Sybase transaction logs only, not the Sybase databases.

See also transaction log backup

internationalization (I18N) Adaptation of software to accept the input and output of the linguistic characters and data formats for various locales.

L

level Backup configuration option that specifies how much data is saved during a scheduled or manual backup:

- A full backup backs up one or more Sybase databases and the associated transaction logs.
- An incremental backup backs up only Sybase transaction logs.

log backup See "transaction log backup."

M

manual backup See "on-demand backup."

MCS Management console server. The server subsystem that provides centralized administration (scheduling, monitoring, and management) for the Avamar server. The MCS also runs the server-side processes used by *Avamar Administrator*.

multiple session backup or restore Method of backing up or restoring multiple Sybase databases simultaneously.

multi-streaming Feature that enables a single backup or restore to use multiple sessions (data stream) to the Avamar server of Data Domain system. Multi-streaming enables you to improve backup and restore performance in most environments.

O

on-demand backup Type of backup that a user initiates from the client, also known as a manual or unscheduled backup.

online backup Backup of database objects performed while the corresponding database or instance is running and available to users. Also known as a hot backup.

P

pathname Set of instructions to the operating system for accessing a file:

- An absolute pathname indicates how to find a file by starting from the root directory and working down the directory tree.
- A relative pathname indicates how to find a file by starting from the current location.

physical host Node or host that forms part of a cluster.

plug-in Avamar client software that recognizes a particular kind of data resident on that client.

point-in-time restore Restore of a backup to a specific point-in-time.

policy A set of rules for client backups that can be named and applied to multiple groups. Groups have dataset, schedule, and retention policies.

R

recovery Application of transaction logs to restored data to make the data consistent with a given point-in-time.

See also restore

registration The process of establishing an identity with the Avamar server. When Avamar recognizes the client, it assigns a unique client ID (CID), which it passes back to the client during *client activation*.

See also client registration

relocated restore Restore of data from a backup to a different location on the same host or an alternate host.

restore To retrieve data from a backup and pass the data to a Sybase database.

See also recovery

restore browsing Type of browsing that searches the previously created backups for specific backups to be restored.

retention The time setting to automatically delete backups on an Avamar server. Retention can be set to permanent for backups that should not be deleted from an Avamar server. Retention is a persistent and reusable Avamar policy that can be named and attached to multiple groups.

S

schedule The ability to control the frequency and the start and end time each day for backups of clients in a group. A schedule is a persistent and reusable Avamar policy that can be named and attached to multiple groups.

scheduled backup Type of backup that is configured to start automatically through an Avamar policy for a group of one or more Avamar clients.

shared storage Storage that is connected to multiple nodes in the cluster.

Sybase plug-in Alternative term for the Avamar Plug-in for Sybase software.

See also Avamar Plug-in for Sybase

Sybase server Sybase ASE server, which is the only type of Sybase database server that the Avamar Plug-in for Sybase software supports for backups and restores.

T

target database Database that the Avamar server backs up as a safeguard against data loss.

transaction log System table in each Sybase database that keeps track of the changes to the database.

transaction log backup Backup of the transaction log of a Sybase database, not the entire database.

See also incremental backup

U

unscheduled backup See "on-demand backup."

V

virtual cluster client Client that is not permanently bound to one physical host but is managed by a cluster manager. It is also referred to as a logical cluster client or a virtual client.