Upgrade to SAP MaxDB Database 7.9 on Windows
Operating System: Windows
## Content

<table>
<thead>
<tr>
<th>1</th>
<th>Introduction.</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>New Features.</td>
<td>4</td>
</tr>
<tr>
<td>1.2</td>
<td>Before You Start.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>SAP Notes for the Upgrade.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>More Information on SAP Service Marketplace.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Naming Conventions.</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Planning.</td>
<td>8</td>
</tr>
<tr>
<td>2.1</td>
<td>SAP MaxDB Isolated Installation.</td>
<td>8</td>
</tr>
<tr>
<td>2.2</td>
<td>Database Requirements.</td>
<td>10</td>
</tr>
<tr>
<td>2.3</td>
<td>Operating System Requirements.</td>
<td>10</td>
</tr>
<tr>
<td>2.4</td>
<td>SAP System Requirements.</td>
<td>11</td>
</tr>
<tr>
<td>2.5</td>
<td>Upgrade Strategy.</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>Preparation.</td>
<td>13</td>
</tr>
<tr>
<td>3.1</td>
<td>Preparing for an Upgrade with In-Place.</td>
<td>13</td>
</tr>
<tr>
<td>3.2</td>
<td>Preparing for an Upgrade with Patch Installation.</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>Upgrade Process.</td>
<td>15</td>
</tr>
<tr>
<td>4.1</td>
<td>Performing an Upgrade for In-Place.</td>
<td>15</td>
</tr>
<tr>
<td>4.2</td>
<td>Performing an Upgrade for Patch Installation.</td>
<td>17</td>
</tr>
<tr>
<td>4.3</td>
<td>Upgrading the SAP MaxDB Client Software.</td>
<td>17</td>
</tr>
<tr>
<td>5</td>
<td>Post-Upgrade.</td>
<td>19</td>
</tr>
<tr>
<td>5.1</td>
<td>Performing Post-Upgrade Steps After an In-Place Upgrade.</td>
<td>19</td>
</tr>
<tr>
<td>5.2</td>
<td>Updating the Database Software to the Current Release.</td>
<td>21</td>
</tr>
<tr>
<td>5.3</td>
<td>Installing or Upgrading Database Studio for SAP MaxDB.</td>
<td>21</td>
</tr>
<tr>
<td>5.4</td>
<td>Secure Sockets Layer Protocol for Database Server Communication.</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Installing the SAP Cryptographic Library.</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Generating the Personal Security Environment.</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Configuring the SSL Communication between the Application Server and the Database Server</td>
<td>28</td>
</tr>
<tr>
<td>6</td>
<td>Additional Information.</td>
<td>29</td>
</tr>
<tr>
<td>6.1</td>
<td>Database Directory Structure.</td>
<td>29</td>
</tr>
<tr>
<td>6.2</td>
<td>Log Files for Troubleshooting.</td>
<td>30</td>
</tr>
</tbody>
</table>
**Document History**

**i Note**
Before you start the implementation, make sure you have the latest version of this document that is available at [http://service.sap.com/instguides](http://service.sap.com/instguides).

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

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.05</td>
<td>2019-10-03</td>
<td>Revised version</td>
</tr>
<tr>
<td>1.04</td>
<td>2016-01-20</td>
<td>Revised version</td>
</tr>
<tr>
<td>1.03</td>
<td>2015-01-28</td>
<td>Revised version</td>
</tr>
<tr>
<td>1.02</td>
<td>2013-05-22</td>
<td>Revised version: clarification for upgrade with MSCS</td>
</tr>
<tr>
<td>1.01</td>
<td>2012-04-17</td>
<td>Revised version</td>
</tr>
<tr>
<td>1.00</td>
<td>2011-11-10</td>
<td>Initial version</td>
</tr>
</tbody>
</table>
1 Introduction

This documentation explains how to upgrade the SAP MaxDB database for the SAP system:

- From at least SAP Max DB version 7.5
- To SAP MaxDB version 7.9

⚠️ 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 > Database Upgrades > SAP MaxDB

If you have a high-availability (HA) liveCache with a cluster environment, see SAP Note 2113981 for more information before starting the upgrade.

Implementation Considerations

- Make sure that you read the relevant SAP Notes [page 5] before beginning the upgrade. These notes contain the most recent information about the upgrade, as well as corrections to the documentation.
- For more information about SAP MaxDB, see the following:
  http://help.sap.com > SAP NetWeaver > SAP MaxDB
  For the most up-to-date information about the SAP MaxDB documentation and where to find it, see SAP Note 767598.
- Note that the descriptions for the upgrade – that is, Upgrade Process [page 15] and Updating the Database Software to the Current Release [page 21] – are not valid for SAP MaxDB and liveCache with Microsoft Cluster Service (MSCS). Check SAP Note 1855747 to find out which upgrade procedure is valid for your system. The procedure mainly depends on the start version and on the MaxDB / liveCache configuration in MSCS.

1.1 New Features

For more information about the new features for SAP MaxDB version 7.9, see:

http://www.sdn.sap.com/irj/sdn/maxdb

For more information about the most important enhancements and features for version 7.9, see SAP Note 1444241.
As of SAP MaxDB version 7.6, support packages and patch levels have been introduced. For more information, see SAP Note 820824.

As of SAP MaxDB version 7.8, the installation has changed. For more information, see SAP MaxDB Isolated Installation [page 8].

### 1.2 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]

#### 1.2.1 SAP Notes for the Upgrade

Read the SAP notes before you begin the upgrade. Make sure that you have the most recent version of each SAP Note, which you can find at:

http://service.sap.com/notes

The following notes contain information relevant to the upgrade:

<table>
<thead>
<tr>
<th>SAP Note</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1492467</td>
<td>Additional Information for Upgrade to MaxDB 7.9</td>
</tr>
<tr>
<td>820824</td>
<td>Frequently Asked Questions (FAQ): SAP MaxDB</td>
</tr>
<tr>
<td>498036</td>
<td>Overview note on importing database versions</td>
</tr>
<tr>
<td>1855747</td>
<td>Overview: Update of SAP MaxDB/liveCache/CS in MSCS</td>
</tr>
<tr>
<td>2113981</td>
<td>SAP MaxDB / liveCache / Content Server Maintenance in High Availability System Environment</td>
</tr>
</tbody>
</table>

**Caution**

Before you begin the upgrade, always make sure that you read the first SAP Note listed above, 1492467, because it contains up-to-date information essential to the upgrade, including corrections not contained in this upgrade documentation.

This note also contains the valid DVD numbers for SAP MaxDB 7.9.
1.2.2 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>
</tr>
</thead>
<tbody>
<tr>
<td>Database upgrade guides</td>
<td><a href="http://service.sap.com/instguides">http://service.sap.com/instguides</a></td>
</tr>
<tr>
<td>Product Availability Matrix (PAM)</td>
<td><a href="http://service.sap.com/pam">http://service.sap.com/pam</a></td>
</tr>
<tr>
<td>SAP Notes</td>
<td><a href="http://service.sap.com/notes">http://service.sap.com/notes</a></td>
</tr>
<tr>
<td>Support Packages and patches</td>
<td><a href="http://service.sap.com/patches">http://service.sap.com/patches</a></td>
</tr>
</tbody>
</table>

1.2.3 Naming Conventions

We use the following naming conventions in this documentation:

- Release
  Unless otherwise specified, we use “release” to refer to the release of SAP NetWeaver
- SAP MaxDB name
  DBSID refers to the SAP MaxDB name. For <DBSID> you need to substitute your SAP MaxDB name, for example, MDB.
- SAP system name
  SAPSID refers to the SAP system name. Pay attention to lowercase or uppercase. If <SAPSID> is used, insert your SAP System name, for example, PRD.
- <SAPSID> user name
  The user name is written in uppercase and abbreviated with <SAPSID>ADM.

⚠️ Caution

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

- Support Packages and patches
  For more information, see:
  http://service.sap.com/patches
- SAP MaxDB operational states
  There are the following SAP MaxDB operational states:

<table>
<thead>
<tr>
<th>SAP MaxDB State Identifier</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONLINE</td>
<td>The database instance has been started and users can log on.</td>
</tr>
<tr>
<td>SAP MaxDB State Identifier</td>
<td>Meaning</td>
</tr>
<tr>
<td>----------------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>ADMIN</td>
<td>The database instance is only available to administrators.</td>
</tr>
<tr>
<td>OFFLINE</td>
<td>The database instance is not running.</td>
</tr>
</tbody>
</table>
2 Planning

Prerequisites

You have checked the SAP Notes for the upgrade [page 5].

Process Flow

You have to complete the following planning activities:

1. If required, you read about the SAP MaxDB isolated installation [page 8], which is the new kind of installation as of SAP MaxDB version 7.8.
2. You check the database requirements [page 10].
3. You check the operating system requirements [page 10].
4. You check the SAP system requirements [page 11].
5. You choose an upgrade strategy [page 11].

2.1 SAP MaxDB Isolated Installation

As of SAP MaxDB version 7.8, the installation principles of SAP MaxDB have changed, so that the following features are now supported:

- Multiple SAP MaxDB installations of the same version can be installed on one computer
- Multiple SAP MaxDB installations of different versions can be installed on one computer
- Multiple different clients as well as multiple versions of the same client can be installed on the same computer
- Any server or client installation can be maintained individually
- SAP MaxDB databases or liveCache installations can be maintained individually

When installing SAP MaxDB software of version 7.8 and higher, for SAP environments the software and database are stored in the following paths:

<table>
<thead>
<tr>
<th>Path Name</th>
<th>Variable Name</th>
<th>Properties</th>
<th>Shared</th>
<th>Stored Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global programs</td>
<td>GlobalProgPath</td>
<td>/sapdb/programs</td>
<td>By all SAP MaxDB installations on this computer</td>
<td>Installation tools, (for example: sdbuninst, sdbverify, sdbconfig) global listener</td>
</tr>
<tr>
<td>path</td>
<td></td>
<td></td>
<td>Once per computer only</td>
<td>(sdbgloballistener)</td>
</tr>
</tbody>
</table>

Upgrade to SAP MaxDB Database 7.9 on Windows
Planning
### Path Name | Variable Name | Properties | Shared | Stored Components
--- | --- | --- | --- | ---
Global data path | GlobalDataPath | /sapdb/data
Once per computer only | By all SAP MaxDB installations <7.8 on this computer | Parameter and log files of SAP MaxDB versions < 7.8

- **Installation path**
  - For database server software:
    - /sapdb/<DBSID>/db
  - For database client software:
    - /sapdb/clients/ <SAPSID>
  - Once per installation, several Installation paths allowed on a computer
  - No
  - Database server software, such as database kernel, X server software (for SAP MaxDB versions < 7.8), and database client software, such as DBMCLI, SQLDBC, JDBC

- **Private data path**
  - For database server software:
    - /sapdb/<DBSID>/data
  - For database client software:
    - /sapdb/clients/ <SAPSID>/data
  - Once per installation, several private paths on a computer are allowed
  - No
  - All database related files are stored here (they are no longer stored in the global data path). These files include installation registry and log files, database parameter files, knldiag file, and so on.

As a consequence of the new installation principles, higher versions can no longer unintentionally update existing software from a previous version.

Since more than one client can be installed on an individual computer, as of SAP MaxDB 7.8 each application server has its own SAP MaxDB runtime (client software installation). This lets you update any client installation without affecting any other client installation. For example, you can now update the SAP MaxDB runtime of an individual application server without affecting a second application server on the same computer. Likewise, you can upgrade a database together with its software to a higher version without affecting another database on this computer and its current connections. You also can run test systems and production systems on the same computer. The creation of system copies in SAP systems is now much easier, since a private data path is used for the SAP MaxDB software.

⚠️ **Caution**

There is still only one database instance allowed for each software installation.
2.2 Database Requirements

As part of the upgrade planning [page 8], make sure that your database meets the following requirements before you start the upgrade:

- The database is ready to run.
- The system tables have been loaded at least once for the existing instance.
- The database instance is the only instance that refers to the installation path of the software version that you want to upgrade.
- The database parameters of the database instance that you want to upgrade have not changed since the last restart.
- The database start version – that is, before you start the upgrade – is at least 7.5

⚠️ Caution

If the database start version does not meet the above requirement, you must upgrade to this version before starting the upgrade.

For more information about how to upgrade to the correct database start version, see SAP Note 498036.

2.3 Operating System Requirements

As part of the upgrade planning [page 8], make sure that your operating system meets the following requirements before you start the upgrade:

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Supported Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td>2008 (Status: planned)</td>
</tr>
<tr>
<td>Windows IA64</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td>2008 R2 (Status: planned)</td>
</tr>
<tr>
<td>Windows X64</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td>2008 R2</td>
</tr>
</tbody>
</table>

For the most up-to-date SAP MaxDB-specific release information on the database and operating system of your product, including required patch levels, check the SAP Product Availability Matrix (PAM) at:

http://service.sap.com/pam

There you can also find additional information on required operating system patch levels and patches for C++ RTE.
2.4 SAP System Requirements

As part of the upgrade planning [page 8], make sure that your SAP system meets the following requirements before you start the upgrade:

- SAP MaxDB Version 7.9 is initially released for SAP NetWeaver 7.0 Enhancement Package 3, and subsequent releases.
- For previous SAP releases, SAP Note 1353266 shows – with reference to the Product Availability Matrix (PAM) – whether an official downward-compatible release exists for SAP products or whether a special release has been granted for the SAP upgrade start release.

For more information, see the Product Availability Matrix (PAM) at:

http://service.sap.com/pam

You can also find the information in the above SAP Notes at:

http://service.sap.com/notes

2.5 Upgrade Strategy

As part of the upgrade planning [page 8], you choose an upgrade strategy, which depends on your database start version:

<table>
<thead>
<tr>
<th>Your Database Start Version</th>
<th>Your Upgrade Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5 or later</td>
<td>In-Place Upgrade</td>
</tr>
</tbody>
</table>

With an In-Place upgrade, you upgrade the database instance and the database software.

The start version of the database software must be Version 7.5 or later and the target version must be 7.9 or later.

For an In-Place upgrade, the software has a significant amount of new functionality that could cause incompatibilities between the existing data and the new software.

Therefore, the adaptations to the new database functionality and structures are made internally during an In-Place upgrade.
<table>
<thead>
<tr>
<th>Start Version</th>
<th>Your Upgrade Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.9</td>
<td>Patch Installation</td>
</tr>
</tbody>
</table>

With a patch installation, you *only* upgrade the database software.

You can use this procedure if the *only* difference between the source and target version is the build number or the support package number, or both.

For a patch installation, the software does **not** have a significant amount of new functionality that could cause incompatibilities between the existing data and the new software.
3 Preparation

Prerequisites

You have completed planning the upgrade [page 8].

Process Flow

You have to complete the following preparations:

1. If your upgrade strategy is In-Place, you prepare for an In-Place upgrade [page 13].
2. If your upgrade strategy is Patch installation, you prepare for an upgrade with Patch installation [page 14].

3.1 Preparing for an Upgrade with In-Place

Use

As part of the upgrade preparations [page 13] for an In-Place upgrade, you need to perform the preparations described below.

Procedure

1. Make sure that the operational state [page 6] of your database is ONLINE.
2. In case you need to recover the database, make sure that you have an installation kit with the start version of the database software. This means that you must have database Version 7.5, 7.6, 7.7, or 7.8 with the same or a higher build.
3. Check the required free space in the database. You need at least 15% free space.
4. Check that there are no bad indexes in the database, using the Database Studio or the Database Manager GUI.
   For more information about how to remove bad indexes, see SAP Note 566883.
5. Shut down the SAP system using the SAP Microsoft Management Console (SAP MMC).
   For more information about SAP MMC, see:
6. Bring the database to operational state OFFLINE using the Database Manager CLI command `db_offline`, Database Manager GUI, or Database Studio.

7. Bring the database to operational state ADMIN using Database Manager CLI command `db_admin`, Database Manager GUI, or Database Studio.

8. Set up the database so that it can be recovered:
   - If you have a recent data backup, make an incremental data backup and a log backup.
   - Otherwise, make a complete data backup

   △ Caution
   
   If you do not have a backup, you might lose data in the event of a database failure that requires database recovery.
   
   After the backup, put the database in operational state ONLINE before the upgrade.

9. Exit the Database Manager CLI, GUI, or Database Studio and any other database applications that are running.

10. If you need to upgrade your operating system do this now.

### 3.2 Preparing for an Upgrade with Patch Installation

#### Use

As part of the upgrade preparations [page 13] for an upgrade with Patch installation, you need to perform the preparations described below.

#### Procedure

1. Make sure that the operational state [page 6] of your database is ONLINE, ADMIN, or OFFLINE without any errors.

2. Stop application software – such as Database Studio, Database Manager CLI or GUI – and the database that you intend to upgrade, so that you can run a full backup. In this case, you do not need to stop the X server.

   △ Caution
   
   The upgrade tool does not check whether a database backup is available.
   
   Therefore, always perform a database backup before the upgrade, so that you can recover the database in the event of data loss.
4 Upgrade Process

Prerequisites

You have completed preparing for the upgrade [page 13].

⚠️ Caution

The information given here does not apply to SAP MaxDB with liveCache on MSCS. For more information, see SAP Note 1855747.

Process Flow

You have to complete the following to perform the upgrade:

1. If your upgrade strategy [page 11] is In-Place, perform the upgrade for In-Place [page 15].
2. If your upgrade strategy [page 11] is Patch installation, perform the upgrade for Patch installation [page 17].
3. If required, you upgrade the SAP MaxDB client software [page 17].

4.1 Performing an Upgrade for In-Place

Prerequisites

⚠️ Caution

Never terminate the upgrade.

If you terminate the upgrade, you risk losing all your data. Your only option then is to use data backups to recover the database instance, which is risky and time-consuming.
Context

As part of upgrading the database [page 15], you perform this procedure to upgrade your database if your chosen upgrade strategy [page 11] is In-Place.

Procedure

⚠️ **Caution**

Start the upgrade at the command prompt. If you start it using the Explorer, error messages are not always displayed.

1. Log on as a user with administrator rights (<sapsid>adm).
2. Load the Max 7.9 DVD in the drive.
3. Change directory to:

   `<SAP MaxDB DVD>:\DATA_UNITS\MAXDB_UPDATE`

4. Start the upgrade as follows:

   `DBUPDATE.BAT -s <SAPSID> -d <DBSID> -u <DBM,DBM password> [ -dir <temporary directory> ]`

   **iNote**

   The default temporary directory is C:\temp. If you want to change this setting, use the `-dir` parameter.

Results

When you see the message confirming that the upgrade has completed successfully, this means that:

- The database instance and its software are now upgraded.
- The database instance is in the operational state ONLINE.
- Only valid for database start version 7.7 or lower:
  The isolated database client software (installation name CL_<SAPSID>) is now installed in the directory `/sapdb/clients/<SAPSID>`. This is only valid for database servers where associated SAP application software is installed.
- The upgrade is flagged as complete.
4.2 Performing an Upgrade for Patch Installation

Use

As part of upgrading the database [page 15], you perform this procedure to upgrade your database if your chosen upgrade strategy [page 11] is Patch installation.

Procedure

⚠️ Caution
Start the upgrade at the command prompt. If you start it using the Explorer, error messages are not always displayed.

1. Log on as a user with administrator rights (<sid>adm).
2. Load the SAP MaxDB 7.9 DVD in the drive.
3. Change the directory to:
   <SAP MaxDB DVD>:\DATA_UNITS\UPDATE
4. Start the upgrade tool as follows:
   `DBUPDATE.BAT -s <SAPSID> -d <DBSID> -u <DBM,DBM password> [ -dir <temporary directory> ]`

ℹ️ Note
The default temporary directory is C:\temp. If you want to change this setting, use the -dir parameter.

Result

When you see the message confirming that the upgrade has completed successfully, this means that:

- The database software is now upgraded.
- The database instance is now in the operational state ONLINE.
- The upgrade is flagged as complete.

4.3 Upgrading the SAP MaxDB Client Software

If required, as part of upgrading the database [page 15], you must upgrade the database client software for the host where the SAP central or dialog instance runs.
**Prerequisites**

Stop the following:

- The central and dialog instance
- Any other SAP MaxDB instances that are running on the central or dialog instance server
  
  In this case, also stop the server for Remote SQL using the following command:
  
  `x_server stop`

- All DBMGUI, SQL Studio, and DBMCLI sessions.

**Procedure**

1. Log on as a user with administrative rights (`<sid>adm`).
2. Load the SAP MaxDB 7.9 DVD in the drive.
3. Start the client software upgrade:
   
   `<SAP MaxDB DVD>\DATA_UNITS\MAXDB_UPDATE\DBUPDATE.BAT -client <SAP System Name>`

4. Only valid for database start version 7.7 or lower:
   
   As the `<sapsid>adm` user, perform the migration of the SAP MaxDB paths in the local user environment, as described in SAP Note 1357452.

   **i Note**

   Only valid for database start version 7.7 or lower:
   
   Make sure that you log on again from the beginning because the environment of `<sapsid>adm` has been changed.

5. Only valid for database start version 7.7 or lower:
   
   After logging on again, restart the SAP service `<SAPSID>_<InstanceNumber>` so that the environment changes become active.

6. Restart the SAP system using the SAP Microsoft Management Console (SAP MMC).
   
   For more information about SAP MMC, see:
   

7. If required, check the client software version as described in SAP Note 822239. If you need to obtain the latest client software, see SAP Note 649814, which describes how to download it from SAP Service Marketplace.
5  Post-Upgrade

Prerequisites

You have completed the upgrade [page 15].

Process Flow

You have to complete the following post-upgrade steps:

1. If your upgrade strategy [page 11] is In-Place, perform post-upgrade steps after an In-Place upgrade [page 19].
2. You update the database software to the current release [page 21].
3. You install or upgrade Database Studio [page 21].
4. If required, you set up Secure Sockets Layer (SSL) protocol for database server communication [page 23].

5.1  Performing Post-Upgrade Steps After an In-Place Upgrade

Use

As part of the post-upgrade [page 19] steps, you perform this procedure if your chosen upgrade strategy [page 11] is In-Place.

Procedure

1. Perform a complete backup of the database data so that you can recover the new database if necessary.

⚠️ Caution

We do not guarantee that you can recover the database using backups from different versions of the database.

2. Only valid for database start version 7.7 or lower:
   As the <sid>adm user, perform the migration of the SAP MaxDB paths in the local user environment, as described in SAP Note 1357452.
Note
Only valid for database start version 7.7 or lower:
Make sure that you log on again from the beginning, because the environment of <sapsid>adm has been changed.

3. Only valid for database start version 7.7 or lower:
After logging on again, restart the SAP service SAP<SAPSID>_<InstanceNumber> so that the environment changes become active.

4. This step applies only to SAP installations that include **AS Java (SAP J2EE Engine)** and when the database start version is 7.7 or lower:
Obtain the JDBC driver as follows:
<DB drive>\sapdb\clients\<SAPSID>\runtime\jar

Note
The location of the driver has changed compared to previous versions of SAP MaxDB. This is the old location of the JDBC driver, before SAP MaxDB version 7.8:
<DB drive>/sapdb\programs\runtime\jar

SAP Note [867976](http://help.sap.com/nw70) describes how to update the location of the JDBC driver for the Java application server.

5. Start the SAP system using the SAP Microsoft Management Console (SAP MMC).
For more information about SAP MMC, see:

6. We recommend you to update the optimizer statistics.

7. Only valid for database start version 7.7 or lower:
After a successful update and assuming that no SAP application is using it, you can deinstall the SAP MaxDB client software from version 7.7 or lower:

⚠️ Caution
Only deinstall the old legacy SAP MaxDB client software if you are completely sure that you do not need it.

Log in as a user with administration rights and execute the following command:
<DB drive>\sapdb\programs\bin\sdbuninst -i Legacy

8. Users have to be members of the **SDB Operators** group as of SAP MaxDB 7.8 if they want to administer SAP MaxDB, such as executing dbmcli commands.
5.2 Updating the Database Software to the Current Release

After the upgrade and before you start production operation, we strongly recommend you to update the database software to the latest SAP MaxDB patch available on the SAP Software Distribution Center (SWDC).

Procedure

Download the latest SAP MaxDB patches from http://support.sap.com/swdc Databases SAP MaxDB.

For more information about upgrading to a SAP MaxDB patch from a SWDC Support Package, see SAP Note 735598.

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. Database Studio is the database administration tool for SAP MaxDB. With Database Studio you can administer MaxDB databases version 7.6 and newer.

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.

  i 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 7.9
      | Operating System | Database Studio 7.9.08 | Database Studio 7.9.09 |
      |------------------|-----------------------|-----------------------|
      | Windows 2008     | X64                   | X64                   |
      | Windows 2008 R2  | X64                   | X64                   |
Operating System | Database Studio 7.9.08 | Database Studio 7.9.09
---|---|---
Windows Vista | IA32 and X64 | X64
Windows 7 | IA32 and X64 | X64
Windows 8 | IA32 and X64 | X64
Windows 10 | IA32 and X64 | 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 by downloading them from: https://launchpad.support.sap.com/#/softwarecenter Databases SAP MaxDB Database Patches MAXDB GUI COMPONENTS/TOOLS MAXDB DATABASE STUDIO 7.9
- Database Studio 7.9.09 comes with the SAP Java Runtime SAPJVM. You no longer need to download the Java runtime.
- Database Studio 7.9.08 is still available for downloading.
  To check your Java version, enter the following command: `java -version`
  To download Java, go to http://java.com/en/download.

**Context**

For more information about Database Studio, see https://help.sap.com/maxdb "<Version> Application Help SAP MaxDB Library Tools Database Studio"

**Note**

Database Studio replaces Database Manager GUI and SQL Studio, which were available in previous releases.

For up-to-date information about installing Database Studio, see SAP Note 1097311.

For more information about Database Studio, including troubleshooting, see SAP Note 1097311 and 1795588.

**Procedure**

1. Start the installation or upgrade by simply executing the downloaded `SDBSETUP.EXE` (Windows clients) or `SDBSETUP` (Linux clients) file.
The Installation Manager starts.

2. Follow the Installation Manager steps to install or upgrade Database Studio.
3. If you are prompted to restart your computer after the installation, make sure that you first shut down any databases that are running.

5.4 Secure Sockets Layer Protocol for Database Server Communication

The SAP MaxDB database server supports the Secure Sockets Layer (SSL) / Transport Layer Security (TLS) 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. You need to install SAP’s cryptographic library - SAPCRYPTOLIB. For more information on software versions, see SAP Note 2243688.

⚠️ 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 [install the SAP Cryptographic Library](#) [page 23] and [generate the personal security environment](#) [page 25] (PSE) on the server (SSL Server PSE) and on the client (SSL Client PSE). In addition, you need to [configure the SSL communication between the application server and the database server](#) [page 28].

**Related Information**

- Installing the SAP Cryptographic Library [page 23]
- Generating the Personal Security Environment [page 25]
- Configuring the SSL Communication between the Application Server and the Database Server [page 28]

5.4.1 Installing the SAP Cryptographic Library

This section describes how to install the SAP Cryptographic Library.

**Prerequisites**

**Prerequisites**
Download the appropriate installation package for your operating system and liveCache version from:

https://launchpad.support.sap.com/#/softwarecenter

Support Packages & Patches ➤ SAP TECHNOLOGY COMPONENTS ➤ SAPCRYPTOLIB ➤ COMMONCRYPTOLIB <version>

Context

The SAP Cryptographic Library supplies the cryptographic functions required to build a database server-client connection using the 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 consists of the following:

- The SAP Cryptographic Library:
  - SAP liveCache >= 7.9.09: CommonCryptoLib (CCL)
  - SAP liveCache < 7.9.09: SAPCRYPTOLIB
- Configuration tool sapgenpse.exe

The installation package is called SAPCRYPTOLIBP_<patch_level>-<platform_id>.SAR. For example, CCL 8.4.45 on 64-bit AIX is called SAPCRYPTOLIBP_8445-20011699.SAR.

For more information on the CCL, see SAP Note 1848999.

You use the configuration tool to generate key pairs and PSEs.

Procedure

1. Unpack the installation package for the SAP Cryptographic Library using sapcar.exe, which you can find for example on your installation master media, using the following command:

    sapcar -xvf <name of your package>

    *Note*

    The remainder of the procedure (as described below) does not apply to client applications such as SQL Studio, which do not recognize an independent directory. In this case, you must copy the sapcrypto installation package to the installation directory of the application.

2. Copy the sapcrypto library to the lib subdirectory of the independent program directory.

    You can find the value of the independent program directory by entering the following command:

    dbmcli dbm_getpath IndepProgPath

    *Example*

    The independent program directory might be called the following:

    /sapdb/programs/lib
3. Copy the configuration tool sapgenpse.exe to the directory <independent_program>\lib.
4. Create a subdirectory called sec under the independent data directory.
   
   Example
   
   The result might look as follows:
   
   /sapdb/data/sec

5. Make sure that the directory and the files that the sec directory contains – including the SSL Server PSE – belong to the user lcown and the group lcadm, and that the rights are restricted to 0660.

5.4.2 Generating the Personal Security Environment

This section describes how to generate the SSL Server PSE and the SSL Client PSE.

Context

The information required by the database server or client application to communicate using Secure Sockets Layer is 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

1. You generate the SSL Server PSE [page 26]
2. You generate the SSL Client PSE [page 27]
5.4.2.1 Generating the SSL Server PSE

Proceed as follows to generate the SSL Server PSE.

**Context**

**i 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.

**Procedure**

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 a SSL Server PSE, SDBSSLS.pse, and generate a certificate request file, certreq, in the directory defined by SECUDIR (see step 2):
   ```
   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.
5. 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 the Thawte website 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.
6. 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 the line breaks.
Example

This is an example of a certificate request:

Sample Code

```plaintext
-----BEGIN CERTIFICATE REQUEST-----
MIIBPzCBQgQIBADAAMIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQD/302IT+/Y
wpignSw7u9FmeyWz3WIi6S18aFCYkRo00wCpD8UwcaC4dd84uGT6h12W1J0/FotUg
+EQxon2baRrk9sTkxnImqX3YAe/g/eqdF1wvuYkb0gjmKm811M/
jb9B0d8rMFyoBy9jMC7v5u7+TZWmWa6RjvC1v1GgMw1DQAQBoAAADQYJKoZ1hvcNAQEFBQ
ADgYEA
x2zuTAOKPdGnUXK1WdasUpim4vhaH7ZD8viypvK38ayYCT
+dpmVjhcph9E7cUjL80/6Rup5cnLAA05FhVt5MS6zJNa9YYS9XP+5/
MPF6Q4ayJ0VryTkbSpbbPrW1bKhdDss97LQVtQ/myKIAHECwyW6t7sAFJwn4P0fzmKo=
-----END CERTIFICATE REQUEST-----
```

7. Import the reply to the SSL Server PSE:
   a. Copy the text to a temporary file called `srcert`
   b. 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).

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

### 5.4.2.2 Generating the SSL Client PSE

Proceed as follows to generate the SSL Client PSE.

**Procedure**

1. Change to the `<global programs\lib` directory.
2. Set up the following environment variable:
   ```
   SECUDIR=<global data\sec
   ```
3. 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.
4. To see the database server certificate, enter the following command:
   ```
   "x_ping -n <servermode> -c[apture]
   ```
   You can check whether to trust the database server certificate. The client certificate is not affected by this.
5. Start the import with this command:

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

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

```bash
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.

---

### 5.4.3 Configuring the SSL Communication between the Application Server and the Database Server

Set the connection information for each database connection for which SSL is to be used.

**Procedure**

Using transaction `dbco`, set the connection information for each database connection for which SSL is to be used as follows:

- Connection information for database connection `<name>`
  ```plaintext
  maxdb:remotes://<host>/database/<SID>-<SID>
  ```
- Connection information for database connection `<name>`+
  ```plaintext
  @DBM_SSL:<host>-<SID>
  ```

For more information, see SAP Note [2190094](https://-support.sap.com/sapcoeffICIENT/2190094).

**Example**

Database connection: `Test`

- `<host>`: `lu12345`
- `<SID>`: `WB9`

Connection information for database connection `Test`:

```plaintext
maxdb:remotes://lu12345/database/WB9-WB9
```

Connection information for `Test+`:

```plaintext
@DBM_SSL:lu12345-WB9
```
6 Additional Information

6.1 Database Directory Structure

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.

**Note**

As of SAP MaxDB version 7.8, with the introduction of the isolated installation, the database directory structure in SAP installations has changed. This section describes the new structure.

- **Global programs path:** `GlobalProgPath`
  This area contains all services that are only allowed to exist once per computer and are downward compatible (for example, installation tools and the global listener, `sdbgloballistener`). Therefore, only programs of the most recent installed version exist here.
  You can check the path for `GlobalProgPath` with the following `dbmcli` command:
  ```plaintext```
  `dbmcli dbm_getpath GlobalProgPath`
  ```
  By default, `GlobalProgPath` is set as follows for the installation:
  ```plaintext```
  `<DB drive>:\sapdb\programs`
  ```

- **Global data path:** `GlobalDataPath`
  This area contains all data necessary for an instance with version 7.7 or lower, including run directories and their parameter files. The directory containing this data is called the `GlobalDataPath`.
  You can check the path for `GlobalDataPath` with the following `dbmcli` command:
  ```plaintext```
  `dbmcli dbm_getpath GlobalDataPath`
  ```
  By default, `GlobalDataPath` is set as follows for the installation:
  ```plaintext```
  `<DB drive>:\sapdb\data`
  ```

- **Private data path:** `PrivateDataPath`
  This area contains all data necessary for an instance with version 7.8 or higher, including run directories and their parameter files. The directory containing this data is called the `PrivateDataPath`.
  You can check the path for `PrivateDataPath` with the following `dbmcli` command:
  ```plaintext```
  `dbmcli –s inst_enum <InstallationPath>`
  By default, `PrivateDataPath` is set as follows for the installation:
  ```plaintext```
  ○ SAP MaxDB server software installations:
    ```plaintext```
    `<DB drive>:\sapdb\<DBSID>\data`
  ○ SAP MaxDB client software installations:
    ```plaintext```
    `<DB drive>:\sapdb\clients\<SAPSID>\data`
  ```

- **Installation path:** `InstallationPath`
  This area contains all programs necessary for a running database instance or for client software.
  `InstallationPath` of server software (for a database 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 `InstallationPath` of the instance.
InstallationPath of a client software:
This area contains shared libraries and dlls required by SAP clients at runtime connecting to database instances of version 7.8 or higher, including SQLDBC, JDBC, ODBC, and so on. The client software is installed on each computer, for each SAP instance separately.
The installation sets up the directory as follows:

○ SAP MaxDB server software installations:
  <DB drive>:\sapdb\<DBNAME>\db

○ SAP MaxDB client software installations:
  <DB drive>:\sapdb\clients\<SAPSID>

You can display instance names and the associated InstallationPath on a computer with the following dbmcli command:

  dbmcli db_enum

You can display the InstallationPath of installed software on a computer with the following dbmcli command:

  dbmcli inst_enum

6.2 Log Files for Troubleshooting

This section provides information about how you can find log files relevant for the upgrade and the associated software installation.

All steps of the upgrade and the associated software installation are logged in the file with the following name:

<GlobalDataPath>\wrk\SDBUPDMsg<timestamp>.log

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

i Note

If you are updating the SAP MaxDB client software, you can find the log files here instead:

<GlobalDataPath>\wrk\SDBINSTMsg<timestamp>.log
Important Disclaimers and Legal Information

Hyperlinks

Some links are classified by an icon and/or a mouseover text. These links provide additional information.

About the icons:

- Links with the icon : You are entering a Web site that is not hosted by SAP. By using such links, you agree (unless expressly stated otherwise in your agreements with SAP) to this:
  - The content of the linked-to site is not SAP documentation. You may not infer any product claims against SAP based on this information.
  - SAP does not agree or disagree with the content on the linked-to site, nor does SAP warrant the availability and correctness. SAP shall not be liable for any damages caused by the use of such content unless damages have been caused by SAP’s gross negligence or willful misconduct.
- Links with the icon : You are leaving the documentation for that particular SAP product or service and are entering a SAP-hosted Web site. By using such links, you agree that (unless expressly stated otherwise in your agreements with SAP) you may not infer any product claims against SAP based on this information.

Beta and Other Experimental Features

Experimental features are not part of the officially delivered scope that SAP guarantees for future releases. This means that experimental features may be changed by SAP at any time for any reason without notice. Experimental features are not for productive use. You may not demonstrate, test, examine, evaluate or otherwise use the experimental features in a live operating environment or with data that has not been sufficiently backed up.

The purpose of experimental features is to get feedback early on, allowing customers and partners to influence the future product accordingly. By providing your feedback (e.g. in the SAP Community), you accept that intellectual property rights of the contributions or derivative works shall remain the exclusive property of SAP.

Example Code

Any software coding and/or code snippets are examples. They are not for productive use. The example code is only intended to better explain and visualize the syntax and phrasing rules. SAP does not warrant the correctness and completeness of the example code. SAP shall not be liable for errors or damages caused by the use of example code unless damages have been caused by SAP’s gross negligence or willful misconduct.

Gender-Related Language

We try not to use gender-specific word forms and formulations. As appropriate for context and readability, SAP may use masculine word forms to refer to all genders.