Upgrade Guide
SAP SCM 7.0 EHP1 – Standalone Engine SAP liveCache Technology 7.7: UNIX

Target Audience
- Technology Consultants
- System Administrators

PUBLIC
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Before you start the implementation, make sure you have the latest version of this document. You can find the latest version on SAP Service Marketplace [http://service.sap.com/instguides](http://service.sap.com/instguides).

The following table provides an overview on the most important document changes:

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<tr>
<td>1.0</td>
<td>2011-03-24</td>
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This documentation describes how to upgrade an SAP liveCache instance from at least Release 7.5 to Release 7.7. SAP liveCache is used in SAP Supply Chain Management (SCM).

CAUTION
Make sure you have the latest version of this document. See the version number on the front page. You can always find the latest version at:

http://service.sap.com/instguides

For more information about SAP SCM technology, see:

http://service.sap.com/scm

1.1 Before You Start

Make sure that you read the following sections before you start the upgrade:

- SAP Notes for the Upgrade [page 5]
- Information Available on SAP Service Marketplace [page 6]
- Naming Conventions [page 6]

1.1.1 SAP Notes for the Upgrade

Read the following SAP Notes, which you can find at http://service.sap.com/notes:

<table>
<thead>
<tr>
<th>Note Number</th>
<th>Title</th>
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<tr>
<td>1072392</td>
<td>Enhancements to the upgrade to liveCache 7.7</td>
</tr>
<tr>
<td>498036</td>
<td>Overview note: Importing MaxDB/liveCache versions</td>
</tr>
<tr>
<td>833216</td>
<td>Parameter values as of liveCache versions 7.5, 7.6 and 7.7</td>
</tr>
<tr>
<td>337445</td>
<td>liveCache and Memory Management</td>
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<td>487972</td>
<td>Operating system parameterization of liveCache</td>
</tr>
<tr>
<td>829408</td>
<td>Upgrading a database in the UNIX cluster</td>
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CAUTION
Before you begin the upgrade, make sure that you read SAP Note 1072392 because it contains current information and corrections essential to the upgrade.
1.1.2 More Information on SAP Service Marketplace

You can find more information on SAP Service Marketplace as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Address</th>
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<tr>
<td></td>
<td>SAP Business Suite Applications → SAP SCM → SAP SCM Server → Using SAP enhancement package 1 for SAP SCM Server 7.0</td>
</tr>
<tr>
<td>Product Availability Matrix (PAM)</td>
<td><a href="http://service.sap.com/pam">http://service.sap.com/pam</a></td>
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<td>SAP Notes</td>
<td><a href="http://service.sap.com/notes">http://service.sap.com/notes</a></td>
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1.1.3 Naming Conventions

Release Names

Where release descriptions are used in the following documentation, they correspond to the following SAP SCM Releases:

<table>
<thead>
<tr>
<th>Release of SAP Web Application Server or SAP NetWeaver</th>
<th>Release of SAP SCM</th>
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<tbody>
<tr>
<td>6.40</td>
<td>4.1</td>
</tr>
<tr>
<td>7.0</td>
<td>5.0, 2007 (5.1)</td>
</tr>
<tr>
<td>7.01</td>
<td>7.0</td>
</tr>
<tr>
<td>7.02</td>
<td>7.01</td>
</tr>
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</table>

SAP System

The SAP system name is called SPSID below. Follow the notation in pointed brackets. If <SPSID> is used, insert your SAP system name, for example PRD.

<sPSID> User Name

The user name is written in uppercase and abbreviated with <SPSID>ADM.

**CAUTION**

Always enter the user name <spsid>adm in lowercase for the standalone database server.

liveCache Application Routines

The liveCache application routines are called “liveCache applications”. The application area is BC-DB-LCA, where the abbreviations have the following meanings:

- BC means Basis components
- DB means database
- LCA means liveCache applications
2 Planning

To plan the upgrade, you need to do the following:
1. You check the software requirements [page 7].
2. You choose an upgrade strategy [page 7].
3. You identify the correct source of the New liveCache software [page 8].

2.1 Checking Software Requirements

Procedure
1. Check that:
   ■ SAP liveCache is ready to run.
   ■ The system tables have been loaded at least once for the existing instance.
   ■ The database parameters of the database instance that you want to upgrade have not changed since the last restart.
   ■ The starting version of SAP liveCache (that is, before the upgrade) is at least 7.5.
2. Check your operating system release.
   For the most up-to-date release information on the database and operating system of your product, check the SAP Product Availability Matrix (PAM) as follows:
   2. Choose Start PAM with navigation by category.
   4. Click the red exclamation mark in column Remarks to see the number of the note with additional information on required operating system patch levels and patches for C++ RTE.
   For additional operating system requirements, see the following SAP Notes:
   ■ 337445 liveCache and Memory Management
   ■ 487972 Operating System Parameterization of liveCache
   You can find these notes at:
   http://service.sap.com/notes

2.2 Choosing an Upgrade Strategy

The upgrade strategy you choose depends on your existing release of SAP liveCache, your start release, and your target release of the SAP system.
Prerequisites

The upgrade strategies differ as follows:

■ Inplace upgrade

Inplace upgrade does not change the structure, as occurs when the start and target releases for the SAP system or the SAP liveCache database are different. Therefore, only the SAP liveCache software is updated during an inplace upgrade.

■ SCM Extract / Load Upgrade

With the SCM extract / load upgrade, transaction data is backed up using ABAP reports during the SCM system upgrade, that is, before the SAP liveCache upgrade. This type of upgrade overwrites data files and devspaces from SCM Release 4.1, 5.0, or 5.1 during the installation of the new SAP liveCache software. You do not need to first deinstall anything. Finally, the SAP liveCache instance is recreated and initialized.

NOTE
SCM Release 4.0 is not supported as a start release for the upgrade.

CAUTION
Use the SCM extract / load upgrade strategy only for an SCM upgrade to 7.0 EHP1.

Procedure

Choose your upgrade strategy in one of the following ways:

■ Follow the instructions in the relevant SAP system upgrade documentation.

■ Use the tables below to determine your upgrade strategy.

### SAP liveCache Upgrade During an SCM Upgrade

<table>
<thead>
<tr>
<th>SCM Start Releases</th>
<th>SCM Target Release</th>
<th>SAP liveCache Kernel Start Release</th>
<th>Upgrade Strategy</th>
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<tr>
<td>4.1, 5.0, 2007 (5.1)</td>
<td>7.0 EHP1</td>
<td>≥ 7.5</td>
<td>SCM extract / load upgrade</td>
</tr>
</tbody>
</table>

### SAP liveCache Upgrade Without an SAP System Upgrade

<table>
<thead>
<tr>
<th>SAP liveCache Kernel Start Release</th>
<th>SAP liveCache LCA Start Release</th>
<th>Upgrade Strategy</th>
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2.3 Identifying the Correct Source of the New liveCache Software

You need to identify whether you can use the liveCache software on the liveCache DVD in the SCM 7.0 package or whether you must use the most up-to-date liveCache software from the Software Distribution Center (SWDC) on SAP Service Marketplace.

Procedure

■ If you are using SCM 5.0 or lower, you can use the liveCache DVD in the SAP SCM 7.0 EHP1 package.
If you are using SCM 5.1 where the liveCache major version is already 7.7 and if your starting version—in terms of package level and patch level—of SAP liveCache (that is, before the upgrade) is already higher than the liveCache version on the DVD, you must use the most up-to-date liveCache software from the SWDC.

You can find your current version of liveCache with the following command:
```
dbmc1i -d <LCSID> -u control,<control_password> show version
```
You can find the DVD versions in SAP Note 1072392 or by entering the following command with the mounted liveCache DVD:
```
<DVD dir>/DATA_UNITS/LC_<OS>/SDBINST -l
```
If you use the command, check the database kernel version shown in the command output with your current version of liveCache.

You can download and unpack the liveCache software from the SWDC here:
```
http://service.sap.com/swdc\Support Packages and Patches\A-Z Index\S\SAP SCM\SAP SCM 7.0\Entry by Component\SAP liveCache\SAP LC/LCAPPS 7.0\<OS>\&
```
You can also find information about the availability of liveCache versions in SCM 7.0 EHP1 here:
```
http://www.sdn.sap.com/irj/sdn/livecache\SCM 7.0\&
```

**CAUTION**

If there is no equivalent or higher SAP liveCache version available at the SWDC, you **cannot** perform the upgrade at the current time.

Following release of a new version of liveCache 7.7 for SCM 5.1, we will release an equivalent or higher version for SCM 7.0 EHP1 as soon as possible, but delays are possible. Normally, with a new Support Package for SCM 7.0 EHP1 there is also a new liveCache version available. For information about planned Support Packages for SCM 7.0 EHP1, see the following:
```
http://service.sap.com/sp-stacks\SP Stack Information\SP Stack Schedule\SAP EHP1 for SAP SCM 7.0\&
```
You complete the upgrade preparations [page 11].

### 3.1 Completing the Upgrade Preparations

#### Procedure

**SCM Extract / Load Upgrade**

**NOTE**

The report /SAPAPO/OM_LC_UPGRADE_70 issues a message when it is time to upgrade liveCache.

1. Make sure that, during the REQ_APOUPG phase of the SCM upgrade, the SAP liveCache transaction data is downloaded to the SCM database.

**NOTE**

You cannot start the upgrade without a successful download. You do not need to copy the master data to the SCM database, because master data – unlike transaction data – is already present in the SCM database (this is true for the SCM system at all times).

2. Make sure that you stop SAP liveCache in the REQ_APOUPG phase.

3. If an SCM instance or another SAP MaxDB instance is running on the SAP liveCache server, stop it.

4. Stop the server for Remote SQL using the command:

   `x_server stop`.

5. Stop all DBMGUIs and all DBMCLI sessions.

**Inplace Upgrade**


2. If an SCM instance or another SAP MaxDB instance is running on the SAP liveCache server, stop it.

3. Stop the server for Remote SQL using the command:

   `x_server stop`.

4. Stop all DBMGUIs and all DBMCLI sessions.
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4 Upgrading liveCache

Procedure

1. Log on as user root
2. Start the upgrade tool with the liveCache DVD or with the downloaded software from the Software Distribution Center (SWDC):
   ■ liveCache DVD
     1. Load and mount the liveCache DVD.
     2. Start the upgrade tool from the liveCache DVD as follows:
        <DVD>/DATA_UNITS/LC_UPDATE/LCUPDATE.SH
   ■ SWDC
      
      Only use this method for start release SCM 5.1 where the liveCache version on DVD is too low. For more information, see Identifying the Correct Source of the New liveCache Software [page 8].
      
      Start the upgrade tool from the downloaded and extracted file as follows:
      SDBUPD

3. Enter or (if you are using SDBUPD) select the SAP liveCache name, DBM user, and DBM password (that is, for the control user).
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5 Post-Upgrade

You perform the following post-upgrade steps:

1. You perform post-upgrade activities [page 15].
2. You set up a liveCache user [page 17].
3. You install or upgrade Database Studio [page 17].

5.1 Performing Post-Upgrade Activities

Procedure

1. Check the setting of OMS_HEAP_LIMIT as described in SAP Note 833216.

   CAUTION
   It is essential that the SAP liveCache parameter OMS_HEAP_LIMIT is set to a value greater than zero. The unit for this parameter is KB. If you have to change this parameter, restart the SAP liveCache instance so that the change takes effect.

2. Check the instructions in SAP Note 833216 to parameterize the SAP liveCache Release 7.7 server initially if your SAP liveCache start release was 7.2.5.

3. Check the following prerequisites before you upgrade the SAP central or dialog instance:
   - If the liveCache instance is on the same host as the SCM instance, you do not need to update the client software.
   - For the client software upgrade for liveCache, you need to stop the central and dialog instance.
   - If other SAP MaxDB instances are running on the central or dialog instance server, stop them.

4. If your SCM start release is 5.0 or lower, extend the environment variable with the path to the shared library libSQLDBC76 of the liveCache client installation. To do this, permanently add the path <INDEP_PROG_PATH>/lib[lib64] to the relevant environment variable of the user <sid>adm, depending on your operating system:
   - SUN, DEC, SNI: LD_LIBRARY_PATH
   - HP: SHLIB_PATH
   - AIX: LIBPATH

   CAUTION
   If you do not perform this step, you might have connection problems.

5. Upgrade the database client software for the host where the SAP central and dialog instances are running, depending on whether your client is running on UNIX or Windows:

   NOTE
   You do not need to update the client software if:
The database instance is on the same host as the SAP instance
Your client software is already release 7.7 or higher – but in this case we recommend you to always use the latest client software

Your Client is Running on UNIX
1. Log on as the root user.
2. Stop the SAP central or dialog instances.
3. Start the client software upgrade with the liveCache DVD or with the downloaded software from the Software Distribution Center (SWDC):
   - liveCache DVD
     `<liveCache DVD>/LCUPDATE.SH -client`
   - SWDC

   **NOTE**
   Only use this method for start release SCM 5.1 where the liveCache version on DVD is too low. For more information, see Identifying the Correct Source of the New liveCache Software [page 8].

   `SDBINST -profile "Runtime For SAP AS"`
4. Log on as the `<sapid>adm` user.

   **CAUTION**
   Make sure that you log on from the beginning, because the environment of `<sapid>adm` has been changed.
5. Restart the SAP instance:
   `startsap r3`
6. If you stopped other SAP MaxDB instances, restart them.

Your Client is Running on Windows
1. Log on as a user with administrator rights.
2. Stop the SAP central and dialog instances.
3. Stop the server for Remote SQL:
   `x_server stop`
4. Start the client software upgrade with the liveCache DVD or with the downloaded software from the Software Distribution Center (SWDC):
   - liveCache DVD
     `<liveCache DVD>:\LCUPDATE.BAT -client`
   - SWDC

   **NOTE**
   Only use this method for start release SCM 5.1 where the liveCache version on DVD is too low. For more information, see Identifying the Correct Source of the New liveCache Software [page 8].
5. Log on again as a user with administrator rights.

**NOTE**
Make sure that you log on from the beginning because the user environment has been changed.

6. Restart the SAP instance service `SAP<SID>_<instance number>`.

7. Start the SAP instance using the Microsoft Management Console.

8. If you stopped other SAP MaxDB instances, restart them and also restart the server for Remote SQL using the following command:

   `x_server start`

6. If you are performing an upgrade with the SCM extract/load upgrade strategy [page 7], follow the SCM upgrade documentation and section C of report `/SAPAPO/OM_LC_UPGRADE_70`. There you can find descriptions of when to restart liveCache and when to perform a complete liveCache backup.

7. If you are performing an upgrade with the Inplace upgrade strategy [page 7]:
   1. Start the server for Remote SQL using the command `x_server start`.
   2. If you need to import a new SAP liveCache version as part of the SAP liveCache upgrade, do this now. You can find the newest versions of SAP liveCache at:
      
   4. Perform a complete backup of the liveCache data so that you can recover the new liveCache if necessary.

### 5.2 Setting Up a liveCache Super User

**Process**

You need to create a liveCache and liveCache applications super user for liveCache administration. Assign the roles `SAP_APO_LC_ALL` or `SAP_LCA_ALL` and `SAP_BC_LVC_SUPERUSER` to the user, as these roles already contain all required privileges.

If you want to create users with limited privileges for transaction LC10 see SAP Note 452745 for more information about the authorization concept for transaction LC10.

### 5.3 Installing or Upgrading Database Studio for SAP MaxDB

This section describes how to install or upgrade Database Studio for SAP MaxDB and SAP liveCache on Windows front ends. Database Studio is the database administration tool for SAP MaxDB.

For more information about Database Studio, see one of the following:
5.3 Installing or Upgrading Database Studio for SAP MaxDB


**NOTE**
Database Studio replaces Database Manager GUI and SQL Studio, which were available in previous releases.
The use of Database Studio for SAP liveCache is optional. If you do not want to use it, skip this section.

For up-to-date information about installing Database Studio, see SAP Note [1360996](http://maxdb.sap.com/doc/7_8/default.htm).

**Prerequisites**
- You can install Database Studio on Linux or Windows in your network, even if your database runs on a different operating system. You can then remotely administer the database on a different host.
The instructions below refer mainly to the Windows version.

**NOTE**
To run Database Studio on Linux, you need to meet the requirements for the SAP MaxDB database server.

- Your PC must meet the following **minimum** requirements:
  - Software requirements:
    - Operating System Requirements for Database Studio
      | Operating System | Version   |
      |------------------|-----------|
      | Windows XP       | IA32 and X64 |
      | Windows 2008     | IA64 and X64 |
      | Windows 2008 R2  | IA64 and X64 |
      | Windows Vista    | IA32 and X64 |
      | Windows 7        | IA32 and X64 |
  - Hardware requirements:
    - RAM: 512 MB (recommended RAM: 1 GB)
    - Processor speed: 1.5 GHz
    - Free disk space: 200 MB
    - Monitor: 1024x768 pixels, 256 colors
  - You can obtain the required files from one of the following:
    - The DVD for the SAP MaxDB RDBMS or SAP liveCache
    - By downloading from:
      - [service.sap.com/patches](http://service.sap.com/patches) → Database Patches → MaxDB → MAXDB GUI COMPONENTS/TOOLS → MAXDB DATABASE STUDIO 7.8
  - You need Java version 5 (also known as 1.5) or higher.
To check your Java version, enter the following command:

```
java -version
```


To uninstall the database manager GUI, which is the tool replaced by Database Studio, choose `Start → Settings → Control Panel → Add/Remove Programs`.

**Procedure**

1. Start the installation or upgrade as follows (the paths shown are for the 32-bit installation):
   - If you are using the SAP MaxDB RDBMS DVD:
     `<DVD>/MAXDB_LINUX_I386/SDBSETUP`
   - If you are using the SAP liveCache DVD:
     `<DVD>/LC_LINUX_I386/SDBSETUP`
   - If you are using the downloaded files, simply execute the downloaded `SDBSETUP` file.

   The `Installation Manager` starts.

2. Choose `Start Installation/Upgrade` and then `Custom`.

3. Deselect all components except `Database Studio`.

4. Choose `Install`.

   The installation manager installs Database Studio.

5. If you are prompted to restart your computer after the installation, make sure that you first shut down any databases that are running.

**More Information**

For more information about Database Studio, including troubleshooting, see SAP Note [1097311](http://www.sap.com).
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6 Additional Information

6.1 Operating Information for liveCache

If you manually reinitialize liveCache with transaction LC10, make sure that you first delete all administration reports, especially /SAPA0/DELETE_LC_ANCHORS and SLCA_INIT_FOLLOW_UP, from the definition of the logical liveCache LCA connection.

6.2 Secure Sockets Layer Protocol for Database Server Communication

The SAP MaxDB database server supports the Secure Sockets Layer (SSL) protocol. You can use this protocol to communicate between the database server and its client, here the Application Server (AS). SSL guarantees encrypted data transfer between the SAP MaxDB database server and its client applications. In addition, the server authenticates itself to the client.

CAUTION

There is a performance cost for SSL since the data has to be encrypted, which requires time and processing power.

To use SSL you need to:

1. Install the SAP cryptographic library [page 21] on the client host and on the server host machines
2. Generate the Personal Security Environment [page 23] (PSE) on the server (SSL Server PSE) and on the client (SSL Client PSE).

6.2.1 Installing the SAP Cryptographic Library

The SAP Cryptographic Library supplies the cryptographic functions required to build a database server-client connection using Secure Sockets Layer (SSL) protocol. Therefore, you need to install the SAP Cryptographic Library on the host machine of the SAP MaxDB database server and the SAP Application Server (AS).

The installation package sapcrypto.car consists of the following:

- SAP Cryptographic Library: libsapcrypto.so/s1
- License ticket: ticket
- Configuration tool: sapgenpse.exe

You use the configuration tool to generate key pairs and PSEs.
CAUTION
The SAP Cryptographic Library is subject to German export regulations and might not be available to some customers. In addition, the library might be subject to the local regulations of your country. These regulations might further restrict import, use, and export or re-export of cryptographic software.
For more information, contact your local SAP representative.

Prerequisites
Download the appropriate SAP Cryptographic Library installation package for your operating system from http://service.sap.com/swdc.

Procedure
1. Unpack the installation package for the SAP Cryptographic Library using sapcar.exe, which you can find for example on your Installation Master DVD, using the following command:
   ```
car -xvf SAPCRYPTO.CAR
   ```
   NOTE
   The remainder of the procedure (as described below) does not apply to client applications such as SQL Studio, which do not recognize a “global” directory. In this case, you must copy the SAPCRYPTO installation package to the installation directory of the application. In this directory you need to create a directory sec, into which you copy the ticket file.

2. Copy the sapcrypto library to the lib subdirectory of the “global program” directory.
   You can find the value of the global program directory by entering the following command:
   ```
sdbconfig IndepPrograms
   ```
   EXAMPLE
   The global program directory might be called the following:
   `/sapdb/programs/lib`

3. Copy the configuration tool sapgenpse.exe to the directory `<global program>\lib`.

4. Create a subdirectory called sec under the “global data” directory and copy the ticket file into it.
   EXAMPLE
   The result might look as follows:
   `/sapdb/data/sec/ticket`

5. Make sure that the directory and the files that the sec directory contains – including the ticket file and the SSL Server PSE – belong to the user lcown and the group lcadm, and that the rights are restricted to 0600.

Result
The system copies the SAP Cryptographic Library is copied to the application server and configures the environment correctly so that the server can find the library at runtime.
6.2.2 Generating the Personal Security Environment

The information required by the database server or client application to communicate using Secure Sockets Layer are stored in the Personal Security Environment (PSE). The required information differs according to whether SSL PSE is for the server or client:

- **SSL Server PSE**
  This PSE contains the security information from the database server, for example, the public-private cryptographic key pair and certificate chain. To install the SSL Server PSE, you need to generate the PSE. You can either do this for a single database server or system-wide. The SSL Server PSE is called `SDBSSLS.exe`.

- **SSL Client PSE**
  The client requires an anonymous certificate called `SDBSSLA.exe`, which contains the list of the public keys of trustworthy database servers.

**Procedure**

**Generating the SSL Server PSE**

**NOTE**
You need to know the naming convention for the distinguished name of the database server. The syntax of the distinguished name, which you enter in the procedure below, depends on the Certification Authority (CA) that you are using.

1. Change to the `<global programs>\lib` directory.
2. Set up the following environment variable:
   ```
   SECUDIR=<global data>\sec
   ```
3. Create a SSL Server PSE, `SDBSSLS.pse`, and generate a certificate request file, `certreq`, in the directory defined by `SECUDIR` (see previous step):
   ```
   sapgenpse gen_pse -v -r `<SECUDIR>\certreq` -p SDBSSLS.pse "<your distinguished name>"
   ```
   For each database server that uses a server-specific PSE, you must set up a unique certificate request. If you are using a valid system-wide SSL Server PSE, you only need to set up a single certificate request for all servers.
4. Send the certificate request to the CA for signing. You can either send it to the SAP CA or to another CA.
   You must make sure that the CA offers a certificate corresponding to the PKCS #7 certificate chain format. Thawte CA at [http://www.thawte.com](http://www.thawte.com) offers a suitable certificate, either SSL Chained CA Cert or PKCS #7 certificate chain format.
   The CA validates the information contained in the certificate request, according to its own guidelines, and sends a reply containing the public key certificate.
5. After you have received the reply from the CA, make sure that the contents of the certificate request have not been destroyed during download.

For example, if you requested the certificate on a UNIX system and stored it on a Windows front end, the formatting (that is, line indents and line breaks) is affected.

To check the contents, open the certificate request with a text editor (such as Notepad) and repair the line indents and line breaks.

```
-----BEGIN CERTIFICATE REQUEST-----
MIIBPzCBqQIBADAAMIGfMA0GCSqGSIb3DQEBAQUA4GNADCBiQKBgQD/302IT+/Y
wpignSw7U9FwneyWy3W110S18aFCYkRo00wCpD8UwcaC4dd4uGT6h12W1J6/F0tUg
+EQxonZbaRkk9sTa1knq3YAUe/gEaGdf1wvuYkb0gjMK811M/jb9B7d8srMPyoBy9jMC7v5u7
+TZwmWaGRjnvClvYGGmW1DAQABoAAwDQYJKoZIhvcNAQEFAQADgYEax2zuaTA0KpdGmXUKY1WdasU
p1m4vHfaHa7ZDBwipvKJ8akYCT
+dpmVjhcpp9E7cUjlB80/6Rup5cnLAAO5FhVt5MS6zNJaz9YSN9XP+5/
MPF6Q4ayJ0VryTkSpbbPrWlbKh1Dds97LQVuQ/myKIAHECwyW6t7sAFJWn4P0dxmKo=
-----END CERTIFICATE REQUEST-----
```

6. Import the reply to the SSL Server PSE:

1. Copy the text to a temporary file called `srcert`.
2. Enter the following command:
   ```
   sapgenpse import_own_cert -c srcert -p SDBSSLS.pse
   ```

   You have generated the SSL Server PSE. You can now start the XServer as usual (if it is already running, you must stop and restart it).

7. To check whether the SSL functionality is working correctly, view the trace file `niserver_<local computer name>.trace` in the `<global data>\wrk` directory.

### Generating the SSL Client PSE

1. Change to the `<global programs>\lib` directory.
2. Set up the following environment variable:
   ```
   SECUDIR=<global data>\sec
   ```
3. Enter `<global program>/lib` in the environment variable `LD_LIBRARY_PATH`.
4. Create an anonymous client SSL Client PSE, `SDBSSLA.pse` in the directory defined by `SECUDIR` (see previous step):
   ```
   sapgenpse gen_pse -v -noreq -p SDBSSLA.pse
   ```

   You can leave the distinguished name empty.

   Before you can establish an SSL connection to a database server, the server certificate must be entered in the PK list of the anonymous client certificate.

5. To see the database server certificate, enter the following command:
6. Start the import with this command:

```
x_ping -n <servermode> -i[import]
```

7. To administer the PSE, use the configuration tool sapgenpse. For more information, enter the following command:

```
sapgenpse -h
```

**NOTE**
For applications such as SQL Studio replace the global data or global program in the above description with the relevant installation directory.

### 6.3 Database Directory Structure

As of SAP DB Release 7.2.4, you can set up several database instances with different releases in one user environment. For this the database services are split into the following areas:

- **Release-independent programs:** IndependentProgPath
  
  This area contains all services that are only allowed to exist once per computer and are downward compatible (for example, the server for Remote SQL, `x_server`). Therefore, only programs of the most recent installed version exist here.
  
  You can check the path for `IndependentProgPath` with the following `dbmcli` command:

  ```
  dbm_getpath IndependentProgPath
  ```

  By default, `IndependentProgPath` is set as follows for the installation:

  `/sapdb/programs`

  The subdirectory `bin` and, for Windows, the extra directory `pgm` must be specified in the environment variable path.

- **Instance data:** IndependentDataPath
  
  This area contains all data necessary for an instance, including run directories and their parameter files. The directory containing this data is called the `IndependentDataPath`.
  
  You can check the path for `IndependentDataPath` with the following `dbmcli` command:

  ```
  dbm_getpath IndependentDataPath
  ```

  By default, `IndependentDataPath` is set as follows for the installation:

  `/sapdb/data`

  The subdirectory `bin` and, for Windows, the extra directory `pgm` must be specified in the environment variable path.

- **Instance-dependent programs:** INSTROOT
  
  This area contains all programs necessary for a running instance. The programs must all correspond to the instance version and are installed once per instance. The programs include, for
example, kernel, console, dbmsrv, and so on. The storage location is known as the INSTROOT of the instance.

The installation sets up the directory as follows:

/ sapdb/<DBNAME>/db

You can display instance names and associated INSTROOTs on a computer with the following dbmc11 command:

db_enum

Client-runtime libraries and dlls

This area contains shared libraries and dlls required by clients at runtime, including runtime precompilers, ODBC, and so on. The runtime libraries are installed on each computer, but different versions must be possible.

The directories for the runtime software are set up during the installation beneath IndepProgPath as follows:

<IndepProgPath>/runtime/<version>

6.4 Sample Directory Structure

The following graphic shows a sample directory structure:

![Sample Directory Structure](image)

---

**Figure 1:**
6.5 Log Files for Troubleshooting

All steps of the upgrade and the associated software installation are logged in the file `SAPliveCacheUpdate_install-<date>-<time>.log` with the following name:

`<independent_data_path>/wrk/SAPliveCacheUpdate_install-<date>-<time>.log`

If the directory `<independent_data_path>` is not known at the time of failure, the log is written to the current directory.
# Typographic Conventions

<table>
<thead>
<tr>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;Example&gt;</code></td>
<td>Angle brackets indicate that you replace these words or characters with appropriate entries to make entries in the system, for example, “Enter your &lt;User Name&gt;”.</td>
</tr>
<tr>
<td>▶ Example → Example ▶</td>
<td>Arrows separating the parts of a navigation path, for example, menu options</td>
</tr>
<tr>
<td>Example</td>
<td>Emphasized words or expressions</td>
</tr>
<tr>
<td>Example</td>
<td>Words or characters that you enter in the system exactly as they appear in the documentation</td>
</tr>
<tr>
<td><a href="http://www.sap.com">http://www.sap.com</a></td>
<td>Textual cross-references to an internet address</td>
</tr>
<tr>
<td>/example</td>
<td>Quicklinks added to the internet address of a homepage to enable quick access to specific content on the Web</td>
</tr>
<tr>
<td>123456</td>
<td>Hyperlink to an SAP Note, for example, SAP Note 123456</td>
</tr>
</tbody>
</table>
| Example  | • Words or characters quoted from the screen. These include field labels, screen titles, pushbutton labels, menu names, and menu options.  
• Cross-references to other documentation or published works |
| Example  | • Output on the screen following a user action, for example, messages  
• Source code or syntax quoted directly from a program  
• File and directory names and their paths, names of variables and parameters, and names of installation, upgrade, and database tools |
| EXAMPLE  | Technical names of system objects. These include report names, program names, transaction codes, database table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE |
| EXAMPLE  | Keys on the keyboard |
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