Installation Guide **PUBLIC**

SAP Adaptive Server Enterprise 16.0 SP02
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Installation Guide for Windows

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1 Conventions

These style and syntax conventions are used in SAP Adaptive Server Enterprise (SAP ASE) documentation.

- In a sample window display, commands to be entered exactly as shown appear in:

  ```
  this font
  ```

- In a sample window display, words that you should replace with the appropriate value for your installation are shown in:

  ```
  <this font>
  ```

- In the regular text of this document, the names of files and directories appear in this font: `/usr/u/home_dir`.
- The names of programs, utilities, procedures, and commands appear in this font: `sqlupgrade`.
- Commands for both the C shell and the Bourne shell are provided, when they differ. The initialization file for the C shell is called `.cshrc`. The initialization file for the Bourne shell is called `.profile`. If you are using a different shell, such as the Korn shell, refer to your shell-specific documentation for the correct command syntax.

Table 1: SQL Syntax Conventions

Key	Definition
`command`	Command names, command option names, utility names, utility flags, and other keywords are in a bold san-serif font.
`<variable >`	Variables, or words that stand for values that you fill in, are in *italic*.
`{ }`	Curly braces indicate that you choose at least one of the enclosed options. Do not include braces in your option.
`[ ]`	Brackets mean choosing one or more of the enclosed options is optional. Do not include brackets in your option.
`( )`	() are to be typed as part of the command.
`|`	The vertical bar means you can select only one of the options shown.
`,`	The comma means you can choose as many of the options shown as you like, separating your choices with commas, which are typed as part of the command.

2 Installation Task Overview

To successfully install and configure SAP ASE, use the configuration guide along with this installation guide.

The SAP ASE installation guide explains how to unload the SAP ASE software from the distribution media to your hard disk, and perform the minimal set of additional tasks so that you can start SAP ASE on your machine.

The configuration guide provides instructions for:

- Reconfiguring certain attributes of your existing SAP ASE, Backup Server™, and XP Server™ to meet your specific needs.
- Creating network connections.
- Configuring optional functionality.
- Performing operating system administrative tasks.
- Working with system administration issues that are relevant to SAP ASE running on UNIX platforms. This manual supplements the *System Administration Guide* and the *Performance and Tuning Series*.

2.1 Download SAP ASE Software

The SAP ASE installation and update packages are available on the SAP Software Download Center.

Procedure

1. To download the installation media for SAP ASE, go to:

   SAP Software Download Center.
2. Go to the following:

Option	Description
For a major release	*Installations and Upgrades* > *A-Z Index* > *Installations and Upgrades - A* > *SAP ADAPTIVE SERVER ENTERPRISE* > *SAP ASE 16.0* > *Installation* Select your operating system, then choose the installation package from the bottom of the page.
For support packages an patches	*Support Packages and Patches* > *A-Z Index* > *Support Packages and Patches - A* > *SAP ADAPTIVE SERVER ENTERPRISE* > *SAP ASE 16.0* > *SAP ASE SERVER 16.0* Select your operating system, then choose the support package or patch from the bottom of the page.

2.2 Installation Workflows

Workflows define a complete path for planning, installing, and upgrading.

Whether you plan to install or upgrade SAP ASE, identify the components and options to install or upgrade, and obtain a license.

Installing SAP ASE for the First Time

1. Plan your installation and review system requirements.
2. Install SAP ASE.
3. Perform postinstallation tasks.

Upgrading to a New Version of SAP ASE

1. Determine your upgrade eligibility, plan your installation, and review system requirements.
2. Install the new SAP ASE.
3. Run the `preupgrade` utility to test upgrade eligibility.
4. Upgrade SAP ASE.
5. Perform postinstallation (postupgrade) tasks.

Uninstalling SAP ASE

See Uninstalling SAP ASE [page 54].

3 SAP ASE Components

SAP ASE is based on a client/server model, communicating with its clients over the network via the Tabular Data Stream™ (TDS) protocol. Each client process may execute on one machine and communicate with a database server on the same or a different machine.

SAP ASE runs as an application on top of an operating system. The hardware that the operating system runs on is completely transparent to SAP ASE, which sees only the operating system's user interfaces. To enhance performance on multiprocessor systems, configure multiple processes (engines).

SAP ASE is divided into a DBMS component and a kernel component. The kernel component uses the operating system services for process creation and manipulation, device and file processing, and interprocess communication. The DBMS component manages SQL statement processing, accesses data in a database, and manages different types of server resources.

3.1 SAP ASE Editions

Analyze your system and scalability requirements to determine which edition of SAP ASE is appropriate for your enterprise.

- Enterprise edition – has no limit on scalability and supports all of the options that can be purchased or licensed separately.
- Small business edition – has limited scalability, and supports a limited set of the options that are purchased or licensed separately.
- Developer edition – has limited scalability and includes many of the options that are included in the enterprise edition.
- Express edtion - (Linux Power and x86-64 platforms) has limited scalability, memory, and database size. Includes many of the options that are included in the enterprise edition.

See the *SySAM Users Guide* for information about unlocking editions and optional features.

The SAP ASE installer automatically installs a SySAM license server if you choose the full installation option or enter a served license when prompted for the SySAM license key. You can also install the license server using the installer's custom installation option. See the *SySAM Users Guide* to generate licenses.

3.1.1 Determining the Edition You Have

If you already use SAP ASE, use the `sp_lmconfig` system procedure to identify the version.

Procedure

Enter:

```
sp_lmconfig 'edition'
```

SAP ASE returns a value of `EE`, `SE`, or `DE` based on the edition that is currently running. See the *Reference Manual* for more information about `sp_lmconfig`.

3.2 SAP ASE Options

SAP offers various optional features for SAP ASE, such as data compression, partitions, and encrypted columns.

Option	Description
Database MemScale	The MemScale option is a licensed option introduced in SAP ASE version 16.0 SP02 as part of the SQL Server Administration group. This option includes various features, including: • Compiled queries (simplified native access plans) • Transactional memory • Latch-free indexes If you have a license for the SAP ASE In Memory Database feature, MemScale includes this functionality. Enable all of the features included in the ASE_MEMSCALE license by turning the `sp_config enable mem scale` option on. **Note** When you enable an individual feature that is part of the MemScale option, the license manager verifies that you have the ASE_MEMSCALE license, and that you have enabled the `enable mem scale` configuration option.
In Memory Database	Fully integrated within SAP ASE, this option equips applications with instant responsiveness and very high throughput. SAP ASE in-memory databases have zero-disk footprint and reside completely in memory.
Always-on	Enables enterprises to recover from adverse events by restoring operations as quickly as possible and recovering as much information as possible, reducing the return to

Option	Description
	operations and mitigating data loss. Integrated "zero data loss" support is via synchronous replication for custom applications, using sync rep technology. See *HADR Users Guide* for information.
Workload Analyzer	Enables the capture, analysis, and replay of a production workload non-disruptively and enables the user to utilize the captured workload to diagnose problems and understand and manage configuration changes proactively. See *Workload Analyzer Users Guide* for information.
Security and Directory Services	Provides lightweight directory services and network-based authentication and encryption using SSL and Kerberos.
Encrypted Columns	Increases security parameters and allows for addition of datatypes.
Partitions	Enables semantic partitioning for table row data.
Active Messaging	Provides a cost-effective solution for eliminating delays in information as it flows through the enterprise, providing immediate insight into business events as they occur.
Compression	Enables compression for regular and large object data, which uses less storage space for the same amount of data, reduces cache memory consumption, and improves performance due to lower I/O demands.
Tivoli Storage Manager (TSM)	Enables the database to back up and restore operations to IBM Tivoli Storage Manager.

SAP ASE editions and optional features are unlocked by SySAM licenses. See the *SySAM Users Guide*.

To install any of these optional features to an existing SAP ASE installation, use the same steps as you used to install SAP ASE.

3.3 Managing SAP ASE with SAP ASE Cockpit

SAP ASE cockpit provides a single, comprehensive, Web-administration console for real-time performance, status, and availability monitoring of large-scale SAP enterprise servers.

SAP ASE version 16.0 SP02 uses SAP ASE cockpit to managing and monitor SAP ASE servers. SAP ASE cockpit includes historical monitoring, threshold-based alerts and notifications, alert-based script execution, and intelligent tools for identifying performance and usage trends. SAP ASE cockpit replaces the SAP Control Center for SAP ASE. Unlike SAP Control Center, SAP ASE cockpit is designed as an onboard management solution, where you install the cockpit on each SAP ASE host to manage and monitor that system.

SAP ASE cockpit is installed as part of an SAP ASE server installation. The SAP ASE cockpit agent continually broadcasts information about the server to subscribing clients via the SAP ASE cockpit framework. Messages from the Web client pass through the SAP ASE cockpit framework to the agent, which in turn, processes the request on the SAP ASE server.

SAP ASE cockpit is licensed free of charge to customers who have a paid license for SAP ASE.

For detailed SAP ASE cockpit information, see the*SAP Adaptive Server Enterprise Cockpit* documentation, which includes SAP ASE configuration procedures, user assistance, and troubleshooting information.

Related Information

Starting and Stopping SAP ASE Cockpit [page 64]
SAP ASE Upgrades [page 65]
Installing SAP ASE in GUI Mode [page 38]
Configuration Options [page 46]

3.3.1 System Requirements for SAP ASE Cockpit

Make sure your system meets all requirements before you install SAP ASE cockpit. If you install SAP ASE cockpit on the same host as a managed server, the host must meet the requirements outlined here in addition to the requirements for the managed server.

SAP recommends the following minimum specifications for the SAP ASE cockpit server machine:

- 4GB of RAM

Server Platform	Operating System
x86 32-bit and 64-bit	• Windows 7 • Windows 8 • Windows Server 2008 R2 • Windows Server 2012 • Red Hat Enterprise Linux 5, 6 • SUSE Linux Enterprise 10, 11 SP1
Solaris-64 (x64)	Solaris 10, 11
Solaris SPARC 64-bit	Solaris 10, 11
PowerPC	• IBM AIX 6.1, 7.1 • Red Hat Enterprise Linux 5, 6 • SUSE Linux Enterprise 10, 11 SP1
Itanium 2	HP-UX 11i31

OS Patch Requirements for Java

Before you run the installer, install any patches for your operating system that are required for SAP Java Runtime Environment (JRE) 7.1. (You need not install or upgrade the JRE; it is included in the installer.)

For SAP JRE requirements, see SAP Note 1367498: SAP JVM Installation Prerequisites.

For Windows, install the patch:

Microsoft Visual C++ 2005 Service Pack 1 Redistributable Package ATL Security Update, available at http://www.microsoft.com/en-us/download/details.aspx?id=14431.

Browser Requirements

SAP ASE cockpit supports these browsers with Flash Player 10 or greater:

- Internet Explorer 9 or greater
- Firefox 3.6 or greater

3.3.2 Network Ports for SAP ASE Cockpit

Check the ports used on the installation machine for conflicts with the ports SAP ASE cockpit uses.

SAP SE cockpit uses TCP ports for a variety of services. If another application is using one of the ports listed here, the cockpit may fail to start, or its services might not work properly. You can use `cockpit.sh --info` ports to list ports currently in use (by any application or server).

Table 2: Network Port Requirements for SAP ASE Cockpit

Port Name	Default Port Number	Required?	Description
RMI	4992	Yes	Server port used for RMI protocol access.
HTTP	4282	Yes	Server port used for HTTP Web access to the server. All HTTP traffic is redirected to the secure HTTPS channel.
HTTPS	4283	Yes	Server port used for secure HTTPS Web access to the server. All HTTP traffic is redirected to the secure HTTPS channel.
Database	3638	Yes	Server repository database port; used by several services.
Messaging Service	4993	Yes	Server messaging port.
Tds	4998	No	Server port used for Tabular Data Stream (TDS) protocol access.
Jini Http	9092	No	Jini HTTP port for Jini discovery services.
Jini Rmid	9095	No	Jini RMID server port for Jini discovery services.
Ldap	389	No	LDAP discovery service adapter port.

3.4 Client Components and Utilities

There are several components that you can install onto a PC client to support the SAP ASE server, which are downloaded from the SAP Community Network. The previous PC-Client installer is replaced in SAP ASE 16.0 SP02 by separately downloadable installers that provide many of the same components.

SDK for SAP ASE

The SAP Community Network provides both 32-bit and 64-bit SDK for SAP ASE images. Download the software development kit (SDK) that matches your version of Windows (32- or 64-bit).

Included in the SDK are:

Product	Description
Open Client	In addition to Open Client (Client Library, `dblib`), the following, which are all installed into the `OCS-16_0` directory: • ESQL/C • ESQL/COBOL • XA • SAP ASE extension module for Python • SAP ASE database driver for Perl • SAP ASE extension module for PHP
DataAccess	Installed into the `DataAccess64` directories: • ODBC – a driver used that connects to SAP ASE from ODBC-based applications. • ADO.NET – a provider used that connects to SAP ASE from .NET-based applications.
Java Runtime Environment (JRE)	Installed into the `shared` directory, JRE is a runtime Java virtual machine used to execute Java-based programs, such as Interactive SQL, and which is shared by several other components.
Language Modules	Installed into the `locales` directory. Provides system messages and date/time formats.
Character Sets	Installed into the `charsets` directory. Provides character sets that are available for use with SAP ASE.

Product	Description
jConnect	Installed into the `jConnect-16_0` directory, jConnect provides a Java Database Connectivity (JDBC) driver for SAP ASE.
Interactive SQL	Installed into the `DBISQL-16_0` directory, Interactive SQL is a GUI tool that allows you to execute SQL statements, build scripts, and display data from SAP ASE.
`jutils-3_0` utilities	`ribo` is an SAP ASE utility program that is used to trace TDS traffic between a client program and SAP ASE.

For download and installation instructions, see 2093510 – How to Download Free SDK for SAP ASE [Windows, Linux, Unix].

PowerDesigner Physical Modeler

The modeler is available in the ASE SAP 16.0 SP02 section of the SAP Service Marketplace, and is installed from its own image.

To install the modeler, download and extract the 16.0 SP02 file, then run `setup.exe` in your root directory.

SySAM Utilities

Available from the SAP ASE installation image and installed in the SAP ASE top level directory. You can also access these utilities by searching for **`sysam 2.4`** in the SAP Service Marketplace.

See the *SySAM Users Guide*.

MS-Cluster Server Admin Utility

Install this component from the SAP ASE Windows 64 image.

QP-Tune

Run this components from the SAP ASE server image directly.

Related Information

Installation Directory Contents and Layout [page 28]

3.5 Running SAP ASE on VMware vSphere 5.0

You can install and run SAP ASE on VMware vSphere 5.0.

Refer to the VMware Compatibility Guide to view hardware supported by VMware. The performance of SAP ASE may depend on the vSphere configurations for the hardware you choose. Refer to VMware published best practices for running vSphere on the hardware.

4 Requirements

Before installing SAP ASE version 16.0 SP02, install the latest patches and system requirements. Do not use a patch that is earlier than the version suggested for your operating system. Use the patch recommended by the operating system vendor, even if it supersedes the patch listed.

For information about platform support for SAP ASE and other products, see SAP Product Availability Matrix (PAM).

The following information is published regularly on PAM:

- Release type (for example, standard release, early adoption release, or custom development project release)
- Planned availability
- Maintenance durations
- Upgrade paths
- Platform availability, including database platforms and operating systems

Identify the Windows Service Pack level from *Control Panel* > *System*, or by running the `winver` command.

4.1 Windows System Requirements

Verify that your system is up-to-date. Do not use a patch that is earlier than the version suggested for your operating system. Use the patch recommended by the operating system vendor, even if it supersedes the patch listed.

Table 3: Windows X64 System Requirements

Operating System	Hardware	Supported Protocols
Windows 2008 R2 Service Pack 1	• Intel Xeon EM64T • AMD Opteron	• TCP • Named pipes (not supported for LDAP server connections)
Windows 2012 R2		

Windows X64 memory requirements are:

- Minimum RAM for SAP ASE – 127MB
- Minimum RAM per additional user, with default stack size, packet size, and user log cache size – 83KB
- Default user stack size – 73KB

The value of minimum RAM per additional user depends on the connection needs. See the *System Administration Guide* for information about configuring memory.

Use the following patches:

Operating System	Required Patches
Windows 2008 R2 SP1	• Microsoft Visual C++ 2008 Service Pack 1 Redistributable Package • Microsoft Visual Studio 2010 Service Pack 1 and KB2565057
Windows 2012 R2	• Microsoft Visual C++ 2008 Service Pack 1 Redistributable Package
Windows 7 SP1	• Microsoft Visual C++ 2008 Service Pack 1 Redistributable Package • Microsoft Visual Studio 2010 Service Pack 1 and KB2565057 • Windows 6.1-KB917607-x64

- Microsoft Visual C++ 2010 Service Pack 1 Redistributable Package and KB2565063
- Microsoft Visual Studio 2010 Service Pack 1 and KB2565057
- (On Windows 7) Windows 6.1-KB917607-x64

Missing any of the above patches causes the installer to fail, and you see this message: `Missing DLL MSVCR100.dll during Install.`

Table 4: Windows Disk Space Requirements

Product	Windows 64
SAP ASE typical installation	500MB
Default databases created during installation, with SAP ASE using a 4K page size	306MB
Total	656MB

> **Note**
>
> To use ODBC, OLE DB, or ADO.NET drivers, you must install Microsoft .NET Framework 2.0 Service Pack 1, or the installer displays errors, and the drivers do not function. Confirm that .NET Framework 2.0 Service Pack 1 is listed as a currently installed program in *Control Panel* > *Add or Remove Programs*.

4.2 SAP Java Runtime Environment Requirements

Ensure that you have the required operating system patches for the SAP Java Runtime Environment (JRE). The SAP ASE installer includes JRE versions 7.1 and 8.

For JRE requirements, see 1367498 – SAP JVM installation prerequisites. Log in with your SAP support account to view the SAP note.

4.3 System Requirements for Clients

Check the system requirements for the machine on which you plan to install the client applications and utilities.

Type	Requirement
Product	Programs and utilities installed onto the PC client
Hardware	X86 or X64 system running Xeon or AMD 1.5 GHz or faster
Operating system	Windows Server 2012, Windows 2008 R2 SP1, Windows 2008 x86, Windows 8, Windows 7 SP1
Suggested minimum RAM	512 MB

Note

If you are using ODBC or ADO.NET drivers, make sure that Microsoft .NET Framework 2.0 Service Pack 1 is installed on your Windows machine. To confirm that it is installed, select *Control Panel* > *Add or Remove Programs* and verify that .NET Framework appears in the list of currently installed programs.

5 Planning Your SAP ASE Installation

Before you install or upgrade, prepare your environment.

Procedure

- Identify the components and options to install or upgrade.
- Obtain a license.

  > **Note**
  >
  > If you are using a served license, you must install the SySAM license server version 2.4 or later.

- Make sure your system meets all requirements for your installation scenario and planned use.

5.1 SAP ASE Release Bulletin

The release bulletin contains last-minute information about installing and upgrading SAP ASE software.

The latest release bulletins are available at the SAP ASE Help Portal.

5.2 OpenSSL Versions

Ensure that you are using the (Common Security Infrastructure) CSI libraries and OpenSSL versions required for your security needs.

Multiple versions of CSI are provided to prevent issues where multiple products are installed in the same `$SYBASE` location. Providing multiple versions of CSI libraries allows different products to find corresponding libraries at runtime.

As SAP ASE is dynamically linked with the CSI libraries, the dependent CSI libraries can be listed using the `ldd` command:

```
$ ldd dataserver | grep csi
```

```
libsybcsi_core210.so => /remote/releases/linuxamd/rel16_ebfs/sp02_pl4/OCS-16_0/
lib3p64/libsybcsi_core210.so (0x00007ffff7da1000)
libsybcsi_profiler210.so => /remote/releases/linuxamd/rel16_ebfs/sp02_pl4/
OCS-16_0/lib3p64/libsybcsi_profiler210.so (0x00007ffff7b9d000)
libsybcsi_propertiesconfig210.so => /remote/releases/linuxamd/rel16_ebfs/
sp02_pl4/OCS-16_0/lib3p64/libsybcsi_propertiesconfig210.so (0x00007ffff7998000)
```

```
libsybcsi_openssl210.so => /remote/releases/linuxamd/rel16_ebfs/sp02_pl4/
OCS-16_0/lib3p64/libsybcsi_openssl210.so (0x00007ffff74e9000)
```

Your `ldd` output shows that `core210` is being used.

The core version of the OpenSSL can be determined by using the string command:

```
$ strings /remote/releases/linuxamd/rel16_ebfs/sp02_pl4/OCS-16_0/lib3p64/
libsybcsi_openssl210.so | grep ^"OpenSSL 1"
```

This shows that `OpenSSL 1.0.2h-fips` is being used.

```
OpenSSL 1.0.2h-fips  3 May 2016
```

In general, delete older CSI libraries that do not meet your security requirements after performing the following:

- Upgrade older versions of installed SAP products which have an indirect dependency through OCS to older CSI libraries.

  > **Note**
  >
  > OCS refers Open Client and Open Server, or SAP Open Server and SDK for SAP ASE.

- Any existing application that is statically linked to older OCS libraries should be recompiled and relinked with the latest OCS libraries provided with the installed version.

5.3 Licensing Your Software

When you purchase an SAP product, you receive an e-mail message that tells you how to generate SQP ASE license keys on the Web. The e-mail message also provides specific product and licensing information. Use this information when you generate your licenses.

Context

Before installing your product, choose a SySAM license model, and obtain license files from the SAP Service Marketplace (SMP).

> **Note**
>
> If you purchased your product from Sybase or an authorized Sybase reseller and have not been migrated to SAP Service Marketplace (SMP), go to the Sybase Product Download Center (SPDC) to generate license keys.

Procedure

1. Choose a SySAM license model.

License Model	Description
Unserved license model	Licenses are obtained directly from the license file. If you are using an unserved license, save the license file to the machine on which you install the product.
Served license model	A license server manages the allocation of licenses among multiple machines.

> **Note**
>
> The SAP ASE installer automatically installs a SySAM license server if you choose the full installation option or enter a served license when prompted for the SySAM license key. You can also install the license server using the installer's custom installation option. See the *SySAM Users Guide* to generate licenses.

2. For the served license model, decide whether to use an existing or new license server.

   The license server and your product installation need not share the same machine, operating system, or architecture.

> **Note**
>
> There can be only one instance of a SySAM license server running on a given machine. To set up a SySAM 2 license server on a machine that is already running a SySAM 1.0 license server, follow the migration instructions in the *SySAM Users Guide*. A migrated license server can serve licenses for both SySAM 1.0 and SySAM 2-enabled products.

3. Get your host IDs.

   When you generate licenses, you must specify the host ID of the machine where the licenses will be deployed.

   - For unserved licenses – the host ID of the machine where the product will run. If you are running a product with per-CPU or per-chip licensing that supports SySAM sub-capacity and want to run the product in a virtualized environment, see *SySAM Users Guide* > *SySAM Sub-capacity Licensing*.
   - For served licenses – the host ID of the machine where the license server will run.

4. Before installing your product, obtain license files from SMP or from SPDC using the access information in your welcome e-mail message.

   If you plan to use sub-capacity licensing, see the *SySAM Users Guide* for information on how to configure using the `sysamcap` utility.

   Use `sp_lmconfig` to configure and show license management-related information in SAP ASE. See `sp_lmconfig` in *Reference Manual: Procedures*.

5.3.1 Product Licensing

Available licenses are determined by product edition. Optional features are sold and licensed separately.

Whether you install a licensed or evaluation edition, you have 30-day access to all features and options. To use an option beyond the 30-day evaluation period, you must purchase and install an appropriate SAP Software Asset Management (SySAM) license.

The e-mail message you receive when you purchase an SAP product provides specific product and licensing information. Before installing and configuring any product edition, know which features you are licensed to use.

5.3.2 SySAM License Server

If you choose to use the served licensed model, make sure you have installed the required SySAM license server version.

The license server is a lightweight application that serves licenses to products running on any operating system.

A license server can run on a low-end machine or a machine with spare cycles. For example, a license server running on a Solaris UltraSparc-60 serving 100 different licenses to 200 product instances, used 50MB of memory, 5 minutes of CPU time per week, and 100MB of disk space per year.

SAP ASE 16.0 SP02 requires SySAM 2.3 or later. To determine the current license server version, use the `sysam version` command.

> **Note**
>
> This command is not available in SySAM version 2.0 and earlier.

Download the latest SySAM version from https://support.sap.com/patches.

SAP ASE 16.0 SP02 and SySAM 2.3 use FlexNet Publisher version 11.11.

To check the version of FlexNet Publisher used by your license server, examine the license server log or execute the `lmgrd -v` command.

The license server installer is available in the `<ASE_installer>\sysam_setup` directory.

> **Note**
>
> You cannot start the license server until there is at least one served license saved to the `licenses` directory on the license server host machine.

5.3.3 Determining Host IDs

When you generate licenses at SMP, you must specify the host ID of the machine where the licenses will be deployed.

Context

- For unserved licenses, specify the host ID of the machine where the product will run. If you are running a product with per-CPU or per-CHIP licensing that supports SySAM sub-capacity, and you want to run the product in a virtualized environment, see *SySAM Sub-capacity Licensing* in the *SySAM Users Guide* for information about determining the host ID for unserved licenses.
- For served licenses, specify the host ID of the machine where the license server will run.

SMP remembers the host information so that you can select the same license server when generating additional licenses.

To determine the host ID of the machine, run the `lmutil` utility from a terminal window or the Windows command prompt. For example:

```
lmutil lmhostid
```

> **Note**
>
> You can download the `lmutil` utility from either:
>
> - The SAP ASE installer image, under the `sysam_utilities` directory; or,
> - The Flexera Software Web site .

You can also determine the host ID using native operating system commands. See the Frequently Asked Questions topic "What is my Host ID?" (requires login)

.

5.3.3.1 Determining Host IDs for Machines with Multiple Network Adapters

On some platforms, the host ID is derived from the network adapter address.

Context

If the machine where your product is installed or where the license server is hosted has multiple network adapters, running `lmutil lmhostid` returns one host ID for each network adapter, and returns output similar to this:

```
The FLEXlm host ID of this machine
is ""0013023c8251 0015c507ea90""
Only use ONE from the list of hostids.
```

It is important that you:

- Choose only one host ID to enter during license generation.
- Use the value associated with the primary wired Ethernet adapter.
- Do not use values associated with internal loopback or virtual adapters.

If you cannot determine the host ID using the `lmutil lmhostid` output, use the native operating system commands to get additional details.

5.3.3.2 Using Alternate Host IDs on Windows

If your Windows machine does not have a network adapter, SySAM allows you to use an alternate host ID based on the hard disk serial number.

Procedure

1. At a Windows command prompt on the machine where you will deploy your license, enter:

   ```
   lmutil lmhostid -vsn
   ```

   This returns output similar to:

   ```
   The FLEXlm host ID of this machine is "DISK_SERIAL_NUM=70ba7a9d"
   ```

2. Use the complete output (`DISK_SERIAL_NUM=70ba7a9d`) for the host ID value requested during license generation.

5.3.4 Generating Licenses

Before you generate licenses, gather the necessary information and complete these tasks.

Table 5: Information Needed Before Generating Licenses

Required Information or Action	Served Licenses	Unserved Licenses	Description
License deployment model	X	X	Decide whether to use a served or unserved license deployment model. Typically, this is a company-wide decision that is made only once. Therefore, this is one of the most important things to determine before license generation.
Product machine host ID		X	Determine the host ID of the machine, or machine partition where the product will run.
License server – download and install	X		Download and install the SySAM license server before you generate the product's licenses, and before you install the product.
License server host ID	X		Determine the host ID of the machine where the license server will run.
License server host name	X		Determine the host name of the machine where the license server will run.
License server TCP/IP port numbers	X		Determine the two port numbers on which the license server will listen for license requests.

5.3.4.1 Generating a SySAM License

Generate a license key for SAP products that use SySAM 2-based licenses. Refer to the e-mail message you received for information about your account.

Context

When you purchase SySAM 2-enabled SAP products, you must generate, download, and deploy SySAM product licenses.

- Before you generate your license, you need the host ID and host name of the server where you plan to install SAP ASE.
- Served licenses require a license server. If you do not plan to use an existing license server, you must install one before you install SAP ASE.

Procedure

1. Log into the SAP Support Portal.
2. Go to the License Keys page.
3. Follow the online instructions.
4. Save your license to a temporary location on the local file system. You must save the license file with a `.lic` extension.

5.3.5 Knowing the Product License Type

SAP sells products under different license types, which entitle the customer to different rights of use. For example, whether a product is entitled to be used in production, or standby, or development and test environments.

The license type determines the quantity of licenses required; dictating, for example, whether a license is required for each machine; or for each CPU, or CPU chip; or per terabyte of storage.

For example, a product purchased under the CPU License (CP) type requires one license per CPU on the machine, partition, or resource set where it will run. The same product purchased under the Server License (SR) type requires a single license for the machine, partition, or resource set.

Your account can have the same product licensed under multiple license types. Make sure you select the correct license type when you generate your SySAM license file.

When you generate licenses, each license type is presented on the License Information screen in bold font. For example:

```
License Type: CPU License (CP)
```

5.3.5.1 Optional Feature Licenses

Some SAP ASE applications are offered as base products with optional features that require a separate license.

Customers can mix license types. For example, customers can order SAP ASE under the Server License (SR) license type and order an optional feature (for example, High Availability or Enhanced Full Text Search) under the CPU License (CP) type.

Optional features are licensed only with the base product of the same product edition. For example, if you order SAP ASE, you cannot use a Small Business Edition optional feature license with the Enterprise Edition base product. In addition, the entitled use of the license types must be compatible; for example, both types should allow use in a production environment.

5.3.5.2 SySAM Licensing Checkout

If SAP ASE is licensed using a per-processor license type, it checks out a license quantity equal to the number of processors, or, if insufficient licenses are available, allows a 30-day grace period.

If the number of processors is dynamically increased while running and the software cannot check out additional licenses, the software permits a 30-day grace period. If sufficient licenses are not made available within the grace period, the software shuts down. Decreasing the number of processors that the software can use while it is running does not reduce the required license quantity. You must restart the SAP ASE server on the correct number of processors.

See the *SySAM Users Guide*.

5.3.5.3 Sub-capacity Licensing

Sub-capacity licensing allows you to license a subset of the CPUs available on a physical machine using the SySAM sub-capacity license functionality.

Virtualization Technology Support

Platform information is not listed in the following table, as SAP ASE support for subcapacity on these virtualization technologies is not confined to specified version. As long as a release of SAP ASE is certified on a version of an operating system, it supports subcapacity for that platform. For example, SAP ASE version 16.0 SP02 is certified on AIX 6.1 and 7.1. LPAR on AIX 6.1 and 7.1 is covered.

Table 6: SySAM Virtualization Sub-Capacity Compatibility

Vendor	Product	Virtualization Type
HP	nPar	Physical partition
	vPar	Virtual partition
	Integrity Virtual Machines with Resource Manager	Virtual machine
	Secure Resource Partitions	OS containers
IBM	LPAR	Virtual partition
	dLPAR	Virtual partition
Sun	Dynamic System Domains	Physical partition
	Solaris Containers/Zones with Solaris Resource Manager	Virtual partition
	Sun Logical Domain (LDOM)	Virtual partition

Vendor	Product	Virtualization Type
Intel, AMD	VMWare ESX Server Guest O/S: Windows **Note** VMWare ESX Server excludes VMWare Workstation, and VMWare Server.	Virtual machine
	VMWare ESX Server Guest OS: Linux, Sun Solaris x64	Virtual machine
	Xen, KVM, DomainU: Windows **Note** Xen excludes Sun Solaris x64.	Virtual machine
	Xen, KVM, DomainU: Linux	Virtual machine
	Hyper-V	Virtual machine

Enabling SAP ASE Sub-Capacity Licensing

If you purchased your product from Sybase or an authorized reseller, you must have a sub-capacity licensing agreement with SAP or Sybase before you can enable sub-capacity licensing.

> **Note**
>
> Keep your license server up-to-date.Although the installation media includes a copy of the most recent SySAM license server, we recommend that you periodically check for updates at https://support.sap.com/patches.

When using SySAM sub-capacity licensing, set the SYBASE_SAM_CAPACITY environment variable before installing, or copy in the license key after installation.

5.4 Installation Directory Contents and Layout

SAP ASE includes server components that are installed into specific directories.

Product	Description
SAP ASE	Installed into the `ASE-16_0/bin` directory:

Product	Description
	• SAP ASE – the database server. • Backup Server – an application based on SAP Open Server that manages all database backup (`dump`) and restore (`load`) operations. • XP Server – an Open Server application that manages and executes extended stored procedures (ESPs) from within SAP ASE. • Job Scheduler – provides a job scheduler for SAP ASE. Job Scheduler components are located in `ASE-16_0\jobscheduler\`.
Connectivity	Installed into the `OCS-16_0` directory: • Open Client (`<Client Library>`, `<dblib>`) • ESQL/C • ESQL/COBOL • XA Installed into the `DataAccess` and `DataAccess64` directories: • ODBC (Windows, Solaris SPARC, Solaris x64, Linux Power, HP-UX Itanium, IBM AIX) – a driver used to connect to SAP ASE from ODBC-based applications. • ADO.NET (Windows only) – a provider used to connect to SAP ASE from .NET based applications.
Shared Directory	The `Shared` directory contains components and libraries that are shared by several other components. In earlier versions, this directory was named `Shared-1_0`. • Java Runtime Environment (JRE) – is a runtime Java virtual machine used to execute Java-based programs, such as SAP ASE Cockpit. SAP ASE includes the JRE. In typical installations, by default, the JRE is fully installed. In custom installations, if you select a component for installation that requires the JRE, the JRE is also automatically selected. It is located in the `Shared\SAPJRE-7_0 *` directory.
SAP ASE Cockpit	SAP ASE cockpit logs and utilities – files related to the Web-based tool for monitoring the status and availability of SAP ASE servers. They are installed into the `%SYBASE%\COCKPIT-4` directory.
Language Modules	Installed into the `locales` directory. Provides system messages and date/time formats.
Character Sets	Installed into the `charsets` directory. Provides character sets that are available for use with SAP ASE.
Collation Sequences	Installed into the `collate` directory. Provides the collation sequences that are available for use with SAP ASE.
SySAM	Installed into the `SYSAM-2_0` directory. Provides asset management of SAP ASE servers and optional features.

Product	Description
Web Services	Installed into the `WS-16_0` directory. An optional product that provides access to SAP ASE using HTTP/SOAP and WSDL.
Interactive SQL	Interactive SQL is a GUI tool that allows you to execute SQL statements, build scripts, and display data from SAP ASE. It is installed into the `DBISQL-16_0` directory.
`jutils-3_0` Utilities	`ribo` is a tool used to trace TDS traffic between a client program and SAP ASE.
SAP jConnect for JDBC	Installed into the `jConnect-16_0` directory. Provides a Java Database Connectivity (JDBC) driver for SAP ASE.
OData Server	Installed into the `ODATA-16_0` directory when you install OData Server as part of a full or custom installation, OData (Open Data Protocol) enables data services over RESTful HTTP, allowing you to perform operations through URIs (Universal Resource Identifiers) to access and modify information.

Note

We strongly recommend that you install the ECDA DirectConnect option or MainframeConnect DirectConnect for z/OS, including DirectConnect Manager, into its own directory.

Related Information

Client Components and Utilities [page 13]

5.5 Preparing to Install SAP ASE

Before you start the installer, prepare your system.

Procedure

1. Back up your current system.
2. Verify that you have `Winrar` or `Winzip` installed on your machine so the installer can decompress files during the installation process.
3. Ensure that the account used to start the server has read and write permissions for the directory in which you are installing the server. You may need to create nonadministrative logins to install the server into personal directories.

4. Review the SySAM licensing procedures, and plan your server configuration using the configuration guide for your platform.
5. Create an account that has administrative privileges with which to perform all installation and device-creation tasks. This user account could be "sap" or any other user name, as long as you use the same name so that the installer and products have permission to read and write the files.

   This user must have permission privileges from the top (or root) of the disk partition or operating system directory, down to the specific physical device or operating system file. Maintain consistent ownership and privileges for all files and directories. A single user—the system administrator with read, write, and execute permissions—should perform all installation, upgrade, and setup tasks.

   If you are installing SAP ASE on more than one computer, create the "sap" user account on each machine.

   The user should be a member of the Windows system-defined "Administrators" group so that the installation process can create the entries in the service control manager for all the processes.
6. Log in to the machine as "sap".
7. Decide where to install SAP ASE:
   - Make sure there is sufficient disk space and temporary directory space available.
   - Ensure there are no spaces in the path name of the directory.

Related Information

Preupgrade Tasks [page 72]
Reenabling Auditing [page 93]
Upgrade Java in the Database [page 69]

5.5.1 VMware vSphere 5.0

Configure your VM before you install SAP ASE.

5.5.1.1 BIOS Settings

Change some BIOS settings before you install and run SAP ASE on the VMware guest operating system.

Enable or Disable	Settings
Enable	• Virtualization technology • Turbo mode • Hardware-based virtualization support • Hyperthreading (workload dependent) • Wake on LAN (required for VMware vSphere Distributed Power Management)

Enable or Disable	Settings
	• Execute Disable (required for vMotion and DRS) • Static high performance and balanced policies

Disable	• Node interleaving
	• C1E halt state
	• Power saving
	• Any unused features, such as:
	  ○ Video BIOS shadowable
	  ○ Video RAM cacheable
	  ○ On-board audio
	  ○ On-board modem
	  ○ On-board serial ports
	  ○ On-board parallel ports
	  ○ On-board game port
	  ○ Floppy disk drive
	  ○ CD-ROM drive
	  ○ USB port

5.5.1.2 The Guest Operating System

Disable unnecessary foreground and background processes.

> **Note**
>
> You should install the VMware Tools on the guest operating system. VMware Tools includes utilities that enhance the performance of the virtual machine's guest operating system and improve management of the virtual machine.

5.5.1.3 CPU Considerations

To improve performance for latency-sensitive applications running on guest operating systems, schedule all virtual machines on the same Non-Uniform Memory Access (NUMA) node. Allocate all virtual memory from the local physical memory attached to that NUMA node.

When you schedule processor affinity for vCPUs on a specific NUMA node, use the vSphere Client to set the processor affinity:

- To change the VM settings for processor affinity – in the vSphere Client, select *Resources* > *Advanced CPU* > *Scheduling Affinity*.
- To change the virtual machine settings for memory affinity – in the vSphere Client, select *Resources* > *Advanced Memory* > *NUMA Memory Affinity*.

5.5.1.3.1 Virtual CPUs

In a production environment, verify that the total virtual CPU resources for the virtual machines do not exceed the CPU capacity of the host machine. That is, the total number of CPUs for the virtual machine cannot exceed the CPU capacity of the physical machine.

You should undercommit CPU resources on the host machine; if the host CPU capacity is overloaded, the virtual database performance may degrade. Never overcommit CPU resources in a production environment.

A reasonable upper limit for CPU resources is about 80 percent of consumption. Consider creating an alert to be sent to the virtual infrastructure administrator when CPU resources reach 90 percent of consumption.

Multithreaded applications like SAP ASE may benefit from using multiple CPUs. To ensure that the physical CPUs are not oversubscribed, limit the total number of virtual CPUs to the total number of physical CPUs minus 1.

Configuring virtual SAP ASE with excess virtual CPUs can impose a small resource requirement on vSphere because unused virtual CPUs continue to consume timer interrupts. vSphere coschedules virtual CPUs and attempts to run the virtual CPUs in parallel whenever possible. Unused virtual CPUs impose scheduling constraints on the used virtual CPUs and might degrade performance.

5.5.1.3.2 CPU Scheduling

You may see improved performance if you ensure that the virtual machine remains scheduled when the vCPU is idle.

To determine whether a scheduled virtual machine is providing optimal database performance:

- Set `monitor_control.halt_desched` to false.
- vCenter (the VMware management utility) should normally monitor performance. However, periodically use the vSphere Client to collect additional statistical measurements, or use the `esxtop` or `resxtop` vSphere command line utilities.
  `esxtop` provides performance insight concerning CPU resource contention. Database administrators should work with their VMware administrator to interpret `esxtop` statistics.

Generally, the system is overloaded if the load average listed on the first line of the `esxtop` CPU Panel is greater than or equal to the number of physical processors on the system.

The "`usage percentage of physical CPUs`" on the PCPU line may indicate an overloaded system. A reasonable upper limit in production environments is 80 percent usage; 90 percent usage should be used as an alert to the VMware administrator that the CPUs are approaching an overloaded condition. However, make decisions concerning usage levels based on the criticality of the database you are virtualizing and the desired load percentage.

The critical statistics are:

Statistic	Description
%RUN	The percentage of total time the processes on the VMkernel are running on the processor; a high value for `%RUN` does not necessarily indicate that the virtual machine is resource constrained.

Statistic	Description
%RDY	The percentage of time the processes on the VMkernel are ready to run, but are not scheduled to a core. A process on the VMKernel in a run queue is waiting for the CPU scheduler to let it run on a PCPU. A value of greater than 10 percent may indicate resource contention.
%CSTP	The percentage of time the processes on the VMkernel are stopped to allow other virtual CPUs on the virtual machine to catch up (this is the unscheduled state). A value greater than 5 percent typically indicates that the virtual machine's workload is not balanced.

5.5.1.4 Memory Considerations

Configure the value for virtual memory equal to the value of the SAP ASE server `max memory` configuration parameter.

When consolidating SAP ASE instances, vSphere allows you to share memory across virtual machines that may be running the same operating systems, applications, or components. In this situation, vSphere uses a proprietary transparent page-sharing technique to reclaim memory, and allows databases to run with less virtual memory than physical memory (see your VSphere documentation). You can use transparent page sharing for consolidation purposes in a test or development environment. However, never overcommit on production environments.

5.5.1.5 Resource Management

vSphere advanced workload management features, such as VMware vMotion and VMware DRS, free SAP ASE from the resource limitations of a single host.

You can use vMotion to move running SAP ASE virtual machines from one physical vSphere to another to balance available resources. DRS can dynamically allocate and balance computing resources by continuously monitoring the resource pools associated with virtual machines in a VMware cluster.

You can safely overcommit virtual resources for SAP ASE in nonproduction environments where predictable and consistent performance is not critical.

5.5.1.6 Hardware-Assisted Memory Virtualization

Some processors address memory management unit (MMU) virtualization overhead by providing hardware support that virtualizes the MMU.

Without hardware-assisted MMU virtualization, VMware ESX maintains "shadow page tables" that directly map a guest's virtual memory to a host's physical memory address.

These shadow page tables are maintained for the processor, and are kept synchronized with the guest page tables. This allows ordinary memory references to execute without additional overhead, since the hardware translation lookaside buffer (TLB) caches direct guest virtual memory to a host's physical memory address

translations that are read from shadow page tables. However, extra work is required to maintain the shadow page tables.

Hardware assistance eliminates software memory virtualization overhead. In particular, it eliminates the overhead required to keep shadow page tables synchronized with guest page tables, although the TLB miss latency is significantly higher than without hardware assistance. This means that hardware assistance provides workload benefits that depend primarily on the memory virtualization overhead that is caused when using software memory virtualization.

If a workload involves a small amount of page table activity (for example, process creation, mapping the memory, or context switches), software virtualization does not cause significant overhead. However, workloads that include a large amount of page table activity, such as workloads from a database, are likely to benefit from hardware assistance.

Allow vSphere to choose the virtual machine monitor based on the combination of CPU and guest operating system. In most cases, you see better performance by using hardware-assisted virtualization rather than by using shadow page tables.

5.5.1.7 Linux Huge Pages

Linux huge pages can increase the efficiency of translation lookaside buffer access, improving database performance.

Since using huge pages at the operating system level allows for approximately a 10 percent improvement in SAP ASE performance; consider using them in any 64-bit production system. In larger memory configurations (that is, configurations where SAP ASE uses more than 256 GB RAM), huge pages are required to start an SAP ASE server.

Adaptive Server versions 15.0.3 and later support huge pages. By default, huge page support is enabled in VMware ESX versions 3.5 and later.

5.5.1.8 Networking

Consider using VMXNET 3 virtual network interface cards (NICs) for your SAP ASE running on Windows virtual machines.

VMXNET3 supports an adaptive interrupt coalescing algorithm, which helps drive high throughputs to virtual machines using multiple vCPUs with parallelized workloads (for example, multiple threads). For this reason, you may see a performance improvement when using VMXNET3 NICs running on the Windows guest operating system compared to using the default E1000 adapter.

5.5.1.9 Storage

vSphere uses datastores to store virtual disks. Datastores provide an abstraction of the storage layer that hides the physical attributes of the storage devices from the virtual machines.

VMware administrators can create a single datastore to use as a consolidated pool of storage, or they can create multiple datastores to isolate various application workloads.

If you use a traditional storage area network (SAN) deployment, you should create a dedicated datastore, which allows database administrators to define individual service-level guarantees for different applications, similar to provisioning dedicated logical unit numbers (LUNs) for physical disks. You can use vSphere features such as VMware vSphere Storage I/O Control, Storage vMotion, and Storage DRS to prioritize and manage datastore workloads.

You should use dedicated datastores for production SAP ASE servers, and consolidated datastores for less demanding test or development environments.

6 Installing SAP ASE

Install SAP ASE using your chosen method.

Prerequisites

Complete installation planning tasks.

To run the installer from a UNC (uniform naming convention) file path or mapped drive on Windows 8 and Windows 2012 Server, copy the installer and and run it in the local drive.

Context

> **Note**
>
> If you are installing the SAP ASE Always-On option for high-availability disaster recovery, you must have `sudo` permission on your system to perform the installation. See *Database Always-On Users Guide* for complete instructions on installing and configuring this licensed option.

Procedure

1. Choose an installation method:
   - GUI mode (recommended)
   - Console mode
   - Silent mode (response file)
2. Follow the instructions for your chosen method.
3. Perform postinstallation steps.

6.1 Installing SAP ASE in GUI Mode

Use GUI mode to install SAP ASE and related products.

Prerequisites

Shut down all programs before running the installer.

Context

The installer creates the target directory (if it does not yet exist) and installs the selected components into that directory.

> **Note**
>
> Version 16.0 included new major versions of SAP ASE and many supporting components. Installing version 16.0 and higher into the same directory with existing products should not impact the existing products.
>
> Install SAP ASE version 16.0 SP02 into the existing Sybase/SAP directory.
>
> SAP ASE version 15.5 and later uses InstallAnywhere for its installation, while versions earlier than 15.5 and other products use InstallShield Multiplatform. Do not use both installers to install products into the same directory, as this creates files to be installed incorrectly and overwritten without warning.

At the end of the installation, verify that the product has installed correctly. You may also need to perform additional configuration procedures.

Procedure

1. Insert the installation media in the appropriate drive, or download and extract the SAP ASE installation image from the SAP Service Marketplace (SMP).
2. Launch the `setup` program.

   If the installer does not launch automatically, double-click `setup.exe` or go to *Start* > *Run* and enter the following, where `<x>` is your CD or DVD drive:

   ```
   <x>:\setup.exe
   ```

   If there is not enough disk space in the temporary disk space directory, set the environment variable TMP to `<directory_name>` before running the installer again, where `<directory_name>` is where the installation program writes the temporary installation files. When specifying the `<directory_name>`, include its full path.

> **Note**
>
> You cannot run the installer from a Universal Naming Convention (UNC) path (such as `\\<host>\<share_name>`). Map a network share to a drive instead.

3. If you are prompted with a language selection list, specify the appropriate language.
4. On the Introduction screen, click *Next*.
5. In the Choose Install Folder screen, the default directory or enter a new path to specify where to install SAP ASE, then click *Next*.

> **Note**
>
> Do not use the following when specifying the installation path:
> - Double-byte characters
> - Single- or double-quote characters
> - A space character anywhere in the path.
>
> The installer does not recognize these, and displays an error.

If you see *Choose Update Installation*, this means that there is an older version of SAP ASE in the directory you specified for the installation, and you need to perform an upgrade rather than a new installation. See SAP ASE Upgrades [page 65].

6. In the Choose Install Set screen, select the type of installation:

Option	Description
Typical	(Default) Recommended for most users, this option installs a default set of components, including: the SAP ASE Cockpit .
Typical SAP ASE, database always-on option	Installs all the necessary files for an SAP ASE with integrated "zero data loss" database always-on support via synchronous replication for custom applications, using sync rep technology. Using this requires the always-on license option. **Note** Before you continue with your installation of SAP ASE with the database always-on option, see the *Database Always-On Users Guide* for complete information on installation, configuration, and use.
Full	Installs every SAP ASE component, including all the supported language modules, as well as the SAP ASE Cockpit . This option, as with the *Typical SAP ASE, database always-on option* installation, also includes the database always-on option.
Customize	Lets you select the components to install. Some components are automatically installed if they are required to run your selected components.

7. Select the software license type:
   - *Install licensed copy of SAP Adaptive Server Enterprise*

- *Install Free Developer Edition of SAP Adaptive Server Enterprise*
- *Evaluate SAP Adaptive Server Enterprise*
  An evaluation is valid for 30 days from the installation date.

8. In the End-user License Agreement screen, choose the most appropriate region, read the license terms, then select *I agree*. Select *Next.*
9. In the SySAM License screen:
   a. Specify the license type:
      - Enter a license file. If it is a served license key, you are prompted to set up the license server.
      - Use an existing license server.
      - Proceed without specifying license information for the duration of 30 days from the installation date.
   b. Specify the product edition:
      - *Enterprise Edition*
      - *Small Business Edition*
      - *Developer Edition*
      - *Unknown* – select this if you are unsure about the license type.

      > **Note**
      >
      > Choosing *Unknown* prevents you from being able to select *Optimize SAP ASE* later in the installation process.

      Depending on the edition, you can also select the license type under which the product is licensed.
   c. Configure your server to send e-mail notifications about license management events that require attention:
      - SMTP server host name
      - SMTP server port number
      - E-mail return address
      - Recipient e-mail addresses
      - Message severity that triggers e-mail messages
10. In the preinstallation summary, review:
    - Product name – SAP Adaptive Server Enterprise
    - Installation folder – The path into which SAP ASE is installed
    - Product features – The list of features you are installing
    - Disk space information – Both the amount of space required, as well as what is available in the location you specified.

    Verify the installation type and that you have enough disk space for the installation. Click *Previous* to make changes, *Install* to install the server, or *Cancel* to cancel the installation.

    The installation status window displays the progress of the installation process.

    > **Note**
    >
    > Installing the server can take several minutes.

Next Steps

Configure some basic settings for SAP ASE, Backup Server, Job Scheduler self-management, Web Services, and the SAP ASE Cockpit.

Related Information

Configuration Options [page 46]
SAP ASE Upgrades [page 65]
Managing SAP ASE with SAP ASE Cockpit [page 10]

6.2 Installing SAP ASE in Console Mode

Choose command line installation if you prefer a nonwindowing interface, or if you are developing custom installation scripts.

Prerequisites

Launch the installer in console mode. If the installer launches automatically, click *Cancel* to cancel the GUI installation, then launch the `setup` program from a terminal or console.

Context

The steps for installing components in an interactive text mode are the same as those described for installing in GUI mode, except you use the following command to execute the installer from the command line, and you enter text to select installation options:

```
setupConsole.exe -i console
```

Procedure

1. To display Western European fonts such as French, English, and Italian on Windows:
   a. Run `chcp 1252` to change the code page to 1252, which is the code page that Java uses to display Western European fonts for Windows.
   b. Open the properties of `cmd.exe` and set Font to *Lucida Console*.

2. At the command line, start the installation program:

```
setupConsole.exe -i console
```

   If `setupConsole.exe -i console` hangs on Windows 2008 or Windows 7, perform either of these workarounds:

   - From *Start* > *All Programs* > *Accessories* >, right-click *Command Prompt* and select *Run as administrator*, then enter `setupConsole.exe -i console`.
   - From the *Command Prompt* window, issue `setupConsole.exe -i console`, then press and hold the Ctrl key until you see the output.
3. Follow the remaining prompts to install SAP ASE, then specify the basic settings for your installation. The flow of the installation is identical to a GUI installation, except output is written to a terminal window and responses are entered using the keyboard.

6.3 Installing SAP ASE Using a Response File

Unattended or silent installations are typically used to update multiple systems across the enterprise.

Procedure

To perform a silent, or "unattended" installation, run the installer and provide a response file that contains your preferred installation configuration.

6.3.1 Creating a Response File

By saving installation configuration information into a response file during the initial GUI installation, you can perform subsequent installations of SAP ASE using a silent—or unattended—method.

Context

> **Note**
>
> SAP ASE version 16.0 and higher uses a rearchitected installation program that is incompatible with response files generated for versions 15.0.3 and earlier. Do not use response files from these earlier versions; instead, create a new one from a 16.0 SP02 installation.

To create a response file when installing in GUI or console mode, specify the `-r` command line argument. The `-r` argument records your responses to the installation wizard prompts and creates a response file when the InstallAnywhere wizard exits. The response file is a text file that you can edit to change any responses before

you use it in any subsequent installations. You can find a sample response file named in `sample_response.txt` in the `<installer image>` directory.

Procedure

1. Create a response file during GUI installation:

   ```
   setupConsole.exe -r [<response_file_name>]
   ```

   Where:

   - `-r` – specifies the command line argument.
   - `<response_file_name>` – is the absolute path of the file into which the installation information is stored, such as `C:\responsefile.txt`.

   > **Note**
   >
   > The directory path you specify must already exist.

2. Verify that the response file includes the passwords for the SAP ASE sa login and SAP ASE cockpit by including these lines in the file:

   ```
   SY_CFG_ASE_PASSWORD=<ASE sa password>
   CONFIG_SCC_CSI_SCCADMIN_PWD=<Cockpit admin password>
   CONFIG_SCC_CSI_UAFADMIN_PWD=<Cockpit agent admin password>
   CONFIG_SCC_REPOSITORY_PWD=<Cockpit repository password>
   COCKPIT_TECH_USER_PASSWORD=<Cockpit technical user password>
   ```

   Each password must be at least six characters long. The cockpit logins need not be the same as the sa password.

   You can also set these passwords using these environment variables:

   - SY_CFG_ASE_PASSWORD
   - CONFIG_SCC_CSI_SCCADMIN_PWD
   - CONFIG_SCC_CSI_UAFADMIN_PWD
   - CONFIG_SCC_REPOSITORY_PWD
   - COCKPIT_TECH_USER_PASSWORD

   > **Note**
   >
   > Secure these response files appropriately if they contain passwords.

3. To configure SAP ASE cockpit, define these properties:

   ```
   ENABLE_COCKPIT_MONITORING=<true | false>
   COCKPIT_TECH_USER=<SAP ASE cockpit technical user>
   CFG_REMOTE_AND_CONTROL_AGENT=<true | false>
   ```

   `COCKPIT_TECH_USER` is required if `ENABLE_COCKPIT_MONITORING=true` .
   `CFG_REMOTE_AND_CONTROL_AGENT` is only valid if the Remote Command and Control Agent is installed.

4. To enable a different user for the SAP ASE you are installing, define these properties:

```
SY_CFG_SERVICE_ACCOUNT_CHANGE=<yes | no>
SY_CFG_SERVICE_ACCOUNT_NAME=<account name>
SY_CFG_SERVICE_ACCOUNT_PASSWORD=<account password>
SY_CFG_SERVICE_DATA_DIRECTORY=<data directory>
```

You need not configure `SY_CFG_USER_ACCOUNT_NAME` or `SY_CFG_USER_ACCOUNT_PASSWORD` unless you set `SY_CFG_USER_ACCOUNT_CHANGE` to **`yes`**.

For the `SY_CFG_SERVICE_DATA_DIRECTORY` property, enter a directory other than the installed directory to which SAP ASE can create all the data files during configuration

SAP ASE creates these files during installation to place in the data directory:

- The interfaces file.
- RUN_server file.
- Configuration utilities log files.
- SAP ASE configuration file (`.cfg`) – under the `ASE-16_0` subdirectory.
- SAP ASE shared memory file (`.krg`) – under the `ASE-16_0` subdirectory.
- SAP ASE SySAM properties file – under the `ASE-16_0\sysam` subdirectory.
- Job Scheduler template `.ini` files – under the `ASE-16_0\jobscheduler\Templates` subdirectory

Database device files and server error log files are created in the data directory, but you can move them after the installation is finished.

> **Note**
>
> Make sure that the user you specify in this property setting has read/write/modify permissions to access the data directory.

To support earlier versions of SAP ASE on your system, you can specify these properties for a different Windows Service Account for each server for which you have not defined `SY_CFG_SERVICE_ACCOUNT_*`:

- For SAP ASE Windows Service:

```
SY_CFG_ASE_SERVICE_ACCOUNT_CHANGE=<yes | no>
SY_CFG_ASE_SERVICE_ACCOUNT_NAME=<account name>
SY_CFG_ASE_SERVICE_ACCOUNT_PASSWORD=<account password>
```

- For Backup Server Windows Service:

```
SY_CFG_BS_SERVICE_ACCOUNT_CHANGE=<yes | no>
SY_CFG_BS_SERVICE_ACCOUNT_NAME=<account name>
SY_CFG_BS_SERVICE_ACCOUNT_PASSWORD=<account password>
```

- For XP Windows Service:

```
SY_CFG_XP_SERVICE_ACCOUNT_CHANGE=<yes | no>
SY_CFG_XP_SERVICE_ACCOUNT_NAME=<account name>
SY_CFG_XP_SERVICE_ACCOUNT_PASSWORD=<account password>
```

6.3.2 Installing in Silent Mode

To perform a silent, or unattended installation, run the installer and provide a response file that contains your preferred installation configuration.

Prerequisites

Use `setupConsole.exe -r <responseFileName>` to generate an installation response file during a console or GUI installation, or edit and use the `sample_response.txt` sample responses file located in the installer image's top directory (`<installer_image>\sample_response.txt`)

Procedure

Run the following, where `<responseFileName>` is the absolute path of the file name containing the installation options you chose:

```
setupConsole.exe -f responseFileName -i silent
-DAGREE_TO_SAP_LICENSE=true
```

> **Note**
>
> You must agree to the SAP License Agreement when installing in silent mode. You can either:
> - Include the option `-DAGREE_TO_SAP_LICENSE=true` in the command line argument, or,
> - Edit the response file to include the property `AGREE_TO_SAP_LICENSE=true`.

Except for the absence of the GUI screens, all actions of InstallAnywhere are the same, and the result of an installation in silent mode is exactly the same as one performed in GUI mode using the same responses.

> **Caution**
>
> We recommend that you use the `setupConsole.exe` executable, which runs in the foreground when you perform a silent installation. The normal `setup.exe` executable runs in the background, giving you the impression that the installation has terminated, which may result in your performing additional installation attempts using the silent installation. Multiple installations at the same time may corrupt the Windows Registry and lead to a failure to restart the operating system.

6.3.3 Command Line Options

Options for installing or uninstalling SAP ASE in console mode.

Option	Purpose
`-i console`	Uses the console interface mode, where messages appear on the Java console and the wizard runs in console mode.
`-i silent`	Installs or uninstalls the product in silent mode, without user interaction.

`-D`	Passes custom variables and properties. For example, to override the default installation directory when you run the installer, enter:
	`<install_launcher_name>`
	`-DUSER_INSTALL_DIR=E:\Sybase`

`-r`	Generates a response file and a reference.
`-f`	References response files.
`-l`	Sets the installer's locales.
`-\?`	Displays the installer help.

6.4 Configuration Options

Use GUI mode to minimally configure an SAP ASE server and related products for use.

Prerequisites

The Configure window shows a list of everything you can configure. By default, all products are selected. Unselect any products you do not want to configure now:

- *Configure new SAP ASE*
- *Configure new Backup Server* – see the *System Administration Guide*
- *Configure new XP Server* – see the *Transact-SQL Users Guide*.
- *Setup database always-on option* – this option is only available with the always-on licensed option. See the *HADR Users Guide* for complete information.
- *Configure new Job Scheduler* – see the *Job Scheduler Users Guide*.
  - *Enable Self Management*
- *Configure Cockpit* see *SAP Adaptive Server Enterprise Cockpit* documentation.

When finished, click *Next* in the GUI wizard, or enter *0* in console mode. You are now ready to begin configuring the SAP ASE server.

Procedure

1. The Configure Servers with Different User Accounts window allows you to configure the servers under a different user account. Select one:

Option	Description
Yes	The dialog displays: ○ *User name* – enter the user name. ○ *User password* – enter and confirm a password that is at least six characters long. This field cannot be empty.
No	This is the default.

   The SAP ASE, Backup Server, and XP Server Windows Service accounts are then configured under the account name you specify.

2. In the User Configuration Data Directory window, specify the directory in which to install SAP ASE.

   > **Note**
   >
   > The default directory is the installation directory. If you specify a different directory, make sure you or the account specified in the Configure Servers with Different User Account window has write permission to it.

   The installer creates these files in the main installation directory:
   - The interfaces file.
   - SAP ASE configuration file (`.cfg`).

   The installer creates these files the `ASE-16_0` directory:
   - `RUN_server` file – in the `ASE-16_0\install` subdirectory.
   - Configuration utilities log files – in the `ASE-16_0\init\logs` subdirectory.
   - SAP ASE shared memory file (`.krg`) – in the `ASE-16_0` subdirectory.
   - SAP ASE SySAM properties file – in the `ASE-16_0\sysam` subdirectory.
   - Job Scheduler template `.ini` files – in the `ASE-16_0\jobscheduler\Templates` subdirectory.

   Database device files and server error log files are also created in the data directory you specify, but you can move them after the installation is finished.

3. In the Configure New SAP ASE window, entering the configuration values for the new SAP ASE.

Configuration	Value
SAP ASE Name	The default is the machine name.
System Administrator's Password	Enter and confirm your password.
Enable SAP ASE for SAP ASE Cockpit Monitoring	You see this field if you installed SAP ASE Cockpit. Select it to enable SAP ASE Cockpit. If you did not install SAP ASE Cockpit, and installed just the Remote Command and Control Agent for SAP ASE (for SAP Control Center), you see a checkbox for

Configuration	Value
	Configure Remote Command and Control Agent for SAP ASE. Select this to enable this functionality.
Technical User	If you selected *Enable SAP ASE for SAP ASE Cockpit monitoring*, you see: ○ *Technical user* – enter a username for the technical user. The default is `tech_user`. ○ *Technical user password* – enter and confirm the technical user's password.
Host Name	By default, the ASE installer automatically chooses native host names. Use this field to specify a different host name, such as to bind virtual hosts to physical hosts in a cloud environment. This field allows applications to not be affected by the name change of a virtual machine due to a relocation or reconfiguration.
Port Number	Default is 5000. If port 5000 is used, the installer automatically defaults to the next available port.
Error Log	Name and location of the error log file. Defaults to the full path of the`<servername>.log`.
Application Type	○ (Default) MIXED – both OLTP and DSS. ○ OLTP – online transaction processing generally consists of smaller, less complex transactions. ○ DSS – decision-support systems generally have less update activity with large complex queries.
Page Size	○ 2KB ○ (Default) 4KB – if you plan to load database dumps from an SAP ASE with a page size that is not 4KB, enter the page size that matches the database dump. **Note** The default logical page size in earlier versions of SAP ASE was 2KB. ○ 8KB ○ 16KB
Default Language	The default is us-english. In typical installations, only us-english is available.
Default Character Set	Default is `cp850`.
Default Sort Order	Default is `bin_iso_1`

Configuration	Value
Optimize SAP ASE Server Configuration	Optimize the configuration for your system. If you select this option, you see: ○ Available physical memory for SAP ASE (MB) – the default is 80 percent of physical memory. ○ Available CPU for SAP ASE – the default is 80 percent of the CPU or 1, which ever is higher. The default values are dynamic and machine-dependent. **Note** If you specify a value that is larger than the available resource for allocation to the server, this optimize configuration may fail, causing the server to not start.
Create Sample Databases	Select this option for the installer to install sample databases. The installer automatically calculates any additional space needed for your master device.

Click *Previous* to go back to the User Configuration Data Directory window, or *Next* to configure the following additional fields:

Configuration	Value
Master Device	Name, including location, of the master device. Defaults to the full path of `master.dat`.
Master Device Size (MB)	The default sizes are: ○ 2 KB page size – 36 MB ○ 4 KB page size – 52 MB ○ 8 KB page size – 104 MB ○ 16 KB page size – 208 MB
Master Database Size (MB)	The default sizes are: ○ 2 KB page size – 18 MB ○ 4 KB page size – 26 MB ○ 8 KB page size – 52 MB ○ 16 KB page size – 104 MB
System Procedure Device	Name, including location, of the system procedure device. Defaults to the full path of `sysprocs.dat`.
System Procedure Device Size (MB)	The default is 196 for all page sizes.
System Procedure Database Size (MB)	The default is 196 MB for all page sizes.
System Device	Name, including location, of the system device. Defaults to the full path of `sybsysdb.dat`.

Configuration	Value
System Device Size (MB)	The default options are: ○ 2 KB page size server – 3 MB ○ (Default) 4 KB page size server – 6 MB ○ 8 KB page size server – 12 MB ○ 16 KB page size server – 24 MB
System Database Size (MB)	The default options are: ○ 2 KB page size server – 3 MB ○ (Default) 4 KB page size server – 6 MB ○ 8 KB page size server – 12 MB ○ 16 KB page size server – 24 MB
Tempdb Device	Name, including location, of the `tempdb` device. Defaults to the full path of `tempdbdev.dat`.
Tempdb Device Size (MB)	The default is 100 MB for all page sizes.
Tempdb Database Size (MB)	The default is 100 MB for all page sizes.
Enable PCI in SAP ASE	Enable the pluggable component interface. The PCI is a generic interface internal to SAP ASE that is installed by default when you install or upgrade SAP ASE. See *Java in SAP Adaptive Server Enterprise*.
PCI Device	Appears when you select *Enable PCI*. The default is `sybpcidbdev_data.dat` in `%SYBASE%\data`.
PCI Device Size (MB)	Appears when you select *Enable PCI*. ○ 2 KB page size server – 48 MB ○ (Default) 4 KB page size server – 96 MB ○ 8 KB page size server – 192 MB ○ 16 KB page size server – 384 MB
PCI Database Size (MB)	Appears when you select *Enable PCI*. The PCI device and PCI database size are the same: ○ 2 KB page size server – 48 MB ○ (Default) 4 KB page size server – 96 MB ○ 8 KB page size server – 192 MB ○ 16 KB page size server – 384 MB

Click *Previous* to go back to the first Configure New SAP ASE window, or *Next* to configure a new Backup Server.

4. In the *Configure New Backup Server* window, configure the following:

Configration	Value
Backup Server Name	The default is `<ASE_server_name>_BS`.
Port Number	The port number of the Backup Server. The default is 5001.
Error Log	The full path to the error log file. Defaults to the full path of `<ASE_server_name>_BS.log`.
Allow Hosts	Specify any remote hosts you want to use or want to connect to this Backup Server. Comma-separated lists of hosts that are allowed to connect to this Backup Server. When null, only the dataserver running on the same host as the Backup Server can access this Backup Server. The default value is null.

Click *Previous* to go back to the second Configure New SAP ASE window, or *Next* to configure a new XP Server.

5. In the *Configure New XP Server* window, configure the following:

Configuration	Value
XP Server Name	The default XP Server name is `<ASE_server_name>_XP`. This format and name cannot be changed.
Port Number	The port number of the XP Server. The default is 5002.
Error Log	The full path to the error log file. Defaults to the full path of `<ASE_server_name>_XP.log`.

Click *Previous* to go back to the first Configure New Backup Server window, or *Next* to configure a new Job Scheduler.

6. In the *Configure Job Scheduler* window, configure the following:

Configuration	Value
Job Scheduler Agent name	The default is `<ASE Server Name>`_JSAGENT.
Port number	The default is 5003.
Management device	The full path to the device. Defaults to the full path of `sybmgmtdb.dat`.
Management device size	The default is 76 MB.
Management database size	The default is 76 MB.

Click *Previous* to go back to the first Configure New XP Server window, or *Next* to configure a new Self Management.

7. Self Management allows you to create a scheduled job to rim `update statistics` on any table in any server database in the SAP ASE. In the *Configure Self Management* window, specify the following:

Configuration	Value
Self Management User Name	Entering a new user name creates it in SAP ASE. The default is "sa".
Self Management User Password	This field is activated if you enter a new username in the *Self Management User Name* field, then click *Next*. Enter and confirm a password that is at least six characters long. This field cannot be empty.

8. If you installed the SAP ASE cockpit, set the *Cockpit Hosts and Ports* option.

   Accept the default options, or specify other, unused ports, ensuring that the port numbers do not conflict with those used by other applications or services on your system:

Configuration	Value
Host Name	By default, the ASE installer automatically chooses native host names. Use this field to specify a different host name, such as to bind virtual hosts to physical hosts in a cloud environment. This field allows applications to not be affected by the name change of a virtual machine due to a relocation or reconfiguration.
HTTP Port	Choose an integer between 1025 and 65535.
HTTPs Port	Choose an integer between 1025 and 65535.
TDS Port	Choose an integer between 1025 and 65535. The default is 4998.
RMI Port	Choose an integer between 1025 and 65535. The default is 4992.

9. In the Configure Cockpit window, specify the following:

Configuration	Value
Cockpit Administrator User	Enter the name of the cockpit administrator. The default is "`sccadmin`".
Cockpit Administrator Password	Enter and confirm password that is at least six characters long. This field cannot be empty.

Configuration	Value
Cockpit Agent Administrator User	Enter the name of the cockpit agent administrator. The default is "`uafadmin`".
Cockpit Agent Administrator Password	Enter and confirm a password that is at least six characters long. This field cannot be empty.
Cockpit Repository Password	Enter and confirm the password that is at least six characters long. This field cannot be empty.

10. Verify that you want to set the SAP ASE cockpit as a Windows service in *Cockpit – Configure a Windows Service*.
11. Verify that the values that appear in the New Server Configuration Summary window are correct. Click *Previous* to change any values, or click *Next* to proceed. You see the Configure New SAP ASE window.

    You may see the Restart window, which reminds you to either log out or restart your machine to complete the installation process.

    The configuration begins, and you see its progress in the Configure New SAP ASE window.
12. In the Installation Completed window:

Option	Description
GUI mode	Click *Done*
Console mode	Press *Enter* to exit the installation

Results

SAP ASE and related products have been successfully installed and configured for use. You can install sample databases to begin experimenting with your servers, or see the *System Administration Guide* for more advanced topics.

Related Information

Installing Sample Databases [page 60]
Installing SAP ASE in GUI Mode [page 38]
SAP ASE Upgrades [page 65]
Managing SAP ASE with SAP ASE Cockpit [page 10]

6.5 Uninstalling SAP ASE

To remove SAP ASE, run the uninstaller. The uninstallation process reverses only those actions originally performed by the installer, leaving intact any files or registry entries you created after the installation.

Prerequisites

Stop all services using the *Services* option from the *Control Panel*. If any of the services are marked to automatically start, change them to be started manually. Restart the system to release any DLLs that are already loaded into memory.

If you installed SAP ASE version 16.0 on top of an existing SAP ASE 12.5 or earlier, that earlier version of SAP ASE created a shortcut that launches the uninstaller, whereas SAP ASE 16.0 registered the uninstaller with the *Add/Remove Programs* option on the Control Panel. Use the *Add/Remove Programs* option to remove SAP ASE. This does not remove some of the shortcuts created by the SAP ASE version 12.5 or earlier installer; you must manually remove these shortcuts.

Procedure

1. Remove your server from within SAP ASE: *Start* > *Programs* > *SAP* > *Adaptive Server Enterprise* > *Server Config* > *Remove Server*.
2. You can uninstall SAP ASE using:

Option	Description
Windows GUI	Go to *Control Panel* > *Programs and Features* > *Uninstall a program* and select SAP Adaptive Server Enterprise.
Command line	Execute the uninstallation utility at `%SYBASE%\sybuninstall\ASESuite\uninstall.exe`.

3. Click *Next* in the Uninstall SAP Adaptive Server Enterprise welcome window.
4. Choose one of the following, then click *Next*:

Option	Description
Complete Uninstall	Uninstalls everything originally installed by the installer. Files and folders created after the installation are not removed.
Uninstall Specific Features	Displays a list of features. If any unselected products/components are dependent on features selected for uninstallation, you can still proceed with the uninstallation but dependent features are not uninstalled.

You see a window indicating that the uninstallation process is being performed. There is no progress bar.

> **Note**
>
> You may need to confirm the deletion of some files that have been modified since installation.

5. When you see the final window, click *Done* to exit the uninstallation program.
6. Manually remove any files or registry entries you created after the installation.

6.5.1 Removing an Existing SAP ASE Server

Remove an existing SAP ASE server.

Procedure

1. Stop the server.
2. From the Windows taskbar, select *Start* > *Programs* > *SAP* > *Server* > *Configuration*.
3. From the icons on the left of the Configure Sybase Servers screen, select the type of Sybase server to remove.
4. Click *Remove SAP ASE*.
5. Select the server to remove.
6. Restart the computer to reset registry entries.

7 Postinstallation Tasks

After you install the server, set it up.

The SAP ASE installation includes folders that contain sample client library applications. These sample programs are included for training purposes only and are not intended to be installed in a production environment.

If you are setting up a production environment, remove these directories:

- `%SYBASE%\OCS-16_0\sample`
- `%SYBASE%\DataAccess*\ODBC\samples`
- `%SYBASE%\jConnect-16_0\sample2`
- `%SYBASE%\jConnect-16_0\classes\sample2`
- `%SYBASE%\ASE-16_0\sample`
- `%SYBASE%\WS-16_0\samples`

Related Information

Installing Sample Databases [page 60]

7.1 Set Up sybase User in Windows

After you install SAP ASE, stop the services and set up the "sybase" user in Windows.

Context

Perform these steps as the "sybase" user that installed the SAP ASE product. Verify that the "sybase" user is a member of the Windows system-defined group "Administrators" so the user has the access privileges to perform these steps.

Procedure

1. Stop all SAP ASE services.

From the Windows task manager, select *Start* > *Settings* > *Control Panel* > *Administrative Tools* > *Services*. Select each of the SAP ASE entries and stop them. There are separate entries for Sybase SQLServer, XPServer, BCKServer, and SYSAM.

2. Identify the drives and folders where the SAP ASE software is installed, and identify the SAP ASE disk devices. Use Windows Explorer or `cacls` (a Windows command line utility) to set access permissions on the identified drives and folders.

   We recommend that you grant full control to the user "sybase" and deny access to others on all identified drives, files, and folder hierarchies.

   If users other than "sybase" need access to files (configuration files, programs, libraries, and so on) in the folder hierarchy, limit their access to read and execute. The administrator should carefully review this access, and any other further permissions, to ensure they are required.

3. Specify SAP ASE services to start as the user "sybase":
   - From the Windows task manager, select *Start* > *Settings* > *Control Panel* > *Administrative Tools* > *Services*. Select each of the SAP ASE entries installed.
   - Set the "Log On" properties for each of the entries to use "sybase" and the password for this account. This action results in the user "sybase" being granted "log on as a service" rights by Windows.
   - Select each of the SAP ASE entries that you stopped in the first step, and start them.

7.2 Verifying That Servers are Running

Verify that the servers are running.

Prerequisites

Before starting the server, make sure you have stopped, then started the services related to the server.

Context

If you have already started the server, do not run the command a second time. Running it more than once can cause problems.

Procedure

1. From the Windows task manager, select *Start* > *Settings* > *Control Panel* > *Administrative Tools* > *Services*.

2. Scroll through the list of services until you locate SAP ASE `<servername>`.
   The Status column indicates if it is started. If it is not, select the server, then click *Start*.

7.3 Verifying Your Connection to the Servers

Use `isql` to verify your connection to the servers.

Context

1. At the command prompt, enter the following:

   ```
   %SYBASE%\%SYBASE_OCS%\bin\isql -Usa -P<password> -S<server_name>
   ```

   Where:
   - `<password>` – is the password for sa.

     > **Caution**
     > When you log in to an SAP ASE server for the first time, the default "sa" system administrator username is assigned all privileges but has no password. For security purposes, assign it a password promptly.

   - `<server_name>` is the SAP ASE server name.

   You see the `isql` prompt if the login is successful.
2. At the `isql` prompt, enter:

   ```
   1> select @@version
   2> go
   ```

   The output should show that you are at the current version and edition of SAP ASE.

Alternatively, start `dsedit`.

Procedure

1. From the Windows taskbar, select *Start* > *Programs* > *SAP* > *Connectivity* > *Open Client Directory Service Editor*.
2. Select a Directory Services window to open, then click *OK*.
3. Highlight `<servername>` (the name of the server you want to test).
4. Select *Server Option* > *Ping*.
   A successful connection returns the message that the connection succeeded.

7.4 Test the Installation and Network Connections

After installing SAP ASE, SAP ASE cockpit, and the Java Runtime Environment, test the installation and network connections. The SAP ASE server communicates with other SAP ASE servers, Open Server applications (such as Backup Server), and client software on your network. Clients can talk to one or more servers, and servers can communicate with other servers using remote procedure calls.

Context

For SAP products to interact with one another, each product must know where the others reside on the network. SAP stores this information in the interfaces file (`sql.ini`) on Windows or in a Lightweight Directory Access Protocol (LDAP) server.

Follow the instructions in *SAP Adaptive Server Enterprise Cockpit* documentation to launch SAP ASE cockpit and configure the SAP ASE server for monitoring.

Procedure

1. Use the `libtcl.cfg` file to specify an LDAP server name, port number, directory information tree (DIT) base, user name, and password to connect to an LDAP server.

   For details, see *Use the Lightweight Directory Access Protocol as a Directory Service* in the configuration guide.
2. Use the `dsedit` utility to add a server to the directory service.

   For details, see *Set Up Communications Across the Network > Create a Directory Services Entry* in the configuration guide and the *Utility Guide*.
3. Adding a server to the interfaces file.

   For details, see *Set Up Communications Across the Network > Create a Directory Services Entry* in the configuration guide.

7.5 The System Administrator Account

When you install SAP software, the software creates a system administrator account called "sa," which can use any database on an SAP ASE server, including `master`, with full privileges.

The user specified the password for "sa" during the installation and configuration of SAP ASE. See the *Security Administration Guide* for more information about passwords.

7.6 Installing Sample Databases

The sample databases, which contain fictitious information, are designed to help you learn how to use SAP ASE. The sample databases are intended for training purposes only. Do not install them in an SAP ASE production environment.

File Name	Description
`%SYBASE%\%SYBASE_ASE%\scripts\instpbs2`	Installs the `pubs2` sample database. This database contains data that represents a publishing operation. Use this database to test your server connections and to learn Transact-SQL. Most of the examples in the SAP ASE documentation query the `pubs2` database. **Note** The `master` device size should be at least 30MB to install the full `pubs2` database, including the `image` data.
`%SYBASE%\%SYBASE_ASE%\scripts\instpbs3`	Installs the `pubs3` sample database. This updated version of `pubs2` uses referential integrity. In addition, its tables are slightly different than the tables used in `pubs2`. Where noted, the SAP ASE documentation uses the `pubs3` database in its examples.
`%SYBASE%\%SYBASE_ASE%\scripts\instpix2`	Installs the `image` data that is used with the `pubs2` database. Run the `instpix2` script after you run `instpbs2`. The `image` data requires 10MB—there are six pictures, two each in the PICT, TIFF, and Sun raster file formats. Run `installpix2` script only to use or test the `image` datatype. SAP does not supply any tools for displaying `image` data; you must use appropriate window graphics tools to display the images after you have extracted them from the database.
`%SYBASE%\%SYBASE_ASE%\sample\backupserver`	Makefiles are provided for UNIX and Windows.:q To make a program on Windows 64 (using Microsoft Visual Studio) type: `nmake -f makefile_nt sample_nt` This will create the DLL `libsample_nt.dll`. Copy the file to `%SYBASE%\%SYBASE_ASE%\lib` or provide its location to the backupserver using the `-A` parameter.

Related Information

Postinstallation Tasks [page 56]
Configuration Options [page 46]

7.6.1 Default Devices for Sample Databases

The SAP ASE installation includes scripts for installing the us_english sample database, foreign language sample databases, and the image data associated with the US English `pubs2` sample database on a default device.

These scripts are located in `%SYBASE%\%SYBASE_ASE%\scripts`.

By default, these scripts install the sample databases on the `master` device. Because the databases use valuable space on the `master` device that is best reserved for system tables – each sample database requires 3MB on a 2KB server, and multiples of 3MB on a 4KB, 8KB, and 16KB server on your database device – we recommend that you change the default to a device other than the `master` device.

To change the default location where the scripts install these databases, use `sp_diskdefault`. See `sp_diskdefault` in *Reference Manual: Procedures*. Alternatively, use a text editor to revise the script directly.

7.6.2 Running the Database Scripts

After you determine your default device, run the scripts to install the sample databases.

Prerequisites

Back up the original `instpbs2` and `instpbs3` scripts, in case you have problems with the edited scripts.

Procedure

1. Start SAP ASE.
2. Go to the scripts directory at `%SYBASE%\%SYBASE_ASE%\scripts`.
3. Use `isql` to log in to the SAP ASE server and run the script:

   ```
   isql -Usa -P<password> -S<server_name> -i<script_name>
   ```

   Where:
   - `<server_name>` – is the destination server for the database.
   - `<script_name>` – is the full path to and file name of the script to run.

   For example, to install `pubs2` on a server named VIOLIN, enter:

   ```
   isql -Usa -P<password> -SVIOLIN -i %SYBASE%\%SYBASE_ASE%\scripts\instpbs2
   ```

4. Install the `image` data associated with `pubs2`:

   ```
   %SYBASE%\%SYBASE_ASE%\ isql -Usa -P<password> -S<servername>
   -i%SYBASE%\%SYBASE_ASE%\scripts\instpix2
   ```

The `pubs3` database does not use `image` data.

For more information about running these scripts, see the *Configuration Guide for Windows*.

7.6.3 Installing the interpubs Database

The `interpubs` database is similar to `pubs2`, and contains French and German data.

Prerequisites

Back up the original `installintpubs` script, in case you experience problems with the edited script.

Procedure

1. Set your terminal to display 8-bit characters.
2. Verify that iso_1, iso_15, Roman8, Roman 9, or UTF-8 is installed as either the default character set or as an additional character set.

   The `interpubs` database contains 8-bit characters and is available for use at SAP ASE installations using the ISO 8859-1 (iso_1), ISO 8859-15 (iso_15), Roman 8, or Roman9 (for HP-UX) character set.
3. Determine the type (raw partition, logical volume, operating system file, and so on) and location of the device where you will be storing the `interpubs` database. You will need to provide this information later.
4. Execute the script, using the `-J` flag to ensure that the database is installed with the correct character set:

```
isql -U<sa> -P<password> -S<servername> -Jiso_1 \
 -i %SYBASE%\%SYBASE_ASE%\scripts\iso_1
```

7.6.4 Installing the jpubs Database

If you installed the Japanese language module with your server, you can run the `installjpubs` script to install `jpubs`, which is a database similar to `pubs2` that contains Japanese data. `installjpubs` uses the EUC-JIS (eucjis), UTF-8 (utf8), or the Shift-JIS (sjis) character sets.

Prerequisites

Copy the original `installjpubs` script, in case you experience problems with the edited script.

Procedure

1. Set your terminal to display 8-bit characters.
2. Verify that the EUC-JIS, Shift-JIS, or the UTF-8 character set is installed either as the SAP ASE default character set or as an additional character set.
3. Determine the type (raw partition, logical volume, operating system file, and so on) and location of the device where you will be storing the `jpubs` database. You will need to provide this information later.
4. Execute the `installjpubs` script, using the `-J` flag to ensure that the database is installed with the correct character set:

   ```
   isql -U<sa> -P<password> -S<servername> -Jeucjis \
    -i %SYBASE%\%SYBASE_ASE%\scripts\eucjis\installjpubs
   ```

   or:

   ```
   isql -U<sa> -P<password> -S<servername> -Jsjis \
    -i %SYBASE%\%SYBASE_ASE%\scripts\sjis\installjpubs
   ```

   For more information on the `-J` option in `isql`, see the *Utility Guide*.

7.6.5 Maintaining Sample Databases

The sample databases contain a guest user option that allows authorized users to access the database. Guest users have a wide range of privileges, including permissions to `select`, `insert`, `update`, and `delete` user tables.

Context

We recommend that you remove the guest user option from user databases in production systems. For more information about the guest user and a list of guest permissions, see the *System Administration Guide*.

Procedure

- If possible, and if space allows, give each new user a clean copy of the sample databases so that he or she is not confused by other users' changes.
- If space is a problem, instruct users to issue the `begin transaction` command before updating a sample database.
- After users have finished updating one of the sample databases, instruct them to issue the `rollback transaction` command to undo the changes.

7.7 Starting and Stopping SAP ASE Cockpit

SAP ASE cockpit is a Web-based tool for monitoring the status and availability of SAP ASE servers, and replaces the SAP Control Center for SAP ASE that was available before SAP ASE version 16.0 SP02. Set the %SYBASE% environment variables and start a cockpit agent on your SAP ASE server.

Prerequisites

Context

Use these steps to run SAP ASE cockpit for the first time and to verify the installation. For complete instructions, see *SAP Adaptive Server Enterprise Cockpit* .

Procedure

- To start SAP ASE cockpit:
  a. Enter the SAP ASE cockpit command:

     ```
     %SYBASE%\COCKPIT-4\bin\cockpit.bat
     ```

     After the cockpit starts, you see a URL for the cockpit Web console;
  b. Copy and paste the URL into a browser window. When the cockpit login appears, the SAP ASE server name appears, and you can log in with your sa login.

     You should see a status message similar to:
- To shut down SAP ASE cockpit:
  a. From the cockpit window, click *Log Out*.
  b. In the console, type:

     ```
     shutdown
     ```

Related Information

Managing SAP ASE with SAP ASE Cockpit [page 10]

8 SAP ASE Upgrades

You can upgrade to SAP ASE version 16.0 SP02 from versions 15.0.x or later.

Upgrades are supported only between nonclustered editions of SAP ASE. You cannot upgrade from SAP ASE Cluster Edition to a nonclustered edition.

Table 7: SAP ASE Versions and Upgrades

Upgrade Type	Version Number
Major upgrade	You can perform an upgrade to SAP ASE version16.0 SP02 from the following versions by executing the upgrade sequence from the same node on which the database resides. • Version 15.0.x • Version 15.5.x • Version 15.7 GA , ESD#1 , ESD#2 , ESD#3 and ESD#4 • Version 15.7 SP60 – SP122 • Version 15.7 SP130, SP131 This is a major upgrade, and requires that you perform preupgrade tasks.
Minor upgrade	You can also perform a minor upgrade from a these versions to 16.0: • Version 16.0 GA and PL01 – PL05 • Version 16.0 SP01 To find which versions you can upgrade to 16.0 SP02, see the `sourcesps` property in `<SAP ASE_installer>\archives\asemanifest.mf` file.
Nondirect upgrades	You cannot perform a direct upgrade to this version of SAP ASE from: • Version 11.9.x • Version 12.0.x • Version 12.5.x To upgrade from one of these versions,, upgrade first to version 15.x before upgrading to version 16.0 SP02.

You can upgrade from a 32-bit version to a 64-bit version.

If your server has replicated databases, consult the *Replication Server Configuration Guide* before starting the upgrade preparatory tasks.

Only upgrades to and from the same page size are supported. If you are migrating between servers with the same major version number, you can use `sybmigrate` to re-create the schema and load data from one page size to another. See the *Utility Guide*.

SAP ASE version 16.0 SP02 includes both new and changed system catalogs that may affect your existing applications. See the *SAP Adaptive Server Enterprise What's New* for a complete list.

> **Caution**
>
> Once you upgrade to SAP ASE 16.0 SP02, you cannot revert back to an version earlier than 16.0.

Related Information

Managing SAP ASE with SAP ASE Cockpit [page 10]
Installing SAP ASE in GUI Mode [page 38]
Configuration Options [page 46]

8.1 Considerations When Upgrading from SAP ASE 15.0.x

A minor change was made to the format of a log record in SAP ASE version 15.5 that introduces an unlikely possibility for the SAP ASE server to misinterpret this changed log record in cases where the upgraded server contains a database that is the primary database for replication. This change should not affect your upgrade process; however, it requires that you to strictly follow some steps when you move from SAP ASE 15.0.x to SAP ASE 15.5.x and later. See the following table for all possible combinations of upgrades.

An upgrade is done by:

- Upgrading your entire installation by switching binaries.
- Upgrading a single database using `online database`, having first loaded it with a database dump and transaction logs taken on a server with an earlier version.

Table 8: Upgrading Your Entire Installation

Current Version	Upgrading to	Special Upgrade Information
SAP ASE 15.0.x	**SAP ASE 16.0 SP02**	If you are using Replication Server to replicate one or more databases in the version to be upgraded, ensure that all transactions have been replicated before the polite shutdown is done, by draining the log. See *Upgrading ASE in a Replication System* and *Upgrading Replication Server* in the *Replication Server Configuration Guide* for your platform.
SAP ASE Cluster Edition 15.5.x or later	**SAP ASE 16.0 SP02**	Upgrading any version of SAP ASE Cluster Edition to a nonclustered version is not supported.
SAP ASE 15.5.x	**SAP ASE 16.0 SP02**	No special upgrade instructions.

Table 9: Upgrading a Single Database

Current Version	Upgrading to	Special Upgrade Instructions
SAP ASE 15.0.x	**SAP ASE 16.0 SP02**	When you use `online database` to upgrade a single database in SAP ASE 16.0 SP02 after loading a database dump and transaction logs from SAP ASE 15.0.x, if the database you are upgrading is also replicated, make sure the database's transaction log is truncated before you turn replication back on.
SAP ASE Cluster Edition 15.5.x or later	**SAP ASE 16.0 SP02**	Upgrading a database from any version of the Cluster Edition to a nonclustered version is not supported.
SAP ASE 15.5.x	**SAP ASE 16.0 SP02**	No special upgrade instructions.

Related Information

Postupgrade Tasks [page 90]

8.1.1 Considerations for Component Integration Services

If you have both a local and a remote server running on SAP ASE version 15.x and are upgrading both of them to version 16.0 SP02, upgrade the local server first. If you plan to upgrade one server but not the other, upgrade the local server.

SAP does not certify that Component Integration Services running on earlier versions of SAP ASE can connect to later versions. You may encounter errors if an earlier version of SAP ASE maps a proxy table to a later version and if the remote table uses functionality that is unavailable in the earlier version.

SAP certifies that each version of SAP ASE connects to earlier versions through Component Integration Services. Component Integration Services is tested and certified to connect to earlier versions of SAP ASE.

8.1.2 Considerations for Moving from SCC to SAP ASE Cockpit

The SAP ASE 16.0 SP02 installer includes SAP ASE cockpit, a Web-administration console that replaces SAP Control Center for monitoring and managing SAP enterprise servers.

The version of SAP Control Center (SCC) that you installed with the previous version of SAP ASE required the installation of these two items to work:

- (Optional) Remote Command and Control Agent for SAP ASE – a remote agent that ran on the hosts where your SAP ASE server installations resided.

- SAP Control Center Management User Interface for SAP ASE – the GUI that allowed you to manage and monitor activities in SAP ASE using a Web browser, which was installed on a separate host SCC server, and that allowed you to monitor multiple SAP ASE servers.

Unlike SCC, the SAP ASE cockpit provides on-board capabilities to manage and monitor SAP ASE directly on the server itself (that is, on board the same host machine as the SAP ASE server that it manages) without the need for a separate SCC server. This means that the ASE management agent plug-in is installed directly on the SAP ASE server's host machine.

This change has the following impact on your system:

- You no longer need a separate host to install SCC server.
- You no longer need the SCC remote agent that was installed on your SAP ASE machine.

8.1.2.1 Upgrading to SAP ASE Cockpit

While there is no utility to upgrade from SAP Control Center to SAP ASE cockpit, you can upgrade your system to include cockpit functionality.

Procedure

1. On each host where a SAP ASE server is to be upgraded, shut down Remote Command and Control Agent for SAP ASE if it had been installed there.
2. Install the SAP ASE cockpit component.
3. Remove SCC 3.x from each of the hosts where SAP ASE server is running.
4. Start SAP ASE cockpit on each host.
   The cockpit automatically discovers the SAP ASE server running on the host.
5. Log in to the cockpit web interface to manage the SAP ASE server.

8.2 Upgrade Java in the Database

If you have enabled Java in the database, create the `sybpcidb` database before upgrading to SAP ASE version 16.0 SP02.

Procedure

1. Create the `sybpcidb` database, which stores configuration information for the pluggable component interface (PCI) and all pluggable component adapter (PCA) components. This database is used by the `installpcidb` script. For example:

   ```
   1> disk init
   2> name = "sybpcidb_dev",
   3> physname = "%{SYBASE}%\data\sybpcidb_dev.dat",
   4> size = "48M"
   5> go
   1> create database sybpcidb on sybpcidb_dev = 48
   2> go
   ```

   The device and database sizes depend on the SAP ASE server page size. The minimum and default size requirements for `sybpcidb` are:
   - 2KB page size server – 48 MB
   - (Default) 4KB page size server – 96 MB
   - 8KB page size server – 192 MB
   - 16KB page size server – 384 MB
2. Disable Java in the database:

   ```
   1> sp_configure 'enable java', 0
   2> go
   ```
3. Enable Java PCI Bridge for SAP ASE:

   ```
   1> sp_configure 'enable pci', 1
   2> go
   ```
4. Reenable the feature after you have successfully upgraded to SAP ASE 16.0 SP02:

   ```
   1> sp_configure 'enable java', 1
   2> go
   ```

Related Information

Preupgrade Tasks [page 72]
Reenabling Auditing [page 93]
Preparing to Install SAP ASE [page 30]

8.3 Preparing to Upgrade

Use the `syconfig` (`syconfig.exe`) and `sybatch` `sybatch.exe` utilities to upgrade SAP ASE versions earlier than 16.0.

Prerequisites

> ⚠ Caution
>
> Since it is not possible to downgrade once you upgrade to SAP ASE 16.0 or higher, make sure to back up all databases, including `master` and other system databases, before beginning the upgrade process.

Context

To perform an upgrade from:

- A version earlier than 16.0 to version 16.0 SP02, run the `preupgrade` utility to check the upgrade eligibility then use `syconfig.exe` or `sybatch.exe` to upgrade the server.
- Version 16.0 to 16.0 SP02, run the `updatease` utility.

You must have system administrator privileges to perform an upgrade.

The executable files that run the `preupgrade` and `upgrade` utilities are `syconfig` (a GUI application that you start with `syconfig.exe`), and `sybatch` (a command line utility you start with `sybatch.exe`).

Each new server version contains features that introduce parameters, commands, reserved words, and so on. The `preupgrade` utility checks the old server by making sure all necessary directories and settings are correct for the upgrade. When running the `preupgrade` utility, the server must be running. You need not start the server before running the `syconfig.exe` upgrade utility; the utility starts the server when needed.

If you are upgrading from:

- Version 12.5.4 with cache bindings on `sybsystemdb` – drop the cache bindings for `sybsystemdb` that are bound to a user-defined cache before you run the `preupgrade` utility.
- Earlier than version 16.x but later than 12.5.4 – from the SAP ASE 16.0 installation directory, use the `preupgrade` utility to perform the preupgrade checks on the old server.

The `preupgrade` utility is located in `%SYBASE%\%SYBASE_ASE%\bin`. In SAP ASE 16.0 SP02 PL05 and later, the `preupgrade` utility is also available at the top level of the image directory to allow for a preupgrade check before installing SAP ASE.

Manually drop objects before you execute procedures for the first time. The first time you run the server after an upgrade, the server internally rebuilds procedures from the text in `syscomments`. The procedure may not execute properly if it contains code that drops, then re-creates, an existing object.

Procedure

Choose one of:

- Go to the `%SYBASE%\%SYBASE_ASE%\bin` directory and run the `preupgrade` utility.
- For versions 16.0 SP02 PL05 and later, run the `preupgrade` utility located at the top level of the image directory

8.4 Changes in SAP ASE Directories

The directory structures for SAP ASE installations differ, depending on version.

Table 10: Directory Changes

Component	Location
SAP ASE	• 12.5.4 – `%SYBASE%\ASE-12_5` • 15.0.2, 15.0.3, 15.5 and 15.7 – `%SYBASE%\ASE-15_0` • 16.0 and later – `%SYBASE%\ASE-16_0`
SAP Control Center	In SAP ASE version 16.0 SP02, SAP Control Center is replaced by SAP ASE cockpit. • 15.7 SP100 – `%SYBASE%\SCC-3_2` • Versions of 16.0 earlier than SP02 – `%SYBASE%\SCC-3_3`
SAP ASE Cockpit	The SAP ASE cockpit was introduced in SAP ASE version 16.0 SP02, and replaces the SAP Control Center. • 16.0 SP02 – `%SYBASE%\COCKPIT-4`

JRE	• 12.5.4 – `%SYBASE%\Shared\Sun\jre142`
	• 15.0.2 – `%SYBASE%\Shared\Sun\jre142_*`
	• 15.0.3 – `%SYBASE%\Shared\JRE-6_0_*`
	• 15.5 and 15.7:
	  ○ 15.7 ESD #1 and earlier – `%SYBASE%\Shared\JRE-6_0_*`
	  ○ 15.7 ESD #2 and later – `%SYBASE%\Shared\JRE-7_0_*`
	• 16.0 and later:
	  ○ 32-bit – `%SYBASE%\Shared\SAPJRE-7_1_*_32BIT`
	  ○ 64-bit – `%SYBASE%\Shared\SAPJRE-7_1_*_64BIT`

Language settings (`locales`)	• 12.5.4 and 15.0.2 – `%SYBASE%\locales` • 15.0.3, 15.5, and 15.7 – `%SYBASE%\locales` and `%SYBASE%\ASE-15_0\locales` • 16.0 and later – `%SYBASE%\locales` and `%SYBASE%\ASE-16_0\locales`

Component	Location
Connectivity	• 12.5.4 – `%SYBASE%\OCS-12_5` • 15.0.2, 15.0.3, 15.5, and 15.7 – `%SYBASE%\OCS-15_0` • 16.0 and later – `%SYBASE%\OCS-16_0`
Web Service	• 12.5.4 – `%SYBASE%\WS-12_5` • 15.0.2, 15.0.3, 15.5, and 15.7 – `%SYBASE%\WS-15_0` • 16.0 and later – `%SYBASE%\WS-16_0`
SySAM	• 12.5.4 – `%SYBASE%\SYSAM-1_0` • 15.0.2, 15.0.3, 15.5, 15.7, 16.0 and later – `%SYBASE%\SYSAM-2_0`
Job Scheduler	• 12.5.4 – `%SYBASE%\JS-12_5` • 15.0.2, 15.0.3, 15.5, and 15.7 – `%SYBASE%\ASE-15_0\jobscheduler` • 16.0 and later – `%SYBASE%\ASE-16_0\jobscheduler`
Unified Agent	• 12.5.4 • 15.0.2 and 15.0.3 – `%SYBASE%\UAF-2_0` • 15.5 and 15.7 – `%SYBASE%\UAF-2_5` In SAP ASE 15.7 ESD #1 and later, `UAF-2_5` is placed with `SCC-3_2` for the SAP Control Center. • Versions of 16.0 earlier than SP02 – No longer shipped. Included with SCC. • 16.0 SP02 – No longer shipped. Included with SAP ASE cockpit.

8.5 Preupgrade Tasks

To ensure a successful upgrade, review and perform preparatory tasks as necessary. Depending on the old server configuration, you may not need to perform all preparatory tasks.

Prerequisites

- You need the master and system procedures files to upgrade the server. By default, the `master` (`master.dat`) and system procedures device (`sybsytemprocs.dat`) files are in the `%SYBASE%\data` directory.
- The previously installed version of the server must be running. If you are upgrading Backup Server or XP Server, those servers must not be running.

Context

> **Note**
>
> Follow these steps only if you are performing a major upgrade from an SAP ASE version earlier than 16.0.

Skip these preparatory tasks if you plan to use `syconfig.exe` or `sybatch.exe`, which performs these tasks automatically.

Procedure

1. Check system and upgrade requirements.
2. Ensure that the directory to which your TEMP environment variable points exists.
3. If you are upgrading from SAP ASE 12.5.4, run `syconfig.exe`:
   a. Select *Upgrade Adaptive Server*.
   b. Choose the server name.
   c. Log in to the server.
   d. Choose *Command line*, and add `-T7841`.
4. Verify that the text of all stored procedures you upgrade is available in `syscomments` by either:
   - Reinstalling the procedures with text, or,
   - Removing and reinstalling the procedures after the upgrade.

   This step can allow you to inspect the stored procedures for any hidden or unwanted text.
5. Make sure reserved words use quoted identifiers.
6. Verify that users are logged off.
7. Use `dbcc` to check for database integrity.
8. Back up databases.
9. Dump the transaction log.
10. Verify that `master` is the default database for the "sa" user.
11. Prepare the database and devices for upgrade using the `preupgrade` utility. See `preupgrade` in the *Utility Guide* for more information. After `preupgrade` finds no errors by exiting with status 0 (zero):
    a. Create a `sybsystemdb` database if it does not already exist.
    b. Disable auditing by running `sp_configure 'auditing', 0`.
    c. If Job Scheduler is enabled, copy `%OLDSYBASE%\%OLDSYBASE_OCS%\libtcl*.cfg` to `%SYBASE%\%SYBASE_OCS%`.
    d. If Job Scheduler if enabled, disable it.
    e. Obtain the current audit settings for the pre-16.0 SAP ASE using `sp_displayaudit`; use this saved information to reenable auditing after you complete the upgrade.
    f. If you made any site-specific changes to the permissions for system stored procedures, obtain the current permission settings for them using `sp_helprotect`; then use this saved information to reenable the permissions after you complete the installation. Pay special attention to
       - Any stored procedures that are not granted execute permission to public, such as `sp_addauditrecord`, `sp_monitor`, and `sp_sysmon`.

- Any stored procedures where execute permission has been revoked from public.

g. Disable disk mirroring.

Fix any problems that `preupgrade` utility reports.

When there are no problems and the old server is ready for upgrade, `syconfig.exe` automatically starts the upgrade process when the `preupgrade` utility reports no errors.

You can safely ignore any warnings SAP ASE issues about configuration parameters not being set to the default, as these are only for your information.

12. If you are upgrading from a nonclustered 12.5.4, 15.0.2, 15.5, or 15.7 server, and archive database access has been applied in the lower version server, disable the related functionality before upgrading.
13. Ensure that the procedure cache size is at least 150 percent of the default procedure cache size, or between 53,248 and 2,147,483,647 2KB pages.
14. If you have enabled the Java in the database feature, create the `sybpcidb` database and disable the feature during the installation.
15. The `syconfig` utility (`syconfig.exe` file) cannot connect to an SAP ASE that uses a named pipe directory service. Remove the named pipe directory service from the `sql.ini` interfaces file before upgrading SAP ASE.

Related Information

Reenabling Auditing [page 93]
Preparing to Install SAP ASE [page 30]
Upgrade Java in the Database [page 69]

8.5.1 Upgrade Stored Procedures

If you modified any system stored procedures without altering their names, back them up before you upgrade SAP ASE. The upgrade process overwrites these modified procedures with default versions.

8.5.2 Reserved Words

Reserved words are pieces of SQL syntax that have special meaning when used as part of a command.

Transact-SQL does not allow words that are part of command syntax to be used as identifiers unless they are enclosed in quotation marks. If you are upgrading SAP ASE, you see errors when you run queries, stored procedures, or applications that use these identifiers in your user databases.

> **Note**
>
> Before upgrading, use `sp_renamedb` to change the name of any user database that is a reserved word.

If you change an object name, also change applications and stored procedures that refer to that object. Conflicts between object names do not prevent the upgrade process from completing. However, applications that refer to conflicting object names may not work after the upgrade. Rename all objects that use reserved words.

As part of the preupgrade process, you can have `syconfig.exe` or `sybatch.exe` perform a reserved-word check. See the*Reference Manual: Building Blocks* for a complete list of reserved words.

8.5.2.1 Running a Reserved Word Check

Run the reserved word check on the SAP ASE server you are upgrading.

Context

Even if you plan to use `sqlupgraderes` to upgrade SAP ASE noninteractively, you can still first run the interactive `sqlupgrade` utility to perform reserved-word checks and other potential upgrade eligibility problems, and then continue with the upgrade if no problems are found.

Both `sqlupgrade` and `sqlupgraderes` automatically install new reserved words and the `sp_checkreswords` system procedure, which detects and displays identifiers in your existing databases that conflict with reserved words in the new database. You can use `sp_checkreswords` at any time while performing preupgrade tasks.

> **Note**
>
> Do not use an older version of `sp_checkreswords` to check for reserved words, as it does not contain the most current list of reserved words.

Procedure

The Server Config utility installs `sp_checkreswords` and checks the reserved words during the upgrade. Server Config does not display the names or locations of identifiers that conflict with reserved words; only the number of conflicts.

Server Config always discovers one reserved-word conflict for each database in your SAP ASE server. This is because the `sysobjects` table in SAP ASE inserts a reserved word with each of its table entries. You do not need to address these conflicts because they do not adversely affect the upgrade process.

8.5.2.2 Addressing Reserved Words Conflicts

Change any database names that are reserved words.

Procedure

1. Use `sp_dboption` to set the database to single-user mode, then run `sp_renamedb`, specifying the new name.
2. If other identifiers are reserved words, you can use:
   - `sp_rename` to change the name of the object, before or after the upgrade.
   - Quoted identifiers.
   - Brackets around the identifier. For example:

     ```
     create table [table] ( [int] int, [another int] int )
     ```
3. Run `sp_checkreswords` in `master` and in each user database to display the names and locations of conflicting identifiers.

   See *Reference Manual: Procedures* for information about `sp_dboption`, `sp_rename`, and `sp_checkreswords`.

8.5.2.3 Quoted Identifiers

To avoid reserved word conflicts, all users on the server must invoke the `quoted_identifier` option in all stored procedures and queries that include the reserved words.

To invoke the `quoted_identifier` option of the `set` command in procedures and queries that include the reserved words, enclose the reserved words that are identifiers in double quotation marks. The `set quoted_identifier` option tells SAP ASE to treat any character string enclosed in double quotation marks as an identifier.

See *Reference Manual: Commands* for more information on `set quoted_identifier`.

8.5.3 Preparing the Database and Devices

Before starting the upgrade process, confirm that you have enough space for the upgrade to succeed.

Procedure

1. To calculate the free space required for the upgrade to succeed, double the size of the largest catalog that you are going to upgrade, then add approximately 10 percent. For example, if you have a large number of

stored procedures or compiled objects in any database, the `syscomments` and `sysprocedures` system tables require additional space.

The `preupgrade` utility scans the system catalogs and performs this calculation automatically.

2. If you are:
   - Not using two-phase commit or distributed transaction management (DTM) applications, create a `sybsystemdb` with a minimum of 4MB if it does not already exist.
   - Using two-phase commit or DTM, create either:
     - A minimum-sized `sybsystemdb` for upgrade and expand it later, or
     - A `sybsystemdb` of 5MB to 20MB, depending on your expected usage. Approximately 25 percent of the database should be data storage, and 75 percent should be log storage.
3. If it does not already exist, create the `sybsystemdb` database. Servers that use a 2KB logical page size require a `sybsystemdb` that is at least 4MB. Servers that use a larger logical page size require a `sybsystemdb` that is at least as large as the `model` database:

```
1> create database sybsystemdb on default = '4M'
2> go
1> use sybsystemdb
2> go
1> sp_create_syscoordinations
2> go
```

   SAP ASE uses this database for tracking transactions, and during recovery. It is also used by applications using two-phase commit and DTM.
4. Verify that the `sybsystemdb` database is large enough. For an upgrade, the default size for `sybsystemdb` is 124MB, or enough free space to accommodate the existing `sybsystemdb` database, and the largest catalog that is to be upgraded, plus 10 percent for logging upgrade changes. You may need more space if you are adding user-defined stored procedures.
5. If you use Java in the database, the `preupgrade` utility detects that you set `sp_configure "enable java"` to **1**, and requests that you enable PCI and configure `sybpcidb` before you upgrade the server.
6. Increase the default database size:
   a. Use `alter database` to increase the size of the `master` database.
   For example:

```
1> alter database tempdb on master=<X>
2> go
1> alter database model on master=<X>
2> go
```

   `<X>` is the megabytes of space you are adding.

   Repeat this process for each temporary and `model` databases, making sure that `model` is at no point larger than `tempdb`.

   b. Use `sp_helpdb` to verify the size of each system database you increase in size.
   c. Use `sp_configure` to update the values as indicated by the `preupgrade` utility.
   This example updates the number of locks available for all users on the SAP ASE server to 6,000:

```
sp_configure 'number of locks', 6000
```

8.5.4 The sybprocsdev device

System stored procedures are stored in the `sybsystemprocs` database, which is stored in the `sysprocsdev` device. You may need to increase the size of `sysprocsdev` before upgrading SAP ASE.

Regardless of page size, when configuring a new server, the size of `sybsystemprocs` is:

- Minimum – 184 MB
- Default – 196 MB

For upgrades, you need an additional 10 percent of this.

You may need more space if you are adding user-defined stored procedures.

If your `sybsystemprocs` database does not meet these requirements and you have enough room on the device to expand the database to the required size, use the `alter database` command to increase the database size.

Use:

- `sp_helpdb` to determine the size of the `sybsystemprocs` database:

```
1> sp_helpdb sybsystemprocs
2> go
```

- `sp_helpdevice` to determine the size of the `sysprocsdev` device:

```
1> sp_helpdevice sysprocdev
2> go
```

If the `<db_size>` setting is less than the required minimum, increase the size of `sysprocdev`.

8.5.4.1 Increasing the Size of the sybsystemprocs Database

Create a new database with sufficient space if your current `sybsystemprocs` database does not have the minimum space required for an upgrade. The minimum size of `sybsystemprocs` is 184MB; the recommended size is 196MB.

Prerequisites

Create a current backup of your old database.

Context

Although you can drop the old database and device and create a new `sysprocsdev` device, SAP recommends that you leave the old database and device and add a new device that is large enough to hold the additional memory, and alter the `sybsystemprocs` onto the new device.

Procedure

1. In `isql`, use `alter database` to increase the size of the `sybsystemprocs` database. For example:

   ```
   1> use master
   2> go
   1> alter database sybsystemprocs on sysprocsdev=40
   2> go
   ```

   In this example, "sysprocsdev" is the logical name of the existing system procedures device, and 40 is the number of megabytes of space to add. If the system procedures device is too small, you may receive a message when you try to increase the size of the `sybsystemprocs` database.

   If there is space available on another device, expand `sybsystemprocs` to a second device, or initialize another device that is large enough.

2. Verify that the SAP ASE server has allocated more space to `sybsystemprocs`:

   ```
   1> sp_helpdb sybsystemprocs
   2> go
   ```

Results

When the database is large enough to accommodate the increased size of `sybsystemprocs`, continue with the other preupgrade tasks.

8.5.4.2 Increasing Device and Database Capacity for System Procedures

Perform one of these methods if you cannot fit the enlarged `sybsystemprocs` database on the system procedures device. The minimum size of `sybsystemprocs` is 184 MB; the recommended size is 196MB.

Procedure

- Perform this step if the device that contains `sybsystemprocs` is a file on a storage system – where the device is not a raw device, and thus can have its size modified – and there is additional space on the storage system that contains that file.
- Make the existing device larger.
  a. Use `disk resize` to extend the device.

     For example, if `sybsystemprocs` exists entirely on device `sybprocsdev`, and both the device and the database are 124 MB, The desired size of sybsystemprocs is 196 MB:

     ```
     1> disk resize name=sybprocsdev, size='72M'
     2> go
     ```

     This adds the requisite space on `sybprocsdev` (196 MB - 124 MB = 72 MB).
  b. Use `alter database` to increase the size of the database.

     ```
     1> alter database sybsystemprocs on sybprocsdev='72M'
     2> go
     ```

  Your existing device should now be larger.
- Use the following method only if the previous step could not make your existing device larger, as this method drops and re-creates the database.

  > **Note**
  >
  > This procedure removes all stored procedures you have created at your site. Before you begin, save your local stored procedures using the `defncopy` utility. See the *Utility Guide*.

- This procedure involves dropping the database. For more information on `drop database`, see the *Reference Manual*.
  a. Determine which device you must remove:

     ```
     select <d.name>, <d.phyname>
     from sysdevices d, sysusages u
     where u.vstart between d.low and d.high | u.vdevno = d.vdevno
     and u.dbid = db_id("sybsystemprocs")
     and d.status & 2 = 2
     and not exists (select vstart
         from sysusages u2
         where u2.dbid != u.dbid
         and u2.vstart between d.low and d.high | u.vdevno = d.vdevno)
     ```

     Where:

- <d.name> – is the list of devices to remove from sysdevices.
- <d.phyname> – is the list of files to remove from your computer.
- u.vstart between d.low and d.high – is the syntax you use for SAP ASE version 12.5.4
- u.vdevno = d.vdevno – is the syntax you use for SAP ASE versions 15.0 and later

The not exists clause in this query excludes devices that are used by sybsystemprocs and other databases.

Make a note of the names of the devices to use in subsequent steps.

> **Caution**
>
> Do not remove any device that is in use by a database other than sybsystemprocs, or you will destroy that database.

b. Drop sybsystemprocs:

```
1> use master
2> go
1> drop database sybsystemprocs
2> go
```

> **Note**
>
> In versions earlier than 15.x, use sysdevices to determine which device has a low through high virtual page range that includes the vstart from step 2.
>
> In version 15.x, select the <vdevno> from sysusages matching the <dbid> retrieved in step 1.

c. Remove the device:

```
1> sp_configure "allow updates", 1
2> go
1> delete sysdevices
    where name in ("<devname1>", "<devname2>", ...)
2> go
1> sp_configure "allow updates", 0
2> go
```

The where clause contains the list of device names returned by the query in step 1.

> **Note**
>
> Each device name must have quotes. For example, "<devname1>", "<devname2>", and so on.

If any of the named devices are OS files rather than raw partitions, use the appropriate OS commands to remove those files.

d. Remove all files that were returned in the <d.phyname> list.

> **Note**
>
> File names might not be complete path names. If they are relative paths, note that they are relative to the directory from which your server was started.

e. Find another existing device that meets the requirements for additional free space, or use a `disk init` command similar to the following to create an additional device for `sybsystemprocs`, where `\sybase\work\` is the full, absolute path to your system procedures device:

```
1> use master
2> go
1> disk init
2> name = 'sysprocsdev',
3> physname = '\sybase\work\sysproc.dat',
4> size = '200M'
5> go
```

> **Note**
>
> Server versions 12.0.x and later accept, but do not require `"vdevno=number"`. For information about determining whether `vdevno` is available, see the *System Administration Guide.*

The size you provide should be the number of megabytes of space needed for the device, multiplied by 1024. `disk init` requires the size to be specified in 2KB pages. In this example, the size is 200 MB (200 x 1024 = 204,800). For more information on `disk init`, see the *Reference Manual: Commands*.

f. Create a `sybsystemprocs` database of the appropriate size on that device, for example:

```
1> create database sybsystemprocs on sysprocsdev = 180
2> go
```

g. In the old server installation directory, enter:

```
isql -Usa -P<password> -S<server_name> -i %SYBASE%\ASE-15_0\scripts
\instmstr
```

8.6 Upgrade to SAP ASE 16.0 SP02

If you are performing a major upgrade from a version earlier than 16.0, and you successfully run the `preupgrade` utility to test upgrade eligibility, you can upgrade the server, using `syconfig.exe` (the `Server Config` utility) or `sybatch.exe`.

> **Note**
>
> The `syconfig` utility (`syconfig.exe`) cannot connect to an SAP ASE server that uses a named pipe directory service. Remove the named pipe directory service from the interfaces file before upgrading the SAP ASE server.

8.6.1 Upgrading SAP ASE on Windows

Use the Server Config utility to upgrade SAP ASE.

Procedure

1. If you are upgrading from SAP ASE 12.5, 12.5.4, Or 15.x, run the `sybatch` utility (`sybatch.exe`) to perform the upgrade:

   ```
   set <OLDSYBASE>=<<old_$SYBASE_directory>>
   set <OLDSYBASE>_ASE=ASE-12_5
   ```

   For 15.x releases:

   ```
   set <OLDSYBASE>=<<old_$SYBASE_directory>>
   set <OLDSYBASE>_ASE=ASE-15_0
   ```

   Install the new SAP ASE into the same directory as the SAP ASE you are upgrading.

2. Go to *Start* > *Programs* > *SAP* > *Adaptive Server Enterprise* > *Server Config* >, and click *Upgrade Adaptive Server* in the Configure Sybase Servers window.
3. If you are upgrading from:

Version	Enter
SAP ASE 12.5.4	○ `ASE-12_5` for the old ASE component directory ○ `OCS-12_5` for the old OpenClient directory
SAP ASE 15.x	○ `ASE-15_0` for the old ASE component directory ○ `OCS-15_0` for the old OpenClient directory

   Click *Continue*.

4. In Existing Servers, select the SAP ASE server to upgrade.
5. In *Password*, enter the administrator login name and password, then click *Continue*. SAP ASE starts running.
6. Before making any changes to the existing SAP ASE databases, you see:

   You are advised to back up your databases before upgrading. Do you want to proceed with the upgrade? Click:

   - *Yes* if you have backed up the databases.
   - *No* if you have not. Use `dump database` to make back-up copies before proceeding.

   The Server Config utility begins the database eligibility test. Once all preupgrade checks succeed, it upgrades the server.

7. If the upgrade is successful, back up all the databases, including the master database, in your upgraded SAP ASE.

   To check the upgrade, use a text editor to view the log file in `%SYBASE%\%SYBASE_ASE%\upgrade\errorlog.upg`.

   View log information in `%SYBASE\%SYBASE_ASE%\init\logs\`.

8.6.2 Manually Upgrading SAP ASE

You can upgrade manually from a major release earlier than 16.0 without using a wizard or utility.

Prerequisites

- Source the old `SYBASE.bat` file.
- Start the old SAP ASE server.
- Source the new `SYBASE.bat` file.
- Run `%SYBASE%\ASE-16_0\bin\preupgrade.exe`

Context

To upgrade SAP ASE manually, use the `upgrade` executable located in `%SYBASE%\ASE-16_0\bin`.

Procedure

1. Copy the `sql.ini` interfaces file from old installation directory to new directory if they are not the same.
2. Copy the `<server_name>.cfg` file from old directory to the new `%SYBASE%` directory.
3. Copy `RUN_server_name` file in old `%SYBASE%\%SYBASE_ASE%\install` directory to the new `%SYBASE%\ASE-16_0\install`
4. Update the paths of the `RUN_server_name` file in `%SYBASE%\%SYBASE_ASE%\install`.
5. Update the registry keys paths:
   - `HKEY_LOCAL_MACHINE\SOFTWARE\Sybase\servers\<ASE_server_name>\* -`
   - `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\services\SYBSQL_<ASE_server_name>\*`
6. Source the `SYBASE.bat` file in the new directory.
7. Start SAP ASE from the Windows Service or by executing the `net start SYBSQL_<server_name>` file.
8. Run `upgrade`. If problems occur, fix them, and re-run the upgrade process.
9. Reinstall the SAP ASE-supplied stored procedures to prevent any errors caused from changes to the system catalogs.

8.6.3 Install and Upgrade an Existing Installation

Use a binary overlay to install SAP ASE 16.0 SP02 over an existing version 16.0 installation directory.

If you have enabled the Java-in-the-database feature, create the `sybpcidb` database and disable the feature during the installation.

After you install SAP ASE version 16.0 SP02 over an existing 16.0 directory, run the `updatease` utility to upgrade the ASE servers.

Related Information

Upgrade Java in the Database [page 69]

8.6.3.1 Determining the SAP ASE Version

Before using the binary overlay, verify that your current version of SAP ASE is at least 16.0.

Procedure

Verify that you have version 16.0 or higher:

- If your server is running:

```
1> select @@version
2> go
```

- If your server is not running:

```
%SYBASE%\%SYBASE_ASE%\bin\sqlsrvr -v
```

Results

If the result shows that SAP ASE is earlier than version 16.0, you cannot use the binary overlay, but must use an upgrade method instead. See SAP ASE Upgrades [page 65].

8.6.3.2 Backing Up SAP ASE

Installing SAP ASE version 16.0 SP02 and later overwrites the current SAP ASE software. Before installing, verify that your databases are error-free, and back up the SAP ASE directory.

Procedure

1. To ensure that your database is error free, run `dbcc checkdb`, `dbcc checkcatalog`, and `dbcc checkstorage` before loading any new SAP ASE binaries, including the master database. If the `dbcc` commands reveal problems, call SAP Technical Support.
2. After you have verified that your database is error free, back up your `%SYBASE%` directory in case you need to roll back to the original version of the software.
3. SAP ASE provides the `uninstmsgs.ebf` script for backing up `sysmessages` before upgrading to 16.0 SP02. Use it to back up `sysmessages` before running `instmsgs.ebf`.

8.6.3.3 Installing SAP ASE Using the Binary Overlay

Use the installer to install SAP ASE version 16.0 SP02 on top of your existing SAP ASE, if it is no earlier than version 16.0.

Procedure

1. From your SAP ASE directory, shut down the servers that are using the binaries. Use a regular "polite" shutdown as opposed to using the `shutdown with nowait` option, both as the initial and final steps. Doing so flushes free space accounting figures, object statistics, and runs `checkpoint` on the database to minimize recovery work during the upgrade process.
2. Use the installer to load the new software from the installation media.

   Navigate to the CD or DVD drive and enter `./setup.bin`.

   The installer starts automatically.
3. Select the language.
4. On the Introduction screen, click *Next*.
5. Specify the destination directory with the SAP ASE you want to update, then click *Next*.

   > **Note**
   >
   > Do not use single or double quotes character when specifying a path. The installer does not recognize quote marks, and displays an error.

6. If you see *Choose Update Installation*, this means that there is an older version of SAP ASE in the directory you specified for the installation.

If you click:

- *Yes* – the installer identifies which features you already have, and automatically updates them to the newest version.
- *No* – the installer prompts you to perform a typical, full, or custom installation to specify what features you want to update.

> **Note**
>
> Clicking *No* does not take you to the previous screen to change the installation directory. To do this, click *Previous*.

7. Click *Next*.
   The installer checks that the version you wish to update is compatible with the version of SAP ASE you are installing. If the version is incompatible, the *Check Upgrade Incompatible Version* dialog appears, and you see a message similar to:
   Warning: The current "SAP Adaptive Server Enterprise Suite" in your destination directory is not compatible with this version upgrade; some bug fixes may be unavailable if you proceed. See the release note for more information.

   You may see a similar message if your SAP ASE is an out-of-band release, such as an emergency bug fix, one-off, controlled, or instrumental release:
   Warning: The current "SAP Adaptive Server Enterprise Suite" in your destination directory is an out-of-band release; some bug fixes may be unavailable if you proceed. Verify that the bug fixes you need are in this newer version before proceeding with the upgrade.

   If you see such messages, click *Cancel* to stop the installation process. To override the error and continue with the installation, select *Proceed installation with incompatible version* and click *Next*.

   > **Caution**
   >
   > Upgrading to an incompatible version may cause software regression. We recommend that you cancel the installation and obtain a compatible version of SAP ASE.

   If you perform the installation in a silent, or unattended mode, and the versions are incompatible, the installer asks you to rerun the installer with this argument, then quit:

   ```
   -DALLOW_UPGRADE_TO_INCOMPATIBLE_VERSION=true
   ```

8. Install SAP ASE 16.0 SP02 into the existing `%SYBASE%` installation path.

   Once the installer unloads the files, the installer displays the Choose Update Adaptive Server dialog, which installs and updates SAP ASE, system stored procedures, and messages. If you select *Update Adaptive Server*, the installer prompts you to select your SAP ASE, and enter the system administrator password.

9. Navigate to *Start* > *Settings* > *Control Panel* > *Administrative Tools* > *Services* > *SAP SQLserver_<servername>*, then stop and start the services to restart the SAP ASE server.
10. Run `select @@version`. The server should now be at version 16.0 SP02.

8.6.3.4 The updatease Utility

The `updatease` utility reinstalls scripts and updates system stored procedures and messages.

The `updatease` executable file is located in the `%SYBASE%\%SYBASE_ASE%\bin\` directory.

When you perform a minor upgrade or update from SAP ASE version 16.0 and later, you must also reinstall the scripts in `%SYBASE%\ASE-16_0\scripts\` as well as update the system stored procedures and messages.

`updatease` can perform these tasks for you.

> **Note**
>
> If you performed the minor upgrade using the SAP ASE installer, the installer ran `updatease` in the background; you need not perform any additional steps.

Syntax

```
updatease -S<server_name> -P<ASE_password> -k
```

Parameters

-S<server_name>
: specifies the SAP ASE you are updating.

-P<ASE_password>
: is the SAP ASE "sa" password. If you do not specify this, `updatease` obtains the information from the SYBASE_ASE_SA_PWD environment variable or at the prompt.

-k
: (optional) when specified, skips the database free-space check.

Permissions

To use `updatease`, you must be an SAP ASE system administrator (the sa login).

8.7 Upgrading in Silent Mode

To perform a silent, or unattended installation, run the installer and provide a response file that contains your preferred installation configuration.

Procedure

1. Create a response file during a console or GUI upgrade:

```
setupConsole.exe -r <response_file_for_upgrade>
```

2. If you are upgrading to SAP ASE 16.0 SP02 from SAP ASE 15.5 or later, set the following properties in the response file to **true**:

Property	Description
DO_UPDATE_INSTALL	When you set DO_UPDATE_INSTALL to **true**, the installer reviews and updates the installed components in $SYBASE.

DO_UPDATE_ASE_SERVER	(Optional) When you set DO_UPDATE_ASE_SERVER to **true**, the installer installs (or reinstalls) system procedures, messages, scripts, and so on in the SAP ASE instance.
	DO_UPDATE_ASE_SERVER is valid only if you set DO_UPDATE_INSTALL to **true**.
	The DO_UPDATE_ASE_SERVER property requires that you also set:
	○ UPDATE_ASE_SERVER_NAME_[<n>]=<SAP_ASE_name_to_update>
	○ UPDATE_ASE_PASSWORD_[<n>]=<SAP_ASE_password> – if the SAP ASE password is null, set this value to "**NA**".
	For example:
	`DO_UPDATE_ASE_SERVER=true`
	`UPDATE_ASE_SERVER_NAME_1=SYBASE1`
	`UPDATE_ASE_PASSWORD_1=NA`
	`UPDATE_ASE_SERVER_NAME_2=SYBASE2`
	`UPDATE_ASE_PASSWORD_2=NA`
	You also can set UPDATE_ASE_SERVER_NAME_[<n>] and UPDATE_ASE_PASSWORD_[<n>] property values through the UPDATE_ASE_SERVER_NAME_[<n>] and UPDATE_ASE_PASSWORD_[<n>] environment variables.
	If you choose to update the SAP ASE instance manually after the installation, you need not set DO_UPDATE_ASE_SERVER.

> **Note**
>
> Do not include the DO_UPDATE_INSTALL property in the response file if you are upgrading from a version of SAP ASE earlier than 15.5, as this causes the installer to fail.

3. Run:

```
setup.exe -f <response_file_for_upgrade> -i silent
-DUSER_INSTALL_DIR=<install_location> -DAGREE_TO_SAP_LICENSE=true
```

where:

- `<response_file_for_upgrade>` – is the absolute path of the file name containing the upgrade options you chose.
- `<install_location>` – is the directory in which you are upgrading SAP ASE.

Agree to the SAP License Agreement when upgrading in silent mode using one of these methods:

- Include the option `-DAGREE_TO_SAP_LICENSE=true` in the command line argument
- Edit the response file to include the property `AGREE_TO_SAP_LICENSE=true`.

Except for the absence of the GUI screens, all actions of InstallAnywhere are the same, and the result of an upgrade in silent mode is exactly the same as one done in GUI mode with the same responses.

> ⚠ Caution
>
> You should use the `setupConsole.exe` executable, which runs in the foreground when you are running a silent installation. The normal `setup.exe` executable runs in the background, giving you the impression that the installation has terminated, and results in additional installation attempts using the silent installation. Multiple installations at the same time may corrupt the Windows Registry and lead to a failure to restart the operating system.

Related Information

Installing SAP ASE Using a Response File [page 42]
Creating a Response File [page 42]
Installing in Silent Mode [page 45]

8.8 Postupgrade Tasks

After you have upgraded, make sure your new SAP ASE server is up and running.

Context

The upgrade process does not cause any changes in existing statistics, so you need not run `update statistics` on any tables after the upgrade. If you are upgrading from SAP ASE version 15.x, however, restart the server to make the statistics available.

Procedure

1. To explicitly re-compile the objects, run `dbcc upgrade_object()` for each database.
2. If you upgraded from SAP ASE version 12.5.2 or earlier, ensure there are no issues with OAM pages by running `dbcc checkcatalog` with the `fix` option:

   ```
   dbcc checkcatalog (<database_name>, fix)
   ```

3. If you have any system stored procedures that you had saved from before the upgrade (because you had modified them without altering their names), reload them now.
4. Execute:

   ```
   dbcc gam (<dbname>,0,0,'check')
   ```

   This command performs upgrade operations on `text` and `image` columns that are deferred during the SAP ASE upgrade process, and prevents `dbcc checkstorage` from taking a long time when it is run for the first time after the upgrade.

Related Information

Considerations When Upgrading from SAP ASE 15.0.x [page 66]
Restoring Functionality in SAP ASE After Upgrading [page 92]
How Compiled Objects Are Handled When Upgrading SAP ASE [page 104]

8.8.1 Running the instmsgs.ebf Script

Run message-related scripts after upgrading from version 16.0 to version 16.0 SP01.

Procedure

1. If you upgraded from SAP ASE version 16.0, run `uninstmsgs.ebf` to safeguard your modified messages in the `master` database before you install the default version 16.0 SP01 messages:

   ```
   isql -Usa -P<password> -w1000 -iuninstmsgs.ebf -orestoremsgs.ebf
   ```

2. Run `instmsgs.ebf` to install the default 16.0 SP01 messages:

   ```
   isql -Usa -P<password> -iinstmsgs.ebf
   ```

> **Note**
>
> To undo `instmsgs.ebf` changes, run this script once you have downgraded to the version from which you upgraded:
>
> ```
> isql -S -Usa -P<password> -irestoremsgs.ebf
> ```

3. If you use localized files, install any localized language using `langinstall`, `sqlloc`, or `syconfig`.

   If you run `instmsgs.ebf` after installing the 16.0 SP01 localized messages, this script may delete some new messages.

8.8.2 Restoring Functionality in SAP ASE After Upgrading

Restore functionality in the server after an upgrade.

Procedure

1. If you changed any configuration parameters before upgrading, use `sp_configure` to set them back to their earlier values.
2. Use `sp_dboption` to reset any database options you disabled before upgrading.
3. Before you use the upgraded server, verify that all custom scripts point to SAP ASE 16.0.
4. Verify procedure cache allocation. The size should be the same as before upgrading, unless the original size was smaller than the default value.
5. Check the procedure cache requirements. Version 16.0 stored procedures, triggers, and other compiled objects require much more memory to run than earlier versions.

   Use `sp_configure` to increase the `procedure cache size` during runtime, and `sp_configure verify` to verify any changes you make to the configuration file without having to restart SAP ASE:

   ```
   sp_configure "configuration file", 0, "verify", "<full_path_to_file>"
   ```

   See *Reference Manual: Procedures* and the *Performance and Tuning Guide* for details about `sp_configure` and `sp_sysmon`, and the *System Administration Guide* for information about configuring memory.
6. Verify data cache allocation.

   During the upgrade process, the server ensures that the default data cache size remains the same. Therefore, during the preupgrade process before the upgrade, the size of the default data cache is obtained and written to the configuration file as an absolute value, not as a default. This enables the server to have the same default data cache size as before the upgrade. If this size is less than the default size of 8MB, the server allocates a default data cache of 8MB.
7. If you unmirrored devices, remirror them using the `disk remirror` command.
8. If you used compiled objects, see How Compiled Objects Are Handled When Upgrading SAP ASE [page 104].

9. If you used two-phase commit in the earlier version of SAP ASE, run the script to install the two-phase commit tables:

```
isql -U<sa> -P<sa_password> -S<server_name>
  -i%SYBASE%\%SYBASE_ASE%\scripts\instcomm
```

Related Information

Postupgrade Tasks [page 90]
How Compiled Objects Are Handled When Upgrading SAP ASE [page 104]

8.8.3 Reenabling Auditing

If the server you upgraded from was configured for auditing, reenable auditing in the upgraded server.

Procedure

1. Enter:

```
sp_configure 'auditing', 1
```

2. Reenable auditing for all system stored procedures for which auditing was enabled before the upgrade.
   a. Use the output of `sp_displayaudit` recorded during the preupgrade process to identify the system stored procedures for which auditing was enabled.
   b. Reenter the audit options using `sp_audit`. For example, if you had enabled stored procedure auditing for `sp_addgroup` stored procedure in your server before upgrading, run:

```
sp_audit "exec_procedure", "all", "sp_addgroup", "on"
```

Related Information

Preupgrade Tasks [page 72]
Preparing to Install SAP ASE [page 30]
Upgrade Java in the Database [page 69]

8.8.3.1 Updating Threshold Procedures for Audit Segments

An post-upgrade task is required for threshold procedures used to archive audit segments.

If your previous installation used a threshold procedure, similar to this, execute the following to archive the <sysaudits> table:

```
INSERT MyPre15SysAuditHistoryTable SELECT * FROM
sysaudits_0n
```

where <n> corresponds to the sysaudits table number 1–8 and MyPre15SysAuditHistoryTable is a table defined prior to version 16.0, then you must alter MyPre15SysAuditHistoryTable to add a nodeid column using:

```
alter table MyPre15SysAuditHistoryTable
    add nodeid tinyint NULL
```

See the *Reference Manual: Tables* for system tables for details about the sysaudits tables.

8.8.4 Restoring Permissions on System Stored Procedures

If the server you upgraded from had site-specific permissions on system stored procedures, restore those permissions in the upgraded server.

8.9 Migrate

You can migrate from 32-bit to 64-bit versions on different computers or partitions.

To migrate SAP ASE from the 32-bit to the 64-bit version, first install and configure the 64-bit operating system.

SAP ASE 12.5.x 32-bit for Windows can run on a Windows x64 OS. The opposite, however, is not true; you cannot run SAP ASE 64-bit software on a Windows 32-bit OS.

To migrate, you can:

- Use dump and load.
- Use the bcp utility.
- Replace the binary.

Note

Once you have install your new SAP ASE server, the environment variables become set to the last version installed. To run the previous installation, run the SYBASE.bat file from the command prompt to set the 12.5.x environment, such as:

```
c:\sybase125
```

```
c:\sybase15
```

8.9.1 Migrating Data Using a Dump-and-Load Method

To perform migrations, back up and restore databases using the `dump` and `load` commands.

Procedure

1. In the 32-bit SAP ASE server, run `dbcc` checks (`checkdb`, `checkalloc`, `checkcatalog`, and `checkstorage`) on all databases in the 32-bit SAP ASE server to ensure they are error free.
2. Create a 64-bit server in a new directory.
3. Create devices and databases to match those in the 32-bit server. Make sure the `<sysusages>` mapping is correct.

   > **Note**
   >
   > Allow 10 percent additional space for the `sybsystemprocs` database.

4. Dump the databases from the 32-bit server.
5. Load the databases to the 64-bit server.
6. If you have partitioned tables, update partition statistics.
7. Run `dbcc` checks on the 64-bit server and make sure they run cleanly.

   For information on upgrading compiled objects, see Finding Compiled Object Errors Before Production [page 105].

8.9.2 Migrating Data Using bcp

If you use DDL scripts to create devices, databases, tables, rules, stored procedures, triggers, and views, you can use `bcp` to migrate data from a 32-bit SAP ASE to a 64-bit SAP ASE.

Context

If you:

- Do not have DDL scripts, use the `ddlgen` utility to re-create the schema for the SAP ASE you are about to migrate. See the *Utility Guide*.
- Have DDL scripts to create devices, databases, tables, rules, stored procedures, triggers, and views, you can use `bcp` to move data out of the old database and into the new.

Procedure

1. In the 32-bit SAP ASE, run `dbcc` checks (`checkdb`, `checkalloc`, `checkcatalog`, and `checkstorage`) on all databases in the 32-bit SAP ASE to ensure they are error free.
2. Use `bcp` to extract all the data from all the tables in the databases.
3. Create a new 64-bit SAP ASE in a new directory.
4. Create devices, databases, and tables.
5. Use `bcp` to bulk copy data into tables.
6. Re-create all views, triggers, and stored procedures.
7. Run `dbcc` checks on the 64-bit SAP ASE server and make sure they run cleanly.

8.10 SAP ASE Components and Related Products

After you finish upgrading SAP ASE, upgrade its components and related products.

Refer to *Using SAP Failover in a High Availability System* for instructions on how to upgrade an SAP ASE configured with high availability.

8.10.1 Upgrading Job Scheduler

After upgrading to a new SAP ASE server, upgrade Job Scheduler.

Context

> **Note**
>
> You must have `%SYBASE%\%SYBASE_OCS%\bin` directory in `PATH` so the `isql` executable is accessible. Use `isql` to perform all the steps in this task.

Procedure

1. Copy the directory services entry for JSAGENT (or jsagent) from the old server to the new server.
2. Make sure the new server is running.
3. Ensure that at least 9000 locks are configured. If the number of locks on the server is fewer than 9000, increase it:

```
1> sp_configure "number of locks", 9000
```

```
2> go
```

4. Before you restart the SAP ASE server and run Job Scheduler, run the `installjsdb` script to update Job Scheduler tables and stored procedures:
   a. Disable Job Scheduler:

   ```
   1> sp_configure "enable job scheduler", 0
   2> go
   1> sybmgmtdb..sp_sjobcontrol @name=NULL, @option="stop_js"
   2> go
   ```

   b. Run the `installjsdb` script:

   ```
   isql -Usa -Psa_password -S<servername>
   -i%SYBASE%\%SYBASE_ASE%\scripts\installjsdb
   ```

   > **Note**
   >
   > The directory with the `isql` executable (`%SYBASE%\%SYBASE_OCS%\bin`) must be in your path.

   The `installjsdb` script looks for the `sybmgmtdb` database.

   c. Enable Job Scheduler:

   ```
   sp_configure "enable job scheduler", 1
   ```

   d. To start Job Scheduler, either restart the server, or enter:

   ```
   1> use sybmgmtdb
   2> go
   1> sp_sjobcontrol @name=NULL, @option="start_js"
   2> go
   ```

5. Restart the SAP ASE server if you restarted Job Scheduler manually.
6. (Optional) Add more log space. Some 64-bit platforms require additional space for the `sybmgmtdb` log:

   ```
   1> use master
   2> go
   1> alter database sybmgmtdb LOG on sybmgmtdev=20
   2> go
   ```

7. To upgrade `sybmgmtdb`, run the `installjsdb` script that is included, saving the output to a file:

   ```
   isql -Usa -Psa_password -Sservername -n -i%SYBASE%\%SYBASE_ASE%\scripts
   \installjsdb -ooutput_file
   ```

   > **Note**
   >
   > When upgrading to SAP ASE version 16.0 SP02 from earlier versions, make sure that the size of `sybmgmtdb` is at least 160 MB, so that it has at least 60 MB of free log space.

8.10.1.1 Upgrading Job Scheduler Templates

After upgrading to the new server, upgrade the templates and jobs created by Job Scheduler.

Context

> **Note**
>
> Several changes impact the Job Scheduler templates. These changes make some templates incompatible with earlier versions of the server. The current templates are version 3.0 in the XML files.

Procedure

1. Disable Job Scheduler.
2. Update environment variables, scripts, or applications that refer to the Job Scheduler directory path. The Job Scheduler directory is under the `ASE-16_0` directory, in `%SYBASE%\%SYBASE_ASE%\jobscheduler`.

   Directories below `jobscheduler` remain the same.
3. Copy files from the `jobscheduler` directory to the `ASE-16_0` directory. If you are installing the new server directories over the old server directories, the installer automatically moves your files to the new `jobscheduler` directory.
4. If you modified SAP-supplied templates, stored procedures, or XML documents, do not overlay the new templates with your modified versions. If you do, you lose the enhancements provided by the revised templates. Carefully merge your template changes into the SAP template files, or better yet, rename your modified templates.
5. You may need to make minor modifications to jobs you created from 2.0 or earlier templates. In some templates, parameters changed from `varchar(5)` to `int`. The following table lists the templates that changed in version 2.1 and the changes you must make to the SQL code in the jobs created from the templates.

   Table 11: Changed Job Scheduler Templates

Template	Modified Files	Datatype for <parameter> Changed from varchar(5) to int
`dump database`	`jst_dump_databases`	`@use_srvr_name`
`dump database log`	`jst_dump_log`	`@truncate_flag` and `@use_srvr_name`
`update statistics`	`jst_update_statistics`	`@index_flag`
`rebuild indexes`	`jst_reorg_rebuild_indexes`	`@dump_flag`

Template	Modified Files	Datatype for <parameter> Changed from varchar(5) to int
rebuild table	jst_reorg_rebuild_tables	@dump_flag
reclaim indexes	jst_reclaim_index_spac	@dump_flag
reclaim tables	jst_reclaim_table_space	@resume_flag

6. Some Job Scheduler templates have been modified to support new server functionality. These changes are related to new parameters for specifying a partition name, or a data change value for the new server commands that added these options. If you have jobs created from any of the enhanced templates, modify the SQL of the jobs for the 16.0 SP02 servers.

   If you have a job scheduled to run on a pre-16.0 server and you need it to also run on 16.0 SP02 servers, leave the existing job alone and create a new job for pre-16.0 servers, as the job commands are different.

   You need not modify any jobs you run on pre-16.0 servers. The following table lists the templates that changed in version 3.0 and the changes you must make to jobs created from them.

   > **Note**
   >
   > All templates listed below, except `delete statistics`, are incompatible with pre-15.0.1 servers. Do not use them to create jobs that are scheduled on pre-15.0.1 servers; you must use the 2.1 or 2.2 versions for pre-15.0.1 servers.

   Table 12: Modified Job Scheduler Templates

Template	Modified File	Change Description	Job Modifications
delete statistics	jst_delete_statistics	Added @ptn_name as third parameter.	Optional.
update statistics	jst_update_statistics	Added @ptn_name as fifth parameter, @datachg_threshold as the 10th parameter, and added reference.	Required. Include values (or NULL) for new parameters.
rebuild indexes	jst_reorg_rebuild_indexes	Added @ndx_ptn_name as third parameter.	Required. Include value (or NULL) for new parameter.
reclaim indexes	jst_reclaim_index_space	Added @ptn_name as third parameter.	Required. Include value (or NULL) for new parameter.
reclaim tables	jst_reclaim_table_space	Added @ptn_name as second parameter.	Required. Include value (or NULL) for new parameter.
multiple	jst_get_freespace, jst_get_usedspace	Replace reserved_pgs and data_pgs with reserved_pages and data_pages.	No impact on job SQL.

7. Install the template stored procedures and move them to the Job Scheduler template stored procedure directory. For example:

```
cd %SYBASE%\%SYBASE_ASE%\jobscheduler\Templates\sprocs
```

   Run the stored procedure installation script for each server being upgraded:

```
installTemplateProcs <<servername>> <<username>> <<password>>
```

   > **Note**
   >
   > Upgrade template stored procedures on all Job Scheduler servers and target servers that are upgraded to SAP ASE version 16.0 SP02. Do not install them on pre-15.5 servers.

8. Install and move the template XML documents into the JS template XML directory. For example:

```
cd %SYBASE%\%SYBASE_ASE%\jobscheduler\Templates\xml
```

9. Before running the `installTemplateXml` XML installation script, set the SYBASE_ASE_SA_USER environment variable and SYBASE_ASE_SA_PWD variable in the `SYBASE.csh` file before running the XML installation script:
10. Run the XML installation script on 16.0 SP02 servers with Job Scheduler installed:

```
installTemplateXml <servername> <machinename> <serverport>
    <username> <password> [<language_code>]
```

   Use "en" for the `<language_code>` or omit the parameter completely, as "en" is the default.

   > **Note**
   >
   > Upgrade template XML documents on all Job Scheduler servers upgraded to SAP ASE version 16.0 SP02. Do not install them on pre-16.0 servers or servers where Job Scheduler is not installed.

8.10.2 Upgrading High Availability and Cluster Support

Upgrade the cluster subsystem.

Context

> **Note**
>
> Use these steps to upgrade a cluster subsystem for a nonclustered edition of SAP ASE.

SAP ASE 16.0 and higher supports these cluster platforms for high availability:

- HPIA – MCSG 11.18
- IBM AIX – PowerHA 7.1

- Sun Solaris – VCS4.0, SunCluster 3.2
- Linux-AMD – VCS4.1
- Win2008 R2 – Failover Cluster

There are two ways to upgrade a cluster subsystem:

Procedure

- Perform a major upgrade, which involves cluster downtime, then shut down and restart all servers. You must:
  a. Run `sp_companion suspend`, as described in *Using SAP Failover in a High Availability System*.
  b. Take offline the resource groups of primary and secondary companions on both nodes. Ensure that the companion server and corresponding resource groups are not automatically brought online until the cluster system upgrade is complete.
  c. Upgrade the cluster subsystem following the instructions from the cluster system vendor. You may find options to migrate the current resource groups to the new cluster version. If such an option is not available (or if the resource groups get deleted or corrupted), re-create the resource groups and configure them appropriately after you have upgraded the cluster system.
  d. Bring the resource groups online. This should bring primary and secondary companions online on their respective nodes.
  e. Run `sp_companion resume` as described in *Using SAP Failover in a High Availability System*.
- To avoid cluster downtime, perform a minor upgrade. Nodes are failed over to other nodes and upgraded one at a time. For example, assuming ASE1 is the primary companion on node N1, and ASE2 is secondary companion running on node N2:
  a. Upgrade the primary companion:
     1. Relocate the primary resource group to N2 or shut down ASE1. This causes ASE1 to fail over from N1 to N2.
     2. Upgrade the cluster subsystem on N1 following the upgrade instructions provided by the vendor.
     3. Fail back ASE1 from N2 to N1. See the appropriate cluster chapter in *Using SAP Failover in a High Availability System* for more details on SAP ASE failback.
  b. Upgrade the secondary companion. If you are using a symmetric configuration, follow the steps in "upgrade the primary companion," above, for ASE2.
     If you are using an asymmetric configuration:
     1. Take the secondary resource group offline and verify that ASE2 is shut down. ASE2 is unavailable during this upgrade.
     2. Upgrade the cluster subsystem on N2 following the upgrade instructions from the vendor.
     3. Start ASE2 by bringing the secondary resource group online to N2.

8.10.3 Upgrading Java in the Database

If Java in the database functionality is currently enabled, you must run the `installpcidb` script, which creates tables and stored procedures in the `sybpcidb` database.

Procedure

1. Use `isql` to run the `installpcidb` script, saving the output to an operating system file.

```
isql -Usa -P<<sa_password>> -S<<server_name>>
  -i%SYBASE%\%SYBASE_ASE%\scripts\installpcidb
-o<<output_file>>
```

2. Enable the Java in the database functionality:

```
1> sp_configure 'enable pci', 1
2> go
1> sp_configure 'enable java', 1
2> go
```

   You may need to increase `'max memory'` to enable these parameters. Restart the server for changes to take effect. You can configure the maximum size of the PCI bridge memory pool through the `'pci memory size'` configuration parameter. For more information, see *Java in Adaptive Server Enterprise*.

8.10.3.1 Enabling Java in the Database in a High Availability System

You can use the Java in the database feature on a system that also uses high availability.

Context

Drop high availability companionship before installing the `sybpcidb` database, and reestablish companionship afterwards.

Java in the database functionality must be either enabled or disabled on both nodes of the high availability system.

8.10.4 Upgrading Backup Server

You can upgrade Backup Server at any point after you upgrade SAP ASE using similar steps. XP Server does not have a formal upgrade process.

Procedure

1. If you are:

Option	Description
Upgrading during the initial server installation	Select: ○ *Upgrade Existing Servers* when the installer prompts ○ *Upgrade SAP ASE Server and Backup Servers* This launches the `sqlupgrade` utility. Click *OK*.
Upgrading after the initial installation	Start the `sqlupgrade` utility from the command line. Enter: `%SYBASE%\%SYBASE_ASE%\bin\sqlupgrade`

2. Perform the upgrade steps as prompted.

8.10.5 Upgrading Databases Using Dump and Load

When you upgrade SAP ASE, you can also upgrade databases and transaction logs from versions of SAP ASE as early as 12.5 using the `dump` and `load` commands.

Context

Some issues of which you should be aware:

- The upgrade process requires space for copying data and logging changes to the system tables. If the source database in the dump was full, the upgrade process might fail. You can use `alter database` to extend the free space in the event of insufficient-space errors.
- After reloading an older dump, run `sp_checkreswords` from the new installation on the loaded database to check for reserved words.

8.10.6 How Compiled Objects Are Handled When Upgrading SAP ASE

SAP ASE upgrades compiled objects based on their source text.

Compiled objects include:

- Check constraints
- Defaults
- Rules
- Stored procedures (including extended stored procedures)
- Triggers
- Views

The source text for each compiled object is stored in the `syscomments` table, unless it has been manually deleted. The upgrade process verifies the existence of the source text in `syscomments`. However, compiled objects are not actually upgraded until they are invoked.

For example, if you have a user-defined stored procedure named `list_proc`, the presence of its source text is verified when you upgrade. The first time `list_proc` is invoked after the upgrade, SAP ASE detects that the `list_proc` compiled object has not been upgraded. SAP ASE recompiles `list_proc`, based on the source text in `syscomments`. The newly compiled object is then executed.

Upgraded objects retain the same object ID and permissions.

You do not receive any notification if the compiled objects in your database dump are missing source text. After loading a database dump, run `sp_checksource` to verify the existence of the source text for all compiled objects in the database. Then, you can allow the compiled objects to be upgraded as they are executed, or you can run `dbcc upgrade_object` to find potential problems and upgrade objects manually.

Compiled objects for which the source text has been hidden using `sp_hidetext` are upgraded in the same manner as objects for which the source text is not hidden.

For information on `sp_checksource` and `sp_hidetext`, see *Reference Manual: Procedures*.

> **Note**
>
> If you are upgrading from a 32-bit to a 64-bit SAP ASE, the size of each 64-bit compiled object in the `sysprocedures` table in each database increases by approximately 55 percent when the object is upgraded. The preupgrade process calculates the exact size; increase your upgraded database size accordingly.

To determine whether a compiled object has been upgraded when you upgrade to a 64-bit pointer size in the same version, look at the `<sysprocedures.status>` column. It contains a hexadecimal bit setting of 0x2 to indicate that the object uses 64-bit pointers. If this bit is not set, it indicates a 32-bit object, which means it has not been upgraded.

To ensure that compiled objects have been upgraded successfully before they are invoked, upgrade them manually using the `dbcc upgrade_object` command.

Related Information

Postupgrade Tasks [page 90]
Restoring Functionality in SAP ASE After Upgrading [page 92]

8.10.6.1 Finding Compiled Object Errors Before Production

Use `dbcc upgrade_object` to identify potential problem areas that may require manual changes to achieve the correct behavior.

After reviewing the errors and potential problem areas, and fixing those that need to be changed, use `dbcc upgrade_object` to upgrade compiled objects manually instead of waiting for the server to upgrade the objects automatically.

Table 13: Upgrade Problems

Problem	Description	Solution
Missing, truncated, or corrupted source text	If the source text in `syscomments` has been deleted, truncated, or otherwise corrupted, `dbcc upgrade_object` may report syntax errors.	If: • The source text was not hidden – use `sp_helptext` to verify the completeness of the source text. • Truncation or other corruption has occurred – drop and re-create the compiled object.
Temporary table references	If a compiled object, such as a stored procedure or trigger refers to a temporary table (#temp `<table_name>`) that was created outside the body of the object, the upgrade fails, and `dbcc upgrade_object` returns an error.	Create the temporary table exactly as expected by the compiled object, then execute `dbcc upgrade_object` again. Do not do this if the compiled object is upgraded automatically when it is invoked.
Reserved word errors	If you load a database dump from an earlier version of SAP ASE into version 15.7 or later and the dump contains a stored procedure that uses a word that is now reserved, when you run `dbcc upgrade_object` on that stored procedure, the command returns an error.	Either manually change the object name or use quotes around the object name, and issue the command `set quoted identifiers on`. Then drop and re-create the compiled object.

8.10.6.1.1 Quoted Identifier Errors

Quoted identifiers are not the same as literals enclosed in double quotes. The latter do not require you to perform any special action before the upgrade.

Context

`dbcc upgrade_object` returns a quoted identifier error if:

- The compiled object was created in a pre-11.9.2 version with quoted identifiers active (`set quoted identifiers on`).
- Quoted identifiers are not active (`set quoted identifiers off`) in the current session.

For compiled objects the upgrade process automatically activates or deactivates quoted identifiers as appropriate.

Procedure

1. Activate quoted identifiers before running `dbcc upgrade_object`.

   When quoted identifiers are active, use single quotes instead of double quotes around quoted `dbcc upgrade_object` keywords.
2. If quoted identifier errors occur, use the `set` command to activate `quoted identifiers`, and then run `dbcc upgrade_object` to upgrade the object.

8.10.6.1.2 Determining Whether to Change select * in Views

Determine whether columns have been added to or deleted from the table since the view was created.

Context

Perform these queries when `dbcc upgrade_object` reports the existence of `select *` in a view:

Procedure

1. Compare the output of `syscolumns` for the original view to the output of the table.

In this example, you have the following statement:

```
create view all_emps as select * from employees
```

> **Caution**
>
> Do not execute a `select *` statement from the view. Doing so upgrades the view and overwrites the information about the original column information in `syscolumns`.

2. Before upgrading the `all_emps` view, use these queries to determine the number of columns in the original view and the number of columns in the updated table:

```
select name from syscolumns
  where id = object_id("all_emps")
select name from syscolumns
  where id = object_id("employees")
```

3. Compare the output of the two queries by running `sp_help` on both the view and the tables that comprise the view.

   This comparison works only for views, not for other compiled objects. To determine whether `select *` statements in other compiled objects need to be revised, review the source text of each compiled object.

   If the table contains more columns than the view, retain the preupgrade results of the `select *` statement. Change the `select *` statement to a `select` statement with specific column names.

4. If the view was created from multiple tables, check the columns in all tables that comprise the view and rewrite the `select` statement if necessary.

8.10.6.1.3 Using dbcc upgrade_object

The following section covers syntax, parameters, permissions, increasing the log segment, error reporting and examples for using `dbcc upgrade_object`.

8.10.6.1.3.1 Syntax for Using dbcc upgrade_object

This section describes the syntax for using `dbcc upgrade_object`.

Syntax

```
dbcc upgrade_object [(<dbid> | <dbname>
      [, [<database>.[<owner>].]<compiled_object_name>' |
      'check' | 'default' | 'procedure' | 'rule' | 'trigger' | 'view'
      [, 'force' | 'check']])
```

Parameters

upgrade_object

upgrades a compiled object from the text stored in the syscomments table. The `upgrade_object` parameters are:

<dbid>
Specifies the database ID. If you do not specify `<dbid>`, all compiled objects in the current database are upgraded.

<dbname>
Specifies the database name. If you do not specify `<dbname>`, all compiled objects in the current database are upgraded.

<compiled_object_name>
Is the name of a specific compiled object you want to upgrade. If you use the fully qualified name, `<dbname>` and `<database>` must match, and you must enclose the fully qualified name in quotes. If the database contains more than one compiled object of the same name, use the fully qualified name. Otherwise, all objects with the same name are parsed, and if no errors are found, upgraded.

check
Upgrades all check constraints and rules. Referential constraints are not compiled objects and do not require upgrading.

default
Upgrades all declarative defaults and the defaults created with the `create default` command.

procedure
Upgrades all stored procedures.

rule
Upgrades all rules and check constraints.

trigger
Upgrades all triggers.

view
Upgrades all views.

The keywords `check`, `default`, `procedure`, `rule`, `trigger`, and `view` specify the classes of compiled objects to be upgraded. When you specify a class, all objects in that class, in the specified database, are upgraded, provided that `dbcc upgrade_object` finds no errors or potential problem areas.

force
forces an upgrade of the object from `syscomments` even if an upgrade is not required. Errors are raised if the source text contains errors, as well as for other non-syntax errors including normalization issues such as ambiguous object references (error 209). `dbcc`

	`upgrade_object` requires the traceflag 3604 to be set to on to send output to the client. `force` specifies that you want to upgrade the specified object even if it contains a `select *` clause. Do not use `force` unless you have confirmed that the `select *` statement is not returning unexpected results. The `force` option does not upgrade objects that contain reserved words, contain truncated or missing source text, refer to nonexistent temporary tables, or do not match the quoted identifier setting. You must fix these objects before they can be upgraded.
`check`	checks syntax for the specified compiled object in `syscomments` in the specified database. Does not raise errors on occurrences of `select`.

> **Note**
>
> The keywords `check`, `default`, `procedure`, `rule`, `trigger`, and `view` specify the classes of compiled objects to be upgraded. When you specify a class, all objects in that class, in the specified database, are upgraded, provided that `dbcc upgrade_object` finds no errors or potential problem areas.
>
> If `set quoted identifiers` is on, use single quotes around the keywords. If `set quoted identifiers` is off, you can use either double quotes or single quotes.

Permissions

The permission checks for `dbcc` commands differ based on your granular permissions settings. This table shows the permission requirement for each `dbcc` command.

Table 14: Permissions Requirements

DBCC Command Name	Permission Requirement	
	Granular Permissions Disabled	Granular Permissions Enabled
trace flags 3604	• sa_role	• `set tracing` • `monitor qp performance` • `set switch`
`upgrade_object`	• `object owner` • Database owner • sa_role	• `manage database` • Object owner

8.10.6.1.3.2 Increasing the Log Segment Size

You can specify that all compiled objects of a particular class should be upgraded in one execution of `dbcc upgrade_object`.

For example, you can upgrade all triggers by using the `trigger` keyword. However, even though you use only one `dbcc` command, the upgrade of each object is recorded in a separate transaction; the old row is deleted from `sysprocedures` and a new row is written. Therefore, if you run `dbcc upgrade_object` on a large number of compiled objects, your system may run out of log space. Increase the size of the log segment in the databases in which you plan to run this command, to allow sufficient room to log all the upgrades.

8.10.6.1.3.3 Error Reporting

To send all the output from `dbcc upgrade_object` to the window, a System Administrator can execute `dbcc traceon(3604)`.

SAP recommends that you use this command if you think the output of error messages might overflow the error log.

8.10.6.1.3.4 Examples

This section shows examples of using `dbcc upgrade_object`.

- Example 1 – Upgrades all compiled objects in the active database:

```
dbcc upgrade_object
```

- Example 2 – Upgrades all stored procedures in the listdb database. Single quotes are used around procedure because set quoted identifiers is on:

```
dbcc upgrade_object(listdb, 'procedure')
```

- Example 3 – Upgrades all rules and check constraints in the listdb database. Double quotes are used around rule because set quoted identifiers is off:

```
dbcc upgrade_object(listdb, "rule")
```

- Example 4 – Upgrades all stored procedures named list_proc in the listdb database:

```
dbcc upgrade_object(listdb, list_proc)
```

- Example 5 – Upgrades the stored procedure list_proc, which is owned by the login “jkarrik”:

```
dbcc upgrade_object(listdb, "listdb.jkarrik.list_proc")
```

- Example 6 – Returns an error because the value of dbname is master and the value of database is listdb. These values must match:

```
dbcc upgrade_object(master, "listdb.jkarrik.list_proc")
```

9 SAP ASE Downgrades

An SAP ASE server that has been upgraded to 16.0 SP02 requires specifics tasks before it can be downgraded to a version of 16.0.

You can downgrade SAP ASE version 16.0 SP02 to:

- SAP ASE version 16.0
- SAP ASE version 16.0 SP01

Even if you have not used any of the new features in SAP ASE 16.0 SP02, the upgrade process added columns to system tables. This means you must use `sp_downgrade_esd` to perform the downgrade.

There are additional steps to perform if you are using encryption or replicated databases. See *Replication Server Administration Guide Volume 2* for information on downgrades and replicated databases.

> **Note**
>
> You cannot downgrade a single database through `dump` and `load` directly from SAP ASE 16.0 SP02 to an earlier version.

9.1 Downgrading from SAP ASE Version 16.0 SP02

Use `sp_downgrade_esd` to downgrade SAP ASE 16.0 SP02.

Prerequisites

To use `sp_downgrade_esd`, you must have sa_role, and be in the `master` database.

Context

Use the `sp_downgrade_esd` system procedure to downgrade a database from SAP ASE version 16.0 SP02 to 16.0

> **Note**
>
`sp_downgrade_esd` does not downgrade an entire SAP ASE installation at once.

Procedure

1. Restart the SAP ASE server in single-user mode by specifying the `-m` option.
2. In a loop, run `sp_downgrade_esd` on each database. You need not downgrade temporary databases – including `tempdb` as well as user-created temporary databases – as they are re-created from a template database when the SAP ASE server starts. To downgrade your entire installation, run `sp_downgrade_esd` for each database in your installation.

   > **Caution**
   >
   > If you are downgrading the entire installation, downgrade the `master` database last, only after performing `sp_downgrade_esd` on all of your non-temporary databases

   The syntax for `sp_downgrade_esd` is:

   ```
   sp_downgrade_esd @<database_name> [, @<target_version> [, @verbose]]
   ```

   where:
   - `<@database_name>` – is the name of the database you are downgrading
   - `<@target_version>` – is a string that specifies what version of 16.0 to go back to. It accepts values "GA" (the default) or "SP0 PLxx" where "xx" is an integer. "GA" is an abbreviation for "SP0 PL0". The valid options are:
     - `"GA"` – (default) for SAP ASE version 16.0.
     - `"SP0 PL<xx>"` – where `<xx>` is an integer. Specifying `"SP0 PL0"` is the same as using `"GA"`
     - `"SP1 PL<xx>"` – where <xx> is an integer.
   - `@<verbose>` – is an integer that, when used, displays the output in the verbose mode. Valid values are:
     - 1 – the procedure produces extra messages about what it is doing
     - 0 – produces no additional messages

   For example:

   ```
   1> sp_downgrade_esd sybsystemprocs, GA
   2> go
   Reverting database 'sybsystemprocs' to 'GA'.
   Database 'sybsystemprocs' is now suitable for use by GA.
   (return status = 0)
   1>
   2> sp_downgrade_esd sybsystemdb, GA
   3> go
   Reverting database 'sybsystemdb' to 'GA'.
   Database 'sybsystemdb' is now suitable for use by GA.
   (return status = 0)
   1> sp_downgrade_esd model, GA
   2> go
   Reverting database 'model' to 'GA'.
   Database 'model' is now suitable for use by GA.
   (return status = 0)
   1> sp_downgrade_esd MYASE_tdb_1, GA
   2> go
   Reverting database 'MYASE_tdb_1' to 'GA'.
   Database 'LUMINOUS_tdb_1' is now suitable for use by GA.
   (return status = 0)
   1> sp_downgrade_esd master, GA
   2> go
   ```

```
Reverting database 'master' to 'GA'.
Database 'master' is now suitable for use by GA.
(return status = 0)
1> shutdown
2> go
```

3. Shut down the 16.0 SP02 version of SAP ASE.
4. With your 16.0 SP02 SAP ASE shut down, start your older version of SAP ASE 16.0 using the same master device that the 16.0 SP02 was using.

9.2 Dumping a 16.0 SP02 Database to Load Into an Older Version of SAP ASE 16.0

You can open an SAP ASE 16.0 SP02 database in a 16.0 SAP ASE by using the `sp_downgrade_esd` system procedure.

Context

If you have a database in SAP ASE version 16.0 SP02 that you want to open in SAP ASE 16.0, you can downgrade the database with `sp_downgrade_esd` and perform the dump and load. You can then revert the database so that it is usable in the current version of SAP ASE again.

> **Note**
>
> Use these steps only to open a 16.0 SP02 database in an earlier 16.0 version of SAP ASE, and not to downgrade SAP ASE itself.

Perform these steps for one database at a time, and only for the databases you want to open in version 16.0 of SAP ASE.

Procedure

1. Put a database (`<@db_name>`) in single-user mode.
2. Run `sp_downgrade_esd` `<@db_name>` on the database.

   The syntax for `sp_downgrade_esd` is:

   ```
   sp_downgrade_esd @<database_name> [, @<target_version> [, @verbose]]
   ```

   where:
   - `<@database_name>` – is the name of the database you are downgrading
   - `<@target_version>` – is a string that specifies what version of 16.0 to go back to. It accepts values “GA” (the default) or “SP0 PLxx” where “xx” is an integer. “GA” is an abbreviation for “SP0 PL0”. The valid options are:

    - "GA" – (default) for SAP ASE version 16.0.
    - "SP0 PL<xx>" – where <xx> is an integer. Specifying "SP0 PL0" is the same as using "GA"
    - "SP1 PL<xx>" – where <xx> is an integer.
  - @<verbose> – is an integer that, when used, displays the output in the verbose mode. Valid values are:
    - 1 – the procedure produces extra messages about what it is doing
    - 0 – produces no additional messages
3. Use dump database <@db_name> to dump the database.
4. Run online database <@db_name>. This brings the affected database back to its proper revision level after the downgrade procedure.
5. Take the <@db_name> database out of single-user mode.

9.3 Downgrading Job Scheduler

If you are downgrading to SAP ASE version 16.0, run installjsdb script from the earlier version.

Procedure

1. Disable Job Scheduler:

```
1> sp_configure "enable job scheduler", 0
2> go
1> sybmgmtdb..sp_sjobcontrol @name=NULL, @option="stop_js"
2> go
```

2. Follow the downgrade steps for your platform.
3. After downgrading, enter this command from the earlier version of SAP ASE:

```
isql -Usa -Psa_password -S<servername>
-i%SYBASE%\%SYBASE_ASE%\scripts\installjsdb
```

> **Note**
>
> The directory with the isql executable (%SYBASE%\%SYBASE_OCS%\bin) must be in your path.

4. Enable Job Scheduler:

```
sp_configure "enable job scheduler", 1
```

5. To start Job Scheduler, either restart the server, or enter:

```
1> use sybmgmtdb
2> go
1> sp_sjobcontrol @name=NULL, @option="start_js"
2> go
```

9.4 Post-downgrade Tasks for SAP ASE

After you perform the basic downgrade steps, finish the process by handling residual tasks.

Procedure

1. Installing system stored procedures over the old version drops auditing information about system stored procedures. Use the output of `sp_displayaudit` recorded during predowngrade to help determine the system stored procedures for which auditing was enabled. Reenter the audit options using `sp_audit`. For example, if `sp_addlogin` was audited in your server before upgrading, run this command to reenable auditing on `sp_addlogin`:

   ```
   sp_audit "exec_procedure", "all", "sp_addlogin", "on"
   ```

   After you run `instmstr`, `instmodl`, `instcomm`, `instsecu`, `insthasv`, `installjsdb`, and `installmsgsvss` on your downgraded server, return system stored procedures to their earlier form. New stored procedures introduced in releases subsequent to the downgraded server are not removed.

2. The on-disk structures of stored procedures, triggers, and views may contain statement identity tokens, datatypes, and object references that are not understood by the earlier SAP ASE versions. You must drop all compiled objects that use features introduced into SAP ASE subsequent to the version to which you are downgrading.
3. If during the upgrade process you ran `update all statistics` on `syslogins`, you must `delete statistics` for `syslogins` and re-create them.

   `spt_values` are dropped and re-created when you run `installmaster` from the release area you downgraded to. Any new types are eliminated from this table.
4. Run `instmstr` from the release area of the server to which you downgraded to remove configuration parameters that belong to 16.0 SP02, by deleting `<sysconfigures>` rows for configuration parameters that do not exist in `syscurconfigs`. After running `instmstr`, the error messages no longer appear when you start the server.

   If you start a downgraded server using the 16.0 SP02 configuration file, the new options generate an `Unknown parameter` message. The unknown options are reported the first time you restart the server. You can ignore these messages; the configuration file is rewritten without the unknown options.

10 Troubleshooting SySAM Errors

Troubleshoot the most common SySAM errors.

If a license problem occurs, solve the problem as quickly as possible. Products that cannot acquire a valid license during installation may still install or run within a grace period. If you do not solve the problem or acquire a valid license before the grace period expires, the product stops functioning.

See the *SySAM Users Guide* for more information.

10.1 Where to Find License Error Information

Typically, server products list problems in an error log, and optionally allow you to configure e-mail notifications.

GUI tool products generally show messages in a status window. Additionally, some products may support a command or menu option, such as *Help* > *About* to display the current license status.

If you use served licenses, and license servers, all license server status and error messages are written to the `SYBASE.log` debug file, which is located, by default, in the `log` subdirectory.

10.2 SySAM Problems and Solutions

If the product does not install or does not function after installation, check for a solution before contacting Technical Support.

Installation Warning: Cannot Find a Valid License

Possible cause: You may not have the required licenses installed, or the licenses may be incorrect for the product or feature you are trying to install.

Cannot Install SAP ASE, or SAP ASE Does Not Start in a Virtual Environment

When this occurs, SAP ASE reports an error similar to this:

```
Cannot determine the total number of processor cores
on the machine from within this virtual system. The ASE_CORE
```

```
("CH") license type is restricted for use on a machine with a
maximum of 2 processor chips regardless of whether the virtual
system is limited to use fewer processor chips. You need to run
'sysamcap' on the physical machine (or virtual-machine/partition
control domain) and set the reported environment variable prior
to running Installer.
```

Possible causes:

- SAP ASE is running on a virtual system that does not have access to the processor counts of the physical machine (this applies to all virtual environments except AIX LPAR and HP-UX vPar), or
- SAP ASE is using a license type that is restricted for use to a machine with no more than a specific number of processors; for example, you cannot use SAP ASE Enterprise Small Business Edition on a machine with more than two processor chips.

Solution:

1. Run the `sysamcap machine` command on the physical machine or control domain for the virtualization technology (for example, the VMware ESX console or XEN dom0).
2. Prior to running the product or product installer, set the environment variable reported.

See the SySAM Sub-capacity licensing section of the *SySAM Users Guide* for more information.

Updating an Existing Installation

Make sure your license authorizes you to install the update. See *Installing Product Updates and Support Renewal* in the *SySAM Users Guide*. If your license does not allow you to perform the update, the product may not be usable.

If you are installing an update that is authorized by the license, see the solution for *Product cannot check out a license and starts in grace period*, below, before you proceed with the update.

License Server Executables and Scripts Not Installed

Possible cause: When you installed your product, the license server was not installed. Some product installations offer the option to install a license server; however when available, this option, by default, is not selected for installation. You may need to explicitly install a license server. See your product installation guide and release bulletin to determine if the product installer offers this option.

Use one of the following solutions

- If your product offers the option to install a license server, use the instructions in the product installation guide to install the license server.
- If your product does not include the option to install a license server, obtain it from Support Packages and Patches. See SySAM License Server [page 22] for more information.

License Server Does Not Start

See *When the License Server Fails* in the *SySAM Users Guide*.

Go to SAP Service Marketplace (SMP) or Sybase Product Download Center (SPDC), generate a valid served license for your product, and copy it into the `licenses` directory on the machine where the license server is installed. See *Generating License Keys from SAP Service Marketplace* or *Generating Licenses from SPDC*.

License Server Does Not Recognize the License Files

Possible causes:

- The license was generated for a different machine or generated using an incorrect host ID.
- The license has been altered. You cannot change any information in a generated license.
- If the host ID for your platform is based on the network adapter identification, the most common problem occurs when you have used an ID associated with the address of a virtual network adaptor.

Solution:

- Verify that the host ID recorded in the license file matches the host ID of the actual machine for which the license was issued. If the host IDs do not match, go to SMP or SPDC, check in the license, then regenerate the license with the correct host ID.
- If your license is being created by typing from a paper copy, verify whether errors occurred when the license information was entered. You can also download a new copy of the activated license from SMP or SPDC.
- If the host ID for your platform is based on a network adapter, verify that the ID you are using is associated with a valid NIC and that the ID is not associated with loopback or virtual adapters. If the ID you are using is associated with a removable network adapter, verify that the adapter is actually attached to the computer.

Linux Virtual Machine Does Not Appear to be Part of the Microsoft Hyper-V Host

Possible causes: `/usr/sbin/dmidecode` in Linux virtual machine cannot read from `/dev/mem`.

Solution: Log in to Linux virtual machine as root, then execute `chmod 4555 /usr/sbin/dmidecode`.

Product Does Not Start, License Checkout Error

Possible causes:

- You have not generated and deployed the valid licenses for the product requesting licenses.
- The required license does not exist and the product does not award a grace period.
- The product is configured to use the wrong edition or license type.

- You have the wrong host ID for an unserved license.
- When multiple product editions include optional features, the features are offered as separately licensed items for each edition. Licensed optional features work only with the licensed base product of the same edition. For example, if you order SAP Adaptive Server Enterprise, you cannot use a Small Business Edition optional feature license with an Enterprise Edition base product.
- You are using an unserved Standalone Seat (SS) type license on a terminal server.
- The license is for a different operating system.
- The license is a Floating License (FL) but is currently in use elsewhere.

Solution: At a command prompt or in a terminal window, execute the following commands, where `<feature_name>` is the name of the feature for which SySAM failed to check out a license:

```
sysam diag <feature_name>
```

If the SySAM script is unavailable, enter:

```
lmutil lmdiag -c license_directory_location feature_name
```

Go to SMP or SPDC and generate required licenses for your product. To use a separately licensable optional feature, you must have a license for both the base product and the option. If the product has more than one edition, the edition of the base product and option must be the same.

If you generated an invalid license, check in the license at SMP or SPDC, and regenerate the license with the correct information.

Product Cannot Check Out a License and Starts in Grace Mode

To help you determine the possible causes when your product cannot check out a license, execute the following command from the `SYSAM-2_0/bin` directory, at a Windows command prompt or in a UNIX system terminal window, where `<feature_name>` is the name of the feature license that cannot be checked out:

```
sysam diag <feature_name>
```

If the command output says that no licenses are available for checkout, this may be due to an issue with with a deployment model. See *Unserved License Deployment Models* and *Served License Deployment Models*.

Solution: See *Served License Deployment Models* or *Unserved License Deployment Models*, both in the *SySAM Users Guide*.

Product Continues to Run in Grace Period After Fixing a License Problem

Possible cause: The license status has not yet been updated. When the product periodically performs license checks, the license status is not immediately updated.

Solution: Wait up to 6 hours for server products, and up to 1.5 hours for tool products.

Product Cannot Find Licenses for Optional Features

Possible causes: You either have not installed the license for the optional feature, or the license exists, but cannot be checked out.

Solution: See *Solution for Problem: Product Cannot Find Licenses for Optional Features* in the *SySAM Users Guide*.

Product Obtains the Wrong License

Possible causes: These locations are searched, in the order specified, until a suitable license is found. When a license directory is specified, license files in that directory are loaded in the directory sort order. When a product looks for a license, it looks in:

- The locations that represent the values set for the SYBASE_LICENSE_FILE and LM_LICENSE_FILE variables. SAP does not advocate using environmental variables and recommends that all licenses be located centrally in the expected licenses directory.
- All files with a `.lic` extension in the licenses directory. This location is product specific, though typically the directory is `$SYBASE/SYSAM-2_0/licenses`.

The first license that matches the feature name, version, edition, and license type filter is used; however, this license may not be the intended license your product requested.

Solution:

- Configure your product to choose a license for a specific edition and license type.
- If you are using served licenses, use the options file to ensure that the correct license is used.

lmgrd is not Running: Cannot Connect to License Server System

The license server manager (lmgrd) has not been started yet, the wrong port@host or license file is being used, or the port or host name in the license file has been changed.

Possible causes: One or more of the required executables is not present in the expected location.

Solution: If SySAM is running on any OS that requires IPv6 (Windows 2008 Server, for example) make these changes:

1. Navigate to `C:\SAP\SYSAM-2_0\bin\binIPv6`.
2. Copy these files:
   - `installs.exe`
   - `lmgrd.exe`
   - `SYBASE.exe`
3. Paste the copied files into `C:\Sybase\SYSAM-2_0\bind`.
4. If prompted to replace existing files, back them up first, then complete the replacement.
5. If you get an error on replacing the files, make sure the SySAM service is not running.
6. After files have been successfully copied, restart the SySAM service.

License Checkout Problems with Unserved License

Solution: See *Unserved License Deployment Models* in the *SySAM Users Guide*.

License Checkout Problems with Served License

Solution: See *Served License Deployment Models* in the *SySAM Users Guide*.

Errors from Running SySAM utilities in a Non-English Environment

Running SySAM utilities such as `sysamcap` or `cpuinfo` in a non-English environment can produce an error message.

Possible causes: The SySAM utilities can display a message similar to the following, in English, even if the files to which they refer are present:
Failed to open the localised message file '../locales/unicode/sylapi/zh/cn/sylapi.lcu' (il8nuni_FileOpen returned -479)

Solution: You can safely ignore the message, or prevent it from displaying by setting this environment variable before running the utility:

```
LANG=en_US
```

On Windows, you can also set the UTF-8 code page before running any SySAM utilities by issuing this command:

```
chcp 65001
```

10.2.1 Installing for the First Time

The installer or product cannot find a valid license and issues a warning.

Procedure

1. If the installation fails, go to SPDC or SMP to generate and install the required valid licenses, then restart the installation.
2. Verify that you have generated and deployed the correct license. The error message should indicate what the problem is:
   - An incorrect host ID for unserved licenses

- An incorrect license server reference file, or the license server is not running on the machine and listening on the specified port
- A license generated for a specific product edition and license type, but the product is configured to use a different product edition and license type.
- Using Standalone Seat (SS) unserved licenses on a terminal server
- Check the `SYBASE.log` file to make sure the license server has started.

3. Ignore the warning. If the product continues to install within a grace period, complete the installation. Generate and install the required SySAM licenses before the grace period expires.

10.2.2 Possible Causes of a License Server Failure

The most common reason for a license server failing to start is that no served licenses are installed on the license server.

There must be at least one served license in the `licenses` directory for the license server to start. When you install a new license server, there are, by default, no served licenses in the `licenses` directory. Generate and deploy a served license to this directory.

Additional reasons for a license server failing to start include:

- Using an unserved license with a license server – the license activated from SPDC or SMP is an unserved license. Examine the license files. Served licenses always start with a `SERVER` header. If you do not see a line starting with `SERVER` , you are using an unserved license that does not work with the license server.
- The license server port number is already in use – if you are using a specific port number for the license, that port number may already be in use. Use `netstat -a` to verify that the port number is free. If not, reassign the port or use a different port number for the license server.
- Mismatch between the host name in the license file and the actual host name – the host name is recorded next to the `SERVER` keyword. If it does not match the actual host name, correct the host name in the license file or set the value next to the `SERVER` to `this_host` which is a keyword that works with any host name.
- Header mismatch – when you have multiple license files, each one must have the same header, host name, port, and so on.
- The licenses on one machine were generated for a different machine – examine the host ID recorded next to the value in the license file host name in the `SERVER` header. It must match the host ID for the machine on which the license server will run.

10.2.3 Solution for Problem: Product Cannot Find License for Optional Features

If a license for the optional feature exists, but cannot be checked out by the product, perform these diagnostic tasks to determine the specific problem.

Context

To ensure that the license for the optional feature exists and can be checked out from the machine where the product is running, execute:

```
sysam diag <feature_name>
```

Compare the feature and the license to:

- Verify that the optional feature is for the same edition of the feature's base product.
- (Products and features that support active and standby licensing only) Verify that the active or standby flags match for the base product license and the optional feature license.
- Compare the product and optional feature editions, and active and standby status, then verify that the available license matches.

See the *SySAM Users Guide* for more information.

If any of the above items do not match, go to SPDC or SMP to generate and download the correct licenses or adjust product configuration.

10.2.4 Unserved License Deployment Models

Resolve problems with unserved licenses.

License is not in the Local Licenses Directory

The license for the product or feature you are using is not in the local `licenses` directory. The local license directory is product-specific, and the license must be deployed to the correct location for the product. Typically, this directory is `%SYBASE%\SYSAM-2_0\licenses`.

Solution: Generate the required unserved licenses from SPDC or SMP and deploy them.

Activated with Incorrect Host ID

Your product's license may have been activated with the incorrect host ID for the machine on which you are running the product.

Solution:

1. Check the license back in to SPDC or SMP.
2. Regenerate the license at SPDC or SMP with the correct host ID.
3. Install the license to the local machine where you are running your instance of the SySAM 2-enabled SAP product.

Different Operating System

The available licenses are for a different operating system or architecture than the machine on which you are running your product feature.

Solution: Obtain a license for the correct platform from SPDC.

1. Check the license back in to SPDC.
2. Generate a license for the correct platform, or install the product on the correct platform.
3. Deploy a license to the local machine where you are running your instance of the SAP product.

> **Note**
>
> Licenses generated from SMP are platform-independent.

Running in a Terminal Services Environment with Unserved Standalone Seat License

You are running your SySAM 2-enabled program in a terminal services (TS) environment with an unserved Standalone Seat (SS) license.

Solution: Set up served licenses for a terminal server environment:

1. Log in to SPDC or SMP and check in your old license.
2. Generate served licenses and deploy them to a license server.
3. Configure the product to obtain licenses from the license server.

Product Configured for a Different Edition or License Type

If the output from running `sysam diag <feature_name>` states that a license for your product or feature is available for checkout, you still may be unable to check out the license because your product has been configured as a specific edition or with a specific license type. For example, the product is configured to look for an SAP ASE, Enterprise Edition license, but only an SAP ASE, Developer Edition license is available; or, the product is configured to use a Server License (SR) license type, but only a CPU License (CP) is available.

Another incompatibility may occur if your product has several editions, and you are trying to run a separately licensed feature from one edition with the base product of a different edition. You can run an Enterprise Edition

base product only with an Enterprise Edition separately licensed feature; you cannot run a Developer Edition feature with an Enterprise Edition base product.

Solution: If the problem is incompatible editions or license types, reconfigure your product, or go to SPDC or SMP and check in the incorrect license and regenerate a license for the correct edition or license type.

10.2.5 Served License Deployment Models

Learn about license checkout problems for served licenses.

The License Server May Not be Running

Verify that the license server is running by entering this command from the `bin` directory on the license server host:

```
sysam status
```

If the license server is not running, restart it.

The License Server is Running, But Does Not Contain the Desired License

Enter the following command to determine if the license server is trying to grant a license for the licensed feature you are trying to use, where `<feature_name>` is the name of the separately licensed product feature for which the license server failed to check out a license:

```
sysam status -f <feature_name>
```

If the license is generated for one edition or license type, and the product configured to use another, go to SPDC or SMP and generate the correct licenses for your product or feature.

All Licenses May be in Use; No Licenses Available for Checkout

If the output from `sysam status -f <feature_name>` indicates that there are no available licenses:

- Go to SPDC or SMP and generate additional licenses; or,
- If the product is using Floating License (FL) type licenses, you can shut down other instances of the product or feature you are using, running on other machines, to free licenses. See *Controlling License Use with the SySAM Options File* in the *Sybase Software Asset Management (SySAM) 2 Users Guide*.

Cannot Connect to the License Server

Ensure that the client can connect to both TCP/IP ports used by the license server. If there is a firewall, fix the ports used by both `lmgrd` and the SYBASE vendor daemon (the license server's constituent processes), and set up the firewall or VPN policies to allow access to both ports. The license server's `SYBASE.log` file shows the port numbers to be fixed:.

```
19:04:47 (lmgrd) lmgrd tcp-port 27010
19:04:47 (lmgrd) Starting vendor daemons ...
19:04:47 (lmgrd) Starting vendor daemon at port 27011
```

You can telnet from the client machine to check that the ports can be accessed:

```
telnet keyserver 27010
telnet keyserver 27011
```

See *Access Through A Firewall or VPN* in the *Sybase Software Asset Management (SySAM) 2 Users Guide*.

10.3 Contacting SySAM Technical Support

If you cannot resolve a SySAM problem, contact Technical Support for licenses generated from SPDC, or visit SMP if your license was generated from SMP. Have available as much information about your system, and the conditions leading to the problem, as possible.

If you encounter problems when installing, upgrading, or running SySAM, report an incident on the SAP Support Portal at SAP Support Portal using the component for SAP Adaptive Server Enterprise: BC-SYBASE.

Typical information for an unserved license:

- The product name, version, edition (if any)
- Optional product features that are enabled
- The product error log or debug log output (if the product produces one), or a screenshot or copy of error message text if not
- The SySAM 2-enabled product or feature licenses saved in the `$SYBASE/SYSAM-2_0/licenses` directory, which is on your local machine or in the product-specific license location

Typical information for a served license:

- The output from:

  ```
  sysam diag <feature_name>
  ```

- The license server software version
- The license server debug log file
- The licenses that are saved in the `licenses` subdirectory of the `SYSAM-2_0` directory on the license server host machine

11 Troubleshoot the Server

Determine the cause of problems and apply the recommended solution.

To determine the cause of an error, first look in the log file of the utility being used, to identify the task the utility was performing when it failed. Then check the server error log.

This table lists possible causes and solutions for common problems that you might encounter during a first-time installation, or an upgrade. If you continue to have problems, retry the installation or upgrade.

The Installation Program Cannot Start the SAP ASE Server

- Make sure you meet RAM requirements. If you have the required amount of RAM, remove, then reinstall all applications to the hard drive and restart the installation.
- After SAP ASE is installed, there should be 25MB of free disk space left in the disk drive.
- Verify that you are logged in as system administrator. You must log in as an administrator to start the SAP ASE server.
- The SAP ASE server may not start if it cannot find a SySAM license or if the grace period has expired. Check the SAP ASE error log for the cause of the license checkout failure and fix the issues.

SAP ASE-Related Products Cannot Locate Their Required DLLs

The installation program makes several modifications to your operating environment to locate required files. Log out of Windows, and log in again for the changes to take effect. Use the system administrator login account or assign yourself system administrator privileges.

Verify that you are logged in to Windows as a member of the Administrators group.

The Installation Program Cannot Connect to the Ppgraded SAP ASE Server

Exit and restart the Server Config utility.

Cannot Start SAP ASE as a Service

You cannot start SAP ASE as a service because it cannot open the `master` device.

This occurs because the installation process configures the SAP ASE service to run as "LocalSystem" instead of "Administrator." You can successfully access the SAP ASE server by logging in as Administrator and

running the `start_server.bat` file, but attempting to start SAP ASE as a service fails due to incorrect permission settings.

To resolve this issue:

1. Go to *Control Panel* > *Administrative Tools* > *Services* > *SAP_SQLServer_<servername>*.
2. Right-click *SAP_SQLServer_<servername>* and click *Properties*.
3. Click the *LogOn* tab, and choose *This account*.
4. Provide your login and password, and click *OK*.

You can now start SAP ASE as a service.

11.1 Error Logs for Installation Utilities

The information in the error logs may help determine the reason and possible solutions for problems with installation-related utility programs.

Utility	Default Location and File Name
SAP ASE Installer	`%SYBASE%\log\ASE_Suite.log`
`sybatch`	`%SYBASE%\%SYBASE_ASE%\init\logs`
`syconfig`	`%SYBASE%\%SYBASE_ASE%\init\logs`

11.2 Error Logs for SAP ASE Servers

The information in the error logs may help to determine the reason and possible solution for an error message.

Server	Default Location and File Name
SAP ASE	`%SYBASE%\%SYBASE_ASE%\install\<servername>.log`
Backup Server	`%SYBASE%\%SYBASE_ASE%\install\<servername>.log`
XP Server	`%SYBASE%\%SYBASE_ASE%\install\<servername>.log`

11.3 Troubleshooting Common Installation Problems

Identify the cause of installation problems and apply the recommended solutions.

If your installation fails, review error messages and your SAP ASE error log to determine the cause of the failure.

Installer Log is Missing

While the installer is still running, the `ASESuite.log` installer log file does not yet exist in the `log` subdirectory of your installed directory. This file is created only after a graceful exit from the installer. If the installer crashes or is interrupted (for example, by pressing `Ctrl` + `C`), the installer standard output and error files (used to create the installer log) are in a temporary directory with file names `lax-*-out.tmp` and `lax-*-err.tmp`. If you encounter any problems with an installation that was interrupted without a graceful exit, view these temporary files to debug the cause.

> **Note**
>
> The temporary directory in which the files are created is not `/tmp/`; you can change it by changing the $IATEMPDIR environment variable (%TEMP% in Windows).

Port Already in Use

Enter a different port number on the `srvbuild` window. The command `netstat -a` produces a list of port numbers in use.

Installer Fails to Start

Restart the installer in debug mode. Hold down the Ctrl key immediately after launching the installer and until a console window appears.

Cannot Start XP Server

You may receive the following message from XP Server when it is invoked by `xp_cmdshell` or some other extended stored procedure:

```
Msg 11018, Level 16, State 1:
Procedure "xp_cmdshell", Line 2:
XP Server must be up for ESP to execute.
```

```
(return status = -6)
```

Verify that there is an XP Server entry in the SAP ASE `sysservers` table and in the interfaces file or LDAP server.

Use `sp_addserver` to add an entry to the `sysservers` table.

Troubleshooting Resource File Installations

If you encounter problems during the build, configuration, or upgrade process while using the `syconfig.exe` or `sybatch.exe`, it may be that these utilities did not allow enough time for a SAP ASE server to shut down properly.

Set the SYBSHUTWAIT environment variable to force the utilities to wait for the SAP ASE server to shut down. For example, this command forces the utility to wait for two minutes before proceeding with the next task:

```
% set SYBSHUTWAIT=120
```

11.3.1 If the Installation Quits While You Are Configuring an SAP ASE Server

Perform specific steps if the installation suddenly quits.

Procedure

1. View the contents of the log file generated by the SAP ASE server.
2. Take any suggested actions to correct the problem. If the installation fails after:
   - The installation program created any operating system files, such as the master device or system procedures device files, delete those files.
   - The installation program starts the SAP ASE server that you are attempting to install, shut down that server.
3. Use the `Server Config` utility to restart the configuration.

11.3.2 PATH Environment Variable Exceeds Maximum Length

The PATH environment variable cannot exceed 2048 characters on Windows.

If your PATH environment variable exceeds 2048 characters, you may see an error similar to the following:

```
WindowsEnvironmentVariableAction.updateEnv() : cannot set env PATH because value
exceed max length.
```

11.4 Stopping an SAP ASE Server After a Failure

If the installation or upgrade session fails after you start a SAP ASE server for any reason, use the `shutdown` command.

Procedure

1. Open an MS-DOS Command Prompt window.
2. Start `isql` and connect to the SAP ASE server:

   ```
   %SYBASE%\%SYBASE_OCS%\bin\isql -Usa -P -S<server_name>
   ```

   where:
   - `<%SYBASE%>` – is the SAP ASE installation directory.
   - `<server_name>` – is the name of your SAP ASE server.
3. Shut down the SAP ASE server using the `shutdown with nowait` command. This stops the server immediately, without waiting for currently executing SQL statements to finish:

   ```
   1> shutdown with nowait
   2> go
   ```

   Note

   If you cannot connect to the SAP ASE server with `isql`, or if the `shutdown with nowait` command fails, use the Task Manager (press *Ctrl+Alt+Del*) or a Windows process monitoring utility, (for example, the `pview.exe` program included with the Microsoft Toolkit), to stop the SAP ASE process.

11.5 If SAP ASE Fails the Preupgrade Eligibility Test

Examine the log file to determine why SAP ASE is ineligible for an upgrade.

Context

If SAP ASE fails the preupgrade test, you see:
Server `<SERVER_NAME>` failed preupgrade eligibility test. See log for more information.

Procedure

1. You see `Upgrade Check Failed`. Click *OK*.
2. From the Configure Sybase Servers window, select *Exit*.
3. Examine the log file created in the `%SYBASE%\%SYBASE_ASE%\init\logs` directory to find out why SAP ASE failed the preupgrade eligibility test.

   After you resolve any problems, shut down the SAP ASE server and use `Server Config` to restart the upgrade session.

11.6 When an Upgrade Fails

If the upgrade process fails, the installation program displays error messages.

Once you start SAP ASE on the new version, you cannot start SAP ASE on the earlier version. Attempts to do so result in having to restore from backups.

11.6.1 If You Can Identify the Cause of the Upgrade Failure

If the error logs or messages clearly indicate the cause of failure, and you are confident that your databases have not been damaged, you can attempt to fix the problem and immediately re-run the upgrade.

Context

If the upgrade process fails again and you cannot determine the cause of failure, check the error log file to find out when and where the upgrade failed, and contact SAP Product Support.

Procedure

1. Exit the Server Config program.
2. Perform the necessary actions to fix the problem.

   For example, if the error log indicates that the upgrade failed because your existing databases do not contain enough space, use the `alter database` command to increase the available space.
3. If needed, shut down the SAP ASE server.

   Shutting down the server enables the installation program to start the server and re-run the upgrade session.
4. Start Server Config from the Sybase program folder.

5. Select *Upgrade SAP ASE*, and proceed with the upgrade.

11.6.2 Restoring Databases After a Failed Upgrade

You may need to restore your databases due to a failed upgrade.

Procedure

- If you think the upgrade failure or its cause may have damaged your databases, restore the databases from backups. For information about restoring databases, see the *System Administration Guide*.
- If you are concerned about the possible corruption of your databases, exit `sqlupgrade`, but do not attempt to restart the upgrade session until you have restored the databases from backup. After restoration is complete, retry the upgrade.

11.6.3 Recovering from a Failed Upgrade

Upgrade issues may be due to a failure to upgrade an individual database, or a failure to complete configuration changes after all databases have been upgraded.

Context

Use the output from the upgrade utility to correct the problem that caused the failure.

Procedure

- If the upgrade failed because the process ran out of some resource, such as data or log space, locks, or auxiliary scan descriptors, add space to the database using the `alter database` command.

  You may also correct other resource failures by changing the server's configuration using the `sp_configure` stored procedure.
- If an upgrade failure leaves a database offline, and the failure can be corrected only by making data changes in the database, you can gain access to the failed database by using `isql` or a similar program to connect to the affected server as user "sa" and issuing this command:

  ```
  dbcc traceon(990)
  ```

  Having set this trace flag, user "sa" can now use the offline database and make the necessary changes to correct the upgrade failure.

> **Note**
>
> This trace flag grants access only to user "sa"; "sa_role" does not work. If you have disabled the "sa" login, reenable it to get access using this method.

To restart a server that has not successfully upgraded, use:

```
online database <failed_db_name>
```

The server restarts that database's upgrade from the point of failure.

- If the failure occurs after all databases have been upgraded, or if a failure somehow causes the upgrade utility to fail, manually re-run the utility. After you diagnose and correct the failure, run the upgrade utility:

  ```
  %SYBASE%\%SYBASE_ASE%\bin\upgrade.exe
  ```

  When restarted in this way, the upgrade process says it is "verifying" the upgrade rather than "starting" it, but it makes all the same checks as for the original upgrade.
- To verify that a database has upgraded successfully, check any database's upgrade status using the `online database` command. If any upgrade is required for a database, this command performs it. You may also use a procedure such as this to check all databases at a given installation:

  ```
  declare @dbname varchar(255)
  select @dbname = min(name)
  from master..sysdatabases
  while @dbname is not null
  begin
  online database @dbname
  select @dbname = min(name)
  from master..sysdatabases
  where name > @dbname
  end
  ```
- Reinstall system stored procedures using the scripts from the new version:

  ```
  isql -Usa -P<password> -i %SYBASE%\%SYBASE_ASE%\scripts\instmstr
  ```

  > **Note**
  >
  > When a server fails during an upgrade process, it attempts to upgrade the databases when it restarts. When the installation is fully recovered, re-run the upgrade utility to ensure that all postupgrade configuration work is done. Then reinstall the system stored procedures.
- During the upgrade process, the log may become too full due to recorded catalog changes. If so, log in to the new server using `isql`, and issue:

  ```
  isql> dump tran <dbname> with truncate_only
  ```

  a. If `truncate_only` indicates that it cannot truncate the log, retry the command as `no_log` instead.
  b. If this does not truncate the log successfully, use the `alter database` command to extend the database as explained below.
- In some cases, preupgrade space estimations are insufficient for the data copy phase of upgrade. You see a message that there is insufficient space in the system segment for the upgrade. When this happens, the

upgrade process stops responding, waiting for space to be provided. To increase the size of the database, log in to the new server using `isql`, and use `alter database`:

```
isql> alter database <dbname> on <device_name> = "<2>m"
```

`alter database` allows you to specify the size to alter the database with the unit specifier "m", or "M".

> **Note**
>
> There are certain upgrade failures from which the server cannot recover. For example, attempts to upgrade system tables to version 15.x are quite sensitive to failures at certain points during the required changes. If you encounter such a failure, restore the failed database from backup. To prevent the upgrade from failing again, correct the problem that caused the original failure before issuing the `online database` command for that database. These catastrophic failures are nearly always caused by running out of resources, as described above, which then causes a failure to undo the aborted transaction.

11.6.4 If You Cannot Identify the Cause of an Upgrade Failure

Your attempts to upgrade may continue to fail.

Procedure

1. If attempts to upgrade continue to fail, check the error log file to identify where and where the upgrade failed.

   By default, the log file is located in `%SYBASE%\%SYBASE_ASE%\install\<servername>.log`.
2. Contact Product Support with the information.

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