Installation Guide

SAP NetWeaver Composition Environment 7.1 SR5 on AIX: IBM DB2 for Linux, UNIX, and Windows

Production Edition

Target Audience

- Technology consultants
- System administrators

Document version: 1.1 – 05/16/2008
Document History

⚠️ Caution
Before you start the implementation, make sure you have the latest version of this document. You can find the latest version at http://www.sdn.sap.com/irj/sdn/nw-ce.

The following table provides an overview of the most important document changes.

<table>
<thead>
<tr>
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<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>5/16/2008</td>
<td>Initial Version</td>
</tr>
</tbody>
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1 Introduction

This document explains how to install an SAP NetWeaver Composition Environment system as productive edition.
For more information about SAP NetWeaver Composition Environment, see

Constraints
You need to consider the following constraints before you start your installation:

■ You must only use the SAP installation tools according to the instructions and for the purposes
described in the SAP installation document. Improper use of the SAP installation tools can damage
files and systems already installed.
■ SAP system installations should only be performed by SAP Technical Consultants certified for
your operating system, your database, and the SAP system that you are installing.
■ For downward-compatible releases of DB/OS platforms for SAP products, SAP plans to regularly
release the newest database (DB) and operating-system (OS) versions of SAP products. These
releases are downward-compatible with earlier SAP system releases.
Note that for already shipped SAP components, we only support the installation for database
versions proposed by the installation tool. Therefore, you must install an SAP component or
perform a system copy using a downward-compatible database as follows:
   ● Install the component with the old proposed database version.
   ● Upgrade the old database version to the downward-compatible new version.

1.1 How to Use This Guide

At the beginning of each installation phase – planning, preparation, installation, and post-installation
– you can find a list of the steps that you have to perform in that phase, as well as additional
information. Detailed information about the steps for each phase is available in the relevant chapter.
When you plan the installation, you have to decide what exactly you want to install, because the steps
within each phase vary according to the installation option you choose.
The following installation options are described in this document:

■ Standard system (formerly known as central system)
■ Distributed system
1.2 New Features

Here you can find the new features in this release.

⚠️ Caution
Make sure that you read the release notes for your SAP system. You can find these at [http://service.sap.com/releasenotes](http://service.sap.com/releasenotes).

### SAP System Installation

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAPinst</td>
<td>SAPinst has the following new features:</td>
</tr>
<tr>
<td></td>
<td>- The technical terms used for the instances of an SAP system have changed as follows:</td>
</tr>
<tr>
<td></td>
<td>- “Central instance” (CI) is now called “primary application server instance”.</td>
</tr>
<tr>
<td></td>
<td>- “Dialog instance” (DI) is now called “additional application server instance”.</td>
</tr>
<tr>
<td></td>
<td><a href="#">Note</a> The technical terms “Database instance”, “Java central services instance” (SCS).</td>
</tr>
<tr>
<td></td>
<td>- “Central system” — meaning an SAP system running on one single host — is now called “standard system”.</td>
</tr>
<tr>
<td></td>
<td><a href="#">Only valid for: HA (UNIX)</a></td>
</tr>
<tr>
<td></td>
<td>- You can now install the enqueue replication server (ERS) with SAPinst. There is a new installation option Enqueue Replication Server Instance available for the installation options Distributed System and High-Availability System.</td>
</tr>
<tr>
<td></td>
<td><a href="#">End of: HA (UNIX)</a></td>
</tr>
<tr>
<td></td>
<td>- Host agent</td>
</tr>
<tr>
<td></td>
<td>- The host agent contains all of the required elements for centrally monitoring any host with the Alert Monitor or the SAP NetWeaver Administrator. It is automatically installed during the installation of all SAP NetWeaver components, except TREX.</td>
</tr>
<tr>
<td></td>
<td>- The host agent is automatically installed with your SAP system.</td>
</tr>
<tr>
<td></td>
<td>- You can also install a standalone host agent with SAPinst. There is a new installation option Host Agent available under Software Life-Cycle Options Additional Preparations.</td>
</tr>
<tr>
<td></td>
<td>- You only need to install a standalone host agent in the following cases:</td>
</tr>
<tr>
<td></td>
<td>- You want to centrally monitor a host that does not have an SAP component.</td>
</tr>
</tbody>
</table>
### Description

- You want to perform an upgrade to SAP NetWeaver.
- The locations of all installation DVDs can be entered on one screen.

### Software Deployment Manager (SDM)

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDM</td>
<td>The Software Deployment Manager (SDM) is no longer part of the primary application server instance of a Java-only system. Therefore, there is no longer any technical difference between the primary application server instance and the additional application server instance of a Java-only system. The SAP system directory of both instances is now called $J&lt;instance_number&gt;$. $J&lt;instance_number&gt;$ no longer exists. For more information, see [SAP Directory](page 79).</td>
</tr>
</tbody>
</table>

### Installation DVDs

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<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD</td>
<td>You start the installation from the Installation Master DVD for your database.</td>
</tr>
</tbody>
</table>

### Java Library

<table>
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<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java</td>
<td>There is no longer a Java library for Java systems. Everything is now in the kernel. You no longer need APJ2EELIB and RMVJ2EELIB.</td>
</tr>
</tbody>
</table>

### SAP Java Virtual Machine (SAP JVM)

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<thead>
<tr>
<th>Area</th>
<th>Description</th>
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<tbody>
<tr>
<td>JVM</td>
<td>You no longer have to download and install a Java Development Kit (JDK) from another software vendor as a prerequisite for the installation with SAPinst. The SAP JVM is a Java Development Kit (JDK) provided and supported by SAP. The SAP JVM is fully compliant to the Java Standard Edition 5. It is available on the Installation Master DVD and is installed automatically by SAPinst when you start the installation.</td>
</tr>
</tbody>
</table>

### Visual Administrator tool integrated in SAP NetWeaver Administrator

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<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAD</td>
<td>SAP NetWeaver Administrator is a brand new solution for monitoring and administering Java systems and their applications. It is a web-based tool for administration, configuration, and monitoring. The Visual Administrator tool is no longer available as a separate tool. It has been integrated in the SAP NetWeaver Administrator. SAP NetWeaver Administrator offers you most of the functions previously available in Visual Administrator, but redesigned for the task-oriented approach of SAP NetWeaver Administrator. For more information about SAP NetWeaver Administrator, see the SAP NetWeaver Master Guide and the following: <a href="http://www.sdn.sap.com/irj/sdn/netweaver">http://www.sdn.sap.com/irj/sdn/netweaver</a> lifecycle Management &gt; Operations &gt; Knowledge Center &gt; Administration</td>
</tr>
</tbody>
</table>

### SAP Solution Manager Diagnostics Agent

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<tr>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSM</td>
<td>A SAP Solution Manager Diagnostics Agent (Diagnostics Agent) is a standalone Java program that runs on each of the systems managed by SAP Solution Manager Diagnostics. It gathers information and reports to the SAP Solution Manager system. For more information about the Diagnostics Agent, see <a href="http://service.sap.com/diagnostics">http://service.sap.com/diagnostics</a>. The installation of the Diagnostics Agent is now part of the Installation Master DVD. That is, you can choose between the following options:</td>
</tr>
<tr>
<td></td>
<td>- If there is no Diagnostics Agent already installed on this physical or virtual host, it is installed automatically with an AS Java primary application server instance and additional application server instance.</td>
</tr>
<tr>
<td></td>
<td>- You can also install it as a standalone engine, for example if you want a non-SAP system to be managed by SAP Solution Manager Diagnostics. The installation of the Diagnostics Agent as a standalone engine is not described in this installation guide, but in the <a href="http://service.sap.com/diagnostics">Diagnostics Agent Setup Guide</a>, which is available at <a href="http://service.sap.com/diagnostics">http://service.sap.com/diagnostics</a>.</td>
</tr>
</tbody>
</table>
## Database-Specific Features

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<th>Area</th>
<th>Description</th>
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</table>
| SAP system installation                   | SAP systems that are based on SAP NetWeaver 7.1 and higher are installed on IBM DB2 Version 9.5 for Linux, UNIX, and Windows - in the following referred to as DB2 V9.5.  
As of DB2 V9.1 or higher, you can have multiple DB2 installations on one physical machine. The database installations are independent of each other and can have different Fix Pack levels as well as different configuration settings and so on.  
By default, the software is installed in the following directory: /db2/db2<dbsid>/db2_software. |
| Reduction of database size                | You can significantly reduce the size of your database by selecting the following options in SAPInst during the dialog phase:  
- **Use DB2’s Raw Compression**  
  DB2’s row compression (also known as deep compression) transparently compresses table data in your database, using a dictionary-based compression algorithm. Using row compression typically reduces the size of tables by 60 to 80%. As a result, the size of the database decreases by approximately 30 to 55%.  
- **Use Deferred Table Creation**  
  **Caution**  
  Before you use this function, make sure that you read SAP Note 1151343.  
  The SAP function *deferred table creation* delays the creation of empty database tables until the first row is inserted. That is, until the first row is inserted, the table is substituted by a virtual table (which effectively is a special database view). As soon as the first row is inserted, the SAP kernel transparently replaces the virtual table with a database table.  
  **Note**  
  Depending on the number of tables that remain empty over your system lifetime, the use of deferred table creation can reduce the size of your database by several GB.  
  For more information, see *Optimization of Database Size on Disk* [page 31]. |
| Database software                         | The installation tool **automatically** installs and deinstalls the database software.                                                |
| Support of IBM Tivoli System Automation for Multiplatforms (SA MP) by SAPInst | SAPinst supports the use of IBM Tivoli System Automation for Multiplatforms (SA MP) to make your database high-available.  
For more information, see the document *IBM DB2 High Availability Solution: IBM Tivoli System Automation for Multiplatforms* that you can find at [http://www.sdn.sap.com/irj/sdn/db6](http://www.sdn.sap.com/irj/sdn/db6)  
SAP on DB2 for Linux, UNIX, and Windows Knowledge Center  
Key Topics  
Installation and Upgrade |
### Area | Description
--- | ---
**Self Tuning Memory Management (STMM)** | SAPInst automatically enables the DB2 feature Self Tuning Memory Management (STMM). STMM automatically tunes global memory depending on the workload of the database.

**New DB2 Client Connectivity** | - You no longer have to install DB2 software on the additional application server (formerly known as dialog instance). Instead, CLI Driver that is centrally stored in the global directory is used. During the installation of the database instance, the DB2 CLI driver is automatically installed for the operating system of the database server.
- If you install an additional application server (that is, the first one on an additional operating system in your system landscape), SAPInst automatically installs the DB2 CLI driver for this operating system.
- Every time you start an SAP instance, the CLI driver is copied from the global directory to the local $DB2_HOME directory of this SAP instance.
- The JDBC Driver is automatically installed by SAPInst into the global directory. You can update the JDBC driver automatically using a script whenever you install a new Fix Pack version of the database.

**Note**
Every time you start an SAP instance, the JDBC driver is copied from the global directory to the local $DB2_HOME directory of this SAP instance.

For more information, see Directory Structure of the New DB2 Client Connectivity [page 83].

### Operating Systems

| Area | Description |
--- | ---|
**Support of Operating Systems** | - For supported operating system and database releases, see the Product Availability Matrix at [http://service.sap.com/pam](http://service.sap.com/pam).
- For forums, blogs, content, and community related to all of the supported databases and operating systems, see the Database and Operating Systems area at [http://sdn.sap.com/irj/sdn/dbos](http://sdn.sap.com/irj/sdn/dbos).
1.3 SAP Notes for the Installation

You **must** read the following SAP Notes **before** you start the installation. These SAP Notes contain the most recent information on the installation, as well as corrections to the installation documentation. Make sure that you have the up-to-date version of each SAP Note, which you can find at [http://service.sap.com/notes](http://service.sap.com/notes).

### SAP Notes for the Installation

<table>
<thead>
<tr>
<th>SAP Note Number</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>966416</td>
<td>SAP NetWeaver Installation Based on Kernel 7.10: UNIX</td>
<td>UNIX-specific information about the installation for SAP systems based on kernel 7.10 and corrections to this documentation.</td>
</tr>
<tr>
<td>73606</td>
<td>Supported Languages and Code Pages</td>
<td>Information on possible languages and language combinations in SAP systems.</td>
</tr>
<tr>
<td>953763</td>
<td>Installation of SAP NetWeaver Composition Environment 7.1</td>
<td>CE-specific information about the installation and corrections to this documentation.</td>
</tr>
<tr>
<td>950506</td>
<td>DB6: SAP NetWeaver Inst. based on Kernel 7.10 – UNIX</td>
<td>Platform-specific information about the SAP system installation and corrections to this documentation.</td>
</tr>
<tr>
<td>702175</td>
<td>DB6: Supporting several database partitions with DB2</td>
<td>Platform-specific additional information about the support of multiple partitions with DB2 for Linux, UNIX, and Windows.</td>
</tr>
<tr>
<td>799699</td>
<td>DB6: Required and recommended AIX fixes for DB2 UDB</td>
<td>Important information if your operating system is AIX.</td>
</tr>
<tr>
<td>855498</td>
<td>Installation Prerequisite Checker</td>
<td>SAP Software on UNIX, Windows and System i: Checking OS Dependencies.</td>
</tr>
</tbody>
</table>
### 1.4 Online Information from SAP

More information is available online as follows.

#### Documentation

<table>
<thead>
<tr>
<th>Description</th>
<th>Internet Address</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Guide SAP Solution Manager 4.0</td>
<td><a href="http://service.sap.com/instguides">http://service.sap.com/instguides</a> ▶ SAP Components ▶ SAP Solution Manager Release 4.0</td>
<td>Master Guide — SAP Solution Manager 4.0</td>
</tr>
</tbody>
</table>

#### General Quick Links

<table>
<thead>
<tr>
<th>Description</th>
<th>Internet Address</th>
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<tr>
<td>SAP Notes</td>
<td><a href="http://service.sap.com/notes">http://service.sap.com/notes</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>
</tbody>
</table>
### 1.5 Accessing the SAP Library

For more information about SAP NetWeaver, access the SAP Library from the [SAP Help Portal](http://help.sap.com) at [http://help.sap.com](http://help.sap.com).

The references to SAP NetWeaver Library documentation in this documentation always refer to the following entry point on the [SAP Help Portal](http://help.sap.com):

### 1.6 Naming Conventions

In this documentation, the following naming conventions apply:

**Terminology**

- **SAP system** refers to SAP NetWeaver CE 7.1.
- **Diagnostics Agent** refers to SAP Solution Manager Diagnostics Agent.
- **DB2 V9.5** refers to IBM DB2 Version 9.5 for Linux, UNIX, and Windows.
Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;sid&gt; and &lt;sapsid&gt;</td>
<td>SAP system ID in lowercase letters</td>
</tr>
<tr>
<td>&lt;host_name&gt;</td>
<td>Name of the corresponding host</td>
</tr>
<tr>
<td>&lt;INSTDIR&gt;</td>
<td>Installation directory for the SAP system</td>
</tr>
<tr>
<td>&lt;DVD_DIR&gt;</td>
<td>Directory on which a DVD is mounted</td>
</tr>
<tr>
<td>&lt;OS&gt;</td>
<td>Operating system name within a path</td>
</tr>
</tbody>
</table>

The following example shows how the variables are used:

Example

Log on as user <sapsid>adm and change to the directory /usr/sap/<SAPSID>.
If your SAP system ID is C11, log on as user c11adm and change to the directory /usr/sap/C11.

1.7 DB2 Product Documentation

PDF Format
You can access information on all DB2 manuals (provided as PDF files) at:
http://www-1.ibm.com/support/docview.wss?rs=71&uid=swg27009727

HTML Format
You can access the HTML version of DB2 product documentation at:
http://publib.boulder.ibm.com/infocenter/db2luw/v9r5/.

More Information
For more information about web sites that contain important DB2-related documentation, see SAP Note 690471.
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2 Planning

This section provides general planning information.

You must first:

1. Plan your SAP system landscape according to the Master Guide and the Technical Infrastructure Guide available for your product.
2. Decide on your installation option [page 17].

Now continue with the section for your chosen installation option below.

Standard, Distributed, or High-Availability System

1. You carefully plan the setup of your database [page 24].
2. You decide on the transport host to use [page 35].
3. If you want to use Adobe Document Services (ADS), you check what you have to do if your platform is not supported for ADS [page 36].
4. You decide whether you want to install multiple components in one database (MCOD) [page 40].

Only valid for: HA (UNIX)

5. If you want to install a high-availability system, you read Planning the Switchover Cluster [page 41].

End of: HA (UNIX)

6. You can now continue with Preparation [page 45].

Additional Application Server Instance

You do not have to perform any planning steps.

You can immediately continue with Preparation [page 45].

Host Agent as a Standalone Installation

You do not have to perform any planning steps.

You can immediately continue with Preparation [page 45].

2.1 Installation Options Covered by this Guide

This section shows the installation options covered by this installation guide.

- Standard system [page 18] (formerly known as central system)
- Distributed system [page 18]
2 Planning

2.1 Installation Options Covered by this Guide

- High-availability system [page 19]

You can install one or more additional application server instance(s) [page 20] to an existing standard, distributed or high-availability system.

- You can install a standalone host agent [page 23].

### 2.1.1 Standard System

You can install a standard system on a single host.

In a standard system, all main instances run on a single host:

- Central services instance (SCS)
- Database instance (DB)
- Primary application server instance

![Figure 1: Standard Java System](image)

Optionally you can install one or more additional application server instances. For more information, see Additional Application Server Instance [page 20].

### 2.1.2 Distributed System

In a distributed system, every instance can run on a separate host:

- SCS = Java central services instance
- PAS = Primary application server instance
- DB = Database instance
Central services instance (SCS)
- Database instance (DB)
- Primary application server instance

**Note**
You can also use the SAP transport host or the SAP global host as your primary application server instance host.

Optionally you can install one or more additional application server instances. For more information, see *Installation of an Additional Application Server Instance* [page 20].

**Figure 2:** Distributed Java System

```
SCS = Java central services instance
PAS = Primary application server instance
```

Only valid for: HA (UNIX)

### 2.1.3 High-Availability System

In a high-availability system, every instance can run on a separate host:
- Java Central Services Instance (SCS)
- Database instance
- Primary application server instance
We recommend that you run the SCS in a switchover cluster infrastructure. The SCS must have its own Enqueue Replication Server (ERS) instance. Optionally you can install one to \(<n>\) additional application server instances. For more information, see Installation of an Additional Application Server Instance [page 20].

The following figures show examples for the distribution of the SAP instances in a high-availability system.

**Figure 3:** High-Availability System

---

**2.1.4 Additional Application Server Instance**

You can install one or more additional application server instance(s) for an existing SAP system. An additional application server instance can run on:

- The host of any instance of the existing SAP system (exceptions see below)
2. Planning

2.1 Installation Options Covered by this Guide

On a dedicated host

Note
If you want to install additional application server instances running on another operating system than the primary application server instance, for example if your primary application server instance runs on Solaris, but the additional application server instances shall run on Windows, see Heterogeneous SAP System Installation [page 136].

Additional Application Server Instance for a Standard System
For example, the following figure shows each of the three additional application server instances that are running:

- On the main host of the SAP system, that is on the host on which the primary application server instance and the database instance run
- On dedicated hosts

Figure 4: Additional Application Server Instance for a Standard System

For additional information, see Standard System [page 18].

Additional Application Server Instance for a Distributed System
For example, the following figure shows each of the three additional application server instances that are running:
On the main host of the SAP system, that is on the host on which the primary application server instance and the database instance run

■ On dedicated hosts

It is not recommended to install additional application server instance(s) on the SAP global host.

**Figure 5:** Additional Application Server Instance for a Distributed System

For additional information, see *Distributed System* [page 18].

*Only valid for: HA (UNIX)*

**Additional Application Server Instance for a High-Availability System**

For example, the following figure shows each of the three additional application server instances that are running on:

■ The host of the primary application server instance
■ Dedicated hosts

It is not recommended to install additional application server instance(s) on the switchover cluster infrastructure.
Figure 6: Additional Application Server Instance for a High-Availability System

For more information, see *High-Availability System* [page 19].

End of: HA (UNIX)

### 2.1.5 Standalone Host Agent

Using the host agent you can centrally monitor any host with the Alert Monitor or the SAP NetWeaver Administrator or the Adaptive Computing Controller (ACC). In addition, the host agent is used by the ACC for starting, stopping, and relocating SAP instances and databases. For more information on the ACC see [http://sdn.sap.com/1rj/sdn/adaptive](http://sdn.sap.com/1rj/sdn/adaptive). The host agent is automatically installed during the installation of all SAP NetWeaver instances and components.

You only need to install a **standalone** host agent in the following cases:

- You want to manage a host that does not have an SAP instance or component.
- You have upgraded your SAP system to SAP NetWeaver 7.1 or higher and want to the instances of the upgraded system to be managed by the ACC.
Planning

2.2 Setup of Database Layout

When you plan your SAP system installation, it is essential to consider the setup of your database layout with regard to the distribution of, for example, SAP directories or database file systems to disks. The distribution depends on your specific environment and you must take factors into consideration,
such as storage consumption of the software components involved, safety requirements and expected workload.

Make sure that you read the following sections before starting the SAP system installation:

1. Required File Systems for DB2 for Linux, UNIX, and Windows [page 25]
2. Users and Groups [page 27]
3. DB2 Tablespaces [page 27]
4. Creating Tablespaces Manually (Optional) [page 29]
5. MCOD Tablespaces and File Systems [page 30]
6. Optimization of Database Size on Disk [page 31]
7. Data Safety and Performance Recommendations for Database Directories [page 33]
8. Performance Recommendations for Large Databases [page 35]

### 2.2.1 Required File Systems for DB2 for Linux, UNIX, and Windows

This section lists the file systems that are required by DB2 as well as the permissions that you have to set.

⚠️ **Caution**

If you plan to set up a high availability database cluster (SA MP) that is based on a shared disk, all the file systems listed in the table below **must** be located on the shared disk.

For more information, see the document *IBM DB2 High Availability Solution: IBM Tivoli System Automation for Multiplatforms* at [http://www.sdn.sap.com/irj/sdn/db6] SAP on DB2 for Linux, UNIX, and Windows Knowledge Center  Key Topics  Installation and Upgrade

**Required File Systems**

⚠️ **Note**

**Production systems only:**

During the installation of your SAP system, you can specify the amount and names of the sapdata directories. However, to ensure that your SAP system performs well in a production environment, you have to define and control the distribution of the database directories to physical disks. You do this by creating and mounting separate file systems manually for the directories listed in the following table.
### File System/Logical Volume

<table>
<thead>
<tr>
<th>File System/Logical Volume</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/db2/db2&lt;dbsid&gt;</td>
<td>Home directory of user db2&lt;dbsid&gt; and contains the DB2 instance data for &lt;DBSID&gt; and the DB2 software. Size: at least 1 GB</td>
</tr>
<tr>
<td>/db2/&lt;DBSID&gt;/log_dir</td>
<td>Contains at least the online database log files. Size: at least 1.4 GB</td>
</tr>
<tr>
<td>/db2/&lt;DBSID&gt;/db2dump</td>
<td>Contains DB2 diagnostic log files, DB2 dump files and further service engineer information. Size: 100 MB</td>
</tr>
</tbody>
</table>

- With DB2's automatic storage management: `/db2/<DBSID>/sapdata<n>`
- No automatic storage management: `/db2/<SAPSID>/sapdata<n>`

SAP data for container type *database managed space (DMS) FILE* or for use of DB2's automatic storage management. By default, SAPinst creates four sapdata directories. If you require more or fewer sapdata directories, you can change this on the SAPinst Sapdata Directories dialog.

Temporary tablespaces are equally distributed over the sapdata directories. Make sure that you provide enough free space in your sapdata directories for temporary data.

For more information about the size, see the current “installation note” for DB2 for Linux, UNIX, and Windows.

**Note**

- In a **production system**, you must make sure that the sapdata directories are located in different file systems. Otherwise, system performance can decrease. For more information, see *Data Safety and Performance Considerations for Database Directories* [page 33].
- If you add additional sapdata directories during the dialog phase of SAPinst, the corresponding tablespace containers are equally distributed.

**Note**

On AIX, use large enabled file systems. For more information, see *Setting Up File Systems and Raw Devices for AIX*.

---

### File System Permissions

The file systems and logical volumes must have the permissions and owner shown in the following table and they must be created and mounted before starting SAPinst. SAPinst then sets the required permissions and owners.
Note
You can create the owners and groups manually if they do not exist yet. Otherwise, SAPinst creates them automatically. For more information, see Creating Operating System Users Manually [page 72].

<table>
<thead>
<tr>
<th>File System/Logical Volume</th>
<th>Permissions</th>
<th>Owner</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>/db2/&lt;DBSID&gt;</td>
<td>755</td>
<td>db2&lt;bsid&gt;</td>
<td>db&lt;bsid&gt;adm</td>
</tr>
<tr>
<td>/db2/&lt;DBSID&gt;/log_dir</td>
<td>755</td>
<td>db2&lt;bsid&gt;</td>
<td>db&lt;bsid&gt;adm</td>
</tr>
<tr>
<td>/db2/&lt;DBSID&gt;/db2dump</td>
<td>755</td>
<td>db2&lt;bsid&gt;</td>
<td>db&lt;bsid&gt;adm</td>
</tr>
<tr>
<td>With DB2’s automatic storage management: /db2/&lt;DBSID&gt;/sapdata&lt;n&gt;</td>
<td>750</td>
<td>db2&lt;bsid&gt;</td>
<td>db&lt;bsid&gt;adm</td>
</tr>
<tr>
<td>No automatic storage management: /db2/&lt;SAPSID&gt;/sapdata&lt;n&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

More Information
SAP Directories [page 79]

2.2.2 Users and Groups

SAPinst creates the following users and groups as shown in the following table.

<table>
<thead>
<tr>
<th>User</th>
<th>Home Directory</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>db2&lt;bsid&gt;</td>
<td>/db2/db2&lt;bsid&gt;</td>
<td>db&lt;bsid&gt;adm</td>
</tr>
<tr>
<td>&lt;sapsid&gt;adm</td>
<td>can be chosen</td>
<td>sapsys (primary group), db&lt;bsid&gt;ctl (secondary)</td>
</tr>
<tr>
<td>Default Java database connect user: sap&lt;sapsid&gt;db</td>
<td>/home/sap&lt;sapsid&gt;db</td>
<td>db&lt;bsid&gt;mnt (primary group)</td>
</tr>
</tbody>
</table>

2.2.3 DB2 Tablespaces

During the dialog phase of the installation, SAPinst offers to create the following tablespace types:

- Data and index tablespaces managed by DB2’s automatic storage management (AutoStorage)
  During the installation, SAPinst assigns the sapdata directories to the database, which automatically distributes all tablespaces over the sapdata directories or file systems. In addition, the database automatically adjusts the tablespace sizes as long as there is enough free space left in the sapdata directories or file systems.
If one of the sapdata directories becomes full, new stripe sets are automatically in the remaining sapdata directories. Since the DB2 database automatically creates and administers the tablespace containers, the overall administration effort for the database decreases considerably using tablespaces managed by automatic storage management.

Note

As of DB2 V9.1 and higher, the database and the SYSCATSPACE tablespace are always created with automatic storage management enabled even if you deselect this option on the IBM DB2 for Linux, UNIX, and Windows » Sapdata Directories dialog.

DMS File tablespaces in autoresize mode
SAPinst creates all DMS tablespaces with FILE containers in autoresize mode as well as one tablespace container for each tablespace in every sapdata directory or file system. DB2 automatically extends the size of all DMS FILE tablespaces in autoresize mode as long as there is space left in the sapdata directories or file systems.

With DMS FILE tablespaces in autoresize mode, you are more flexible to distribute heavily used tablespaces to dedicated storage devices at a later point in time.

For more information, see Performance Recommendations for Large Databases [page 35].

Other tablespace types
If you want to use other tablespace types, for example SMS or DMS DEVICE (raw devices), you have to create them manually. Therefore, you deselect the option Create tablespaces with SAPinst during the dialog phase of SAPinst and proceed as described in Creating Tablespaces Manually [page 29].

At a later point in time, you can switch between DMS FILE and DMS DEVICE tablespaces using DB2’s redirected restore tool. In addition, you can enable and disable autoresize mode for databases that are not set up in AutoStorage mode.

To move tablespaces from AutoStorage to other storage modes or vice versa, you have to perform a homogenous system copy. For more information, see the appropriate system copy guide that is available on SAP Service Marketplace at http://service.sap.com/instguidesNW .

Container Type FILE
If you are using tablespaces managed by DB2’s automatic storage management, DB2 creates and administers the tablespace containers for you.

If you are using DMS FILE tablespaces in autoresize mode, each tablespace of your SAP installation has at least one container. A container is a file that holds pages belonging to a tablespace. Since you might want to add containers as your database grows in size, you should adhere to the following naming scheme:

The first container of a tablespace is given the name of the tablespaces plus the ending container001. Therefore, <SAPSID>#BTABD has at least the container <SAPSID>#BTABD.container001. The next container is called <SAPSID>#BTABD.container002, and so on.
2.2.4 Creating Tablespaces Manually (Optional)

If the tablespace layout used by SAPinst does not meet your requirements, you can optionally create your tablespaces manually. During the dialog phase of SAPinst, you can specify if you want to use tablespaces managed by DB2’s automatic storage management and if you want SAPinst to create your tablespaces.

Procedure

Caution
SAPinst does not check the page size of tablespaces that have either been created manually or are already existing. If you create the tablespaces manually, you must make sure that you use a page size of 16 KB.

1. On the dialog [IBM DB2 for Linux, UNIX, and Windows] Sapdata Directories, you must deselect the option Create Tablespaces with SAPinst.

Note
In a typical installation, this dialog does not appear. To get to it, select this parameter on the Parameter Summary screen and choose Revise.

2. Continue to enter all the required parameters and start SAPinst.
During the installation phase, the following message box appears:
You must create the tablespaces now. To do so, use the createTablespaces.sql script that is located in your installation directory.
To continue the installation, choose OK. Alternatively, you can cancel SAPinst here and restart it again.

3. Go to your installation directory and search for script createTablespace.sql. This file content depends on your selection during the dialog phase and the file contains the same commands for the creation of tablespaces that SAPinst uses.
Note

You **must** create all the tablespaces that are listed in the script.

4. Modify the CREATE statements according to your requirements.
5. To execute the script, enter the following command:

   ```
   db2 -tvf <script_name>
   ```

6. When you have finished, continue with the installation by choosing OK on the message box.

**More Information**

- DB2 Tablespaces [page 27]
- Performance Recommendations for Large Databases [page 35]

### 2.2.5 MCOD Tablespaces and File Systems

If you install additional SAP components into one database, each system has its own tablespaces. Only SYSCATSPACE and temporary tablespaces are shared, for example, the additional SAP system `<SAPSID2>` uses tablespaces, such as `<SAPSID2>@BTABD` and `<SAPSID2>@BTABI`

**Note**

During an installation of multiple components on one database, additional space is required for tablespace SYSCATSPACE. If you are **not** using tablespaces with `autosize` mode or DB2’s automatic storage management, you **must** extend SYSCATSPACE manually before you start the SAP system installation.

If you are not using autostorage tablespaces, the tablespaces of the additional SAP system `<SAPSID2>` are located in `/db2/<SAPSID2>/sapdata<n>`. If you are using autostorage tablespaces, the automatic storage paths, which have already been configured in your database, are used.

The temporary tablespace of the additional SAP system `<SAPSID2>` is the same as for `<SAPSID1>`. If temporary tablespaces with 16 KB page size do not exist, they are created in `/db2/<DBSID>/sapdata<n>`.

**Caution**

If you are using a database in `AutoStorage` mode in an MCOD environment, you can choose if your tablespaces are also `AutoStorage` or `AutoResize`. You can only choose this option for your tablespaces if you are using a database in `AutoStorage` mode in an MCOD environment.

Each additional system works with its own SAP connect user `sap<sapid>db`, that means all database objects of SAP system `<SAPSID2>` are owned by `sap<sapid>db`. 
2 Planning
2.2 Setup of Database Layout

Caution
There is only one database administrator $db2\langle dbsid\rangle$.

Required File Systems
The following table lists the file systems that are required for an additional SAP system.

<table>
<thead>
<tr>
<th>File System/Logical Volume</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$/db2/\langle SAPSID2\rangle/sapdata&lt;n&gt;$</td>
<td>Contains the temporary tablespace(s).</td>
</tr>
<tr>
<td>$/sapmnt/\langle SAPSID2\rangle$</td>
<td>Contains the software and data for one SAP system</td>
</tr>
<tr>
<td>$/usr/sap/\langle SAPSID2\rangle$</td>
<td>Contains the instance-specific data as well as symbolic links to the data for one SAP system</td>
</tr>
</tbody>
</table>

2.2.6 Optimization of Database Size on Disk

With the increasing cost for managed storage, database sizes become more and more a concern. You can significantly reduce the size of your database by selecting the following options in SAPInst during the dialog phase:

Use DB2’s Row Compression
DB2’s row compression (also known as deep compression) transparently compresses table data in your database, using a dictionary-based compression algorithm. Using row compression typically reduces the size of tables by 60 to 80%. As a result, the size of the database decreases by approximately 30 to 55 %.

Note
If you want to use row compression, make sure that you have a valid license for this function. If you purchased your DB2 license from SAP (an SAP OEM license), DB2 row compression is already part of your license agreement.

Use Deferred Table Creation

Caution
Before you use this function, make sure that you read SAP Note 1151343.
The SAP function deferred table creation delays the creation of empty database tables until the first row is inserted. That is, until the first row is inserted, the table is substituted by a virtual table (which effectively is a special database view). As soon as the first row is inserted, the SAP kernel transparently replaces the virtual table with a database table.

To reverse this status and to create the empty tables that have not yet been created after the installation, use the DBA Cockpit:

1. In your SAP system, call transaction DBACOCKPIT and choose Space → Virtual Tables in the navigation frame.
   The screen Space: Virtual Tables appears.
2. To replace a virtual table with a real table, select one or more virtual tables and choose Materialize.

Note
Depending on the number of tables that remain empty over your system lifetime, the use of deferred table creation can reduce the size of your database by several GB.

Minimizing the Database Size after the Installation
If you choose to install your SAP system without selecting the options Use DB2’s Row Compression and Use Deferred Table Creation, you can still activate both functions after the installation using the DBA Cockpit.

Activating DB2’s Row Compression

Caution
Activating row compression after the installation requires a high administrative effort and is time consuming. Furthermore, it can only be performed for single tables.

1. Identify the table candidates that are suitable for row compression using the REORGCHK for all Tables job with option With Compression Check in the DBA Planning Calendar.
   For more information about this job, see Scheduling a REORGCHK for All Tables in the document Database Administration Using the DBA Cockpit: IBM DB2 for Linux, UNIX, and Windows at:
   https://www.sdn.sap.com/irj/sdn/db6
   SAP on DB2 for Linux, UNIX, and Windows Knowledge Center → Key Topics → Administration
2. In your SAP system, call transaction DBACOCKPIT and choose Space → Tables and Indexes.
   A list of table candidates are displayed.
4. Double-click the table that you want to enable for row compression.
   The screen Space: Tables and Indexes Details appears.
5. Choose Compression On/Off.
Caution
Be aware that after you have enabled the table for row compression, the table must be reorganized to benefit from the compression.

Activating Deferred Table Creation

Caution
Before you use this function, make sure that you read SAP Note 1151343.

1. In your SAP system, call transaction DBACOCKPIT and choose \Space\ Virtual Tables \.
2. On the screen \Space: Virtual Tables, choose Candidates for Virtualization.
3. Choose Convert Empty Tables.
   A job is scheduled that checks every table if it is empty. If a table is empty, the table is converted to a virtual table.

Caution
The following tables are excluded from the conversion:
- Volatile tables
- MDC tables
- Partitioned tables

2.2.7 Data Safety and Performance Considerations for Database Directories

During the installation of an SAP system you control the distribution of database directories or file systems to physical disks. On Windows operating systems, you assign drive letters to the system components when running the installation tool. On UNIX operating systems, this is done when you create file systems before you start the installation tool. The way you distribute your database components to disk can significantly affect system throughput and data security, and must therefore be carefully planned.

When you work out the assignment of components to disks, you first need to get an overview of the main components and their corresponding directories.

Note
Make sure that you have an overview of the expected database size, the available disks and the I/O adapters that are used to attach the disks to your system.

The following sections provide important information about:
- Data integrity requirements
2.2 Setup of Database Layout

- Performance considerations
- Disk space consumption and storage management

**Data Integrity Requirements**

When you plan your SAP system installation, you must consider the following:

- In an emergency situation you must be able to perform a rollforward recovery of your database in a production system.

**Caution**

In a production system, the DB2 database must run in **log retention** mode. Otherwise, log files **cannot** be applied to the database rollforward operations.

You can set the database to **log retention** mode by changing database configuration parameters at the very end of the installation process. After changing the parameters, you are automatically forced to perform an offline backup. Otherwise, you cannot reconnect to the database, which is reported with an error message.

For information, see *Enabling Recoverability of the Database* [page 128].

- Keep the tablespace container files in directories `sapdata*` and the online log directory `log_dir` on separate disks to be able to perform a full rollforward recovery if a database container file is damaged or lost.

- Since transaction data is lost if online log files are damaged, we recommend that the online log directory `log_dir` is stored on redundant storage.

Hardware mirroring can be done using RAID adapters or intelligent storage systems. For performance reasons, hardware solutions for mirroring should be preferred over mirroring solutions like logical volume managers that are offered by operating systems.

In addition, the DB2 product offers dual log file mechanism. For more information, see SAP Note 409127.

**Performance Considerations**

A high transaction volume can cause high I/O on the online log files. Therefore, the distribution of the online log files is a crucial factor of performance considerations.

Ideally, the online log files should be located on fast physical volumes that do not have high I/O load coming from other components. This allows efficient logging activity with a minimum of overhead such as waiting for I/O.

You should avoid storing the online log files on the same physical volume as the operating system paging space, or a physical volume with high I/O activity.
2.2.8 Performance Considerations for Large Databases

Tablespaces in AutoStorage mode offer maximum ease of use and low administrative cost. In addition, modern file systems avoid most concurrency problems. If you are not running your database in AutoStorage mode, you have detailed but manual control over the distribution of data on disk. In this case and to enhance performance of large databases, we give the following recommendations:

- Distribute heavily used tablespaces across separate disks.
- Avoid putting multiple containers of one tablespace onto the same device.
- Move heavily used tables into their own tablespaces that reside on dedicated disks.
- Put containers of index tablespaces and their respective data tablespaces on different disks.
- Do not configure operating system I/O (for example, swap, paging or heavily spool) on DB2 data disks.

You can run DB2 databases with multiple page sizes in a single database. But once specified for a tablespace, the page size cannot be changed. For each page size a separate buffer pool has to be created in your database. During a standard installation, SAPinst creates the database with a uniform page size of 16 KB. As a result only buffer pools with 16 KB have to be created and administered.

More Information
See the Administration Guide: Performance that you can access using the link in section DB2 product documentation [page 15].

2.3 SAP System Transport Host

The transport host contains the transport directory that is used by the SAP transport system to store transport data and change information of SAP systems, such as software programs, data dictionary data, or customization data. If you have several SAP systems they are usually organized in transport domains. In most cases, all SAP systems in a transport domain have a common transport directory. For more information, see the SAP Library [page 14]:


When you install an SAP system, SAPinst by default creates the transport directory on the primary application server instance host in /usr/sap/trans.

You have to prepare this host for use by the new SAP system if one of the following applies to you:

- You want to locate the transport directory on another host.
- You want to use an existing transport host and directory in your SAP system landscape.

For more information, see Exporting and Mounting the Global Transport Directory [page 89].
2.4 Running Adobe Document Services on Nonsupported Platforms

Adobe document services (ADS) are currently not supported to run natively on all platforms supported by SAP systems based on SAP NetWeaver, in particular on 64-bit platforms.

Procedure
To use ADS in SAP landscapes on nonsupported platforms, install an additional standalone AS Java on a platform supported by ADS. For more information, see SAP Note [925741].

More Information
For more information about running ADS on SAP systems based on SAP NetWeaver, see [http://sdn.sap.com/irj/sdn/adobe](http://sdn.sap.com/irj/sdn/adobe).

2.5 Integration of LDAP Directory Services

This section explains the benefits of using the SAP system with the Lightweight Directory Access Protocol (LDAP) directory and gives an overview of the configuration steps required to use an SAP system with the directory. LDAP defines a standard protocol for accessing directory services, which is supported by various directory products such as Microsoft Active Directory, and OpenLDAP `slapd`. Using directory services enables important information in a corporate network to be stored centrally on a server. The advantage of storing information centrally for the entire network is that you only have to maintain data once, which avoids redundancy and inconsistency. If an LDAP directory is available in your corporate network, you can configure the SAP system to use this feature. For example, a correctly configured SAP system can read information from the directory and also store information there.
2.5 Integration of LDAP Directory Services

**Note**

The SAP system can interact with the Active Directory using the LDAP protocol, which defines:

- The communication protocol between the SAP system and the directory
- How data in the directory is structured, accessed, or modified

If a directory other than the Active Directory also supports the LDAP protocol, the SAP system can take advantage of the information stored there. For example, if there is an LDAP directory on a UNIX or Windows server, you can configure the SAP system to use the information available there. In the following text, directories other than the Active Directory that implement the LDAP protocol are called **generic LDAP directories**.

**Caution**

This section does **not** provide information about the use of LDAP directories with the LDAP Connector. For more information about using and configuring the LDAP Connector for an ABAP system, see the *SAP Library [page 14]*:  
- Function-Oriented View  
- Security  
- Identity Management  
- Identity Management of the Application Server ABAP  
- Configuration of Identity Management  
- Directory Services  
- LDAP Connector

**Prerequisites**

You can only configure the SAP system for Active Directory services or other LDAP directories if these are **already available** on the network. As of Windows 2000 or higher, the Active Directory is automatically available on all domain controllers. A generic LDAP directory is an additional component that you must install separately on a UNIX or Windows server.

**Features**

In the SAP environment, you can exploit the information stored in an Active Directory or generic LDAP directory by using:

- SAP Logon
- The SAP Microsoft Management Console (SAP MMC)
- The SAP Management Console (SAP MC)

For more information about the automatic registration of SAP components in LDAP directories and the benefits of using it in SAP Logon and SAP MMC, see the documentation *SAP System Information in Directory Services* on SAP Service Marketplace at:

- [http://service.sap.com/msplatforms](http://service.sap.com/msplatforms)  
- Microsoft  
- Windows Server

For more information about the SAP MC and how to configure it to access LDAP Directories, see the documentation *SAP Management Console in the SAP Library [page 14]*:

- Administrator’s Guide  
- Technical Operations for SAP NetWeaver  
- Administration of SAP NetWeaver Systems  
- AS Java (Application Server Java)  
- Administration  
- Administration Tools  
- SAP Management Console
SAP Logon

Instead of using a fixed list of systems and message servers, you can configure SAP Logon in the sapmsg.ini configuration file to find SAP systems and their message servers from the directory. If you configure SAP logon to use the LDAP directory, it queries the directory each time Server or Group selection is chosen to fetch up-to-date information on available SAP systems.

To use LDAP operation mode, make sure that the sapmsg.ini file contains the following:

```plaintext
[Address]
Mode=LDAPdirectory
LDAPserver=
LDAPnode=
LDAPoptions=
```

Distinguish the following cases:

- If you use an Active Directory, you must set LDAPoptions="DirType=NT5ADS". For more information, see the SAP system profile parameter 1dap/options.
- You must specify the directory servers (for example, LDAPserver=pcintel6 p24709) if either of the following is true:
  - The client is not located in the same domain forest as the Active Directory
  - The operating system does not have a directory service client (Windows NT and Windows 9X without installed dsclient).

  For more information, see the SAP system profile parameter 1dap/servers.
- For other directory services, you can use LDAPnode to specify the distinguished name of the SAP root node. For more information, see the SAP system profile parameter 1dap/saproot.

SAP MMC

The SAP MMC is a graphical user interface (GUI) for administering and monitoring SAP systems from a central location. It is automatically set up when you install an SAP system on Windows. If the SAP system has been prepared correctly, the SAP MMC presents and analyzes system information that it gathers from various sources, including the Active Directory.

Integrating the Active Directory as a source of information has advantages for the SAP MMC. It can read system information straight from the directory that automatically registers changes to the system landscape. As a result, up-to-date information about all SAP application servers, their status, and parameter settings is always available in the SAP MMC.

If you need to administer distributed systems, we especially recommend that you use the SAP MMC together with Active Directory services. You can keep track of significant events in all of the systems from a single SAP MMC interface. You do not need to manually register changes in the system configuration. Instead, such changes are automatically updated in the directory and subsequently reflected in the SAP MMC.

If your SAP system is part of a heterogeneous SAP system landscape that comprises systems or instances both on Unix and Windows operating systems, you can also use the SAP MMC for operating and monitoring the instances running on Unix.
SAP MC
The SAP MC is a graphical user interface (GUI) for administering and monitoring SAP systems from a central location. The SAP MC is automatically set up when you install an SAP system on any platform. If the SAP system has been prepared correctly, the SAP MC presents and analyzes system information that it gathers from various sources, including a generic LDAP Directory. Integrating a generic LDAP Directory as a source of information has advantages for the SAP MC. It can read system information straight from the directory that automatically registers changes to the system landscape. As a result, up-to-date information about all SAP application servers, their status, and parameter settings is always available in the SAP MC.

Configuration Tasks for LDAP Directories
This section describes the configuration tasks you have to perform for the Active Directory or other (generic) LDAP directories.

Configuration Tasks for Active Directory
To enable an SAP system to use the features offered by the Active Directory, you must configure the Active Directory so that it can store SAP system data.
To prepare the directory, you use SAPinst to automatically:

- Extend the Active Directory schema to include the SAP-specific data types
- Create the domain accounts required to enable the SAP system to access and modify the Active Directory. These are the group SAP_LDAP and the user sap1dap.
- Create the root container where information related to SAP is stored
- Control access to the container for SAP data by giving members of the SAP_LDAP group permission to read and write to the directory

You do this by running SAPinst on the Windows server on which you want to use Active Directory Services and choosing | <SAP System> | Software Life-Cycle Options | LDAP Registration | Active Directory Configuration | . For more information about running SAPinst on Windows, see documentation Installation Guide — <your product> on Windows : <Database>.

>Note
You have to perform the directory server configuration only once. Then all SAP systems that need to register in this directory server can use this setup.

Configuration Tasks for Generic LDAP Directories
To configure other LDAP directories, refer to the documentation of your directory vendor.

Enabling the SAP System LDAP Registration
Once you have correctly configured your directory server, you can enable the LDAP registration of the SAP system by setting some profile parameters in the default profile.
To do this, run SAPinst [page 101] once for your system and choose:
If you use a directory server other than Microsoft Active Directory and/or non-Windows application servers, you have to store the directory user and password information by using `ldappasswd pf=<any_instance_profile>`. The information is encrypted for storage in `DIR_GLOBAL` and is therefore valid for all application servers. After restarting all application servers and start services, the system is registered in your directory server. The registration protocols of the components are `dev_ldap*`. The registration is updated every time a component starts.

### 2.6 Installation of Multiple Components in One Database

You can install **multiple** SAP systems in a **single** database. This is called Multiple Components in One Database (MCOD).

MCOD is available with all SAP components. This technology is available on all the major databases for the SAP system, in line with our commitment to deliver platform-independent solutions. Using this technology is as easy as installing a separate component. No extra effort is required because the MCOD installation is fully integrated into the standard installation procedure. MCOD is not an additional installation option. Instead, it is an option of the database instance installation.

There are two MCOD scenarios:

- The installation of an SAP system in a new database
- The installation of an additional SAP system in an existing database

### Prerequisites

- For more information about MCOD and its availability on different platforms, see [http://service.sap.com/mcod](http://service.sap.com/mcod).
- Since SAP does not support mixed solutions with MCOD, your SAP system must contain Unicode SAP instances only.
- Improved sizing required
  
  In general, you calculate the CPU usage for an MCOD database by adding up the CPU usage for each individual SAP system. You can do the same for memory resources and disk space.

You can size multiple components in one database by sizing each individual component using the SAP Quick Sizer and then adding the requirements together. For more information on the SAP Quick Sizer, see [http://service.sap.com/sizing](http://service.sap.com/sizing).

### Features

- Reduced administration effort
- Consistent system landscape for backup, system copy, administration, and recovery
- Increased security and reduced database failure for multiple SAP systems due to monitoring and administration of only one database
- Independent upgrade
In an MCOD landscape, you can upgrade a single component independently from the other components running in the same database, assuming that the upgraded component runs on the same database version. However, if you need to restore a backup, be aware that all other components are also affected.

**Note**

Special MCOD considerations and differences from the standard procedure are listed where relevant in the installation documentation.

**Constraints**

- **We strongly recommend** that you test MCOD in a test or development system. We recommend that you run MCOD systems in the same context. We do not recommend that you mix test, development, and production systems in the same MCOD.
- In the event of database failure, all SAP systems running on the single database are affected.
- Automated support in an MCOD landscape for the following administrative tasks depends on your operating system and database:
  - Copying a single component from an MCOD landscape to another database at database level.
  - De-installing a single component from an MCOD landscape requires some additional steps. You can use a remote connection to SAP support to request help with these tasks. For more information, see [http://service.sap.com/remoteconnection](http://service.sap.com/remoteconnection).
- When you use `stopsap` in an MCOD system with two primary application server instances, only one primary application server instance is stopped. Therefore, you must first stop the other SAP system with `stopsap R3` to make sure that the database is also stopped.
- For the first SAP system, the database system ID can be different from the SAP system ID.
- For the second SAP system, you must use the same `DBSID` as for the first SAP system.
- If you decide to turn off database logging during the database load phase of the installation, you need to plan downtime for all MCOD systems sharing the database.

---

### 2.7 Planning the Switchover Cluster

You can reduce unplanned downtime for your SAP system by setting up a switchover cluster. This setup installs critical software units – known as “single points of failure” (SPOFs) – across multiple host machines in the cluster. In the event of a failure on the primary node, proprietary switchover software automatically switches the failed software unit to another hardware node in the cluster. Manual intervention is not required. Applications accessing the failed software unit might experience a short delay but can then resume processing as normal.

Switchover clusters also have the advantage that you can deliberately initiate switchover to free up a particular node for planned system maintenance. Switchover solutions can protect against
hardware failure and operating system failure but **not** against human error, such as operator errors or faulty application software. Additional downtime might be caused by upgrading your SAP system or applying patches to it.

Without a switchover cluster, the SAP system SPOFs – central services instance, the database instance, and the central file share – are vulnerable to failure because they cannot be replicated. All of these can only exist **once** in a normal SAP system.

You can protect software units that are **not** SPOFs against failure by making them redundant, which means simply installing multiple instances. For example, you can add additional application server instances. This complements the switchover solution and is an essential part of building HA into your SAP system.

---

**Recommendation**

We recommend switchover clusters to improve the availability of your SAP system.

A switchover cluster consists of:

- A hardware cluster of two or more physically separate host machines to run multiple copies of the critical software units, in an SAP system the SPOFs referred to above
- Switchover software to detect failure in a node and switch the affected software unit to the standby node, where it can continue operating
- A mechanism to enable application software to seamlessly continue working with the switched software unit – normally this is achieved by virtual addressing (although identity switchover is also possible)

**Prerequisites**

You must first discuss switchover clusters with your hardware partner because this is a complex technical area. In particular, you need to choose a proprietary switchover product that works with your operating system.

We recommend that you read the following documentation before you start:

- Check the informations and the installation guides that are available at [http://sdn.sap.com/irj/sdn/ha](http://sdn.sap.com/irj/sdn/ha).
- The enqueue replication server (ERS) is a major contribution to an HA setup and is essential for a Java system. You need one ERS for each Java SCS installed in your system.
- On database level, IBM provides a high-availability cluster solution for Linux and AIX only that is called *IBM Tivoli System Automation for Multiplatforms (SA MP)*. IBM also provides a free two-node license of SA MP for the DB2 database server. The corresponding installation guide describes how to set up a switchover cluster with SA MP based on the DB2 feature “High Availability and Disaster Recovery (HADR)” or a shared disk.

**More information:**
IBM DB2 High Availability Solution: IBM Tivoli System Automation for Multiplatforms at
http://www.sdn.sap.com/irj/sdn/db6
SAP on DB2 for Linux, UNIX, and Windows Knowledge Center
Key Topics: Installation and Upgrade

Features
The following graphic shows the essential features of a switchover setup:

Figure 8: Switchover Setup

Note
This graphic and the graphics in this section are only examples. You need to discuss your individual HA setup with your HA partner.
These graphics summarize the overall setup and do not show the exact constellation for an installation based on one of the available technologies.

The following graphic shows an example of a switchover cluster in more detail:
Constraints

This documentation concentrates on the switchover solution for the central services instance. For more information about how to protect the Network File System (NFS) software and the database instance by using switchover software or (for of the database) replicated database servers, contact your HA partner.

You need to make sure that your hardware is powerful enough and your configuration is robust enough to handle the increased workload after a switchover. Some reduction in performance might be acceptable after an emergency. However, it is not acceptable if the system comes to a standstill because it is overloaded after switchover.

End of: HA (UNIX)
3 Preparation

This section includes the preparation steps that you have to perform for the:

- Standard, distributed or high-availability system
- Additional application server instance
- Standalone host agent

Preparation Steps for a Standard, Distributed, or High-Availability System

Note
In a standard system, all mandatory instances are installed on one host. Therefore, if you are installing a standard system, you can ignore references to other hosts.

1. You identify basic SAP system parameters [page 46].
2. You check the hardware and software requirements [page 55] for every installation host of the HA system landscape that you want to install.
3. You make sure that the required operating system users and groups [page 72] are created.
4. If you want to configure the User Management Engine (UME) of Application Server Java (AS Java) for the user management of a separate ABAP system, you have to prepare user management for an external ABAP System [page 75].
5. You set up file systems and raw devices [page 78] and make sure that the required disk space is available for the directories to be created during the installation.
6. If you want to share the transport directory trans from another system, export [page 89] this directory to your installation hosts.
7. If you want to use virtual host names, you have to set the environment variable SAPINST_USE_HOSTNAME [page 101]. Alternatively you can specify the virtual host name in the command to start SAPinst.

Only valid for: HA (UNIX)

8. If you want to install a high-availability system, you perform switchover preparations [page 72].

End of: HA (UNIX)

9. You generate the SAP Solution Manager Key [page 92].
10. You make sure that the required installation media [page 92] are available on every host on which you want to install an instance of your SAP system.
11. You can continue with Installation [page 97].
3 Preparation
3.1 Basic SAP System Parameters

Preparation Steps for an Additional Application Server Instance
You have to perform the following preparations on the host where you install the additional application server instance(s):

1. You identify basic SAP system parameters [page 46].
2. You check the hardware and software requirements [page 55] for every installation host on which you want to install one or more additional application server instances.
3. You make sure that the required operating system users and groups [page 72] are created.
4. You set up file systems and raw devices [page 78] and make sure that the required disk space is available for the directories to be created during the installation.
5. If you want to share the transport directory trans from another system, export [page 89] this directory to your installation hosts.
6. If you want to use a virtual host name, you have to set the environment variable SAPINST_USE_HOSTNAME [page 101]. Alternatively you can specify the virtual host name in the command to start SAPinst.
7. You make sure that the required installation media [page 92] are available on every host on which you want to install one or more additional application server instances.
8. You can continue with Installation [page 97].

Preparation Steps for a Standalone Host Agent
You have to perform the following preparations on the host where you install a standalone host agent:

1. You identify basic SAP system parameters [page 46].
   You can find the parameters in the table Host Agent.
2. You check the hardware and software requirements [page 55] on the installation host.
   You can find the requirements for the Host Agent in section Requirements for a Standalone Host Agent.
3. You make sure that the required operating system users and groups [page 72] are created.
   You can find the operating system user for the Host Agent in the tables User and Groups of the Standalone Host Agent and Groups and Members of the Standalone Host Agent User.
4. You set up file systems and raw devices [page 78] and make sure that the required disk space is available for the directories to be created during the installation.
   You can find the directories for the Host Agent in section Host Agent Directories
5. You make sure that the required installation media [page 92] are available on the installation host.
   You can find the installation media that are required for the installation of a standalone host agent in the row Host Agent (Standalone) of the media table.
6. You can continue with Installation [page 97].

3.1 Basic SAP System Parameters

SAPinst asks whether you want to run the installation in Typical or Custom mode.
If you choose *Typical*, SAPinst provides automatic default settings and you only have to respond to a minimum number of prompts. However, you can still change any of the default settings on the parameter summary screen.

The tables below list the basic system parameters that you always need to specify before installing your SAP system, both in typical and in custom mode.

For all other SAP system parameters, use the [F1] help in the SAPinst dialogs.

### SAP System ID and Database ID

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP System ID &lt;SAPSID&gt;</td>
<td>The SAP system ID &lt;SAPSID&gt; identifies the entire SAP system. SAPinst prompts you for the &lt;SAPSID&gt; when you execute the <strong>first</strong> installation option to install a new SAP system. If there are further installation options to be executed, SAPinst prompts you for the profile directory. For more information, see the description of the parameter <em>SAP System Profile Directory</em>.</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>This prompt appears when you install the central services instance, which is the first instance to be installed in a distributed system.</td>
</tr>
</tbody>
</table>
| **Caution** | Choose your SAP system ID carefully. Renaming is difficult and requires you to reinstall the SAP system. Make sure that your SAP system ID:  
- Is unique throughout your organization  
- Consists of exactly three alphanumeric characters  
- Contains only uppercase letters  
- Has a letter for the first character  
- Does not include any of the following, which are reserved IDs: ADD ALL AND ANY ASC AUX COM CON DBA END EPS FOR GID IBM INT KEY LOG LPT MON NIX NOT NUL OFF OMS PRN RAW ROW SAP SET SGA SHG SID SQL SYS TMP UID USR VAR |
| Database ID <DBSID> | The <DBSID> identifies the database instance. SAPinst prompts you for the <DBSID> when you are installing the database instance. The <DBSID> can be the same as the <SAPSID>. |
| **Caution** | Choose your database ID carefully. Renaming is difficult and requires you to reinstall the SAP system.  
- **If you want to install a new database:**  
  Make sure that your database ID:  
  - Is unique throughout your organization  
  - Consists of exactly three alphanumeric characters  
  - Contains only uppercase letters |
### 3.1 Basic SAP System Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System ID <code>&lt;SMDSID&gt;</code> of SAP Solution Manager Diagnostics Agent</td>
<td>SAPInst sets <code>&lt;SMDSID&gt;</code> to DA by default. If DAA is already used by another SAP system that is not a Diagnostics Agent instance, <code>&lt;SMDSID&gt;</code> is set to DA&lt;xx&gt;, where &lt;xx&gt; can be any letter from A to Z, and DA stands for “DiagnosticsAgent”). If required, you can change <code>&lt;SMDSID&gt;</code> to a value of your choice on the Parameter Summary screen. If you do so, the same naming conventions as for <code>&lt;SAPSID&gt;</code> apply. For more information, see entry “SAP System ID <code>&lt;SAPSID&gt;</code>” in this table above.</td>
</tr>
</tbody>
</table>

### 3.2 SAP System Profile Directory

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/sapmnt/&lt;SAPSID&gt;/profile</code> or <code>/usr/sap/&lt;SAPSID&gt;/SYS/profile</code></td>
<td>The installation retrieves the parameters entered earlier from the SAP system profile directory. SAPInst prompts you to enter the location of the profile directory when the installation option that you execute is not the first one belonging to your SAP system installation. See also the description of the parameters <code>SAP System ID</code> and <code>Database ID</code>. <code>/usr/sap/&lt;SAPSID&gt;/SYS/profile</code> is the soft link referring to <code>/sapmnt/&lt;SAPSID&gt;/profile</code>.</td>
</tr>
</tbody>
</table>

**Note**

If you install an additional application server instance in an existing SAP system, SAPInst also prompts you for the profile directory of the existing SAP system.

### 3.3 SAP System Instances, Hosts, and Ports

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instance Number of the SAP system</td>
<td><strong>Instance Number:</strong> Technical identifier that is required for every instance of an SAP system, consisting of a two-digit number from 00 to 97. The instance number must be unique on a host. That is, if more than one SAP instance is running on the same host, these instances must be assigned different numbers. The instance number is used to specify the names of the SAP system instance directories which are created automatically by SAPInst during the installation:</td>
</tr>
</tbody>
</table>
### Parameters

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The directory both of the primary application server instance and of an additional application server instance is called J&lt;Instance_Number&gt;).</td>
</tr>
<tr>
<td>The directory of the central services instance is called SCS&lt;Instance_Number&gt;).</td>
</tr>
<tr>
<td>Only valid for: HA (UNIX)</td>
</tr>
<tr>
<td>The directory of the Enqueue Replication Server instance is called ERS&lt;Instance_Number&gt;).</td>
</tr>
<tr>
<td>End of: HA (UNIX)</td>
</tr>
<tr>
<td>For more information, see SAP Directories [page 79].</td>
</tr>
</tbody>
</table>

### Instance Number for the Diagnostics Agent

Technical identifier for internal processes for the Diagnostics Agent, consisting of a two-digit number from 00 to 98. The instance number is set automatically to the next free and valid instance number that has not yet been assigned to the SAP system. The instance number is used to specify the name of the Diagnostics Agent instance directory which are created automatically by SAPinstall during the installation:

The directory of the Diagnostics Agent instance is called J<Instance_Number>).

For more information, see SAP Directories [page 79].

The same restrictions apply as in “Instance Number of the SAP system” (see above).  

### Virtual Host Name

You can use one or more virtual TCP/IP host names for SAP servers within an SAP server landscape to order to conceal their physical network identities from each other. This may be useful when moving SAP servers or complete server landscapes to other new hardware within a short time frame without having to carry out a reinstallation or complicated reconfiguration.

If you want to use virtual host names for the installation, you have to specify the virtual host name [page 101] before you start SAPinstall.

Only valid for: HA (UNIX)  

If you want to install a high-availability (HA) system [page 19], you need the virtual host name when you install the SCS instance into a cluster.

End of: HA (UNIX)

For more information about the use of virtual TCP/IP host names, see SAP Note 962955.

The host name must not exceed 12 characters. For more information about the allowed host name length and characters, see SAP Note 611361.

### Message Server Port

**Caution**

The message server port number must be unique for the SAP system on all hosts. If there are several message port numbers on one host, all must be unique.

**Port Number of the SAP Message Server:**

If you do not specify a value, the default port number is used. The SCS instance profile contains the configuration for the Java message server. The Java message server port uses the parameter rdisp/msserv_internal with default value 39<nn>, where <nn> is the instance number of the SCS message server instance.

For more information about the parameters used for message server ports, see SAP Note 821875.
## Master Password

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Password</td>
<td>This password is used for all <strong>new</strong> user accounts SAPinst creates and for the secure store key phrase. The length has to be 8 to 14 characters. Depending on your installation scenario there might be more restrictions.</td>
</tr>
</tbody>
</table>

⚠️ Caution

If you do not create the operating system users manually, SAPinst creates them with the common master password. For more information, see the description of the parameter **Operating System Users**. In this case, make sure that the master password meets the requirements of your operating system and of your database.

### Operating System Users of the SAP System

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User &lt;sapsid&gt;adm</td>
<td>User <code>&lt;sapsid&gt;adm</code> is the system administrator user. If you did not create user <code>&lt;sapsid&gt;adm</code> manually before the installation, SAPinst creates it automatically during the installation. SAPinst sets the Master Password by default, but you can overwrite it either by choosing parameter mode <strong>Custom</strong> or by changing it on the parameter summary screen. Make sure that the user ID and group ID of this operating system user are unique and the same on each application server instance host. For more information, see <em>Creating Operating System Users</em> [page 72].</td>
</tr>
<tr>
<td>User sapadm</td>
<td>User <code>sapadm</code> is used for central monitoring services. If you did not create user <code>sapadm</code> manually before the installation, SAPinst creates it automatically during the installation. SAPinst sets the Master Password by default, but you can overwrite it either by choosing parameter mode <strong>Custom</strong> or by changing it on the parameter summary screen. Make sure that the user ID and group ID of <code>sapadm</code> are unique and the same on each application server instance host. For more information, see <em>Creating Operating System Users</em> [page 72].</td>
</tr>
<tr>
<td>User &lt;smdsid&gt;adm</td>
<td>User <code>&lt;smdsid&gt;adm</code> is dedicated to the Diagnostics Agent installation with sufficient authorization to manage the agent. If you did not create user <code>&lt;smdsid&gt;adm</code> manually before the installation, SAPinst creates it automatically during the installation. It is created on the central instance host and on every dialog instance host. SAPinst sets the Master Password by default, but you can overwrite it either by choosing parameter mode <strong>Custom</strong> or by changing it on the parameter summary screen. Make sure that the user ID and group ID of <code>&lt;smdsid&gt;adm</code> are unique and the same on each application server instance host. For more information, see <em>Creating Operating System Users</em> [page 72].</td>
</tr>
</tbody>
</table>
### User Management Engine (UME)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UME Configuration</strong></td>
<td><strong>SAPinst prompts you for how to configure the UME during the input phase of the installation.</strong>&lt;br&gt;You can choose between the following options:**&lt;br&gt;  ■ <strong>Use Java database (default).</strong>&lt;br&gt;     * If you choose this option, administrators can manage users and groups with the <strong>UME Web admin tool</strong> and <strong>SAP NetWeaver Administrator</strong> only.&lt;br&gt;  ■ <strong>Use an external ABAP system.</strong>&lt;br&gt;     * If you choose this option, administrators can manage users with the transaction SU01 on the external ABAP system, and, depending on the permissions of the communication user, also with the <strong>UME Web admin tool</strong> and <strong>SAP NetWeaver Administrator</strong>.&lt;br&gt;     * You must have created the required users manually on the external ABAP system.&lt;br&gt;     * For more information, see <em>Preparing User Management for an External ABAP System</em> [page 75].&lt;br&gt;     * For more information about supported UME data sources and change options, see <em>SAP Note 718383.</em></td>
</tr>
</tbody>
</table>
### Solution Key

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest User</td>
<td>This is the name and password of the guest user that you created on the external ABAP system. The guest user is for employees who do not belong to a company or who have registered as company users with pending approval. Guest users belong to the default group Authenticated Users and have read access only.</td>
</tr>
<tr>
<td>Guest Role</td>
<td>The role SAP_J2EE_GUEST must exist on the external ABAP system.</td>
</tr>
</tbody>
</table>

#### Key Phrase for Secure Store Settings

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Phrase for Secure Store Settings</td>
<td>This is a random word or phrase that is used to encrypt the secure store. The Java EE engine uses this phrase to generate the key that is used to encrypt the data. The uniqueness of the phrase you use contributes to the uniqueness of the resulting key.</td>
</tr>
</tbody>
</table>

Recommendation

Use a long key phrase that cannot be guessed easily. Use both uppercase and lowercase letters in the phrase and include special characters.

### Internet Communication Manager (ICM) User Management

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password of webadm</td>
<td>The administration user webadm is created to use the web administration interface for Internet Communication Manager (ICM) and Web Dispatcher. SAPinst sets the master password by default. If required, you can choose another password. The length of the password must be between 5 and 128 characters.</td>
</tr>
</tbody>
</table>

### Host Agent

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password of sapadm</td>
<td>The administration user sapadm is created to use central monitoring services. If this user does not already exist, SAPinst automatically creates it. SAPinst prompts you to enter either the password of the existing user or a new password for the user to be created.</td>
</tr>
</tbody>
</table>

### Solution Manager Key

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP Solution Manager key</td>
<td>To install your SAP system, you need to generate an SAP Solution Manager key [page 92], which the installation requires to continue. For more information, see SAP Note 805390.</td>
</tr>
</tbody>
</table>
Parameters Relevant for the Directory Structure of the System

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP system mount directory</td>
<td>The SAP system mount directory <code>/&lt;sapmnt&gt;</code> is the base directory for the SAP system. For <code>/&lt;sapmnt&gt;</code> you can use a directory of your choice. If you do not specify a directory, SAPInst creates a directory named <code>sapmnt</code> by default. Do not add <code>&lt;SAPSID&gt;</code> as subdirectory because the installer adds this directory automatically.</td>
</tr>
</tbody>
</table>

**Example**

If you enter `/sapmount` for `/<sapmnt>` and `KB1` for `<SAPSID>` during the input phase of the installation, the installer creates the directory `/sapmount/KB1`. For more information, see Setting Up File Systems and Raw Devices [page 78].

<table>
<thead>
<tr>
<th>File systems of DB2 for Linux, UNIX, and Windows</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Database software</td>
<td></td>
</tr>
<tr>
<td>Database home</td>
<td></td>
</tr>
<tr>
<td>Database instance home</td>
<td></td>
</tr>
<tr>
<td>Database log files</td>
<td></td>
</tr>
<tr>
<td>Database diagnostic data</td>
<td></td>
</tr>
<tr>
<td>SAPDATA</td>
<td></td>
</tr>
</tbody>
</table>

For more information, see Required File Systems for DB2 for Linux, UNIX, and Windows [page 25].

Parameters Relevant for the Database

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2 instance owner <code>db2&lt;dbsid&gt;</code></td>
<td><code>db2&lt;dbsid&gt;</code> has the DB2 system administration authorities and belongs to group <code>db&lt;dbsid&gt;adm</code>, which has DB2 SYSDM authorities. By default, user <code>db2&lt;dbsid&gt;</code> is a member of group <code>db&lt;dbsid&gt;adm</code>.</td>
</tr>
<tr>
<td>Java database connect user <code>&lt;sapsid&gt;db&gt;</code></td>
<td>The user name corresponds to the database schema where J2EE tables are created.</td>
</tr>
<tr>
<td>ID of the <code>db&lt;dbsid&gt;adm</code> group</td>
<td><img src="image" alt="Note" /> In a multi-partitioned database environment, the group ID must be the same on all database partition servers.</td>
</tr>
<tr>
<td><code>db&lt;dbsid&gt;adm</code> group</td>
<td>Members of this group have DB2 SYSADM authorities. By default, user <code>db2&lt;dbsid&gt;</code> is a member of this group.</td>
</tr>
<tr>
<td>ID of the <code>db&lt;dbsid&gt;ctl1</code> group</td>
<td><img src="image" alt="Note" /> In a multi-partitioned database environment, the group ID must be the same on all database partition servers.</td>
</tr>
<tr>
<td><code>db&lt;dbsid&gt;ctl1</code> group</td>
<td>Members of this group have DB2 SYSCTRL authorities. By default, <code>&lt;sapsid&gt;adm</code> is a member of this group.</td>
</tr>
</tbody>
</table>
## 3.1 Basic SAP System Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID of the <code>db&lt;sapsid&gt;mnt</code> group</td>
<td><img src="images" alt="Note" /> In a multipartitioned database environment, the group ID must be the same on all database partition servers.</td>
</tr>
<tr>
<td><code>db&lt;sapsid&gt;mnt</code> group</td>
<td>Members of this group have DB2 SYSMNT authorities. By default, <code>sap&lt;sapsid&gt;db</code> (the Java database connect user) is a member of this group.</td>
</tr>
<tr>
<td>Database Communication Port</td>
<td>The DB2 Communication Port is used for TCP/IP communication between the database server and remote DB2 clients. In a central system installation and for the database instance in a distributed installation, SAPinst always proposes 5912 as default value. <img src="images" alt="Note" /> SAPinst requests this value during the database instance installation.</td>
</tr>
<tr>
<td>Database Partition Group Mapping</td>
<td><img src="images" alt="Note" /> SAPinst only asks this parameter if you are performing a heterogeneous system copy and if the following condition is met: You run SAPinst to install the target database in a multipartitioned database environment using the R3Load method. You can assign the displayed node groups to a database partition.</td>
</tr>
<tr>
<td>Add sapdata directories</td>
<td>For an installation on DB2 V9.5, the tablespaces are stored in <code>/db2/&lt;SAPSID&gt;/sapdata&lt;n&gt;</code>. By default, SAPinst creates four sapdata directories (sapdata1, sapdata2, sapdata3, sapdata4). <img src="images" alt="Note" /> Be aware that the first part, for example <code>/db2/&lt;SAPSID&gt;/</code> is definite and you can only enter a value for <code>sapdata&lt;n&gt;</code>. Use Change, that is, add or remove the names and number of the <code>sapdata</code> directories.</td>
</tr>
</tbody>
</table>
| DB2 Type 4 JDBC Driver | SAPinst only asks this parameter if the database software has not been installed. Enter the path where the JDBC Driver files are located. ![Note](images) **J2EE dialog instance installation only:** If you are installing a J2EE dialog instance on a host where no other instance (for example, a database, central or dialog
### 3.2 Hardware and Software Requirements

You check that your hosts meet the hardware and software requirements for your operating system and the SAP instances.

⚠️ **Caution**

If your hosts do not fully meet the requirements, you might experience problems when working with the SAP system.

**Prerequisites**

- Contact your OS vendor for the latest OS patches.
- Make sure that the host name meets the requirements listed in [SAP Note 61136](http://service.sap.com/pam).
- Check your keyboard definitions.
- If you want to install a printer on a host other than the central instance host (for example, on a separate database instance host), make sure that the printer can be accessed under UNIX.

**Process Flow**

1. Check the Product Availability Matrix at [http://service.sap.com/pam](http://service.sap.com/pam) for supported operating system releases.
2. Check the hardware and software requirements using:
   - The **Prerequisite Checker**:
     - Standalone (optional) before the installation process
       For more information, see *Running the Prerequisite Checker Standalone* [page 56].
     - Integrated in the installation tool (mandatory) as part of the installation process
       For more information, see *Running SAPinst* [page 101].

---

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>instance of an ABAP component) is installed, the JDBC driver files db2jcc.jar and db2jcc_license_cu.jar are not available on the dialog instance host. Therefore, you must provide the JDBC driver files from the database server using a network share. Thus, you make sure that always the correct versions of the JDBC driver files are used.</td>
</tr>
</tbody>
</table>
3.2 Hardware and Software Requirements

Note
For the most recent updates to the Prerequisite Checker, always check SAP Note 855498.

The hardware and software requirements checklists for:
- AIX [page 57]
- Standard system [page 60]

Note
These requirements also apply if you want to install the Application Sharing Server as an Optional Standalone Unit.

- Distributed system [page 61]
- High availability system [page 65]
- If you want to install additional application server instances, check the requirements for an additional application server instance [page 69].
- If you want to install the Application Sharing Server as an optional standalone unit, see the requirements for a standard system [page 60].
- If you want to install the host agent on a host that does not have an SAP component, check the requirements for the host agent as a separate installation [page 70].

3. If you are installing a production system, the values provided by the Prerequisite Checker and the hardware and software requirements checklists are not sufficient. In addition, do the following:
  For more information about the SAP QuickSizer and available sizing guides, see the Master Guide - SAP NetWeaver 7.0 at http://service.sap.com/installnw70 Planning.
- You contact your hardware vendor, who can analyze the load and calculate suitable hardware sizing depending on:
  - The set of applications to be deployed
  - How intensively the applications are to be used
  - The number of users

3.2.1 Running the Prerequisite Checker in Standalone Mode (Optional)

Before installing your SAP system, you can run the Prerequisite Checker in standalone mode to check the hardware and software requirements for your operating system (OS) and the SAP instances.

Recommendation
We recommend that you use both the Prerequisite Checker and the requirements tables for reference.
When installing your SAP system, SAPinst automatically starts the Prerequisite Checker and checks the hardware and software requirements in the background.

**Prerequisites**

- You have prepared the Installation Master DVD on the required installation host [page 92].
- You make sure that the required prerequisites are met before starting SAPinst [page 101].

**Procedure**

1. You start SAPinst [page 101].
2. On the Welcome screen, choose <SAP System> > Software Life-Cycle Options > Additional Preparation Tasks > Prerequisites Check >.
3. Follow the instructions in the SAPinst dialogs and enter the required parameters.

   **Note**

   For more information about each parameter, position the cursor on the parameter field and choose [F1] in SAPinst.

   When you have finished, the Parameter Summary screen appears summarizing all parameters you have entered. If you want to make a change, select the relevant parameters and choose Revise.
4. To start the Prerequisite Checker, choose Start.

**Result**

The Prerequisite Check Results screen displays the results found. If required, you can also check the results in file prerequisite_checker_results.html, which you can find in the installation directory.

### 3.2.2 Requirements for AIX

You use the following information to check that the host machine meets the requirements listed in the table below:

**Note**

The information here is not intended to replace the documentation of the AIX operating system.

You can perform AIX-specific steps as follows:

- Manually by entering AIX commands with the appropriate options
- Using System Management Interface Tool (SMIT), a menu-driven system administration tool
If you have problems with the function keys, you can also use [ESC] and the corresponding number to simulate the function key (for example, [F4] is equivalent to [ESC] and [4]).

### Hardware Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape drive</td>
<td>High-capacity tape drive with hardware compression is recommended.</td>
</tr>
<tr>
<td></td>
<td>You can test the drive /dev/rmt0 with this command:</td>
</tr>
<tr>
<td></td>
<td><code>tar -cvf /dev/&lt;tape_device&gt; &lt;test_file&gt;</code></td>
</tr>
<tr>
<td></td>
<td>The device name is always rmt0 unless more than one tape drive exists.</td>
</tr>
<tr>
<td>DVD drive</td>
<td>- ISO 9660 compatible</td>
</tr>
<tr>
<td></td>
<td>- You can configure multiple CD or DVD drives, but you cannot mount all of them.</td>
</tr>
<tr>
<td></td>
<td>For more information, see Mounting a CD / DVD for AIX [page 135].</td>
</tr>
<tr>
<td>Required disks</td>
<td>For data security reasons, you need to distribute over at least three disks. We recommend you to distribute over five disks.</td>
</tr>
<tr>
<td></td>
<td>To display available disks, enter this command:</td>
</tr>
<tr>
<td></td>
<td><code>lspv</code></td>
</tr>
<tr>
<td></td>
<td>Disks marked <code>none</code> in the 3rd column are unused.</td>
</tr>
<tr>
<td></td>
<td>To display free space on a disk, enter this command:</td>
</tr>
<tr>
<td></td>
<td><code>lspv -p &lt;disk_name&gt;</code></td>
</tr>
<tr>
<td></td>
<td>Areas marked <code>free</code> in the 2nd column are unused.</td>
</tr>
<tr>
<td></td>
<td>If an advanced disk array is available (for example, RAID), contact your hardware vendor to make sure that the data security requirements are covered by this technology.</td>
</tr>
<tr>
<td>RAM</td>
<td>To display RAM size in KB, enter the following command:</td>
</tr>
<tr>
<td></td>
<td><code>lsattr -El sys0 -a realmem</code></td>
</tr>
<tr>
<td>CPU</td>
<td>The recommended minimum hardware is either two physical single core processors or one physical dual core processor.</td>
</tr>
</tbody>
</table>

### Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>C++ runtime level</td>
<td>Check the C++ runtime level with the following commands:</td>
</tr>
<tr>
<td></td>
<td>- AIX 6.x:</td>
</tr>
<tr>
<td></td>
<td>- <code>#ls1pp -L xlC.aix61.rte</code></td>
</tr>
<tr>
<td></td>
<td>- The output must be at least 9.0.0.1.</td>
</tr>
<tr>
<td></td>
<td>- <code>#ls1pp -L xlC.rte</code></td>
</tr>
<tr>
<td></td>
<td>- The output must be at least 9.0.0.1.</td>
</tr>
<tr>
<td></td>
<td>- AIX 5.x:</td>
</tr>
<tr>
<td></td>
<td>- <code>#ls1pp -L xlC.aix50.rte</code></td>
</tr>
<tr>
<td></td>
<td>- The output must be at least 8.0.0.5.</td>
</tr>
<tr>
<td></td>
<td>- <code>#ls1pp -L xlC.rte</code></td>
</tr>
<tr>
<td></td>
<td>- The output must be at least 8.0.0.5.</td>
</tr>
<tr>
<td>Operating system version</td>
<td>Check the operating system version with this command:</td>
</tr>
<tr>
<td></td>
<td><code>ls1pp -L bos.rte</code></td>
</tr>
<tr>
<td></td>
<td>The output must include the following or a larger version number:</td>
</tr>
<tr>
<td></td>
<td><code>bos.rte 5.2.0.75</code></td>
</tr>
</tbody>
</table>
### 3.2 Hardware and Software Requirements

#### Requirement: AIX Maintenance Level (ML) and Technology Level (TL)

- **AIX Maintenance Level (ML) and Technology Level (TL)**
  - AIX 6.1: the output of the command `oslevel -s` should be at least 6100-00-01.
  - AIX 5.3: the output of the command `oslevel -s` should be at least 5300-05-01 (TL 5 SP 1).
  - AIX 5.2: the output of the command `oslevel -r` should be at least 5200-06 (ML 6).

#### Requirement: LDAP (Lightweight Directory Access Protocol)

- **LDAP (Lightweight Directory Access Protocol)**
  - If you want to use LDAP, you require the following LDAP library: `libldap.a`

#### Requirement: Additional software

- **Make sure that the following additional file sets are installed:**
  - `bos.adt` — Base Application Development
  - `bos.perf` — performance and diagnostics tools
  - `perfagent.tools` — performance monitoring tools
  - `bos.perf.libperfstat` — Performance Statistics Library

For an overview of the installed file sets, enter the following command:

```
lslpp -L | more
```

Install the necessary local code set by adding an additional language environment as follows:

1. Start the System Management Interface Tool (SMIT) with the following command:
   ```
   smitty mle_add_lang
   ```
2. Select the following:
   - Cultural Conventions to install:
     - ISO8859-1 German (Germany) [de_DE]
   - Language Translation to install:
     - ISO8859-1 German [de_DE]

   This step installs the required `bos.loc` and `bos.iconv` file sets.
3. Additionally, check that all file sets are in a consistent state with this command:
   ```
   lppchk -v
   ```

#### Requirement: DB2—specific software requirements

- **For additional software requirements, see the IBM web page DB2 for Linux UNIX, and Windows — System Requirements at [http://www.ibm.com/software/data/db2/udb/sysreqs.html](http://www.ibm.com/software/data/db2/udb/sysreqs.html).**

- **For important information about known issues for DB2 on AIX, see the following IBM web page: [http://www-1.ibm.com/support/docview.wss?uid=swg21165448](http://www-1.ibm.com/support/docview.wss?uid=swg21165448)**

### Other Requirements

#### Requirement: Printer

- **Check whether a file can be printed with this command:**
  ```
  lp -d<printer_name> <test_file>
  ```

- **Check the status of your spool and the printers with this command:**
  ```
  lpsstat -t
  ```
### 3.2.3 Requirements for a Standard System

If you want to install a standard system – that is, all instances reside on one host – the host must meet the following requirements:

**Hardware Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
</table>
| Hard disk space | - Hard disk drives with sufficient space for the SAP system and the database. For more information, see *SAP Directories* [page 79].  
- For specific disk space information required for an SAP system installation on DB2 V9.5, see SAP Note 950906.  
  
  **Note**  
  - For safety reasons (system failure), the file systems must be physically distributed over several disks, or RAID-technology must be used.  
  - To ensure a good performance of your production system, create separate file systems for the directories listed in section *Required File Systems for DB2 for Linux, UNIX, and Windows* [page 25].  
  - 4.3 GB of temporary disk space for every required installation DVD that you have to copy to a local hard disk. For more information, see *Preparing the Installation DVDs* [page 92].  
  - 1.2 GB of temporary disk space for the installation.  
  - If there is no tape drive attached to your system, you need additional disk space for the files created by DB2s database backup command and the archived database log files. Alternatively, you need access to network-based storage management products, such as Legato Networker or Tivoli Storage Manager (TSM) (for database backup/restore). |
### 3.2.4 Requirements for a Distributed System

The following sections provide information about the hardware and software requirements for a distributed system, where the following SAP instances can reside on different hosts:

- **Central services instance** [page 62]
- **Database instance** [page 62]
- **Primary application server instance** [page 64]

#### 3.2.4.1 Minimum RAM

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum RAM</td>
<td>2 GB</td>
</tr>
</tbody>
</table>

#### Swap Space

You need hard disk drives with sufficient space for swap. The required swap space can be calculated as follows:

- **Optimistic strategy:**
  - For the **database instance** you need:
    - 0.75 * RAM, if RAM is greater than 8.0 GB.
    - 1 * RAM, if RAM is less than 8.0 GB.
  - In addition, you need at least 20 GB for the **primary application server instance** and at least another 10 GB for the **SCS instance** and also for every **additional application server instance**.
  - **Defensive strategy:**
    - 3 * RAM, at least 20 GB

For more information, see [SAP Note 1121904](https://support.sap.com/).

#### Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2 V9.5 for Linux, UNIX, and Windows</td>
<td>DB2 V9.5 for Linux, UNIX, and Windows is automatically installed by SAPInst.</td>
</tr>
<tr>
<td></td>
<td><strong>Caution</strong></td>
</tr>
<tr>
<td></td>
<td>For the installation of your SAP system, <strong>only</strong> the <strong>English version</strong> of DB2 V9.5 is supported.</td>
</tr>
<tr>
<td></td>
<td>You <strong>must only</strong> use the DB2 V9.5 software provided by the <strong>SAP installation DVDs</strong>.</td>
</tr>
<tr>
<td></td>
<td>For more information, see <a href="https://support.sap.com/">SAP Note 101809</a>.</td>
</tr>
<tr>
<td>Network File System (NFS)</td>
<td>If application servers are installed decentralized, Network File System (NFS) must be installed.</td>
</tr>
<tr>
<td>Fonts and code pages</td>
<td>Make sure that the required fonts and code pages are installed.</td>
</tr>
<tr>
<td>National Language Support (NLS)</td>
<td>Make sure that National Language Support (NLS) and corresponding saplocales are installed.</td>
</tr>
</tbody>
</table>
If you install multiple SAP system instances on one host, you need to add up the requirements.

### 3.2.4.1 Requirements for a Central Services Instance

The central services instance host must meet the following requirements for the central services instance:

**Hardware Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard disk space</td>
<td>- Hard disk drives with sufficient space for the central services instance</td>
</tr>
<tr>
<td></td>
<td>For more information, see <em>SAP Directories</em> [page 79].</td>
</tr>
<tr>
<td></td>
<td>- 4.3 GB of temporary disk space for every required installation DVD that you</td>
</tr>
<tr>
<td></td>
<td>have to copy to a local hard disk</td>
</tr>
<tr>
<td></td>
<td>For more information, see <em>Preparing the Installation DVDs</em> [page 92].</td>
</tr>
<tr>
<td></td>
<td>- 1.2 GB of temporary disk space for the installation.</td>
</tr>
<tr>
<td>Minimum RAM</td>
<td>1 GB</td>
</tr>
<tr>
<td>Swap Space</td>
<td>You need hard disk drives with sufficient space for swap. The required swap space</td>
</tr>
<tr>
<td></td>
<td>can be calculated as follows:</td>
</tr>
<tr>
<td></td>
<td>- Optimistic strategy:</td>
</tr>
<tr>
<td></td>
<td>At least 20 GB for the first SAP Instance to be installed on a server and at least</td>
</tr>
<tr>
<td></td>
<td>10 GB for each additional active SAP Instance on that server</td>
</tr>
<tr>
<td></td>
<td>- Defensive strategy:</td>
</tr>
<tr>
<td></td>
<td>3 * RAM</td>
</tr>
<tr>
<td></td>
<td>For more information, see <em>SAP Note</em> 1121904.</td>
</tr>
</tbody>
</table>

**Software Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network File System</td>
<td>Network File System (NFS) must be installed.</td>
</tr>
<tr>
<td>(NFS)</td>
<td></td>
</tr>
</tbody>
</table>

### 3.2.4.2 Requirements for the Database Instance

The database host must meet the following requirements:
## Requirement | Value or Activity
--- | ---
Disk space | For specific information about the required disk space for the database file systems, see SAP Note [950506](#).

**Note**
To ensure a good performance of your production system, create separate file systems for the directories listed in section Required File Systems for DB2 for Linux, UNIX, and Windows [page 25].

- If there is no tape drive attached to your system, you will need additional disk space for the files created by DB2s database backup command and the archived database log files. Alternatively, access to network-based storage management products, such as Legato Networker or Tivoli Storage Manager (TSM) (for database backup/restore), will be needed.
- At least 4.3 GB for each installation DVD that you have to copy to your local disk.
For more information, see Preparing the Installation DVDs [page 92].

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value or Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM</td>
<td>Minimum 4 GB</td>
</tr>
<tr>
<td>Swap Space</td>
<td>3*RAM + 500 MB, minimum 2 GB</td>
</tr>
<tr>
<td>Distribution of database-specific file systems</td>
<td>For safety reasons (system failure), the file systems must be distributed physically over several disks, or RAID-technology must be used.</td>
</tr>
<tr>
<td>Database software</td>
<td>DB2 V9.5 for Linux, UNIX, and Windows (automatically installed by SAPinst).</td>
</tr>
</tbody>
</table>

**Caution**
- For the installation of your SAP system, only the English version of DB2 V9.5 is supported.
- You must only use the DB2 V9.5 software provided by the SAP installation DVDs.
For more information, see SAP Note [101809].

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value or Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kernel parameters</td>
<td>Check the kernel parameters for AIX. For more information, see the IBM documentation Quick Beginnings for DB2 Servers Otherwise, there might be unpredictable problems with your system during or after installation.</td>
</tr>
<tr>
<td>Network File System (NFS)</td>
<td>If application servers are installed decentralized, Network File System (NFS) must be installed.</td>
</tr>
<tr>
<td>Required fonts and code pages</td>
<td>Make sure that the required fonts and code pages are installed.</td>
</tr>
<tr>
<td>National Language Support (NLS)</td>
<td>Make sure that National Language Support (NLS) and corresponding locales are installed.</td>
</tr>
<tr>
<td>Operating systems</td>
<td>For supported operating system and database releases, see the Product Availability Matrix at: <a href="http://service.sap.com/pam">http://service.sap.com/pam</a> Contact your operating system vendor for the latest OS patches.</td>
</tr>
</tbody>
</table>
### 3.2.4.3 Requirements for the Primary Application Server Instance

The host where the primary application server instance runs must meet the following requirements:

#### Hardware Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
</table>
| Hard disk space        | - Hard disk drives with sufficient space for the primary application server instance.  
                        | For more information, see *SAP Directories* [page 79].  
                        | - 4.3 GB of temporary disk space for every required installation DVD that you have to copy to a local hard disk. For more information, see *Preparing the Installation DVDs* [page 92].  
                        | - 1.2 GB of temporary disk space for the installation.  
| Minimum RAM            | 1 GB                                                                                                                                                                                                                                                                                                                                                 |
| Swap Space             | Hard disk drives with sufficient space for swap:  
                        | - Optimistic strategy:  
                        | At least 20 GB for the first SAP Instance to be installed on a server and at least 10 GB for each additional active SAP Instance on that server  
                        | - Defensive strategy:  
                        | 3 * RAM  
                        | For more information, see *SAP Note* 1121904.                                                                                                                                                                                                                                                                                                     |

#### Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
</table>
| DB2 V9.5 CLI Driver / DB2 V9.5 JDBC Driver | **Caution**  
You must only use the DB2 V9.5 software provided by the SAP installation DVDs.  
For more information, see *SAP Note* 101809.  
DB2 V9.5 CLI Driver / DB2 V9.5 JDBC Driver (automatically installed by SAPinst)                                                                                                                                                                                                                       |
| Network File System (NFS)            | If application servers are installed decentralized, Network File System (NFS) must be installed.                                                                                                                                                                                                                                                  |
| Required fonts and code pages        | Make sure that the required fonts and code pages are installed.                                                                                                                                                                                                                                                                                     |
| National Language Support (NLS)      | Make sure that National Language Support (NLS) and corresponding *saplocales* are installed.                                                                                                                                                                                                                                                           |
3.2.5 Requirements for a High Availability System

The following sections provide information about the hardware and software requirements for a high-availability system, where the following SAP instances can reside on different hosts or on a switchover cluster infrastructure:

- Enqueue replication server instances [page 66]
- Database instance [page 67]
- Primary application server instance [page 68]

3.2.5.1 Requirements for a Central Services Instance

The central services instance host must meet the following requirements for the central services instance (SCS):

### Hardware Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
</table>
| Hard disk space | - Hard disk drives with sufficient space for the central services instance.  
                  - For more information, see SAP Directories [page 79].  
                  - 4.3 GB of temporary disk space for every required installation DVD that you have to copy to a local hard disk.  
                  - For more information, see Preparing the Installation DVDs [page 92].  
                  - 1.2 GB of temporary disk space for the installation. |
| Minimum RAM     | 1 GB                   |
| Swap Space      | You need hard disk drives with sufficient space for swap. The required swap space can be calculated as follows:  
                  - Optimistic strategy:  
                    At least 20 GB for the first SAP Instance to be installed on a server and at least 10 GB for each additional active SAP Instance on that server  
                    3 * RAM  
                    For more information, see SAP Note [121904]. |

### Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network File System (NFS)</td>
<td>Network File System (NFS) must be installed.</td>
</tr>
</tbody>
</table>
3.2.5.2 Requirements for an Enqueue Replication Server Instance

The host on which an enqueue replication server instance runs must meet the following requirements:

**Note**

The enqueue replication server instance is only required for high-availability systems. You need one ERS for each Java SCS installed in your system.

### Hardware Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard disk space</td>
<td>▪ Hard disk drives with sufficient space for the central services instance</td>
</tr>
<tr>
<td></td>
<td>For more information, see [SAP Directories](page 79).</td>
</tr>
<tr>
<td></td>
<td>▪ 4.3 GB of temporary disk space for every required installation DVD that you</td>
</tr>
<tr>
<td></td>
<td>have to copy to a local hard disk</td>
</tr>
<tr>
<td></td>
<td>For more information, see [Preparing the Installation DVDs](page 92).</td>
</tr>
<tr>
<td></td>
<td>▪ 1.2 GB of temporary disk space for the installation.</td>
</tr>
<tr>
<td>Minimum RAM</td>
<td>1 GB</td>
</tr>
<tr>
<td>Swap Space</td>
<td>You need hard disk drives with sufficient space for swap. The required swap space can</td>
</tr>
<tr>
<td></td>
<td>be calculated as follows:</td>
</tr>
<tr>
<td></td>
<td>▪ Optimistic strategy:</td>
</tr>
<tr>
<td></td>
<td>At least 20 GB for the first SAP Instance to be installed on a server and at least</td>
</tr>
<tr>
<td></td>
<td>10 GB for each additional active SAP Instance on that server</td>
</tr>
<tr>
<td></td>
<td>▪ Defensive strategy:</td>
</tr>
<tr>
<td></td>
<td>3 * RAM</td>
</tr>
<tr>
<td></td>
<td>For more information, see <a href="1121904">SAP Note</a>.</td>
</tr>
</tbody>
</table>

### Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network File System</td>
<td>Network File System (NFS) must be installed.</td>
</tr>
<tr>
<td>(NFS)</td>
<td></td>
</tr>
</tbody>
</table>

**End of: HA (UNIX)**
### 3.2.5.3 Requirements for the Database Instance

The database host must meet the following requirements:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value or Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk space</td>
<td>• For specific information about the required disk space for the database file systems, see SAP Note 950506.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
</tr>
<tr>
<td></td>
<td>To ensure a good performance of your production system, create separate file systems for the directories listed in section Required File Systems for DB2 for Linux, UNIX, and Windows [page 25].</td>
</tr>
<tr>
<td></td>
<td>• If there is no tape drive attached to your system, you will need additional disk space for the files created by DB2s database backup command and the archived database log files. Alternatively, access to network-based storage management products, such as Legato Networker or Tivoli Storage Manager (TSM) (for database backup/restore), will be needed.</td>
</tr>
<tr>
<td></td>
<td>• At least 4.3 GB for each installation DVD that you have to copy to your local disk.</td>
</tr>
<tr>
<td></td>
<td>For more information, see Preparing the Installation DVDs [page 92].</td>
</tr>
<tr>
<td>RAM</td>
<td>Minimum 4 GB</td>
</tr>
<tr>
<td>Swap Space</td>
<td>3*RAM + 500 MB, minimum 2 GB</td>
</tr>
<tr>
<td>Distribution of database-specific file systems</td>
<td>For safety reasons (system failure), the file systems must be distributed physically over several disks, or RAID-technology must be used.</td>
</tr>
<tr>
<td>Database software</td>
<td>DB2 V9.5 for Linux, UNIX, and Windows (automatically installed by SAPInst).</td>
</tr>
<tr>
<td></td>
<td><strong>Caution</strong></td>
</tr>
<tr>
<td></td>
<td>• For the installation of your SAP system, only the English version of DB2 V9.5 is supported.</td>
</tr>
<tr>
<td></td>
<td>• You must only use the DB2 V9.5 software provided by the SAP installation DVDs.</td>
</tr>
<tr>
<td></td>
<td>For more information, see SAP Note 101809.</td>
</tr>
<tr>
<td>Kernel parameters</td>
<td>Check the kernel parameters for AIX. For more information, see the IBM documentation Quick Beginnings for DB2 Servers Otherwise, there might be unpredictable problems with your system during or after installation.</td>
</tr>
<tr>
<td>Network File System (NFS)</td>
<td>If application servers are installed decentralized, Network File System (NFS) must be installed.</td>
</tr>
<tr>
<td>Required fonts and code pages</td>
<td>Make sure that the required fonts and code pages are installed.</td>
</tr>
</tbody>
</table>
### 3.2.5.4 Requirements for the Primary Application Server Instance

The host where the primary application server instance runs must meet the following requirements:

#### Hardware Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard disk space</td>
<td>▪ Hard disk drives with sufficient space for the primary application server instance. For more information, see SAP Directories [page 79].</td>
</tr>
<tr>
<td></td>
<td>▪ 4.3 GB of temporary disk space for every required installation DVD that you have to copy to a local hard disk. For more information, see Preparing the Installation DVDs [page 92].</td>
</tr>
<tr>
<td>Minimum RAM</td>
<td>1 GB</td>
</tr>
<tr>
<td>Swap Space</td>
<td>Hard disk drives with sufficient space for swap:</td>
</tr>
<tr>
<td></td>
<td>▪ Optimistic strategy: At least 20 GB for the first SAP Instance to be installed on a server and at least 10 GB for each additional active SAP Instance on that server</td>
</tr>
<tr>
<td></td>
<td>▪ Defensive strategy: 3 * RAM</td>
</tr>
<tr>
<td></td>
<td>For more information, see SAP Note [1121904].</td>
</tr>
</tbody>
</table>

#### Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2 V9.5 CLI Driver / DB2 V9.5 JDBC Driver</td>
<td>DB2 V9.5 CLI Driver / DB2 V9.5 JDBC Driver (automatically installed by SAPinst)</td>
</tr>
<tr>
<td></td>
<td>▶ Caution</td>
</tr>
<tr>
<td></td>
<td>You must only use the DB2 V9.5 software provided by the SAP installation DVDs.</td>
</tr>
<tr>
<td></td>
<td>For more information, see SAP Note [101809].</td>
</tr>
<tr>
<td>Network File System (NFS)</td>
<td>If application servers are installed decentralized, Network File System (NFS) must be installed.</td>
</tr>
</tbody>
</table>
### 3.2.6 Requirements for an Additional Application Server Instance

The additional application server host must meet the following requirements:

#### Hardware Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
</table>
| Hard disk space              |  - Hard disk drives with sufficient space for the additional application server instance.  
                                  - For more information, see *SAP Directory* [page 79].  
                                  - 4.3 GB of temporary disk space for every required installation DVD that you have to copy to a local hard disk. For more information, see *Preparing the Installation DVDs* [page 92].  
                                  - 1.2 GB of temporary disk space for the installation.                                                                                                                                                           |
| Minimum RAM                  | 1 GB                                                                                                                                                                                                                   |
| Swap Space                   | You need hard disk drives with sufficient space for swap. The required swap space can be calculated as follows:  
                                  - Optimistic strategy:  
                                  - At least 20 GB for the first SAP Instance to be installed on a server and at least 10 GB for each additional active SAP Instance on that server  
                                  - Defensive strategy:  
                                  - 3 x RAM  
                                  - For more information, see *SAP Note 1121904.*                                                                                                                                                          |

#### Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
</table>
| SAP kernel                   | Make sure that the SAP kernel of the primary application server instance has at least the patch level of the SAP kernel on the SAP Kernel DVD that is used for the installation of the additional application server instance.  
                                  We recommend that you apply the most current SAP kernel from the SAP Service Marketplace at [http://service.sap.com/swdc](http://service.sap.com/swdc). |

---

**Preparation**

**3.2 Hardware and Software Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required fonts and code pages</td>
<td>Make sure that the required fonts and code pages are installed.</td>
</tr>
<tr>
<td>National Language Support (NLS)</td>
<td>Make sure that National Language Support (NLS) and corresponding <code>saplocales</code> are installed.</td>
</tr>
</tbody>
</table>
3.2 Hardware and Software Requirements

### Network File System (NFS)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network File System (NFS)</td>
<td>Network File System (NFS) must be installed.</td>
</tr>
</tbody>
</table>

### DB2 V9.5 CLI Driver / DB2 V9.5 JDBC Driver

The DB2 V9.5 CLI Driver / DB2 V9.5 JDBC Driver is automatically installed by SAPInst.

⚠️ **Caution**

You **must only** use the DB2 V9.5 software provided by the SAP installation DVDs.

For more information, see SAP Note [101809](#).

### 3.2.7 Requirements for a Standalone Host Agent

If you want to install a standalone host agent, the installation host has to meet the following requirements:

#### Hardware Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Disk Space</td>
<td>Minimum disk space</td>
</tr>
<tr>
<td></td>
<td>For information about the required disk space per file system, see Setting Up File Systems <a href="#">page 78</a></td>
</tr>
<tr>
<td></td>
<td>4.3 GB of temporary disk space for every required installation DVD that you have to copy to a local hard disk. For more information, see Preparing the Installation DVDs <a href="#">page 92</a>.</td>
</tr>
<tr>
<td></td>
<td>1.2 GB of temporary disk space for the installation.</td>
</tr>
<tr>
<td>Minimum RAM</td>
<td>0.5 GB</td>
</tr>
<tr>
<td>Swap space</td>
<td>You need hard disk drives with sufficient space for swap. The required swap space can be calculated as follows:</td>
</tr>
<tr>
<td></td>
<td>- Optimistic strategy:</td>
</tr>
<tr>
<td></td>
<td>- At least 20 GB for the first SAP Instance to be installed on a server and at least 10 GB for each additional active SAP Instance on that server</td>
</tr>
<tr>
<td></td>
<td>- Defensive strategy:</td>
</tr>
<tr>
<td></td>
<td>- (3 \times \text{RAM})</td>
</tr>
<tr>
<td></td>
<td>For more information, see SAP Note <a href="#">1121904</a>.</td>
</tr>
</tbody>
</table>

#### Software Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network File System (NFS)</td>
<td>Network File System (NFS) must be installed.</td>
</tr>
</tbody>
</table>
### 3.2.8 Setting up Swap Space for AIX

1. Check the allocated swap space:
   a) To start the System Management Interface Tool (SMIT), enter the following command:
   ```shell
   smitty.
   ```
   b) Perform one of the following steps:
      - Choose Physical & Logical Storage Logical Volume Manager Paging Space List All Paging Spaces
      - Enter this command:
      ```shell
      lspv -A
      ```

2. Check if there is sufficient swap space: 3 to 4 * RAM is recommended, at least 20 GB.

3. If required, add another paging space using `smitty`:
   a) Choose Physical & Logical Storage Logical Volume Manager Paging Space Add Another Paging Space
      A list of volume group names is displayed.
   b) Select a volume group.
   c) Enter the size of paging space in logical partitions.
   d) Set Start using this paging space NOW ? to YES.
   e) Set Use this paging space each time the system is RESTARTED to YES.
   f) To exit smitty, choose [F10].
   g) To check the results, follow the procedure described above in step 1.

### 3.3 Specifying the Virtual Host Name

If you want to use a virtual host name, you can set the environment variable `SAPINST_USE_HOSTNAME` to specify the virtual host name before you start SAPinst.

You can also specify the virtual host name by `starting SAPinst` [page 101] with an equivalent parameter in the command line.

**Procedure**
Set `SAPINST_USE_HOSTNAME` to the virtual host name of the machine on which you are installing an SAP instance as follows:

<table>
<thead>
<tr>
<th>Shell Used</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourne shell (sh)</td>
<td><code>SAPINST_USE_HOSTNAME=&lt;directory&gt;</code>&lt;br&gt; <code>export SAPINST_USE_HOSTNAME</code></td>
</tr>
<tr>
<td>C shell (csh)</td>
<td><code>setenv SAPINST_USE_HOSTNAME &lt;directory&gt;</code></td>
</tr>
<tr>
<td>Korn shell (ksh)</td>
<td><code>export SAPINST_USE_HOSTNAME=&lt;directory&gt;</code></td>
</tr>
</tbody>
</table>

**More Information**
For more information about the use of virtual TCP/IP host names, see SAP Note 962955.
### 3.4 Performing Switchover Preparations for High Availability

Do the following to prepare the switchover cluster:

**Procedure**

1. Make sure that the virtual host name [page 101] can be correctly resolved in your Domain Name System (DNS) setup.
2. Assign the virtual IP addresses and host names for the SCS instance, and (if required) NFS to appropriate failover groups.

**Note**

For more information on virtual addresses and virtual host names and how to assign resources to failover groups, ask your HA partner.

### 3.5 Creating Operating System Users and Groups

During the installation, SAPinst checks all required accounts (users, groups) and services on the local machine. SAPinst checks whether the required users and groups already exist. If not, it creates new users and groups as necessary.

If you do not want SAPinst to create operating systems users, groups, and services automatically, you can optionally create them **before** the installation. This might be the case if you use central user management such as Network Information System (NIS).

SAPinst checks if the required services are available on the host and creates them if necessary. See the log messages about the service entries and adapt the network-wide (NIS) entries accordingly.

SAPinst checks the NIS users, groups, and services using NIS commands. However, SAPinst does **not** change NIS configurations.

**Recommendation**

For a distributed or a high-availability system, we recommend that you distribute account information (operating system users and groups) over the network, for example by using Network Information Service (NIS).
Caution
All users must have identical environment settings. If you change the environment delivered by SAP, such as variables, paths, and so on, we do not assume responsibility.

If you want to use global accounts that are configured on a separate host, you can do this in one of the following ways:

- You start SAPinst and choose Software Life-Cycle Tasks → Additional Preparation Tasks → Operating System Users and Groups. For more information, see Running SAPinst [page 101].
- You create operating system users and groups manually as described in Creating AIX Groups and Users (Optional) [page 74]

Operating System Users and Groups
SAPinst chooses available operating system user IDs and group IDs unless you are installing an additional application server instance. On an additional application server instance you have to enter the same IDs as on the host of the primary application server instance.

Caution
Do not delete any shell initialization scripts in the home directory of the OS users. This applies even if you do not intend to use the shells that these scripts are for.

Caution
The user ID (UID) and group ID (GID) of each operating system user and group must be identical for all servers belonging to the same SAP system.
This does not mean that all users and groups have to be installed on all SAP servers.

Users and Groups of the SAP System

<table>
<thead>
<tr>
<th>User</th>
<th>Primary Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;sapsid&gt;adm</td>
<td>sapsys (db&lt;dbsid&gt;ctl as secondary group)</td>
</tr>
<tr>
<td>Java connect user sap&lt;sapsid&gt;db</td>
<td>db&lt;dbsid&gt;mnt</td>
</tr>
<tr>
<td>Note</td>
<td></td>
</tr>
<tr>
<td>Only used on the database host.</td>
<td></td>
</tr>
<tr>
<td>db2&lt;dbsid&gt;</td>
<td>db&lt;dbsid&gt;adm</td>
</tr>
<tr>
<td>Note</td>
<td></td>
</tr>
<tr>
<td>Only used on the database host.</td>
<td></td>
</tr>
</tbody>
</table>
3.5 Creating Operating System Users and Groups

Users and Groups of the SAP System

<table>
<thead>
<tr>
<th>User</th>
<th>Primary Group</th>
<th>Additional Group</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>sapadm</td>
<td>sapsys</td>
<td>sapinst</td>
<td>Host Agent administrator</td>
</tr>
</tbody>
</table>

⚠️ Caution
If these operating system users already exist, make sure that they are assigned to group sapinst.

⚠️ Caution
If you install a distributed system and you use local operating system user accounts instead of central user management (for example, NIS), user `<sapsid>adm, sapadm`, and the database operating system user must have the same password on all hosts.

Groups and Members of the SAP System Users

<table>
<thead>
<tr>
<th>Groups</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>sapsys</td>
<td><code>&lt;sapsid&gt;adm</code> (SAP system administrator)</td>
</tr>
<tr>
<td></td>
<td>sapadm (Host agent administrator)</td>
</tr>
<tr>
<td>db&lt;dbsid&gt;ctl</td>
<td><code>&lt;sapsid&gt;adm</code></td>
</tr>
<tr>
<td>db&lt;dbsid&gt;adm</td>
<td>db2&lt;dbsid&gt;</td>
</tr>
<tr>
<td>db&lt;dbsid&gt;mnt</td>
<td>Java connect user sap&lt;sapsid&gt;db</td>
</tr>
</tbody>
</table>

Groups and Members of the Standalone Host Agent User

<table>
<thead>
<tr>
<th>Groups</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>sapsys</td>
<td>sapadm</td>
</tr>
<tr>
<td>sapinst</td>
<td>sapadm</td>
</tr>
</tbody>
</table>

### 3.5.1 Creating AIX Groups and Users (Optional)

Creating AIX Groups and Users
To create AIX groups and users, use the System Management Interface Tool (SMIT):

1. Create groups as follows:
   a) Enter the command `smitty`.
   b) Choose `Security and Users` > `Groups` > `Add a group`.
   c) Enter a group name – for example, `sapsys` – and set `administration group` to `true`.
   d) Press `F3` until the `Security & Users` menu appears.

2. To create users, proceed as follows:
a) Enter a user name, for example `<sapsid>adm`.
b) Enter all required values.
3. Set the initial password using the following command:
   `passwd <user>`

**Example**

```
passwd <sapsid>adm
```

### Checking Created Users

As user `root` check all existing users as follows:

1. Enter the command `smitty`.
3. To get a list of users, choose `[F4]`.
4. For user `root` and each created user `<user>` perform the following steps:
   a) Select `<user>`.
   b) Change field `Soft CPU` time to `-1` (this is the default value).
   c) Change field `Soft CORE` file size to `2897151` (this is the default value).
   d) Change field `Soft FILE` size to `4194302`.

**Note**

If you are using large file enabled file systems, set the field `Soft FILE` size to `-1` (unlimited).

e) Change field `Soft DATA` segment to `-1`.
f) Change field `Soft STACK` size to `-1`.
You must make sure that the system-wide default `HARD` values are not explicitly defined to be `lower` than the values given above. Check the file `/etc/security/limits` under the `default` stanza. If they are not explicitly set, then the values are as shown in the table at the top of the file.

### Checking the Operating System

1. Enter the command `smitty`.
3. Change `Maximum number of PROCESSES allowed per user` to `500`.
4. To exit SMIT, choose `[F10]`.

### 3.6 Preparing User Management for an External ABAP System

For a Java system, you can also deploy user management for an external ABAP system. In this case, you configure the User Management Engine (UME) of Application Server Java (AS Java) for the user management of a separate ABAP system.
If you want to connect more than one Java system to the same ABAP system, you need to work out a concept for the communication, administrator, and guest users for each system. You can take one of the following approaches:

<table>
<thead>
<tr>
<th>Approach</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each Java system uses different users</td>
<td>No interdependencies between the connected engines</td>
<td>Initially more administration to create the users in the ABAP system</td>
</tr>
</tbody>
</table>
| All Java systems use the same configuration   | You create the users only once and enter the same information for every Java systems that you install. | Interdependencies between the connected engines:  
  ■ If you change the password of any of the users on the ABAP system, this change affects all connected engines.  
  ■ If you change the administrator user’s password, you must also change the password in secure storage on all of the connected Java systems |

**Recommendation**

For security reasons, we recommend the first approach.

The procedures below assume that you are using the first approach.

**Prerequisites**

- The ABAP system is based on at least SAP Web AS ABAP release 6.20 SP25.
- In transaction PFCE, check that the roles `SAP_BC_JSF_COMMUNICATION` and `SAP_BC_JSF_COMMUNICATION_R0` exist and make sure that their profiles are generated.
- In transaction PFCE, check that the roles `SAP_J2EE_ADMIN`, `SAP_J2EE_GUEST` and `SAP_BC_FP_ICF` exist. Neither role contains any ABAP permissions, so you do not need to generate any profiles.
- For more information, see the SAP Library [page 14]:  

**Note**

For more information about role maintenance, see the SAP Library [page 14] at  
- Function-Oriented View ➤ Security ➤ Identity Management ➤ Identity Management of the Application Server ABAP ➤  
  AS ABAP Authorization Concept ➤.

**Administration of the ABAP system**

Perform the following administration steps in the ABAP system:
1. In transaction SU01, create a new communication user and assign it to the role 
   **SAP_BC_JSF_COMMUNICATION_RO**.

   **Recommendation**
   We recommend that you assign this user the role **SAP_BC_JSF_COMMUNICATION_RO** for read-only (display) access to user data with Java tools. If you intend to maintain user data (that is, to change, create, or delete users) with Java tools, you need to assign the role **SAP_BC_JSF_COMMUNICATION** instead.
   We recommend that you name the user **SAPJSF_<SAPSID_Java_System>**.
   You can use any password.

   In addition, to make sure that this user can only be used for communication connections between systems and not as a dialog user, assign it the type **Communications under Logon data**.

2. In transaction SU01, create a new dialog user and assign it to role **SAP_J2EE_ADMIN**. This is your administrator user in AS Java.

   **Recommendation**
   We recommend that you name the user **J2EE_ADM_<SAPSID_Java_System>**. You can use any password.

   **Caution**
   Log on to the SAP system once with this user to change its initial password. Since the installer of AS Java verifies this password, the installation fails if this password is initial.

3. In transaction SU01, create a new dialog user and assign it to role **SAP_J2EE_GUEST**. This is your guest user in AS Java.

   **Recommendation**
   We recommend that you name the user **J2EE_GST_<SAPSID_Java_System>**. You can use any password.
   Since this user is only used for anonymous access to the system, we recommend you to deactivate the password and, if required, lock it after installation to prevent anyone from using it for explicit named logons.

4. In transaction SU01, create the following dialog users:

   **Caution**
   You must have changed the initial passwords of these users **before** you start the installation of the Java system.

   - Users for Adobe Document Services (ADS) (optional):
3.7 Setting Up File Systems and Raw Devices

- **ADSSUSER:**
  
  In transaction PFCG, assign the role **ADSCallers** to this user.

- **ADSS_AGENT:**
  
  In transaction PFCG, assign the role **SAP_BC_FP_ICF** to this user.

**SLD Data supplier user (optional):**

You only have to create this user if you want to install System Landscape Directory (SLD). The SLD data supplier user name that you enter later on during the Java system installation must be identical to this user.

**Recommendation**

We recommend that you name this user **SLDDSUSER**

**SLD ABAP API user (optional):**

You only have to create this user if you want to install System Landscape Directory (SLD). The SLD ABAP API user name that you enter later on during the Java system installation must be identical to this user.

**Recommendation**

We recommend that you name this user **SLDAPUSER**

**Note**

For more information about SLD users and security roles, see the *SAP Library* [page 14] at Administrator’s Guide ➔ Technical Operations for SAP NetWeaver ➔ Software Life-Cycle Management ➔ Configuring, Working with and Administering System Landscape Directory ➔ Administrating the SLD ➔.

**Activities for the Java System**

Perform the following steps in the Java system:

1. **Before** the installation of the Java system, make sure that you have the correct user names and passwords of the users listed above for the separate ABAP system.
2. **During** the installation of the Java system, make sure that you enter the correct users and passwords in the corresponding SAPinst dialogs.

**3.7 Setting Up File Systems and Raw Devices**

The following section(s) describe the directory structures for the SAP system, how to set up SAP file systems for the SAP system and, if required, raw devices on operating system level:

**Note**

The installation of any SAP system does not require a special file system setup or separate partitions.
3.7 Setting Up File Systems and Raw Devices

- SAP Directories [page 79]
- Directory Structure of the New DB2 Client Connectivity [page 83]
- Performing Switchover Preparations for High Availability [page 72]
- Host Agent Directories [page 84]
- Setting Up File Systems for High-Availability [page 84]
- Configuring Network File System for High Availability [page 86]
- Setting Up File Systems and Raw Devices for AIX [page 88]

### 3.7.1 SAP Directories

Here we describe the directories of a typical SAP system.

SAPinst creates the following types of directories:

- Physically shared directories, which reside on the global host and are shared by Network File System (NFS)
- Logically shared directories, which reside on the local host(s) with symbolic links to the global host
- Local directories, which reside on the local host(s)

#### Features

The following figure shows the directory structure of the SAP system:

**Figure 10:** Directory Structure for a Java System
Physically Shared Directories

SAPinst creates the following directories:

- The directory `/<sapmnt>/SAPSID`, which contains SAP kernel and related files, is created on the first installation host. Normally, the first installation host is the host on which the central services instance is to run, but you can also choose another host for `/<sapmnt>/SAPSID`. You need to manually share this directory with Network File System (NFS) and – for a distributed system – mount it from the other installation hosts.

SAPinst creates the following shared directories during the SAP system installation:

- **global**
  - Contains globally shared data and database-specific directories. For more information, see [Link]
- **profile**
  - Contains the profiles of all instances
- **exe**
  - Contains executable kernel programs

- The directory `/usr/sap/trans`, which is the global transport directory.
  - If you want to use an existing transport directory, you have to mount it before you install the application server instance in question. Otherwise SAPinst creates `/usr/sap/trans` locally. For more information, see Exporting and Mounting the Global Transport Directory [page 89]
3.7 Setting Up File Systems and Raw Devices

<table>
<thead>
<tr>
<th>Directory</th>
<th>Required Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;sapmnt&gt;/SAPSID&gt;</td>
<td>▪ Primary application server instance: 1.5 GB</td>
</tr>
<tr>
<td></td>
<td>▪ Central services instance: 1.0 GB</td>
</tr>
<tr>
<td>/usr/sap/trans</td>
<td>This value heavily depends on the use of your SAP system. For production systems, we recommend using as much free space as available (at least 2.0 GB), because the space requirement normally grows dynamically. For the installation, it is sufficient to use 200 MB for each SAP system instance. You can enlarge the file system afterwards.</td>
</tr>
</tbody>
</table>

Logically Shared Directories

SAPinst creates the directory /usr/sap/<SAPSID>/SYS on each host. The subdirectories contain symbolic links to the corresponding subdirectories of /<sapmnt>/<SAPSID> on the first installation host, as shown in the figure above.

Whenever a local instance is started, the sapcpe program checks the executables against those in the logically shared directories and, if necessary, replicates them to the local instance.

Local Directories (SAP System)

The directory /usr/sap/<SAPSID> contains files for the operation of a local instance as well as symbolic links to the data for one system.

This directory is physically located on each host in the SAP system and contains the following subdirectories:

▪ SYS

**Note**
The subdirectories of /usr/sap/<SAPSID>/SYS have symbolic links to the corresponding subdirectories of /<sapmnt>/<SAPSID>, as shown in the figure above.

▪ <INSTANCE> for each instance installed on the host

  The instance-specific directories have the following names:

  ▪ The directory both of the primary application server instance and of an additional application server instance is called J<Instance_Number>.

  ▪ The directory of the central services instance is called SCS<Instance_Number>.

  (Only valid for HA (UNIX))

  ▪ The directory of the Enqueue Replication Server instance is called ERS<Instance_Number>.

  (End of: HA (UNIX))
3.7 Setting Up File Systems and Raw Devices

<table>
<thead>
<tr>
<th>Directory</th>
<th>Required Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/usr/sap/&lt;SAPSID&gt;</code></td>
<td>Primary application server instance or additional application server instance: 2.5 GB</td>
</tr>
</tbody>
</table>

Local Directories (Diagnostics Agent)

The directory `/usr/sap/<SMDSID>` contains files for the operation of a local Diagnostics Agent instance.

This directory is physically located on each host in the SAP system and contains the following subdirectories:

- **exe**
  - Contains the following global scripts:
    - `smdstart.sh`
      - This script is used to start one or more Diagnostics Agent(s) available in the system landscape.
    - `smdstop.sh`
      - This script is used to stop one or more Diagnostics Agent(s) available in the system landscape.
    - `smdadmin.sh`
      - This script is used to manage one or more Diagnostics Agent(s) available in the system landscape.

- `<INSTANCE>`
  - The directory of the Diagnostics Agent is called `DIA<Instance_Number>`
  - This directory contains the Instance-specific data of the Diagnostics Agent.
  - Contains the following subdirectories:
    - `profile`
      - Contains the `smd.properties` file
    - `sapinst`
      - Contains log files of the installation
    - `script`
      - Contains the following local scripts:
        - `smdstart.sh`
          - This script is used to start the local Diagnostics Agent.
        - `smdstop.sh`
          - This script is used to stop the local Diagnostics Agent.
        - `smdadmin.sh`
          - This script is used to manage the local Diagnostics Agent.
    - `SMDAgent`
      - Contains the Diagnostics Agent software and properties files.
    - `work`
      - This is the work directory of the Diagnostics Agent.
3.7 Setting Up File Systems and Raw Devices

**SYS**
- **profile**
  Contains the profiles of the Diagnostics Agent instance

<table>
<thead>
<tr>
<th>Directory</th>
<th>Required Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>/usr/sap/&lt;SMDSID&gt;/J&lt;instance_number&gt;</td>
<td>500 MB</td>
</tr>
<tr>
<td>/usr/sap/&lt;SMDSID&gt;/SYS/profile</td>
<td></td>
</tr>
<tr>
<td>/usr/sap/&lt;SMDSID&gt;/exe</td>
<td></td>
</tr>
</tbody>
</table>

### 3.7.2 Directory Structure of the New DB2 Client Connectivity

With DB2 V9.1, a new DB2 client connectivity was introduced with a new directory structure as shown in the following graphic:

**Figure 12:**

Directory Structure of the Database Client
(Including the JDBC Driver)

**JDBC Driver**

During the installation of the database instance, the JDBC driver is stored in the global directory (`global/db6/jdbc`) of your SAP system. Each time you start the SAP system, the JDBC driver is copied from the `global/db6` directory to the local `exe` directory and the active SAP system uses these copies of the JDBC driver in the local `exe` directory.

Therefore, by exchanging the JDBC driver in the `global` directory, you are able to update the JDBC driver while the SAP system is up and running. Each time you restart the application server, the JDBC driver is again copied to the local `exe` directory and always the latest version is used.
3.7 Setting Up File Systems and Raw Devices

### Updating the Global Directory During Fix Pack Installation

During the Fix Pack installation, the database software is automatically updated. However, to update the DB2 CLI driver(s) or JDBC driver in the global directory, you have to run the script `db6_update_client.sh` as follows:

1. Log on to the database server as user `<sapsid>adm`.
2. Mount the DB2 V9.5 LUW CLI/JDBC-Driver DVD.
3. Change to directory `<mount_DVD_Dir>/CLIENT`.
4. Run the `db6_update_client.sh` script by entering the following command:
   ```
   db6_update_client.sh -u
   ```

**Result**

The `db6_update_db.sh` updates the DB2 CLI driver in the `global/db6` directory for all operating systems available as well as the JDBC driver.

### 3.7.3 Host Agent Directories

For the host agent, the following directories are required:

<table>
<thead>
<tr>
<th>Directories</th>
<th>Description</th>
<th>Required Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/usr/sap/hostctrl</code></td>
<td>Contains the following directories:</td>
<td>70 MB</td>
</tr>
<tr>
<td></td>
<td>■ <code>exe</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ Contains the profile</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ <code>host_profile</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ <code>work</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Working directory of the host agent</td>
<td></td>
</tr>
</tbody>
</table>

Only valid for: HA (UNIX)

### 3.7.4 Setting Up File Systems for a High-Availability System

When you prepare a high-availability (HA) installation with switchover software, you need to set up your file systems as described here. For more information, consult your HA partner.

**Prerequisites**

You have already installed the hardware – that is, hosts, disks, and network – and decided how to distribute the database, SAP instances, and (if required) Network File System (NFS) server over the cluster nodes (that is, over the host machines). For more information, see *Planning the Switchover Cluster* [page 41].
Procedure

1. Create the file systems or raw partitions for the central services instance on shared disks. For more information, see Setting Up File Systems and Raw Devices [page 78].

   ![Note]
   The directories /sapmnt/<SAPSID> and /usr/sap/trans have to be mounted from a Network File System (NFS). However, /usr/sap/<SAPSID>/<INSTTYPE><NR>, which should be part of a cluster, has to be a directory of the application server instance that is always mounted on the cluster node currently running the instance (not with NFS). Therefore, if the host running the primary application server instance is not the NFS server host, you might have to mount the file systems for /sapmnt/<SAPSID> and /usr/sap/trans on different physical disks from the file system for /usr/sap/<SAPSID>/<INSTTYPE><NR>.

2. Use the following approach for the file system for the /usr/sap/<SAPSID> directory:

   The /usr/sap/<SAPSID> directory contains at least two subdirectories:
   - SYS, which contains links to the central directory /sapmnt/<SAPSID>
   - <INSTTYPE><NR> – where the name is defined by the type of services and the application server number, for example SCS<NR> – which contains data for the local Java central services instance. Only the latter directory needs to be migrated with the application server instance during the switchover. Since the SYS subdirectory contains only links that do not require any space, you can create it locally on each cluster node. Other local instances can also reside locally, such as an Enqueue Replication Server instance in /usr/sap/<SAPSID>/ERS<NR>, which should not be affected by a switchover.

   Therefore, instead of /usr/sap/<SAPSID>, create a file system for /usr/sap/<SAPSID>/<INSTTYPE><NR> with the usual <> substitutions.

   The instance-specific directory name for the central services instance is normally SCS<NR>. Migrating only this directory avoids mount conflicts when switching over to a node on which another AS instance is already running. The SCS<NR> directory can join the /usr/sap/<SAPSID> tree instead of mounting on top of it.

   ![Note]
   This approach becomes increasingly important when you want to cluster the central services instances with other local instances running on the cluster hosts outside the control of the switchover software. This applies to the Enqueue Replication Server (ERS) and additional ABAP or Java application server instances. The result is a more efficient use of resources. You must use this approach for integrated installations of the application server with ABAP and Java stacks.

3. You assign the local file systems to mount points.
4. You assign the shared file systems to mount points in appropriate failover groups.
The graphic below shows an example of the file systems and disks in an HA setup. Note that this is only an example. For more information on a setup that meets your needs, consult your HA partner.

**Figure 13:**

### 3.7.5 Configuring Network File System for a High-Availability System

If required, you configure Network File System (NFS), which is a system-wide Single Point-of-Failure (SPOF), for a high-availability (HA) installation with switchover software. For more information, consult your HA partner.

We regard NFS as an extension to the operating system. The switchover product protects NFS and makes it transparently available to the SAP system in switchover situations.

You need to decide:

- How to protect NFS
Which switchover cluster nodes NFS is to run on

The NFS configuration might depend on your database system. The directories need to be available for the SAP system before and after a switchover.

**Procedure**

1. Check the NFS directories, several of which need to be shared between all instances of a system. These directories are:
   - `/sapmnt/<SID>/profile`
     Contains the different profiles to simplify maintenance
   - `/sapmnt/<SID>/global`
     Contains log files of batch jobs and central SysLog
   - `/usr/sap/trans`
     Contains data and log files for objects transported between different SAP systems (for example, development – integration). This transport directory ought to be accessible by at least one AS instance of each system, but preferably by all.
   - `/sapmnt/<SID>/exe`
     Contains the kernel executables. These executables ought to be accessible on all AS instances locally without having to use NFS. The best solution is to store them locally on all AS instance hosts.

2. Since you can protect NFS by a switchover product, it makes sense to install it on a cluster node. The requirements of your database system might dictate how NFS has to be set up. If required, you can configure the NFS server on the cluster node of the clustered application server instance or the DB.

   In both cases the NFS clients use the virtual IP address to mount NFS. If the second node is used as an additional SAP instance during normal operation (for example, as an additional application server instance), it also needs to mount the directories listed above from the primary node.

   When exporting the directories with their original names, you might encounter the problem of a “busy NFS mount” on the standby node. You can use the following workaround to solve this problem:

   a) On the primary server, mount the disks containing the directories:
      ```
      /export/usr/sap/trans
      /export/sapmnt/<SID>
      ```

   b) The primary server creates soft links to the directories with the original SAP names:
      ```
      /usr/sap/trans -> /export/usr/sap/trans
      /sapmnt/<SID> -> /export/sapmnt/<SID>
      ```

      Alternatively the primary server can also mount the directories:
      ```
      /export/usr/sap/trans -> /usr/sap/trans
      /export/sapmnt/SID -> /sapmnt/<SID>
      ```

   c) The primary server exports:
      ```
      /export/usr/sap/trans
      ```
3.7.6 Setting Up File Systems and Raw Devices for AIX

Setting up File Systems

1. Create one logical volume for each file system listed in the appropriate SAP profile:
   a) Using SMIT, choose [Physical & Logical Storage] [Logical Volume Manager] [Logical Volumes] [Add a Logical Volume].
   b) Enter a volume group name, for example, sapr3vg.
   c) Enter a logical volume name, for example, lvsap01.
   d) Enter the number of logical partitions.

2. Create the file systems.
   a) Using SMIT, choose [Physical & Logical Storage] [File Systems] [Add/Change/Show/Delete File Systems] [Journaled File Systems] [Add a Journaled File System on a previously defined Logical Volume] [Add a Standard Journaled File System].
      If you want to use large enabled file systems for files larger than 2 GB, you have to choose Add a Large File Enabled Journaled File System instead of Add a Standard Journaled File System.
      If you want to use JFS2 file systems, you have to choose Enhanced Journaled File System instead of Journaled File System.
3 Preparation

3.8 Exporting and Mounting the Global Transport Directory

b) To get a list of logical volumes, choose [F4].
c) Select one logical volume.

Caution
Select the logical volume with the desired size.

d) Enter mount point as given in the file system list files.

Example
/db2/<DBSID>

e) Set mount automatically to yes.
f) To exit smitty, choose [F10].

Setting up Raw Devices

1. Create volume group.
2. Create logical volume:
   a) Enter the command smitty.
   b) Choose ▶ Physical & Logical Storage ▶ Logical Volume Manager ▶ Logical Volumes ▶ Add a Logical Volume ▶.
   c) Enter volume group name.
   d) Enter logical volume name (for example: lvsap02).
   e) Enter the number of logical partitions.
   f) Set the logical volume TYPE to r3data and press ENTER.
   g) To exit SMIT, choose [F10].

Note
The logical volume can be accessed through /dev/r<name of raw log.vol>.

Example
A logical volume called lvsap02 points to the device name /dev/r1vsap02.

3. Accessing raw devices:
It is not necessary to create a link to access the volume.

3.8 Exporting and Mounting the Global Transport Directory

In your SAP system landscape, a global transport directory for all SAP systems is required. During the installation, you can select the check box SAP System will be under NWDI control on the screen NWDI Landscape. Then SAPinst copies all SCAs belonging to the software units that you installed to the global transport directory.
For more information, see the SAP Library [page 14]:

... (Administrator's Guide)...

- If the global transport directory already exists, make sure that it is exported on the global transport directory host and mount it on the SAP instance installation host.
- If the global transport directory does not exist, proceed as follows:
  - Create the transport directory (either on the host where the primary application server instance is running or on a file server).
  - Export it on the global transport directory host.
  - If you did not create the transport directory on your SAP instance installation host, mount it there.

**Exporting the Transport Directory**

1. Log on as user root to the host where the global transport directory /usr/sap/trans resides.
2. Make sure that /usr/sap/trans belongs to the group sapsys and to the user root.
3. If not already done, export the directory using Network File System (NFS).

**Mounting the Transport Directory**

**Note**

If the transport directory resides on your local SAP instance installation host, you do not need to mount it.

1. Log on as user root to the host of the primary or additional application server instance, where /usr/sap/trans is to be mounted.
2. Create the mount point /usr/sap/trans.

**More Information**

Mounting Directories via NFS for AIX (Optional) [page 90]

**3.9 Exporting and Mounting Directories via NFS for AIX (Optional)**

There are two ways of mounting directories via NFS:

- Manually
- Using the System Management Interface Tool (SMIT)
Procedure

To mount directories via NFS from the host where the directory to be mounted resides:

1. Log on as user root.
2. To start NFS services at the host where the directory to be mounted resides, use SMIT as follows:
   a) Enter the command smitty.
   b) Choose Communications Applications and Services ⇒ NFS ⇒ Network File System (NFS) ⇒ Configure NFS on this System ⇒ Start NFS.
   c) In the line Start NFS now, on system restart or both, enter: both.
   d) Choose ENTER.
3. Export the directory (for example <sapmnt>/<SAPSID>/exe) with read or read-write access for the host where the additional instance runs:
   a) Enter the command smitty.
   b) Choose Communications Applications and Services ⇒ NFS ⇒ Network File System (NFS) ⇒ Add a Directory to Exports List.
   c) Enter the path of the directory that you want to export (for example, <sapmnt>/<SAPSID>/exe).
   d) Choose export mode (use read-write or read-only as required by SAP). In the line HOSTS allowed not access, enter the name of the host where the additional instance runs. For security reasons, make sure that this root access is disabled after the installation.
   e) In the line Export directory now, system restart or both, enter: both
   f) Choose ENTER.
4. Create the mount point at the host where the additional instance runs:
   /usr/bin/mkdir <sapmnt>/<SAPSID>/SYS/exe
5. Mount the directory on the host where the additional instance runs.
   a) Enter the command smitty.
   b) Choose Communications Applications and Services ⇒ NFS ⇒ Network File System (NFS) ⇒ Add a File System for Mounting.
   c) Enter the path name of the mount point.
   d) Enter the path name of the remote directory (the directory of the primary application server instance).
   e) Enter the host where the remote directory resides.
   f) Set Mount now, add entry to /etc/filesystem or both to both.
   g) Set /etc/filesystem entry will mount the directory on system RESTART to yes.
   h) Change Mount file system soft or hard to sof and press ENTER.
6. If you exported the directory with read-write access, check if the host where the additional instance is to run has write access to directory <sapmnt>/<SAPSID>/exe by using the following commands:
   cd <sapmnt>/<SAPSID>/SYS/exe
   touch test (create a file called test)
   ls -l test (check if file test is created)
   rm test (remove the file test)
3.10 Generating the SAP Solution Manager Key

You need to generate the Solution Manager key because the installation tool prompts for it during the installation. Without this key, the installation process cannot continue.
For more information, see SAP Note 805390.

Procedure

1. If SAP Solution Manager is not yet available in your system landscape, proceed as follows:
   a) Order SAP Solution Manager as described in SAP Note 628901.
   b) Install SAP Solution Manager as described in the documentation Installation Guide — SAP Solution Manager <release> on <OS>: <Database> which is available at:
      ![http://service.sap.com/solutionmanager](http://service.sap.com/solutionmanager) SAP Solution Manager Installation Guides Release 4.0
2. Generate the SAP Solution Manager key as described in SAP Note 811923.

Result
The SAP Solution Manager system displays the key for which you are prompted during the installation of your SAP system.

3.11 Preparing the Installation DVDs

This section describes how to prepare the installation DVDs, which are available as follows:

- You normally obtain the installation DVDs as part of the installation package.
- You can also download the installation DVDs from SAP Service Marketplace, as described at the end of this section.

1. Identify the required DVDs for your installation [page 17] as listed below.
   Keep them separate from the remaining DVDs as this helps you to avoid mixing up DVDs during the installation.

   **Note**
   - The media names listed in the following table are abbreviated.
   - You can find the Software Component Archives (SCAs) for the installation of SAP NetWeaver usage types on the NetWeaver Java DVD.
### SAP Instance Installation

<table>
<thead>
<tr>
<th>SAP Instance Installation</th>
<th>Required DVDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central services instance (SCS)</td>
<td>- Installation Master DVD</td>
</tr>
<tr>
<td></td>
<td>- NetWeaver Java DVD</td>
</tr>
<tr>
<td></td>
<td>- Kernel DVD</td>
</tr>
<tr>
<td></td>
<td>- CLI Driver / JDBC Driver DVD</td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td></td>
</tr>
<tr>
<td>You <strong>must only</strong> use the DB2 software provided by the <strong>SAP installation DVDs</strong>.</td>
<td></td>
</tr>
<tr>
<td>The CLI / JDBC driver DVD is required <strong>only</strong> if the application server is running on a <strong>different operating system</strong> than the database instance.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Database instance</th>
<th>- Installation Master DVD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Kernel DVD</td>
</tr>
<tr>
<td></td>
<td>- RDBMS DVD and the CLI/JDBC Driver DVD</td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td></td>
</tr>
<tr>
<td>For the installation of your SAP system, <strong>only</strong> the <strong>English version</strong> of DB2 V9.5 is supported.</td>
<td></td>
</tr>
<tr>
<td>You <strong>must only</strong> use the DB2 V9.5 software provided by the <strong>SAP installation DVDs</strong>.</td>
<td></td>
</tr>
<tr>
<td>- Export DVD</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HA only: Enqueue Replication Server</th>
<th>- Installation Master DVD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Kernel DVD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary application server instance</th>
<th>- Installation Master DVD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- NetWeaver Java DVD</td>
</tr>
<tr>
<td></td>
<td>- Kernel DVD</td>
</tr>
<tr>
<td></td>
<td>- CLI Driver / JDBC Driver DVD</td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td></td>
</tr>
<tr>
<td>You <strong>must only</strong> use the DB2 V9.5 software provided by the <strong>SAP installation DVDs</strong>.</td>
<td></td>
</tr>
<tr>
<td>The CLI / JDBC driver DVD is required <strong>only</strong> if the application server is running on a <strong>different operating system</strong> than the database instance.</td>
<td></td>
</tr>
</tbody>
</table>
2. Make the required installation media available on each installation host.
If you need information about how to mount DVDs on AIX, see Mounting a CD / DVD for AIX [page 135].

Note
Depending on your installation type, one or more instances can reside on the same host. You need to keep this in mind when you make the required installation media available on each installation host.
For a standard system, you need to make all required installation media available on the single installation host.

Use one of the following methods to make DVDs available:
- **Before** the installation, copy DVDs manually to local hard disks.
- **During** the installation, use the SAPinst Media Browser dialog and copy the entire DVDs to the path you entered in the Copy To column.

Caution
- Mount the DVDs locally. We do **not** recommend you to use Network File System (NFS), because reading from DVDs mounted with NFS might fail.
- If you copy the DVDs to disk, make sure that the paths to the destination location of the copied DVDs do not contain any blanks.
- If you perform a local installation and there is only one DVD drive available on your installation host, you must copy at least the Installation Master DVD to the local file system.

**Downloading Installation DVDs from SAP Service Marketplace (Optional)**
You normally obtain the installation DVDs as part of the installation package from SAP.
However, you can also download installation DVDs from SAP Service Marketplace at:

**Note**
If you download installation DVDs, note that the DVDs might be split into several files. In this case, you have to reassemble the required files after the download.

**Caution**
To extract the downloaded SAR files make sure that you use the latest SAPCAR version, which you can find on SAP Service Marketplace at [http://service.sap.com/swdc](http://service.sap.com/swdc). You need at least SAPCAR 700 or SAPCAR 640 with patch level 4 or higher because older versions of SAPCAR can no longer unpack current SAR files. For more information, see SAP Note [212876](http://service.sap.com/swdc).

1. Create a download directory on the host where you want to run SAPinst.
2. Identify all download objects that belong to one installation DVD according to one or both of the following:
   - **Material number**
     All download objects that are part of an installation DVD have the same material number and an individual sequence number:
     \(<\text{material\_number}>_<\text{sequence\_number}>\)

   **Example**
   51031387_1
   51031387_2
   ...

   - **Title**
     All objects that are part of an installation DVD have the same title, such as \(<\text{solution}>_<\text{DVD\_name}>_<\text{OS}>\) or \(<\text{database}>_<\text{RDBMS}>_<\text{OS}>\) for RDBMS DVDs.
3. Download the objects to the download directory.
4. Extract the individual download objects using SAPCAR, starting with the lowest sequence number — for example 51031387_1, then 51031387_2, and so on.
During the download SAPCAR sets up the structure of the installation DVD.

**Note**
SAPCAR asks if you want to replace existing files, for example LABELIDX.ASC. Always accept with **Yes**.
This page is intentionally left blank.
4 Installation

Installation Steps for a Standard System

1. You run SAPinst [page 101] to install the SAP system.
2. You continue with Post-Installation [page 115].

Installation Steps for a Distributed System

1. If you want to share the transport directory trans from another system, you have to mount [page 89] it from this system. Otherwise we recommend that you share the trans directory that is created during the installation of the primary application server instance.
2. On the SAP global host, you do the following:
   a) You export global directories [page 100] in <sapmnt>/<SAPSID> to the database and primary application server instance host.
   b) You run SAPinst [page 101] to install the database instance.
3. On the database instance host, you do the following:
   a) You mount the global directories [page 100] in <sapmnt>/<SAPSID> that you exported from the SAP global host and – optionally – the trans directory that you exported [page 89] from the SAP transport host.
   b) You run SAPinst [page 101] to install the database instance.
4. On the primary application server instance host, you do the following:
   a) You mount the global directories [page 100] in <sapmnt>/<SAPSID> that you exported from the SAP global host.
   b) You run SAPinst [page 101] to install the primary application server instance.
   c) If you want to use the shared transport directory trans from another system, you also mount [page 89] this directory.
5. If required, you can now install one to n additional application server instance(s) [page 20].
6. You continue with Post-Installation [page 115].

Installation Steps for a High-Availability System

1. If you want to share the transport directory trans from another system, you have to mount [page 89] it from this system. Otherwise we recommend that you share the trans directory that is created during the installation of the primary application server instance (see below).
2. You set up the switch over cluster infrastructure as follows:
   a) You run SAPinst [page 101] to install the central services instance (SCS) using the virtual host name [page 101] on the primary cluster node, host A.
b) You prepare the standby cluster node, **host B**, making sure that it meets the *hardware and software requirements* [page 55] and it has all the necessary *file systems* [page 84], mount points, and (if required) Network File System (NFS).

c) You set up the user environment on the standby node, host B.

For more information, see *Creating Operating System Users and Groups* [page 72]. You make sure that you use the same *user and group IDs* [page 72] as on the primary node. You create the home directories of users and copy all files from the home directory of the primary node.

d) You configure the switchover software and test that switchover functions correctly to **all** standby nodes in the cluster.

e) You perform the switchover to a node where you want to install the enqueue replication server (ERS).

f) You *run SAPinst* [page 101] to install the enqueue replication server (ERS).

g) You repeat the previous two steps for **all** nodes in the cluster.

3. You *export global directories* [page 100] in `<sapmnt>/<SAPSID>` to the database host and to the primary application server instance host.

4. On the **database instance host**, you do the following:

a) You make available the global directories in `<sapmnt>/<SAPSID>` from the switchover cluster infrastructure and – optionally – from the SAP transport host.

b) You *run SAPinst* [page 101] to install the database instance on the **database instance host**.

5. On the **primary application server instance host**, you do the following:

> **Note**

In a high-availability installation, the primary application server instance does **not** need to be part of the cluster because it is no longer a single point of failure (SPOF). The SPOF is now in the central services instance (SCS), which is protected by the cluster.

a) You *mount the global directories* [page 100] in `<sapmnt>/<SAPSID>` that you exported from the switchover cluster infrastructure.

b) You *run SAPinst* [page 101] to install the primary application server instance.

c) If you want to use the shared transport directory `trans` from another system, you also *mount* [page 89] this directory (see above).

6. We recommend you to install additional application server (AS) instances with SAPinst to create redundancy.

Since the AS instances are not a SPOF, you do **not** need to include these instances in the cluster.

7. You continue with *Post-Installation* [page 115].
Installation Steps for an Additional Application Server Instance

Installation Steps for Additional Application Server Instance(s) for a Standard System

1. On the main host on which your SAP system runs, you export global directories in `<sapmnt>/<SAPSID>` to the database and primary application server instance host.
2. On every additional application server instance host, you do the following:
   a) You mount the global directories [page 100] in `<sapmnt>/<SAPSID>` that you exported from the SAP global host.
   b) You run SAPinst [page 101] to install the additional application server instance.
3. You continue with Post-Installation [page 115].

Installation Steps for an Application Server Instance for a Distributed System

1. If you want to share the transport directory `trans` from another system, you have to mount [page 89] it from this system. Otherwise we recommend that you share the `trans` directory that is created during the installation of the primary application server instance.
2. On the SAP global host, you export global directories in `<sapmnt>/<SAPSID>` to the database and primary application server instance host.
3. On every additional application server instance host, you do the following:
   a) You mount the global directories [page 100] in `<sapmnt>/<SAPSID>` that you exported from the SAP global host.
   b) You run SAPinst [page 101] to install the additional application server instance.
   c) If you want to use the shared transport directory `trans` from another system, also mount [page 89] this directory.
4. You continue with Post-Installation [page 115].

Installation Steps for an Additional Application Server Instance for a High-Availability System

1. If you want to share the transport directory `trans` from another system, you have to mount [page 89] it from this system. Otherwise we recommend that you share the `trans` directory that is created during the installation of the primary application server instance.
2. On the primary node, host A, of the switchover cluster infrastructure, you export global directories in `<sapmnt>/<SAPSID>` to every additional application server instance host.
3. On every additional application server instance host, you do the following:
   a) You mount the global directories [page 100] in `<sapmnt>/<SAPSID>` that you exported from the SAP global host.
   b) You run SAPinst [page 101] to install the additional application server instance.
   c) If you want to use the shared transport directory `trans` from another system, you also mount [page 89] this directory.
4. You continue with Post-Installation [page 115].
Installation Steps for Additional Components and Tools for SAP NetWeaver CE (Optional)

- You install additional components [page 111] for SAP NetWeaver Composition Environment, such as
  - Composition Tools
  - Adobe Document Services
  - Composite Voice
  - IDE Update Site

Installation Steps for a Standalone Host Agent

1. You run SAPinst [page 101] to install the host agent.
2. You continue with Post-Installation [page 115].

4.1 Exporting and Mounting Global Directories

If you install a database or an additional application server instance on a host other than the SAP Global host, you must mount global directories from the SAP Global host.

Prerequisites

If you want to install the executables locally instead of sharing them, do not mount the exe directory with Network File System (NFS). Instead, create `<sapmnt>/<SAPSID>/exe` as a local directory (not a link) with a minimum of 1.5 GB free space.

Procedure

1. Log on to the SAP Global host as user root and export the following directories with root access to the host where you want to install the new instance:
   `<sapmnt>/<SAPSID>/exe`
   `<sapmnt>/<SAPSID>/profile`
   `<sapmnt>/<SAPSID>/global`
   For more information, see Mounting Directories via NFS for AIX [page 90].
   Make sure that the user root of the host where you want to install the new instance can access the exported directories.
2. Log on to the host of the new instance that you want to install as user root.
3. Create the following mount points and mount them from the SAP Global host:
   `<sapmnt>/<SAPSID>/exe`
   `<sapmnt>/<SAPSID>/profile`
   `<sapmnt>/<SAPSID>/global`
4.2 Specifying the Virtual Host Name

If you want to use a virtual host name, you can set the environment variable `SAPINST_USE_HOSTNAME` to specify the virtual host name before you start SAPinst. You can also specify the virtual host name by starting SAPinst [page 101] with an equivalent parameter in the command line.

**Procedure**

Set `SAPINST_USE_HOSTNAME` to the virtual host name of the machine on which you are installing an SAP instance as follows:

<table>
<thead>
<tr>
<th>Shell Used</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourne shell (sh)</td>
<td><code>SAPINST_USE_HOSTNAME=&lt;directory&gt;</code></td>
</tr>
<tr>
<td></td>
<td><code>export SAPINST_USE_HOSTNAME</code></td>
</tr>
<tr>
<td>C shell (csh)</td>
<td><code>setenv SAPINST_USE_HOSTNAME &lt;directory&gt;</code></td>
</tr>
<tr>
<td>Korn shell (ksh)</td>
<td><code>export SAPINST_USE_HOSTNAME=&lt;directory&gt;</code></td>
</tr>
</tbody>
</table>

**More Information**

For more information about the use of virtual TCP/IP host names, see SAP Note 962955.

4.3 Running SAPinst

This procedure tells you how to install an SAP system with SAPinst. SAPinst includes a SAPinst GUI and a GUI server, which both use Java.

If you need to see the installation on a remote display, we recommend you perform a remote installation with SAPinst [external document], where SAPinst GUI is running on a separate host from SAPinst and the GUI server. Alternatively you can use an X Server for Microsoft Windows or other remote desktop tools like vncviewer or nxserver/nxclient offered by various vendors (or OpenSource) for the Remote Access of SAPinst GUI on Windows Workstations. We recommend you use the Hummingbird Exceed X Server which we use ourselves to validate installations with SAPinst.

**Note the following information about SAPinst:**

- SAPinst normally creates the installation directory `sapinst_instdir` directly below the temporary directory. SAPinst finds the temporary directory by checking the value of the `TEMP`, `TMP`, or `TMPDIR` environment variable. If no value is set for these variables, SAPinst uses `/tmp` as default installation directory.

  If you want to use an alternative installation directory, set the environment variable `TEMP`, `TMP`, or `TMPDIR` to the required directory before you start SAPinst.
**Recommendation**

We recommend that you keep all installation directories until the system is completely and correctly installed.

- SAPInst creates a subdirectory for each installation option called \(<\text{sapinst_instdir}/\langle\text{installation_option_directory}\rangle\).
- The SAPInst Self-Extractor extracts the SAPInst executables to the temporary directory. These executables are deleted again after SAPInst has stopped running. Directories called \(\text{sapinst exe}.xxxxx.xxxx\) sometimes remain in the temporary directory.
  You can safely delete them.
- The temporary directory also contains the SAPInst Self-Extractor log file \(\text{dev_selfex.out}\), which might be useful if an error occurs.

**Caution**

If SAPInst cannot find a temporary directory, the installation terminates with the error \(\text{FCO-00058}\).

- During the installation, the default ports \(21200, 21212,\) and \(4239\) are used for communication between SAPInst, GUI server, SAPInst GUI and HTTP server. SAPInst uses port \(21200\) to communicate with the GUI server. The GUI server uses port \(21212\) to communicate with SAPInst GUI. \(4239\) is the port of the HTTP server, which is part of the GUI server. You get an error message if one of these ports is already in use by another service.
  In this case, you must execute \texttt{sapinst} using the following parameters:
  \(\text{SAPINST\_DIALOG\_PORT}=\langle\text{free\_port\_number\_sapinst\_to\_gui\_server}\rangle\)
  \(\text{GUISERVER\_DIALOG\_PORT}=\langle\text{free\_port\_number\_gui\_server\_to\_sapinst\_gui}\rangle\)
  \(\text{GUISERVER\_HTTP\_PORT}=\langle\text{free\_port\_number\_http\_server}\rangle\).
- To get a list of all available SAPInst properties, start SAPInst as described above with the option \(-p:\)
  \(./\text{sapinst} \ -p\).
- If required, you can terminate SAPInst and the SAPInst Self-Extractor by pressing \(\text{Ctrl} + \text{C}\).

**Using SAPInst GUI**

The following table shows the most important functions that are available in SAPInst GUI:

<table>
<thead>
<tr>
<th>Input Type</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function key</td>
<td>F1</td>
<td>Displays detailed information about each input parameter</td>
</tr>
<tr>
<td>Menu option</td>
<td>File Exit</td>
<td>Stops the SAPInst GUI, but SAPInst and the GUI server continue running</td>
</tr>
</tbody>
</table>
### Prerequisites

- Make sure that your operating system does not delete the contents of the temporary directory `/tmp` or the contents of the directories to which the variables `TEMP`, `TMP`, or `TMPDIR` point, for example by using a `crontab` entry.

  Make sure that the temporary directory has the permissions 777.

- Make sure that you have at least 300 MB of free space in the installation directory for each installation option. In addition, you need 300 MB free space for the SAPinst executables. If you cannot provide 300 MB free space in the temporary directory, you can set one of the environment variables `TEMP`, `TMP`, or `TMPDIR` to another directory with 300 MB free space for the SAPinst executables.

  You can set values for the `TEMP`, `TMP`, or `TMPDIR` environment variable as follows:

<table>
<thead>
<tr>
<th>Shell Used</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourne shell (sh)</td>
<td><code>TEMP=$(directory)</code></td>
</tr>
<tr>
<td></td>
<td><code>export TEMP</code></td>
</tr>
<tr>
<td>C shell (csh)</td>
<td><code>setenv TEMP $(directory)</code></td>
</tr>
<tr>
<td>Korn shell (ksh)</td>
<td><code>export TEMP=$(directory)</code></td>
</tr>
</tbody>
</table>

---

**Input Type** | **Label** | **Description** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Menu option</td>
<td><img src="icon" alt="SAPinst Log Browser" /></td>
<td>Displays the Log Viewer dialog. This dialog enables you to access the following log files directly:</td>
</tr>
<tr>
<td>Menu option</td>
<td><img src="icon" alt="SAPinst Cancel" /></td>
<td>Cancels the installation with the following options:</td>
</tr>
<tr>
<td>Message button</td>
<td><strong>Retry</strong></td>
<td>Performs the installation step again (if an error has occurred)</td>
</tr>
<tr>
<td>Message button</td>
<td><strong>Stop</strong></td>
<td>Stops the installation without further changing the installation files. You can continue the installation later from this point.</td>
</tr>
<tr>
<td>Message button</td>
<td><strong>Continue</strong></td>
<td>Continues with the option you have chosen before</td>
</tr>
</tbody>
</table>
Make sure that your `DISPLAY` environment variable is set to `<host_name>:0.0`, where `<host_name>` is the host on which you want to display the SAPinst GUI.

You can set values for the `DISPLAY` environment variables as follows:

<table>
<thead>
<tr>
<th>Shell Used</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourne shell (sh)</td>
<td><code>DISPLAY=&lt;host_name&gt;:0.0</code></td>
</tr>
<tr>
<td></td>
<td><code>export DISPLAY</code></td>
</tr>
<tr>
<td>C shell (csh)</td>
<td><code>setenv DISPLAY &lt;host_name&gt;:0.0</code></td>
</tr>
<tr>
<td>Korn shell (ksh)</td>
<td><code>export DISPLAY=&lt;host_name&gt;:0.0</code></td>
</tr>
</tbody>
</table>

Make sure that you have checked the following values for user `root`:

* In csh execute `limit`

<table>
<thead>
<tr>
<th>Output</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>cputime</td>
<td>unlimited</td>
</tr>
<tr>
<td>filesize</td>
<td>unlimited</td>
</tr>
<tr>
<td>datasize</td>
<td>2097148 KB</td>
</tr>
<tr>
<td>stacksize</td>
<td>8192 KB</td>
</tr>
<tr>
<td>coredumpsize</td>
<td>unlimited</td>
</tr>
<tr>
<td>descriptors</td>
<td>8192</td>
</tr>
<tr>
<td>memorysize</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

* In sh or ksh execute `ulimit -a`

<table>
<thead>
<tr>
<th>Output</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>time(seconds)</td>
<td>unlimited</td>
</tr>
<tr>
<td>file(blocks)</td>
<td>unlimited</td>
</tr>
<tr>
<td>data(kbytes)</td>
<td>2097148</td>
</tr>
<tr>
<td>stack(kbytes)</td>
<td>8192</td>
</tr>
<tr>
<td>coredump(blocks)</td>
<td>unlimited</td>
</tr>
<tr>
<td>nofiles(descriptors)</td>
<td>8192</td>
</tr>
<tr>
<td>memory(KBytes)</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

If your parameter settings differ from the settings above, change these values accordingly.
Example

If you have to change the value for descriptors to 8192, proceed as follows:

- In csh execute:
  ```bash
  limit descriptors 8192
  ```
- In sh or ksh execute:
  ```bash
  ulimit -n 8192
  ```

Make sure that you have carefully planned your database layout, in particular the tablespace layout, as described in Setup of Database Layout [page 24].

If you want to set up DB2’s high-availability cluster solution SA MP, make sure that you have read the document IBM DB2 High Availability Solution: IBM Tivoli System Automation for Multiplatforms at [http://www.sdn.sap.com/irj/sdn/db6 | SAP on DB2 for Linux, UNIX, and Windows Knowledge Center | Key Topics | Installation and Upgrade](http://www.sdn.sap.com/irj/sdn/db6).

Make sure that you have defined the most important SAP system parameters as described in Basic SAP System Parameters [page 46] before you start the installation.

Check that your installation host(s) meets the requirements for the installation option(s) that you want to install. For more information, see Running the Prerequisite Checker [page 56].

If you are installing a second or subsequent SAP system in an existing database, make sure that the database is up and running before starting the installation.

For more information, see Installation of Multiple Components in One Database [page 40].

Procedure

1. Log on to your host as user root.

   Caution
   Make sure that the root user has not set any environment variables for a different SAP system or database.

2. If you want to install a primary application server instance, a central services instance, a database instance, or an additional application server instance, mount the Installation Master DVD.
   Mount the DVDs locally. We do not recommend that you use Network File System (NFS), because reading from DVDs mounted with NFS might fail.
   For more information about mounting DVDs, see Mounting a CD / DVD for AIX [page 135].

3. Start SAPinst from the Installation Master DVD by entering the following commands:
   ```bash
   cd <mountpoint_of_Installation_Master_DVD>/DATA_UNITS/IM_<OS>_<DB>
   ./sapinst
   ```
For example, if the mountpoint of the Installation Master DVD is sapcd2, the operating system is LINUX_X86_64 and the database is Oracle, the commands are as follows:

```
  cd /sapcd2/DATA UNITS/IM_LINUX_X86_64_ORA
  ./sapinst
```

Only valid for: HA (UNIX)

If you want to use a virtual host name and you have not already set the environment variable `SAPINST_USE_HOSTNAME` to specify the virtual host name, start SAPinst as follows:

```
  ./sapinst SAPINST_USE_HOSTNAME=<virtual host name>
```

End of: HA (UNIX)

- **Caution**
  - Make sure that the installation directory is not mounted with NFS, or there might be problems when the Java Virtual Machine is started.
  - Make sure that your current working directory is not an `IM_<OS>_<DB>` directory belonging to another operating system.
  - For example, if your operating system is HP-UX PARISC and your database is Oracle, the following commands are **incorrect** and cause an error:
    - `$ cd /sapcd2/DATA UNITS/IM_HPUX_IA64_ORA`
    - `$ /sapcd2/DATA UNITS/IM_HPUX_PARISC_ORA/sapinst`

The following commands are **correct**:

- `$ cd /sapcd2/DATA UNITS/IM_HPUX_PARISC_ORA`
- `$ /sapcd2/DATA UNITS/IM_HPUX_PARISC_ORA/sapinst`

4. In the *Welcome* screen, choose the required SAPinst installation option from the tree structure.
   For more information, see *SAPinst Installation Options* [page 108].

5. Follow the instructions in the SAPinst input dialogs and enter the required parameters.

- **Note**
  - To find more information on each parameter during the input phase of the installation, position the cursor on the required parameter and press **F1**.

6. Make sure that you check the following parameters depending on the installation type that you have chosen:
   - If you are performing a **typical installation**, SAPinst creates by default four sapdata directories. If you require more or fewer sapdata directories, depending on the storage devices you are using, you must change this parameter before you start the installation. By selecting this parameter
on the Parameter Summary screen and choosing Revise, SAPinst returns to the IBM DB2 for Linux, UNIX, and Windows —> Sapdata Directories dialog. On this dialog, you can also decide if you want the installation tool to create the regular data and index tablespace with DB2’s automatic storage management enabled. By default, the option for automatic storage management is preselected.

Note

As of DB2 V9.1 and higher, the database and the SYSCATSPACE tablespace are always created with automatic storage management enabled even if you deselect this option on the IBM DB2 for Linux, UNIX, and Windows —> Sapdata Directories dialog.

For more information, see DB2 Tablespaces [page 27].

If you are performing a custom installation, you set these parameters during the dialog phase of SAPinst.

Note

If the tablespace layout used by SAPinst does not meet your requirements, you can create the tablespaces manually by deselecting the option Create Tablespaces with SAPinst on the IBM DB2 for Linux and UNIX and Windows —> Sapdata Directories screen.

During the installation phase, SAPinst then displays the following message:

You must create the tablespaces now. To do so, use the createTablespaces.sql script that is located in your installation directory.

To continue the installation, choose OK. Alternatively, you can cancel SAPinst here and restart it again.

SAPinst does not check the page size of tablespaces that have either been created manually or are already existing. If you create the tablespaces manually, you must make sure that you use a page size of 16 KB.

For more information, see Creating Tablespaces Manually [page 29].

7. To start the installation, choose Start.

SAPinst starts the installation and displays the progress of the installation. When the installation has successfully completed, SAPinst shows the dialog Execution of <option_name> has been completed successfully.

8. If required, delete directories with the name sapinst_exe.xxxxx.xxxx after SAPinst has finished. Sometimes these remain in the temporary directory.

Note

If there are errors with SAPinst Self-Extractor, you can find the Self-Extractor log file dev_selfexec.out in the temporary directory.
4 SAPinst Installation Options

This section provides information about the following in SAPinst:

- Installation Options
- Software Life-Cycle Options

**Note**

- Choose the required installation options from the tree structure exactly in the order they appear for each system variant.
- If you want to use global accounts, which are configured on separate hosts, you must run the installation option Operating System Users and Groups before you start the installation of the SAP system (see table Software Life-Cycle Options below).
- If required, install an additional application server instance for a standard system (all instances on one host) or distributed system by choosing &gt;&gt; &lt;SAP System&gt; &gt; Software Life-Cycle Options &gt; Additional Application Server Instance &gt; Additional Application Server Instance &gt;.*
- If required, install additional CE components by choosing &gt;&gt; &lt;SAP System&gt; &gt; Software Life-Cycle Options &gt; Additional CE Components &gt; Additional CE components &gt;.*
- If required, install SAP Memory Analyzer by choosing &gt;&gt; &lt;SAP System&gt; &gt; Software Life-Cycle Options &gt; SAP Memory Analyzer &gt; SAP Memory Analyzer &gt;.*

2 Recommendation

We recommend that you keep all installation directories until you are sure that the system is completely and correctly installed.

9. We recommend you to delete all files in the directory &lt;user_home&gt;/ .sdtgui /

10. If not already done, install the DB2 license.

**Note**

If you have bought your DB2 license from SAP (OEM customers), install the DB2 license as described in SAP Note 816773.

11. If you have copied installation DVDs to your hard disk, you can delete these files when the installation has successfully completed.

**More Information**

- Interrupted Installation with SAPinst [external document]
- Entries in the Services File Created by SAPinst [external document]
- Troubleshooting with SAPinst [external document]
4.4 SAPinst Installation Options

Installation Options
You choose SAP Systems with <your database> to install a SAP system with usage types or software units. You can install the following system variants:

- **Standard System**

**Installation Options for a Standard System**

<table>
<thead>
<tr>
<th>Installation Option</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard System</td>
<td>Installs a complete SAP system including the following instances on one host:</td>
</tr>
<tr>
<td></td>
<td>- Central services instance (SCS)</td>
</tr>
<tr>
<td></td>
<td>- Database instance</td>
</tr>
<tr>
<td></td>
<td>- Primary application server instance</td>
</tr>
<tr>
<td></td>
<td>You can install a standard system in the following modes:</td>
</tr>
<tr>
<td></td>
<td>- Typical Mode</td>
</tr>
<tr>
<td></td>
<td>- If you choose Typical, the installation automatically uses default settings. You only have to respond to a small selection of prompts. However, you can change any of the default settings on the parameter summary screen.</td>
</tr>
<tr>
<td></td>
<td>- Custom Mode</td>
</tr>
<tr>
<td></td>
<td>- If you choose Custom, the installation prompts you for all parameters. At the end, you can change any parameter on the parameter summary screen.</td>
</tr>
</tbody>
</table>

**Note**

You require at least usage type AS Java or AS ABAP. You can choose the usage types or software units on the next screen.

- **Distributed System**

**Installation Options for a Distributed System**

<table>
<thead>
<tr>
<th>Installation Options</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Services Instance (SCS)</td>
<td>Installs a central services instance (SCS) and prepares the SAP global host</td>
</tr>
<tr>
<td></td>
<td>Mandatory step in installing a distributed SAP system with usage types or software units based on AS Java</td>
</tr>
<tr>
<td>Database Instance</td>
<td>Installs a database instance</td>
</tr>
<tr>
<td></td>
<td>Mandatory step in installing a distributed SAP system</td>
</tr>
<tr>
<td></td>
<td>You must have finished the Central Services Instance (SCS) installation before you can choose this installation option.</td>
</tr>
<tr>
<td>Primary Application Server Instance</td>
<td>Installs a primary application server instance and enables additional software units</td>
</tr>
<tr>
<td></td>
<td>Mandatory step in installing a distributed SAP system on several hosts</td>
</tr>
<tr>
<td></td>
<td>You must have finished the database instance installation.</td>
</tr>
</tbody>
</table>

Only valid for: HA (MCS); HA (UNIX); HA (z/OS)

- **High-Availability System**
Installation Options for a High Availability System

<table>
<thead>
<tr>
<th>Installation Options</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Services Instance (SCS)</td>
<td>Installs a central services instance (SCS)</td>
</tr>
<tr>
<td>Database Instance</td>
<td>Installs a database instance</td>
</tr>
<tr>
<td>Enqueue Replication Server Instance</td>
<td>Installs an enqueue replication server, which contains a replica of the lock table (replication server)</td>
</tr>
</tbody>
</table>

- **Note**
  - Make sure that you have configured the SCS instance for the switchover cluster before starting this installation option.

<table>
<thead>
<tr>
<th>Primary Application Server Instance</th>
<th>Installs a primary application server instance and enables additional usage types or software units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Application Server Instance</td>
<td>Installs an additional application server instance</td>
</tr>
</tbody>
</table>

Software Life-Cycle Options

You use the options located in this folder to perform the following tasks or to install the following components:

<table>
<thead>
<tr>
<th>Installation Option</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| Additional Preparations | Host Agent
  Choose Additional Preparations Host Agent Host Agent to install the host agent with the profiles SAPSystem=99 and SAPSystemName=SAP.
  The host agent contains all of the required elements for centrally monitoring any host.
  Normally you do not need to install a standalone host agent, because it is automatically installed during the installation of all SAP NetWeaver components, except TREX.
  You only need to install a standalone host agent when:
  - You want to centrally monitor a host that does not have an SAP component.
  - You want to perform an upgrade to SAP NetWeaver.
  For more information, see Standalone Host Agent [page 23].
  Operating system users and groups
  Lets you use global accounts that are configured on a separate host

- **Caution**
  - Perform this SAPinst option **before** you start the installation of your SAP system.

- **Prerequisites check**
<table>
<thead>
<tr>
<th>Installation Option</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choose Additional Preparations Prerequisites Check if you want to check your hardware and software requirements before you start the installation. Otherwise, SAPinst automatically checks the hardware and software requirements during the installation with the Prerequisite Checker. If any changes are necessary to the SAP system or operating system settings, SAPinst automatically prompts you. For more information, see Running the Prerequisites Checker in Standalone Mode [page 56].</td>
<td></td>
</tr>
<tr>
<td>Additional Application Server Instances</td>
<td>Choose Additional Application Server Instances Additional Application Server Instance to install one or more additional application server instance(s) in an already installed SAP system, if required.</td>
</tr>
<tr>
<td>Additional CE Components</td>
<td>Choose this option to install additional CE components, such as Composition Tools, Adobe Document Services (if available for your platform), Composite Voice, IDE Update Site.</td>
</tr>
<tr>
<td>SAP Memory Analyzer</td>
<td>Choose this option to install SAP Memory Analyzer. SAP Memory Analyzer helps you to analyze Java heap dumps, easily find big chunks of memory or complex memory aggregation patterns in your data structures and identify who is keeping this memory alive.</td>
</tr>
<tr>
<td>Database Tools</td>
<td>Choose this option to add additional partition(s).</td>
</tr>
<tr>
<td>System Copy</td>
<td>Choose this option to perform a system copy. For more information, see the system copy guide for your SAP system at: <a href="http://service.sap.com/instguides">http://service.sap.com/instguides</a> &lt;SAP system&gt; Installation.</td>
</tr>
<tr>
<td>Uninstall</td>
<td>Choose this option to uninstall your SAP system, standalone engines, or optional standalone units. For more information, see Deleting an SAP System [page 146].</td>
</tr>
</tbody>
</table>

### 4.5 Installing Additional Components (Optional)

You can install the following additional components:

- Composition Tools
- Adobe Document Services (if available for your platform)
- Composite Voice
- IDE Update Site

**Prerequisites**

You need to fulfill the same hardware and software requirements as for your already installed production system plus an additional 2 GB RAM.
The Composition Tools and Composite Voice component make use of the Visual Composer. Visual Composer is a Web browser based tool to model user interfaces. To run Visual Composer, the following programs must be installed on the client computer from which you access Visual Composer:

- Microsoft Internet Explorer 6.0 SP1 or higher
- Adobe SVG Viewer 3.0
- Microsoft XML Parser 4.0 or higher

**Note**

- Before installing additional components, you need to stop all application servers manually.
- Before installing additional components and in the case that you made changes to the default template settings, see SAP Note 953763.

**Procedure**

**Note**

When installing from a network share make sure that **everyone** has read access to this share. The installation routine creates users such as `<sid>adm` (for example, `ce1adm`). During the installation SAPInst does a user switch to this user. If the newly created user does not have permissions to the network share where the installation is running from, the installation will fail.

1. Insert the SAP Installation Master DVD into your DVD drive or mount it locally.
2. Run **SAPInst** [page 101].
3. In the **Welcome** screen, choose **SAP NetWeaver CE Productive System** ➤ **Software Life-Cycle Options** ➤ **Additional CE Components** ➤ **Install Additional Components**.
4. Choose whether you want to run the installation in **Typical** mode or in **Custom** mode.
   - If you select **Typical**, the installation wizard provides automatic default settings and you only have to respond to a small selection of prompts. The rest is set by default. If you select **Custom**, you have to respond to all prompts.

**Note**

If you want to install the offline documentation for SAP NetWeaver CE, you need to choose **Custom** mode.

After the installation, you can access the offline documentation by choosing **Start** ➤ **All Programs** ➤ **SAP NetWeaver Composition Environment** ➤ `<SAPSID>`.

5. Follow the screens and enter the required parameters.
4.6 Installing SAP Memory Analyzer (Optional)

SAP Memory Analyzer helps you to analyze Java heap dumps, easily find big chunks of memory or complex memory aggregation patterns in your data structures and identify who is keeping this memory alive. New and innovative analysis techniques support the user with a fast and powerful feature set. The tool (Eclipse RCP application) was developed to analyze real productive heap dumps, which tend to get enormous in size with hundreds of millions of objects. Performance, low resource consumption and especially the newly developed innovative analysis techniques make it a helpful tool, even to small application heap dumps.

You can install SAP Memory Analyzer as an additional tool.

Procedure

1. Insert the SAP Installation Master DVD into your DVD drive or mount it locally.
2. Run SAPinst [page 101].
3. In the Welcome screen, choose **SAP NetWeaver CE Productive System** ➔ **Software Life-Cycle Options** ➔ **SAP Memory Analyzer** ➔ **Install SAP Memory Analyzer** ➔.
4. Choose whether you want to run the installation in *Typical* mode or in *Custom* mode. If you select *Typical*, the installation wizard provides automatic default settings and you only have to respond to a small selection of prompts. The rest is set by default. If you select *Custom*, you have to respond to all prompts.

**Note**

If you want to install the offline documentation for SAP NetWeaver CE, you need to choose *Custom* mode.

After the installation, you can access the offline documentation by choosing `Start` ➔ `All Programs` ➔ `SAP NetWeaver Composition Environment` ➔ `<SAPSID>` ➔.

5. Follow the screens and enter the required parameters.

**Note**

For more information about the input parameters and information about restrictions for passwords, position the cursor on the required parameter and press `F1`.

After you have entered all requested input parameters, SAPinst displays the *Parameter Summary* screen. This screen shows both the parameters that you entered and those that SAPinst set by default. If required, you can revise the parameters before starting the installation.

6. To start the installation, choose `Start`. SAPinst starts the installation and displays the progress of the installation. When the installation has successfully been completed, SAPinst shows the dialog `Execution of `<Option_Name>` has been completed successfully`. 
5 Post-Installation

This section includes the post-installation steps that you have to perform for the:

- Standard, distributed or high-availability system
- Additional application server instance
- Standalone host agent

Standard, Distributed, or High-Availability System

Note
In a standard system, all mandatory instances are installed on one host. Therefore, if you are installing a standard system, you can ignore references to other hosts.

1. If required, you perform a full installation backup [page 129] immediately after the installation has finished.
2. You check whether you can log on to the SAP system [page 116].

Note
In a distributed or high-availability system you check whether you can log on to every instance of the SAP system that you installed.

3. You ensure user security [page 117].
4. You install the SAP license [page 119].
5. You set up the licenses for high availability [page 122].
6. You configure the remote connection to SAP support [page 120].
7. On the primary application server instance host, you apply the latest kernel and Support Packages [page 121].
8. You check the Java manuals [page 123] for information that is relevant for running your Java system.
9. You perform CE-specific post-installation steps [page 125].
10. For a production system, you must enable your database for recoverability [page 128].
11. You perform a full installation backup [page 129].
12. If you want or need to implement the E2E Root Cause Analysis scenario, you have to perform post-installation steps for the Diagnostics Agent [page 131] on your central instance and/or dialog instance(s).

Additional Application Server Instance

1. You check whether you can log on to the additional application server instance [page 116].
5. Post-Installation

5.1 Logging On to the Application Server

2. You perform a full installation backup [page 129].

3. If you want or need to implement the E2E Root Cause Analysis scenario, you have to perform post-installation steps for the Diagnostics Agent [page 131] on your central instance and/or dialog instance(s).

Standalone Host Agent

You perform the post-installation steps for the Host Agent [page 123].

5.1 Logging On to the Application Server

You need to check that you can log on to the application server using the following standard users:

<table>
<thead>
<tr>
<th>User</th>
<th>User Name Storage: Database</th>
<th>User Name Storage: External ABAP System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>Administrator</td>
<td>You create this user manually during the installation process.</td>
</tr>
</tbody>
</table>

Recommendation

We recommend that you call the user J2EE_ADM_<SAPSID_Java_System>

The maximum length is 12 characters.

Prerequisites

- The SAP system is up and running.

Logging On to the Java Application Server

You access AS Java with a URL using a Web browser from your client machines. To log on to the Java application server, proceed as follows:

1. Start a Web browser and enter the following URL:

   \[http://hostname_of_Java_EE_Engine_Server>:5<Instance_Number>00\]

   **Note**

   You must always enter a two-digit number for \(< Instance_Number >\). For example, do not enter 1 but instead enter 01.
Example

If you installed the SAP NetWeaver Application Server Java on host saphost06 and the instance number of your SAP NetWeaver Application Server Java is 04, enter the following URL:

http://saphost06:50400

The start page of the SAP NetWeaver Application Server Java appears in the Web browser.

2. Log on by pressing the icon of any of the provided applications, for example the SAP NetWeaver Administrator.

5.2 Ensuring User Security

You need to ensure the security of the users that SAPInst creates during the installation. For security reasons, you also need to copy the installation directory to a separate, secure location — such as a DVD — and then delete the installation directory.

Recommendation

In all cases, the user ID and password are only encoded when transported across the network. Therefore, we recommend using encryption at the network layer, either by using the Secure Sockets Layer (SSL) protocol for HTTP connections, or Secure Network Communications (SNC) for the SAP protocols dialog and RFC.

For more information, see the SAP Library [page 14]:
↳ Function-Oriented View ↳ Security ↳ Network and Transport Layer Security ↳

Caution

Make sure that you perform this procedure before the newly installed SAP system goes into production.

Prerequisites

If you change user passwords, be aware that SAP system users might exist in multiple SAP system clients (for example, if a user was copied as part of the client copy). Therefore, you need to change the passwords in all the relevant SAP system clients.

Procedure

For the users listed below, take the precautions described in the relevant SAP security guide, which you can find on SAP Service Marketplace at http://service.sap.com/securityguide:

<table>
<thead>
<tr>
<th>User Type</th>
<th>User</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system user</td>
<td>&lt;sapsid&gt;adm</td>
<td>SAP system administrator</td>
</tr>
</tbody>
</table>

05/16/2008  PUBLIC  117/156
## 5.2 Ensuring User Security

<table>
<thead>
<tr>
<th>User Type</th>
<th>User</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system user</td>
<td>&lt;smdsid&gt;adm</td>
<td>Administrator for the Diagnostics Agent</td>
</tr>
<tr>
<td>Database and operating system user</td>
<td>db2&lt;dbsid&gt;</td>
<td>Database administrator</td>
</tr>
<tr>
<td></td>
<td>sap&lt;sapsid&gt;db</td>
<td>Database connect user in a Java system</td>
</tr>
</tbody>
</table>

### Host Agent User

<table>
<thead>
<tr>
<th>User</th>
<th>User Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system user</td>
<td>sapadm</td>
<td>SAP system administrator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You do not need to change the password of this user after the installation. This user is for administration purposes only.</td>
</tr>
</tbody>
</table>

**Note**

You can set up Java standalone users with the SAP User Management Engine (UME) in one of the following ways:
- With the users stored in an external ABAP system – see the first table below
- With the users stored in the database – see the second table below

The next two tables show these ways of managing the users.

### SAP System Users Stored in an External ABAP System

<table>
<thead>
<tr>
<th>User</th>
<th>User Name Storage: External ABAP System</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>You create this user manually in the external ABAP system during the installation process.</td>
<td>This user's password is stored in secure storage. Therefore, whenever you change the administrator's password, you must also change the password in secure storage with the Config Tool. For more information, see Checking the SAP Java Documentation [page 123].</td>
</tr>
</tbody>
</table>

**Recommendation**

We recommend that you call the user J2EE_ADM_<SAPSID_Java_System>

The maximum length is **12** characters.
## 5.3 Installing the SAP License

You must install a **permanent** SAP license. When you install your SAP system, a **temporary** license is automatically installed. This temporary license allows you to use the system for **only four weeks** from the date of installation.

**Caution**

**Before** the temporary license expires, you must apply for a permanent license key from SAP. We recommend that you apply for a permanent license key as soon as possible after installing your system.
**5.4 Configuring the Transport Management System**

You have to perform some steps to be able to use the Transport Management System.

**Procedure**

1. Perform post-installation steps for the transport organizer:
   a) Call transaction SE06.
   b) Select Standard Installation.
   c) Choose Perform Post-Installation Actions.

2. Call transaction STMS in your SAP Solution Manager system to configure the domain controller in the Transport Management System (TMS).

**Result**

You can now perform Java transports in the TMS of your SAP Solution Manager system.

**More Information**

For more information, see the SAP Library [page 14]:

- Function-Oriented View  
- Application Server ABAP  
- Administration Tools for AS ABAP  
- Change and Transport System

---

**5.5 Configuring the Remote Connection to SAP Support**

SAP offers its customers access to support and a number of remote services such as the EarlyWatch Service or the GoingLive Service. Therefore, you have to set up a remote network connection to SAP. For more information, see SAP Service Marketplace at [http://service.sap.com/remoteconnection](http://service.sap.com/remoteconnection).
5.6 Applying the Latest Kernel and Support Packages

You have to apply the latest kernel and Support Packages for your SAP system from SAP Service Marketplace.

⚠️ Caution

Before you apply support packages, make sure that you read the release notes for your SAP system. You can find these at [http://service.sap.com/releasenotes](http://service.sap.com/releasenotes). The release notes might include information about steps you have to perform after you have applied the support packages.

⚠️ Caution

Make sure that the entry `DIR_CT_RUN` exists in the instance profile. Otherwise you cannot restart the system after patches have been applied.

You can use Java Support Package Manager (JSPM) to apply both the latest ABAP+Java or Java kernel and Java support packages.

JSPM is a Java standalone tool that you can use with SAP NetWeaver 7.1. JSPM uses the Software Deployment Manager (SDM) to apply support packages and patches and to deploy software components.

For more information about JSPM and how to use this tool, see the SAP Library [page 14]:

- Administrator’s Guide
- Technical Operations for SAP NetWeaver
- General Administration Tasks
- Software Life-Cycle Management
- Software Logistics
- Application Server Java (AS Java) Software Logistics
- Software Maintenance
- Java Support Package Manager (JSPM)

- Administrator’s Guide
- Technical Operations for SAP NetWeaver
- General Administration Tasks
- Software Life-Cycle Management
- Software Logistics
- Application Server Java (AS ABAP) Software Logistics
- Software Maintenance
- Support Package Manager (SPAM)

Procedure

1. Apply the latest kernel.

   We recommend that you replace the installed kernel with the latest kernel from SAP Service Marketplace. In particular, you should replace the installed kernel if:
   - You installed the kernel executables locally on every host.
   - Your primary application server instance host runs on a different operating system than your additional application server instance host.

   For more information about how to download a kernel, see SAP Note 19466.

   To exchange the ABAP+Java kernel, you can use Java Support Package Manager (JSPM).

2. Apply Support Packages.

   a) 

   b) Alternatively, you can download Support Packages from:

   [http://service.sap.com/patches](http://service.sap.com/patches)
c) Apply the Java Support Packages to your SAP system with the help of the Java Support Package Manager (JSPM).

For more information about the availability of Support Packages, see:
http://service.sap.com/ocs-schedules

For more information about how to update your CE system, see the documentation SAP NetWeaver Composition Environment 7.1 — Update Guide SP<xx>, available at http://www.sdn.sap.com/irj/sdn/nw-ce.

Only valid for: HA (UNIX)

5.7 High Availability: Setting Up Licenses

Every SAP system needs a central license, which is determined by the environment of the message server. Since SAP’s high-availability (HA) solution stipulates two or more cluster nodes (host machines) where the message server is enabled to run, you have to order as many license keys [page 119] as you have cluster nodes.

When we receive confirmation from your vendor that you are implementing a switchover environment, we provide the required license keys for your system, one key for each machine.

SAP has implemented a license mechanism for transparent and easy use with switchover solutions and clustered environments. Your customer key is calculated on the basis of local information on the message server host. This is the host machine where the central services instance (SCS) runs. There is no license problem when only the database is switched over.

Prerequisites
The SAP system is up and running.

Procedure
1. Make sure that the SCS instance on the primary host, node A, is running.
2. To find the hardware key of the primary host, run the SAP NetWeaver Administrator (NWA) on any application server instance and choose Configuration Management > Infrastructure Management > Licenses #.

   The hardware key is displayed in the NWA.
3. Perform a switchover of the central services instance (SCS) to another node in the cluster and repeat the previous step.

   Repeat this for all remaining nodes in the cluster.
4. To obtain the two license keys, enter the hardware IDs for the primary and backup hosts at:
   http://service.sap.com/licensekey
5. To import the files containing the two licenses to the primary cluster node, run the NWA on any application server instance and choose:
6. Perform a switchover of the central services instance (SCS) to another node in the cluster and repeat the previous step. Repeat this for all remaining nodes in the cluster.

**Result**
The license is no longer a problem during switchover. This means you do not need to call saplicense in your switchover scripts.

---

### 5.8 Post-Installation Steps for the Host Agent

You have to perform the following steps on each host where the host agent is installed. This applies whether the host agent is installed on a host within the SAP system or standalone on another host.

**Procedure**

1. You check whether the installed services are available as follows:
   a) Log on as user sapadm.
   b) Check whether the following services are available:
      - The control program saphostexec
      - The operating system collector saposcol
      - The SAP NetWeaver Management agent SAPHostControl (sapstartsrv in host mode)

   **Note**
   When the host is booted, the startup script sapinit automatically starts the required executables.

2. You configure the host agent according to your requirements.

**More Information**

For more information, see the SAP Library [page 14]:

- Function-Oriented View
- Application Server ABAP
- Administration Tools for AS ABAP
- Monitoring in the CCMS
- Infrastructure of the SAP NetWeaver Management Agents

### 5.9 Checking the SAP Java Documentation

Here you can find information in the SAP Library about the configuration of Application Server Java (AS Java) and about SAP Java technology.
Procedure

1. Choose the following in the SAP library [page 14]:
   [Function-Oriented View ➤ Application Server Java ➤ AS Java (Application Server Java) ➤]

2. Check the following documentation for information relevant to running your Java system:

<table>
<thead>
<tr>
<th>Manual</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Application Server Infrastructure ➤ Architecture of the SAP NetWeaver Application Server ➤ Architecture of AS Java ➤]</td>
<td>This documentation provides an overview of the architecture of the Application Server Java (AS Java). It contains information on: ▪ Java cluster architecture ▪ Application Server Java (AS Java) system architecture ▪ Zero Administration (technical configuration within AS Java)</td>
</tr>
<tr>
<td>[Application Server Java ➤ Administration ➤]</td>
<td>This documentation describes how to administer the SAP system, focusing on AS Java. It contains information on: ▪ Administration Tools ▪ SAP Management Console The SAP Management Console (SAP MC) provides a common framework for centralized system management. It lets you monitor and perform basic administration tasks on the SAP system centrally, thus simplifying system administration. ▪ SAP NetWeaver Administrator SAP NetWeaver Administrator is a Web-based tool for administration and monitoring that offers a single entry point to configure, administer, and monitor your SAP NetWeaver system, its components, and the applications running on it. ▪ Config Tool The Config Tool provides offline configuration of the SAP NetWeaver Application Server Java (AS Java) instances. It lets you modify the properties of all services, managers, and applications. In addition, it enables you to manage log configurations offline, add filters, and edit the JVM parameters. ▪ Administration Using Telnet ▪ SAP Java Virtual Machine (SAP JVM) ▪ The Startup Framework for AS Java ▪ Administration Functions for Information Lifecycle Management</td>
</tr>
<tr>
<td>[Application Server Java ➤ Identity Management of the Application Server Java ➤]</td>
<td>Identity Management of the SAP NetWeaver Application Server (AS) Java enables you to manage users and roles for access to applications of the AS Java and the data, which the applications require. The user management engine (UME) provides identity management as a service of the AS Java. This documentation contains information on: ▪ User Management Engine ▪ Authorization Concept of the AS Java ▪ Configuring Identity Management ▪ Administration of Users and Roles</td>
</tr>
</tbody>
</table>
5.10 CE-Specific Post-Installation Activities

This section describes the steps that you have to perform after the installation has finished successfully.

Running the Configuration Wizard (Optional)

Note
You can run the configuration wizard only once and only directly after installing and patching your SAP system.

After SAPinst has finished, run the configuration wizard to apply automated configuration tasks to your system.
For SAP NetWeaver CE, you need to run the following configuration tasks, depending on the installed components:

- Configuration of Services Registry Webservice Destinations
- Configuration and Mirroring of local NWDS Update Site
- Initial setup ADS in CE (if ADS is available on your platform)
- Change Management Service (CMS): Create an Application Skeleton
- Change Management Service (CMS): Modify a Software Component

For more information about how to start the configuration wizard, see the configuration documentation in the SAP Solution Manager.

Enabling Adobe Document Services
If you have installed SAP NetWeaver Composition Environment with the Adobe Document Services add-on a Windows platform, you must complete the following post-installation steps to enable the add-on. In case you have installed an AS Java cluster, apply the procedure to the central host, as well as to all hosts where additional application server instances are running.

1. Using the SAP Management Console, stop the AS Java system.

2. From the Start menu, open ▶ Control Panel ▶ Administrative Tools ▶ Computer Management ▶ Services and Applications ▶ Services ▶.

3. Select SAP<SID>_<Instance_Number> (for example, SAPCE1_00) and open Properties from the context menu.

4. On the Log On tab page, enable the Local System account indicator.

5. Repeat the above steps for the second SAP<SID>_<Instance_Number> service that you see in the list.

6. Start the AS Java system.

Adobe LiveCycle Designer
For more information about how to install and configure the Adobe LiveCycle Designer see SAP Note 962763.

Enabling Services Registry
You must apply additional configuration steps to enable Services Registry after you have installed an SAP NetWeaver Composition Environment system containing the following components:

- Java Application Server and Composition Platform
- Java Application Server and Adobe Document Services

To enable Services Registry, you must apply the following configuration template to your system: CE_Complete_Stack_production_full

**Note**
For more information about what configuration templates are available, see Configuration Templates [page 134].
For more information about applying configuration templates, see [http://help.sap.com/nwce](http://help.sap.com/nwce)

See also

Configuring the Portal in SAP NetWeaver CE
After installing the portal in SAP NetWeaver CE, a number of deactivated or irrelevant tools are displayed in the UI. To display the correct portals tools for CE, proceed as follows:

1. Open a browser and log on to your portal as an administrator.

2. In the same browser session, enter the following URL:

where \texttt{<host>} is the host name of your server and \texttt{<httpport>} is the port number of your server.

3. In the Portal Mode Configuration Tool, choose \textit{Activate Development Mode} to restore the portal tools and content that are assigned to the development mode.

4. Restart or refresh your browser.

5. In the SAP Management Console, restart the server.

You may then continue with the mandatory and optional configuration steps as described in

\url{http://help.sap.com/nwce} \rightarrow \textit{SAP NetWeaver Composition Environment Library} \rightarrow \textit{Administrator's Guide} \rightarrow \textit{Configuration of SAP NetWeaver Composition Environment} \rightarrow \textit{Configuration for CE Additional Components} \rightarrow \textit{Configuring the Portal}.

\section*{Changing the Password for the Internet Communication Manager (ICM)}

You can monitor and manage the Internet Communication Manager (ICM) from the command line program.

After the installation of your SAP NetWeaver CE system has successfully finished, you need to change the ICM password manually. To do so, proceed as follows:

1. Log on at operating system level to the computer where the ICM is running.

2. Start the program \texttt{icmon} with \texttt{icmon -a profile=<instance_profile>} to maintain the authentication file (default: \texttt{authfile.txt}).

3. Choose \texttt{a} to add a user.

4. Choose \texttt{c} to change the password of the existing user.

5. Choose \texttt{s} to save your settings.

\section*{Further Configuration Steps}

After installing your SAP NetWeaver CE system and performing the post-installation steps to get the system up & running, you may need to perform further configuration steps.

Refer to the following documentation to proceed with your tasks:

\begin{itemize}
  \item If you are a \textbf{system administrator}, refer to \url{http://help.sap.com/nwce} \rightarrow \textit{Administrator's Guide}. It contains information about how to configure and administer your system.
  \item If you are a \textbf{developer}, refer to \url{http://help.sap.com/nwce} \rightarrow \textit{Developer's Guide}. It provides guidelines for developing applications using the SAP NetWeaver CE.
\end{itemize}

\section*{Note}

The SAP NetWeaver CE documentation is also available offline as a part of your installation. To access it, choose \url{Start} \rightarrow \textit{All Programs} \rightarrow \textit{SAP NetWeaver} \rightarrow \textit{Composition Environment 1.0} \rightarrow \textit{Documentation}.
5.11 Enabling Recoverability of the Database

Example

This text was only inserted for test purposes (IBP).

Caution

This section only applies to your database. You only have to perform the steps outlined in this section once — even if you install multiple SAP systems into one database or if you perform a Java Add-In installation into an existing ABAP system.

Roll forward recovery provides the ability to recover lost data due to media failure, such as hard disk failure, and applies log file information (log journal) against the restored database. These log files contain the changes made to the database since the last backup.

Caution

A production system must run in log retention mode.

If a system is not running in log retention mode, all changes applied to the database since the last complete backup are lost in the event of a disk failure.

In log retention mode, the log files remain in the log directory (log_dir). To archive the log files, you can use DB2’s own log file management solution. For more information, see the Database Administration Guide — SAP on IBM DB2 for Linux, UNIX, and Windows at:

http://www.sdn.sap.com/irj/sdn/db6 Key Topics Administration.

Procedure

1. Log on to the database server as user db2<dbsid>.
2. To activate log retention mode and to specify the log archiving method, you must set configuration parameter LOGARCHMETH1 to one of the following options:
   - LOGRETAIN
     No log archiving takes place. Log files remain in the log directory.
   - DISK:<log_archive_path>
     Log files are archived to a disk location. You can archive them to tape using the DB2 tape manager (db2tapemgr) at a later point in time.
   - TSM:<TSM_management_class>
     Log files are archived to Tivoli Storage Management (TSM)
   - VENDOR:<path_to_vendor_lib>
     Log files are archived to a library that is provided by your vendor storage management
USEREXIT

For downward compatibility with the former user exit concept, you can specify value USEREXIT for parameter LOGARCHMETH1.

To set configuration parameter LOGARCHMETH1 for your preferred archiving method, enter the following command:

db2 update db cfg for <dbsid> using LOGARCHMETH1 <log_archiving_method>

For more information, see the Database Administration Guide — SAP on IBM DB2 for Linux, UNIX, and Windows at:

http://www.sdn.sap.com/irj/sdn/db6

SAP on DB2 for Linux, UNIX, and Windows Knowledge Center > Key Topics > Administration.

3. To activate the settings, you must restart the database. The database is now in backup pending mode. You need to take an offline backup before you can continue.

4. To start the offline backup for a single-partitioned database, enter the following command:

db2 backup db <dbsid> to <device>

**Example**

For example, to perform an offline backup of database C11 to tapes in devices rmt0 and rmt1, enter the following command:

db2 backup database C11 to /dev/rmt0, /dev/rmt1

**Note**

On a multi-partitioned database, you must activate log retention mode on all database partitions. In addition, you also have to perform an offline backup for all database partitions.

For more information about how to start a DB2 backup, see the DB2 online documentation.

### 5.12 Performing a Full Installation Backup

You must perform a full offline backup after the configuration of your SAP system. If required, you can also perform a full offline backup after the installation (recommended). In addition, we recommend you to regularly back up your database.

**Caution**

Make sure that you fully back up your database so that you can recover it later if necessary.

You need to back up the following directories and files:

- All SAP-specific directories:
Perform a full offline database backup.
For more information about backups, see the IBM DB2 documentation.

Make sure that you back up the home directory of db2<dbname>.
For more information about backups, see the IBM DB2 documentation.

The root file system
This saves the structure of the system and all configuration files, such as file system size, logical volume manager configuration, and database configuration data.

Note
This list is only valid for a standard installation.

Prerequisites
You have logged on [page 116] as user <sapsid>adm and stopped the SAP system and database [page 136].

This procedure works on all hardware platforms. For more information about operating system-specific backup procedures, see your operating system documentation.

Backing Up the Installation
1. Log on as user root.
2. Manually create a compressed tar archive that contains all installed files:
   - Saving to tape:
     ```bash
tar -cf <file_system> | compress -c > <tape_device>
```
   - Saving to the file system:
     ```bash
tar -cf <file_system> | compress -c > ARCHIVENAME.tar.Z
```
3. Perform your offline database backup.
   For more information, see the IBM DB2 documentation.

Restoring Your Backup
If required, you can restore the data that you previously backed up.

Caution
Check for modifications in the existing parameter files before you overwrite them when restoring the backup.

1. Log on as user root.
2. Go to the location in your file system where you want to restore the backup image.
5. Restore the data with the following commands:
   - From tape:
     ```
     cat <tape_device> | compress -cd | tar -xf -
     ```
   - From the file system:
     ```
     cat ARCHIVENAME.tar.Z | compress -cd | tar -xf -
     ```
4. Restore your offline database backup.
   For more information about how to restore backups, see the IBM DB2 documentation.

### 5.13 Post-Installation Steps for the Diagnostics Agent

To implement the E2E Root Cause Analysis scenario, you have to perform the following post-installation steps.

#### Prerequisites
You have installed an AS Java central instance or dialog instance.

#### Procedure
1. Upgrade the JDK on AIX and Linux x86_64 operating systems as described in SAP Note 1093831. This avoids connection problems between the Diagnostics Agent and the Diagnostics Managing system, as well as out-of-memory errors and class-loader problems.
2. Plan the implementation of the SAP Solution Manager Diagnostics Agent as described in the Root Cause Analysis Installation and Upgrade Guide, which you can find at one of the following:
   - [http://service.sap.com/instguides](http://service.sap.com/instguides) ➤ SAP Components ➤ SAP Solution Manager ➤ <Current Release>
This page is intentionally left blank.
6 Additional Information

Here you can find additional information about the installation of your SAP system. There is also information about how to delete an SAP system.

- Mounting a CD / DVD for AIX [page 135].
- Additional Information about SAPinst [page ]
- Starting and Stopping the SAP System [page 136]

[Only valid for: HA (UNIX)]

- High-Availability: Finalizing the enqueue replication server for high availability [page 146].
  You have to perform this procedure only if you have installed the enqueue replication server (ERS) into an existing system.

[End of: HA (UNIX)]

- Deleting an SAP System [page 146]
- Deleting the Database Instance and Database Software Manually (Optional) [page 148]

6.1 Transporting Self-Developed Software Component Archives (SCA) into the System

Prerequisites
You have developed your own Software Component Archives (SCA) and want to transport them into your SAP NetWeaver CE system.

Procedure
To transport your SCAs to the SAP NetWeaver CE system, proceed as follows:

2. Log on to your system as user root and, from an empty directory, run the update tool update<ID>.sh.

   ![Note]

   If the tool displays descriptions such as Applying Support Packages, you can ignore them.

3. In the dialog screens, specify the directory where your SCAs are located.
4. Follow the on-screen instructions.

### 6.2 Configuration Templates

Configuration templates contain the predefined instance configuration for specific scenarios. They are automatically applied according to the installation option you have selected. The templates are designed to optimize system performance by applying certain configuration to the Java Virtual Machine and the application server, as well as by applying startup filters to AS Java services and applications to start only those relevant for the selected installation options.

The following table provides information about the available templates with SAP NetWeaver Composition Environment. In the template name, replace the `<system_mode>` parameter by `development` (for the templates relevant to systems installed in `development` mode) or `production` (for the templates relevant to systems installed in `productive` mode).

<table>
<thead>
<tr>
<th>Configuration Template</th>
<th>Selected Installation Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE_Java EE_&lt;system_mode&gt;_full</td>
<td>Java Application Server Installation</td>
</tr>
<tr>
<td>CE_Composition_Environment_&lt;system_mode&gt;_full</td>
<td>Java Application Server Installation + Composition Platform Installation</td>
</tr>
<tr>
<td>CE_Adoce_Document_Service_&lt;system_mode&gt;_full</td>
<td>Java Application Server Installation + Adobe Document Services Add-on Installation</td>
</tr>
<tr>
<td>CE_Composite_Voice_&lt;system_mode&gt;_full</td>
<td>Java Application Server Installation + Voice Add-on Installation</td>
</tr>
<tr>
<td>CE_Complete_Stack_&lt;system_mode&gt;_full</td>
<td>Java Application Server Installation + Composition Platform Installation + Adobe Document Services Add-on Installation + Voice Add-on Installation</td>
</tr>
</tbody>
</table>

If your selection cannot be mapped to one of the combinations in the above table, the template CE_Complete_Stack_<system_mode>_full is applied. It starts all applications and services needed to run the complete stack.

You can manually apply a different configuration template if you want to switch to another installation option. For example, by changing from template CE_Complete_Stack_<system_mode>_full to CE_Java EE_<system_mode>_full, you achieve shorter startup times and less memory consumption, but also less functionality since not all applications and services are running.


**Note**

Make sure that you do not apply a development template to a productive system or vice versa.
6.3 Uninstalling SAP NetWeaver Composition Environment

You have to uninstall all components of the SAP NetWeaver Composition Environment separately. You can uninstall your SAP NetWeaver CE system in different ways.

Uninstalling SAP NetWeaver CE
Start the uninstallation from the directory /usr/sap/SID/SYS/exe/uc/<platform>/uninstall.

Uninstalling SAP NetWeaver CE Using SAPinst
1. Insert the SAP Installation Master DVD into your DVD drive or mount it locally.
2. Start SAPinst from the SAP Installation Master DVD as described in the section Installing SAP NetWeaver Composition Environment.
3. In the Welcome screen, choose Uninstall SAP System or Single Instances from the tree structure.
4. Follow the on-screen instructions.

6.4 Mounting a CD / DVD for AIX

You can use this procedure to mount a CD or DVD.

Note
<medium-mountdir> refers to either <cd-mountdir> or <dvd-mountdir>.

Procedure
1. Log on as user root.
2. Add a CD / DVD file system.
   a) Enter the command smitty.
   c) To get a list of device names, choose [F4].
   d) Enter the mount point <medium-mountdir>.

   Example
   <medium-mountdir> is /sapcd

   e) Choose [ENTER].
   f) To exit smitty, choose [F10].
3. Mount the CD / DVD as follows:
6.5 Heterogeneous SAP System Installation

This section provides information on the installation of an SAP system in a heterogeneous system landscape. “Heterogeneous system landscape” means that application servers run on different operating systems.

Procedure

See SAP Note 1067221 for information on

- supported combinations of operating systems and database systems,
- how to install an application server on Windows in a heterogeneous (UNIX) SAP system environment,
- heterogeneous SAP system landscapes with different UNIX operating systems.

6.6 Starting and Stopping SAP System Instances

You can start and stop SAP system instances and the Diagnostics Agent by using the SAP Management Console (SAP MC) [page 137].

Apart from using the SAP Management Console (SAP MC) you can also use scripts to:

- Start or stop SAP system instances [page 140]
- Start or stop the Diagnostics Agent [page 144].
6.6.1 Starting and Stopping the SAP System Using the SAP Management Console

You can start and stop all SAP system instances using the SAP Management Console (MC) except the database instance. You have to start and stop the database instance as described in Starting and Stopping the SAP System Using startsap and stopsap [page 140].

Note
If your newly installed SAP system is part of a heterogeneous SAP system landscape comprising systems or instances on Windows platforms, you can also start and stop it from a Windows system or instance using the Microsoft Management Console (MMC).
For more information about handling the MMC, see the SAP Library [page 14]:
» Function-Oriented View » Application Server ABAP » Administration Tools for AS ABAP » Monitoring in the CCMS » SAP Microsoft Management Console: Windows

Prerequisites
- Make sure that the host on which you start SAP MC meets the following requirements:
  - Java Runtime Environment (JRE) 5.0 is installed.
  - The browser supports Java.
  - The browser's Java plug-in is installed and activated.
- You have logged on to the host as user <sapsid>adm.

Starting the Web-Based SAP Management Console

1. Start a Web browser and enter the following URL:
   
   http://<hostname>:5<instance_number>13

   Example
   If the instance number is 53 and the host name is saphost06, you enter the following URL:
   
   http://saphost06:55313

   This starts the SAP MC Java applet.

   Note
   If your browser displays a security warning message, choose the option that indicates that you trust the applet.

2. Choose Start.
   The SAP Management Console appears.
Note
When you start the SAP MC for the first time for a newly installed SAP system, you have to register your system as described in Registering Systems and Instances below. Having done this, the instances installed on the host you have connected to are already added in the SAP Management Console when you start the SAP MC next time.

By default, the instances installed on the host you have connected to are already added in the SAP Management Console.
If you want to change the configuration to display systems and instances on other hosts, see Registering Systems and Instances below.

Starting and Stopping Systems and Instances

Starting an SAP System or Instance
1. In the navigation pane, open the tree structure and navigate to the system node that you want to start.
2. Select the system or instance and then, from the context menu, choose Start.
3. In the Start SAP System(s) dialog box, choose the required options.
4. Choose OK. The SAP MC starts the specified system or system instances.

Note
The system might prompt you for the SAP system administrator credentials. To complete the operation, you must have administration permissions. Log in as user <sapsid>adm.

Starting Instances Separately
If you need to start the instances of an SAP system separately, for example when you want to start a distributed or a high-availability system, proceed in the following sequence:
1. Start the database instance.
2. Start the central services instance SCS<Instance_Number>.
3. Start application server instance(s) J<Instance_Number>.

Stopping an SAP System or Instance
1. Select the system or instance you want to stop and choose Stop from the context menu.
2. In the Stop SAP System(s) dialog box, choose the required options.
3. Choose OK. The SAP MC stops the specified system or system instances.

Note
The system might prompt you for the SAP system administrator credentials. To complete the operation, you must have administration permissions. Log in as user <sapsid>adm.
Similarly, you can start, stop or restart all SAP systems and individual instances registered in the SAP MC.

Stopping Instances Separately
If you need to stop the instances of an SAP system separately, for example when you want to start a distributed or a high-availability system, proceed in the following sequence:

1. Stop application server instance(s) J<Instance_Number>.
2. Stop the central services instance SCS<Instance_Number>.
3. Stop the database instance.

Registering Systems and Instances in the SAP Management Console
You can extend the list of systems and instances displayed in the SAP MC, so that you can monitor and administer all systems and instances from a single console. You can configure the SAP MC startup view to display the set of systems and instances you want to manage.

Prerequisites
The SAP MC is started.

Registering SAP Systems

1. In the SAP MC, choose menu File → New.
2. In the New System dialog box, enter the required data.

Note
If you have already registered systems in the SAP MC, they are stored in the history. To open the System's History dialog box, choose the browsing button next to the Instance Nr. field. Select an instance of the system that you want to add and choose OK.

3. Choose Finish.

Registering Individual Instances

1. In the SAP MC, choose menu File → New.
2. In the New System dialog box, enter the required data and deselect Always show all SAP Instances.
3. The SAP MC displays the SAP system node, the instance node and the relevant database node in a tree view in the navigation pane.

Note
To view all instances of the respective SAP system, select the relevant system node and choose Add Application Server from the context menu.
Configuring the SAP MC View

- You can choose the instances that the SAP MC displays automatically on startup:
  1. In the Settings dialog box, select History.
  2. In the right-hand side pane, choose the instance you want the SAP MC to display on startup.
  3. Choose the << button.
  4. Choose Apply and then choose OK.

Similarly, you can remove instances from the startup configuration.

- You can save the current configuration in a file:
  1. Choose File > Save Landscape.
  2. In the Save dialog box, enter the required data.
  3. Choose Save.

- You can load a configuration from a file:
  1. Choose File > Load Landscape.
  2. In the Open dialog box, select the configuration you want to load.
  3. Choose Open.

More Information

For more information about how to handle the SAP MC, see the SAP Library [page 14]:

6.6.2 Starting and Stopping the SAP System Using Scripts

You can start and stop the SAP system by running the startsap and stopsap scripts.

Prerequisites

- You have checked the default profile /<sapmnt>/<SAPSID>/profile/DEFAULT.PFL for parameter login/system_client and set the value to the correct productive system client. For example, the entry must be login/system_client = 001 if your productive client is 001.
- You have logged on to the SAP system hosts as user <sapid>adm.
- For more information about how to start or stop database-specific tools, see the database-specific information in this documentation and the documentation from the database manufacturer.
- If you want to use startsap or stopsap (for example, in a script) and require the fully qualified name of these SAP scripts, create a link to startsap or stopsap in the home directory of the corresponding user.
Caution
If there are multiple SAP instances on one host – for example, a primary application server instance and an additional application server instance – you must add an extra parameter to the scripts:

```
startsap <instanceID>
stopsap <instanceID>
```

For example, enter:

```
startsap J00
```

Note
The instance name (instance ID) of the primary application server instance is J<Instance_Number>, the instance name of the central services instance is SCS<Instance_Number>, and the instance name of a Java additional application server instance is J<Instance_Number>.

---

Only valid for: HA (UNIX)

In a high-availability system, you must use the failover cluster software of your hardware vendor to start or stop all instances that are running on the switchover cluster.

You can only use startsap and stopsap scripts for instances that are **not** running on the switchover cluster.

---

Procedure

Starting the SAP system

To start all instances on the **standard system** host, enter the following command:

```
startsap
```

This checks if the database is already running. If not, it starts the database first.

Note
You can start the database and SAP system separately by entering the following commands:

```
startsap DB
startsap R3 <instance ID of central services instance>
startsap R3 <instance ID of primary application server instance>
startsap R3 <instance ID of additional application server instance>
```

Make sure that you always start the database first because otherwise the other instances cannot start.
Note
You can also use the parameter J2EE, which is a synonym for the parameter R3.
For ABAP+Java systems, you can enter either the command `startsap R3` or `startsap J2EE` to start the SAP instance comprising both ABAP and Java.

■ In a **distributed system**, proceed as follows:

1. On the host running the database instance, enter:
   ```
   startdb
   ```
2. On the host running the central services instance, enter:
   ```
   startsap
   ```
3. On the host running the primary application server instance, enter:
   ```
   startsap
   ```
4. For additional application server instance(s), enter the following on the relevant host:
   ```
   startsap R3 <instance ID of additional application server instance>
   ```

Note
Make sure that the SAP system is up and running before you start or restart additional application server instances.

■ In a **high-availability system**, proceed as follows:

Note
In the following example, only the central services instance is running on the switchover cluster.

1. On the database host, enter:
   ```
   startdb
   ```
2. On the switchover cluster infrastructure, use the failover cluster software to start the central services instance.
3. On the host of the primary application server instance, enter:
   ```
   startsap
   ```
4. For additional application server instance(s), enter the following on the relevant host:
   ```
   startsap R3 <instance ID of additional application server instance>
   ```

Note
Make sure that the SAP system is up and running before you start or restart additional application server instances.

■ For an **additional application server instance**, enter the following on the relevant host:
   ```
   startsap R3 <instance ID of additional application server instance>
   ```
Note
Make sure that the SAP system is up and running before you start or restart additional application server instances.

Stopping the SAP System

Note
When you use `stopsap` in a Multiple Components in One Database (MCOD) system with two primary application server instances, only one primary application server instance and the database are shut down. Therefore, you must first stop the other SAP system with `stopsap R3` or make sure that it has already been stopped.
For more information, see *Installation of Multiple Components in one Database* [page 40].

- If you have a **standard system**, enter the following to stop all instances on the standard system host:
  
  `stopsap`

  This stops the primary application server instance, central services instance, and database.

Note
You can stop the database and SAP system separately by entering the following commands:

- `stopsap R3 <instance ID of additional application server instance>`
- `stopsap R3 <instance ID of primary application server instance>`
- `stopsap R3 <instance ID of central services instance>`
- `stopsap DB`

  Make sure that you always stop the primary application server instance first and the central services instance second because otherwise the database cannot be stopped.

Note
You can also use the parameter `J2EE`, which is a synonym for the parameter `R3`.
For ABAP+Java systems, you can enter either the command `stopsap R3` or `stopsap J2EE` to stop the SAP instance comprising both ABAP and Java.

- In a **distributed system**, proceed as follows:
  1. On the host(s) running the additional application server instance(s), enter the following command:
     
     `stopsap <instance ID of additional application server instance>`
  2. On the host running the primary application server instance, enter:
     
     `stopsap`
  3. On the host running the central services instance, enter:
     
     `stopsap`
4. On the host running the database instance, enter:
   \texttt{stopdb}
\begin{itemize}
\item In a \textbf{high--availability system}, proceed as follows:
\end{itemize}

\begin{itemize}
\item \textbf{Note}
\end{itemize}
In the following example, only the central services instance is running on the switchover cluster.

\begin{itemize}
\item On the host(s) running the additional application server instance(s), enter the following command:
   \texttt{stopsap <instance ID of additional application server instance>}
\item On the host running the primary application server instance, enter:
   \texttt{stopsap}
\item On the switchover cluster infrastructure, use the failover cluster software to start the central services instance.
\item On the host running the database instance, enter:
   \texttt{stopdb}
\item For an \textbf{additional application server instance}, enter the following on the relevant host:
   \texttt{stopsap R3 <instance ID of additional application server instance>}
\end{itemize}

\begin{itemize}
\item \textbf{Note}
\end{itemize}
Make sure that the SAP system is up and running before you start or restart additional application server instances.

\begin{itemize}
\item \textbf{Caution}
\end{itemize}
Make sure that no SAP instance is running before you enter \texttt{stopdb} on a standalone database server.
No automatic check is made.

\textbf{6.6.3 Starting and Stopping the Diagnostics Agent Using Scripts}

You can start and stop the Diagnostics Agent by running the \texttt{smdstart} and \texttt{smdstop} scripts.
The local versions of these scripts are located in \texttt{/usr/sap/<SMDSID>/J<instance_number>/script}.
The global versions of these scripts are located in \texttt{/usr/sap/<SMDSID>/exe}.

\begin{itemize}
\item \textbf{Note}
\end{itemize}
You can only start or stop the Diagnostics Agent separately. It is not started or stopped automatically with the SAP system.

You can also use the \textit{SAP Management Console (SAP MC)} [page 137] to start or stop the Diagnostics Agent.
Prerequisites
You have logged on to the central instance or dialog host as user <smdsid>adm.

Procedure
Starting a Diagnostics Agent Locally
1. Change to the following directory:
   /usr/sap/<SMDSID>/J<Instance_Number>/script
2. To start the Diagnostics Agent locally, enter this command:
   ./smdstart.sh

Starting Diagnostics Agent(s) Globally
To start Diagnostics Agent(s) globally, enter this command:
   smdstart <SMDSID> <Instance_Number>

Example
   smdstart SMD 98

Note
You do not have to specify the <SMDSID> if there is only one Diagnostics Agent system on this host.

Stopping a Diagnostics Agent Locally
1. Change to the following directory:
   /usr/sap/<SMDSID>/J<instance_number>/script
2. To stop the Diagnostics Agent locally, enter this command:
   ./smdstop.sh

Stopping Diagnostics Agent(s) Globally
To stop Diagnostics Agent(s) globally, enter this command:
   smdstop <SMDSID> <Instance_Number>

Example
   smdstop SMD 98

Note
You do not have to specify the <SMDSID> if there is only one Diagnostics Agent system on this host.
6.7 High Availability: Finalizing the Enqueue Replication Server

You have to perform this procedure only if you have installed the enqueue replication server (ERS) into an existing system. This is necessary to ensure correct functioning of the ERS, which depends on the switchover software you are using.

Procedure

1. Restart the central services instance associated with the ERS.
   This requires you to restart the primary application server and additional application server instance.
2. Contact your hardware partner to configure and test the ERS.

More Information

See the SAP Library [page 143] Function-Oriented Overview → Application Server Infrastructure → Standalone Enqueue Server → Installing the Standalone Enqueue Server [4]

End of: HA (UNIX)

6.8 Deleting an SAP System

This section describes how to delete a single instance, a standalone engine or a complete SAP system with the Uninstall option of SAPinst.

You can use SAPinst to delete an SAP system and the corresponding database content.

⚠️ Caution

- You cannot delete an SAP system remotely.

Prerequisites

- This description assumes that you have installed your SAP system with standard SAP tools according to the installation documentation.
- You are logged on as user root.
- If the saposcol process on the host where you are working has been started from the SAP system that you want to delete, stop the process using the command saposcol -k. If there are other SAP systems on the host, log on as user <sapsid>adm of the other SAP system and start saposcol from there using the command saposcol -1.
6.8 Deleting an SAP System

**Procedure**

1. Start SAPinst [page 101] and on the Welcome screen, choose:
2. Follow the instructions in the SAPinst input dialogs.

**Note**

For more information about the input parameters, place the cursor on the relevant field and press `F1` in SAPinst.

SAPinst first asks you which SAP instances you want to delete. Make sure that you delete the SAP instances in the order as described hereinafter.

- If you want to delete a standard system (all instances reside on the same host), you can do this in one SAPinst run.
- If you want to delete a distributed system, you have to run SAPinst to delete the required instances locally on each of the hosts belonging to the SAP system in the following sequence:
  a) Additional application server instance(s), if there are any
  b) Database instance

**Caution**

SAPinst only stops local instances automatically. Before you delete the database instance of a distributed system make sure that you stop all remaining instances. You must stop the instance with the message server only after having entered all SAPinst parameters for the deletion of the database instance.

To delete the database instance or one or more database schemas, choose one of the following options:

<table>
<thead>
<tr>
<th>Options</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop database</td>
<td>Select this option if you want to delete the database content, including all database schemas, all tablespaces and their corresponding data files.</td>
</tr>
</tbody>
</table>
| Select the database schema that you want to delete | **Note** If you want to delete a schema in an MCOD environment using SAPinst, no DB2-specific file systems are deleted. Make sure that you manually  
|                                              | delete/db2/<sapsid>/sapdata<1–n>.                                    |

c) Primary application server instance
d) Central services instance

**Note**
To delete system directories mounted from an NFS server, make sure that you run SAPinst on the NFS server.

**Caution**
If you are running multiple components on one database (MCOD), do **not** delete the database.

3. If required, you can delete the directory `/usr/sap/trans` and its content manually. SAPinst does not delete `/usr/sap/trans` because it might be shared.

4. If you created the directories `/usr/sap/<SAPSID>` and `/<sapmnt>/<SAPSID>` as mount points, but not as directories on the local file system, you have to remove them manually.

### 6.9 Deleting the Database Instance and Database Software Manually (Optional)

#### 6.9.1 Deleting the Database and the DB2 Instance Manually (Optional)

You use this procedure to manually delete the database and the DB2 instance of a complete SAP system.

**Prerequisites**
Before deleting the database, stop and delete all SAP instances belonging to the database.

**Procedure**

1. To delete the database, proceed as follows:
   a) Log on as user `db2<dbsid>`.
   b) To start the database, enter the following command:
      ```bash
db2start
      ```
   c) To delete the database `<DBSID>`, enter the following command:
      ```bash
db2 drop database <DBSID>
      ```
   d) To stop the database, enter the following command:
      ```bash
db2stop
      ```
2. To delete the DB2 instance, log on as user `root`.
3. Enter the following command:
   ```bash
   %DB2PATH%/instance/db2idrop db2<dbsid>
   ```
4. Remove user db2<dsid> from group db<dsid>adm (if the group db<dsid>adm is now empty, remove it also).
5. Remove user db2<dsid>.
6. To remove the home directory of db2<dsid> and all subdirectories, enter the following command.
   ```
   rm -rf /db2/db2<dsid>
   ```
7. Unmount and delete the following file systems:
   ```
   /db2/<DSID>/log_dir
   /db2/<DSID>/db2dump
   /db2/<SAPSID>/sapdata<n>
   /db2/<DSID>/saptemp1
   /db2/<DSID>
   ```
8. Remove user sap<sapsid>db from group db<dsid>mnt (if the group db<dsid>mnt is now empty, remove it also).
9. Delete user sap<sapsid>db, its home directory, and all subdirectories of this directory.
10. Delete the /etc/services entries for sapdb2<DBSID>. In other words, delete the lines starting with sapdb2<DBSID>.

### 6.9.2 Deleting a Database Schema Manually (Optional)

You use the following procedure to delete a database schema — but not the complete database — that is, you have to delete all tables (and indexes), views, and tablespaces belonging to the schema (for example, if you are running multiple components in one database).

You delete a database schema in one of the following situations:

- You are running multiple components on one database (MCOD) and you only want to delete the database schema of the corresponding component to be deleted.

**Prerequisites**

- Make sure that any instance that uses the schema is stopped.
- The database must be up and running.

**Procedure**

1. Log on to the database server as db2<dsid> and open a command prompt.
2. Create a script to delete all tables of the database schema by entering the following SQL statement:
   ```
   db2 " SELECT 'DROP TABLE' || CHR(34) || VARCHAR(tabschema) || CHR(34) 
   || '.' || CHR(34) || tabname || CHR(34) || ';' from syascat.tables 
   where tabschema='<SAP_SYSTEM_SCHEMA>' AND TYPE='T' " | find "DROP" >
   drop_<sap_system_schema>_tables.txt
   ```
   where <SAP_SYSTEM_SCHEMA> is the name of the connect user.
3. Create a second script to delete all views of the database schema by entering the following SQL statement:

```sql
db2 "SELECT 'DROP VIEW' || CHR(34) || VARCHAR(tabschema) || CHR(34) || '.' || CHR(34) || tablename || CHR(34) || ':' from syscat.tables
where tabschema='<SAP_SYSTEM_SCHEMA>' AND TYPE='V' " | find "DROP" >
drop_<sap_system_schema>_views.txt
```

where `<SAP_SYSTEM_SCHEMA>` is the connect user.

4. To delete all tables, run the first script by entering the following command:

```sql
db2 -tvf drop_<sap_system_schema>_tables.txt
```

5. To delete all views, run the second script by entering the following command:

```sql
db2 -tvf drop_<sap_system_schema>_views.txt
```

6. To drop the database schema, enter the following command:

```sql
db2 drop schema <SAP_SYSTEM_SCHEMA> restrict
```

7. To delete all tablespaces, proceed as follows:
   a) To get an overview, list all tablespaces by entering the following command:
      ```sql
db2 list tablespaces
      ```
   b) In an ABAP-only or Java-only system, delete all tablespaces starting with `<SAPSID>`.
   c) To delete the required tablespaces, enter the following command:
      ```sql
db2 drop tablespace <tablespace_name>
      ```

---

**6.9.3 Deleting the DB2 Software Installation Manually (Optional)**

1. Check if any DB2 instance exists by entering the following command:

   ```bash
   %DB2PATH%/instance/db2ilist
   ```

   **Note**

   If no instance is listed, you can continue with step 2. If any instance is listed, you must delete this instance **before** you can delete the database software. For more information, see [*Deleting the Database and DB2 Instance Manually*](page 148).

2. Log on as user with root authority.

3. Enter the following command:

   ```bash
   %DB2PATH%/install/db2_deinstall -a
   ```
# Typographic Conventions

<table>
<thead>
<tr>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt; &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 <code>&lt;User Name&gt;</code>.”</td>
</tr>
<tr>
<td>□ △ ◀</td>
<td>Arrows separating the parts of a navigation path, for example, menu options</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>Emphasized words or expressions</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>Words or characters that you enter in the system exactly as they appear in the documentation</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>Textual cross-references to an internet address, for example, <a href="http://www.sap.com">http://www.sap.com</a></td>
</tr>
<tr>
<td><code>/example</code></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>
<tr>
<td><strong>Example</strong></td>
<td>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</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>EXAMPLE</strong></td>
<td>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, <code>SELECT</code> and <code>INCLUDE</code></td>
</tr>
<tr>
<td><strong>EXAMPLE</strong></td>
<td>Keys on the keyboard</td>
</tr>
</tbody>
</table>
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