Installation Guide
SAP ERP 6.0 Including SAP Enhancement Package 5 - Technical Usage "Central Applications" ABAP on HP-UX: Oracle
Based on SAP NetWeaver 7.0 Including Enhancement Package 2

Target Audience

- System administrators
- Technology consultants

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About this Installation Guide

SAP System Installation

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

SAP Installation Tool

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.

Downward Compatibility of Databases

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. That is, you either install the component with the old proposed database version or you upgrade the old database version to the downward-compatible new version.

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 the following location:http://service.sap.com/erp-inst.

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

Version	Date	Description
1.0	2010-12-20	Initial Version

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1 Introduction

This document explains how to install SAP ERP 6.0 including SAP enhancement package 5 - technical usage “Central Applications” **ABAP**. You perform the installation using SAPinst.
SAP ERP 6.0 including SAP enhancement package 5 - technical usage “Central Applications” is based on the technology of SAP NetWeaver 7.0 including enhancement package 2. For more information about the technology provided by SAP ERP and SAP NetWeaver, see `http://service.sap.com/erp` and `http://sdn.sap.com/irj/sdn/netweaver`.
Make sure you read the corresponding Master Guides **before** you start with this installation guide. The Master Guides are available as follows:
`http://service.sap.com/erp-inst` → *SAP ERP 6.0* → *SAP enhancement packages for SAP ERP 6.0* → *SAP enhancement package <version> for SAP ERP 6.0*
You can install SAP ERP 6.0 including SAP enhancement package 5 - technical usage “Central Applications” with the following software units:

- SAP ERP Central Component (ECC)

> **NOTE**
> You also install SAP NetWeaver Application Server ABAP (AS ABAP) with SAP ERP Central Component.

For more information about the usage types of SAP NetWeaver and their interdependencies, see the document *Master Guide – SAP NetWeaver 7.0* at `http://service.sap.com/instguidesNW70`.

Constraints

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

- Your operating system platform must be **64-bit**.

  > **NOTE**
  > The only instance, you can still install on 32-bit is the dialog instance.

- The database must be Oracle 10.2.0.4 or 11.2.0, and higher.

Naming Conventions

- *SAP system* refers to *SAP ERP 6.0 including SAP enhancement package 5 - technical usage "Central Applications”.*
- *ABAP system* refers to *SAP ERP 6.0 including SAP enhancement package 5 - technical usage "Central Applications” ABAP*
- *diagnostics* refers to *diagnostics in SAP Solution Manager.*
- *diagnostics agent* refers to the agent of *diagnostics in SAP Solution Manager.*

Profiling for High Availability

Only valid for: HA (UNIX) |

The profile bars with the wording *Only valid for: HA (UNIX)* – for example, as in this section – refer to content that is only valid if you are installing a high-availability (HA) system on UNIX.

End of: HA (UNIX) |

1.1 New Features

The table below provides an overview of the new features related to the installation.
Make sure that you also read the release notes at http://service.sap.com/releasenotes.

Area	Description
SAPinst	■ Running SAPinst with accessibility mode: ● Keyboard access: This feature is generally available for all operating systems. ● High-color contrast: This feature is derived from the Windows display properties. Therefore, to use this feature, you must perform a remote installation with SAPinst GUI running on a Windows host. For more information, see *Running SAPinst in Accessibility Mode* [page 78]. ● Custom font setting: This feature is derived from the Windows display properties. Therefore, to enable this feature, you must perform a remote installation with SAPinst GUI running on a Windows host. For more information, see *Running SAPinst in Accessibility Mode* [page 78]. ■ Only valid for: HA (UNIX) | You can now install the enqueue replication server (ERS) with SAPinst. There is a new installation option called *Enqueue Replication Server Instance*, which is available for the installation options *High-Availability System*. End of: HA (UNIX) |
Additional ABAP Technical Usage	The installation of SAP ERP 6.0 including enhancement package 5 already contains the technical usage "Central applications". If you want to install an additional ABAP technical usage, you have to use transaction SAINT.

1.2 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.

SAP Notes for the Installation

SAP Note Number	Title	Description
998833	Release Restrictions SAP ERP 6.0 - Enhancement Packages	At the time of the release of SAP ERP 6.0 including SAP enhancement package 5, limitations affect the productive usage of certain functions. This note provides customer information on these restrictions.
1323537	Release Info SAP Enhancement Package 5 for SAP ERP 6.0	SAP Enhancement Package 5 for SAP ERP 6.0 release information.
1313850	Release Restrictions for SAP EHP 2 for SAP NetWeaver 7.0	Customer information on restrictions in the production use of certain functions.
1341276	Inst. NetWeaver 7.0 EHP2 / Business Suite 7i2010- UNIX	UNIX-specific information about the SAP system and corrections to this documentation. **NOTE** This note also contains UNIX-specific information referring to SAP ERP.
1341277	Inst. NetWeaver 7.0 EHP2/ Business Suite 7i2010 - UNIX/ Oracle	Oracle-specific information about the SAP system installation and corrections to this documentation. **NOTE** This note also contains Oracle-specific information referring to SAP ERP.
828268	Oracle 10g: New functions	Information about new Oracle features released for the SAP system
1431800	1431800 Oracle 11.2.0: Central Technical Note	Information about Oracle 11g with multiple links to notes on Oracle 11g
98252	Installing two Oracle databases on a host	This SAP Note is only required if you plan to install more than one Oracle database on the same host.
855498	Installation Prerequisite Checker	SAP Software on UNIX, Windows, and IBM i: Checking OS Dependencies
73606	Supported Languages and Code Pages	Information on possible languages and language combinations in SAP systems
1075118	SAP on HP-UX: FAQ	This SAP Note contains information that is specific to the SAP system installation on HP-UX.
1067221	Central Note for Heterogeneous Installation	This SAP Note and its related SAP Notes describe the released operating system and database combinations for heterogeneous SAP systems landscapes.
789220	Support Package level for NetWeaver Installations/ Upgrades	Information about the ABAP Support Package levels and kernel patch levels contained in the current SAP NetWeaver release.
774615	Support Package levels of ERP/ ECC installations/upgrades	Information about the ABAP Support Package levels and kernel patch levels contained in the current SAP ERP release.

SAP Note Number	Title	Description
1258912	PLM Core 7.00 Release Notes and Information	Information and references to other notes about installing PLM Core 7.00 and importing PLM Core 7.00 Support Packages.

1.3 How to Use This Guide

1. You decide on the **installation option** that you want to install.

   The following installation options are described in this installation guide:

   - Central system
   - Distributed system
   - Only valid for: HA (UNIX) |

     High-availability system

     End of: HA (UNIX) |
   - Dialog instances
   - Host Agent as a separate installation

   For more information, see *Installation Options Covered by This Guide* [page 13].
2. You follow the **list of steps** at the beginning of each installation phase:

   - *Planning* [page 21]
   - *Preparation* [page 39]
   - *Installation* [page 59]
   - *Post-Installation* [page 87]

   NOTE

   This applies to all installation options **except** the *Host Agent as a Separate Installation* [page 19]. This installation option has its own section in *Additional Information* [page 105].

   In *Additional Information* [page 105] you can find special installation options and more information about how to perform certain steps described in the main part of the guide.

2 Installation Options Covered by this Guide

This section shows the installation options covered by this guide. You have to decide what exactly you want to install because the steps you have to perform vary according to the installation option you choose.

- *Central system* [page 13]
- *Distributed system* [page 14]
- Only valid for: HA (UNIX) |
  High-availability system [page 15]
  End of: HA (UNIX) |
- You can install *dialog instances* [page 16] to an existing system.
- You can install a *host agent* [page 19] separately.

2.1 Central System

You can install a **central** system on a **single** host.

These are the following instances:

- Database instance (DB instance)
- Central instance

Optionally you can install one or more dialog instances. For more information, see *Dialog Instance* [page 16].

The following figure shows an example of SAP instances in a central system.

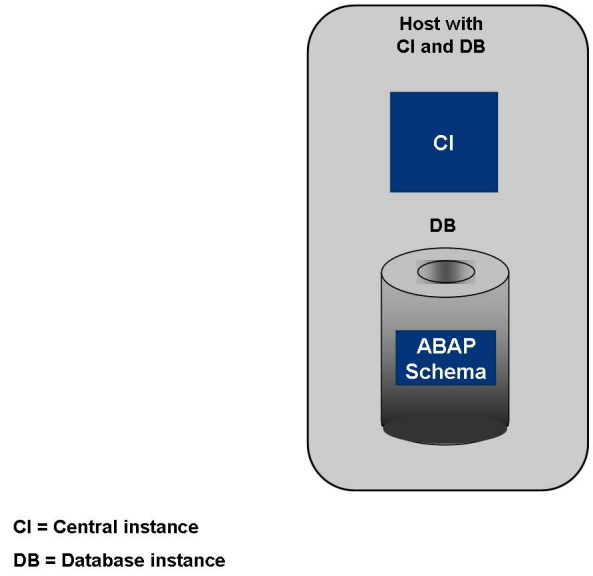

Figure 1: Central ABAP System

Optionally you can install one or more dialog instances. For more information, see *Dialog Instance* [page 16].

2.2 Distributed System

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

These are the following instances:

- Database instance (DB instance)
- Central instance

> **NOTE**
>
> You can also use the SAP transport host or the SAP global host as your central instance host.

Optionally you can install one or more dialog instances. For more information, see *Installation of a Dialog Instance* [page 16].

The following figure assumes the following:

- The global file system resides on a separate host. SAP global host. The SAP global host is the host where the global file system `/<sapmnt>` resides. For more information, see *SAP Directories* [page 42].
- The global transport directory resides on a separate SAP transport host. For more information, see *SAP Transport Host* [page 35].

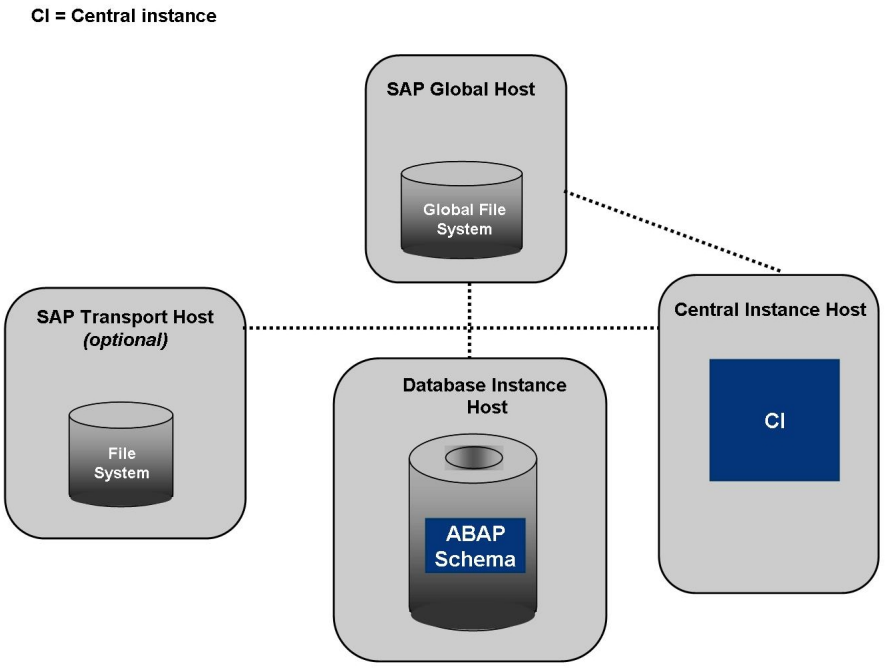

Figure 2: Distributed ABAP System

Only valid for: HA (UNIX) |

2.3 High-Availability System

In a high-availability system, every instance can run on a separate host.

These are the following instances:

- Central services instance for ABAP (ASCS instance)
- Enqueue replication server instance (ERS instance) for the ASCS instance
- Database instance
- Central instance

We recommend that you run both the ASCS instance and the SCS instance in a switchover cluster infrastructure.

To increase high-availability by creating redundancy, we recommend that you install dialog instances on hosts different from the central instance host. For more information, see *Installation of a Dialog Instance* [page 16].

The following figure shows an example for the distribution of the SAP instances in a high-availability system.

This figure assumes the following:

- The ASCS instance and its related ERS instance run on the switchover cluster infrastructure. For more information, see *Setting Up File Systems for a High-Availability System* [page 50].

- The global transport directory resides on a separate SAP transport host. For more information, see *SAP Transport Host* [page 35].

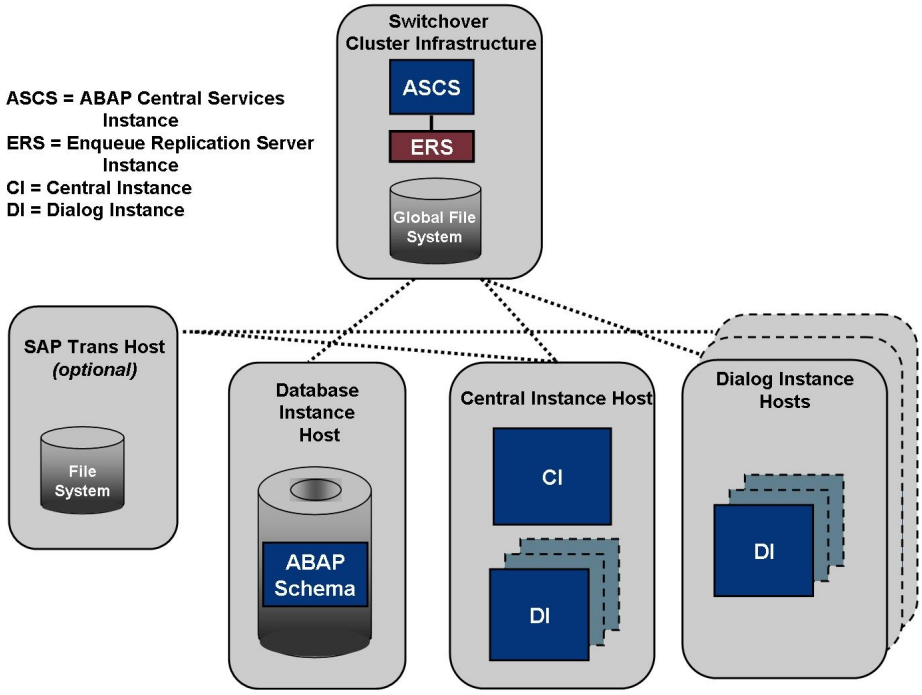

Figure 3: High-Availability System

End of: HA (UNIX) |

2.4 Dialog Instance

You can install one or more dialog instances for an existing SAP system. Dialog instances are optional and can be installed on separate hosts. You can have one or more dialog instances.

A dialog instance can run on:

- The host of any instance of the existing SAP system (exceptions see below)
- On a dedicated host

NOTE

If you install a dialog instance in an existing non-Unicode system (that has been upgraded to the current release), the dialog instance is automatically installed as a non-Unicode instance. SAPinst determines if a non-Unicode system exists and chooses the correct executables for the system type.

NOTE

If you want to install dialog instances running on an operating system other than the central instance, see *Heterogeneous SAP System Installation* [page 132]. For example, you need to do this if your central instance runs on Solaris but the dialog instance is to run on Windows.

Dialog Instance for a Central System

The following figure shows a central system with dialog instances that run:

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

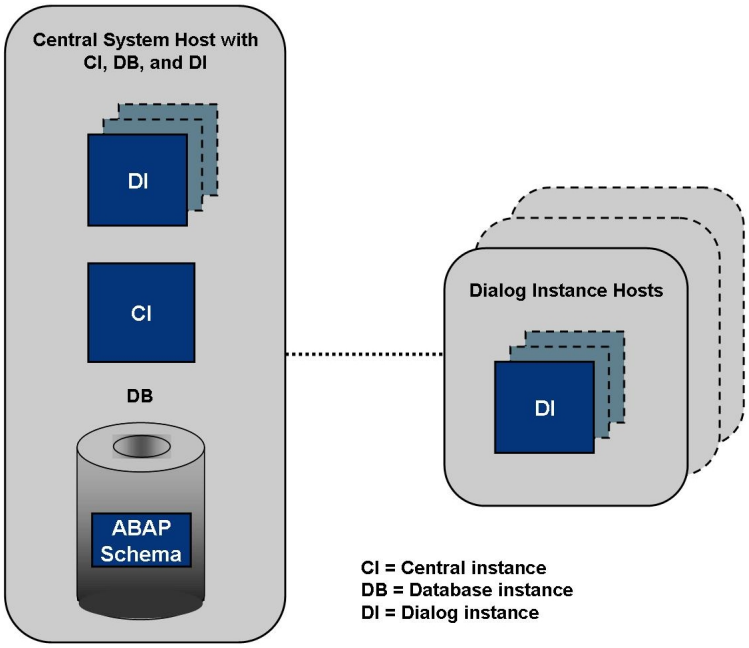

Figure 4: Dialog Instance for a Central System

For more information, see *Central System* [page 13].

Dialog Instance for a Distributed System

The following figure shows a distributed system with dialog instances that run:

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

The following figure assumes the following:

- The global file system resides on a separate host. SAP global host. The SAP global host is the host where the global file system `/<sapmnt>` resides. For more information, see *SAP Directories* [page 42].
- The global transport directory resides on a separate SAP transport host. For more information, see *SAP Transport Host* [page 35].

We do **not** recommend you to install dialog instances on the SAP global host.

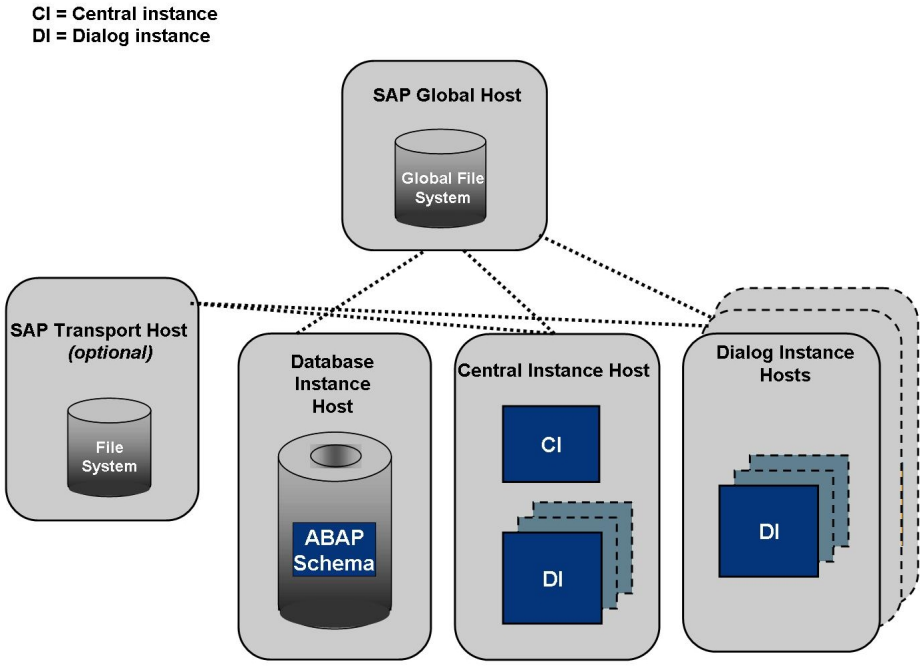

Figure 5: Dialog Instance for a Distributed System

For more information, see *Distributed System* [page 14].

Only valid for: HA (UNIX) |

Dialog Instance for a High-Availability System

The following figure shows a high-availability system with dialog instances that run on:

- The host of the central instance
- Dedicated hosts

This figure assumes the following:

- The ASCS instance and its related ERS instance run on the switchover cluster infrastructure. For more information, see *Setting Up File Systems for a High-Availability System* [page 50].
- The global transport directory resides on a separate SAP transport host. For more information, see *SAP Transport Host* [page 35].

We do **not** recommend you to install dialog instances on the switchover cluster infrastructure.

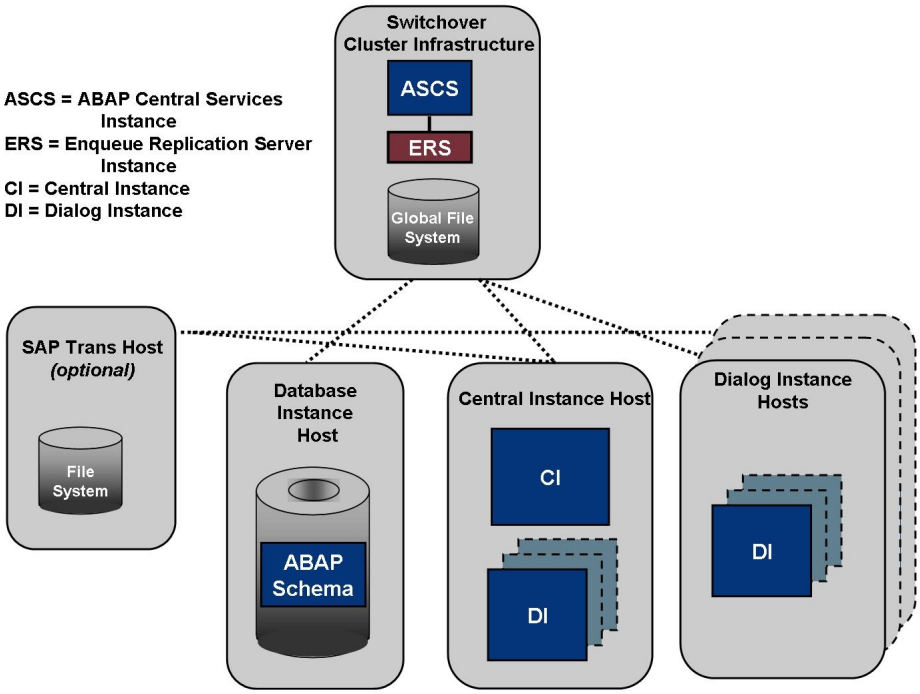

Figure 6: Dialog Instance for a High-Availability System

For more information, see *High-Availability System* [page 15].

End of: HA (UNIX) |

2.5 Host Agent as a Separate Installation

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.

The host agent is automatically installed during the installation of all new SAP system instances based on SAP NetWeaver 7.0 including Enhancement Package 2 or higher. You only need to install a host agent **separately** 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 7.0 including Enhancement Package 2 or higher.

The section *Installing the Host Agent Separately* [page 123] describes how to perform the installation.

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3 Planning

3.1 Planning Checklist

This section includes the planning steps that you have to perform for the following installation options:

- Central, distributed, or high-availability system
- Dialog instance

Detailed information about the steps is available in the relevant chapter.

Prerequisites

1. You have planned your SAP system landscape according to the Master Guide at `http://service.sap.com/erp-inst` and the Technical Infrastructure Guide at `https://cw.sdn.sap.com/cw/community/docupedia/tig`.
2. You have *decided on your installation option* [page 13].

Central, Distributed, or High-Availability System

NOTE

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

1. You *check the hardware and software requirements* [page 22] for each installation host.
2. You *plan how to set up user and access management* [page 28].
3. You *identify basic SAP system installation parameters* [page 28].
4. You *decide on the transport host to use* [page 35].
5. You *decide if you want to use Internet Pricing and Configurator* [page 35].
6. Only valid for: HA (UNIX) |

   To install a high-availability system, you read *Planning the Switchover Cluster* [page 36].

   End of: HA (UNIX) |
7. You can continue with *Preparation* [page 39].

Dialog Instance

1. You check the *hardware and software requirements* [page 22] for the installation host on which you want to install one or more dialog instances.
2. You identify *basic SAP system installation parameters* [page 28].
3. You can now continue with *Preparation* [page 39].

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

- Make sure that the host name meets the requirements listed in **SAP Note** 611361.
- Check **SAP Note** 837670 for HP-UX OS Patch recommendations.
- For "Frequently Asked Questions" about SAP on HP-UX, see **SAP Note** 1075118.
- SAP only supports the use of native binaries. Always use the appropriate SAP binaries for your processor.
- 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` for supported operating system releases.
2. Check the hardware and software requirements using:
   - The *Prerequisite Checker* in one of two modes:
     - Standalone mode (optional) **before** the installation process
       For more information, see *Running the Prerequisite Checker Standalone* [page 23].
     - Integrated in SAPinst (mandatory) **during** the installation process
       For more information, see *Running SAPinst* [page 66].

     NOTE

     For the most recent updates to the *Prerequisite Checker*, always check **SAP Note** 855498.
   - The *Hardware and Software Requirements Tables* [page 23]
3. If you want to install 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:
   - You use the `Quick Sizer` tool available at `http://service.sap.com/sizing`.
     For more information about the `Quick Sizer` 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.

NOTE

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 55].

Procedure

1. You *start SAPinst* [page 66].
2. On the *Welcome* screen, choose ▶ <*Your SAP product*> → *Software Life-Cycle Options* → *Additional Preparations* → *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 and want to have checked. If you want to make a change, select the relevant parameters and choose *Revise*.
4. To start the prerequisites check, choose *Next*.

Result

The *Prerequisite Checker 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 Hardware and Software Requirements Tables

Every installation host must meet at least the requirements listed in the following tables. Most of the requirements are valid for every installation host whereas some requirements are instance-specific and are marked accordingly.

NOTE

The information here is **not** intended to replace the operating system documentation. For more information, see your operating system documentation.

For an SAP system installation on HP-UX, consider the following information:

- For "Frequently Asked Questions" for SAP on HP-UX, see **SAP Note** 1075118.
- For recommendations and information about availability of HP-UX 11.31 (also known as HP-UX 11iv3), see **SAP Note** 1031960.

Hardware Requirements

Requirement	Values and Activities
DVD Drive	■ ISO 9660 compatible ■ You must connect the DVD drive locally to your central instance host. For more information, see *Mounting Installation Media for HP–UX* [page 120].
Distribution of the Oracle Database	We recommend to use a redundant storage solution such as RAID5 for data security reasons. To decide how many hard disks are required for your Oracle database, see section *Database System Configuration* in *SAP Database Guide: Oracle (BC-DB-ORA-DBA)* in the SAP Library at: `http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Application Platform by Key Capability* → *Platform-Wide Services* → *Database Support* → *Oracle* → *SAP Database Guide: Oracle (BC-DB-ORA-DBA)* → *Getting Started with Oracle and the SAP System*
CPU	The recommended minimum hardware is at least one dual core CPU or two single core CPUs. To display the number of existing CPUs, enter the following command: `ioscan -fnkCprocessor`
Hard Disk Space	■ **General Requirements:** ● 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 55]. ● 1.2 GB of temporary disk space for the installation. ● 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. ■ **Instance-specific Requirements:** If you install **several instances** on **one host**, you have to add up the requirements accordingly. For more information about space requirements for the file systems and directories of the instances, see *SAP Directories* [page 42] and the appropriate database-specific information listed below. ● Central services instance for ABAP (ASCS) (high-availability only) 2 GB ● Enqueue replication server instance for the ASCS (high-availability only) 2 GB ● Database Instance: Minimum 150 GB

Requirement	Values and Activities
	For more information about space requirements for the separate file systems and directories, see *Oracle Directories* [page 48]. • Central instance: 10 GB • Dialog instance: 10 GB • Host agent: 1 GB • Diagnostics agent: 1.5 GB

RAM	The following lists the RAM requirements for each instance.
	If you install **several instances** on **one host**, you have to add up the requirements accordingly.
	■ Central services instance for ABAP (ASCS) (high-availability only)
	Minimum 1 GB
	■ Enqueue replication server instance for the ASCS (high-availability only)
	Minimum 1 GB
	■ Database Instance:
	Minimum 2 GB
	NOTE
	The default value used by SAPinst is 50 percent of the entire RAM.
	■ Central instance:
	Minimum 3 GB
	■ Dialog instance:
	Minimum 3 GB
	■ Host agent:
	0.5 GB
	■ Diagnostics agent:
	1 GB
	To display the RAM size on HP-UX, proceed as follows:
	■ On HP-UX PA-RISC, enter the following command:
	`echo "selclass qualifier memory;info;wait;infolog" | cstm |grep Memory |grep Total`
	■ On HP-UX Itanium or all 11.31 systems, you can also use the following command:
	`/usr/contrib/bin/machinfo |grep Memory`

Swap Space	You need hard disk drives with sufficient space for swap. You can calculate the required swap space as follows: 2 * RAM, at least 20 GB In addition, for the **database instance**, you need: ■ Recommended: 3*RAM + 500 MB, at least 20 GB ■ Minimum: 2*RAM For more information about HP-UX swap space recommendations, see **SAP Note** 1112627. For more information about how to set up swap space, see *Setting up Swap Space for HP-UX* [page 113]

Software Requirements

Requirement	Values and Activities
Database Software	Check the Product Availability Matrix (PAM) at http://service.sap.com/pam for supported database platforms.
Operating System Version	Check the Product Availability Matrix (PAM) at http://service.sap.com/pam for supported operating system versions. To check the operating system version on your installation hosts, enter the following command: `uname -r` See **SAP Note** 939891 for information about support time frames of HP-UX.
HP-UX Kernel Parameters	To run an SAP system, make sure that you check and, if necessary, modify the HP-UX kernel. **CAUTION** We recommend that a UNIX system administrator performs all kernel modifications. Proceed as follows: 1. Check **SAP Note** 172747 for recommendations on current HP-UX kernel parameters. **CAUTION** If a kernel value is already larger than the one suggested in the SAP Note, do not **automatically** reduce it to match the SAP requirement. You have to analyze the exact meaning of such a parameter and, if required, to reduce the parameter value. In some cases this might improve the performance of your SAP applications. 2. If necessary, modify the kernel parameters in one of the following ways: ■ Manually For more information, see **SAP Note** 172747. ■ Using System Administrator Manager (SAM) for **HP-UX 11.11** and **HP-UX 11.23** For more information, see *Configuring the Kernel Using SAM for HP-UX 11.11 and 11.23* in *Checking and Modifying the HP-UX Kernel* [page 111]. ■ Using `kcweb` for **HP-UX 11.23** and **HP–UX 11.31** For more information, see *Configuring the Kernel Using kcweb for HP-UX 11.23 and HP–UX 11.31* in *Checking and Modifying the HP-UX Kernel* [page 111]. ■ Using System Management Homepage (SMH) for **HP-UX 11.31** For more information, see *Configuring the Kernel Using SMH for HP-UX 11.31* in *Checking and Modifying the HP-UX Kernel* [page 111].
HP-UX OS Patches	To check the minimum required OS patches, see **SAP Note** 837670.
Lightweight Directory Access Protocol (LDAP)	If you want to use LDAP, you require one of the following LDAP libraries: ■ HP-UX on PA-RISC (11.11/11.23/11.31) `libldapssl40.sl` or `libldap41.sl` ■ HP-UX on Itanium (11.23/11.31)

Requirement	Values and Activities
	`libldapssl41.so`
Fonts and Code Pages	The directory `/lib/X11/fonts` contains the available fonts. You can select fonts in your default profiles for X11 and CDE. EXAMPLE `iso_8859.1` or `hp_roman8`

National Language Support (NLS)	Make sure that National Language Support (NLS) and corresponding `saplocales` are installed.
	■ Enter the following command to check whether National Language Support (NLS) is installed:
	`swlist -v | grep -i nls`
	The output should contain the string `NLS-AUX ...`
	■ Enter the following command to check which locales are available:
	`locale -a`
	The following files must be available: `de_DE.iso88591`, `en_US.iso88591`.

Language Libraries	To make sure that the file set `LANG-MIN` is installed, enter the following command: `swlist -v | grep -i lang-min` If nothing is displayed, the file set is not available, and needs to be installed.

Other Requirements

Requirement	Values and Activities
Host Name	To find out **physical** host names, open a command prompt and enter `hostname`. For more information about the allowed host name length and characters allowed for SAP system instance hosts, see **SAP Note** 611361. If you want to use **virtual** host names, see **SAP Note** 962955.
Login Shell	SAPinst only prompts you for this parameter if you use a login shell other than the recommended C shell (csh). For more information, see **SAP Note** 202227.

Printer	■ To check whether a file can be printed, enter the following command:
	`lp -d<printer_name> <test_file>`
	■ To check the status of your spool and the printers, enter the following command:
	`lpstat -t`

Networking	If application servers are installed decentralized, Network File System (NFS) must be installed.
	■ To check the current kernel configuration files to make sure that the NFS driver is in the kernel, enter the following command:
	`grep nfs /stand/system`
	■ To check whether NFS is running, enter the following commands:
	`ps -ef | grep nfsd`
	`ps -ef | grep rpcbind`
	`grep NFS_C /etc/rc.config.d/nfsconf`
	`grep NFS_S /etc/rc.config.d/nfsconf`
	■ Either `NFS_CLIENT`, `NFS_SERVER`, or both should be set to `1`. You can use `SAM` or `SMH` to start NFS or add the driver to the kernel.

Requirement	Values and Activities
C++ Runtime Environment	Make sure that the patch level of C++ runtime library is equal to or newer than the version recommended in the general HP-UX patch recommendations. For more information, see **SAP Note** 837670.

3.3 Planning User and Access Management

You have to plan how you want to configure user and access management for your SAP system to be installed.

Before you add a newly installed SAP system to your system landscape, you must decide which kind of user management you want to use:

- Use Central User Administration (CUA).
- Use an LDAP directory as the data source for user data.

Procedure

Using Central User Management

1. You install your SAP system as described in this installation guide.
2. Add the system to Central User Administration (CUA). For more information, see *Configuring User Management* [page 89].

Using an LDAP directory as Source for User Data

1. You install your SAP system as described in this installation guide.
2. Configure the user management of the newly installed SAP system to use and LDAP directory. For more information, see *Configuring User Management* [page 89].

More Information

For more information about configuring the user management of your SAP system to be installed, see the SAP Library at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2)* → *English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Security* → *Identity Management* → *Identity Management for System Landscapes* → *Integration of User Management in Your System Landscape*

3.4 Basic SAP System Installation Parameters

SAPinst prompts for input parameters during the *Define Parameters* phase of the installation.

You can install your SAP system either in *Typical* or *Custom* mode:

- *Typical*

If you choose *Typical*, you perform the installation with default settings. This means that you only have to respond to a small selection of prompts including at least the following, which are described in the corresponding tables below:

- SAP system ID and database ID
- SAP system profile directory – only for systems with instances on separate hosts
- Master password
- Java Runtime Environment (JRE) – only prompted if not already available on the installation host
- Java Cryptographic Extension (JCE) Unlimited Strength Jurisdiction Policy files archive – only prompted if not already available on the installation host
- System Landscape Directory (SLD) destination
- SAP Solution Manager Key

If you want to change any of the default settings, you can do so on the *Parameter Summary* screen.

- *Custom*

  If you choose *Custom*, you are prompted for all parameters. At the end, you can still change any of these parameters on the *Parameter Summary* screen.

NOTE

You cannot change from *Custom* to *Typical* mode or from *Typical* to *Custom* mode on the *Parameter Summary* screen.

The following tables list the basic system parameters that you need to specify before installing your SAP system:

- SAP System Parameters
- SAP System Database Parameters
- Diagnostics Agent Parameters

For all other installation parameters, use the F1 help in the SAPinst screens.

SAP System Parameters

Parameters	Description
SAP System ID <SAPSID>	The SAP System ID <SAPSID> identifies the whole SAP system. **CAUTION** Choose your SAP system ID carefully. You **cannot** change the SAP system ID after the installation. Make sure that your SAP system ID: ■ Is unique throughout your organization. Do not use an existing <SAPSID> when installing a new SAP system. ■ 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:

Parameters	Description
	`ADD ALL AMD AND ANY ARE ASC AUX AVG BIT CDC COM CON DBA END EPS FOR GET GID IBM INT KEY LOG LPT MAP MAX MIN MON NIX NOT NUL OFF OLD OMS OUT PAD PRN RAW REF ROW SAP SET SGA SHG SID SQL SUM SYS TMP TOP UID USE USR VAR` ■ If you want to install a dialog instance, make sure that no gateway instance with the same SAP system ID (SAPSID) exists in your SAP system landscape.
SAP System Instance Numbers	Technical identifier for internal processes. It consists 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. If you do not enter a specific value, the instance number is set automatically to the next free and valid instance number that has not yet been assigned to the SAP system to be installed or to SAP systems that already exist on the installation host. To find out instance numbers of SAP systems that already exist on the installation host, look for subdirectories ending with `<nn>` of local (not mounted) `/usr/sap/<SAPSID>` directories. The value `<nn>` is the number assigned to the instance. For more information about the naming of SAP system instances, see *SAP Directories* [page 42]. **CAUTION** Do **not** use 75 for the instance number because this number is already used by the operating system. For more information, see **SAP Note** 29972. **CAUTION** Do **not** use 02 as the instance number because this number is used to determine the port number for report `RSLGCOLL`, which is 14<instance_number> by default. The port 1402 however is already used by the OS process `rstlisten`. If you decide to use 02 as the instance number anyway, the instance fails to start during the installation process. You then have to change the port number for report `RSLGCOLL` manually to continue with the installation. For more information, see *Running SAPinst* [page 66].
Master Password	Common password for all users created during the installation: ■ Operating system users (for example `<sapsid>adm`) **CAUTION** If you did not create the operating system users manually before the installation, SAPinst creates them with the common master password. In this case, make sure that the master password meets the requirements of your operating system and of your database. ■ ABAP users `SAP*` and `DDIC` **CAUTION** SAPinst applies the master password to users `SAP*`and `DDIC` for SAP system clients 000 and 001 only, but not to users `SAP*`, `DDIC`, and `EARLYWATCH` in SAP system client 066. Instead, SAPinst always assigns the following passwords to these users in client 066: `SAP*`: 06071992 `EARLYWATCH`: support See also *Ensuring User Security* [page 97]. ■ Database users (for example `ora<dbsid>` ■ Secure Store key phrase For more information, see table line *Key Phrase for Secure Store Settings*.

Parameters	Description
	Password policy The master password: ■ Must be 8 to 14 characters long ■ Must contain at least one letter (a-z, A-Z) ■ Must contain at least one digit (0-9) ■ Must not contain \ (backslash) and " (double quote) Depending on the installation option, additional restrictions might apply (for example, the master password must not contain the name of a Java user created during the installation).
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. **ABAP Message Server Port** There is an external message server port and an internal message server port. The ABAP message server uses both the internal and the external message server ports. The default profile contains the configuration for both message server ports. The **external** message server port uses the parameter `rdisp/msserv` with default value 36<nn>, where <nn> is the instance number of the ABAP message server instance. The **internal** message server port uses the parameter `rdisp/msserv_internal` with default value 39<nn>, where <nn> is the instance number of the ABAP message server instance. For more information about the parameters used for message server ports, see **SAP Note** 821875.
Java Runtime Environment (JRE)	A valid JRE is required for the installation with SAPinst. For more information about JRE versions supported by SAP and about how to install them, see *Installing the Java Runtime Environment* [page 54].
DNS Domain Name for SAP System	If you want to use HTTP-based URL frameworks such as Web Dynpro applications, you have to specify the DNS domain name for the SAP system. The DNS Domain Name is used to calculate the Fully Qualified Domain Name (FQDN), which is configured in profile parameter `SAPLOCALHOSTFULL`. FQDN is the fully qualified domain name for an IP address. It consists of the host name and the domain name: `<host name>.<domain name>` The DNS Domain Name is needed to define the URLs for the ABAP and Java application servers. It is appended to the server name to calculate the FQDN. For more information, see *Configuring Fully Qualified Domain Names (FQDN)* in *Performing Post-Installation Steps for the ABAP Application Server* [page 93]. EXAMPLE If your application server host is called `kirk.wdf.sap.com`, the DNS Domain Name is `wdf.sap.com`.
Path to `SAPCRYPTO.SAR`	The SAP Cryptographic Library is required to enable Secure Sockets Layer (SSL) encryption of HTTP connections. If you do not have `SAPCRYPTO.SAR` available, you can download it from: `http://service.sap.com/swdc` → *Installations and Upgrades* → *Search for the term "SAP Cryptogaphic Software"* After the installation has finished, you have to perform some post-installation steps to configure AS ABAP for supporting SSL. For more information, see *Configuring AS ABAP to*

Parameters	Description
	Support Secure Socket Layer (SSL) in *Performing Post-Installation Steps for the ABAP Application Server* [page 93]. This software product is subject to export control regulations in Germany as the country of origin and import regulations of your own country. SAP may not yet have a corresponding export license for your user or company. Contact the contract department in your local SAP company. To download the SAP Cryptographic Software from the SAP Service Marketplace, you need a customer user ID. Before any transfer of these software products to persons, companies or other organizations outside your company, in particular in the case of any re-export of the software products, authorization is required from the German export control authorities. This might also be required from your responsible national export control authorities. This also applies to transfers to affiliated companies. Corresponding laws and regulations in the recipient country may also exist which restrict the import or the use of these software products.
SAP Solution Manager key	To install your SAP system, you need to *generate an SAP Solution Manager key* [page 53], which the installation requires to continue. For more information, see **SAP Note** 805390. You have already generated an SAP Solution Manager Key for the central instance, so you do not have to do this for the dialog instance.

SAP System Database Parameters

Parameters	Description
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 that you 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 ● Has a letter for the first character ● Does not include any of the following, which are reserved IDs: `ADD ALL AMD AND ANY ARE ASC AUX AVG BIT CDC COM CON DBA END EPS FOR GET GID IBM INT KEY LOG LPT MAP MAX MIN MON NIX NOT NUL OFF OLD OMS OUT PAD PRN RAW REF ROW SAP SET SGA SHG SID SQL SUM SYS TMP TOP UID USE USR7 VAR`
Code page	The code page that is used by your database (Unicode or Non-Unicode). **NOTE** You only need to enter this parameter if you perform a target system installation as part of a system copy.
Database schema, Passwords	The ABAP database schema is named SAP<SCHEMA_ID>.

Parameters	Description
	Default name is SAPSR3. **RECOMMENDATION** Choose a <SCHEMAID> that is different from your <SAPSID>. It might cause problems when you copy a system where <SCHEMAID> is the same as <SAPSID>, and the database-specific method used for the copy does not allow you to rename the database schemas. In certain situations, you might create a system copy with a new <SAPSID>, but where the database schema has the old <SAPSID>. This is not a technical problem, but might confuse the system administrator.
Oracle Listener Name, Oracle Listener Port	■ If you install the database instance on a host where no other Oracle database is installed, you normally do not have to change the default values for Listener Name and Listener Port. ■ If there is already an Oracle database installed on your installation host, you can either use one listener for both databases or you have to specify an unused Listener Name and an unused Listener Port for the new listener. For more information if you use one listener for both databases, see **SAP Note** 98252. ■ All dialog instances of an SAP system must use the same Listener Port than the database instance.
Tablespaces, Datafiles	An Oracle database consists of one or more logical storage units called tablespaces, which collectively store all of the database's data. Each tablespace in an Oracle database consists of one or more files called datafiles, which are physical structures that conform to the operating system in which Oracle is running. MaxDatafileSize is the initial size of the tablespace datafile and its mapping to the new tablespace layout while importing the external file DBSIZE.XML. SAPinst prompts you to enter MaxDatafileSize in MB: ■ 0: Datafile size defined in DBSIZE.XML is not changed. ■ 2000: Default datafile size. ■ 10000: Maximum datafile size. For more information about space requirements of the SAP datafiles (sapdata 1 - 4), see *Oracle Directories* [page 48].

Diagnostics Agent Parameters

The diagnostics agent is installed automatically with the SAP system.

Parameters	Description
System ID of the Diagnostics Agent <DASID>	SAPinst sets the system ID of the diagnostics agent, <DASID>, to DAA by default. If DAA is already used, SAPinst assigns another default system ID. You can overwrite the default system ID as required.

Parameters	Description
	CAUTION Choose the <DASID> carefully. Renaming is difficult and requires you to reinstall the diagnostics agent. Make sure that the <DASID>: ■ Either does not yet exist on the local installation host or does already exist but was only used for a diagnostics agent installation ■ 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 AMD AND ANY ARE ASC AUX AVG BIT CDC COM CON DBA END EPS FOR GET GID IBM INT KEY LOG LPT MAP MAX MIN MON NIX NOT NUL OFF OLD OMS OUT PAD PRN RAW REF ROW SAP SET SGA SHG SID SQL SUM SYS TMP TOP UID USE USR VAR
Instance Number of the Diagnostics Agent	Technical identifier for internal processes for the diagnostics agent, consisting of a two-digit number from 00 to 97. Default is 97. If 97 is already used for an instance number, the diagnostics agent instance number is set automatically to the next free and valid instance number. The instance number is used to specify the name of the diagnostics agent instance directory that SAPinst automatically creates during the installation. The directory of the diagnostics agent instance is called SMDA<Instance_Number>. For more information, see *SAP Directories* [page 42]. The same restrictions apply as in "Instance Number of the SAP System" (see above).
Java(TM) Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files Archive	You have to download the JCE Unlimited Strength Jurisdiction Policy Files 6 archive for the SAP JVM that is installed with the diagnostics agent. For more information, see *Downloading the JCE Unlimited Strength Jurisdiction Policy Files Archive* [page 54].
SLD Destination	You can choose between the following options: ■ Register in existing central SLD Choose this option to register the diagnostics agent you are installing in an existing SAP System Landscape Directory (SLD) by specifying the SLD connection parameters listed below. **RECOMMENDATION** We recommend that you select this option. ■ No SLD destination If you select this option, SAPinst does **not** prompt you for further SLD parameters. Choose this option if you do **not** want to register the diagnostics agent of the SAP system you are installing in an existing SAP System Landscape Directory (SLD). You then have to configure the SLD destination for the diagnostics agent manually after the installation with SAPinst has finished.

Parameters	Description
SLD HTTP Host (FQN)	The fully qualified host name of the SAP system with the System Landscape Directory (SLD)
SLD HTTP Port	The HTTP port of the SAP system with the System Landscape Directory (SLD). The following naming convention applies: `5<instance_number>00`. **EXAMPLE** If the instance number of your Java system is 01, the SLD HTTP Port is 50100.
SLD Data Supplier User and password	The existing SLD Data Supplier user and password of the existing central SLD

3.5 SAP Transport Host

The SAP transport host contains the transport directory used by the SAP transport system to store transport data and change SAP system information, 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.

When you install an SAP system, you have to decide which transport host and directory you want to use for your SAP system:

- Use the transport directory that SAPinst creates during the installation of the SAP system by default on the global host in `/usr/sap/trans`
- Use a transport directory located on a host other than the global host (default host):
  - You can use an **existing** transport directory and host in your SAP system landscape.
  - You can set up a **new** transport directory on a different host.

  In either case, you must prepare this host for use by the new SAP system. For more information, see *Exporting and Mounting the Global Transport Directory* [page 63].

More Information

- *Required File Systems and Directories* [page 42]
- See the SAP Library:

  `http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Software Life Cycle Management* → *Software Logistics* → *Change and Transport System* → *Change and Transport System – Overview (BC-CTS)* → *Basics of the Change and Transport System* → *Transport Management System – Concept*

3.6 Internet Pricing and Configurator

We deliver Internet Pricing and Configurator (IPC) as part of SAP AP (Application Platform). It runs on normal application servers.

IPC is required for SAP CRM Mobile Application Components that are part of software unit SAP CRM Java Components (JCRM). For more information, see the *Master Guide* [page 139].

Prerequisites

The IPC (SAP AP IPC JAVA 7.00) requires the Virtual Machine Container (VMC) as runtime environment. The VMC is part of SAP Basis 7.02.

Integration

No separate IPC installation steps are necessary. No separate host or separate Java runtime environment is necessary. IPC functionality is processed on each application server. The IPC does not support any special methods to support high availability or load balancing. By running on each application server, SAP standard load balancing or high-availability mechanisms apply.

You need to enable the VMC after the installation of your SAP system. For more information, see *Activating Internet Pricing and Configurator* [page 101].

Only valid for: HA (UNIX) |

3.7 High Availability: Planning the Switchover Cluster

You can reduce unplanned downtime for your high-availability (HA) SAP system by setting up a switchover cluster. This setup replicates 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 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.

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 dialog instances (that is, additional application servers). This complements the switchover solution and is an essential part of building HA into your SAP system.

RECOMMENDATION

We recommend switchover clusters to ensure HA for 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 information and the installation guides available at http://sdn.sap.com/irj/sdn/ha.
- The enqueue replication server (ERS) is essential for a high-availability system. You need one ERS for the ABAP SCS (ASCS) installed in your system.

Features

The following figure shows the essential features of a switchover setup:

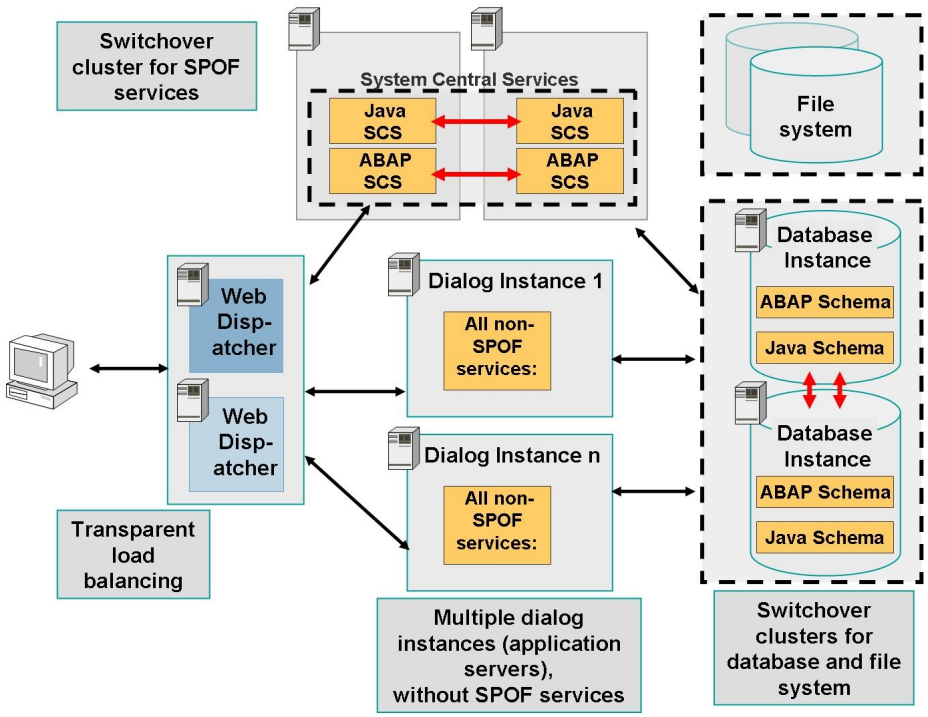

Figure 7:

NOTE

This figure and the figures in this section are only **examples**. Only the instances relevant to the switchover are shown – for example, the central instance is not shown.
These graphics summarize the overall setup and do not show the exact constellation for an installation based on one of the available technologies (ABAP, ABAP+Java, or Java).
You need to discuss your individual HA setup with your HA partner.

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

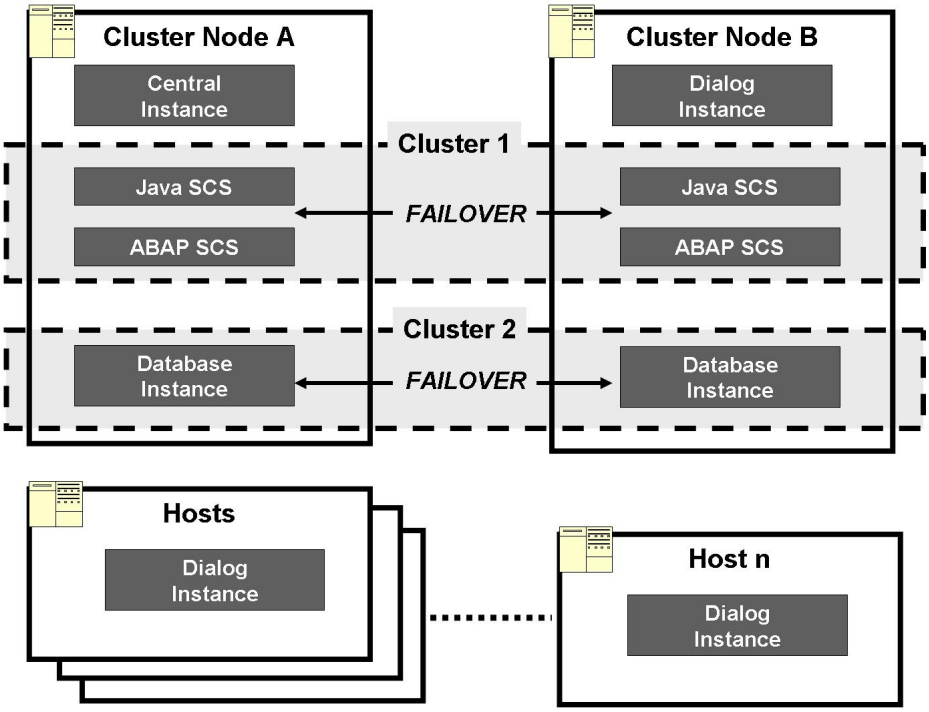

Figure 8:

Constraints

This documentation concentrates on the switchover solution for the central services instance. For more information about how to protect the NFS file system and the database instance by using switchover software or (for the database) replicated database servers, contact your HA partner.
You need to make sure that your hardware is powerful 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) |

4 Preparation

4.1 Preparation Checklist

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

- Central, distributed, or high-availability system
- Dialog instance

Detailed information about the steps is available in the relevant chapter.

Central, Distributed, or High-Availability System

NOTE

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

1. You make sure that the required *operating system users and groups* [page 40] are created.
2. You *set up file systems* [page 42] and make sure that the required disk space is available for the directories to be created during the installation.
3. If required, you *set up virtual host names* [page 52].
4. If you want to install a high-availability system, you *perform switchover preparations* [page 53].
5. If you want to share the transport directory `trans` from another system, you *export* [page 63] this directory to your installation hosts.
6. You *install the SAP frontend software* [page 53] on the desktop of the end user.
7. You *generate the SAP Solution Manager key* [page 53] for your SAP system.
8. You *download JCE policy files* [page 54].
9. You *install the Java Runtime Environment* [page 54].
10. You make sure that the required *installation media* [page 55] are available on each host.
11. You can continue with *Installation* [page 59].

Dialog Instance

You have to perform the following preparations on the host where you install the dialog instance:

1. You make sure that the required *operating system users and groups* [page 40] are created.
2. You *set up file systems* [page 42] and make sure that the required disk space is available for the directories to be created during the installation.
3. If required, you *set up virtual host names* [page 52].

4. If you want to share the transport directory `trans` from another system, you *export* [page 63] this directory to your installation hosts.
5. You make sure that the required *installation media* [page 55] are available on each host.
6. If you upgraded your SAP system from an earlier source release to a target release lower than SAP ERP 6.0 SR3 then installed enhancement package 5 with the SAP Enhancement Package Installer (SAPehpi), and now want to install a dialog instance, you have to *update instance profiles of the existing system* [page 119].
7. You can continue with *Installation* [page 59].

4.2 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.

Only valid for: HA (UNIX) |

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).

End of: HA (UNIX) |

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 Options* → *Additional Preparations* → *Operating System Users and Groups* ◀. For more information, see *Running SAPinst* [page 66].
- You create operating system users and groups manually. Make sure that you also check the settings for these operating system users.
  For more information, see *Creating HP-UX Groups and Users* [page 115]

Operating System Users and Groups

SAPinst chooses available operating system user IDs and group IDs unless you are installing a dialog instance. On a dialog instance host you have to enter the same IDs as on the host of the central instance.

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.
- 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.
- If you use NFS-V4 file system, you have to create the `ora<dbsid>` user on the NFS server. You can do this either manually or by running *Operating System Users and Groups*. This user must have the same user ID as the `ora<dbsid>` user on the database server.

  Otherwise, you see the error message `FSL-02098 Could not change owner of ...` during the installation of the database instance.
- If you install an SAP system with instances distributed over several hosts, make sure that the following requirements are met:
  - The group ID of group `sapinst` is always different from the group ID of any other group (for example, of group `sapsys`) used during the installation.

    For example, if you want to install a dialog instance for an existing SAP system, you must make sure that the group ID of group `sapinst` created on the host of the dialog instance is different from the group ID of any other group on the central instance host of the existing SAP system.
  - If 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.
  - 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.
- If operating system users already exist, make sure that they are assigned to group `sapinst`.
- If you create operating system users manually or use already existing operating system users, make sure that the home directory for each of these users is **not** the root directory (`/`).
- Make sure that the home directory of user `<sapsid>adm` is not critical for recursive changes on permissions:

  When operating system users are created by the installer, the permissions on the home directories of these users are changed recursively. This can cause unpredictable errors if you define a critical home directory.

  For example, the home directory must **not** be `/` or `/usr/sap`.

Users and Groups

User	Primary Group	Additional Groups	Comment
`root`	No primary group is assigned by SAPinst.	`sapinst`	Superuser of the UNIX operating system
`<sapsid>adm`	`sapsys`	`oper, dba, sapinst`	SAP system administrator

User	Primary Group	Additional Groups	Comment
<dasid>adm	sapsys	sapinst	Diagnostics Agent administrator
sapadm	sapsys	sapinst	Host Agent administrator
ora<dbsid>	dba	oper, sapinst	Database administrator This user is only required on the host where the database instance runs.

User and Groups of the Host Agent

User	Primary Group	Additional Group	Comment
sapadm	sapsys	sapinst	Host agent administrator

Groups and Members

Groups	Members
sapsys	<sapsid>adm, <dasid>adm, sapadm
oper	<sapsid>adm, ora<dbsid>
dba	<sapsid>adm, ora<dbsid>
sapinst	root, <sapsid>adm, <dasid>adm, sapadm ora<dbsid>

Groups and Members of the Host Agent User

Groups	Members
sapsys	sapadm
sapinst	sapadm

4.3 Required File Systems and Directories

The following sections describe the directories that are required for the instances of an SAP system, how to set up file systems and – if required – raw devices on operating system level:

- *SAP Directories* [page 42]
- *Oracle Directories* [page 48]
- *Setting Up File Systems for High-Availability* [page 50]

4.3.1 SAP Directories

Depending on the installation option you have chosen, SAPinst automatically creates the directories listed in the following figures and tables.

Before running the installation, you have to set up the required file systems manually. In addition, you have to make sure that the required disk space for the directories to be installed is available on the relevant hard disks.

The figure below assumes that you have set up one file system for the SAP system mount directory <sapmnt> and one file system for the /usr/sap directory. However, you have to decide for which

directories you want to set up separate file systems. If you do not set up any file system on your installation host, SAPinst creates all directories in the root directory (/). You are prompted only for the <sapmnt> directory during the installation.

The following types of directories are created automatically:

- Physically shared directories
- Logically shared directories – for the SAP system and the diagnostics agent
- Local directories – for the SAP system and the diagnostics agent

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

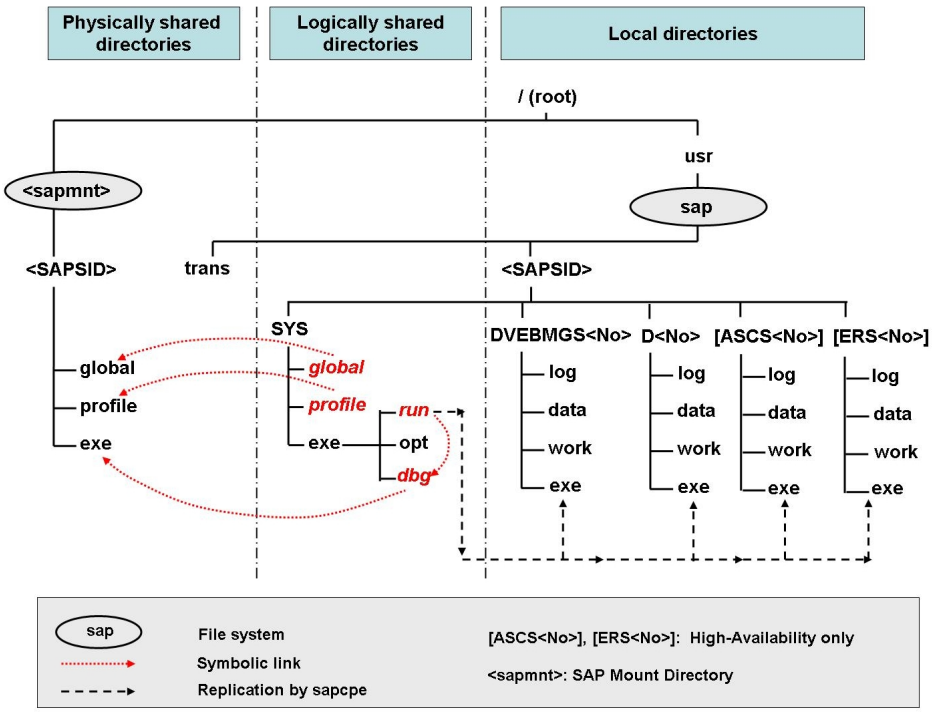

Figure 9: Directory Structure for an ABAP System

Every **new** installation of an ABAP standalone system is Unicode.

Non-Unicode for ABAP is still supported **only** if you perform the system copy for a non-Unicode system that has been upgraded to SAP NetWeaver 7.0 SR3 or higher.

Both the ABAP stack and the Java stack of every **new** installation of an ABAP+Java system are Unicode.

A Java standalone system is always a Unicode system.

Physically Shared Directories

Physically shared directories reside on the SAP global host and are shared by Network File System (NFS). SAPinst creates the following directories:

- The directory /<sapmnt>/<SAPSID>, which contains SAP kernel and related files, is created on the first installation host. The first installation host is usually 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 subdirectories in `/<sapmnt>/<SAPSID>` during the SAP system installation. If you install an SAP system with instances distributed over several hosts, you have to share these directories for all hosts with the same operating system (see *Exporting and Mounting Global Directories* [page 64]):

- `global`
  Contains globally shared data
- `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 63]

Physically Shared SAP Directories

Directory	Description	Required Minimum Disk Space
`<sapmnt>/<SAPSID>`	SAP system directory	Minimum 3 GB
`/usr/sap/trans`	SAP transport directory	This value heavily depends on the use of your SAP system. For production systems, we recommended to use as much free space as available (at least 2 GB), because the space requirement normally grows dynamically. For the installation, it is sufficient to use 1 GB for each SAP system instance. You can enlarge the file system afterwards.

Logically Shared Directories

Logically shared directories reside on the local hosts with symbolic links to the physically shared directories that reside on the SAP global host. 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.

SAPinst uses `sapcpe` to replicate the kernel automatically from `/usr/sap/<SAPSID>/SYS/exe/run/DIR_CT_RUN` to `/usr/sap/<SAPSID>/<INSTANCE>/exe/DIR_EXECUTABLE` for each SAP system instance, where `<INSTANCE>` is either `DVEBMGS<Number>` (central instance) or `D<Number>` (dialog instance).

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.

The following entry in the start profile is responsible for this:

```
Execute_00 = immediate $(DIR_CT_RUN)/sapcpe$(FT_EXE) pf=$(_PF)
```

where `$(_PF)` points to the instance profile.

CAUTION

Do **not** delete `DIR_CT_RUN` from the instance profile. Otherwise, you cannot restart the system after patches have been applied.

Local Directories (SAP System)

SAPinst also creates local directories that reside on the local hosts. 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-specific directories with the following names:
  - The directory of the central instance is called `DVEBMGS<No>`, where `<No>` is the instance number.
  - The directory of a dialog instance is called `D<No>`.
- The directory of the central services instance for ABAP (ASCS instance) is called `ASCS<No>`, where `<No>` is the instance number.
- The directory of an enqueue replication server instance (ERS instance) is called `ERS<No>` (high-availability only), where `<No>` is the instance number.

  For a high-availability system, you must install an ERS instance for the ASCS instance.

Local SAP Directories

Directory	Description	Required Minimum Disk Space
`/usr/sap/<SAPSID>/DVEBMGS<No>`	Central instance directory	9 GB
`/usr/sap/<SAPSID>/D<No>`	Dialog instance directory	9 GB
`/usr/sap/<SAPSID>/ASCS<No>`	ABAP central services instance (ASCS) directory (high-availability only)	1 GB
`/usr/sap/<SAPSID>/ERS<No>`	Enqueue replication server instance (ERS) directory for the ASCS (high-availability only)	1 GB

Directories of the Diagnostics Agent

The diagnostics agent has logically shared and local directories as shown in the following figure:

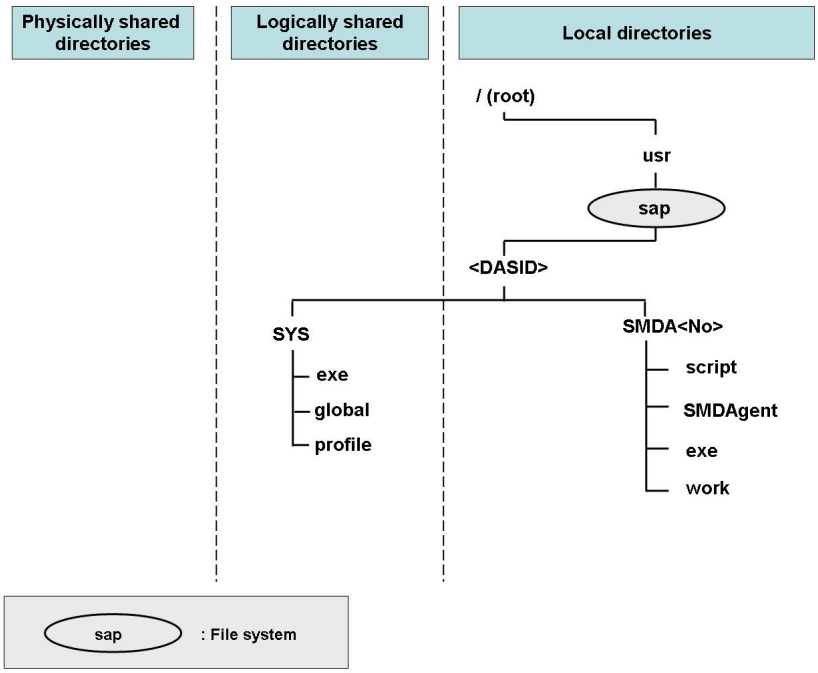

Figure 10: Directory Structure for the Diagnostics Agent

The diagnostics agent directory `/usr/sap/<DASID>` requires 1.5 GB of disk space. It contains the following subdirectories:

- `SYS`, a logically shared directory
- `SMDA<No>`, a local directory

Logically Shared Directories (Diagnostics Agent)

The logically shared directory `SYS` contains the following subdirectories:

- `exe`
  Contains executable kernel programs
- `global`
  Contains globally shared data
- `profile`
  Contains the profiles of the Diagnostics Agent instance

Local Directories (Diagnostics Agent)

The instance directory of the diagnostics agent instance is called `SMDA<No>`, where `<No>` is the instance number. It contains the instance-specific data of the Diagnostics Agent.

It contains the following subdirectories:

- `script`
  Contains the `smdsetup` script
- `SMDAgent`
  Contains the Diagnostics Agent software and `properties` files

- `exe`
  Contains executable kernel programs
- `work`
  Contains log files

Directories of the Host Agent

The host agent has only local directories as shown in the following figure:

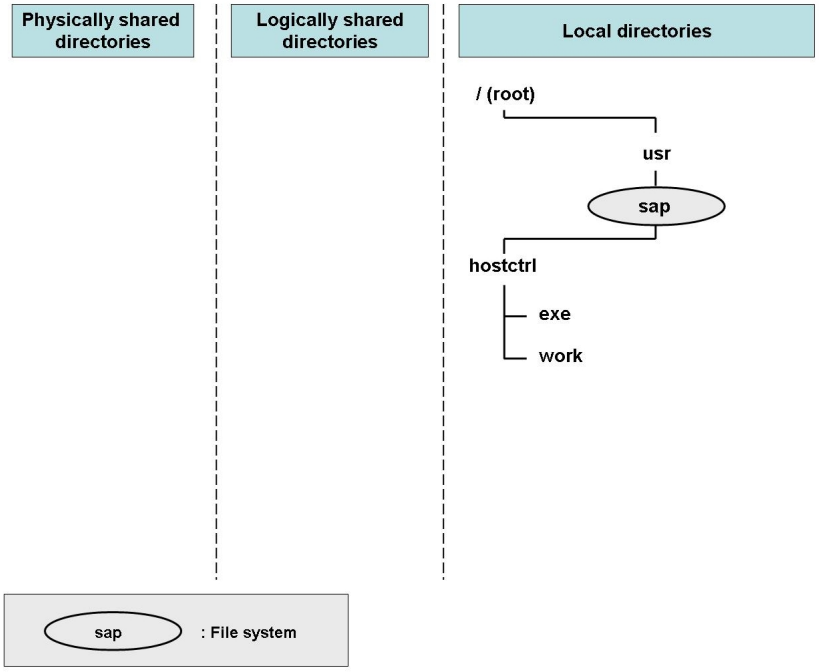

Figure 11: Directory Structure for the Host Agent

Local Directories (Host Agent)

The host agent directory `/usr/sap/hostctrl` requires 100 MB of disk space. It contains the following subdirectories:

- `exe`
  Contains the profile `host_profile`
- `work`
  Working directory of the host agent

More Information

For more information about how to set up file systems and raw devices, see *Setting Up File Systems and Raw Devices for HP-UX* [page 116].

4.3.2 Oracle Directories

The figure below assumes that you have set up one file system for the `oracle` directory. However, you have to decide yourself for which directories you want to set up separate file systems. If you do not set up any file system on your installation host, SAPinst creates all directories in the `root` directory `/`.
Set up the required file system nodes for the Oracle database before the installation.

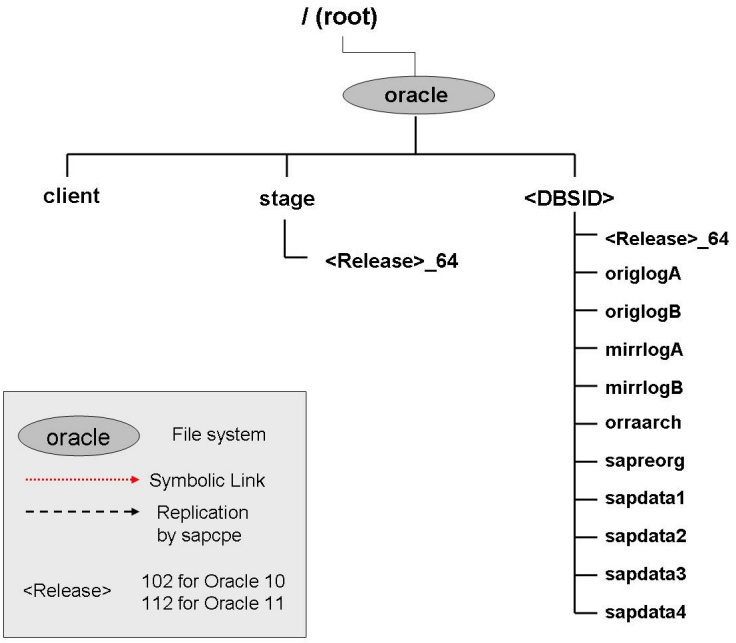

Figure 12: Oracle Directories (Graphical Overview)

The following table provides more information about the Oracle directories in detail, such as about their usage and disk space requirements.
`<Release>` means either `102` if your database is Oracle 10 or `112` if your database is Oracle 11.

Oracle Directories in Details

Directory	Description	Space Required
`/oracle`	Oracle base directory	50 MB for Oracle software Make sure that the `/oracle` file system has the permissions `755`.
`/oracle/client`	File system for Oracle client software SAPinst creates the directory `/oracle/client/<Release>_64/instantclient` during the installation.	100 MB
`/oracle/stage/<Release>_64`	Installation and upgrade directory for database software (staging area) This directory is also used for Oracle upgrades. We recommend that you do **not** delete it after the installation.	5.5 GB
`/oracle/<DBSID>`	Home directory of user `ora<dbsid>`	100 MB for files of user `ora<dbsid>` (for example, log files)

Directory	Description	Space Required
	We recommend that `/oracle/<DBSID>` does **not** reside in the root directory. It must reside in a file system with support for large files. For more information about how to create file systems larger than 2 GB on your operating system, see: *Setting Up File Systems and Raw Devices for HP-UX* [page 116] Therefore, either create `/oracle/<DBSID>` as a separate file system with support for large files or create `/oracle` as a file system with support for large files and create `/oracle/<DBSID>` as a directory in `/oracle`.	
`/oracle/<DBSID>/<Release>_64`	Home directory for Oracle instance `<DBSID>` (`<ORACLE_HOME>`). `<ORACLE_HOME>` must reside on a local disk. It **cannot** be a softlink.	■ Database instance: 4.0 GB ■ All other instances: 200 MB
`/oracle/<DBSID>/origlogA`	Original set A of redo logs	200 MB
`/oracle/<DBSID>/origlogB`	Original set B of redo logs	200 MB
`/oracle/<DBSID>/mirrlogA`	Mirrored set A of redo logs	200 MB
`/oracle/<DBSID>/mirrlogB`	Mirrored set B of redo logs	200 MB
`/oracle/<DBSID>/oraarch`	New standard backup file system for Oracle offline redo logs Use a separate disk for the file system `/oracle/<DBSID>/oraarch`. The file system `/oracle/<SAPSID>/saparch` still remains but now only contains `brbackup` log files. `/oracle/<SAPSID>/saparch` is automatically created by SAPinst.	For the installation, the archive directory `/oracle/<DBSID>/oraarch` requires at least 400 MB free disk space. For the operation of your SAP system, we recommend that the archive directory provides enough space for archives between two backups. In a production system, the amount archived each day is between 300 MB and 1 GB.
`/oracle/<DBSID>/sapreorg`	Working directory for database administration	1.5 GB
`/oracle/<DBSID>/sapdata1`	SAP data	For space requirements of the SAP data file systems required for the installation, see the following file: `<Export_DVD>/DATA_UNITS/EXP1/DB/ORA/DBSIZE.XML`. See also the *General* section in **SAP Note** 1341277
`/oracle/<DBSID>/sapdata2`	SAP data	
`/oracle/<DBSID>/sapdata3`	SAP data	
`/oracle/<DBSID>/sapdata4`	SAP data	

Only valid for: HA (UNIX) |

4.3.3 Setting Up File Systems for a High-Availability System

Third-party technology is used to make the SAP directories available to the SAP system. The technologies of choice are NFS, shared disks, and cluster file system. If you have decided to use a high-availability (HA) solution for your SAP system, make sure that you properly address the HA requirements of the SAP file systems in your SAP environment with the HA partner of your choice. From the perspective of an SAP application, there are the following types of *SAP Directories* [page 42]:

- Physically shared directories: `/<sapmnt>/<SAPSID>` and `/usr/sap/trans`
- Logically shared directories that are bound to a node such as `/usr/sap` with the following local directories:
  - `/usr/sap/<SAPSID>`
  - `/usr/sap/<SAPSID>/SYS`
  - `/usr/sap/hostctrl`
- Local directories that contain the SAP instances, such as `/usr/sap/<SAPSID>/ASCS<Number>`

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 36] and contact your HA partner.

Procedure

1. Create the file systems or raw partitions for the SAP instances you can switch over in such a way that the content can be made available to all nodes that can run the service. At least the central services instance for ABAP (ASCS instance) must be part of the switchover cluster.
   The SAP directories `/sapmnt/<SAPSID>` and `/usr/sap/trans` are usually mounted from a Network File System (NFS). However, an SAP instance directory `/usr/sap/<SAPSID>/<INSTTYPE><Number>` that you want to prepare for HA has to always be mounted on the cluster node currently running the instance. Do **not** mount such directories with NFS.
   Therefore, if the host running the central 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><Number>`.

   CAUTION

   To start or stop an SAP instance, you have to either make the physically shared SAP directories under `/<sapmnt>/<SAPSID>/` available to the server beforehand or you have to replace the links in `/usr/sap/<SAPSID>/SYS` by a physical copy. Consult your HA partner to clarify the best solution for the cluster software.

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 (see also *SAP Directories* [page 42]):
   - `SYS`, which contains links to the central directory `/sapmnt/<SAPSID>`
   - `<INSTTYPE><Number>` – where the name is defined by the type of services and the application server number:
     - `DVEBMGS<Number>` – which contains data for the central instance
     - `D<Number>` – which contains data for a dialog instance
     - `ASCS<Number>` – which contains data for the ABAP central services instance

   Only `<INSTTYPE><Number>` directories need to be migrated with the SAP instances during the switchover.
   Therefore, instead of `/usr/sap/<SAPSID>`, create a file system for `/usr/sap/<SAPSID>/<INSTTYPE><Number>` with the usual `<>` substitutions.
   The instance-specific directory name for the central services instance is normally `ASCS<Number>`. Migrating only these directories avoids mount conflicts when switching over to a node on which another SAP instance is already running. The `ASCS<Number>` 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 instance (ERS instance) and dialog 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** (non-switching) file systems to **permanent** mount points.
4. You assign the **shared** file systems as documented by your HA partner.

EXAMPLE

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.

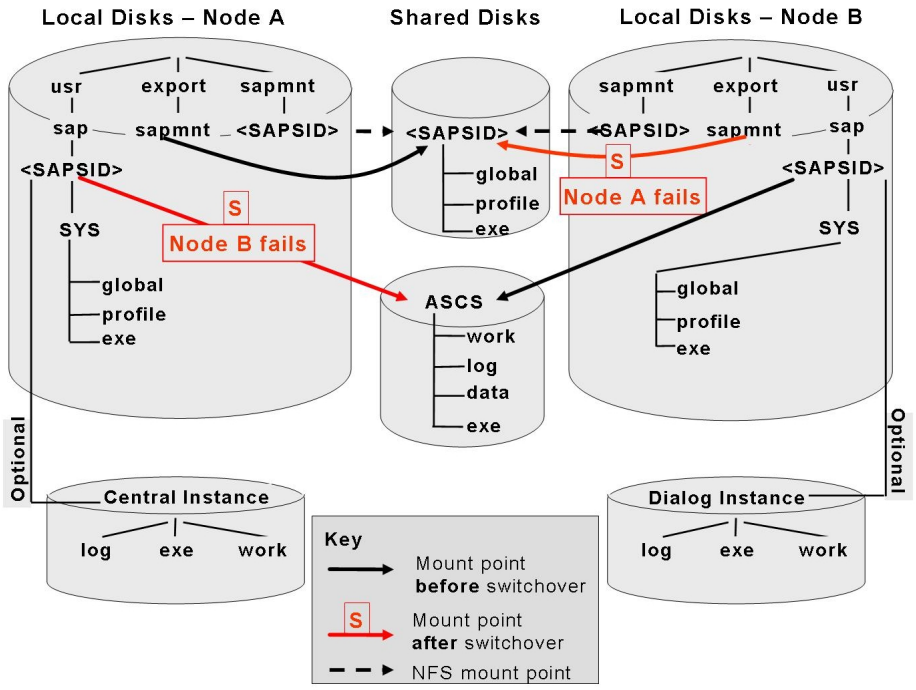

Figure 13:

More Information

For more information about how to set up file systems and raw devices, see *Setting Up File Systems and Raw Devices for HP-UX* [page 116].

End of: HA (UNIX) |

4.4 Using Virtual Host Names

You can use one or more virtual TCP/IP host names for SAP servers within an SAP server landscape to conceal their physical network identities from each other. This can be useful when quickly moving SAP servers or complete server landscapes to alternative hardware without having to reinstall or reconfigure.

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

Virtual host names are also required for a high-availability installation. For more information, see *Performing Switchover Preparations for High Availability* [page 53].

End of: HA (UNIX);HA (z/OS) |

Prerequisites

Make sure that the virtual host name can be correctly resolved in your Domain Name System (DNS) setup.

Procedure

Proceed as described in **SAP Note** 962955.

Only valid for: HA (UNIX) |

4.5 Performing Switchover Preparations for High Availability

If you want to use a virtual host name, you have to set the SAPinst property `SAPINST_USE_HOSTNAME` to specify the required virtual host name before you start SAPinst. For more information, see *Running SAPinst* [page 66].

Procedure

Assign the virtual IP addresses and host names for the ASCS 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.

End of: HA (UNIX) |

4.6 Installing the Front-End Software

For the installation, make sure that the front-end software is installed on at least **one** computer in your system environment.

We recommend that you install SAP front-end release 7.10 or higher.

For more information about installing the front-end software, see the documentation *SAP Front End Installation Guide - <Current Release>* at:

`http://service.sap.com/installNW70` → *Installation - Clients*

4.7 Generating the SAP Solution Manager Key

You must 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 about SAP Solution Manager and its role within your system landscape, see the Master Guide of your SAP application.

Procedure

1. If SAP Solution Manager is not yet available in your system landscape, proceed as follows:
   1. Order SAP Solution Manager as described in **SAP Note** 628901.
   2. Install SAP Solution Manager as described in the documentation *Installation Guide – SAP Solution Manager <Current Release> on <OS>: <Database>*, which is available at:

http://service.sap.com/instguides → *SAP Components* → *SAP Solution Manager* → <*Current Release*>

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.

4.8 Downloading JCE Policy Files

Strong encryption is mandatory for the diagnostics agent. You need to download the **latest version** of the *Java(TM) Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files 6* archive for the SAP JVM so that SAPinst can install them.

Procedure

Download the **latest version** of the *JCE Unlimited Strength Jurisdiction Policy Files 6* archive as described in **SAP Note** 1240081.

NOTE

Do **not** unzip the archive.

More Information

For more information, see *Basic SAP System Installation Parameters* [page 28]

4.9 Installing the Java Runtime Environment

You need to prepare your system for SAPinst. This includes the installation of a Java Runtime Environment (JRE), which is required for SAPinst. The JRE is part of the JDK (Java Development Kit) and not part of the SAP shipment.

NOTE

If required, you can perform a **remote** installation using a standalone SAPinst GUI on a separate Windows or UNIX host. This lets you perform the installation on a remote host, controlling it with the SAPinst GUI from a local host. If you want to perform a remote installation, see *Performing a Remote Installation with SAPinst* [page 75].

Procedure

1. Check the JRE versions that are released for SAP systems in the Product Availability Matrix (PAM):
   1. Go to http://service.sap.com/pam.
   2. Choose *Start PAM with navigation by category*.

3. On the right-hand panel, choose ▶ *SAP Application Components* → *<your product>* ↵.
4. Choose tabstrip *JSE Platforms*.

> **NOTE**
>
> For more information about how to download it, see the relevant SAP Note for your operating system, which is referenced near the beginning of **SAP Note** 723909.

2. Make sure a valid JRE version is installed, as follows:
   - If the JRE is not already installed, download and install it.
   - If the JRE is already installed, check the installed version of the JRE by entering:

     ```
     java -version
     ```

4.10 Preparing the Installation Media

This section describes how to prepare the installation media, which is available as follows:

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

Procedure

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

   > **CAUTION**
   >
   > The media names listed below are **abbreviated**.
   > You can find the **full names** in section *Media List* in the corresponding Master Guide for SAP ERP 6.0 including SAP enhancement package 5 - Technical Usage "Central Applications":
   > ▶ `http://service.sap.com/erp-inst` → *SAP ERP 6.0* → *SAP enhancement packages for SAP ERP 6.0* → *SAP enhancement package <current version> for SAP ERP 6.0* ↵

   > **NOTE**
   >
   > If you are installing on an existing system using Multiple Components in One Database (MCOD), the required media differ.

   The following table shows the required DVDs for the installation of an SAP system based on the usage type **AS ABAP**:

   > **NOTE**
   >
   > For a central system, where all mandatory instances reside on one host, you need the installation DVDs that are required for the central instance and database instance.

SAP Instance Installation	Required DVDs
Global host preparation	■ Installation Master DVD ■ Kernel DVD

SAP Instance Installation	Required DVDs
High-availability system only: ASCS instance, ERS instance	■ Installation Master DVD ■ Kernel DVD
Central instance, dialog instance	■ Installation Master DVD ■ Kernel DVD ■ RDBMS Client DVD
Database instance	■ Installation Master DVD ■ Kernel DVD ■ SAP ERP Installation Export DVD ■ RDBMS DVD ■ RDBMS Patch DVD (if available) **NOTE** For an MCOD system you require the RDBMS Client DVD instead of the RDBMS DVD and the RDBMS Patch DVD (if available).

Standalone Host Agent

SAP Instance Installation	Required DVDs
Host Agent (Standalone)	■ Installation Master DVD ■ Kernel DVD

2. Make the required installation media available on each installation host.

   If you need information about how to mount DVDs on HP-UX, see *Mounting Installation Media for HP-UX* [page 120].

   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 central system, you need to make all required installation media available on the single installation host.

   Use one of the following methods to make media available:

   - **Before** the installation, copy media 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 Package 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 and commas.
   - 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 the Installation Media from SAP Service Marketplace

You normally obtain the installation media as part of the installation package from SAP. However, you can also download installation media from the software distribution center on SAP Service Marketplace using one of the following paths:

- http://service.sap.com/swdc → *Installations and Upgrades* → *My companys application components* → *<your product>* → *<your product version>*
- http://service.sap.com/swdc → *Installations and Upgrades* → *A-Z index* → *<first letter of your product>* → *<your product version>*

NOTE

If you download installation media, note that they 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 also download from http://service.sap.com/swdc. You need at least SAPCAR 700. For more information, see **SAP Note** 212876.

1. Create a download directory on the host on which 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:
     `<material_number>_<sequence_number>`

     EXAMPLE

     51031387_1
     51031387_2
     ...
   - Title
     All objects that are part of an DVD have the same title, such as `<solution><DVD_name><OS>` or `<database>RDBMS<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 extraction SAPCAR sets up the structure of the DVD.

   NOTE

   SAPCAR asks if you want to replace existing files, for example `LABELIDX.ASC`. Always accept with `Yes`.

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5 Installation

5.1 Installation Checklist

This section includes the installation steps that you have to perform for the following installation options:

- Central system
- Distributed system
- High-availability system
- Dialog instance

Detailed information about the steps is available in the relevant chapter.

Central System

1. You *install the SAP system with SAPinst* [page 66].

   NOTE

   Do **not** install the Oracle database software before you run SAPinst.
   SAPinst stops and prompts you to *install the Oracle database* [page 79] while the installation of the database instance is running.
   If you *install an SAP system in an existing database (MCOD)* [page 105] SAPinst prompts you for the existing database.
2. You continue with *Post-Installation* [page 87].

Distributed System

1. If you want to share the transport directory `trans` from another system, you have to *mount* [page 63] it from this system. Otherwise, we recommend that you share the `trans` directory that is created during the installation of the central instance (`/usr/sap/trans`).
2. On the **SAP global host**, proceed as follows:
   1. You *run SAPinst* [page 66] to prepare the global host.
      This sets up the global directories `<sapmnt>/<SAPSID>/exe`, `<sapmnt>/<SAPSID>/profile`, and `<sapmnt>/<SAPSID>/global`.
   2. You *export the global directories* [page 64] to the database instance host, to the central instance host, and – if required – to the hosts where you want to install one or more dialog instances.
3. On the **database instance host**, proceed as follows:
   1. You *mount the exported global directories* [page 64] from the SAP global host (`<sapmnt>/<SAPSID>/exe`, `<sapmnt>/<SAPSID>/profile`, `<sapmnt>/<SAPSID>/global`) and SAP transport host (`/usr/sap/trans`).

2. You *run SAPinst* [page 66] to install the database instance.

   NOTE

   Do **not** install the Oracle database software before you run SAPinst.
   SAPinst stops and prompts you to *install the Oracle database software* [page 79] while the installation of the database instance is running.
   If you *install an SAP system in an existing database (MCOD)* [page 105] SAPinst prompts you for the existing database.

4. On the **central instance host**, proceed as follows:

   NOTE

   You can use the SAP transport host or the SAP global host as your central instance host.

   1. You *mount the exported global directories* [page 64] from the SAP global host (`<sapmnt>/<SAPSID>/exe`, `<sapmnt>/<SAPSID>/profile`, `<sapmnt>/<SAPSID>/global`) and SAP transport host (`/usr/sap/trans`).
   2. You *run SAPinst* [page 66] to install the central instance.

5. If required, you install one or more dialog instances on the chosen hosts as described later in this section.
   1. You *mount the exported global directories* [page 64] from the SAP global host (`<sapmnt>/<SAPSID>/exe`, `<sapmnt>/<SAPSID>/profile`, `<sapmnt>/<SAPSID>/global`) and SAP transport host (`/usr/sap/trans`).
   2. You *run SAPinst* [page 66] to install the dialog instance.

6. You continue with *Post-Installation* [page 87].

Graphical Overview

The following figure shows how you install the various instances in a distributed system:

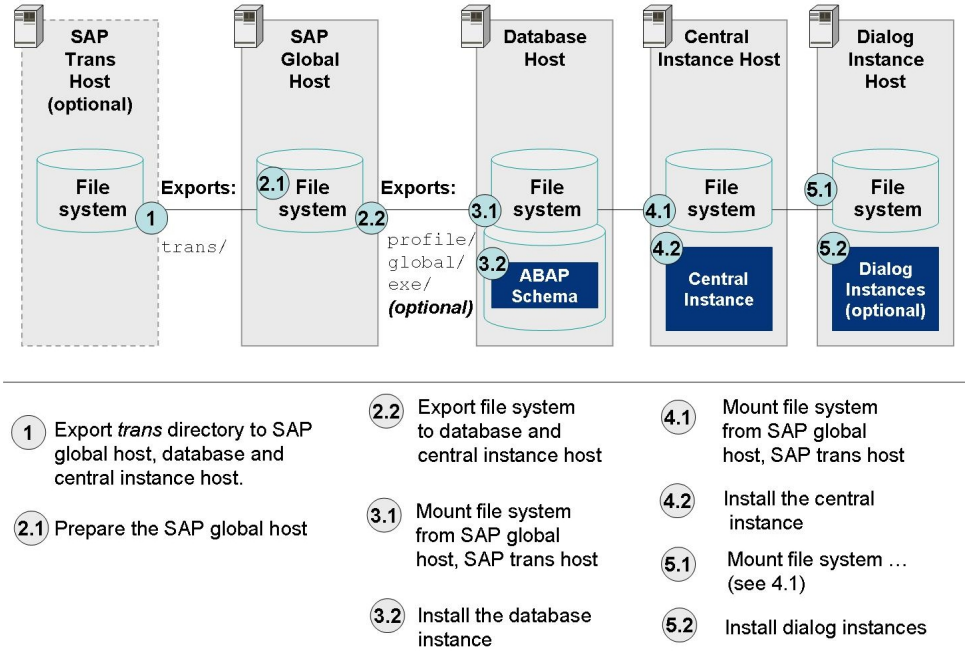

Figure 14: Distribution of Instances in an ABAP System

Only valid for: HA (UNIX) |

High-Availability System

This section describes how you install a high-availability (HA) system consisting of two nodes (**host A** and **host B**). For more information, consult your HA partner.

This procedure describes the steps that are required for a hardware cluster consisting of two nodes (host A and host B):

1. If you want to share the transport directory `trans` from another system, you have to *mount* [page 63] it from this system. Otherwise, we recommend that you share the `trans` directory that is created during the installation of the central instance (see below).
2. You set up the **switchover cluster infrastructure** as follows:
3. On the **database instance host**, proceed as follows:

   RECOMMENDATION

   We recommend that the database instance is part of the hardware cluster or of any other proprietary high-availability solution for the database.

   1. You prepare the database instance host and make sure that it has all the necessary *file systems* [page 50], mount points, and (if required) Network File System (NFS).
   2. You *run SAPinst* [page 66] to install the database instance.

      NOTE

      Do not install the Oracle database software in advance. During the installation of the database instance, SAPinst stops the installation and prompts you to install the Oracle database software.

If you *install an SAP system in an existing database (MCOD)* [page 105] SAPinst prompts you for the existing database.

4. On the **central instance host**, proceed as follows:

   NOTE

   In a high-availability installation, the central 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 ABAP central services instance (ASCS instance), which is protected by the cluster.

   1. You prepare the central instance host and make sure that it has all the necessary *file systems* [page 50], mount points, and (if required) Network File System (NFS).
   2. You *run SAPinst* [page 66] to install the central instance.
   3. If you want to use the shared transport directory `trans` from another system, you also *mount* [page 63] this directory (see above).
5. We recommend that you install dialog instances with SAPinst to create redundancy. The application server instances are not a SPOF. Therefore, you do **not** need to include these instances in the cluster.
   1. You *mount the global directories* [page 64] in `<sapmnt>/<SAPSID>`.
   2. You *run SAPinst* [page 66] to install the dialog instance.
   3. If you want to use the shared transport directory `trans` from another system, you also *mount* [page 63] this directory (see above).
6. You continue with *Post-Installation* [page 87].

Graphical Overview

The following figure provides an overview of how you install the various instances in a high-availability installation:

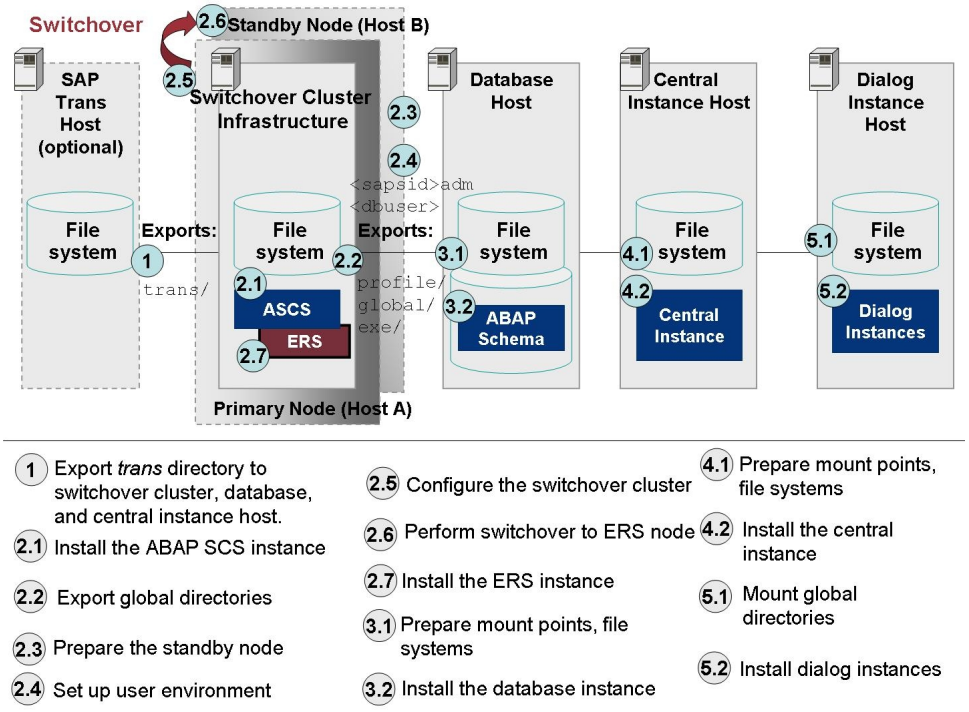

Figure 15: Distribution of Instances in a High-Availability ABAP System

End of: HA (UNIX) |

Dialog Instance

You perform the following steps on the host where you install the dialog instance.

1. You make sure that the *global directories of the SAP system for which you want to install the dialog instance are mounted* [page 64] on the host where you want to install the dialog instance.
2. You *run SAPinst* [page 66] to install the dialog instance.
3. You continue with *Post-Installation* [page 87].

5.2 Exporting and Mounting the Global Transport Directory

In your SAP system landscape, a global transport directory for all SAP systems is required.

- If this 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 this global transport directory does not exist, proceed as follows:
  - Create the transport directory (either on the central instance host 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.

Procedure

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 central or dialog instance host where `/usr/sap/trans` is to be mounted.
2. Create the mount point `/usr/sap/trans`.
3. Mount `/usr/sap/trans` using Network File System (NFS) from the exporting host.

More Information

Mounting Directories via NFS for HP-UX [page 122]

5.3 Exporting and Mounting Global Directories

If you install an SAP system distributed over several hosts, you have to determine one host as the SAP global host. This is the host on which the global directories are to reside. You have to make sure that the global directories are also available on the hosts on which you intend to install the remaining instances of the SAP system. You do this by exporting the global directories on the SAP global host and mounting them on the installation hosts of the remaining SAP system instances to be installed.

EXAMPLE

You install an SAP system distributed over several hosts. You decide that the host with the ABAP central services instance (ASCS instance) is the SAP global host. You then install the ASCS instance with the physical global directories on the SAP global host. Before you install the remaining instances (central instance, a database instance, dialog instances), you have to export the global directories from the SAP global host and mount them on the installation hosts for the remaining instances.

Procedure

Choose one of the following ways to proceed, depending on whether you perform a homogeneous or heterogeneous installation:

Exporting and Mounting Global Directories for a Homogeneous Installation

Homogeneous installation means that all SAP system instances are installed on hosts with the **same** UNIX operating system.

Proceed as follows:

1. Log on to the SAP global host as user `root` and export the following directories with `root` access to the host on which 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 HP-UX* [page 122].

   CAUTION

   Make sure that the global transport directory is mounted on every host where you want to install an SAP system instance. For more information, see *Exporting and Mounting the Global Transport Directory* [page 63]. Otherwise, the installation of this SAP system instance fails.
2. Log on to the host of the new instance 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`

   CAUTION

   Make sure that these mount points are permanent. Otherwise, automatic start of the instance services does not work when you reboot the system.

Exporting and Mounting Global Directories for a Heterogeneous Installation

Heterogeneous installation means here that the instances of an SAP system are installed on hosts with **different UNIX operating systems**. If you need information about the installation of application servers on Windows in a UNIX environment, see *Heterogeneous SAP System Installations* [page 132].

Proceed as follows for a heterogeneous installation with different UNIX operating systems:

1. Log on to the SAP global host as user `root` and export the following directories with `root` access to the host on which you want to install the new instance:

   `<sapmnt>/<SAPSID>/profile`

   `<sapmnt>/<SAPSID>/global`

   For more information, see *Mounting Directories via NFS for HP-UX* [page 122].

   CAUTION

   Do **not** export `<sapmnt>/<SAPSID>/exe`.

   CAUTION

   Make sure that the global transport directory is mounted on every host where you want to install an SAP instance. For more information, see *Exporting and Mounting the Global Transport Directory* [page 63]. Otherwise, the installation fails.
2. Log on to the host of the new instance as user `root`.
3. Create the following mount points and mount them from the SAP global host:

`<sapmnt>/<SAPSID>/profile`

`<sapmnt>/<SAPSID>/global`

CAUTION

Make sure that these mount points are permanent. Otherwise automatic start of the instance services does not work when you reboot the system.

CAUTION

Do **not** mount `<sapmnt>/<SAPSID>/exe` and do not create it locally. It is created automatically during the installation.

5.4 Running SAPinst

This section describes how to run the installation tool SAPinst. SAPinst includes a GUI client and a GUI server, which both use Java.

This section describes an installation where SAPinst, GUI client, and GUI server are running on the same host. In the following, GUI client and GUI server are addressed as "SAPinst GUI".

If you need to see the installation on a remote display, we recommend that you *perform a remote installation with SAPinst* [page 75], where the SAPinst GUI is running on a **separate** host from SAPinst.

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 open source – for remote access to the GUI on Windows workstations. We recommend you use the Hummingbird Exceed X Server, which we use to validate installations with SAPinst. For more information, see **SAP Note** 1170809.

Useful Information About SAPinst

- When you start SAPinst, it automatically starts the SAPinst GUI.
- SAPinst creates the installation directory `sapinst_instdir` directly below the temporary directory. SAPinst finds the temporary directory by checking the value of the following environment variables in the following sequence: `TEMP`, `TMP`, and `TMPDIR`. If no value is set for these variables, SAPinst creates the installation directory `sapinst_instdir` directly below the `/tmp` directory by default. If you want SAPinst to create the installation directory `sapinst_instdir` in another directory, set the environment variable `TEMP` to this directory before you start SAPinst.

Shell Used	Command
Bourne shell (sh)	`TEMP=<directory>` `export TEMP`
C shell (csh)	`setenv TEMP <directory>`
Korn shell (ksh)	`export TEMP=<directory>`

CAUTION

Make sure that the installation directory is not mounted with NFS, or there might be problems when the Java Virtual Machine is started.

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 `sapinst_instdir/<installation_option_directory>`.
- SAPinst extracts itself to a temporary directory called `sapinst_exe.xxxxxx.xxxx`, which is located in the environment variables `TEMP`, `TMP`, or `TMPDIR`. These files are deleted after SAPinst has stopped running.

  The temporary directory `sapinst_exe.xxxxxx.xxxx` sometimes remains undeleted. You can safely delete it.

  The temporary directory also contains the log file `dev_selfex.out` from the extraction process, which might be useful if an error occurs.

  CAUTION

  If SAPinst cannot find a temporary directory, the installation terminates with the error `FCO-00058`.
- During the installation, the default ports 21200, 21212, and 4239 are used for communication between SAPinst, GUI server, GUI, and HTTP server, as follows:
  - SAPinst uses port 21200 to communicate with the GUI server.
  - The GUI server uses port 21212 to communicate with the GUI client.
  - 4239 is the port of the HTTP server, which is part of the GUI server.

  If the ports for SAPinst and the GUI server are already in use, SAPinst automatically searches for free port numbers. If the search fails, SAPinst exits.

  In this case or if you want SAPinst to use specific ports, you can assign them by executing the `sapinst` executable with the following command line parameters:
  - `SAPINST_DIALOG_PORT=<port_number_sapinst_to_gui_server>`
  - `GUISERVER_DIALOG_PORT=<port_number_gui_server_to_gui_client>`
  - `GUISERVER_HTTP_PORT=<port_number_http_server>`
- To see a list of all available SAPinst properties, start SAPinst as described above with command line parameter `-p`:

  `./sapinst -p`.
- If you need to run SAPinst in accessibility mode, proceed as described in *Running SAPinst in Accessibility Mode* [page 78].
- If required, you can stop SAPinst by choosing *SAPinst → Cancel* in the SAPinst GUI menu.

  NOTE

  If you need to terminate SAPinst, you can do this by pressing Ctrl + C.

Prerequisites

- We recommend that you use the `csh` shell for the installation with SAPinst. If you want to use another shell, make sure that you have read **SAP Note** 202227.
  SAPinst uses `csh` scripts during the installation to obtain the environment for user `<sapsid>adm`. This is also true if user `<sapsid>adm` already exists from an earlier SAP system installation, and the shell of this user is not `csh`. Before you start SAPinst, execute the following command as user `<sapsid>adm` to make sure that the `csh` scripts are up-to-date:
  ```
  /bin/csh -c "source /<home>/<sapsid>adm/.cshrc;env"
  ```
- Make sure that you have specified the most important SAP system parameters as described in *Basic SAP System Installation Parameters* [page 28] **before** you start the installation.
- Check that your installation hosts meet the requirements for the installation options that you want to install.
  For more information, see *Running the Prerequisite Checker* [page 23].
- If you want to perform a distributed or a high-availability installation, make sure that you have *exported and mounted global directories* [page 64].
- If you are installing a second or subsequent SAP system into an existing database (MCOD), make sure that the database is **up and running before** starting the installation.
  Check that the SYSTEM tablespace contains at least 400 MB of free space. If there is not enough space left, increase the size of this tablespace with BRSPACE or BRTOOLS.
  For more information, see *Installation of Multiple Components in One Database* [page 105].
- Check the value of the environment variable `TEMP`, `TMP`, or `TMPDIR`:

Shell Used	Command
Bourne shell (sh)	`TEMP=<directory>` `export TEMP`
C shell (csh)	`setenv TEMP <directory>`
Korn shell (ksh)	`export TEMP=<directory>`

  - 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 variable `TEMP`, `TMP`, or `TMPDIR` points – for example, by using a `crontab` entry.
  - Make sure that you have at least 60 MB of free space in the installation directory for each installation option. In addition, you need 200 MB free space for the SAPinst executables. If you cannot provide 200 MB free space in the temporary directory, you can set one of the environment variables `TEMP`, `TMP`, or `TMPDIR` to another directory with 200 MB free space for the SAPinst executables.
  - Make sure that the temporary directory has the permissions `1777`.
- 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 GUI.

Shell Used	Command
Bourne shell (sh)	`DISPLAY=<host_name>:0.0` `export DISPLAY`
C shell (csh)	`setenv DISPLAY <host_name>:0.0`
Korn shell (ksh)	`export DISPLAY=<host_name>:0.0`

- Make sure that `umask` is set to `022` for user `root`.

  As user `root`, enter the following command: `umask 022`
- Check the following values for user `root`:
  - In `csh`, execute `limit`

Output	Properties
`cputime`	`unlimited`
`filesize`	`unlimited`
`datasize`	`unlimited`
`stacksize`	`8192 KB`
`coredumpsize`	`unlimited`
`descriptors`	`8192`
`memorysize`	`unlimited`

  - In `sh` or `ksh`, execute `ulimit -a`

Output	Properties
`time(seconds)`	`unlimited`
`file(blocks)`	`unlimited`
`data(kbytes)`	`unlimited`
`stack(kbytes)`	`8192`
`coredump(blocks)`	`unlimited`
`nofiles(descriptors)`	`8192`
`memory(KBytes)`	`unlimited`

  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:

    `limit descriptors 8192`
  - In `sh` or `ksh` execute:

    `ulimit -n 8192`
- If you want to install a dialog instance to an existing SAP system, make sure that:
  - There is exactly one entry in the `/usr/sap/sapservices` file for each SAP instance installed on this host. Make sure that you check that the entry refers to the correct profile.
  - There are no profile backup files with an underscore "_" in their profile name. If so, you must replace the "_" with a ".".

EXAMPLE

Rename `/usr/sap/S14/SYS/profile/S14_DVEBMGS20_zsi-aix693p2_D20081204` to `/usr/sap/S14/SYS/profile/S14_DVEBMGS20_zsi-aix693p2.D20081204`.

Procedure

1. Log on to the installation host as user `root`.

   CAUTION

   Do not use an existing `<sapsid>adm` user.

   CAUTION

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

2. 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 HP-UX* [page 120].

3. Change to the directory with the `sapinst` executable for your operating system by entering the following command:

   ```
   cd <Mountpoint of Installation Master DVD>/IM_<your OS>
   ```

4. Start SAPinst by executing the following command:

   ```
   ./sapinst
   ```

   NOTE

   If you want to use a virtual host name, start SAPinst with the SAPinst property `SAPINST_USE_HOSTNAME` as follows:

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

   CAUTION

   Make sure that the installation directory is not mounted with NFS, or there might be problems when the Java Virtual Machine is started.

5. In the *Welcome* screen, choose your SAP system. You can do either one of the following:

   - Install an SAP system

     Choose ▶ *<Your SAP product>* → *SAP Application Server ABAP* → *<Database>* → *<System Variant>* ↵

     You can install the following system variants:

System Variants	Remarks
Central System	Installs an SAP system with all mandatory instances on one host
Distributed System	Installs an SAP system with all mandatory instances on different hosts Perform the installation options **exactly** in the order they appear. You have to restart SAPinst on the relevant host for each installation option.
High-Availability System	Installs a high-availability SAP system with all mandatory instances on different hosts Perform the installation options **exactly** in the order they appear. You have to restart SAPinst on the relevant host for each installation option.

> **NOTE**
>
> When you start the installation from a 32-bit installation master DVD, all you see is the folder *Software Life-Cycle Options* on the *Welcome* screen.

- Perform other tasks or install additional components

  Choose ▶ <*Your SAP product*> → *Software Life-Cycle Options* ↵.

  The following software life-cycle options are available:

Software Life-Cycle Installation Options	Remarks
Additional Preparation Options	These options comprise the following tasks: • Host Agent Installs a standalone host agent. For more information, see *Installing the Host Agent Separately* [page 123]. • Operating System Users and Groups Allows you to use global accounts that are configured on a separate host Run this installation option **before** you start the installation of the SAP system. • Prerequisites Check Checks your hardware and software requirements **before** you start the installation. For more information, see *Running the Prerequisites Checker in Standalone Mode* [page 23].
Application Server	Installs one or more dialog instances in an already installed SAP system, if required
LDAP Registration	Sets up LDAP support for an application server instance For more information about LDAP and Active Directory, see *Integration of LDAP Directory Services* [page 107].
System Copy	Performs a system copy
Uninstall	Uninstalls your SAP system, standalone engines, or optional standalone units For more information, see *Deleting an SAP System* [page 133].

6. Choose *Next*.
7. Follow the instructions in the SAPinst input screens and enter the required parameters.

   > **NOTE**
   >
   > For more information about the input parameters, position the cursor on the 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.
8. To start the installation, choose *Start*.

   SAPinst starts the installation and displays the progress of the installation.

   > **NOTE**
   >
   > - During the installation of the Oracle database instance, SAPinst stops the installation and prompts you to *install the Oracle database software* [page 79].

This action is not required if you install a system into an existing database (MCOD). After you have finished the installation of the Oracle database, you continue the database instance installation by choosing *OK* in the GUI of the database instance installation.

- For Oracle 10, check **SAP Note** 841728 for known installation problems with Oracle 10 g.
- For Oracle 11, check **SAP Note** 1431800 for technical information about Oracle Release 11.2 in SAP environments.

CAUTION

If you decided to use 02 as the instance number, the instance fails to start during the installation process. For more information about the cause, see *Basic SAP System Installation Parameters* [page 28]. You have to manually change the port number for report `RSLGCOLL` to continue with the installation.

Proceed as follows:

1. Go to directory `/<sapmnt>/<SAPSID>/profile`
2. Edit DEFAULT.PFL.
3. Set the parameter `rslg/collect_daemon/listen_port` to a free port number.

9. If required, install a dialog instance for a central system or distributed system.
10. If required, delete directories with the name `sapinst_exe.xxxxxx.xxxx` after SAPinst has finished. Sometimes these remain in the temporary directory.

NOTE

If there are errors with the SAPinst extraction process, you can find the log file `dev_selfex.out` in the temporary directory.

RECOMMENDATION

Keep all installation directories until you are sure that the system, including all instances, is completely and correctly installed. Once the system is completely and correctly installed, make a copy of the installation directories with all their contents. Save the copy to a physically separate medium, such as a DVD or a USB drive that is separate from your installation hosts. This might be useful for analyzing issues occurring later when you use the system. For security reasons, do **not** keep installation directories on installation hosts, but make sure that you delete them after saving them separately.

11. We recommend that you delete the directory `<user_home>/.sdtgui/`.
12. If you copied installation DVDs to your hard disk, you can delete these files when the installation has successfully completed.

More Information

- *Interrupted Installation with SAPinst* [page 73]
- *Performing a Remote Installation with SAPinst* [page 75]
- *Starting SAPinst GUI Separately* [page 76]

- *Running SAPinst in Accessibility Mode* [page 78]
- *Entries in the Services File Created by SAPinst* [page 79]
- *Troubleshooting with SAPinst* [page 133]

5.5 Additional Information About SAPinst

The following sections provide additional information about SAPinst:

- *Interrupted Installation with SAPinst* [page 73]
- *Performing a Remote Installation with SAPinst* [page 75]
- *Starting SAPinst GUI Separately* [page 76]
- *Running SAPinst with Accessibility Mode* [page 78]
- *Entries in the Services File Created by SAPinst* [page 79]

5.5.1 Interrupted Installation with SAPinst

The SAP system installation might be interrupted for one of the following reasons:

- An error occurred during the *Define Parameters* or *Execute* phase:
  SAPinst does not abort the installation in error situations. If an error occurs, the installation pauses and a dialog box appears. The dialog box contains a short description of the choices listed in the table below as well as a path to a log file that contains detailed information about the error.
- You interrupted the installation by choosing *Cancel* in the *SAPinst* menu.

CAUTION

If you stop an option in the *Execute* phase, any system or component **installed** by this option is incomplete and not ready to be used. Any system or component **uninstalled** by this option is not completely uninstalled.

The following table describes the options in the dialog box:

Option	Definition
Retry	SAPinst retries the installation from the point of failure without repeating any of the previous steps. This is possible because SAPinst records the installation progress in the `keydb.xml` file. We recommend that you view the entries in the log files, try to solve the problem, and then choose *Retry*. If the same or a different error occurs, SAPinst displays the same dialog box again.
Stop	SAPinst stops the installation, closing the dialog box, the SAPinst GUI, and the GUI server. SAPinst records the installation progress in the `keydb.xml` file. Therefore, you can continue the installation from the point of failure without repeating any of the previous steps (see the procedure below).

Option	Definition
Continue	SAPinst continues the installation from the current point.
View Log	Access installation log files.

NOTE

You can also terminate SAPinst by choosing Ctrl + C. However, we do **not** recommend that you use Ctrl + C, because this kills the process immediately.

Procedure

This procedure describes the steps to restart an installation, which you stopped by choosing *Stop*, or to continue an interrupted installation after an error situation.

1. Log on to your local UNIX 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. Mount your Installation Master DVD.

   NOTE

   Mount the DVD locally. We do not recommend using Network File System (NFS).

3. Start SAPinst using the following commands:

   ```
   cd <Installation_Master_DVD>/IM_<OS>
   ./sapinst
   ```

4. From the tree structure in the *Welcome* screen, select the installation option that you want to continue and choose *Next*.

   The *What do you want to do?* screen appears.

5. In the *What do you want to do?* screen, decide between the following alternatives and continue with *Next*:

Alternative	Behavior

Run a new option	SAPinst does not continue the interrupted installation option. Instead, it moves the content of the old installation directory and all installation-specific files to a backup directory. Afterwards, you can no longer continue the old installation option.
	For the backup directory, the following naming convention is used:
	`<log_day_month_year_hours_minutes_seconds>`
	EXAMPLE
	`log_01_Oct_2008_13_47_56`
	CAUTION
	SAPinst moves all the files and folders to a new log directory, even if these files and folders are owned by other users. If there are any processes currently running on these files and folders, they might no longer function properly.

Alternative	Behavior
Continue with the old option	SAPinst continues the interrupted installation option from the point of failure.

5.5.2 Performing a Remote Installation with SAPinst

You use this procedure to install your SAP system on a **remote** host. In this case, SAPinst runs on the remote host, and the SAPinst GUI runs on the **local** host. The local host is the host from which you control the installation with the SAPinst GUI. The SAPinst GUI connects using a secure SSL connection to SAPinst.

Alternatively you can use an X server for Microsoft Windows or other remote desktop tools such as `VNC Viewer` or `NX Server / NX Client` – offered by various vendors or open source – for remote access to SAPinst GUI on Windows workstations. We recommend that you use the `Hummingbird Exceed X Server`, which we use to validate installations with SAPinst. For more information, see **SAP Note** 1170809.

Prerequisites

- The remote host meets the prerequisites for starting SAPinst as described in *Running SAPinst* [page 66]
- Both computers are in the same network and can ping each other.

  To test this:

  1. Log on to your remote host and enter the command `ping <local host>`.
  2. Log on to the local host and enter the command `ping <remote host>`.

Procedure

1. Log on to your remote 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. Mount the Installation Master DVD.
3. Change to the directory of the `sapinst` executable by entering the following command:

   ```
   cd <Mountpoint of Installation Master DVD>/IM_<OS>
   ```
4. Start SAPinst by executing the following command:

   ```
   ./sapinst -nogui
   ```

   SAPinst now starts and waits for the connection to the SAPinst GUI. You see the following at the command prompt:

   ```
   guiengine: no GUI connected; waiting for a connection on host <host_name>, port <port_number> to continue with the installation
   ```

5. Start the SAPinst GUI on your **local** host as described in *Starting the SAPinst GUI Separately* [page 76].

5.5.3 Starting SAPinst GUI Separately

You use this procedure to start the SAPinst GUI separately. You need to start the SAPinst GUI separately in the following cases:

- You closed the SAPinst GUI using *File* → *Exit* from the SAPinst menu while SAPinst is still running.
- You want to perform a remote installation, where the SAPinst GUI runs on a different host from SAPinst. For more information, see *Performing a Remote Installation with SAPinst* [page 75].
- You want to run SAPinst in accessibility mode. In this case, you have to start the SAPinst GUI separately on a Windows host as described below with the additional command line parameter `-accessible`. For more information, see *Running SAPinst in Accessibility Mode* [page 78].

Prerequisites

The host on which you want to start the SAPinst GUI meets the prerequisites for starting SAPinst as described in *Running SAPinst* [page 66].

Procedure

Starting SAPinst GUI on Windows

1. Insert the SAP Installation Master DVD into your DVD drive.
2. Change to the directory of the `sapinstgui` executable:
   `<Drive>:\<Installation_Master_DVD>\IM_WINDOWS_<platform>`

   > **NOTE**
   > If you want to start the SAPinst GUI on a Windows 32-bit operating system, change to the following directory:
   > `<Drive>:\<Installation_Master_DVD>\IM_WINDOWS_I386`
3. Start the SAPinst GUI from a command prompt by executing `sapinstgui.exe` with the relevant command line parameters:
   - If you want to perform a remote installation, execute the following command:
     `sapinstgui.exe -host <remote_host> -port <port_number_gui_server_to_gui_client>`
     – where `<remote_host>` is the name of the remote host, and `<port_number_gui_server_to_gui_client>` is the port the GUI server uses to communicate with the GUI client (21212 by default).
   - If you closed the SAPinst GUI using *File* → *Exit* and want to reconnect to SAPinst, proceed as follows:

- If you are performing a local installation with SAPinst and SAPinst GUI running on the same host, execute the following command:

  ```
  sapinstgui.exe -port <port_number_gui_server_to_gui_client>
  ```

  – where `<port_number_gui_server_to_gui_client>` is the port the GUI server uses to communicate with the GUI client (21212 by default).
- If you are performing a remote installation with SAPinst and SAPinst GUI running on different hosts, execute the following command:

  ```
  sapinstgui.exe -host <remote_host> -port
  <port_number_gui_server_to_gui_client>
  ```

  – where `<remote_host>` is the name of the remote host, and `<port_number_gui_server_to_gui_client>` is the port the GUI server uses to communicate with the GUI client (21212 by default).

The SAPinst GUI starts and connects to SAPinst.

Starting SAPinst GUI on UNIX

1. Mount the Installation Master DVD.

   NOTE

   Mount the DVD locally.

   We do **not** recommend that you use Network File System (NFS).
2. Change to the directory of the `sapinstgui` executable by entering the following command:

   ```
   cd <Mountpoint of Installation Master DVD>/IM_<OS>
   ```

   NOTE

   If you want to start the SAPinst GUI on a Linux 32–bit platform, enter the following command:

   ```
   cd <Mountpoint of Installation Master DVD>/IM_LINUX_I386
   ```
3. Start the SAPinst GUI by executing `./sapinstgui` with the relevant command line parameters:
   - If you want to perform a remote installation, execute the following command:

     ```
     ./sapinstgui -host <remote_host> -port <port_number_gui_server_to_gui_client>
     ```

     – where `<remote_host>` is the name of the remote host, and `<port_number_gui_server_to_gui_client>` is the port the GUI server uses to communicate with the GUI client (21212 by default).
   - If you closed the SAPinst GUI using *File* → *Exit* and want to reconnect to SAPinst, proceed as follows:
     - If you are performing a local installation with SAPinst and SAPinst GUI running on the same host, execute the following command:

       ```
       sapinstgui -port <port_number_gui_server_to_gui_client>
       ```

       – where `<port_number_gui_server_to_gui_client>` is the port the GUI server uses to communicate with the GUI client (21212 by default).

- If you are performing a remote installation with SAPinst and SAPinst GUI running on different hosts, execute the following command:

  ```
  sapinstgui -host <remote_host> -port
  <port_number_gui_server_to_gui_client>
  ```

  – where `<remote_host>` is the name of the remote host, and `<port_number_gui_server_to_gui_client>` is the port the GUI server uses to communicate with the GUI client (21212 by default).

The SAPinst GUI starts and connects to SAPinst.

5.5.4 Running SAPinst in Accessibility Mode

You can also run SAPinst in accessibility mode. The following features are available:

- Keyboard access:
  This feature is generally available for all operating systems.
- High-contrast color:
  This feature is derived from the Windows display properties. Therefore, to enable this feature, you must perform a remote installation with the SAPinst GUI running on a Windows host.
- Custom font setting:
  This feature is derived from the Windows display properties. Therefore, to enable this feature, you must perform a remote installation with the SAPinst GUI running on a Windows host.

Procedure

Activating and Adjusting Accessibility Settings on Windows

You first have to activate and adjust the relevant settings for the font size and color schemes **before** you start SAPinst or the SAPinst GUI.

NOTE

The following procedure applies for Windows Server 2008 and might be different when using another Windows operating system.

1. Right click on your Windows desktop and choose *Personalize*.
2. Select *Adjust font size (DPI)* and choose *Larger scale (120 DPI)*.
   To define other font size schemes, choose *Custom DPI*.
3. In the right-hand pane, select *Window Color and Appearance*.
   Select a color scheme from the *Color scheme* drop-down box.
   To define your own color schemes, choose *Advanced*.

Running SAPinst in Accessibility Mode

You perform a remote installation as follows:

1. Start SAPinst on the remote host by executing the following command from the command line as described in *Performing a Remote Installation with SAPinst* [page 75]:
   ```
   ./sapinst -nogui
   ```
2. Start SAPinst GUI on a local Windows host by executing the following command from the command line as described in *Starting the SAPinst GUI Separately for a Remote Installation* [page 76]:
   ```
   sapinstgui.exe -accessible -host <remote_host> -port
   <port_number_gui_server_to_gui_client>
   ```

5.5.5 Entries in the Services File Created by SAPinst

After the installation has finished successfully, SAPinst has created the following entries in `/etc/services`:

`sapdp<nn> = 32<nn>/tcp`

`sapdp<nn>s = 47<nn>/tcp`

`sapgw<nn> = 33<nn>/tcp`

`sapgw<nn>s = 48<nn>/tcp`

`sapms<SAPID> = 36<nn>/tcp` (unless you specified another value during the installation)

NOTE

- `<nn>` is the instance number. There is a port created for every possible instance number, regardless of which instance number you specified during the installation. For example, for `sapgw<nn> = 33<nn>/tcp` the following range of entries is created:
  ```
  sapgw00 = 3300/tcp
  sapgw01 = 3301/tcp
  sapgw02 = 3302/tcp
  [...]
  sapgw98 = 3398/tcp
  sapgw99 = 3399/tcp
  ```
- If there is more than one entry for the same port number, this is **not** an error.

5.6 Oracle Database Software Installation

Continue with the section relevant for the release of the Oracle database that you want to install:

- *Oracle 10 Database Software Installation* [page 79]
- *Oracle 11 Database Software Installation* [page 83]

5.6.1 Oracle 10 Database Software Installation

SAPinst prompts you to install the Oracle database.

Proceed as follows to install the Oracle 10 database software:

Process Flow

1. You *update SAP-specific files in the Oracle stage area* [page 80].
2. You *run the Oracle Universal Installer* [page 80]
3. You *install the current patch set* [page 82]
4. You *install required interim patches* [page 83]

5.6.1.1 Updating SAP-Specific Files in the Oracle Staging Area

SAPinst extracts the Oracle RDBMS software to the staging area, usually `/oracle/stage/102_64/database`.

The `SAP` folder located in `/oracle/stage/102_64/database` contains SAP-specific scripts as well as the response files.

Before starting the Oracle software installation, you need to update this `SAP` folder so that the updated versions of the scripts or response files are used.

Procedure

1. Rename the original `SAP` folder by performing one of the following:
   - `mv /oracle/stage/102_64/database/Disk1/SAP /oracle/stage/102_64/database/Disk1/SAP_ORIG`
   - `mv /oracle/stage/102_64/database/SAP /oracle/stage/102_64/database/SAP_ORIG`
2. Download the file `RDBMS_SAP_64.zip` attached to **SAP Note** 819830 and copy it to a temporary location such as `/tmp`.
3. Extract the zip file by performing one of the following:
   - `cd /oracle/stage/102_64/database`
     `unzip /tmp/RDBMS_SAP_64.zip`
   - `cd /oracle/stage/102_64/database/Disk1`
     `unzip /tmp/RDBMS_SAP_64.zip`

   You should now see the directory `SAP` extracted with the updated version of SAP-specific files.

5.6.1.2 Running the Oracle Universal Installer

To install the Oracle database software; you run the Oracle Universal Installer (OUI).

Prerequisites

A graphical user interface (GUI) is required for the database installation with Oracle Universal Installer.

CAUTION

Check **SAP Note** 841728 for known problems that occur during the installation of Oracle 10g database software.

Procedure

1. Log on as user `ora<dbsid>`.

   Since you are already logged on as user `root`, you can switch to user `ora<dbsid>` by entering the following command:

   ```
   su - ora<dbsid>
   ```

2. Make sure that `umask` is set to 022 by entering the following command:

   ```
   umask 022
   ```

3. If you install Oracle database software with Release 10.2.0.1 or 10.2.0.x on a new operating system or a new operating system version, the Oracle Universal Installer might not yet recognize or support this operating system. Follow the instructions in **SAP Note** 980426.

4. Make sure that the `DISPLAY` environment variable is set to `<host_name>:0.0`, where `<host_name>` is the host on which you want to display the GUI of the Oracle Universal Installer (OUI).

Shell Used	Command
Bourne shell (sh)	`DISPLAY=<host_name>:0.0` `export DISPLAY`
C shell (csh)	`setenv DISPLAY <host_name>:0.0`
Korn shell (ksh)	`export DISPLAY=<host_name>:0.0`

5. Start the OUI with the user `ora<dbsid>` by entering one of the following:

   - `cd /oracle/stage/102_64/database/Disk1/SAP`

     `./RUNINSTALLER`
   - `cd /oracle/stage/102_64/database/SAP`

     `./RUNINSTALLER`

   You see a message that a response file is being generated. It might take several minutes before you see the OUI screen.

6. Respond to the OUI as follows:

Prompt or Condition	Action
When you run the OUI for the first time on this host, a dialog box, *Specify File Locations Destination...*, appears. This dialog box proposes the inventory location as `/oracle/oraInventory` and the installation group as `dba`.	Accept the OUI proposal and continue by choosing *Next*.
Available Product Components	Confirm the default selections by choosing *Next*.
Product-Specific Prerequisite Checks	For items that are flagged as warnings or failed, review the cause for the warning or failure on screen and fix the problem if possible.

Prompt or Condition	Action
This phase checks if all necessary requirements for installing and running the database have been met.	Alternatively you can verify the items manually and confirm them by clicking the checkbox. You can find details about each check by clicking on the relevant item.
Summary page	Check the information on this page and then start the installation.
When the Install step has completed, a dialog box appears.	Execute the file `$ORACLE_HOME/root.sh` with the user `root`, and confirm the dialog box by choosing *OK*. If this is the first time that the Oracle software has been installed on this host, the OUI also asks you to execute a second script, `/oracle/oraInventory/orainstRoot.sh`, as the `root` user. Execute this script as well. Continue by choosing *Next*.

7. At the end of the installation, in case there are any Configuration Assistants that have been started automatically (for example, Oracle Net) choose *Cancel* and terminate the Net Config Assistant. You can ignore messages that some of the config assistants failed to complete successfully.
   The Installer finishes, reporting that the Oracle installation was successful. It also informs you about the services that it started. You can find the port numbers for these services in the `$ORACLE_HOME/install/portlist.ini` file.
8. To exit the OUI, choose *Exit* and confirm the dialog box that appears.

NOTE

You can now access the Oracle 10.2 online documentation, which was installed during the last step. You can find the entry point to the Oracle online documentation at `$ORACLE_BASE/doc/index.htm`.

5.6.1.3 Installing the Current Patch Set

After the *database software installation* [page 80], you need to install the current Oracle Database 10g Release 2 (10.2) patch set.

Prerequisites

- For more information on the latest patch set available for Oracle 10.2, see **SAP Note** 839187.
- For more information about how to install the patch set, see the patch set `README` file.

CAUTION

Do **not** perform any of the post-installation steps mentioned in the patch set `README` file. The post-installation steps are to be performed only on an existing Oracle 10.2 database.
At this stage you have only installed the Oracle 10.2 software. The database itself is still not Oracle 10.2. Therefore, make sure that you do not perform the post-installation steps mentioned in the `README` file.

- You only have to install the **latest** (that is, the current) patch set.

Procedure

1. Log on at the operating system level with the `ora<dbsid>` user.
2. Install the patch set as described on the patch set `README` file.
   For more information, see **SAP Note** 839187.

5.6.1.4 Installing Required Interim Patches

After the Oracle database software installation, you need to install required interim patches, using the Oracle tool OPatch. You need these interim patches **in addition to** the current patch set.

RECOMMENDATION

You can install all the required interim patches in a single step using the Oracle tool MOPatch, which you can find at **SAP Note** 1027012.
MOPatch can also download patches directly from SAP Service Marketplace and check for any potential patch conflicts.

Prerequisites

- Make sure you have already *installed the current patch set* [page 82].
- Check **SAP Note** 871096 and 1137346 to find the list of required patches to be installed.
- Check **SAP Note** 839182 for instructions on how to use OPatch.

Procedure

1. Log on at the operating system level as the `ora<dbsid>` user.
2. Install the patches, following the instructions in **SAP Note** 839182.

   NOTE

   You can apply the patches in any order.
   We recommend that you first copy the patches to a directory called `ora_patches` in `$ORACLE_HOME`.
3. After all the patches have been successfully applied, you can query the status with the following command:

   ```
   $ORACLE_HOME/OPatch/opatch lsinventory
   ```

   This command lists all the patches that have been applied to the software installation.

5.6.2 Oracle 11 Database Software Installation

SAPinst prompts you to install the Oracle database.
Proceed as follows to install the Oracle database software:

Process Flow

1. You *run the Oracle Universal Installer* [page 84]
2. You *install the current patch set* [page 85]
3. You *install the required SAP bundle patch* [page 86]

5.6.2.1 Running the Oracle Universal Installer

To install the database software, you run the Oracle Universal Installer (OUI).

Prerequisites

A graphical user interface (GUI), for example `X11`, is required for the Oracle database software installation with `runInstaller`. For more information, see the documentation of your operating system.

Procedure

1. Log on as user `ora<dbsid>`.
   Since you are already logged on as user `root`, you can switch to user `ora<dbsid>` by entering the following command:
   ```
   su - ora<dbsid>.
   ```
2. Make sure that `umask` is set to 022 by entering the following command:
   ```
   umask 022
   ```
3. Make sure that the `DISPLAY` environment variable is set to `<host_name>:0.0`, where `<host_name>` is the host on which you want to display the GUI of the Oracle Universal Installer (OUI).

Shell Used	Command
Bourne shell (sh)	`DISPLAY=<host_name>:0.0` `export DISPLAY`
C shell (csh)	`setenv DISPLAY <host_name>:0.0`
Korn shell (ksh)	`export DISPLAY=<host_name>:0.0`

4. Start the OUI with the user `ora<dbsid>` by entering the following:
   ```
   cd /oracle/stage/112_64/database/SAP
   ./RUNINSTALLER
   ```
   You see a message that a response file is being generated. It might take several minutes before you see the OUI screen.
5. Respond to the OUI as follows:

Prompt or Condition	Action
Configure Security Updates	Do **not** select the checkbox. The runInstaller issues a warning. Choose *OK* and then *Next*.
Select Installation Option	Confirm the default selections by choosing *Next*.

Prompt or Condition	Action
Grid Installation Options	Confirm the default selection *Single Instance Installation* and then choose *Next*.
Select Product Language	Confirm the default option *English* and then choose *Next*.
Select Database Edition	Confirm the default option *Enterprise Edition* and then choose *Next*.
Specify Installation Location	This screen displays the value for `ORACLE_BASE` which is set in the environment. It also displays the value for `ORACLE_HOME`, which should be `/oracle/DBSID/112_64`. Select this option and then *Next*.
Privileged OS Groups	This screen displays the operating system groups for the DBA and the operator. Normally, these are `dba` and `oper`.
Perform Prerequisite Checks	This screen checks if all the required system prerequisites for installation of the database software have been met. If some of the checks are displayed as *Failed*, you can fix these problems (either by installing the missing patches or configuring the kernel parameters) and run the check again by choosing *Check Again*. **RECOMMENDATION** We strongly recommend you to make sure that there are no failed checks before starting the software installation.
Summary	Review the information displayed on this screen and choose *Finish*.
Finish	Finish the software installation by executing the `root.sh` script as the `root` user from another session.

6. To exit the OUI, choose *Exit* and confirm the dialog box that appears.

5.6.2.2 Installing the Current Patch Set

After the Oracle database software installation, you need to install the current patch set for Oracle Database 11g Release 2 (11.2).

Prerequisites

- For more information on the latest patch set available for Oracle 11.2, see **SAP Note** 1431799.
- For more information about how to install the patch set, see the patch set `README` file.

CAUTION

Do **not** perform any of the post-installation steps mentioned in the patch set `README` file. Only perform the post-installation steps on an existing Oracle 11.2 database.

> At this stage, you have only installed the Oracle 11.2 software. The database itself is still not Oracle 11.2. Therefore, make sure that you do not perform the post-installation steps mentioned in the README file.

- You only have to install the **latest** (that is, the current) patch set.

Procedure

1. Log on at the operating system level with the ora<dbsid> user.
2. Install the patch set as described in the patch set README file.
   For more information, see **SAP Note** 1431799.

5.6.2.3 Installing the Required SAP Bundle Patch

After the Oracle database software installation, you need to install the required SAP bundle patch, using the Oracle tool MOPatch. You need the SAP bundle patch **in addition to** the current patch set.

NOTE

You must install the SAP bundle patch in a single step using the Oracle tool MOPatch, which you can find at **SAP Note** 1027012.

You only need to install the **latest** SAP bundle patch because these patches are cumulative. After installing the SAP bundle patch, you do **not** need to install any critical patch updates (CPUs).

The SAP bundle patch also delivers a set of upgrade scripts that automate most of the pre-upgrade and post-upgrade tasks.

Prerequisites

- Make sure you have downloaded and installed OPatch from SAP Service Marketplace as described in **SAP Note** 839182.
- Make sure you have already *installed the current patch set* [page 85].
- Check **SAP Note** 1431800 to find a cross-reference to the current SAP Note with the list of required patches to be installed.
- Check **SAP Note** 1027012 for instructions on how to use MOPatch.

Procedure

1. Log on at the operating system level as the ora<dbsid> user.
2. Install the SAP bundle patch according to the instructions in the SAP bundle patch README file.
3. After the software installation has finished, create a symbolic link in ORACLE_HOME as follows:

```
ln -s /oracle/DBSID/112_64/lib/libnnz11.so libnnz10.so
```

6 Post-Installation

6.1 Post-Installation Checklist

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

- Central, distributed, or high-availability system
- Dialog instance

Detailed information about the steps is available in the relevant chapter.

Central, Distributed, or High-Availability System

NOTE

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

You have to complete the following post-installation steps, which are described in more detail in the linked chapters:

1. If required, you *perform a full installation backup* [page 103] immediately after the installation has finished.
2. You *perform post-installation steps for the operating system* [page 88].
3. You check whether you can *log on to the application server* [page 88].

   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.
4. You *install the SAP license* [page 90].
5. Only valid for: HA (UNIX) |

   If you installed a high-availability system, you *set up the licenses for high availability* [page 90].

   End of: HA (UNIX) |
6. You *apply the latest kernel and Support Package stacks* [page 91].
7. You *configure the remote connection to SAP support* [page 92].
8. You *install the SAP Online Documentation* [page 92].
9. You *perform post-installation steps for the ABAP application server* [page 93].
10. You *ensure user security* [page 97].
11. On the database instance host, you *perform the Oracle-specific post-installation steps* [page 99].
12. To connect your SAP system to an existing central system landscape directory (SLD), you *configure the connection to a central System Landscape Directory (SLD)* [page 100].
13. You *implement SAP ERP ABAP Add-On Components* [page 101].

14. You *perform the client copy* [page 101].
15. 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 102] on your central and dialog instances.
16. You *perform a full backup of the installation* [page 103].

Dialog Instance

You have to complete the following post-installation steps, which are described in more detail in the linked chapters:

1. If required, you *perform an installation backup* [page 103] for the dialog instance immediately after the installation has finished.
2. You *perform post-installation steps for the operating system* [page 88].
3. You check whether you can *log on to the application server* [page 88] of the dialog instance.
4. You *configure user management* [page 89].
5. You *ensure user security* [page 97].
6. If you installed a dialog instance on a host with a UNIX operating system different from the UNIX operating system of the central instance, you have to *update the kernel of the dialog instance* [page 92].
7. You *install the SAP Online Documentation* [page 92].
8. You *activate the Internet Pricing and Configurator* [page 101].
9. You *implement SAP ERP ABAP Add-On Components* [page 101].
10. You *perform an installation backup* [page 103] for the dialog instance.

6.2 Performing Post-Installation Steps for the Operating System

You have to perform the following post-installation steps for the operating system.

Procedure

1. You check and if necessary modify the settings for the operating system users for your SAP system if they were created by SAPinst.
   For more information, see *Creating Operating System Users and Groups* [page 40].
2. You set the required permissions for `sapstartsrv` and `sapuxuserchk` in the `/<sapmnt>/<SAPSID>/exe`, and `/usr/sap/<SAPSID>/SYS/exe`, and `/usr/sap/<SAPSID>/<Instance_Name>/exe` directories as described in **SAP Note** 927637.
   See also *Starting and Stopping SAP System Instances Using the SAP Management Console* [page 126].

6.3 Logging On to the Application Server

You need to check that you can log on to the SAP system with the standard users, given in the table below.

ABAP Users

User	User Name	Client
SAP system user	SAP*	000, 001, 066
	DDIC	000, 001

Prerequisites

- The SAP system is up and running.
- You have already installed a front end.

Procedure

Logging On to the ABAP Application Server

1. Start *SAP Logon* on the host where you have installed the front end as follows:
   - SAP GUI for **Windows**:

     Choose *Start* → *All Programs* → *SAP Front End* → *SAP Logon*.
   - SAP GUI for **Java**:

     Choose *Start* → *All Programs* → *SAP Clients* → *SAP GUI for Java<Release>*.

     NOTE

     You can alternatively enter the command `guilogon` in the SAP GUI installation directory to start SAP GUI for Java.

     The *SAP Logon* appears.
2. Create a logon entry for the newly installed system in the *SAP Logon*.

   For more information about creating new logon entries, press F1.
3. When you have created the entry, log on as user `SAP*` or `DDIC`.

6.4 Configuring User Management

After the installation of your SAP system has finished, you must decide whether you want to do the following:

- Add the system to Central User Administration (CUA)
- Use Lightweight Directory Access Protocol (LDAP) synchronization

For more information, see the SAP Library at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2)* → *English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Security* → *Identity Management* → *Identity Management for System Landscapes* → *Integration of User Management in Your System Landscape* → *Adding an ABAP System to Your System Landscape*

6.5 Installing the SAP License

You must install a **permanent** SAP license. When you install your SAP system, a **temporary** license is automatically installed.

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.

Procedure

Install the SAP license as described in the SAP Library at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *Technology Consultant's Guide* → *Cross-NetWeaver Configurations* → *SAP License Keys*

Only valid for: HA (UNIX) |

If you have installed a high-availability system, proceed as described in *High Availability: Setting Up Licenses* [page 90].

End of: HA (UNIX) |

More Information

For more information about SAP license keys and how to obtain them, see `http://service.sap.com/licensekey`.

Only valid for: HA (UNIX) |

6.6 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 2 or more cluster nodes (host machines) where the message server is enabled to run, you have to order as many *license keys* [page 90] 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, 1 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 ABAP central services instance (ASCS instance) 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 ABAP central services instance (ASCS instance) on the primary host, node A, is running.
2. To find the hardware ID of the primary host, log on to any application server instance of the SAP system and call transaction SLICENSE.
3. Perform a switchover of the ABAP central services instance (ASCS instance) 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, log on to any application server instance of the SAP system and call transaction SLICENSE.
6. Perform a switchover of the ABAP central services instance (ASCS instance) 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.

End of: HA (UNIX) |

6.7 Applying the Latest Kernel and Support Package Stacks

We strongly recommend that you apply the latest kernel and Support Package stacks from SAP Service Marketplace before you start configuring your SAP system.

Prerequisites

Make sure that you read the release notes for your SAP system before you apply Support Package stacks. The release notes might include information about steps you have to perform after you have applied the Support Package stacks. For more information, see `http://service.sap.com/releasenotes`.

Procedure

Download and apply the latest kernel and Support Package stacks as described in the *SAP NetWeaver 7.0 – Support Package Stack Guide <current version>* at `http://service.sap.com/maintenancenw70`
For up-to-date release information on SAP NetWeaver Support Package stacks, see **SAP Note** 789220.
For up-to-date release information on Support Package stacks, see **SAP Note** 849887.

6.8 Dialog Instances in a Heterogeneous UNIX Environment only: Updating the Kernel

If you have installed dialog instances on hosts that have a different UNIX operating system than the central instance, you have to update the kernel of the newly installed dialog instances.

Procedure

1. Stop the dialog instance as described in *Starting and Stopping SAP System Instances* [page 126].
2. Update the kernel to the same level as the central instance by replacing the old kernel with the new one as follows:
   1. Log on as user `<sapsid>adm` to the host of the dialog instance to be updated.
   2. Download the required kernel, as described in **SAP Note** 19466.
   3. Back up the kernel directory specified by the profile parameter `DIR_CT_RUN`.
   4. Extract the `SAR` files of the kernel Support Packages of the target SP level to a temporary directory using the `SAPCAR` tool.
   5. Copy or move the extracted programs from the temporary directory to the local kernel directory.
   6. Adjust the ownership and permissions of the kernel binaries by entering the following command sequence (execute the `saproot.sh` script located in the kernel directory):

      ```
      su - root
      cd <kernel directory>
      ./saproot.sh <SAPSID>
      exit
      ```
3. Restart the dialog instance as described in *Starting and Stopping SAP System Instances* [page 126].

6.9 Configuring Remote Connection to SAP Support

SAP offers its customers access to support and to a number of remote services such as the SAP EarlyWatch service or the SAP 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`.

6.10 Installing the SAP Online Documentation

SAP currently provides an HTML-based solution for the online documentation, including the Application Help, Glossary, Implementation Guide (IMG), and Release Notes. You can display the documentation with a Java-compatible Web browser on all front-end platforms supported by SAP.

Process

Install the SAP online documentation in your SAP system as described in the `README.TXT` file contained in the root directory of the online documentation DVD, delivered as part of the installation package.

6.11 Performing Post-Installation Steps for the ABAP Application Server

You have to perform the following post-installation steps for the ABAP application server:

- Perform a consistency check
- Maintain your company address for initial users
- Configure the transport management system
- Perform basic operations
- Configure system parameters
- Configure the number of work processes
- Install languages and performing language transport
- Configure the integrated Internet Transaction Server (ITS)
- Make your newly installed SAP system known to your SAP Solution Manager
- Configure AS ABAP to support Secure Socket Layer (SSL)
- Configure Fully Qualified Domain Names (FQDN)
- Configure business applications

For more information, see the appropriate sections below.

Prerequisites

You have logged on to the ABAP application server as described in *Logging On to the Application Server* [page 88].

Procedure

Performing a Consistency Check

We recommend that you check the consistency of the newly installed SAP ABAP system. When logging on to the system for the first time, you need to trigger a consistency check manually. The function is then called automatically whenever you start the system or an application server.

This checks the following:

- Completeness of installation
- Version compatibility between the SAP release and the operating system

  The initial consistency check determines whether:
  - The release number in the SAP kernel matches the release number defined in the database system
  - The character set specified in the SAP kernel matches the character set specified in the database system

- Critical structure definitions that are defined in both the data dictionary and the SAP kernel are identical. The structures checked by this function include SYST, T100, TSTC, TDCT, and TFDIR.

- Accessibility of the message server
- Availability of all work process types
- Information about the enqueue server and the update service

To perform a consistency check, you can either call transaction SICK (SAP initial consistency check) or choose *Tools* → *Administration* → *Administration* → *Installation Check* from the menu.

For more information, see the SAP Library at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *System Management* → *Tools for Monitoring the System* → *Consistency Check*

Maintaining Your Company Address for Initial Users

Maintain your company address in your ABAP system using transaction `SU01` as described in the SAP Library at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Application Platform by Key Capability* → *Business Services* → *Business Address Services (BC-SRV-ADR)* → *Addresses in User Administration* → *Maintenance of Address Data*

NOTE

You must maintain your company address to create ABAP system users.

Configuring the Transport Management System

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

1. Perform post-installation steps for the transport organizer:
   1. Call transaction `SE06`.
   2. Select *Standard Installation*.
   3. Choose *Perform Post-Installation Actions*.
2. Call transaction STMS in the ABAP system to configure the domain controller in the Transport Management System (TMS).

For more information, see the SAP Library at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Software Life Cycle Management* → *Software Logistics* → *Change and Transport System*

Performing Basic Operations

1. Go to the SAP Library at:

   `http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability*

2. Choose the relevant sections to perform the following operations:

Operation	Section in SAP Documentation
Set up operation modes – transaction RZ04	*Solution Life Cycle Management by Key Capability → System Management → Configuration → Operation Modes*
Set up logon groups – transaction SMLG	*Solution Life Cycle Management by Key Capability → System Management → Configuration → Logon Load Balancing → SAP Logon*
Set up administrators	*Solution Life Cycle Management by Key Capability → System Management → Background Processing → Authorizations for Background Processing*
Schedule background jobs	*Solution Life Cycle Management by Key Capability → System Management → Background Processing*
Install a printer	*Solution Life Cycle Management by Key Capability → System Management → SAP Printing Guide*
Configure the system log	*Solution Life Cycle Management by Key Capability → System Management → Tools for Monitoring the System → System log → Configuring the System Log*

Configuring System Parameters

For more information about system profiles, which is where work processes and profile parameters are defined, and how to configure them, see the SAP Library at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English → SAP NetWeaver Library → SAP NetWeaver by Key Capability → Solution Life Cycle Management by Key Capability → System Management → Tools for Monitoring the System → Configuration → Profiles*

Checking the Configured Number of Work Processes

SAPinst installs ABAP systems with a minimum number of work processes. This is only an initial configuration so that you can start working after the installation. You have to adapt the number of work processes in a production system to the system resources and the number of users working in each ABAP system application

For more information about how to configure work processes, see the SAP Library at `http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English → SAP NetWeaver Library → SAP NetWeaver by Key Capability → Solution Life Cycle Management by Key Capability → System Management → Tools for Monitoring the System → Displaying and Controlling Work Processes*

Configuring Kernel Parameters

To configure your kernel parameters, follow the recommendations in **SAP Notes** 146289 and 835474.

Installing Languages and Performing Language Transports

- Install languages using transaction I18N:
  - If you want to use English only, you must activate the default language settings once.
  - If you want to use languages other than English, you must install them and activate the language settings.

For more information about configuring the language settings, see the online documentation in transaction I18N at ▶ *I18N Menue* → *I18N Customizing* ◀.

- Perform language transport using transaction SMLT as described in the SAP Library at:
  ▶ http://help.sap.com/nw70 → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Software Life Cycle Management* → *Software Logistics* → *Change and Transport System* → *Language Transport* ◀

Using and Configuring the SAP ITS Integrated ICM

The SAP Internet Transaction Server (SAP ITS) is integrated in the SAP NetWeaver Application Server ABAP (AS ABAP) as an Internet Communication Framework (ICF) service. You can access this, like other services, with the Internet Communication Manager (ICM). With the SAP ITS integrated in AS ABAP, the Web browser now communicates directly with the SAP system. Furthermore, all SAP ITS-related sources, such as service files, HTML templates, or MIME files, are now stored in the database of the system.

The SAP ITS supports the following functions:

- SAP GUI for HTML
- Internet Application Component (IAC) runtime or Web Transaction technology

For more information about how to configure the integrated SAP ITS, see the SAP Library at:

▶ http://help.sap.com/nw70 → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Application Platform by Key Capability* → *ABAP Technology* → *UI Technology* → *Web UI Technology* → *SAP ITS in the SAP NetWeaver Application Server* → *Configuration* ◀

Making your Newly Installed SAP System Known to your SAP Solution Manager

Make your newly installed SAP system known to your SAP Solution Manager as described in the SAP Library at:

▶ http://help.sap.com → *SAP Solution Manager* → *SAP Solution Manager <Release of your SAP Solution Manager system>* → *SAP Solution Manager* → *Basic Settings* → *Solution Manager System Landscape* → *Create Systems* ◀

Configuring AS ABAP to Support Secure Socket Layer (SSL)

If you installed the SAP Cryptographic Library – see *Basic SAP System Installation Parameters* [page 28] – you have to configure AS ABAP to support Secure Socket Layer (SSL), as described in the SAP Library at:

▶ http://help.sap.com/nw70 → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Security* → *System Security* → *System Security for SAP Web AS ABAP Only* → *Trust Manager* → *Example* → *Configuring the SAP Web AS for Supporting SSL* ◀

Configuring Fully Qualified Domain Names (FQDN)

If you want to use Web Dynpro ABAP as UI technology and you assigned a DNS Domain Name to your SAP System – see *Basic SAP System Installation Parameters* [page 28] – you have to perform the required configuration steps.

For more information, see **SAP Note** 654982 and the SAP Library at:

http://help.sap.com/nw70 → *SAP NetWeaver 7.0 Library (including Enhancement Package 2)* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Application Platform by Key Capability* → *ABAP Technology* → *UI Technology* → *Web UI Technology* → *Web Dynpro ABAP* → *Web Dynpro ABAP Configuration* → *Fully Qualified Domain Names (FQDN)*

Configuring Business Applications

Prepare the SAP system for using business applications, which includes customizing the ABAP system and the business components, as described in the SAP Library at:

http://help.sap.com/nw70 → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Customizing*

6.12 Ensuring User Security

You need to ensure the security of the users that SAPinst created during the installation. The tables below at the end of this section list these users:

- Operating system users
- SAP system users

During the installation, SAPinst by default assigned the master password to all users created during the installation unless you specified other passwords.

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.

CAUTION

SAPinst applied the master password to users `SAP*` and `DDIC` only for SAP system clients 000 and 001, but not to users `SAP*`, `DDIC`, and `EARLYWATCH` in client 066.

Instead, SAPinst always assigns the following passwords to these users in client 066:

`SAP*`: 06071992

`EARLYWATCH`: support

See also *Master Password* in *Basic SAP System Installation Parameters* [page 28].

RECOMMENDATION

User ID and password are encoded only 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:

> http://help.sap.com/nw70 → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Security* → *Network and Transport Layer Security*

CAUTION

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

Procedure

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

Operating System Users

After the installation, operating system users for SAP system, database, diagnostics agent, and host agent are available as listed in the following table:

Operating System and Database Users

User	User Name	Comment
Operating system user	<sapsid>adm	SAP system administrator
	<smdsid>adm	Administrator for the diagnostics agent
	sapadm	User for central monitoring services
	ora<dbsid>	Oracle database administrator (that is, the owner of the database files)
Oracle database user	SAP<SCHEMA_ID>	Oracle database owner (that is, the owner of the database tables)
	SYSTEM	Oracle standard database user
	SYS	Oracle standard database user
	OUTLN	Oracle standard database user
	DBSNMP	Oracle standard database user

Host Agent User

User	User Name	Comment
Operating system user	sapadm	SAP system administrator You do not need to change the password of this user after the installation. This user is for administration purposes only.

SAP System Users

After the installation, ABAP system users are available. The following table shows these users together with recommendations on how you can ensure the security of these users.

ABAP Users

User	User Name	Comment
SAP system user	SAP*	User exists in at least SAP system clients 000, 001, and 066 **CAUTION** This user has extensive authorizations. Make sure that you assign a secure password.
	DDIC	User exists in at least SAP system clients 000 and 001 **CAUTION** This user has extensive authorizations. Make sure that you assign a secure password.
	EARLYWATCH	User exists in at least SAP system client 066
	SAPCPIC	User exists in at least SAP system clients 000 and 001

More Information

For more information about managing ABAP users, see:

http://help.sap.com/nw70 → *SAP NetWeaver 7.0 Library (including Enhancement Package 2)* → *SAP NetWeaver Library* → *Security* → *Identity Management* → *User and Role Administration of AS ABAP*

6.13 Performing Oracle-Specific Post-Installation Steps

You have to perform the following Oracle-specific post-installation steps:

Procedure

Security Setup for the Oracle Listener

If the Oracle security setup defined by the standard installation is not restrictive enough for your purposes, see **SAP Note** 186119 to configure the Oracle listener to accept only connections from specific hosts.

Checking the Recommended Oracle Database Parameters

When installing the Oracle database, a standard database parameter set is used. To take into account the size and configuration of your SAP system and to enable new Oracle features, check and apply the parameter settings as described in **SAP Note** 830576 (Oracle 10g), or **SAP Note** 1431798 (Oracle 11g). You can find an automated script in **SAP Note** 1171650 to help you check whether your SAP system complies with the database parameter recommendations at any given point in time.

Updating Oracle Optimizer Statistics

To update the Oracle optimizer statistics, perform the following:

1. Execute the following commands as the `ora<dbsid>` user:

   ```
   brconnect -u / -c -f stats -t system_stats;
   brconnect -u / -c -f stats -t oradict_stats;
   ```

2. Execute the following commands with SQLPlus:

   ```
   SQL> exec dbms_scheduler.disable('GATHER_STATS_JOB');
   SQL> exec dbms_scheduler.disable('ORACLE_OCM.MGMT_CONFIG_JOB');
   SQL> exec dbms_scheduler.disable('ORACLE_OCM.MGMT_STATS_CONFIG_JOB');
   ```

   For Oracle 11g, also execute the following command:

   ```
   SQL> exec DBMS_AUTO_TASK_ADMIN.DISABLE
   ```

   For more information, see **SAP Note** 974781.

Checking the Version of the Oracle Instant Client

If necessary, install the most up-to-date version of the Oracle Instant Client, as described in SAP Note 819829.

Configuring and Operating the Oracle Database

You have to configure your Oracle database before you start operating it with the SAP system.
For information about Oracle database configuration and administration, see the documentation in the SAP Library at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Application Platform by Key Capability* → *Platform-Wide Services* → *Database Support* → *Oracle*.

6.14 Configuring the Connection to a Central System Landscape Directory

For each system in your landscape that reports data to a central System Landscape Directory (SLD), you have to configure a corresponding SLD data supplier.

Procedure

Configure the SLD data suppliers and the API for the SLD as described in the SAP Library at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Software Life Cycle Management* → *System Landscape Directory* → *Configuring Systems to Connect to SLD*

More Information

This documentation is also available in PDF form in the *User Manual – SLD of SAP NetWeaver 7.0* at:

`http://www.sdn.sap.com/irj/sdn/nw-sld`

6.15 Activating Internet Pricing and Configurator

If you want to use Internet Pricing and Configurator, you have to enable the Virtual Machine Container (VMC).

Procedure

To enable the VMC, proceed as described in **SAP Note** 854170.

6.16 Implementing SAP ERP ABAP Add-On Components

You can install several Add-On Components to your SAP ERP ABAP system.

Procedure

You can find a detailed description on how to implement each available SAP ERP Add-On Component in the related SAP Notes on SAP Service Marketplace at `https://service.sap.com/erp-inst` ▶ *SAP ERP 6.0* → *SAP Notes* ↵.

6.17 Performing the Client Copy

SAPinst creates three ABAP clients during the installation, client 000, client 001, and client 066.
Client 000 is the SAP reference client for ABAP.
Use client 000 as source client for the client copy.

Procedure

1. Maintain the new client with transaction `SCC4`.
2. Activate kernel user `SAP*`:
   1. Set the profile parameter `login/no_automatic_user_sapstar` to `0`.
   2. Restart the application server.
3. Log on to the new client with kernel user **SAP*** and password **PASS**.
4. Copy the client with transaction `SCCL` and profile `SAP_CUST`.
5. Check the log files with transaction `SCC3`.
6. Create the required users. These users must have at least the authorizations required for user administration and system administration. Create a user `SAP*` with all required authorizations for this user. If you want to have other users for system administration, you can also create user `SAP*` without authorizations.
7. Deactivate kernel user `SAP*`:
   1. Reset `login/no_automatic_user_sapstar` to `1`.
   2. Restart the application server.

More Information

For more information about the client copy and about how to perform it, see the SAP Library at:

http://help.sap.com/nw70 → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Software Lifecycle Management* → *Software Logistics* → *Change and Transport System* → *BC – Client Copy and Transport*

6.18 Post-Installation Steps for the Diagnostics Agent

The Solution Manager Diagnostics Agent (diagnostics agent) is the remote component of the E2E Root Cause Analysis. It allows you to perform a connection between SAP Solution Manager as the managing system and the managed system(s) and then to gather information from the managed systems and reports them to the Solution Manager system.
To implement the E2E Root Cause Analysis scenario, you have to configure the diagnostics agents on the application server instances of your SAP system.

Procedure

Proceed as described at http://service.sap.com/diagnostics.

6.19 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. Log on as user `sapadm`.
2. Check whether the following services are available:
   - The control program `saphostexec`
   - 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.
3. Configure the host agent according to your requirements.

More Information

For more information, see the SAP Library at:

http://help.sap.com → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Solution Monitoring* → *Monitoring in the CCMS* → *Infrastructure of the NetWeaver Management Agents*

6.20 Performing a Full Installation Backup

You must perform a **full offline backup** at the end of the installation. This procedure also describes how to use the back-up data for a restore.

CAUTION

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

Prerequisites

- If required, you have completed client maintenance, such as the *client copy* [page 101].
- You have *logged on* [page 88] as user `<sapsid>adm` and *stopped the SAP system and database* [page 128].

Procedure

Use the backup tool of your choice, for example the HP DataProtector and refer to the backup software documentation. You can also use the standard UNIX commands as described below.

Backing Up the Installation

NOTE

The following only applies to a standard installation.

1. Back up the following file systems:
   - `/usr/sap/<SAPSID>`
   - `/usr/sap/trans`
   - `<sapmnt>/<SAPSID>`
   - Home directory of the user `<sapsid>adm`
   - All database-specific directories

   Proceed as follows:
   1. Log on as user `root`.
   2. Manually create a compressed `tar` archive that contains all installed files:
      - Saving to tape:

        ```
        tar –cf – <file_system> | compress –c > <tape_device>
        ```
      - Saving to the file system:

        ```
        tar –cf – <file_system> | compress –c > ARCHIVENAME.tar.Z
        ```
2. Back up the operating system using operating system means.

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

Restoring Your Backup

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

CAUTION

Check for modifications to 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.
3. Execute the following commands to restore the data:
   - Restoring the data from tape:
     ```
     cat <tape_device> | compress –cd | tar –xf –
     ```
   - Restoring the data from the file system:
     ```
     cat ARCHIVENAME.tar.Z | compress –cd | tar –xf –
     ```

Performing a Full Database Backup

1. Configure your third-party backup tool, if used.
2. Perform a full database backup (preferably offline).
   If you use BR*TOOLS for the backup, refer to *BR*Tools for Oracle DBA* in the *SAP Database Guide: Oracle (BC-DB-ORA-DBA)*. This documentation is available in the SAP Library at:
   `http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 1) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Application Platform by Key Capability* → *Platform-Wide Services* → *Database Support* → *Oracle* → *SAP Database Guide: Oracle (BC-DB-ORA-DBA)*

6.21 Accessing Configuration Documentation in SAP Solution Manager

To access configuration documentation in SAP Solution Manager, you have to connect your newly installed SAP system to SAP Solution Manager.

NOTE

For SAP NetWeaver, you can also find configuration documentation in the *Technology Consultant's Guide* at:
`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *Technology Consultant's Guide*

Procedure

Create a configuration project with the related configuration guide as described in the following documentation:
`http://help.sap.com` → *SAP Solutions* → *SAP Solution Manager* → *Documentation for SAP Solution Manager* → *<current release>* → *SAP Solution Manager* → *Implementing and Upgrading SAP Solutions* → *Projects* → *Configuration*.

More Information

`http://service.sap.com/solutionmanager` → *Media Library* → *How-To Documents* → *How to Create a Configuration Guide using SAP Solution Manager*

7 Additional Information

The following sections provide additional information about **optional** preparation, installation, and post-installation tasks.
There is also a section describing how to delete an SAP system.

Preparation

- *Installation of Multiple Components in One Database* [page 105]
- *Integration of LDAP Directory Services* [page 107]
- *Checking and Modifying the HP-UX Kernel* [page 111]
- *Setting up Swap Space for HP-UX* [page 113]
- *Creating HP-UX Groups and Users* [page 115]
- *Setting Up File Systems and Raw Devices for HP-UX* [page 116]
- *Dialog Instance Installation for an Upgraded System: Updating Instance Profiles* [page 119]
- *Mounting Installation Media for HP-UX* [page 120]
- *Exporting and Mounting Directories via NFS for HP-UX* [page 122]

Installation

- *Installing the Host Agent Separately* [page 123]

Post-Installation

- *Starting and stopping SAP System Instances* [page 126]
- If you decided to use a generic LDAP directory, you have to *create a user for LDAP directory access* [page 132]
- *Heterogeneous SAP System Installation* [page 132]
- *Troubleshooting* [page 132]

Deleting an SAP System or SAP Instance

- *Deleting an SAP System* [page 133]
- *Deleting the Oracle Database Software* [page 136]

7.1 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 and all the major databases for the SAP system. 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.

With MCOD we distinguish two scenarios:

- The installation of an SAP system in a new database
  The system then creates new tablespaces and a new database schema.
- The installation of an additional SAP system in an existing database (MCOD)
  The system then automatically creates additional tablespaces in the existing database and a schema user in the existing database.

Prerequisites

- For more information about MCOD and its availability on different platforms, see http://www.sdn.sap.com/irj/sdn/dbos → *Key Topics* → *Multiple Components in One Database (MCOD)*.
- We have released MCOD for Unicode installations. A prerequisite is that the MCOD system contains Unicode instances only. SAP does not support mixed solutions.
- 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 `Quick Sizer` tool and then adding the requirements together. For more information about the `Quick Sizer`, see 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

RECOMMENDATION

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.
  - Uninstalling 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`.
- You **cannot** install a Unicode ABAP system with a non-Unicode ABAP system in one database.
- For the second SAP system, you must use the same `DBSID` as for the first SAP system.
- If you install an MCOD system, the `SYSTEM` tablespace must contain at least 400 MB of free space. If there is not enough space left, increase the size of this tablespace with `BRSPACE` or `BRTOOLS`.
- If you decide to turn off archive log mode during the database load phase of the installation, you need to plan downtime for all MCOD systems sharing the database.

7.2 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.

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 at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Security* → *Identity Management* → *User and Role Administration of AS ABAP* → *Configuration of User and Role Administration* → *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* at:

`http://www.sdn.sap.com/irj/scn/go/portal/prtroot/docs/library/uuid/d0a0d051-eae2-2b10-e1ac-f3a7f6494c53`

For more information about the SAP MC and about how to configure it to access LDAP Directories, see the documentation *SAP Management Console* at:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Application Platform by Key Capability* → *Java Technology* → *Administration Manual* → *J2EE Engine* → *J2EE Engine Administration Tools* → *SAP Management Console*

SAP Logon

Instead of using a fixed list of systems and message servers, you can configure the 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:

```
[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 `ldap/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 `ldap/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 `ldap/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. If the SAP system has been prepared correctly, the SAP MC presents and analyzes system information that it gathers from various sources, including 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 `saplda p`.
- 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 where you want to use Active Directory Services and choosing ▶ *<Your SAP product>* → *Software Life-Cycle Options* → *LDAP Registration* → *Active Directory Configuration* ↵. For more information about running SAPinst on Windows, see the documentation *Installation Guide — <Your SAP 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 **once** for your system and choose ▶ *<Your SAP product>* → *Software Life-Cycle Options* → *LDAP Registration* → *LDAP Support* ↵

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.

7.3 Checking and Modifying the HP-UX Kernel

To run an SAP system, make sure that you check and, if necessary, modify the HP-UX kernel.

RECOMMENDATION

We recommend that a UNIX system administrator performs all kernel modifications.

Procedure

1. Check **SAP Note** 172747 for recommendations on current HP-UX kernel parameters.

   CAUTION

   If a kernel value is already larger than the one suggested in the SAP Note, do not **automatically** reduce it to match the SAP requirement.
   You have to analyze the exact meaning of such a parameter and, if required, to reduce the parameter value. In some cases this might improve the performance of your SAP applications.
2. If necessary, modify the kernel parameters in one of the following ways:
   - Manually
     For more information, see **SAP Note** 172747.
   - Using System Administrator Manager (SAM) for **HP-UX 11.11** and **HP-UX 11.23**
     For more information, see section *Configuring the Kernel Using SAM for HP-UX 11.11 and 11.23* below.
   - Using `kcweb` for **HP-UX 11.23** and **HP–UX 11.31**
     For more information, see section *Configuring the Kernel Using kcweb for HP-UX 11.23 and HP–UX 11.3* below.
   - Using System Management Homepage (SMH) for **HP-UX 11.31**
     For more information, see section *Configuring the Kernel Using kcweb for HP-UX 11.31* below.

Configuring the Kernel Using SAM for HP-UX 11.11 and HP–UX 11.23

1. Enter the following command:
   ```
   /usr/sbin/sam
   ```
2. Choose ▶ *Kernel Configuration* → *Configurable Parameters* ↵.
3. Choose the parameter to be modified and choose ▶ *Actions* → *Modify Configurable Parameter* ↵
   .

4. Modify all kernel parameters according to the table above.
5. From the *Actions* menu, choose *Process New Kernel*.
6. Exit `SAM`.
7. Reboot the system.

Configuring the Kernel Using kcweb for HP-UX 11.23 and HP-UX 11.31

Kernel configuration using `kcweb` is a combination of a command set and a Web-based graphical user interface (GUI) that lets you configure an HP-UX kernel and monitor consumption of kernel resources controlled by parameters.

The `kcweb` application replaces the kernel configuration portion of SAM and adds the following commands for kernel configuration and monitoring to the system:

- `kcweb(1M)`
- `kcusage(1M)`
- `kcalarm(1M)`

There is also the daemon `kcmond(1M)` , which replaces the obsolete `krmond(1M)`.

The `kcweb` application provides the following new features:

- New Web-based, PC-supported GUI that is faster and easier to use remotely than the current SAM interface
- Kernel parameter documentation that you can view within the GUI
- Support for dynamic (no reboot) kernel tuning
- Parameter monitoring that lets you continually monitor the usage of kernel resources (with `kcmond`) and proactively tune the kernel instead of waiting for an application to fail

  Parameter monitoring offers you:
  - Tables and graphs of kernel resources controlled by kernel parameters
  - User-created threshold alarms that issue alerts when consumption of a kernel resource exceeds a specified percentage of the parameter value
- Improved command line interface (CLI) that offers all functionality available in the GUI
- Improved separation between GUI and kernel so that the application does not need to be patched so frequently

Less than 12 MB of disk is necessary for `kcweb`, and minimal memory is required by CLIs (approximately 20 MB memory for HP Apache-based Web Server and Netscape).

Additionally, the `kcweb` application GUI offers online help.

Configuring the Kernel Using SMH for HP-UX 11.31

1. Enter one of the following commands:
   - `/usr/sbin/smh`
   - `http://<hostname>:<port>`

     where `<port>` is either the default port 2381 or your defined port (for example 2301)
2. Choose ▶ *Kernel Configuration* → *Tunables* ↵.

3. Choose the parameter to be modified and enter `m` (*m-Modify*).
4. Modify all kernel parameters according to the table above.
5. Choose *Modify*.
6. Exit `SMH`.
7. Reboot the system.

7.4 Setting up Swap Space for HP-UX

Here, you can find information about how to set up swap space for HP-UX.

Procedure

1. Check whether there is sufficient swap space (see *Hardware and Software Requirements* [page 22]).
   You can determine the size of the installed RAM in one of the following ways:
   - Using the System Administration Manager (SAM):
     Choosing *Performance Monitors* → *System Properties* → *Memory*
   - Manually:
     - To display the RAM size on HP-UX PA-RISC, enter the following command:
       ```
       echo "selclass qualifier memory;info;wait;infolog" | cstm |grep Memory |
       grep Total
       ```
     - To display the RAM size on HP-UX Itanium or all HP–UX 11.31 systems, you may also use the following command:
       ```
       /usr/contrib/bin/machinfo |grep Memory
       ```
2. To check whether enough swap space is currently configured on your system, enter the following command and add up the total device swap space:
   ```
   /usr/sbin/swapinfo –dm
   ```

   EXAMPLE

   ```
   /usr/sbin/swapinfo -dm
   Mb Mb Mb PCT Mb
   TYPE AVAIL USED FREE USED START RESERVE PRI NAME
   dev 10000 82 9918 1% 0 - 1 /dev/vg00/lvol2
   dev 20000 83 19917 0% 0 - 1 /dev/vg01/lvol9
   ```

   In this case, the total device swap space is 30000 MB.
3. If necessary, increase the swap space in one of the following ways:
   - Manually, as described below in *Setting Up Swap Space Manually*
   - Using SAM, as described below in *Setting up Swap Space Using SAM for HP-UX 11.11/11.23*
   - Using SMH, as described below in *Setting up Swap Space Using SMH for HP-UX 11.31*
4. If you are not installing a standalone database server, check the paging size and the kernel settings, as described below in *Checking Paging Space Size and Kernel Settings*.

Setting up Swap Space Manually

1. To create a logical volume, enter the following command:

   ```
   lvcreate -C y -n <LVName> /dev/<VGName>
   ```

2. To define the size and allocate the logical volume to a disk, enter the following commands:

   ```
   lvextend -L <size in MB> /dev/<VGName>/<LVName> \
   /dev/dsk/<diskdevice>
   ```

3. To enable automatic swap activation at boot time, add the following entry to `/etc/fstab`:

   ```
   /dev/<VGName>/<LVName> /swap swap defaults 0 0
   ```

4. To manually activate the space for swap devices defined in `/etc/fstab`, enter the following command:

   ```
   /usr/sbin/swapon -a
   ```

5. To check if the swap space has been activated, enter the following command:

   ```
   /usr/sbin/swapinfo -tm
   ```

Setting up Swap Space Using SAM for HP-UX 11.11/11.23

1. To start SAM, enter the following command:

   ```
   /usr/sbin/sam
   ```

2. Choose

   ▶ *Disks and Filesystems* → *Swap* → *Actions* → *Add Device Swap* → *Using the LVM* ↵

3. Select a partition for swap and choose *OK*.
4. Exit `SAM`.

NOTE

You cannot set the swap space on HP-UX 11.31 with `SMH`. On HP-UX 11.31 you have to configure the swap space manually.

Checking Paging Space Size and Kernel Settings

NOTE

If you are installing a **standalone** database server do **not** execute this step.

1. Make sure that the UNIX kernel, paging space, and user limits are already configured for the SAP system.
2. Execute `memlimits` to verify paging space size and kernel settings as follows:
   1. To unpack file `memlimits`, enter the following commands:

      ```
      cd <INSTDIR>
      <DVD-DIR>/K0<x>/UNIX/<OS>SAPCAR \
      -xvfg <DVD-DIR>/K0<x>/UNIX/<OS>/SAPEXE.SAR memlimits
      ```

   2. To start `memlimits`, enter the following command:

      ```
      ./memlimits -l 20000
      ```

3. If you see error messages, increase the paging space and rerun `memlimits` until there are no more errors.

7.5 Creating HP-UX Groups and Users

Here you can find information about how to create operating system users and groups on HP-UX.

NOTE

To prevent terminal query errors in the `<sapsid>adm` environment, change the following shell template as follows:

1. Edit `/etc/skel/.login`.
2. Comment out (with #) the following line:

   ```
   #eval `tset -s -Q -m ':?hp'
   ```

For more information, see **SAP Note** 1038842.

Procedure

Choose one of the following procedures, depending on the version of your operating system:

Creating Groups and Users for HP-UX 11.11/11.23

1. Enter the following command:

   ```
   /usr/sbin/sam
   ```

2. Choose ▶ *Accounts for Users and Groups* → *Local Users* → *Actions* → *Add* ↵
3. Enter the required users.
4. Choose ▶ *Accounts for Users and Groups* → *Groups* → *Actions* → *Add* ↵.
5. Enter the required groups.
6. Exit the System Administration Manager (SAM).
7. Verify that the TZ settings in the following are consistent:

   ```
   /etc/TIMEZONE
   /etc/profile
   /etc/csh.login
   ```

Creating Groups and Users for HP-UX 11.31

1. Enter one of the following commands:
   - `/usr/sbin/smh`
   - `http://<hostname>:<port>`

     where `<port>` is either the default port 2381 or your defined port (for example 2301)
2. Choose ▶ *Accounts for Users and Groups* → *Local Users* → *Add User Account* ↵
3. Enter the required users.
4. Choose ▶ *Accounts for Users and Groups* → *Groups* → *Add new Group* ↵.
5. Enter the required groups.

6. Exit SMH.
7. Verify that the TZ settings in the following are consistent:

   ```
   /etc/TIMEZONE
   /etc/profile
   /etc/csh.login
   ```

More Information

For more information about required operating system users and groups, see *Creating Operating System Users and Groups* [page 40].

7.6 Setting Up File Systems for HP-UX

Here you can find information about how to set up file systems for HP-UX.
Using a Logical Volume Manager (LVM) lets you distribute logical volumes across several disks or LUNs (physical volumes). The individual logical volumes are grouped together into volume groups.

Procedure

HP-UX 11i v3 introduces a new agile addressing scheme for mass storage devices, with opaque minor numbers, persistent device special files (DSFs), and new hardware path types and formats. The addressing scheme used in previous HP-UX releases – called “legacy addressing” – coexists with this new scheme to ensure backward compatibility. The legacy addressing is to be deprecated in a future HP-UX release. For more information about the changes between HP-UX 11.23 and 11.31, see the document *HP-UX 11i v3 Mass Storage Device Naming* at the HP website.

NOTE

Consider the SAP recommendations for data security when planning the distribution of data in LVM.

RECOMMENDATION

Refer to **SAP Note** 1077887 for recommendations on blocksize and mount option configuration.

You can create file sytems in one of the following ways:

- Manually, as described below in “Setting up File Systems Manually Using LVM”.
- Using the interactive tools SAM (HP-UX 11.11 or 11.23) or SMH (HP-UX 11.31)., See Table 2-4 in the "SAM-HP SMH Cross Reference Guide HP-UX 11i" (http://www.hp.com/go/hpux-core-docs under “HP-UX 11i v3”).).

Setting up File Systems Manually Using LVM

1. Examine the device configuration:

- The `ioscan` command provides the device file name and the hardware addresses of all available devices, using the device class disk:
  - For persistent device files (HP-UX 11.31 only), enter:
    ```
    ioscan -m lun
    ```
  - For legacy device files, enter:
    ```
    ioscan -f -C disk
    ```
- To show the mapping of the legacy device files and the persistent device files (HP-UX 11.31 only), enter:
  ```
  ioscan -m dsf
  ```
- Device file name format:
  - Persistent device filenames (HP-UX 11.31 only) have the following format: /dev/disk/disk<number>

    EXAMPLE

    `/dev/disk/disk6`(block device)

    `/dev/rdisk/disk6`(raw device)
  - Legacy device filenames have the following format: /dev/dsk/c<number>t<number>d<number>

    EXAMPLE

    `/dev/dsk/c2t5d0`(block device)

    `/dev/rdsk/c2t5d0` (raw device)
- The following command scans all disks for the current LVM:
  ```
  vgscan -pv
  ```

  NOTE

  Make sure that you use option `-p` (preview), otherwise `/etc/lvmtab` is updated.

2. You can determine disk or LUN size using the following command:
   ```
   diskinfo /dev/rdisk/<raw device file name>
   ```
3. Prepare disks for LVM by using the following command:
   ```
   pvcreate /dev/rdisk/<diskdevice>
   ```
4. Create one or more volume group directories `<VG Name>` and group device files. For each volume group in the system, there must be a volume group directory that has a character device file named group in it.

   Execute the following commands:
   ```
   mkdir /dev/<VG Name>
   mknod /dev/<VG Name>/group c 64 0x<nn>000
   ```

   NOTE

   HP-UX 11.11 and 11.23 only: `<nn>` cannot exceed the kernel parameter `maxvgs`.
5. Create the volume group by specifying which physical volumes (disks or LUNs) belong to the group:

```
vgcreate /dev/<VG Name> /dev/disk/<diskdevice>
```

> **NOTE**
>
> For large disk sizes and large numbers of disks one might need to increase the volume group physical extent (PE) size with –s option and the maximum physical volume option `-p`.

Proceed as follows to add other disks or LUNs to an existing volume group:

```
vgextend /dev/<VG Name> <block device file name>
```

6. To check the size and number of physical volumes or disks in a volume group, use the following command:

   ```
   vgdisplay -v /dev/<VG Name>
   ```

7. Create logical volumes.

   Create one logical volume for each file system as follows:

   1. Enter the following command:

      ```
      lvcreate /dev/<VG Name>
      ```

   2. Allocate the required logical volume size to disks or LUNs as follows:

      ```
      lvextend -L <size in MB> /dev/<VGName>/<LVName> <block device filename>
      ```

      `<size in MB>` needs to be a multiple of the physical extent size, otherwise the size is rounded up.

      You can determine the size of the logical volumes can be determined with either of the following commands:

      - `vgdisplay -v /dev/<VG Name>`
      - `lvdisplay /dev/<VG Name>/<LV Name>`

   For the required size for each file system, see *SAP Directories* [page 42].

8. Create the file systems that are required by SAP as follows:

   ```
   newfs -F vxfs -b 8192 /dev/<VG Name>/r<LV Name>
   ```

   > **NOTE**
   >
   > Refer to **SAP Note** 1077887 for block size recommendations which are database dependent.

9. Create mount directories using the following command:

   ```
   mkdir <mountdir>
   ```

10. Add the new file system to `/etc/fstab`.

    > **EXAMPLE**
    >
    > ```
    > /dev/<VG Name>/<LV Name> /<mountdir> vxfs delaylog,nodatainlog 0 2
    > ```

    > **NOTE**
    >
    > Refer to **SAP Note** 1077887 for mount option recommendations (for example using Concurrent I/O (CIO), Direct I/O (DIO) or buffered I/O) which are database dependent.

NOTE

When defining the mount order sequence in `/etc/fstab`, you have to consider mount order dependencies. For example, `/sapmnt/<SAPSID>` must be mounted before `/sapmnt/<SAPSID>/profile`.

11. Mount the file systems by entering the following command:

```
mount -a
```

7.7 Dialog Instance Installation for an Upgraded System only: Updating Profiles

You only need to perform the *Procedure* further below if you want to install a dialog instance and you have **already** performed the following steps:

1. You upgraded your SAP system from an earlier source release to a target release **lower** than SAP ERP 6.0 SR3.
2. You installed the current Enhancement Package with the SAP Enhancement Package Installer.

Procedure

1. On the SAP Global host, go to folder `/<sapmnt>/<SAPSID>/profile`.

NOTE

SAP system profiles are named as follows:

Instance profiles: `<SAPSID>_<INSTANCE_ID>_<hostname>.pfl`

Start profiles: `START_<INSTANCE_ID>_<hostname>.pfl`

2. Make sure that the parameter `DIR_CT_RUN`, if set, has identical values in the instance profile and the start profile of the central instance:
   - If it **is** set in the instance profile, it must **also** be set in the start profile.
   - If it is **not** set in the instance profile, it must **not** be set in the start profile either.
3. Edit the default profile `DEFAULT.PFL` by setting `rdisp/msserv_internal` to a free port number.

EXAMPLE

`DEFAULT.PFL`

Before the change:

```
...
rdisp/msserv = sapms<SAPSID>
...
```

After the change:

```
...
rdisp/msserv = sapms<SAPSID>
rdisp/msserv_internal = <free port number>
...
```

4. Only valid for: HA (UNIX) |

   In a high-availability system, edit the instance profile of the central services instance for ABAP (ASCS) and do the following:

   End of: HA (UNIX) |

   - Set `rdisp/msserv` to `0`.
   - Set `rdisp/msserv_internal` to the port number assigned to `rdisp/msserv`.

   EXAMPLE

   Instance profile of the central services instance:

   Before the change:

   ...

   ```
   rdisp/msserv = 4711
   ```

   ...

   After the change:

   ...

   ```
   rdisp/msserv = 0
   rdisp/msserv_internal = 4711
   ```

   ...

5. Restart all SAP services and instances of your SAP system.

7.8 Mounting Installation Media for HP-UX

Proceed as follows to mount a CD or DVD.

NOTE

The placeholder `<medium-mountdir>` is used for either `<cd-mountdir>` or `<dvd-mountdir>`.

Procedure

Mounting a CD / DVD Manually

1. Log on as user `root`.
2. To create a mount point for CD / DVD, enter the following command:

   ```
   mkdir /<medium-mountdir>
   ```

   EXAMPLE

   `<medium-mountdir>` is `/sapcd`

3. To find out the hardware address of the CD/DVD drive, proceed as follows:
   1. Enter the following command:

      ```
      ioscan -fnkCdisk
      ```

      A list of all devices is displayed
   2. Note the hardware address of the CD/DVD drive, for example `c0t4d0`.

4. To check that the driver is part of the kernel (skip this step if the CD / DVD drive is already working), enter the following command:

   ```
   grep cdfs /stand/system
   ```

   If the driver is not configured, you have to add the string `cdfs` to the file `/stand/system` and rebuild the kernel. For more information about how to build a new kernel, see *Checking and Modifying the HP-UX Kernel* [page 111]. After rebuilding the kernel, reboot the system.
5. To mount the CD / DVD on HP-UX 11.11 or 11.23, enter the following command:

   ```
   mount -r -F cdfs -o rr /dev/dsk/<diskdevice> <medium-mountdir>
   ```

   To mount the CD / DVD on HP-UX 11.31, enter the following command:

   ```
   mount -r -F cdfs -o rr /dev/disk/<diskdevice> <medium-mountdir>
   ```

   EXAMPLE

   HP-UX 11.11 or 11.23: `mount -r -F cdfs -o rr /dev/dsk/c0t4d0 /sapcd`

   HP-UX 11.31: `mount -r -F cdfs -o rr /dev/disk/disk2 /sapcd`

Mounting a CD / DVD Using SAM for HP-UX 11.11 or HP–UX 11.23

1. Enter the command:

   ```
   /usr/sbin/sam
   ```
2. Choose ▶ *Disks and Filesystems* → *Disk Devices* → *Actions* → *Mount* ↵
3. Enter the mount directory:

   ```
   <medium-mountdir>
   ```

   EXAMPLE

   For example, `<medium-mountdir>` is `/sapcd`.
4. Perform task.
5. Exit SAM.

Mounting a CD / DVD Using SMH for HP-UX 11.31

1. Enter one of the following commands:
   - `/usr/sbin/smh`
   - `http://<hostname>:<port>`

     where `<port>` is either the default port 2381 or your defined port (for example 2301)
2. Choose ▶ *Disks and Filesystems* → *File Systems* → *Add CDFS* ↵
3. Enter the mount directory:

   ```
   <medium-mountdir>
   ```

   EXAMPLE

   For example, `<medium-mountdir>` is `/sapcd`.
4. Choose the hardware path.
5. Choose *New CDFS*
6. Exit SMH.

7.9 Exporting and Mounting Directories via NFS for HP-UX

You can configure NFS on HP-UX in one of the following ways:

- Manually (HP-UX 11.11 and 11.23) as described below in *Configuring NFS manually on HP-UX 11.11 or 11.23*
- Manually (HP-UX 11.31) as described below in*Configuring NFS manually on HP-UX 11.31*
- Using the interactive tools SAM (HP-UX 11.11 or 11.23) or SMH (HP-UX 11.31).

For more information on NFS for HP-UX, see the document *NFS Services Administrator's Guide HP-UX 11i version 3* at the HP website.

Procedure

Configuring NFS manually on HP-UX 11.11/11.23

Procedure on the Host where the Main Instance Runs (export NFS volumes)

1. Add the file system that you want to export to the file `/etc/exports` using the following syntax:

   ```
   <file system to share> -root= <client_1>:<client_n>,> \
   access= <nfs_cli_hostname_1>:...:< nfs_cli_hostname_n>
   ```

   EXAMPLE

   ```
   /sapmnt/C11/exe root=hw5111:hw5115, access=hw5111:hw5115
   ```

   If you encounter problems, try using the FQDN (Fully Qualified Domain Name) of the NFS clients.
2. To make the file system available to NFS clients, enter the following command:

   ```
   /usr/sbin/exportfs -a
   ```

Procedure on the Host where the Additional Instance Runs (mount NFS volumes)

1. Add the remote file system to `/etc/fstab`.

   EXAMPLE

   ```
   hwi173:/sapmnt/C11 /sapmnt/C11 nfs defaults 0 0
   ```
2. Mount the file system.

   EXAMPLE

   ```
   mount -a
   ```

Configuring Directories via NFS manually on HP-UX 11.31

Procedure on the Host where the Main Instance Runs (export NFS volumes)

1. Add the file system that you want to export to the file `/etc/dfs/dfstab` using the following syntax:

   ```
   share –F nfs –o root= <client_1>:<client_n>,> \
   access= <client_1>:<client_n> <file system to share>
   ```

   EXAMPLE

   ```
   share –F nfs –o root=hw5111:hw5115, access=hw511:hw5115 /sapmnt/C11/exe
   ```

NOTE

If you are moving from a legacy system with the `/etc/exports` NFS configuration file you can use `/usr/contrib/bin/exp2dfs` to automatically convert the legacy syntax to the new syntax in `/etc/dfs/dfstab`.

If you encounter problems, try using the FQDN (Fully Qualified Domain Name).

2. To make the file system available to NFS clients, enter the following command:

```
/usr/sbin/shareall
```

Procedure on the Host where the Additional Instance Runs (mount NFS volumes)

1. Add the remote file system to `/etc/fstab`.

EXAMPLE

```
hwi173:/sapmnt/C11 /sapmnt/C11 nfs defaults 0 0
```

2. Mount the file system.

EXAMPLE

```
mount -a
```

7.10 Installing the Host Agent Separately

This procedure tells you how to install a host agent **separately**.

The host agent is automatically installed during the installation of all new SAP system instances based on SAP NetWeaver 7.1 or higher. You only need to install a host agent **separately** 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 7.0 EHP2 or higher and want the instances of the upgraded system to be managed by the ACC.

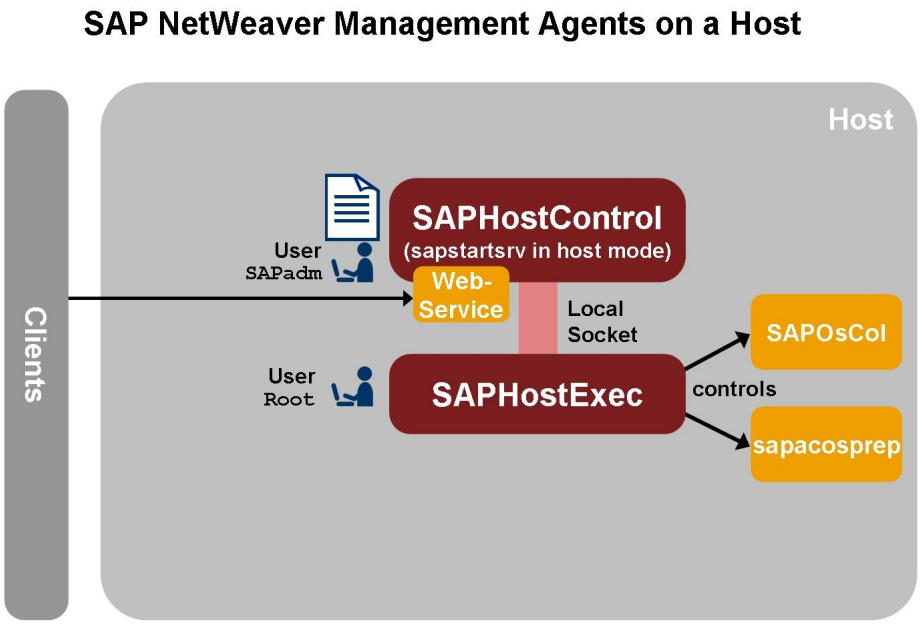

Figure 16: Host Agent

The host agent contains the following elements:

- The control program `saphostexec`
- The SAP NetWeaver Management agent SAPHostControl (`sapstartsrv` in host mode)
- The `sapacosprep` executable of the Adaptive Computing Infrastructure
- The operating system collector `saposcol`

NOTE

The installed programs are automatically started when the host is booted.

The automatic start is ensured by the startup script `sapinit`, which starts the required executables.

Procedure

You have to perform the following steps on the host where you install the host agent separately:

1. Check the hardware and software requirements on the installation host.

   The minimum requirements are as follows:

   - Hard Disk Space: 1 GB
   - RAM: 0.5 GB
   - Swap Space: 2 x RAM

   For more information, see *hardware and software requirements* [page 22].

2. Make sure that the `sapadm` user is created:

   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.

User and Groups of the Host Agent

User	Primary Group	Additional Group	Comment
`sapadm`	`sapsys`	`sapinst`	Host agent administrator

Groups and Members of the Host Agent User

Groups	Members
`sapsys`	`sapadm`
`sapinst`	`sapadm`

3. Set up the required file system for the host agent.

Directories	Description	Required Disk Space
`/usr/sap/hostctrl`	Contains the following directories: ■ `exe` Contains the profile `host_profile` ■ `work` Working directory of the host agent	100 MB

For more information, see *Setting up file systems and raw devices* [page 42]

4. Mount the Installation Master DVD.

For more information, see *Preparing the Installation Media* [page 55].

5. You *start SAPinst* [page 66] to install the host agent.

On the *Welcome* screen, choose ▶ *Software Life-Cycle Options* → *Additional Preparation Options* → *Host Agent* ↵.

6. You perform the following post-installation steps:
   1. Check whether the installed services are available as follows:
      1. Log on as user `sapadm`.
      2. Check whether the following services are available:
         - The control program `saphostexec`
         - 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 monitoring architecture with the installed host agent as described in the SAP Library at:

      ▶ `http://help.sap.com` → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Solution Monitoring* → *Monitoring in the CCMS* → *Infrastructure of the NetWeaver Management Agents* ↵

7.11 Starting and Stopping SAP System Instances

You can start or stop SAP system instances in one of the following ways:

- *Using the SAP Management Console (SAP MC)* [page 126]
- *Using commands* [page 128].

7.11.1 Starting and Stopping SAP System Instances Using the SAP Management Console

You can start and stop all SAP system instances (except the database instance) and the Diagnostics Agent using the **SAP Management Console (SAP MC)**. You have to start and stop the database instance as described in *Starting and Stopping the SAP System Using startsap and stopsap* [page 128].

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 (SAP MMC)**.

For more information about handling the MMC, see:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Solution Monitoring* → *Monitoring in the CCMS* → *SAP Microsoft Management Console: Windows*

Prerequisites

- Make sure that the host names defined in the DNS server match the names of the SAP system instance hosts. In particular, keep in mind that host names are case-sensitive. For example, if the names of the SAP system instance hosts are in upper case, but the same host names are defined in the DNS server in lower case, starting and stopping the system does not work.
- Make sure that the host where you want to start SAP MC meets the following requirements:
  - At least Java Runtime Environment (JRE) 5.0 is installed.
  - The browser supports Java.
  - The browser's Java plug-in is installed and activated.
  - You have set the required permissions for `sapstartsrv` and `sapuxuserchk` in the `/<sapmnt>/<SAPSID>/exe`, and `/usr/sap/<SAPSID>/SYS/exe`, and `/usr/sap/<SAPSID>/<Instance_Name>/exe` directories as described in **SAP Note** 927637.

    See also *Performing Post-Installation Steps for the Operating System* [page 88].
- You have logged on to the host as user `<sapsid>adm`.

Procedure

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.

   By default, the instances installed on the host you have connected to are already added in the SAP Management Console.

   NOTE

   If the instances have not been added or if you want to change the configuration to display systems and instances on other hosts, you have to register your system manually. This is described in *Registering Systems and Instances in the SAP Management Console* below.

Starting and Stopping SAP System Instances

Starting SAP Systems or Instances

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 choose *Start* from the context menu.
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 credentials of the SAP system administrator. To complete the operation, you must have administration permissions. Log in as user `<sapsid>adm`.

Starting the Instances of a Distributed SAP System 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 as follows:

1. Start the database instance.

2. Only valid for: HA (UNIX) |

   If your system is a high-availability system, start the ABAP central services instance `ASCS<Instance_Number>`.

   End of: HA (UNIX) |
3. Start the central instance `DVEBMGS<Instance_Number>`.
4. Start dialog instances `D<Instance_Number>`, if there are any.

Stopping SAP Systems or Instances

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 the Instances of a Distributed SAP System 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 as follows:

1. Stop dialog instances `D<Instance_Number>`, if there are any.
2. Stop the central instance `DVEBMGS<Instance_Number>`.
3. Only valid for: HA (UNIX) |

   If your system is a high-availability system, stop the ABAP central services instance `ASCS<Instance_Number>`.

   End of: HA (UNIX) |
4. Stop the database instance.

More Information

For more information about the SAP Management Console, see:

`http://help.sap.com/nw70` → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *Solution Monitoring* → *Monitoring in the CCMS* → *SAP Management Console*

7.11.2 Starting and Stopping SAP System Instances Using Commands

You can start and stop SAP system instances using the **`startsap`** and **`stopsap`** commands.

You can use command line options to specify these commands. Command line options are available in **new style** or **old style**.

Using New Style for Command Line Options and Parameters

Using new style, the syntax is as follows:

```
stopsap | stopsap [-t | -task <task>] [-i | -instance <instance>] [-v | -vhost
"<virtual hostname>[ <virtual hostname>]*"][-c | -check] [-h | -help] [-V | -VERSION]
[-C | -checkVHost]
```

EXAMPLE

If you want to start a central instance `DVEBGMS00` that has the virtual host names `cic11` and `cic12`, enter the following commands :

```
startsap -t r3 -i DVEBGMS00 -v "cic11 cic12"
```

The following command line options and parameters are available:

Command Line Options (New Style)

Parameter Name	Description
`[-t | -task <task>]`	Specify task
`[-i | -instance <instance>]`	Specify SAP system instance
`[-v | -vhost "<virtual hostname>[ <virtual hostname>]*"]`	Specify virtual host names
`[-c | -check]`	Check database and SAP instance status
`[-h | -help]`	Display help
`[-V | -VERSION]`	Display `startsap` script version
`[-C | -checkVHost]`	Check virtual host name

Parameters for <task> (New Style)

Parameter Name	Description
`check`	Check status of database and SAP system instances
`r3`	Start or stop SAP instances only.
`db`	Start or stop database only
`all | <blank>`	Start or stop database and SAP instance
`startupsrv`	Start or stop `sapstartsrv` program

Parameters for <instance> where <nn> is the instance number

Parameter Name	Description
`DVEBMGS<nn>`	Central Instance
`D<nn>`	Dialog instance
`ASCS<nn>`	ABAP central services instance (ASCS instance)
`ERS<nn>`	Enqueue replication server instance (ERS instance)
`SMDA<nn>`	Diagnostics agent instance
`W<nn>`	Web services instance
`G<nn>`	Gateway instance

Using Old Style for Command Line Options and Parameters

Using old style, the syntax is as follows:

```
stopsap | stopsap [db|r3|all|check|startupsrv] [<instance>] [<virtual hostname>]
```

EXAMPLE

If you want to start a central instance `DVEBGMS00` that has the virtual host names `cic11` and `cic12`, enter the following commands :

```
startsap r3 DVEBGMS00 cic11 cic12
```

The following command line options and parameters are available:

Command Line Options (Old Style)

Parameter Name	Description
`check [<instance>] [<virtual hostname>]`	Check status of database and SAP system instances
`r3 [<instance>] [<virtual hostname>]`	Start or stop SAP instances only
`db [<instance>] [<virtual hostname>]`	Start or stop database only
`all | <blank>`	Start or stop database and all SAP system instances running on the same physical host
`startupsrv`	Start or stop `sapstartsrv` program

Parameters for <instance> where <nn> is the instance number

Parameter Name	Description
`DVEBMGS<nn>`	Central Instance
`D<nn>`	Dialog instance
`ASCS<nn>`	ABAP central services instance (ASCS instance)
`ERS<nn>`	Enqueue replication server instance (ERS instance)
`SMDA<nn>`	Diagnostics agent instance
`W<nn>`	Web services instance
`G<nn>`	Gateway instance

Prerequisites

- Make sure that you have logged on to the physical host of the SAP system instances as user `<sapsid>adm`.
- Make sure that the host names defined in the DNS server match the names of the SAP system instance hosts. In particular, keep in mind that host names are case-sensitive. For example, if the names of the SAP system instance hosts are in upper case, but the same host names are defined in the DNS server in lower case, starting and stopping the system does not work.
- 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 the `startsap` script in the home directory of the corresponding user.
- You **cannot** use `startsap` or `stopsap` commands in a switchover cluster environment. Therefore in a **high-availability (HA) system** you must use the failover cluster software of your HA partner to start or stop instances running on the switchover cluster.

- You **cannot** use `startsap` or `stopsap` commands to start or stop database-specific tools. 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.
- Make sure that no SAP instance is running before you execute `stopsap` on a standalone database server. No automatic check is made.
- When you use `stopsap` in a Multiple Components in One Database (MCOD) system with two central instances, only **one** central instance and the database are shut down. Therefore, you must first stop the other SAP system or make sure that it has already been stopped.

Procedure

Starting an SAP System

- If you want to start all SAP system instances running on the same host, execute the following command:
  New style: `startsap` or `startsap -t all`
  Old style:`startsap` or `startsap all`
- If you want to start SAP system instances separately, enter the following command:
  New style:`startsap -t r3 -i <instance> [-v "<virtual host name>"]`
  Old style:`startsap r3 <instance> [<virtual host name>]`
  Make sure that you adhere to the following sequence when starting the instances:
  1. Database instance
  2. Central instance
  3. Dialog instances (if available)

Stopping an SAP System

- If you want to stop all SAP system instances running on the same host, execute the following command:
  New style: `stopsap` or `stopsap -t all`
  Old style:`stopsap` or `stopsap all`
- If you want to stop SAP system instances separately, enter the following command:
  New style:`stopsap -t r3 -i <instance> [-v "<virtual host name>"]`
  Old style:`stopsap r3 <instance> [<virtual host name>]`
  Make sure that you adhere to the following sequence when stopping the instances:
  1. Dialog instances (if available)
  2. Central instance
  3. Database instance

7.12 Creating a User for LDAP Directory Access

If you use LDAP directory services, you have to set up a user with a password on the host where the SAP system is running. This permits the SAP system to access and modify the LDAP directory.
For more information, see *Preparing the Active Directory* in the Windows installation guide for your SAP system solution and database.

Prerequisites

During the SAP instance installation you chose to configure the SAP system to integrate LDAP services.

Procedure

1. Log on as user `<sapsid>adm`.
2. Enter:

   ```
   ldappasswd pf=<path_and_name_of_instance_profile>
   ```
3. Enter the required data.

   EXAMPLE

   The following is an example of an entry to create an *LDAP Directory User*:

   ```
   CN=sapldap,CN=Users,DC=nt5,DC=sap-ag,DC=de
   ```

7.13 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 more 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 (see also *Exporting and Mounting Global Directories: Distributed and High-Availability Systems* [page 64])

7.14 Troubleshooting

The following sections describe the steps that you need to perform manually if SAPinst fails:

- *Troubleshooting with SAPinst* [page 133]

7.14.1 Troubleshooting with SAPinst

This section tells you how to proceed when errors occur during the installation with SAPinst.
If an error occurs, SAPinst:

- Stops the installation.
- Displays a dialog informing you about the error.

Procedure

1. To view the log file, choose *View Logs*.
2. If an error occurs during the *Define Parameters* or *Execute* phase, do either of the following:
   - Try to solve the problem
   - Stop the installation by choosing *Cancel* in the *SAPinst* menu.
     For more information, see *Interrupted Installation with SAPinst* [page 73].
   - After resolving the problem, you can continue the installation by choosing *Retry*.
3. Check the log and trace files of the GUI server and SAPinst GUI in the directory `<user_home>/.sdtgui/` for errors.
   - If the SAPinst GUI does not start, check the file `sdtstart.err` in the current `<user_home>` directory.
   - If you use an X Server for Microsoft Windows or other remote desktop tools for the Remote Access of SAPinst GUI on Windows Workstations and you experience display problems such as missing repaints or refreshes, contact your X Server vendor. The vendor can give you information about whether this X Server supports Java Swing-based GUIs and also tell you about further requirements and restrictions. See also **SAP Note** 1170809.
4. If you cannot resolve the problem, create a customer message using component BC-INS.

7.15 Deleting an SAP System or Single Instances

This section describes how to delete a complete SAP system or single SAP instances with the *Uninstall* option of SAPinst.

NOTE

With this SAPinst option you do **not** delete the database software.

Note the following when deleting an SAP system:

- We strongly recommend that you delete an SAP system using SAPinst. To delete an SAP system manually, proceed as described in **SAP Note** 1229586.
- You cannot delete an SAP system remotely.
- SAPinst deletes the database instance but not the database software. You have to delete the database software manually.

- If you delete network-wide users, groups, or service entries in an environment with Network Information System (NIS), other SAP installations might also be affected. Make sure that the users, groups, and service entries to be deleted are no longer required.
- During the uninstall process, all file systems and subdirectories of the selected SAP system or single instance are deleted. Before you start uninstalling, make sure that you have saved a copy of all files and directories that you want to keep in a secure location.
- The uninstall process is designed to remove as much as possible of the SAP system to be deleted. If an item cannot be removed, a message informs you that you have to remove this item manually. You can do this either at once or after the uninstall process has finished. As soon as you confirm the message, the uninstall process continues.

Prerequisites

- You have installed your SAP system with standard SAP tools according to the installation documentation.
- You are logged on as user `root`.
- Make sure that the SAP system, or single instance, or standalone engine, or optional standalone unit to be deleted is down and that you are not logged on as one of the SAP system users. If there is a lock on one of the SAP system objects, this breaks the uninstall. Make also sure that all SAP-related processes are stopped.

  NOTE

  You do not have to stop the host agent. The host agent is stopped automatically during the uninstall process.
- Make sure that there are no open sessions by one of the SAP system users when starting the uninstall.

Procedure

1. Start SAPinst as described in *Running SAPinst* [page 66].
2. On the *Welcome* screen, choose:

   <Your SAP product> → Software Life-Cycle Options → Uninstall → Uninstall System / Standalone Engine / Optional Standalone Unit
3. Follow the instructions in the SAPinst input dialogs to delete a complete SAP system or single instances.

   NOTE

   For more information about the input parameters, place the cursor on the relevant field and press F1 in SAPinst.

   The following table provides information about deleting a complete system or single instances with SAPinst.

Deletion of	Remarks
Central system	You can delete a central system (where all instances reside on the same host), in one SAPinst run.

Deletion of	Remarks
Distributed or high-availability system	If you want to delete a distributed or high-availability 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: 1. Dialog instances, if there are any 2. Central instance 1. Close SAPinst with *Cancel* and *Exit*. 2. Log off and log on again. 3. To finish uninstalling the central instance, restart SAPinst. 3. Database instance Choose whether you want to drop the entire database instance or only one or more database schemas. Since SAPinst only stops local instances automatically, make sure that before deleting the database instance of a distributed system, 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. Before deleting any database schema, make sure that: ■ You have performed a recent offline database backup. ■ You have stopped or deleted all SAP instances belonging to this database schema. ■ If you have installed a Java system, you have stopped the AS Java with transaction SMICM. ■ You only delete the tablespaces that belong to the selected schema. The Java schema `SAP<SCHEMAID>DB` by default belongs to the database tablespace `PSAP<SCHEMAID<DB`. All other SAP tablespaces belong to the ABAP schema `SAP<SCHEMAID>` (or `SAPR3` for older SAP systems. 4. Only valid for: HA (UNIX) | Central services instance for ABAP (ASCS) End of: HA (UNIX) | **NOTE** To delete system directories mounted from an NFS server, make sure that you run SAPinst on the NFS server.
Dialog instance	If you want to delete dialog instances of an existing SAP system, you have to run SAPinst to delete them **locally** on each dialog instance host.
Standalone host agent	The host agent is automatically uninstalled from a host together with the last remaining SAP system instance. If you want to uninstall a **standalone** host agent, deselect *Profiles Available* and select *Uninstall Standalone Host Agent* on the *General SAP System Parameters* screen.
Diagnostics agent	If you want to delete a diagnostics agent instance, enter the location of the profile directory of the diagnostics agent that you want to uninstall on the *General SAP System Parameters* screen: `/usr/sap/<DASID>/SYS/profile`

4. When you have finished, delete the relevant directory structure on the global host.
5. Delete the Oracle database software with the Oracle Universal Installer (OUI).
   For more information, see *Deleting the Oracle Database Software* [page 136].
6. 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.

7. 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.

7.16 Oracle Database Software Deinstallation

You have to deinstall the Oracle database software to complete the deletion of the Oracle database instance.

- *Deinstalling the Oracle 10 Database Software* [page 136]
- *Deinstalling the Oracle 11 Database Software* [page 137]

7.16.1 Deinstalling the Oracle 10 Database Software

Here you find information how to delete the Oracle 10 database software with the Oracle Universal Installer (OUI).

NOTE

This section only applies if you have deleted your SAP system using the *Uninstall* option of SAPinst. We strongly recommend that you delete a database instance with SAPinst and then remove the database software manually. To delete the **complete** database instance manually, proceed as described in **SAP Note** 1229689.

Procedure

1. Start the OUI with the user `ora<dbsid>` by entering one of the following:
   - `cd /oracle/stage/102_64/database/Disk1/SAP`
     `./runInstaller`
   - `cd /oracle/stage/102_64/database/SAP`
     `./runInstaller`

   You see a message that a response file is being generated. It might take several minutes before you see the OUI screen.
2. Choose *Installed Products* or *Uninstall Products*.
3. Select the database schema you want to uninstall: `<DBSID>_102_64`.
4. Mark the Oracle database within the selected product.
5. Choose *Remove*.
6. Confirm your selection with *Yes*.
7. Choose *EXIT*.

7.16.2 Deinstalling the Oracle 11 Database Software

This procedure tells you how to deinstall the database software, starting with Oracle Database 11g Release 2 (11.2). For more information, see SAP Note 1525025.

CAUTION

Do **not** use RunInstaller or the new deinstall tool to remove an Oracle 11.2 database installation. The deinstall tool might not only delete the software from the Oracle home, but also other files (database files, logs, traces, configuration files, inventory) in `<ORACLE_BASE>`.
Therefore, we strongly recommend you to use the procedure below to remove the 11.2 Oracle home software.

Procedure

1. Back up the central Oracle inventory, which is normally located at `$ORACLE_BASE`:

   ```
   OS> cd $ORACLE_BASE
   OS> zip -r oraInventory.zip oraInventory
   ```

2. Check whether Oracle home is registered in the central Oracle inventory:

   ```
   OS> $ORACLE_HOME/OPatch/opatch \
   lsinventory -all
   -invPtrLoc $ORACLE_HOME/oraInst.loc
   ```

   If Oracle home is registered, it appears in the displayed `List of Oracle Homes`. Otherwise, opatch returns error code 73.
   Oracle home must be registered in order to detach it.

3. Detach Oracle home from the central Oracle inventory:

   ```
   OS> $ORACLE_HOME/oui/bin/runInstaller \
   -silent \
   -detachHome ORACLE_HOME=$ORACLE_HOME \
   -waitForCompletion \
   -invPtrLoc $ORACLE_HOME/oraInst.loc
   ```

   At the end of the procedure, you see the message:

   ```
   'DetachHome' was successful
   ```

4. Remove the Oracle home software from the file system:

   ```
   OS> rm -rf $ORACLE_HOME
   ```

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A Appendix

A.1 Online Information from SAP

More information is available online as follows.

Documentation

Description	Internet Address	Title
Master Guide for SAP ERP 6.0 including SAP enhancement package 5	http://service.sap.com/erp-inst → *SAP ERP 6.0* → *SAP enhancement packages for SAP ERP 6.0* → *SAP enhancement package <current version> for SAP ERP 6.0*	*Master Guide — SAP Enhancement Package 5 for SAP ERP 6.0 Powered by SAP NetWeaver Using SAP Enhancement Package 5 for SAP ERP 6.0 and SAP NetWeaver 7 including Enhancement Package 2*
Master Guide for SAP ERP 6.0	http://service.sap.com/erp-inst → *SAP ERP 6.0*	*Master Guide — SAP ERP 6.0 Using SAP NetWeaver 7.0*
Master Guide SAP Solution Manager 7.0	http://service.sap.com/instguides → *SAP Components* → *SAP Solution Manager* → *Release 7.0*	*Master Guide – SAP Solution Manager 7.0*
Installation of SAP Solution Manager	http://service.sap.com/instguides → *SAP Components* → *SAP Solution Manager* → *<Release>*	*Installation Guide – SAP Solution Manager <Release> on <OS>: <Database>*
Configuration of SAP Solution Manager 7.0 EHP1	http://service.sap.com/instguides → *SAP Components* → *SAP Solution Manager* → *Release 7.0 EHP1*	*Configuration Guide – SAP Solution Manager 7.0 EHP1*
Patching of SAP NetWeaver 7.0 scenarios	http://service.sap.com/maintenanceNW70 → *SPS <current stack>* → *Support Package Stack Guide – SPS <current stack>*	*Support Package Stack Guide – SAP NetWeaver 7.0 SPS <current stack>*
Installation of Multiple Components in One Database (MCOD) and its availability on different platforms	http://www.sdn.sap.com/irj/sdn/dbos → *Multiple Components in One Database (MCOD)*	*Multiple Components in One Database (MCOD)*
Installation of SAP NetWeaver Developer Workplace	http://service.sap.com/installNW70 → *Installation* → *Installation – Clients* → *Installation – SAP Developer Workplace <release>*	*Installation Guide – Developer Workplace for SAP NetWeaver*
Installation of SAP NetWeaver Developer Studio	http://service.sap.com/installNW70 → *Installation* → *Installation – Clients* → *Installation – SAP NetWeaver Developer Studio*	*SAP NetWeaver Developer Studio – Standalone Installation Guide*
Configuration of the System Landscape Directory (SLD)	http://service.sap.com/installNW70 → *Configuration* → *Post-Installation Guide - SLD of SAP NetWeaver 7.0 EHP 2*	*Post-Installation Guide – System Landscape Directory of SAP NetWeaver 7.0 EHP 2*

Description	Internet Address	Title
Installation of a standalone gateway	http://service.sap.com/installNW70 → *Installation – Standalone Engines* → *Installation – Gateway on <platform>*	*Installation Guide – Gateway on <platform> – For SAP Systems Based on SAP NetWeaver 7.0 including Enhancement Package 2*
Installation of a Web Dispatcher	http://service.sap.com/installNW70 → *Installation – Standalone Engines* → *Installation – Web Dispatcher on <platform>*	*Installation Guide – Web Dispatcher on <platform> – For SAP Systems Based on SAP NetWeaver 7.0 including Enhancement Package 2*
Front End installation	http://service.sap.com/installNW70 → *Installation – Clients* → *SAP Front End Installation*	*SAP Front End Installation Guide <Current Release>* This guide is also available on the Presentation DVD.
Homogeneous and heterogeneous system copy	http://service.sap.com/installNW70 → *Installation – SAP NetWeaver Systems* → *System Copy for SAP Systems Based on <Release> <Technology>*	*System Copy Guide – System Copy for SAP Systems based on SAP NetWeaver <Release> <Technology>*
SAP NetWeaver Problem Analysis Guide	http://help.sap.com/nw70 → *SAP NetWeaver 7.0 Library (including Enhancement Package 2) English* → *SAP NetWeaver Library* → *SAP NetWeaver by Key Capability* → *Solution Life Cycle Management by Key Capability* → *SAP NetWeaver Problem Analysis Guide (PAG)*	*SAP NetWeaver Problem Analysis Guide (PAG)*

General Quick Links

Description	Internet Address
SAP Help Portal	http://help.sap.com
SAP NetWeaver Library in SAP Help Portal	http://help.sap.com/nw70
SAP ERP Library in SAP Help Portal	http://help.sap.com/erp
SAP Notes	http://service.sap.com/notes
SAP Notes for SAP NetWeaver 7.0 installation	http://service.sap.com/sapnotesnw70
Forums, blogs, and general information related to all of the supported databases and operating system platforms	http://sdn.sap.com/irj/sdn/dbos
Product Availability Matrix (PAM) for supported operating system releases	http://service.sap.com/pam
Release notes	http://service.sap.com/releasenotes
Unicode SAP systems and their availability	http://service.sap.com/unicode
System sizing (Quick Sizer tool)	http://service.sap.com/sizing
SAP NetWeaver capabilities	http://sdn.sap.com/irj/sdn/netweaver
Life-cycle management for SAP NetWeaver	http://sdn.sap.com/irj/sdn/lcm

Description	Internet Address
Landscape design for SAP NetWeaver	http://sdn.sap.com/irj/sdn/landscapedesign
Application management for SAP NetWeaver	http://sdn.sap.com/irj/sdn/applicationmanagement
High Availability	http://sdn.sap.com/irj/sdn/ha
System Landscape Directory	http://sdn.sap.com/irj/sdn/nw-sld
Software logistics for SAP NetWeaver	http://sdn.sap.com/irj/sdn/softwarelogistics
SAP NetWeaver operations	http://sdn.sap.com/irj/sdn/operations
SAP NetWeaver Development Infrastructure	http://sdn.sap.com/irj/sdn/nw-di
Security for SAP NetWeaver	http://sdn.sap.com/irj/sdn/security
Information on SAP Support Package Stacks	http://service.sap.com/sp-stacks
SAP Solution Manager	http://service.sap.com/solutionmanager
Maintenance Optimizer	http://service.sap.com/solman-mopz
End-to-End Root Cause Analysis	http://service.sap.com/diagnostics

Typographic Conventions

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

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