Installation Guide

SAP® R/3 Enterprise on Windows: Oracle

Using SAP R/3 Enterprise Core 4.70 Support Release 1, SAP R/3 Enterprise Extension Set 1.10

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Typographic Conventions

Type Style	Represents
Example Text	Words or characters that appear on the screen. These include field names, screen titles, pushbuttons as well as menu names, paths and options.
	Cross-references to other documentation
Example text	Emphasized words or phrases in body text, titles of graphics and tables
EXAMPLE TEXT	Names of elements in the system. These include report names, program names, transaction codes, table names, and individual key words of a programming language, when surrounded by body text, for example, SELECT and INCLUDE.
`Example text`	Screen output. This includes file and directory names and their paths, messages, names of variables and parameters, source code as well as names of installation, upgrade and database tools.
`Example text`	Exact user entry. These are words or characters that you enter in the system exactly as they appear in the documentation.
`<Example text>`	Variable user entry. Pointed brackets indicate that you replace these words and characters with appropriate entries.
`EXAMPLE TEXT`	Keys on the keyboard, for example, function keys (such as `F2`) or the `Enter` key.

Icons

Icon	Meaning
	Caution
	Example
	Note
	Recommendation
	Syntax

Contents

SAP R/3 Enterprise Installation on Windows: Oracle

Purpose

This documentation explains how to install both a Unicode and non-Unicode SAP system on Windows 2000 when your database is Oracle.

SAP R/3 Enterprise is based on the SAP Web Application Server 6.20 and latest SAP 6.20 downward compatible kernel.

The SAP Web Application Server (SAP Web AS) is the underlying technology of almost all mySAP.com solutions. This is the new name for what has been referred to up until SAP Release 4.6D as SAP Basis. The release number of the SAP Web Application Server reflects the independence of solutions and their underlying technology components provided by SAP.

For more information on the technology provided by the SAP Web AS, see at:
`http://service.sap.com/netweaver` → *SAP NetWeaver in Detail* → *SAP Web Application Server*

A minimum SAP system consists of a central instance and a database instance. Optional dialog instances can be installed on different hosts once the installation of the central instance **and** the database instance has been completed.

When you set up an SAP system, you need to install the main components that enable the system to operate. These are the:

- Central instance

- Database instance

- Dialog instances, if required

- Gateway instance, if required

- Front ends

    The installation of front ends for the SAP system is described separately in the documentation *SAP Front End Installation Guide.*

Implementation Considerations

Before you can begin with the installation of the main SAP components, you have to plan the configuration of the system. This involves deciding which components you need and working out how these must be distributed to hosts. Normally an SAP hardware partner can assist you in this task. On the basis of information about the expected workload, set of applications that are to be deployed and number of users, the partner can recommend a feasible configuration.

As the system configuration fundamentally influences the installation procedure, it is important to have a clear configuration plan before you start the installation. There are the following basic configuration types:

- **Central System**

    The central instance and database instance are installed on a **single** host.

- **Standalone Database System**

    The central instance and database instance are installed on **two different** hosts.

This type of configuration is often used when a large SAP system with a heavy workload and many concurrent users is set up.

The configuration plan must specify whether a central or standalone database system is to be installed and how many dialog instances are required. Once the plan is complete and the required hardware available, you can start with the installation process.

SAP R/3 Enterprise Architecture

SAP R/3 Enterprise is built on the principle of optimizing the stable and mature core processes and infrastructure and making new enhancements optional and deployable when needed.

Tuned core, optimized for performance – based on 4.6C
(SAP R/3 Enterprise Core)

Optional new functional enhancements
(SAP R/3 Enterprise Extensions)

Newest version of mySAP.com Technology technologies and infrastructure enhancements
(SAP Web Application Server)
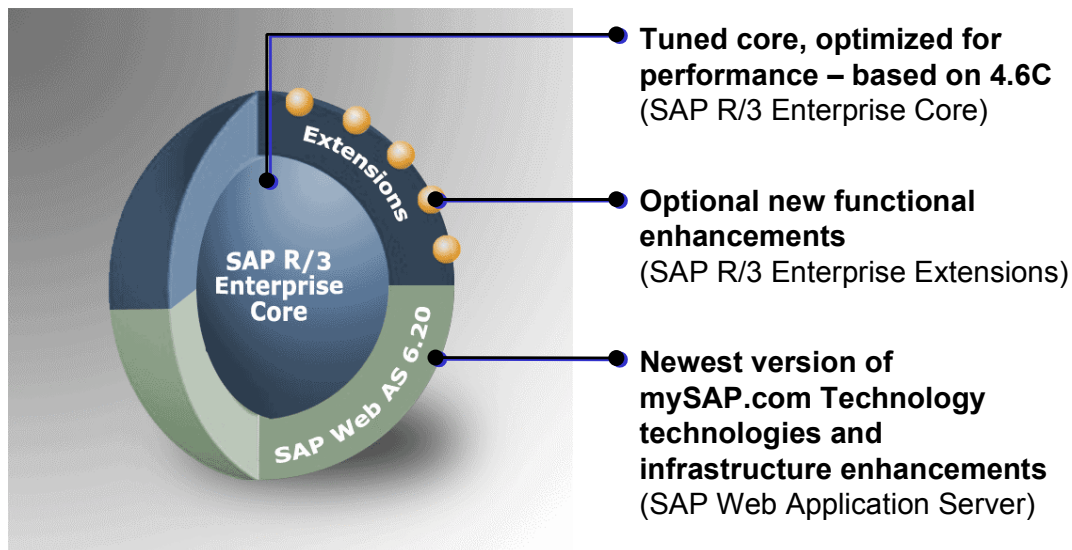
The first version of SAP R/3 Enterprise consists of:

* SAP R/3 Enterprise Extension Set 1.10

An SAP R/3 Extension Set includes all SAP R/3 Enterprise Extensions with the same release.

* SAP R/3 Enterprise Core (4.70 Support Release 1)
* SAP R/3 Plug-In 2002.1
* SAP Web Application Server 6.20

All SAP R/3 Enterprise Extensions get installed, but to use the functions contained in the SAP R/3 Enterprise Extensions or industry solutions each can be activated separately. This means you can implement only those new developments that you require.

For more information about SAP R/3 Enterprise, see SAP Service Marketplace at:
`http://service.sap.com/enterprise`

SAP R/3 Enterprise and Support of Unicode

Unicode unifies the encoding systems for characters in computer systems by unifying all characters of all character sets into a single encoding scheme.

Without Unicode, there are hundreds of conflicting encoding systems. For example, two encoding systems can use the same number for two different characters, or use different numbers for the same character. Any given computer needs to support many different encoding systems. Whenever data is passed between different encoding systems or platforms, data needs to be transformed from one encoding scheme to another, causing a risk of data loss or corruption.

Unicode removes this risk by providing a unique number for every character independent of platform, program or language.

SAP uses a single-source approach for transparent Unicode support. The ABAP coding is the same and runs identically on both non-Unicode and Unicode SAP systems. The SAP kernel and executables, however, are built differently for non-Unicode and Unicode SAP systems.

- Non-Unicode SAP system
  All characters are represented in binary with only one byte.

- Unicode SAP system
  All characters are represented in binary with two or four bytes.

This documentation describes the installation of both **Unicode** and **non-Unicode** SAP systems.

> You can find more information on Unicode SAP systems and their availability in **SAP Note 79991** and in the SAP Service Marketplace at:
> `http://service.sap.com/unicode`

Constraints

The SAP installation tools must only be used in accordance with the instructions and for the purposes described in the SAP installation documentation. Improper use of the SAP installation tools can damage files and systems already installed.

> SAP system installations should **only** be performed by SAP Technical Consultants who are certified for your operating system, your database, and the SAP system you are installing.

> Downward-Compatible Releases of DB/OS platforms for SAP Products
>
> SAP regularly plans to release the newest database (DB) and operating-system (OS) versions for mySAP.com products. These releases are downward-compatible with earlier SAP releases. Be aware that for already shipped mySAP.com components, we only support the installation for database versions proposed by the installation tool. Therefore, you must install a mySAP.com component or perform a system copy using a downward-compatible database as follows:
>
> – Install the component with the old proposed database version.
>
> – Upgrade the old database version to the downward-compatible new version.

Part I Standard Installation

This section describes how to perform a **standard** installation of the SAP R/3 Enterprise system.

For more information, if you want to adapt your standard installation for a **cluster** installation, see Cluster Installation with MSCS [Page 109].

1 New Features

The installation for SAP R/3 Enterprise using SAP R/3 Enterprise Core 4.70 has the following new features:

Area	Description
Installation CDs	As of SAP R/3 Enterprise using SAP R/3 Enterprise Core 4.70 SR 1, the installation is started from the SAPinst CD.
New Installation Procedure	The structure of the installation documentation and therefore the procedure to use it have changed significantly for SAP R/3 Enterprise.
New Installation Tool	SAP provides a new installation tool called System Landscape Implementation Manager, known for short as *SAPinst*.
	The main advantages compared with the previous installation tool R3SETUP are:
	• SAPinst does not abort due to errors. Instead, it stops the installation and you can retry the installation after having solved the problem. Alternatively, you can abort the installation manually if you want.
	• SAPinst records installation progress in a single log file, `sapinst.log`.
	• SAPinst has a graphical user interface (GUI) called SAPinst GUI that allows you to watch the progress of the installation and see all messages issued by **SAPinst**. As SAPinst GUI is Java based, you need a Java Runtime Environment (JRE). A *What's this?* help is integrated in SAPinst GUI. To use this, choose ![icon], then click on the field for which you want more information.
	You can start SAPinst GUI on a remote computer if you want.
	For more information on SAPinst, see the documentation *SAPinst Troubleshooting Guide* at: `http://service.sap.com/sapinstfeedback`
Support of Unicode	With SAP R/3 Enterprise using SAP R/3 Enterprise Core 4.70, SAP supports Unicode. For more information on Unicode, see: SAP R/3 Installation on Windows: Oracle [Page 6]
Support of Multiple Components on One Database	With SAP R/3 Enterprise using SAP R/3 Enterprise Core 4.70, SAP offers the installation of Multiple Components on One Database (MCOD). That is, you can install an additional SAP system into an existing SAP system database.
	For an MCOD installation, you can only combine systems for which the MCOD feature is released by SAP.
	For more information on MCOD, see:
	Installation of Multiple Components on One Database [Page 27] for general information on this feature.

Area	Description
Documentation	Due to the above changes, especially the introduction of SAPinst, we have restructured and rewritten the documentation for SAP R/3 Enterprise using SAP R/3 Enterprise Core 4.70.

Oracle Database Installation

Area	Description
Oracle database version	You can find information about the released database version for your installation in the SAP Service Marketplace at: **http://service.sap.com/platforms**
`svrmgrl` no longer exists	Server Manager `svrmgrl` has been replaced with `sqlplus`.
	If you enter `sqlplus` you are asked to enter your user name and password. To avoid this and to have the same behavior as with the previous command `svrmgrl`, enter the following to start the database administration tool:
	sqlplus /nolog
	If you have your own scripts using `svrmgrl` that connect to the database, you need to rewrite these accordingly: Replace the previous command `svrmgrl command=@<sql_file_name>` with `sqlplus /nolog @<sql_file_name>`
Database user internal no longer exists	User internal no longer exists in Oracle9i. To connect to the database as database administrator use the command:
	`connect / as sysdba`
	The previous command
	`connect internal/<password>`
	is no longer available.
New Name for Oracle Failsafe Service	The Oracle Failsafe Service from previous Oracle releases is now called `OracleMSCSServices`. You might still see the old name in certain SAP Notes. Be sure to always use the new name `OracleMSCSServices`
Oracle sapdata File Systems	Only four sapdata file systems (`sapdata1` to `sapdata4`) are required for the Oracle database.
New backup file system for Oracle offline redo logs	`<drive>\oracle\<DBSID>\oraarch` is the new standard file system for Oracle offline redo logs.
	The file system `\oracle\<SAPSID>\saparch` still persists but now only contains brbackup log files.

Oracle Tablespace Implement. Method	As of Oracle 8.1.7, a new, effective method of implementing tablespaces is used. With this new tablespace implementation, only the following three database tablespaces are created:
	
	 `PSAP<SAPSID>`
	
	 `PSAP<SAPSID><RELEASE>`
	
	 `PSAP<SAPSID>USR`
	
	 All three tablespaces are created with `AUTOEXTEND ON` and `EXTENT MANAGEMENT LOCAL AUTOALLOCATE`.

Database System ID	In an MCOD installation, there is an Oracle database system ID <DBSID> that can be different from the SAP system ID `<SAPSID>.` The database owner name (that is, the owner of tables) changed to `sap<sapsid>`.

Operating System Support

Area	Description
Windows 2000	Windows 2000 is the only supported operating system for the SAP system installation. See also the SAP Service Marketplace at: **http://service.sap.com/platforms**

2 How to Install Your SAP R/3 Enterprise System

Purpose

⚠️

The structure of the installation documentation has changed significantly. Therefore, you **must** read this chapter before starting the installation.

Use the tables referred to below as checklists for installing your SAP system.

Prerequisites

Distinguish between the following types of installation:

- Central system

    The central instance and database instance are installed on the **same** host. This is commonly used for smaller SAP systems.

    ⚠️

    For the installation of SAP R/3 Enterprise using SAP R/3 Enterprise Core 4.70, there is no single-step procedure to install a central instance and a database instance on one host comparable to the former installation tool R3SETUP. Instead, you have to start the installation tool SAPinst more than once (see Running SAPinst [Page 61]).

- Standalone database system

    The central instance and database instance are installed on **different** hosts. This is commonly used for larger SAP systems.

Procedure

We recommend you to proceed as follows to install your SAP system:

1. Print out the required tables:

    - To install a central system, see Installing a Central System [Page 14].

    - To install a standalone database system, see Installing a Central Instance [Page 18] and Installing a Database Instance [Page 21]

    - To install a dialog instance, see Installing a Dialog Instance [Page 22].

    - To install a gateway instance, see Installing a Gateway Instance [Page 23].

    💡

    You might need to refer to Additional Information [Page 96] for the installation.

2. Follow the installation sequence exactly as shown in the tables:

    a. If a step is required for your installation, follow the link for that step to the corresponding section.

    b. Perform the procedure described there.

    c. After successfully completing the installation step, mark the corresponding entry in the printed table with ✓ to log the progress of your installation.

d. Proceed with the next step listed in the table.

2.1 Installing a Central System

To install a central system (that is, you install a central instance and a database instance on the same host), perform the following steps:

Installation Planning

✔	Action
	Read the required documentation [Page 25], particularly the current SAP Notes.
	Decide, if you want to install multiple components on one database (MCOD) [Page 27]. ⚠️ Be aware that you **cannot** install multiple component on one database in a cluster environment. 💡 Be aware that you **cannot** install a Unicode SAP system with a non-Unicode SAP system in one database (MCOD).
	Decide if you want to use LDAP (Lightweight Directory Access Protocol) for SAP Logon or the Microsoft Management Console (MMC). For more information, see Integration of Active Directory Services [Page 30]
	Check the system configuration [Page 32]
	Check the hardware and software requirements [Page 38]

Installation Preparations

✔	Action
	Make sure that the front end software is installed on at least one host machine in your system environment. To simplify administration of your SAP system, we recommend that you do this on the central instance host. For more information on installing the front end software, see the separate documentation: *SAP Front End Installation Guide* (English version) *SAP Frontend-Installationsleitfaden* (German version)
	Check the Windows file system [Page 45]
	Check the Windows domain structure [Page 45], if required
	Reduce the size of the file cache [Page 46]
	Grant user rights for the installation [Page 46]
	Choose the SAP system IDs [Page 47]
	Prepare the SAP system transport host [Page 51]
	Prepare the SAPinst installation [Page 52]
	Prepare the required CDs for the installation [Page 54]
	If you decided to use LDAP for SAP Logon or Microsoft Management Console (MMC),

✔	Action
	see Prepare the Active Directory for Use with the SAP System [Page 56].

Installation Process

✔	Action
	Install the Oracle database server software [Page 58]
	Run SAPinst [Page 61] to install the central instance and check the input for the installation [Page 64]. • If you want to install a Unicode SAP system, use the Unicode Kernel CD, if you want to install a non-Unicode SAP system, use the non-Unicode Kernel CD. • Make sure to start SAPinst from a newly created installation directory.
	Run SAPinst [Page 61] to install the database instance and check the input for the installation [Page 64]. • If you want to install a Unicode SAP system, use the Unicode Kernel CD, if you want to install a non-Unicode SAP system, use the non-Unicode Kernel CD. • Make sure to start SAPinst from a newly created installation directory. • If you want to install an additional SAP system into an existing database (MCOD), see Installation of Multiple Components On One Database [Page 27].

Post-Installation Activities

To complete the installation, you have to perform a number of actions. Some of these actions are mandatory, others are optional and serve to activate features that might be useful.

✔	Action
	Check that you can start and stop the SAP system [Page 75]
	Check that you can log on to the SAP system [Page 76].
	Install the SAP license [Page 77]
	Check the SAP system services [Page 78]
	Install the online documentation [Page 78]
	Configure SAProuter and SAPNet – R/3 Frontend [Page 80].
	Configure the Transport Management System [Page 80].
	Perform basic operations [Page 81].
	Check and, if required, adapt the Configured Number of Work Processes [page 82].
	If required, install additional languages [Page 81].
	Import Support Packages [Page 83].

✔	Action
	If required, <u>set up Secure Single Sign-On [Page 83] or Kerberos Single Sign-On [Page 88].</u>

✔	**Action**
	To activate the SAP R/3 Enterprise Extensions you want to use, see **SAP Note 535003**.
	If required, perform application-specific actions [Page 92].
	Unicode SAP system installation only: 1. Log on to your SAP system. 2. Call transaction SE38. 3. Enter program **UMG_POOL_TABLE**. 4. Choose *Execute* (F8). 5. Select *Postprocessing* (After Import). 6. Choose *Execute* (F9).
	This is an **optional** post-installation step for Oracle 9.2.x only. If you want to extend the backup functionality to include, for example, incremental backup, you must use one of the following backup libraries: • SAP backup library • Legato Storage Manager • Backup tool of a third-party vendor that implements the backup interface of the Oracle Recovery Manager The use of a backup library is optional. You can install a backup library any time after the Oracle installation. For more information on how to install and use the SAP backup library and the Legato Storage Manager, see **SAP Note 142635**. When installing third-party backup software, follow the vendor's instructions.
	Perform the client copy [Page 92]
✔	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.
	Perform a full installation backup [Page 93]
	Once you have completed and checked the SAP system installation, you need to prepare the SAP system for using business applications. This process includes customizing the basis system and the various business components. For more information, see the SAP Library (choose *Help → SAP Library* in your SAP system or access the SAP Library at: `http://help.sap.com`) and choose *mySAP Technology Components → SAP Web Application Server → Customizing*.
	Change passwords of created users [Page 94].

Additional Steps

✔	Action
	Continuing after the central system installation
	If you want to install a:
	Dialog instance, proceed with Installing a Dialog Instance [Page 22]
	Gateway instance, proceed with Installing a Gateway Instance [Page 23]

2.2 Installing a Central Instance

To install a central instance, perform the following steps on the central instance host:

Installation Planning

✔	Action
	Read the required documentation [Page 25], particularly the current SAP Notes.
	Decide, if you want to install multiple components on one database (MCOD) [Page 27]. ⚠ Be aware that you **cannot** install multiple component on one database in cluster. 💡 Be aware that you **cannot** install a Unicode SAP system with a non-Unicode SAP system in one database (MCOD).
	Decide if you want to use LDAP (Lightweight Directory Access Protocol) for SAP Logon or the Microsoft Management Console (MMC). For more information, see Integration of Active Directory Services [Page 30].
	Check the system configuration [Page 27]
	Check the hardware and software requirements [Page 38]

Installation Preparations

✔	Action
	Make sure that the front end software is installed on at least one host machine in your system environment. To simplify administration of your SAP system, we recommend that you do this on the central instance host. For more information on installing the front end software, see the separate documentation: • SAP Front End Installation Guide (English version) • SAP Frontend-Installationsleitfaden (German version)
	Check the Windows file system [Page 45]
	Check the Windows domain structure [Page 45], if required.
	Reduce the size of the file cache [Page 46]

✔	Action
	Grant user rights for the installation [Page 46]
	Choose the SAP system IDs [Page 47]
	Prepare the SAP system transport host [Page 51]
	Prepare the SAPinst installation [Page 52]
	Prepare the required CDs for the installation [Page 54]
	If you decided to use LDAP for SAP Logon or Microsoft Management Console (MMC) see, Prepare the Active Directory for Use with the SAP System [Page 56].

Installation Process

✔	Action
	Install the Oracle database client software [Page 58]
	Run SAPinst [Page 61] to install the central instance and check the input for the installation [Page 64]. • If you want to install a Unicode SAP system, use the Unicode Kernel CD, if you want to install a non-Unicode SAP system, use the non-Unicode Kernel CD. • Make sure to start SAPinst from a newly created installation directory.
	Install the database instance on the database host as described in Installing a Database Instance [Page 21] and check the input for the installation [Page 64]. Make sure to start SAPinst from a newly created installation directory. If you want to install an additional SAP system into an existing database (MCOD), see Installation of Multiple Components On One Database [Page 27].

Post-Installation Activities

To complete the installation, you have to perform a number of actions. Some of these actions are mandatory, others are optional and serve to activate features that might be useful.

✔	Action
	Check that you can start and stop the SAP system [Page 75]
	Check that you can log on to the SAP system [Page 76]
	Install the SAP license [Page 77]
	Check the SAP system services [Page 78]
	Install the online documentation [Page 78]
	In a standalone database system, after you have installed the database instance, check the RFC destination [Page 79]
	Configure SAProuter and SAPNet – R/3 Frontend [Page 80].

2.2 Installing a Central Instance

✔	Action
	Configure the Transport Management System [Page 80].
	Check and, if required, adapt the Configured Number of Work Processes [page 82].
	Perform basic operations [Page 81].
	If required, install additional languages [Page 81].
	Import Support Packages [Page 83].
	If required, set up Secure Single Sign-On [Page 83] or Kerberos Single Sign-On [Page 88].
	To activate the SAP R/3 Enterprise Extensions you want to use, see **SAP Note 535003**.
	If required, perform application-specific actions [Page 92].
	Unicode SAP system installation only: 1. Log on to your SAP system. 2. Call transaction SE38. 3. Enter program **UMG_POOL_TABLE**. 4. Choose *Execute (F8)*. 5. Select *Postprocessing* (After Import). 6. Choose *Execute* (F9).
	This is an **optional** post-installation step for Oracle 9.2.x only. If you want to extend the backup functionality to include, for example, incremental backup, you must use one of the following backup libraries: • SAP backup library • Legato Storage Manager • Backup tool of a third-party vendor that implements the backup interface of the Oracle Recovery Manager The use of a backup library is optional. You can install a backup library any time after the Oracle installation. For more information on how to install and use the SAP backup library and the Legato Storage Manager, see **SAP Note 142635**. When installing third-party backup software, follow the vendor's instructions.
	Perform the client copy [Page 92]
	Perform a full installation backup [Page 93]
	Once you have completed and checked the SAP system installation, you need to prepare the SAP system for using business applications. This process includes customizing the basis system and the various business components. For more information, see the SAP Library (choose *Help → SAP Library* in your SAP system or access the SAP Library at: `http://help.sap.com`) and choose *SAP Web Application Server*. Under *mySAP Technology Components → SAP Web Application Server → Customizing*.

✔	Action
	Change passwords of created users [Page 94].

Additional Steps

✔	Action
	Continuing after the central instance installation.
	If you want to install a:
	• Dialog instance, proceed with Installing a Dialog Instance [Page 22]
	• Gateway instance, proceed with Installing a Gateway Instance [Page 23]

2.3 Installing a Database Instance

Installation Planning

✔	Action
	Read the required documentation [Page 25], particularly the current SAP Notes.
	Decide, if you want to install multiple components on one database (MCOD) [Page 27]
	Check the system configuration [Page 27]
	Check the hardware and software requirements [Page 38]

Installation Preparations

✔	Action
	Check the Windows file system [Page 45]
	Check the Windows domain structure [Page 45], if required.
	Reduce the size of the file cache [Page 46]
	Grant user rights for the installation [Page 46]
	Choose the SAP system IDs [Page 47]
	Prepare the SAP system transport host [Page 51]
	Prepare the SAPinst installation [Page 52]
	Prepare the required CDs for the installation [Page 54]

Installation Process

✔	Action
	Install the Oracle database server software [Page 58]
	Run SAPinst [Page 61] to install the database instance and check the input for the installation [Page 64] • If you want to install a Unicode SAP system, use the Unicode Kernel CD, if you want to install a non-Unicode SAP system, use the non-

	Unicode Kernel CD.
	• Make sure to start SAPinst from a newly created installation directory.
	• If you want to install an SAP system into an existing database, see Installation of Multiple Components on One Database [Page 27].

Post-Installation Activities

	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.
	Perform the post-installation activities of the central instance installation [Page 18] on the central instance host

2.4 Installing a Dialog Instance

Installation Planning

✔	Action
	Read the required documentation [Page 25], particularly the current SAP Notes.
	Check the hardware and software requirements [Page 38]

Installation Preparations

✔	Action
	Make sure that the front end software is installed on at least one host machine in your system environment. To simplify administration of your SAP system, we recommend that you do this on the central instance host. For more information on installing the front end software, see the separate documentation: • SAP Front End Installation Guide (English version) • SAP Frontend-Installationsleitfaden (German version)
	Check the Windows file system [Page 45]
	Check the Windows domain structure [Page 45], if required.
	Reduce the size of the file cache [Page 46]
	Grant user rights for the installation [Page 46]
	Prepare the SAPinst installation [Page 52]
	Prepare the required CDs for the installation [Page 54]

Installation Process

✔	Action
	Install the Oracle database client software [Page 58]
	Run SAPinst [Page 61] to install the dialog instance and check the input for the

	installation [Page 64].
	
	       • If you want to install a Unicode SAP system, use the Unicode Kernel CD, if you want to install a non-Unicode SAP system, use the non-Unicode Kernel CD.
	
	       • Make sure to start SAPinst from a newly created installation directory.

Post-Installation Activities

To complete the installation, you have to perform a number of actions. Some of these actions are mandatory, others are optional and serve to activate features that might be useful.

✔	**Action**
	Check that you can start and stop the SAP system [Page 75]
	Check that you can log on to the SAP system [Page 76].
	If required, set up Secure Single Sign-On [Page 83] or Kerberos Single Sign-On [Page 88]
	Perform a full installation backup [Page 93]
	Change passwords of created users [Page 94].

Additional Steps

✔	**Action**
	Continuing after the dialog instance installation If you want to install a: Dialog instance, repeat this procedure. Gateway instance, proceed with Installing a Gateway Instance [Page 23]

2.5 Installing a Gateway Instance

If required, install a standalone gateway instance:

Installation Planning

✔	**Action**
	Read the required documentation [Page 25], particularly the current SAP Notes.
	Check the hardware and software requirements [Page 38]

Installation Preparations

✔	**Action**

	Check the Windows file system [Page 45]
	Check the Windows domain structure [Page 45], if required.
	Choose the SAP system IDs [Page 47]
	Prepare the SAPinst installation [Page 52]
	Prepare the required CDs for the installation [Page 54]

Installation Process

✔	**Action**
	Run SAPinst [Page 61] from the Presentation CD to install the gateway instance and check the input for the installation [Page 64].

Make sure to start SAPinst from a newly created installation directory. |

Post-Installation Activities

	Start and stop the Gateway instance. For more information, see, Start and stop the SAP system [Page 75]
	Download the latest Gateway patch which is located in the `DW.SAR` archive from the SAP Service Marketplace at:

`http://service.sap.com` → *SAP Software Distribution Center* → *Download* → *SAP Support Packages & Patches* → *SAP WEB AS* → *SAP WEB AS 6.20* → *Binary Patches* → *SAP Kernel 6.20* → *NT/I386* → *Database independent* |
| | Change passwords of created users [Page 94]. |

2.6 Additional Information

You might need to refer to the **optional** sections below when installing your SAP system.

✔	**Action**
	Performing a Remote Installation with SAPinst [Page 96].
	Continuing an Interrupted Installation with SAPinst [Page 99].
	Deletion of an SAP System Installation [Page 101].

3 Installation Planning

⚠️

The structure of the installation documentation has changed significantly. You **must** use the tables in section How to Install Your SAP R/3 Enterprise System [Page 13] for installing the system and to navigate through the installation procedures. All necessary installation phases (planning, preparation, installation and post-installation) are listed in these tables. This prevents you missing important information.

3.1 Required Documentation

SAP Installation Notes

Read the SAP installation notes before you begin the installation. These notes contain the most recent information regarding the installation, as well as corrections to the installation documentation.

Make sure that you have the most recent version of each SAP Note. You can find the SAP Notes in the SAP Service Marketplace at: **http://service.sap.com/notes**

Note Number	Title
529151	INST: SAP R/3 Enterprise 4.70 on Windows – General
529076	INST: SAP R/3 Enterprise 4.70 on Windows – Oracle
42305	RSCPINST (NLS installation tool)
45619	R/3 with several languages or typefaces
534334	Composite SAP Note Installation/Upgrade SAP R/3 Enterprise

SAPinst Troubleshooting Guide

Read the documentation *SAPinst Troubleshooting Guide*. It provides up-to-date information about how to avoid installation failure and what to do if a failure occurs.

You can find the *SAPinst Troubleshooting Guide* in the SAP Service Marketplace at:

http://service.sap.com/sapinstfeedback

Additional Information

Refer to the following documents if required:

💡

Documents that are also part of delivered *Installation/Upgrade Documentation CD-ROM* are marked with "[CD]"

- Platforms released for mySAP.com, see the SAP Service Marketplace at:

    http://service.sap.com/platforms

3.1 Required Documentation

- Technical infrastructure (like configuration scenarios and related aspects such as security, load balancing, availability and caching), see SAP Service Marketplace at:

  http://service.sap.com/ti

- Unicode SAP systems and their availability, see **SAP Note 79991** and the SAP Service Marketplace at:

  http://service.sap.com/unicode

- Installation of front ends for the SAP system, see the documentation *Front End Installation Guide* [Presentation CD] or the SAP Service Marketplace at:

  http://service.sap.com/instguides

- mySAP.com Workplace, see the SAP Service Marketplace at:

  http://service.sap.com/workplace

- SAP systems for high availability purposes, see:

  SAP online documentation BC SAP High Availability in the SAP Library (choose *Help →
      SAP Library* in your SAP system) or access the SAP Library at:

  http://help.sap.com

  SAP Service Marketplace at:

  http://service.sap.com/ha

- Performing a Homogeneous System Copy, see the documentation *SAP Web AS Homogeneous and Heterogeneous System Copy* available in the SAP Service Marketplace at: **http://service.sap.com/instguides** → *SAP Web Application Server* → *<Release>*.

- Performing a Heterogeneous System Copy, see the SAP Service Marketplace at: **http://service.sap.com/osdbmigration**

- Information about SAP Web AS Security, see the SAP Service Marketplace at:

  http://service.sap.com/security

Naming Convention

In this documentation, the following naming conventions apply:

Terminology

The term *SAP system* stands for an **SAP R/3 Enterprise** (SAP R/3) system.

Variables

Variables	Description
<SAPSID>	SAP system ID in uppercase letters
<sapsid>	SAP system ID in lowercase letters
<DBSID>	Database ID in uppercase letters

Variables	Description
`<dbsid>`	Database ID in lowercase letters
`<INSTDIR>`	Installation directory
`<CD-DIR>`	Directory on which a CD-ROM is mounted
`<OS>`	Operating system name within a path

The following examples show how the variables are used:

Log on as user `<sapsid>adm` and change to the directory `usr\sap\<SAPSID>`.
This means that, if your SAP system ID is C11, you log on as user `c11adm` and change to the directory `\usr\sap\C11`.

Change to the directory `<CD-DIR>\Windows\<OS>`.
If the CD is mounted on `\sapcd1` and your operating system is NT, change to `\sapcd1\Windows\NT`.

3.2 Installation of Multiple Components on One Database

Use

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

You install an SAP R/3 central system and an SAP CRM central system in a single database.

MCOD is scheduled to be available with all mySAP.com components. We are releasing this technology on all the major databases for the SAP system, in line with our commitment to deliver platform-independent solutions.

Using this technology is as easy as installing a separate component. No extra effort is required because the MCOD installation is fully integrated into the standard installation procedure. MCOD is not an additional installation service. Instead, it is an option of the database instance installation.

Prerequisites

- For more information on MCOD, see:

    http://service.sap.com/mcod

- For more information on released platforms and availability, see:

    http://service.sap.com/platforms

3.2 Installation of Multiple Components on One Database

Choose *Platform Availability for mySAP.com → Multiple Components on One Database (MCOD)*.

- 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. The same applies to memory resources and disk space.

  You can size multiple components on one database by sizing each individual component using the SAP Quick Sizer and then adding the requirements together. For more information on the SAP Quick Sizer, see:

  http://service.sap.com/quicksizer

Features

We **strongly recommend** you to test MCOD in a test or development system.

We recommend running MCOD systems in the same context. We do **not** recommend you to mix test, development, and productive systems in the same MCOD.

- 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.

- 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.

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

Constraints

- In the event of database failure, all SAP systems running on the single database are affected.

- Automated support in an MCOD landscape for the following administrative tasks depends on your operating system and database:

  – Copying a single component from an MCOD landscape to another database at database level.

  – De-installing a single component from an MCOD landscape.

  You can use SAPNet - R/3 Frontend to request help with these tasks.

- A Unicode SAP system **cannot** be installed with a non-Unicode SAP system in one database (MCOD).

- You **cannot** install multiple components on one database in a cluster.

Activities

All differences in the installation procedure for MCOD are marked in the corresponding sections of this documentation.

Installing the first SAP System into a new database

1. Perform the central instance installation as usual.

    You install the central instance with SAP system ID `C11`.

2. Start the database instance installation.

    When you are prompted for Database Instance Type, choose Install (first) SAP System into a new database.

    You install the database instance `C11`. On some platforms, you can choose a database instance ID that is different from the SAP system ID, for example `D11`.

3. Finish the installation.

Installing an additional SAP System into an existing database

1. Perform the central instance installation as usual.

    You install the central instance with SAP system ID `C12`.

2. Start the database instance installation.

3. When you are prompted for *Database Instance Type*, choose *Install (additional) SAP System into an existing database*.

4. When SAPinst prompts you for the *Name of the database instance*, enter **exactly** the database instance `<DBSID>` of the existing database.

    When SAPinst prompts for the database instance name, you enter `C11`.

5. Finish the installation.

Due to the MCOD installation, some installation steps are not required and therefore do not appear. These steps are marked in section "Input for the Installation."

3.3 Integration of LDAP Directory Services

Purpose

The Lightweight Directory Access Protocol (LDAP) is a feature of Windows 2000 that allows important information within a corporate network to be stored centrally on a server where it can be easily accessed and administered. Storing information centrally for the entire network has the advantage that data must be maintained only once and therefore will not be redundant or inconsistent.

If an LDAP directory is available in the corporate network, you can configure the SAP system so as to make the most of this feature. For example, a configured SAP system can read information from the directory and also store information there.

The following text explains the benefits of using the SAP system with the LDAP directory. In addition, the text also gives an overview of the configuration steps necessary before the SAP system can be used with the directory.

> The SAP system is able to interact with the Active Directory using the LDAP protocol. This defines how communication between the SAP system and the directory is conducted and 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, the SAP system can be configured to use the information available there. In the following text, directories other than the Active Directory that implement the LDAP protocol are referred to as **generic LDAP directories**.

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

- SAP Logon

- The Microsoft Management Console (MMC)

For more information on the automatic registration of SAP components in LDAP directories and the benefits of using it in SAP Logon and MMC, read the documentation *R/3 System Information in Directory Services* in the *SAP Service Marketplace* at:
http://service.sap.com/msplatforms → *Microsoft* → *Windows Server*

The 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 R/3 systems and their message servers from the directory. If you configure SAP Logon to use the LDAP directory, it will query the directory each time *Server* or *Group* selection is chosen as a means of getting up-to-date information on available SAP R/3 systems.

To use the LDAP operation mode, the `sapmsg.ini` file must contain the following *Address* section:

[Address]

Mode=LDAPdirectory

LDAPserver=

LDAPnode=

`LDAPoptions=`

If you use an Active Directory, you must set `LDAPoptions="DirType=NT5ADS"` (see R/3 profile parameter `ldap/options`). If the client is not located in the same domain forest as the Active Directory, or the operating system does not have a directory service client (NT4.0 and Win9X without installed *dsclient*), you must specify the directory servers (for example, `LDAPserver=pcintel6 p24709`). For more information, refer to the R/3 profile parameter *ldap/servers*. For other directory services, you can use *LDAPnode* to specify the distinguished name of the SAP root node (see SAP R/3 system profile parameter *ldap/saproot*).

The MMC

The MMC is a graphical user interface for administering and monitoring SAP systems from a central location. It presents and analyzes system information that is gathered from various sources, including the Active Directory, if the SAP system has been prepared appropriately. When the Active Directory is integrated as a source of information this has advantages for the 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 MMC.

The use of the MMC in combination with Active Directory services is particularly recommended for the administration of distributed systems. For example, in a distributed environment that implements the Workplace with the mySAP.com components BW, B2B, APO, and CRM, this simplifies administration. It is possible to keep track of significant events in all of the systems from a single MMC interface. Changes within the system configuration do not have to be registered manually; they are automatically updated in the directory and subsequently reflected in the MMC.

Prerequisites

The SAP system can only be configured for Active Directory services or other LDAP directories if these are already available on the network. The Active Directory is a feature of Windows 2000 and is automatically available on all domain controllers. A generic LDAP directory is an additional component that must be installed separately on a UNIX or Windows server.

Process Flow

Active Directory

To enable an SAP system to make use of the features offered by the Active Directory, you must configure both the Active Directory and the SAP system.

- In the first step, the Active Directory must be prepared so that it can store SAP data. This involves extending the schema for the SAP data types, creating a root container for the storage of SAP-specific information, and defining accounts that allow directory access. These tasks are all performed using the R3SETUP tool that offers the option *Configure Active directory for SAP*.

  For more information, see <u>Preparing the Active Directory for Use with the SAP System</u> [Page 56].

- In the second step, the SAP system must be configured to enable interaction with the Active Directory. This is carried out during the installation of the SAP central instance using the SAPinst tool. The SAPinst tool prompts for information related to the Active Directory and then configures the system accordingly.

Generic LDAP Directories

The process of preparing the SAP system for the use of generic LDAP services involves a number of manual steps. Again, both the LDAP directory and the SAP system must be configured appropriately:

- The LDAP directory must be configured to store SAP data. This involves extending the directory schema and creating a container for the SAP data.

- The SAP system must be configured to enable interaction with the LDAP directory. The configuration steps are carried out by the SAPinst tool during the installation of the SAP central instance. The SAPinst tool configures the system correctly using the directory information that must be entered before the installation procedure begins.

- A user with a password must be set up on the server where the SAP system is running to permit the system to access and modify the LDAP directory. This is carried out by running the script `ldappasswd.`

For more information on how to enable interaction between a generic LDAP directory and the SAP system, read the documentation *R/3 System Information in Directory Services* in the *SAP Service Marketplace* at:

`http://service.sap.com/msplatforms` $\rightarrow$ *Microsoft* $\rightarrow$ *Windows Server*

3.4 System Configuration

System Configuration

You and your hardware partner generally plan the system configuration before the installation. Key aspects of the planning include:

- Central system or standalone database system

- Domain or local installation

- How many dialog instances and front ends are required

You and your hardware partner work out a high-performance configuration based on sizing information that reflects the system workload, such as:

- The set of applications to be deployed

- How intensively the applications are to be used

- The number of users

Domain or Local Installation

The installation types differ as follows:

- Local Installation

    You need to be `Local Administrator` of the machine involved. In a local installation, all Windows account and user information is stored locally on one host and is not visible to any other hosts in the system.

    If the SAP system is to run on a **single** machine, you can perform a local installation.

    Performing a local installation for a distributed system leads to authorization problems that have to be resolved.

- Domain installation

  You need to be `Domain Administrator` of the domain involved, and all machines in the system must belong to the same domain. In a domain installation, the user information is stored centrally on the domain controller and is accessible to all hosts in the system.

  If the system is to be distributed across **more than one** machine, we strongly recommend a domain installation.

  ⚠️

  If for any reason, you are not granted domain administration rights, you can perform the installation as a domain user who is a member of the local administrator group. However, the domain administrator has to prepare the system appropriately for you. For more information, see Performing a Domain Installation Without Being a Domain Administrator [Page 48].

For more information on user rights, see also:

Granting User Rights for the Installation [Page 46].

Distribution of Components to Disks

When you install the SAP system, the installation tools prompt you to enter drive letters for the main components of the system. This gives you the opportunity to distribute components to disks in the system as you wish. The way in which you do this significantly affects system throughput and data security, and must therefore be carefully planned. The best distribution depends on your specific environment and must take into consideration factors such as the size of the components involved, security requirements and the expected workload.

When you work out the assignment of components to disks, you first need to get an overview of the main components and their corresponding directories. Then, on the basis of sample configurations and the recommendations provided in this documentation, you can decide which assignment is best for your particular system.

SAP systems are normally installed on RAID arrays that ensure data redundancy. This documentation therefore focuses on RAID subsystems and drives.

Minimal Configuration

The following illustrates a disk configuration for a small test or demo system. As security and performance play a less crucial role in this type of system, many different configurations are feasible. The following shows one of the possible options.

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Use the illustrated configuration exclusively for test or demo systems with a final database size of less than 10 GB. It is unsuitable for production systems because it only minimally satisfies security and performance requirements.

3.4 System Configuration

Distribution of Components to Disks
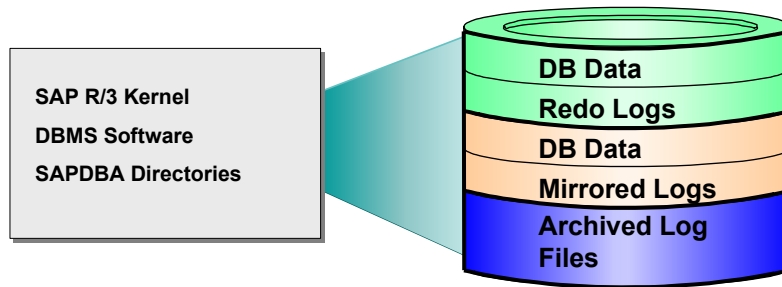
Distribution of Directories to Disks

Disk 1	`\ORACLE\<SAPSID>\920`
	
	`\ORACLE\<SAPSID>\sapreorg`
	`\ORACLE\<SAPSID>\origlogA`
	`\ORACLE\<SAPSID>\origlogB`
	
	`\ORACLE\<SAPSID>\sapdata1`
	`\ORACLE\<SAPSID>\sapdata2`

Disk 2	`\ORACLE\<SAPSID>\mirrlogA`
	`\ORACLE\<SAPSID>\mirrlogB`
	`\ORACLE\<SAPSID>\saptrace`
	`\ORACLE\<SAPSID>\sapbackup`
	`\ORACLE\<SAPSID>\sapcheck`
	
	`\usr\sap`
	
	`\ORACLE\<SAPSID>\sapdata3`
	`\ORACLE\<SAPSID>\sapdata4`

Disk 3	`\ORACLE\<SAPSID>\saparch`

Comments

- The configuration ensures that no data can be lost, but the process for recovering a damaged database is complicated and time-consuming.

- The redo logs and database files are located on the same disks. This means that a single disk failure can result in the loss of both the redo logs and database data.

- The I/O-intensive redo logs are on the same disk volumes as the data files. This can impede performance.

- An equally good alternative would be to simply place all components on a single RAID 5 array.

Integration of Active Directory Services

Optionally, if a Windows 2000 Domain Controller is available on the network, you can decide to integrate Active Directory Services for the SAP system. Integration of the services has the advantage that the system can subsequently access and utilize a wide range of information stored centrally in the directory. You must decide whether you want to use Active Directory in advance of the installation because it influences the procedure. Both the directory and the SAP system have to be prepared appropriately.

For details on how the system can benefit from and be prepared for Active Directory see
Integration of Active Directory Services [Page 30].

3.5 SAP Directories

Definition

This section describes the SAP directories created during the installation. The base
directories required for the central instance are:

- `\usr\sap`

   Created on the central instance and contains general SAP software

- `\usr\sap\trans`

   Created on the transport host and contains SAP software for the transport of objects
   between SAP systems

Both the above directories are global, that is, they are accessed by all hosts in the SAP
system. Therefore, they have names that follow the Universal Naming Convention (UNC).

We distinguish between a global, local, and database host:

- **Global host**

   Machine on which the central instance is running

- **Local host**

   Current machine on which an SAP instance is running

- **DB host**

   Machine on which the database server is running

Use

\usr\sap

The SAP software is stored in the `\usr\sap` directory:

- On global hosts, the `\usr\sap` directory contains global and local (instance-specific)
   data.

- On local hosts, `\usr\sap` contains only instance-specific data and copies of the SAP
   executables. The executables on the local host are replicated from those on the global
   host each time the local instance is started.

The installation program creates the `\usr\sap` directory on the global host and shares it with
the names `sapmnt` and `saploc`. The same directory on the local host is shared as `saploc`.

3.5 SAP Directories

Since SAP traces for the instance are created in `\usr\sap`, sufficient space must be available in this directory. Changes in SAP profiles can also affect the disk space.

If you create the subdirectory ......`\SYS` (global data) locally on application or front-end servers, you have to distribute the software for the SAP system manually when upgrading to a new SAP release. SAP does **not** provide support in this case.

\usr\sap\trans

In an SAP system landscape there must be a global directory, called `\usr\sap\trans`, for the transport of objects between SAP systems. This directory is created on one SAP instance host in the SAP system landscape and is called the transport host. It must be accessible for every host on which an SAP instance is installed and which belongs to this SAP system landscape. The path on every host must be `\\<SAPTRANSHOST>\usr\sap\trans`.

If you want to use the Change and Transport System (CTS), you need additional space in directory `\usr\sap\trans`. Since the required storage size differs depending on the transport volume, we cannot exactly specify the required amount of free disk space. We recommend that you reserve 20 MB per user of the transport system, with a minimum of 200 MB.

With the SAP system you can make a transport host known to the Domain Name Server (DNS) for all Windows systems. For more information, see .

Structure

The following graphics show how the physical directory `\usr\sap` is shared on the global host and in a distributed installation. In both cases, UNC names are used as follows:

* `\\<SAPGLOBALHOST>\sapmnt` to access global directories

* `\\<SAPLOCALHOST>\saploc` to access local instance-specific data

Directory Structure on the Global Host

Global Directories   **Physical Directory Structure**   **Instance Directories**

\\<SAPGLOBALHOST>\sapmnt (UNC name)

usr

\\<SAPLOCALHOST>\saploc (UNC name)

refers to   sap   *refers to*

<SID>

sys   <instance name>

exe   profile   global   work   data   log

run   opt

dbg
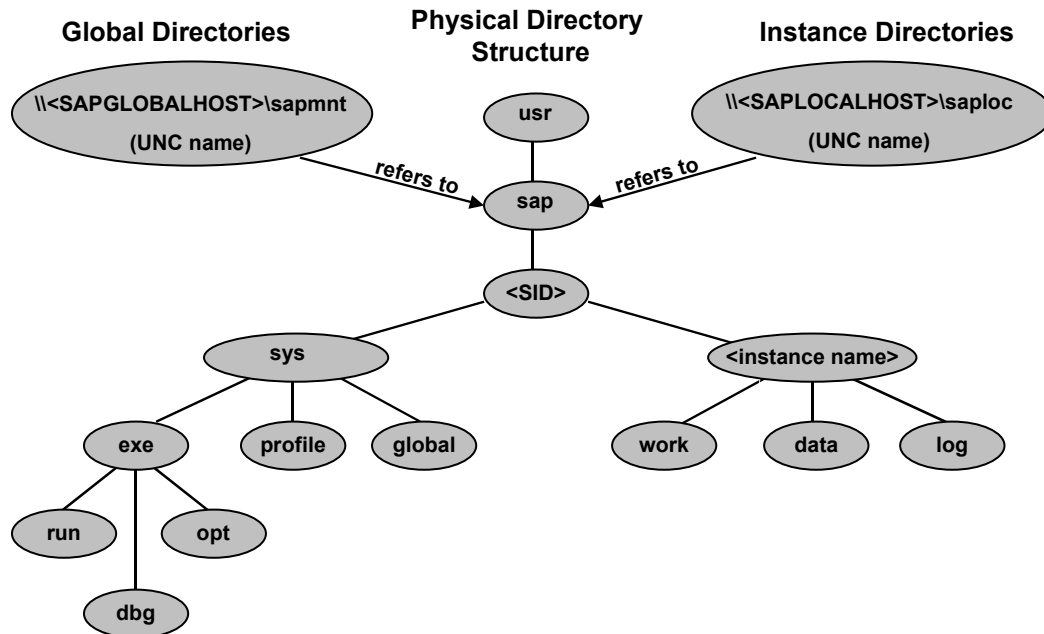
This graphic shows the directory structure on the global host. The global data is stored in the global directories on the global host and physically exists only once for each SAP system. Other computers access the data using the UNC name, `\\<SAPGLOBALHOST>\sapmnt,` where `SAPGLOBALHOST` is replaced by the SAP system with the name of the global host. The global host accesses its own instance-specific data using the UNC name `\\<SAPLOCALHOST>\saploc.` On the global host, the parameters `SAPGLOBALHOST` and `SAPLOCALHOST` have the **same** value.

3.6 Hardware and Software Requirements Check

Directory Structure of a Distributed Installation
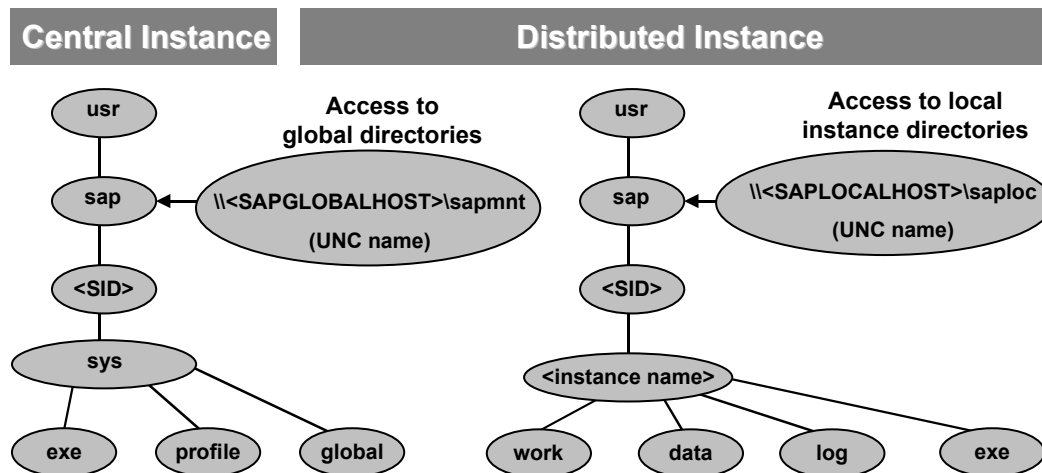
This graphic shows how the central instance, which runs on the global host, interacts with a distributed instance running on another computer. On a distributed instance host, the parameters SAPGLOBALHOST and SAPLOCALHOST have **different** values. Distributed instances use SAPGLOBALHOST to access global data on a separate host, that is, the global host with the central instance.

3.6 Hardware and Software Requirements Check

Purpose

You check the hardware and software requirements using the checklists below. They give the **minimum** requirements for small SAP system installations (database server and application server) and do not take customer data into account. Depending on the amount of data involved, the requirements might change.

For a more precise sizing definition that reflects your particular system load, you can:

- Use the *Quick Sizer* tool available in the SAP Service Marketplace. You enter information on your planned system and the tool calculates the requirements that have to be met to handle the load. You can find more information on the tool at:
  http://service.sap.com/sizing

- Contact a hardware vendor. The vendor analyzes the load and calculates suitable hardware sizing.

If you have any questions, contact the person in charge of installation, or your Competence Center.

Prerequisites

- 33Use Windows 2000 as operating system for the installation of SAP R/3 Enterprise using SAP R/3 Enterprise Core 4.70.

⚠️

> With Windows 2000, you **must** use the **English (International)** version of the operating system, but you can use a different language for the graphical user interface (GUI). For more information, see **SAP Note 362379**.

- For remote support, the remote connection specified in the contract agreement must be available before installation. The Internet address setup at SAP and registration are dealt with during the installation.

- You are only allowed to install an SAP system on certified hardware. AddOn Systemhaus GmbH certifies hardware platforms for SAP on Microsoft Windows 2000. It certifies a specified release of MS Windows 2000. SAP customers can then run the SAP system on the respective platform for all the combinations of the SAP system and databases released by SAP for the specified release of MS Windows 2000. You can find more information about certified platforms at:

  `http://addon.saponwin.com`

Process Flow

1. For a **central system** and **standalone database system**, see the following check lists:

   - [Central instance [Page 39]](#)

   - [Database instance [Page 41]](#)

   - [Dialog instance [Page 42]](#), if you want to install additional instances

     💡

     > If you install multiple SAP system instances on one host, the requirements are cumulative.

     > For example, if you install a central system, you have to add the space and the RAM requirements of the central instance check list and the database instance check list.

     💡

     > Be aware that Unicode systems require additional hardware resources.

     > You can find more information about Unicode SAP systems in the SAP Service Marketplace at:
     > `http://service.sap.com/unicode`

2. You check the network requirements. These are described in the documentation *Network Integration of SAP Servers*. You can find this documentation under *Network Integration Guides* in the SAP Service Marketplace at:

   `http://service.sap.com/network`

   For more information on SAP software in PC networks, see **SAP Note 5324.**

   ⚠️

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

3.6.1 Requirements Checklist for the Central Instance

The following table lists the central instance requirements for both **central system** and **standalone database system** installation.

The host machine running the central instance must meet the following requirements:

Requirement Type	Requirement

Hardware Requirement	• Appropriate backup system
	
	• Disk space
	
	    for a Central System installation (central instance and database instance are installed on one host):
	
	    60 GB (not including virtual memory) on at least 3 physically separate disks
	
	    for a central instance (Standalone Database System installation):
	
	    4 GB (not including virtual memory)
	
	    To check:
	
	      a. Choose *Start → Programs → Administrative Tools → Computer Management → Disk Management*
	
	      b. Right-click on the respective disk and choose *Properties.*
	
	• Paging File Size of 1 GB plus 3 times RAM. Maximum required is 10 GB.
	
	    To check, choose:
	
	      a. Right-click on My Computer and choose Properties.
	
	      b. On the Advanced tab choose Performance Options.
	
	      c. If required, in section *Virtual Memory*, choose *Change.*
	
	• 650 MB of temporary disk space for every required installation CD you have to copy to a local hard disk (see Preparing Required CDs [Page 54]).
	
	• Minimum RAM:
	
	    Unicode: At least 512 MB
	
	    non-Unicode: At least 1 GB

Software Requirement	Windows Oracle 9.2.0 and patch set 9.2.0.2.1 Windows 2000 Server or Windows 2000 Advanced Server * or

Requirement Type	Requirement
	Windows 2000 Data Center Server * with at least service pack 2 (* one of these is recommended for production use and required for MSCS configuration) To check, choose To check, choose: a. Start → Programs → Accessories → Command Prompt b. Enter the command **winver** • Windows 2000 Resource Kit is strongly recommended to enable support.
Other Requirements	• Ensure that no host name is longer than 13 characters. • If you want to install a printer on a decentralized host for the SAP system, ensure that the printer can be accessed under Windows. • Check that the network, dialog instance, and operating system requirements are met

3.6.2 Requirements Checklist for the Database Instance

The following table lists the database instance requirements for both **central system** and **standalone database system** installation.

The host machine running the database instance must meet the following requirements:

Requirement Type	Requirement
Hardware Requirement	• Appropriate backup system • Disk space of 50 GB (not including virtual memory) To check: a. Choose *Start → Programs → Administrative Tools → Computer Management → Disk Management* b. Right-click on the respective disk and choose *Properties.* • Paging File Size: 2 GB RAM To check, choose: a. Right-click on *My Computer* and choose *Properties.*

3.6 Hardware and Software Requirements Check

Requirement Type	Requirement
	b. On the Advanced tab choose Performance Options.
	c. If required, in section *Virtual Memory*, choose *Change.*
	• 650 MB of temporary disk space for every required installation CD you have to copy to a local hard disk (see Preparing Required CDs [Page 54]).
	• Minimum RAM:
	Unicode: At least 512 MB
	Non-Unicode: At least 1 GB
Software Requirement	• Windows Oracle 9.2.0 and patch set 9.2.0.2.1
	• Windows 2000 Server or Windows 2000 Advanced Server * or Windows 2000 Data Center Server *
	with at least service pack 2
	(* one of these is recommended for production use and required for MSCS configuration)
	To check, choose:
	a. *Start → Programs → Accessories → Command Prompt*
	b. Enter the command `winver`
	• Windows 2000 Resource Kit is strongly recommended to enable support
Other Requirements	• Ensure that no host name is longer than 13 characters.
	• If you want to install a printer on a decentralized host for the SAP system, ensure that the printer can be accessed under Windows.
	• Check that the network, dialog instance, and operating system requirements are met

3.6.3 Requirements Checklist for a Dialog Instance

The host machine running the dialog instance must meet the requirements listed below.

Requirement Type	Requirement

Hardware Requirement	• Appropriate backup system
	
	• Disk space
	
	    4 GB (not including virtual memory)
	
	    To check:
	
	    a. Choose *Start → Programs → Administrative Tools → Computer Management → Disk Management*
	
	    b. Right-click on the respective disk and choose *Properties.*
	
	• Paging File Size of 1 GB plus 3 times RAM. Maximum required is 10 GB.
	
	    To check, choose:
	
	    a. Right-click on *My Computer* and choose *Properties.*
	
	    b. On the *Advanced* tab choose *Performance Options.*
	
	    c. If required, in section *Virtual Memory*, choose *Change.*
	
	• 650 MB of temporary disk space for every required installation CD you have to copy to a local hard disk (see [Preparing Required CDs [Page 54]](#)).
	
	• Minimum RAM:
	
	    Unicode: At least 512 MB
	
	    Non-Unicode: At least 1 GB.

Software Requirement	• Windows Oracle 9.2.0 and patch set 9.2.0.2.1
	
	• Windows 2000 Server or Windows 2000 Advanced Server * or Windows 2000 Data Center Server *
	
	    with at least service pack 2
	
	    (* one of these is recommended for production use and required for MSCS configuration)
	
	    To check, choose:
	
	    a. *Start → Programs → Accessories→ Command Prompt*.
	
	    b. Enter the command `winver`

3.6 Hardware and Software Requirements Check

Requirement Type	Requirement
	• Windows 2000 Resource Kit is strongly recommended to enable support.
Other Requirement	• Ensure that no host name is longer than 13 characters. • If you want to install a printer on a decentralized host for the SAP system, ensure that the printer can be accessed under Windows. • Check that the network, dialog instance, and operating system requirements are met.

4 Installation Preparations

⚠️

The structure of the installation documentation has changed significantly. You **must** use the tables in section How to Install Your SAP R/3 Enterprise System [Page 13] for installing the system and to navigate through the installation procedures. All necessary installation phases (planning, preparation, installation and post-installation) are listed in these tables. This prevents you missing important information.

4.1 Checking for the Windows File System

Use

This section describes how to check that you are using the Windows File System (NTFS) on hosts where the SAP system and database are to be installed. NTFS supports full Windows security and long file names.

⚠️

You **must** use NTFS for an SAP system installation. Do not install the SAP directories on an FAT partition.

Procedure

1. Open the *Windows Explorer*.

2. Select the root directory.

3. Choose *File → Properties.*

4. Switch to the *General* tab to see the type of file system that is in use.

4.2 Checking the Windows Domain Structure

This section describes how to check that **all** SAP system and database hosts are members of a **single** Windows domain. We recommend this for all SAP system setups. This step is not required in a local installation.

💡

In Windows 2000 there are two domain models that can be implemented for the SAP system; the **extra** domain model and the **single** domain model.

Extra Domain

In this model, the SAP system is embedded in its own domain that is specially defined for SAP. A second domain exists for the user accounts.

In Windows 2000, the SAP domain and user domain must be incorporated in a domain tree. In this tree, the user accounts must form the root domain and the SAP domain must be a child domain of this.

Single Domain

In this model, the SAP system and the user accounts are included in a single domain.

For performance and security reasons, no SAP instance (including the database instance) should run on the domain controller.

Prerequisites

You are familiar with checking Windows domain structures. See the Windows documentation if you need more information.

Procedure

1. Check that all SAP system and database hosts are part of a single Windows domain.

2. If you want to use the Change and Transport System to move objects between different SAP systems (that is, SAP systems with different `<SAPSIDs>`), check that all these systems are either a member of one domain or members of different domains with a **trust relationship** established between them. Only SAP application and database servers should be members of this domain.

4.3 Reducing the Size of the File Cache

Use

You use this procedure to change the size of the file cache.

Procedure

1. Choose *Start → Settings → Control Panel → Network and Dial-up Connections.*

2. In the *Network and Dial-up connections* dialog box, double-click *Local Area Connections.*

3. In the *Local Area Connection Status* dialog box, choose *Properties*.

4. In the *Local Area Connection Properties* dialog box, double-click *File and Printer Sharing for Microsoft Networks*.

   If you cannot select *File and Printer Sharing for Microsoft Networks*, this option has not yet been installed. To install it, you need the *Windows 2000 Server* CDs.

5. Select *Maximize data throughput for network applications.*

6. To confirm your entries, choose *OK*.

4.4 Granting User Rights for the Installation

Use

You need to make sure that you have the required rights and privileges that authorize you to install the SAPinst tool and the SAP system.

⚠

If you attempt the installation without the required authorization, the system aborts.

If necessary, you have to ask the system administrator to grant you the necessary authorization **before** you start the installation.

Prerequisites

- The authorization required depends on whether you intend to perform a domain or local installation. For more information, see the sections *Installation Planning* and *System Configuration*.

- A domain installation requires a domain controller to store user and account information centrally for the whole system.

⚠

For performance and security reasons, it is advisable not to run an SAP instance (including the database instance) on a domain controller.

Never perform a local installation on a domain controller.

Procedure

Local Installation

To perform a local installation, you need to have `Local Administration` rights for the central instance host. In a local installation, all Windows account and user information is stored locally on one host and is not visible to any other hosts in the system.

To obtain these rights the system administrator must enter you as a member of the `Local Admins` group.

Domain Installation

To perform a domain installation, you need to have `Domain Administration` rights. In a domain installation, the user information is stored centrally on the domain controller and is accessible to all hosts in the system.

To obtain these rights the system administrator must enter you as a member of the `Domain Admins` group.

💡

If you are **not** granted domain administration rights, you can perform the installation as a domain user who is a member of the local administrator group. However, the domain administrator has to prepare the system appropriately for you. For more information, see Performing a Domain Installation without Being a Domain Administrator [Page 48].

4.5 Performing a Domain Installation without Being a Domain Administrator

Use

The installation of the SAP system must be performed by a user with domain administration rights. If, for any reason, you are unable to grant a user domain administrator rights, you can perform the installation as a domain user who is a member of the local administrator group.

However, you must prepare the system appropriately.

The Domain Administrator has to create a new global group called SAP_<SAPSID>_GlobalAdmin, and the two user accounts, called <sapsid>adm and SAPService<SAPSID> (this user is not created for Informix installations). Once the accounts have been created, you have to add the users <sapsid>adm and SAPService<SAPSID> to the newly created group SAP_<SAPSID>_GlobalAdmin.

Prerequisites

To create the SAP_<SAPSID>_GlobalAdmin group:

1. Log on as domain administrator.

2. To start the *Active Directory Users and Computers Console*, choose:

   Start → Programs → Administrative Tools → Active Directory Users and Computers

   If you cannot find *Active Directory Users and Computers*, start it as follows:

   a. Choose *Start → Run* and enter **mmc**.

   b. Choose *Console → Add/Remove Snap-in...* and choose *Add.*

   c. Choose *Active Directory Users and Computers.*

   d. Select *Add.*

   e. When finished, select *Close* and then *OK.*

3. In the tree on the left, right-click on the *Users* folder and choose:

   New → Group

4. Enter the following:

   Group name: **SAP_<SAPSID>_GlobalAdmin**

   Group name (pre-Windows 2000): **SAP_<SAPSID>_GlobalAdmin**

5. Select the following:

   Group scope: *Global*

   Group type: *Security*

6. Choose *OK*.

Creating the New Users

To create the SAP System User <sapsid>adm and SAPService<SAPSID> proceed as follows:

1. In the *Active Directory Users and Computers Console* right-click on the *Users* folder in the tree on the left and choose:

New → *User*

2. Enter the following:

Field name	Entry for <sapsid>adm	Entry for SAPService<SAPSID>
First name:	**None**	**None**
Initials:	**None**	**None**
Last name:	**None**	**None**
Full name:	**<sapsid>adm**	**SAPService<SAPSID>**
User logon name:	**<sapsid>adm**	**SAPService<SAPSID>**

> Enter the `<sapsid>adm` and `SAPService<SAPSID>` user as specified observing upper and lower case.

3. Choose *Next* and enter the following:

    Password: **<password>**

    Confirm password: **<password>**

4. Select *Password never expires.*

> Make sure that no other options are selected

5. Choose *Next* and then *Finish*.

Adding the <sapsid>adm User to the SAP_<SAPSID>_GlobalAdmin Group

1. In the *Users* folder select the newly created user account in the list on the right and double-click it.

2. Select the *Member of* tab.

3. Choose *Add*.

4. Select the new `SAP_<SAPSID>_GlobalAdmin` group and choose *Add* to add it to the list on the bottom.

> By default, the user is also a member of the *Domain Users* group.

5. Choose *OK* twice.

Adding the SAPService<SAPSID> User to the SAP_<SAPSID>_GlobalAdmin Group

1. In the *Users* folder, select the newly created user account `SAPService<SAPSID>` in the list on the right and double-click it.

2. Select the *Member of* tab.

3. Choose *Add*.

4. Select the new `SAP_<SAPSID>_GlobalAdmin` group and choose *Add* to add it to the list on the bottom.

5. Choose *OK*.

> ⚠️
>
> The `SAPService<SAPSID>` user **must not** be a member of the `Domain Users` group.
>
> To remove this group from the *Member of* list:

    a. Select the `SAP_<SAPSID>_GlobalAdmin` group and choose *Set Primary Group*.

    b. Select the `Domain Users` group and choose *Remove* to delete it from the *Member of* list.

6. Choose *OK* to close the *SAPService<SAPSID> Properties* dialog box.

7. Close the *Active Directory Users and Computers Management Console.*

4.6 Choosing the SAP System ID and Host Name

Use

You need to choose an SAP system ID that identifies the whole system. This ID has to be entered for the variable `<SAPSID>` when you install the central instance. You also need to check the host name for compatibility.

> ⚠️
>
> You **cannot** change the SAP system ID after the installation.

Procedure

1. The ID for your SAP system (`<SAPSID>`) as well as for your Database System (`<DBSID>`) must be unique throughout your organization and must consist of exactly three alphanumeric characters. Only uppercase letters are allowed. The first character must be a letter (not a digit).

    Since the following IDs are reserved, you cannot assign them to your SAP system:

    ```
    ADD ALL AND ANY ASC COM DBA END EPS FOR GID IBM INT KEY LOG MON
    NIX NOT OFF OMS RAW ROW SAP SET SGA SHG SID SQL SYS TMP UID USR
    VAR
    ```

    > ⚠️
    >
    > Choose your SAP system ID carefully. Renaming is complicated and requires you to re-install the SAP system.

    > ⚠️
    >
    > If you intend to install a dialog instance on the database host, make sure that the DBSID is different from the dialog name, otherwise the installation will not continue.
    >
    > The dialog instance name is assembled as follows: letter **D** (system setting) and **instance number** (user setting), for example *D01*.

2. Make sure that the host name of your system does not contain any special character such as a hyphen or an underscore. In addition, the host name must not exceed 13 characters in length. Otherwise, unpredictable problems might arise using the SAP System, especially when using the Change and Transport System.

4.7 Preparing the SAP System Transport Host

Use

You need to prepare one host in the SAP system for the role of transport host. This host has the function of controlling the import or export of files between the current SAP system and other SAP systems (for example, a test or development system).

The transport host uses the `usr\sap\trans` directory to temporarily store files that have been exported from one system and are waiting to be imported into another system. Depending on your requirements, you can decide to use the central instance host, the dialog instance host, or any other host as the transport host.

> If you are installing on Windows 2000, see **SAP Note 360515** for more information on preparing the SAP system transport host.Procedure

1. Map the IP address of the transport host to the alias `SAPTRANSHOST` using one of the following methods:

   − On the DNS server

   If a DNS server is available for your system, ask your administrator to map the IP address of the transport host to the alias `SAPTRANSHOST`.

   The DNS server is a database that contains a set of files with information about the TCP/IP network, including the mapping of host names or aliases to IP addresses.

   − In the `hosts` files

   If no DNS server is available, you can map the IP address to the alias `SAPTRANSHOST` in the `hosts` file. This is located in the Windows default directory: `<Drive>:\WINNT\system32\drivers\etc`

   Open the hosts file with an editor and add the line:

   `<IP_address> <hostname> SAPTRANSHOST`

   The result of this step is to assign the alias `SAPTRANSHOST` to the transport host.

   Copy the newly edited `hosts` file to all hosts where an SAP instance is to run.

   > If the transport host has more than one network card, take special care when you determine the IP address that is entered in the `hosts` file or on the DNS server. Make sure you enter the main IP address and that the binding order is correctly defined. To check the binding order, choose:
   > *Start → Settings → Network and Dial-up Connections*. Then choose from the Menue Bar *Advanced → Advanced Settings.*

2. If your transport host is **not** the central instance host, you have to create the transport directory as follows:

   a. On the transport host, create the directory `\usr\sap\trans`.

4.7 Preparing the SAP System Transport Host

b. Grant *Everyone* the permission *Full Control* for the directory.

These permissions are only necessary during the course of the SAPinst installation. After the installation, only the `SAP_<SID>_GlobalAdmin` groups of all the systems that are part of your transport infrastructure must be granted *Full Control* on the directory. SAPinst assigns the appropriate rights with the help of an additional `SAP_LocalAdmin` group. For more information, see Automatic Creation of Accounts and Groups [Page 106].

c. If *no* SAP instance is to be installed on the transport host, you have to share the `usr\sap` directory on the transport host as `SAPMNT`. This enables SAPinst to address the transport directory in the standard way as `\\SAPTRANSHOST\SAPMNT\trans`.

Result

You have configured your system so that the installation tool SAPinst can recognize the transport host.

4.8 Preparing the SAPinst Installation

Use

The Java-based SAPinst graphical user interface (GUI) called SAPinst GUI require a Java Development Kit (Java™ 2 SDK, Standard Edition). Therefore, you must install JDK on **every** host on which you want to install an instance, as described in this section.

Prerequisites

- You can find the JDK versions that are released for SAP Web Application Server at the SAP Service Marketplace at: `http://service.sap.com/platforms` → *Availability of SAP Components in Detail → SAP Web AS / Basis / SAP Kernel → Planned OS / DB / JDK Releases for SAP Web AS 6.20*.

  SAPinst GUI requires the same JDK version as the SAP Web Application Server.

  JDK is not part of the SAP shipment.

  To check the version of an already installed JDK, enter **java –version**

  SAPinst GUI requires the **same** JDK version as the SAP Web Application Server.

  JDK is **not** part of the SAP shipment.

  Make sure that your `JAVA_HOME` environment variable is set to `<JAVA_HOME>`.

  Make sure that `%JAVA_HOME%\bin` is included in your system path.

- This section describes preparations for a normal, that is, a local installation with SAPinst. However, you can perform a remote installation [Page 96] using a standalone SAPinst GUI on a separate Windows or UNIX host. This enables you to perform the installation on a remote host while monitoring it with SAPinst GUI from a local host.

- To avoid an error when starting SAPinst GUI, you must make sure that there are no `.jar` files from an XML parser tool, such as, Xerces or Xalan, in the JDK `ext` directory, as described in the procedure below.

Procedure

To check the JDK `ext` directory:

1. Log on to the host on which you intend to run the SAPinst GUI.

2. Check whether there are already `<parser_name>.jar` files, for example, `xerces.jar` in your `ext` directory. The default path is:

   UNIX: `<JAVA_HOME>/JRE/lib/ext`

   Windows: `<JAVA_HOME>\JRE\lib\ext`

3. If you find any `.jar` files, rename them to, for example, `xerces.xxx`.

4.9 Preparing Required CDs

Do **not** forget to rename the files back to their original names after the installation procedure is complete.

4.9 Preparing Required CDs

This section describes:

- The CDs that are required for the SAP instance installation

- How to prepare the CDs

- How to use the CD Browser dialog

Required CDs for the SAP Instance Installation

You need to prepare several CDs during an SAP system installation. Some of the CDs must be available in parallel, others must only be available sequentially.

For the installation of a Unicode SAP system, the Unicode SAP Kernel CD is required.

The required CDs differ if you are installing in an existing system using Multiple Components on One Database (MCOD).

The following table shows the required CDs:

SAP Instance Installation	Required CDs	
Central Instance	SAPinst CD	
	Kernel CD	
Database Instance for a **non-MCOD** installation	SAPinst CD	
	Kernel CD	
	Export CD 1	Must be available in parallel
	Export CD 2	
	Export CD 3	
	Export CD 4	
	Export CD 5	
	Export CD 6	
	Export CD 7	
	RDBMS CD 1	Must be available in parallel
	RDBMS CD 2	
	RDBMS CD 3	
Database instance for an **MCOD** installation	SAPinst CD	
	Kernel CD	
	Export CD 1	Must be available in parallel

SAP Instance Installation	Required CDs	
	Export CD 2	
	Export CD 3	
	Export CD 4	
	Export CD 5	
	Export CD 6	
	Export CD 7	
Dialog Instance Installation	SAPinst CD	
	Kernel CD	
Gateway Instance	Presentation CD	

Preparing the CDs

As you need at least a central and database instance for an SAP system, we recommend you to make all required CDs (see table above) available in parallel.

> The export CDs and the RDBMS CDs (if relevant) must be available in parallel anyway.

Use one of the following methods to make CDs available in parallel:

- Before the installation

    – Have sufficient CD drives

    – Copy CDs manually to local hard disks

- During the installation

    Use the SAPinst dialog *CD Browser*, that is, you can check the entered location and then copy the entire CD to the path you entered in column *Copy Package to.*

Using the CD Browser Dialog

During the installation procedure SAPinst **first checks** and **finally verifies** the availability and location of the required installation CDs. SAPinst does this by displaying a *CD Browser* dialog, asking for the file LABEL.ASC that contains the information of the software package to be installed.

SAPinst displays the CD Browser dialog in the following situations:

- SAPinst wants to check the availability of the software package.

    You can recognize this situation by the flag *Check Location* displayed in the *CD Browser* window.

    Choose one of the following actions:

Action	Result
Do not enter any *Package*	SAPinst skips the check and you can continue

Location and leave the flag Check Location deselected.	the installation procedure. However, SAPinst asks later for the missing LABEL.ASC (see final bullet point below).
Enter the path of the Package Location and leave the flag Check Location deselected.	SAPinst skips checking the label location, but your entered package locations are used later for the installation. SAPinst only asks again for a missing LABEL.ASC if the package location is incorrect (see final bullet point below).
Enter the path of the Package Location and select the flag Check Location	SAPinst checks the label location and displays an error message if the location is incorrect. If all locations are correct, SAPinst does not ask again for the LABEL.ASC files.

- SAPinst cannot find the correct LABEL.ASC but needs the location of the software to process the installation now.

  You can recognize this situation because Check Location in the CD Browser window is empty. You now have to enter the path to the correct LABEL.ASC. Otherwise, the installation cannot continue.

  Additionally, you can copy the installation package by entering a location in the column Copy Package to.

4.10 Preparing the Active Directory for Use with the SAP System

Use

This section only applies if you want to use Active Directory as LDAP directory service for SAP Logon or Microsoft Management Console (MMC).

The SAP system can only store and access data in the Active Directory, if the directory has been prepared appropriately. To prepare the directory, you use the R3SETUP tool that automatically performs the following tasks:

- Extends the Active Directory schema to include the SAP-specific data types.

- Creates domain accounts that are a prerequisite for enabling the SAP system to access and modify the Active Directory. These are the group SAP_LDAP and the user sapldap.

- Creates the root container where information related to SAP is stored.

- Regulates access to the container for SAP data by giving members of the SAP_LDAP group permission to read and write to the directory.

  For more information on how to set up a Netscape / iPlanet directory server, read the documentation R/3 System Information in Directory Services in the SAP Service Marketplace at: **http://service.sap.com/msplatforms** → Microsoft → Windows Server.

Prerequisites

- A Windows 2000 domain controller with an Active Directory must be installed on the network.

- You must have an SAP Kernel CD of an SAP system installation that is based on SAP Web Application 6.10, SAP Basis 4.6D, or below and contains the previous installation tool R3SETUP.

> If you do not have an R3SETUP Kernel CD, you can download one from the *SAP Service Marketplace* at: **http://service.sap.com/installations** → *SAP Web AS*. → *SAP Web AS 6.10.*

Procedure

Installing the R3SETUP Tool

Use the R3SETUP tool to prepare the Active Directory for the SAP system. Install the R3SETUP tool on the domain controller where the Active Directory is located.

1. Log on to the domain controller as domain administrator.

2. Check that the `TEMP` environment variable has been set by right-clicking the *My Computer* icon and choosing *Properties → Advanced → Environment Variables*. `TEMP` is normally set to: `%userprofile%\Local Settings\Temp`

   For more information, see **SAP Note 387745**.

3. Insert the Kernel CD.

4. *Start* the program `R3SETUP.BAT` from the directory `<CD_DRIVE>:\NT\COMMON`

   The R3SETUP window opens.

5. When you are prompted, enter the following:

   - The name of your SAP system `<SAPSID>`

   - The directory on your hard disk that the R3SETUP files are to be copied to. The default directory is `<DRIVE>:\USERS\<SAPSID>ADM\INSTALL`

   When you have made all the required entries, the R3SETUP tool is automatically installed.

6. Enter *Yes* when a dialog box appears prompting you to log off or reboot.

   The R3SETUP tool now automatically logs off or reboots.

Configuring the Active Directory

1. Log on as the same user that installed the R3SETUP tool.

2. From the Windows Start menu choose *Start → Programs → SAP system Setup for <SAPSID> → Configure Active Directory for SAP.*

3. When you are prompted:

   - Confirm the name of the domain where the SAP_LDAP group is to be created. This is the domain that you are logged on to.

   - Enter the password of the `sapldap` user.

When you have made these entries, the R3SETUP tool automatically configures the Active Directory.

5 Installation Procedures

⚠️

The structure of the installation documentation has changed significantly. You **must** use the tables in section How to Install Your SAP R/3 Enterprise System [Page 13] for installing the system and to navigate through the installation procedures. All necessary installation phases (planning, preparation, installation and post-installation) are listed in these tables. This prevents you missing important information.

5.1 Installation of the Oracle Database Software

Use

First you install the Oracle 9.2.0 database software. Then you install patch set 9.2.0.2.1.

⚠️

You must run different files to install the client and the server software.

💡

There are three CDs for Oracle 9.2.0. You can do one of the following:

- Let the installation prompt you for the correct CD. This means you have to insert the correct CD **during** the installation.

- Copy the CDs to disk as follows **before** the installation:

  a. Copy the contents of `\NT\i386` on RDBMS CD1 to `\disk1` on your hard disk.

  b. Repeat this for the second and third CD. Copy their contents to `\disk2` and `\disk3`.

  \disk1 to \disk3 can be on a network drive if required.

💡

MSCS only:
Install the Oracle 9.2.0 software on both nodes. Ensure that you are logged on to Windows as user <DBSID>adm.

1. Start the *Oracle Universal Installer* as follows:

   – If you have copied the CDs to disk, start from:

     \disk1

   – Otherwise, place the Oracle RDBMS CD1 in the CD drive and start from:

     <CD_DRIVE>:\NT\I386

   On the **database server**, double-click the file sapserver.cmd.

   On the **database client** double-click the file sapclient.cmd.

2. Enter the information as shown in the table below.

If the installer aborts and the error
`The exception unknown software exception ...`
is displayed in an *Application Error* window, make sure that the `TMP` and `TEMP` variables in the user environment of **<**`DBSID>adm` refer to existing files. If not, reset them.

If during the installation an error is reported when writing to a DLL file, the DLL has the read-only attribute. In this case, before you continue the installation, open a command prompt and remove the read-only attribute with the command:
`attrib -r <DRIVE>:\%windir%\system32\<DLL**>**`

To view attributes enter:

`attrib <DRIVE>:\%windir%\system32\<DLL>`

No.	Window	Entry
1.	*File Locations*	Under *Source*: For *Path:* Shows the path to the Oracle source software. Do not change the path. Under *Destination*: For *Name*: Enter the name of the new Oracle Home directory. SAP recommends the name `<DBSID><ORACLE_VERSION>`**,** for example, `C11920` For *Path*: Enter the path of a **new** Oracle Home directory. SAP recommends: `<DRIVE>:\ORACLE\<DBSID>\<ORA_VERS>`, for example, `C:\ORACLE\C11\920` ⚠️ Do **not** specify an already existing Oracle Home directory. You must specify a new directory. You need **2.2 GB** disk space for the Oracle 9.2.0 server software and about 250 MB for the Oracle 9.2.0 client software Choose *Next*.
2.	*Create Database*	Choose *No* and then *Next*.
3.	*Summary*	Choose *Install*.

5.1 Installation of the Oracle Database Software

No.	Window	Entry
4.	*Oracle Net Configuration Assistant: Welcome*	If this dialog appears, select *Perform typical configuration* and continue with *Next*.
5.	*File Locations / End of Installation*	When you have installed the Oracle database software, choose *Exit*.

Installing Patch Set 9.2.0.2.1

Use

When you have installed the Oracle 9.2.0 software, install patch set 9.2.0.2.1.

For more information on patch set 9.2.0.2.1 refer to the `patch_note.htm` file on the RDBMS CD3.

Procedure

1. Make sure that the Oracle services and the Distributed Transaction Coordinator Service are stopped.

2. Make sure that the RDBMS CD3 is in the CD drive.

3. Switch to the directory <CD_DRIVE>:\NT\I386\PATCHES\9.2.0.2.1

4. Double-click the setup.exe file.

5. Enter the required information in the *Oracle Universal Installer*:

Window	Entry
Welcome	Choose N*ext*.

File Locations	Under *Source*:
	
	Path
	
	Shows the path to the Oracle source. Do **not** change the path.
	
	Under *Destination*:
	
	Name
	    Select the name of the Oracle Home directory in which you want to install this patch set.
	
	Path
	    Shows the path to the selected Oracle Home directory.
	
	Choose *Next*.

Summary	Choose *Install* to install the patch set.
End of Installation	When the patch set has been installed, choose *Exit.*

5.2 Running SAPinst

Use

You use this procedure to run SAPinst to install an SAP instance.

Prerequisites

- If you start the SAPinst GUI on your host, make sure that the `JAVA_HOME` environment variable is set correctly.

- As the SAPinst installation directory contains important log and command files for the installation, make sure that you use a **separate** installation directory for **every** instance you are going to install. Otherwise, you might lose previous log and command files stored in the SAPinst installation directory.

    Before you start the installation, be aware of the following:

  - When you install an SAP instance with SAPinst for the very first time on your host, you have to start SAPinst from the *SAPinst* CD with the `setup.cmd` command. SAPinst is copied to the directory you have specified. This directory is also used as the installation directory for the instance you are installing.

  - If you want to install an SAP instance on the host where a previous SAP instance has **not** been successfully installed, you must run SAPinst **again** from the *SAPinst* CD to create a new installation directory for the SAPinst log and command files.

  - For every additional SAP instance that you want to install on the **same** host (after successful installation of another instance), we recommend that you start SAPinst from the *SAPinst* CD. By doing so, you make sure that every instance installation has its own log and command files.

    However, you can start the new installation by entering:

    i. *Start → Programs → <menu_entry> → Prepare New Installation*

    ii. *Start → Programs → <menu_entry> → SAPinst server with GUI*

    ⚠️

    Be aware that the installation directory of the previously installed instance on that host will be overwritten when you use the *Start* menu to start the new installation. For this reason, you should **only** use it if you are sure that you **do not** need the log and command files of the previously successfully installed instance.

- If you want to perform a remote installation – that is, the SAPinst GUI is started on another host to monitor the installation – you do **not** need to set the `JAVA_HOME` environment variable on your instance host. This section describes a standard, that is, a local installation.

- If you are installing a second or subsequent SAP system into an existing database, make sure that the database is **up and running before** starting the installation. For more information, see Installation of Multiple Components on One Database [Page 27].

Procedure

1. Log on to your host as a user who is a member of the local administration group.

2. Insert the *SAPinst CD* in your CD drive.

5.2 Running SAPinst

> If you want to install a Standalone SAP Gateway instance you have to use the Presentation CD. In this case, replace `<SAPinst CD>` with `<Presentation CD>` in this section.

3. Run **`Setup.cmd`** from the following path:

    `<CD drive>:\SAPinst\NT`

    > SAPinst uses the ports 21212 and 21213 during the installation for communication with SAPinst GUI. You get an error message if one of these ports is already in use. In this case, you must do the following:
    >
    > a. Copy directory `SAPINST\NT` from the SAPinst CD (or Presentation CD for the Gateway installation) to your local hard disk.
    >
    > b. In file `SAPINST\NT\Setup.cmd` search for the following string:
    >   `.\sapinst.exe SAPINST_CONTROL_URL=control_bootstrap.xml`
    >
    > c. Append `SAPINST_DIALOG_PORT=<port>` to this string:
    >   **`.\sapinst.exe SAPINST_CONTROL_URL=control_bootstrap.xml SAPINST_DIALOG_PORT=<port>`**
    >   where `<port>` is an unused port on your host.
    >   For example, if you enter 60000 as `<port>`, SAPinst uses the ports 60000 and 60001
    >
    > d. Run **`Setup.cmd`** from your local hard disk.

SAPinst asks if you want to perform a *Standard* or *Custom* installation.

If you choose a *Custom* installation you can define:

–   Installation directory for SAPinst

    You can choose any name for the installation directory. In this documentation, `<SAPinst_INSTDIR>` refers to the installation directory.

–   SAPinst folder in the *Start* menu

> The *Start* menu entry is used to create unique *Start* menu entries.
>
> For example, you enter the following for the *Start* menu during the installation: **`R3_Enterprise_471`**. Then SAPinst creates the following *Start* menu:
> *Start → Programs → R3_Enterprise_471 → …*

–   Connection parameters (not relevant for a local installation)

Start Menu Entry *Start → Programs → <SAPinst_menu_entry> →*	Description
Prepare New Installation	Prepares SAPinst to install an additional instance on this host.

	Current log and command files are copied to a backup directory (under the current SAPinst directory) indicating the date and time of the backup: `<SAPinst_Dir>\log<month>_<date><time>`
Remove SAPinst Files	Deletes the whole SAPinst installation directory
SAPinst GUI	Only relevant for a remote installation. Starts SAPinst GUI **only**. A further dialog then prompts you for parameters (host and port) to connect to the SAPinst server host.
SAPinst Server only	Only relevant for a remote installation. Starts SAPinst server **only** and waits for connection to the SAPinst GUI
SAPinst server with GUI	Starts SAPinst server and SAPinst GUI. The *Welcome* screen is displayed and you can perform the installation.

4. If SAPinst prompts you to reboot, reboot your system. If SAPinst prompts you to relog your system, log off and log on again.

> In both cases, the installation starts automatically and the *Welcome* screen is displayed.

> SAPinst uses the ports 21212 and 21213 during the installation for communication with SAPinst GUI. You get an error message if one of these ports is already in use. In this case, you must do the following:
>
> a. Open a command prompt.
>
> b. Change to your `<SAPinst_INSTDIR>` and run:
>
> **`.\sapinst.exe SAPINST_DIALOG_PORT=<port>`**
>
> where **`<port>`** is an unused port on your host.

6. If the installation does not start automatically, start it manually. To start the installation with SAPinst, choose *Start → Programs → <SAPinst_menu_entry> → SAPinst server with GUI.*

7. If you want to:

    − install a central instance, database instance or dialog instance select *SAP R/3 Enterprise 4.71 for Oracle*.

    − export a database, select *Export SAP System Server Database*

    > For MSCS [Page 109] you also have the options:

    *   *Configure the MSCS Node A for Oracle*

    *   *Configure the MSCS Node B for Oracle*

    > In a Unicode system you have the following options:

    *   *Unicode SAP R/3 Enterprise 4.71 for Oracle*

    *   *Unicode Export SAP System Server Database*

    *   *Unicode Configure the MSCS Node A for Oracle*

- *Unicode Configure the MSCS Node B for Oracle*

8. Choose *Next*.

8. Accept the *License Agreement for STL port*.

9. Follow the instructions in the SAPinst dialogs.

    If you have entered all required information during the input phase, SAPinst starts the installation and displays installation progress during the processing phase.

Troubleshooting

- If an error occurs during the **input phase**, SAPinst:

  - Stops the installation.

  - Displays a dialog informing you about the error.

    You can now directly view the log file by choosing *View Logs.*

    Finally you must abort the installation with *O.K.* and try to solve the problem.

- If an error occurs during the **processing phase**, SAPinst:

  - Stops the installation.

  - Displays a dialog informing you about the error.

    You can now:

  - Directly view the log file by choosing *View Logs.*

  - Try to solve the problem

    See *SAPinst Troubleshooting Guide* at:

    `http://service.sap.com/sapinstfeedback`

  - Retry the installation by choosing *Retry.*

  - Abort the installation by choosing *O.K.*

    See also Continuing an Interrupted Installation with SAPinst [Page 99].

5.3 Input for the Installation

To prepare for the **input phase** of the installation, we recommend you to write down the information you have to enter **before** starting **SAPinst**. Having the required information ready in advance helps you avoid unnecessary delays and errors.

The following table shows the prompts that are required for the central, database, dialog and gateway instance installation:

The following procedures do **not** follow the exact sequence for an installation.

The following abbreviations are used to mark if a prompt is only valid for a certain instance or component installation:

CI: Central Instance
DB: Database Instance
DI: Dialog Instance
GW*:* Standalone Gateway Instance

Window	Prompt	Meaning
CD Browser: Location of the installation CDs	Package Location Check Location Copy package **(CI/DB/DI/GW)**	This dialog only appears if the system wants to check or cannot find the file LABEL.ASC that contains the relevant installation information. For more information on the CD Browser dialog, see section Preparing the Required CDs [Page 54]. CI/DI: Specify the path to the directory where the file LABEL.ASC is located (default value: root of the corresponding CD. DB: Specify the path to the directory where the file LABEL.ASC is located (default value: root of the corresponding CD).

RFC Logon Verification	Password
	
	(CI/DB)
		This prompt only appears if:
		
		• The DDIC password is not set to its default value during the installation (for example, as you logged on to the SAP system during the installation and the SAP system prompted automatically for a new password).
		
		    In this case, enter the changed password of user DDIC.
		
		• The SAP system is not running or can not be accessed on the network.
		
		    In this case, eliminate the cause (for example, start your SAP system), enter the default DDIC password and continue the installation.

5.3 Input for the Installation

Window	Prompt	Meaning
Selecting the Instance Type	SAP System ID **(CI/DB/DI/GW)**	• CI: Enter the SAP system `<SAPSID>` ID, for example, C11. For more information, see [Choosing the SAP System IDs [Page 47]](Choosing the SAP System IDs [Page 47]) • DB/DI: Enter exactly the name of the SAP system `<SAPSID>` that you have entered during the central instance installation. • DB (MCOD only): If you want to install an additional SAP system into an existing database, you have to enter a new SAP system ID `<SAPSID>` • GW: Enter a new SAP system `<SAPSID>` ID. ⚠ For the gateway installation, do not use an SAP system ID that you have entered during a central instance installation.
	Select the Instance to install **(CI/DB/DI)**	Choose the SAP system instance you want to install. ⚠ When you install the SAP system for the first time, you first have to install the central instance before you install the database instance. CI: Choose *Central instance*. DB: Choose *Database instance*. DI: Choose *Dialog instance*.
Selecting the Database Instance Installation Method	**(DB)**	• If you want to copy or migrate an existing SAP system, choose *System Copy / Migration* (for more information, see the documentation *SAP Web Application Server Homogeneous and Heterogeneous System Copy*). • Otherwise, choose *Standard Installation*.

Window	Prompt	Meaning
SAP System Common Parameter	Central Instance: Instance number **(CI/DB/DI)**	• CI: Enter the number of the central instance. You can assign a value from 0 to 97, but **not** the numbers 2, 25, 72, or 89. • DB/DI: Enter exactly the central instance number that you have entered during the central instance installation. To find out the instance number, look under the SAP directory `usr\sap\<SAPSID>\DVEBMGS<nn>`. The value `<nn>` is the number assigned to the central instance.
	Central Instance: Instance host **(CI/DB/DI/GW)**	• CI: Enter the name of the central instance host. • DB/DI: Enter exactly the name of the central instance host that you have entered during the central instance installation. To find out the host name, enter **hostname** at the command prompt of the central instance host. • GW: Enter the name of the gateway instance host.
	Dialog Instance: Instance number **(DI)**	Enter the number of the dialog instance. You can assign a value from 0 to 97, but **not** the numbers 2, 25, 72, or 89. If more than one SAP instance is running on the same host, these instances must be assigned different numbers.
	Gateway Instance: Instance number **(GW)**	Enter the number of the gateway instance. You can assign a number from 0 to 97, but **not** the numbers 2, 25, 72, or 89.

5.3 Input for the Installation

Window	Prompt	Meaning
	Database System ID **(CI/DB/DI)**	CI: The name of the database instance `<DBSID>`. DB: Enter exactly the name of the SAP system `<SAPSID>` that you have entered during the central instance installation. DB (MCOD only): If you want to install an additional SAP system on the same database server you have to enter the `<DBSID>` of the first database system. DI: Enter exactly the name of the database instance `<DBSID>` that you have entered during the central instance installation.
	Database Host **(CI/DB/DI)**	Enter the name of the database instance host. To find out the host name, enter **hostname** at the command prompt of the database instance host.
SAP Instance Host Information	Domain Information for the SAP System accounts **(CI/DB/DI/GW)**	Choose one of the following: Installation in the Domain of the Current User Local installation Installation in a different Domain
	RAM and swap space: Instance RAM **(CI/DB/DI/GW)**	RAM and swap space that is reserved for the SAP instance. The default value is the entire RAM or swap space. Be sure to reserve at least the minimum values required for your instance.

Window	Prompt	Meaning

SAP System LDAP Parameters	LDAP support
	
	(CI/DI/GW)
		If you want to use LDAP for SAP Logon or the Microsoft Management Console (MMC), choose the type of LDAP integration you want to configure for the SAP system. Otherwise, choose *No LDAP*:
		
		• *Via Active Directory Service*
		
		    Select this option to integrate Windows 2000 Active Directory services. An Active Directory must be available on the network. (Profile parameter `ldap/options=DirType=NT5ADS`)
		
		• *Via Generic LDAP Directory*
		
		    Select this option to configure the system to support LDAP directories that are running on Windows or UNIX machines. A generic LDAP directory must be available on the network.
		
		• *No LDAP*
		
		    Select this option if you do not want to use LDAP for SAP Logon and/or MMC or if you do not want to use LDAP at all.
		
		Required Input
		
		Depending on your selection the information below is required. If you choose *No LDAP*, none of the LDAP parameters listed below has to be specified.

	Management Domain	Specifies a container in the Active Directory where information related to the new SAP system is to be stored. Use the distinguished name syntax. The name of the container (that is, management domain) can reflect the organizational structure of your company. For example, if the system is for corporate finance and located in Walldorf, the name can be: `CN=Finance, CN=Walldorf`. Profile parameter: `ldap/saprdn` You need not specify this. However in a large system landscape, we recommend setting this parameter to reflect the structure of multiple SAP installations.

5.3 Input for the Installation

Window	Prompt	Meaning
	Container for all SAP-related entries	Specifies the SAP root container in the LDAP directory under which all future information related to SAP systems is to be stored. Use the distinguished name syntax that specifies both the name of the container and the path to reach it. Profile parameter: `ldap/saproot` • **Via Active Directory Service:** We do not recommend setting this parameter. If you do no set this parameter, the system automatically calculates the default value to store information in the configuration context for Active Directory Service (ADS). • **Via Generic LDAP Directory** You must specify this parameter.
	LDAP servers	Enter the DNS host name of the server on which the LDAP directory is running. If the directory is replicated on other servers in the network, specify these as well. For example: `ldapsrv1 ldapsrv2.` Profile parameter: `ldap/servers.` Note that the replica must be writeable. • **Via Active Directory Service**: We do not recommend setting this parameter. If you do not set this parameter, the system automatically finds the best ADS Server. • **Via Generic LDAP Directory** You must specify one or more LDAP servers, separated by blanks.
SAP System Instance Directories	Drive for SAP System directory **(CI/DB/DI/GW)**	Select the drive for the SAP base directory tree. For example, if you select *D*:, the directory `usr\sap` is created under drive *D*. If *saploc* already exists, you cannot select the local drive.
	Host with Transport Directory **(CI/DB/DI)**	Enter the name of the host where the central transport directory is located.

Window	Prompt	Meaning
Database Installation Type	Available InstallationTypes **(CI/DB/DI)**	• If you install the first SAP system in a new database, choose *Install (first) SAP System into a new database* • If you install an additional SAP system into an existing database (**MCOD**), choose *Install (additional) SAP System into an existing database*.
Entering Password for User	SAP System Administrator and SAP System Service Administrator Information (`<sapsid>adm`, `SAPService<SAPSID>` **(CI/DB/DI/GW)**	CI: Enter and confirm the Password for the `<sapsid>adm` and `SAPService<SAPSID>` User ID. DB/DI: Enter and confirm the same password that you used for the central instance. GW: Enter and confirm the passwords for the `<sapsid>adm` and `SAPService<SAPSID>` User ID. ⚠️ If the `<sapsid>adm` and `SAPService<SAPSID>` users already exist, use the **same** passwords that you used for these users.
SAP System Service Ports	Message Port **(CI/DI)**	CI/DB: Enter the port number of the Message Servers. DI: The port number of the Message Port must be the same as the one on the central instance host.
Database System Common Parameters:	Database Instance Parameters: Database character set **(CI/DB/DI)**	Enter the information of your SAP system database: • *Database Schema* (DI only): Enter the name of the database schema (**SAP\<SAPSID\>**). • *Database character set:* For a non-Unicode system, the default value is `WE8DEC`. For a Unicode system the default value is `UTF8`.
	Database Home Information: DB Home **(CI/DB/DI)**	Enter the name of the Oracle Home.

5.3 Input for the Installation

Window	Prompt	Meaning
	Drives for Database Server Directories **(DB)**	Select the drives where you want to store your • saparch, sapbackup, sapreorg, sapcheck and saptrace directory • Redo Log Archives Directory (oraarch)
Database Network Configuration	Oracle Listener Configuration: Listener Name, Listener Port **(CI/DB/DI)**	• If you are installing 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 (in this case, see SAP Note 98252 for more information) or you have to specify an unused *Listener Name* and an unused *Listener Port* for the new listener.
Database Server Parameters	**(DB)**	No input
Drive Selection	**(DB)**	Specify the path where the archived and online transaction logs have to be copied to.
Sapdata Directory Configuration	Sapdata Drives **(DB)**	Enter the location of the Oracle data files.
Setting Passwords of Database Users	**(DB)**	Enter and confirm the passwords for the database schema user, database user sys and database user system. ⚠️ If you do not change the default setting, the database user passwords are set to well-known default passwords, also for the internal administrators.
Multi National Language Support (Non-Unicode only)	MNLS Support **(DB)**	If you want to install Multi National Language Support (MNLS), choose *MNLS Support required*. The installation then will stop before starting the SAP system (see section Running SAPinst [Page 61]) to let you update the MNLS tables as described in **SAP Note 45619** before continuing the installation. Otherwise, choose *No MNLS Support required*.

Window	Prompt	Meaning

General Load Parameters	Import Settings (DB)	• If you are installing a new SAP system, choose *Load Packages from EXPORT CD*.
		
		• If you want to import the database dump of another SAP system as part of a homogeneous SAP system copy (see documentation *SAP Web AS Homogeneous and Heterogeneous System Copy*), choose *Load Packages from MIGRATION CD* and enter the following parameters:
		
		  – *Migration Key*:
		    Leave this field blank.
		
		  – *Migration Export Directory*:
		    Enter the export directory `<EXPDIR>` containing the database export files (see documentation *SAP Web AS Homogeneous and Heterogeneous System Copy*).

	General Settings (DB)	These settings are for experts only. For the *Number of parallel jobs*, we recommend that you enter the number of processors used.
	Advanced Configuration of Packages (DB)	Decide whether you want to perform *Advanced package configuration.* ⚠️ Advanced package configuration should only be performed by certified database administrators. SAP recommends you to use the default settings if possible.

Setting Passwords of Database Users	(DB)	Enter and confirm the passwords of the following database users if required:
		`SAP<SCHEMA_ID>`
		`SYSTEM`
		`SYS`

Change Default Password of ABAP Super User	User DDIC (DB)	💡 This prompt does only appear if the password is still set to its initial value. If prompted, enter and confirm a new password for user DDIC.

5.3 Input for the Installation

Window	Prompt	Meaning
Change Default Password of ABAP User SAP*	User SAP* **(DB)**	This prompt does only appear if the password is still set to its initial value. If prompted, enter and confirm a new password for user SAP*.

6 Post-Installation Activities

⚠️

> The structure of the installation documentation has changed significantly. You **must** use the tables in section How to Install Your SAP R/3 Enterprise System [Page 13] before performing the post-installation activities. All necessary steps are listed in these tables. This prevents you missing important information.

Purpose

This section describes how you complete and check the installation of an SAP system.

Prerequisites

You have completed the SAP system installation on all the hosts of your SAP system, including setting up at least one front end (for example, on the central instance host).

You install the front-end software on at least one host machine in your system environment. To simplify administration of your SAP system, we recommend that you do this on the central instance host.

For more information on installing the front-end software, see the separate documentation:

- *SAP Front End Installation Guide* (English version)

- *SAP Frontend-Installationsleitfaden* (German version)

6.1 Starting and Stopping the SAP System

Use

You use this procedure to check that you can start and stop the SAP system after the installation. You use the Microsoft Management Console (MMC) to start and stop the SAP system.

Prerequisites

You have logged on to the SAP system host as user `<sapsid>adm`.

Procedure

💡

> The newly installed MMC only allows you to start or stop the SAP system locally on the host that you are logged on to. Later you can configure the MMC to enable central management of all hosts.
>
> For more information, see the SAP Library:

a. Choose *Help → SAP Library* in your SAP system.

b. Choose *mySAP Technology Components → SAP Web Application Server → Computing Center Management System → Monitoring in the CCMS → Microsoft Management Console: Windows*

   Alternatively you can access the SAP Library at **http://help.sap.com:**

a. Choose *SAP Web Application Server → SAP Web Application Server 6.20.*

> b. Select the required language.
>
> c. Choose mySAP Technology *Components* → SAP Web Application *Server* → *Computing Center Management System* → *Monitoring in the CCMS* → *Microsoft Management Console: Windows*

Starting the SAP System

1. On the central system host, choose *Start* → *Programs* → SAP System Management Console.

2. In the tree, select the node representing the central instance.

3. Access the context menu by choosing the right mouse button.

4. Choose *Start*.

    The SAP central instance **and** database start.

5. Repeat the above steps on the dialog instance hosts.

Stopping the SAP System

On each host where there is a central instance or dialog instance of the SAP system that you want to stop:

1. Choose *Start* → *Programs* → *SAP System Management Console*.

2. In the tree, select the node representing the central instance.

3. Access the context menu by pressing the right mouse button.

4. Choose *Stop*.

    ⚠️

    Remember that the database is still running. Do not forget to stop the database.

6.2 Logging on to the SAP System

Use

This section describes how to log on to the SAP system after the installation. To start with, you log on using the front end of the host where the central instance is running.

Prerequisites

You have already started the SAP system and installed a front end.

There are two standard users in the SAP system after the installation:

User	Initial Password	Clients where User Exists
SAP*	06071992	000, 066
DDIC	19920706	000

Procedure

1. Make sure that you are logged on to the operating system as `<sapsid>adm`.

2. To start *SAP Logon*:

− SAP GUI for Windows:
    On the machine, where you have installed the front end, choose *Start → Programs → SAP Front End<Release> → SAPlogon*

− SAP GUI for Java:
    Invoke the script `guilogon` from the GUI installation directory without arguments.

The *SAP Logon* dialog box opens.

3. *Create* a logon entry for the newly installed system:

   a. Choose *New.*

   b. Enter the following data:

Field	*Explanation*
Description of system	Give a meaningful description, for example, the host name of the central instance or the SAP system ID.
Application Server	Specify the name of the central instance host
System number	Specify the number you entered for the central instance during the installation.

   When you choose *OK*, the *SAP Logon* dialog box reappears and now includes an entry for the new system.

4. *Double*-click the new system entry.
   The logon screen for the SAP system appears.

5. Log on as user `SAP*` and choose a new password.

6. *Repeat* the logon as user `DDIC` and choose a new password.

6.3 Installing and Using the SAP License

To work with the SAP system, an SAP license is required. You need to install a new permanent license if you are:

- Performing a new SAP system installation.

    After the installation of the central instance, a temporary license is active for **four weeks only**. During this period, you must install a permanent license.

- Renaming your SAP system ID (that is, `<SAPSID>`).

- Changing the message server host (that is, the central instance).

- Changing an existing hardware configuration.

You can install several licenses, one for each host running the message server. If relevant, you must do this for a Microsoft Cluster Server (MSCS) installation. You must perform this procedure on each host running the message server. The SAP system then searches for the current license.

You can request license keys for SAP systems using:

- SAP Service Marketplace

- SAPNet − R/3 Frontend

- Telefax

For more information about the SAP license, see the SAP Library:

1. Choose *Help → SAP Library* in your SAP system.

2. Choose *mySAP Technology Components → SAP Web Application Server → Client/Server Technology → SAP License.*

Alternatively you can access the SAP Library at `http://help.sap.com`:

1. Choose SAP Web Application Server → SAP Web Application Server 6.20.

2. Select the required language.

3. Choose *mySAP Technology Components → SAP Web Application Server → Client/Server Technology → SAP License*.

See also **SAP Note 94998**.

To see the online help text for the license installation, enter the following command:
`saplicense -help`

6.4 Checking SAP System Services

Use

This section describes how to check SAP system services. This helps you to solve initial problems that you might experience when trying to log on or run the system for the first time.

Procedure

1. <u>Log on to the SAP System [Page </u>76<u>]</u>. If you have trouble logging on, or subsequently experience problems trying to run the system, look at the following files located in the directory `\usr\sap\<SAPSID>\DVEBMGS<no>\WORK\`:

    – `dev_ms`

    – `dev_disp`

    – `dev_w0`

    – `dev_rd`

2. Call transaction SM50 to check services.

    The services available for the instance are displayed, that is, dialog, update, enqueue, batch and spool. If the services are not displayed look at the files listed under no.1 to get more information.

3. Call transaction SM51 to check all available instances with their services.

    A list of all available instances is displayed.

    If the display is OK, double-click one instance to display the services available for that instance. If the display is empty, look at the files listed under no. 1 to get more information.

4. Call transaction SM21 to check the system log.

6.5 Installing the SAP Online Documentation

Use

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

Procedure

1. Install the SAP Online Documentation as described in Installing the Online Documentation contained in the root directory of the *SAP Library - Online Documentation* CD, delivered as part of the installation package.

2. Log on to your SAP system [Page 76].

3. Choose *Help → SAP Library*.

   You can also directly access the help files on the *Online Documentation* CD without starting your SAP system. You need a PC running Microsoft Windows to install the HTMLHelp Viewer for the *Online Documentation* CD.

   The SAP Library can also be accessed at:
   `http://help.sap.com`

6.6 Checking the RFC Destination

Use

In a system configuration where the central and database instance run on different hosts, you have to test whether the database host has been correctly set up as an RFC destination. The database host must be defined as an RFC destination to enable the system to access monitoring data that is collected for the database and operating system.

Procedure

To check the RFC destination:

1. Choose *Tools → Administration → Network →* RFC destinations or enter transaction code SM59.

   The initial screen of the transaction displays a tree with different RFC connection types.

2. In the tree, expand the *TCP/IP connections* node. Find the entry *SAPOSCOL_<DB_hostname>* and double-click on it.

   A screen displaying information about the selected destination appears.

3. Choose *Test Connection.*

   If you find out that the destination has not been set up correctly, you have to maintain it. To do so, follow the instructions in the following section:

   SAP Web Application Server → Basis Services/Communication Interfaces → Remote Communications → RFC Programming in ABAP → Maintaining Remote Destinations

   You can find this documentation in the SAP Library at `http://help.sap.com`.

6.7 Configuring SAProuter and SAPNet - R/3 Frontend

Use

SAProuter increases network security and simplifies network configuration. SAProuter allows you to make indirect network connections. The SAProuter software is included in the standard SAP system. No additional installation is required. The network administrator normally configures SAProuter.

You require SAProuter if you are using any of the following:

- SAPNet – R/3 Frontend

    SAPNet – R/3 Frontend is the SAP-based service system and provides the technical link between SAP customers and SAP. SAPNet – R/3 Frontend was formerly known as the Online Service System (OSS).

    For more information on setting up and using SAPNet – R/3 Frontend, see the documentation in the:

    – SAP Service Marketplace at: `http://service.sap.com/instguides`

    – SAP Library (choose *Help → SAP Library* in your SAP system or access the SAP Library at: `http://help.sap.com`)

- EarlyWatch

    For more information, see the SAP Service Marketplace at:
    `http://service.sap.com/earlywatch`

Procedure

To get a complete list of SAProuter parameters, enter the following at the command line prompt:

saprouter

For more information, see the SAP Library:

1. Choose *Help → SAP Library* in your SAP system.

2. Choose *mySAP Technology Components → SAP Web Application Server → Client/Server Technology → SAProuter*

Alternatively you can access the SAP Library at **http://help.sap.com**:

1. Choose SAP Web Application Server → SAP Web Application Server 6.20.

2. Select the required language**.**

3. Choose mySAP Technology Components → SAP Web Application *Server → Client/Server Technology → SAProuter*

For information on installing SAProuter as a Microsoft Windows service, see **SAP Note 41054**.

6.8 Configuring the Transport Management System

Use

You configure the domain controller in the Transport Management System (TMS) by calling transaction STMS.

Procedure

1. In your SAP system, call transaction STMS.

Enter the required information to configure the domain controller.

> If you are not sure how to configure the domain controller, choose *Save* and configure the controller later or choose *Information* to display the TMS online documentation.

6.9 Basic Operations

A number of operations that you need to perform are described in the SAP Online Documentation.

For instructions on how to set up the operations listed in the table below, see the SAP Library:

1. Choose *Help → SAP Library* in your SAP system.
2. Choose *mySAP Technology Components.*

Alternatively you can access the SAP Library at `http://help.sap.com`:

1. Choose SAP Web Application Server → SAP Web Application Server 6.20.
2. Select the required language**.**
3. Choose mySAP Technology Components.

✔	Operation	Location of the SAP Online Documentation
	Set up operation modes (transaction RZ04)	*mySAP Technology Components → SAP Web Application Server → Computing Center Management System → Configuration → Operation Modes*
	Set up logon groups (transaction SMLG)	*mySAP Technology Components → SAP Web Application Server → Computing Center Management System → Configuration → Logon Load Balancing → The SAP Logon*
	Set up administrators	*mySAP Technology Components → SAP Web Application Server → Computing Center Management System → Users and Roles → First Installation Procedure*
	Plan background jobs	*mySAP Technology Components → SAP Web Application Server → Computing Center Management System → Configuration → Background Processing*
	Install a printer	*mySAP Technology Components → SAP Web Application Server → Computing Center Management System → SAP Printing Guide*

✔	Operation	Location of the SAP Online Documentation
	Configure the system log	*mySAP Technology Components → SAP Web Application Server → Client/Server Technology → System Services → Tools for Monitoring the System → System log → Configuring the System Log*

6.10 Configured Number of Work Processes

Definition

SAPinst installs SAP systems with a minimum number of work processes calculated using the following formula:

```
#dialog_WP = RAM / 256 (min 2, max 18)

#update_WP = RAM / 768 (min 1, max 6)

#update2_WP = RAM / 1024 (min 1, max 3)

#batch_WP = RAM / 1024 (min 2, max 3)

#enqueue_WP = 1

#spool_WP = 1
```

Use

This is only an initial configuration to get you started after the installation. It is not detailed enough for a production system because the optimal number of each type of work process depends on the system resources and on the number of users working in each SAP system application.

Contact SAP Technical Consulting for a detailed configuration.

6.11 Installation of Additional Languages

If you want to install an additional language, you need to perform the following steps:

- Classification of the language

- Scheduling of the language transport

- Scheduling of the language supplementation

For instructions on how to transport an additional language, see one of the following:

- SAP documentation *Language Transport* (English version) or *Sprachentransport* (German version)

- SAP Library

  a. Choose *Help → SAP Library* in your SAP system.

  b. Choose *mySAP Technology Components → SAP Web Application Server → Change and Transport System → Language Transport*

Alternatively you can access the SAP Library at `http://help.sap.com`:

a. Choose *SAP Web Application Server* → *SAP Web Application Server 6.20*.

b. Select the required language.

c. Choose *mySAP Technology Components* → *SAP Web Application Server* → *Change and Transport System* → *Language Transport*.

6.12 Import of Support Packages

Support Packages are available through in the SAP Service Marketplace and through SAPNet – R/3 Frontend. *Support Package Collections* are also shipped regularly on CD-ROM. Information on the availability of Support Packages is available in the SAP Service Marketplace at:
`http://service.sap.com/ocs-schedules`

Support Packages are available for download in the SAP Service Marketplace at:
`http://service.sap.com/patches`

The *Support Package Manager* (formerly called SAP Patch Manager, transaction SPAM) helps you apply Support Packages to your SAP system.

> The *SAP Note Assistant* lets you load, implement and organize individual SAP Notes efficiently. It also recognizes dependencies between SAP Notes, Support Packages and modifications. You can find more information in the SAP Service Marketplace at: `http://service.sap.com/noteassistant`.

6.13 Secure Single Sign-On with Microsoft NT LAN Manager SSP

Use

Single Sign-On (SSO) is a method of logging on to the SAP system that simplifies the logon procedure without reducing security. When a system has been configured for Single Sign-On, an authorized user who has logged on to the operating system can access the SAP system simply by selecting it in the SAP logon window or clicking on the shortcut. Work in the application can begin immediately without first entering an SAP system user name and password. Single Sign-On is easy to administer because it significantly reduces the work associated with SAP system user management.

In this section, we describe the option that is the easiest to implement when using a complete Microsoft Win32 landscape (Windows 9x, Windows ME, Windows NT, Windows 2000). It is a tailored version for SSO using Secure Network Communications (SNC) that uses Microsoft's NT domain authentication, NT LAN Manager Security Service Provider (NTLM SSP). For more information on using SNC, see the *SNC User's Guide* that is available on the SAP Service Marketplace at http://service.sap.com/security

Typically, SNC requires the use of an external security product that adheres to the Generic Security Service API V2 (GSS-API V2) interface and has been certified by the SAP Software Partner Program. However, in this scenario, we provide a library that adheres to the GSS-API V2 interface on one side that communicates with Microsoft's NTLM SSP on the other. Since

6.13 Secure Single Sign-On with Microsoft NT LAN Manager SSP

NTLM SSP is already an integral part of the Microsoft Windows 32-bit platforms, you do not need to purchase an additional security product to be able to use Single Sign-On.

> The Microsoft NTLM SSP only provides authentication based on a challenge-response authentication scheme. It does not provide data integrity or data confidentiality protection for the authenticated network connection. All third-party BC-SNC certified security products do offer data integrity and privacy protection. If you want to use these security features, you will have to obtain a certified security product.
>
> If your environment consists of only Windows 2000 we also offer an alternative library (`gsskrb5.dll`) that uses the Microsoft Kerberos SSP instead of the NTLM SSP for authentication. For details, see The Configuration of Kerberos Single Sign-On [Page 88].
>
> We distribute two different versions of the wrapper library for Microsoft's NTLM SSP. The older version is called **gssapi32.dll** and the newer version is called **gssntlm.dll**. The newer `gssntlm.dll` is available for download on the `sapserv<x>`.

> For additional security aspects involved with this scenario, see SAP Note 165485.

Prerequisites

- A pure Microsoft Win32 environment is required (Windows 9x, Windows ME, Windows NT, Windows 2000). The Microsoft NTLM SSP is **not** available for UNIX or any other operating system.

- When using separate Windows NT domains for users, for their frontend PCs and for the SAP application server machines, bi-directional trust is required between these Windows NT domains.

- The GSS-API V2 library wrapper (`gssntlm.dll`) must be installed on every application server.

- The GSS-API V2 library wrapper must also be installed on every frontend PC.

- We recommend to use for all Windows NT user IDs the 7-bit ASCII character set. It is not possible to enter Windows NT user IDs that contain 8-bit characters into the USRACL table (e.g. by using transaction SU01) when the code page of the SAP system is different from the code page on the Windows machines. The combination of Windows ANSI (=ISO Latin 1) and the default SAP code page 1100 provide the same encoding of 8-bit characters and permits the use of 8-bit characters with `gssntlm.dll`.

Integration

For information on how to improve the security of your system with the help of third-party products, see the SAP online documentation on *Secure Network Communications* in the SAP Library:

1. Choose *Help → SAP Library* in your SAP system.

2. Choose *mySAP Technology* Components → *SAP Web Application Server → Security → Secure Network Communications (SNC)*

Alternatively you can access the SAP Library at **http://help.sap.com**:

1. Choose SAP Web Application *Server* → SAP Web Application Server 6.20.

2. Select the required language.

3. Choose mySAP Technology *Components* → SAP Web Application Server → *Security* → *Secure Network Communications (SNC)*.

Activities

To enable the use of Single Sign-On you need to:

Before you begin this, you must first start the Service *Windows LM Security Support Provider*:

1. Choose *Start* → *Programs* → *Administrative Tools* → *Services*.

2. Select the service *NT LM Security Support Provider*.

3. On the *General* tab, change the startup type from *manual* to *automatic*.

6.13.1 Preparing the Application Server for Single Sign-On

1. Copy the `gssntlm.dll` file to the directory
   `<DRIVE>:\USR\SAP\<SAPSID>\SYS\EXE\RUN` on the central instance of your
   system. The `gssntlm.dll` file is located on `sapserv<x>` in the directory
   `general/misc/security/gssntlm`

2. Set the environment variable `SNC_LIB` to the location of the library

3. In the profile of the central instance, enter the following SAP parameters:

   ```
   snc/data_protection/max   =1

   snc/data_protection/min   =1

   snc/data_protection/use   =1

   snc/enable =1

   snc/gssapi_lib  =
   (<DRIVE>:\USR\SAP\<SAPSID>\SYS\EXE\RUN\<gssntlm.dll>)

   snc/identity/as =p:<DOMAIN_NAME>\<SAP_Service_User>
   ```

   `<SAP_Service_User>` is the user who runs the SAP system.

   `<DOMAIN_NAME>` is the Windows NT domain of this user.

   > Although you can freely choose the Windows NT account under which the SAP system runs, it is typically `SAPService<SAPSID>`.
   >
   > If you use a local account for `SAPService<SAPSID>`, most operations are successful. However, any operations or communications where the SAP system is the initiator of an SNC-protected communication to a remote machine do **not** work with a local account for `SAPService<SAPSID>`. Therefore, use a domain account.

Additional SNC Parameters

The following profile parameters allow you to continue to have password-based access to the SAP system when SNC has been enabled. To log on to the SAP system as an administrator to maintain the mapping of Windows user accounts to SAP system user IDs (user and client), you have to use these additional parameters at least once after enabling SNC. Once the mapping (at least for the administrator) has been entered, you can disable further password-based logons by removing the respective profile parameters.

`snc/accept_insecure_cpic =1`

`snc/accept_insecure_gui =1`

`snc/accept_insecure_rfc =1`

`snc/permit_insecure_start =1`

`snc/permit_insecure_comm =1`

4. Stop and restart the SAP system to activate the profile parameters. Changes to SNC profile parameters always require an application server restart to take effect.

6.13.2 Preparing SAP GUI and SAP Logon for Single Sign-On

Use

This procedure is required to set up Single Sign-On.

Prerequisites

You have completed <u>Preparing the Application Server for Single Sign-On [Page 85]</u>.

Procedure

1. Copy the `gssntlm.dll` file to the SAP GUI directory.

    The `gssntlm.dll` file is located on `sapserv<x>` in the directory `/general/misc/security/gssntlm`

2. Set the Windows environment variable `SNC_LIB` on the PC where your SAP GUI runs.

    The variable specifies the path to the `gssntlm.dll` file. To do this you have two alternatives:

    a. Copy `gssntlm.dll` to a location of your choice and set the environment variable `SNC_LIB` to that location, for example, `<DRIVE>:\<SAPGUI_PATH>\gssntlm.dll`

        i.   Right-click on *My Computer* and choose *Properties.* On the *Advanced* tab click *Environment Variables*.

        ii. In *User Variables for <user>* enter the following:

             Variable: **`SNC_LIB`**

             Value: **`<DRIVE>:\<SAPGUI_PATH>\gssntlm.dll`**

        iii. *Confirm your entries with* OK.

        iv. *Log* off and then log on to your Windows system again, as the same user, to activate the new environment variable setting

    b. Copy `gssntlm.dll` to a directory of the default search path, for example, `%SystemRoot%\system32` and rename the file to `sncgss32.dll`

This is the default filename that SNC uses when `SNC_LIB` is neither passed on the command line nor available in the environment

3. Set the required logon options to activate Single Sign-On:

   a. In the SAP logon window, choose *Edit → Advanced*

   > c. The *Advanced Options* dialog box appears.

   b. In the *SNC name* field, enter:

   p:<DOMAIN_NAME>\<SAP_Service_User>

   <DOMAIN_NAME> is the Windows domain the user `SAPService<SAPSID>` belongs to.

   > If the system `HWA` is running on account `SAPServiceHWA` of the DEC_NT domain, you would enter:
   > **P:DEC_NT\SAPServiceHWA**

4. Select *Enable Secure Network Communications* and confirm the entries with OK.

Result

The SAP Logon window now displays an icon with a small yellow key beside the system entry. This indicates that Single Sign-On is active. When the SAP administrator has entered the mapping between a user's Windows Account and that user's SAP system user ID (see below), the next time this SAP system user logs on to the system, the application is opened without requiring the entry of a user name and password. If only one possible match exists between the Windows account and the SAP system user ID, the logon screen is skipped (unless the profile parameter `snc/force_login_screen = 1` is present in the instance profile of the application server).

6.13.3 Mapping SAP System Users to Windows Users for Single Sign-On

Use

When you have configured your system, you can enable SAP system users to log on with Single Sign-On by assigning them to Windows users.

Prerequisites

You have completed the following procedures:

- Preparing the Application Server for Single Sign-On [Page 85]

- Preparing SAP GUI and SAP Logon for Single Sign-On [Page 86]

Procedure

1. Log on to the SAP system.

2. Choose *Tools → Administration → User Maintenance → Users*. Alternatively, enter transaction code SU01.

   The *User Maintenance* window appears.

3. Enter the name of the SAP system user and choose *User names → Change*.

4. Choose the *SNC* tab. In the field *SNC name*, enter the name of the Windows user that is to be assigned to the SAP system user in **uppercase**:

   `p:<DOMAIN_NAME>\<NT_USERNAME>`

   `DOMAIN_NAME>` is the Windows domain that the Windows user belongs to and `<NT_USERNAME>` the Logon ID of the Windows user.

   p: is a prefix that all SNC names require

   > For the Windows user `Kissnerj`, belonging to the domain `SAP_ALL`, enter **`p:SAP_ALL\ Kissnerj`**

5. Select *Insecure communication permitted.* This permits the user to still access the system without using the Single Sign-On feature, to work in a different domain.

6. Save the entries.

6.14 Configuration of Kerberos Single Sign-On

Use

With Windows 2000, it is possible to implement Single Sign-On using the Kerberos security protocol. Single Sign-On is a method of logging on to the system that simplifies the authentication process for the user. It allows a user that has logged on to Windows 2000 to access other SAP systems without entering an additional user ID or password. The security context for authentication is made available with the Application Programming Interface (API) and Kerberos. The user simply has to select an SAP system in the SAP logon window, or click on its shortcut, to automatically start the authentication process in the background.

The advantage of the Single Sign-On solution based on Kerberos is that the security information which has to be exchanged between the SAP front end and the SAP application server is encrypted. This encryption is not implemented for the solution available for SAP on Windows that is based on the Generic Security Service API (GSS-API) interface

> When using `gsskrb5.dll`, the Microsoft Kerberos Security Service Provider (SSP) is interoperable with Kerberos implementations from other vendors/suppliers. To use SSO with application servers on Unix and Windows 2000 front ends with `gsskrb5.dll`, you might have to purchase a Kerberos implementation for the Unix machine(s).

Prerequisites

Single Sign-On based on Kerberos can only be set up for users that are members of a Windows 2000 domain.

Activities

To prepare users and systems for the use of Single Sign-On, you have to:

1. Prepare the central instance [Page 89]

2. Configure the SAP front ends [Page 89]

3. Configure the SAP logon [Page 91]

4.   Map SAP users to Windows 2000 users [Page 91]

The sections that follow describe these steps in detail.

> In the directory paths specified below, `\%win%\` refers to the location of the Windows 2000 directory.

6.14.1 Preparing the Central Instance

Use

To prepare Single Sign-On, you must adapt the central instance profile and ensure that the necessary Dynamic Link Library (DLL) is located in the Windows 2000 directory.

Procedure

1.   Copy the `gsskrb5.dll` file from the `sapserv<x>` to the following directory on the central instance:

    `Drive:\%windir%\system32.`

    On the `sapserv<x>` the `gsskrb5.dll` file is located in the directory:

    `general/misc/security/gssntlm`

2.   In the instance profile of the central instance, set the SAP parameters

    snc/enable = 1

    snc/gssapi_lib =<DRIVE>:\%windir%\system32\gsskrb5.dll

    snc/identity/as =p:<SAP_Service_User>@<DOMAIN_NAME>

    `<DOMAIN_NAME>` is the Windows 2000 domain that the user `<SAP_Service_User>` belongs to, for example, `NT5.SAP-AG.DE`.

    > Although you can freely choose the Windows account under which the SAP system runs, it is typically `SAPService<SAPSID>`.

    > If you use a local account for `SAPService<SAPSID>`, most operations are successful. However, any operations or communications where the SAP system is the initiator of an SNC-protected communication to a remote machine do not work with a local account for `SAPService<SAPSID>`. Therefore, use a domain account.

3.   Stop and restart the SAP system to enable the profile parameters to take effect.

    > ⚠ The `<DOMAIN_NAME>` and the `<SAP_Service_User>` are case-sensitive. Make sure you enter upper and lowercase correctly, for example:
    >
    > `p:SAPServiceC11@NT5.SAP-AG.DE.`

6.14.2 Configuring the SAP Front End

Use

To enable a logon with Single Sign-On, you have to configure each SAP front end that is in use.

Procedure

When you prepare the SAP front end for Single Sign-On, you can choose between two approaches:

- Configure each front end individually

- Configure all front ends automatically

Configuring SAP Front Ends Individually

1. Perform the steps on the machine where the SAP front end is running.

2. Log on to the machine where the SAP front end is running.

3. Copy the SAPSSO.MSI program from the sapserv<x> directory general/R3Server/binaries/NT/W2K to a local directory or to a shared directory on the network.

4. Double-click the SAPSSO.MSI file.

   The wizard *SAP Single Sign-On Support for Windows 2000* is started and automatically configures the SAP front end.

Configuring SAP Front Ends Automatically

In the following procedure, you define a *Group Policy* for a Windows 2000 domain. This policy causes the Wizard for configuring Single Sign-On to be started automatically in the background the next time any member of the domain logs on to an SAP fontend.

To define the *Group Policy*:

1. Log on to a front-end machine as domain administrator of the Windows 2000 domain.

2. Copy the program SAPSSO.MSI from the sapserv<x> directory general/R3Server/binaries/NT/W2K to a **shared** directory.

3. From the Windows 2000 menu choose *Start → Programs → Administrative tools → Active Directory Users and Computers.*

   The dialog box *Active Directory Users and Computers* appears.

4. Select the domain for which you want to set up Single Sign-On. Right-click and choose *Properties* from the context menu.

   The dialog box *<Domain_Name> Properties* appears.

5. On the *Group Policy* tab, choose *New* to access the dialog box for creating a new policy object.

6. Under *Group Policy Object Links*, enter a name for the new policy object, for example, SAPSSO. Choose *Edit* to define the contents of the policy.

7. In the *Group Policy Editor* choose *User Configuration → Software Settings → Software Installation.*

   The *Deploy Software* dialog box opens.

8. Right-click and choose *New → Package* from the context menu.

The *Open* dialog box appears.

9. Select the file `SAPMSSO.MSI` from the shared location. Specify the path with the UNC name (`\\<hostname>\<share>`).

10. Select *Assign* and confirm with *OK*.

You have now created a new *Group Policy.* The next time any user logs on to the domain with the SAP front end, the wizard *SAP Single Sign-On Support for Windows 2000* is started and automatically prepares the front end for Single Sign-On.

6.14.3 Activating Single Sign-On for the SAP Logon

Use

The Logon option for Single Sign-On must be activated for each SAP front end.

Procedure

The SAP Logon dialog box includes a list of systems or machines that you can log on to. For each of the systems or machines in the list for which you want to implement Single Sign-On, proceed as follows:

1. Select an entry and choose *Properties ˛ Advanced*.

2. Select *Enable Secure Network Communications*.

3. In the *SNC name* field, enter:

   p:<SAP_Service_User>@<DOMAIN_NAME>

   where `<DOMAIN_NAME>` is, for example, `NT5.SAP-AG.DE`.

   > Enter the same string that you entered in the central instance profile for `snc/identity/as`
   >
   > If the system *C11* is running on account `SAPServiceC11` of the domain `NT5.SAP-AG.DE`, you would enter:
   > **P:SAPServiceC11@NT5.SAP-AG.DE**

   > If the entry you selected in the logon dialog box is a group entry, for example, *C11 (PUBLIC)*, the *SNC name* field is already filled out.

4. Confirm your entries with *OK*.

The SAP Logon window now displays an icon with a key beside the system entry. This indicates that Single Sign-On is active for the system in question.

6.14.4 Mapping SAP Users to Windows 2000 Users

Use

When you have configured your system, you can authorize SAP users to log on with Single Sign-On by assigning them to Windows 2000 users.

Procedure

1. Log on to the SAP system as administrator.

2. Choose *Tools → Administration → Maintain Users → Users*.
   Alternatively, enter transaction code SU01.

   The *User Maintenance* window appears.

3. Enter the name of the SAP user and choose *User names → Change.*

4. Choose the *SNC* tab. In the *SNC name* field, enter the name of the Windows 2000 user that is to be assigned to the SAP user in uppercase:

   p:<WINNT_USERNAME>@<DOMAIN_NAME>

   Where <WINNT_USERNAME> is the Logon ID of the Windows 2000 user and <DOMAIN_NAME> the Windows 2000 domain the user is logged on to.

   For the user Kissnerj, belonging to the domain NT5.SAP-AG.DE , enter **p:kissnerj@NT5.SAP-AG.DE**

5. Select *Insecure communication permitted.* This permits the user to still access the system without using the Single Sign-On feature, to work in a different domain.

6. Save the entries.

You have now completed the process of setting up Single Sign-On.

6.15 Application-Specific Actions

SAP Retail

If you use SAP Retail, follow the instructions in **SAP Note 157755**.

> For some languages you can execute a short text conversion. Prerequisite is that SAP BASIS support package 3 is installed. For more information about the short text conversion, see the SAP Online Documentation under *Logistics → SAP Retail → Basic Principles → Retail Terminology*).

6.16 Client Copy

Perform the client copy:

The client copy consists of the following procedures:

- Maintenance of the client (transaction SCC4).

- Copy of the client (local – transaction SCCL).

- Copy of the log files (transaction SCC3).

  For instructions on how to perform the client copy, see the SAP Library:

  a. Choose *Help → SAP Library* in your SAP system.

b. Choose *mySAP Technology Components* →*SAP Web Application Server* → *Change and Transport System* → *Client Copy and Transport*

Alternatively you can access the SAP Library at `http://help.sap.com`:

a. Choose *SAP Web Application Server* → *SAP Web Application Server 6.20*.

b. Select the required language.

c. Choose *mySAP Technology Components* → *SAP Web Application Server* → *Change and Transport System* → *Client Copy and Transport*.

6.17 Performing a Full Backup

Use

You must perform an offline full backup at the end of the installation.

Prerequisites

- You have completed client maintenance (for example, client copy).
- You have stopped the following:
  - The SAP system
  - The SAP-related services (`SAP<SAPSID>_<instance>` and `SAPOSCol`)
  - The database
- You are logged on as user `<sapsid>adm`.

Procedure

Log on as Log on as user `<sapsid>adm` and shut down the SAP system and database.

1. To save the Registry:

    a. Choose *Start* → *Programs* → *Accessories* → *System Tools* → *Backup*

    b. Click *Emergency Repair Disk.*

    c. The *Emergency Repair Diskette* dialog box appears.

    d. Select *Also Backup the Registry to the Repair directory…*

    When you confirm your entry the Registry is written to diskette.

2. Save the System State Data:

    a. Choose *Start* → *Programs* → *Accessories* → *System Tools* → *Backup*.

    b. Click *Backup Wizard*.

    c. On the *Backup Wizard* dialog box, select *Only backup the System State Data* and choose *Next*.

    d. Specify the *Backup media type* and the destination of the backup. Choose *Next*.

    e. Check the information on the dialog box and then choose *Finish* to start the backup.

3. Back up all SAP-specific and all database-related directories:

    a. Choose *Start* → *Programs* → *Accessories* → *System Tools* → *Backup*.

    b. Click *Backup Wizard.*

c. On the *What to Back up* dialog box, select *Backup selected files, drives or network data* and choose *Next*.

d. On the *Items to Back Up* dialog box, select the Windows directory and all SAP and database-related directories, including:

```
\USR\SAP
\USR\SAP\TRANS
<HOMEDIR> of <sapsid>adm
\WINNT
```

Choose *Next*.

e. On the *Where to Store the Backup* screen, specify the media type and destination for the backup.

f. Check the information displayed and then choose *Finish* to start the backup.

6.18 Changing Passwords of Created Users

Use

You need to change the passwords of the users that SAPinst creates during the installation. The table below lists these users. You also need to remove the contents of the installation directory and store them securely because otherwise they might represent a security risk.

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

Procedure

1. Change the passwords of these users according to the *SAP Security Guide*.

   For more information, see the *SAP Service Marketplace* at the Internet address:

   service.sap.com/securityguide

   - SAP system users might exist in more SAP system clients than listed below (for example, if a user was copied as part of the client copy [Page 92]).

   - We strongly recommend that you change the initial passwords even if SAPinst prompted for a new password during the installation procedure.

User Type	User	Comment
SAP system user	SAP*	User exists at least in SAP system client 00
	DDIC	User exists at least in SAP system clients 00 and 66

User Type	User	Comment
	`EARLYWATCH`	User exists at least in SAP system client 66
	`SAPCPIC`	User exists at least in SAP system client 00
Oracle database user	`SAP<SCHEMA_ID>`	Oracle database owner (that is, the owner of the database tables)
	`SYSTEM`	–
	`SYS`	–

2. For security reasons we recommend that you remove all relevant files from the SAPinst installation directory, `<SAPinst_INSTDIR>`, and keep them in a safe place:

   a. Enter the following command:

   > **`<SAPinst_INSTDIR>/newinstall`**

   This command creates a new subdirectory under `<SAPinst_INSTDIR>` containing all files that might represent a security risk.

   b. Copy the newly created subdirectory to another medium and keep this in a safe place.

   c. Remove the newly created subdirectory from the installation host.

7 Additional Information

For information on how to delete an SAP installation, see:

Deletion of an SAP Installation [Page 101]

For background information on the security concept implemented for SAP on Windows, see:

SAP Security on Windows [Page 104]

7.1 Performing a Remote Installation with SAPinst

Use

You can run SAPinst GUI in standalone mode.

This allows you to install a SAP system on another host (the remote host) while monitoring the installation with SAPinst GUI on your local Windows or UNIX computer (the local host).

The procedure consists of the following basic steps:

1. Install SAPinst on your remote host and SAPinst GUI on your local host.

2. Start SAPinst server on your remote host.

3. Start SAPinst GUI on your local host.

4. Perform the installation using SAPinst GUI.

For more information, see *Procedure* below.

Prerequisites

- Make sure that you have performed the preparation activities for your local host (SAPinst GUI host) and your remote host.

    For more information, see "Installation Preparations" in this documentation.

- Both computers are on the LAN and can ping each other.

    To test this, log on to your remote host and enter the command **ping <local host>** from the command prompt. on the local host On the local host, use the `ping` command **ping <remote host>**.

- SAPinst ports

    SAPinst uses the ports 21212 and 21213 during the installation for communication with SAPinst GUI. If one of these ports is already used by another service, SAPinst aborts the installation with an appropriate error message.

    In this case, you must start SAPinst or SAPinst GUI from the command prompt as follows:

    − UNIX:

      - SAPinst: **./sapinst SAPINST_DIALOG_PORT=<free_port_number>**

      - SAPinst GUI: **./sapinstgui.sh -port <free_port_number>**

    − Windows:

      - SAPinst: **sapinst SAPINST_DIALOG_PORT=<free_port_number>**

      - SAPinst GUI: **sapinstgui.bat -port <free_port_number>**

where `<free_port_number>` and `<free_port_number>` + 1 define unused port numbers. For example, if you enter `60000` as `<free_port_number>`, SAPinst uses the ports `60000` and `60001`.

The same applies to the SAPinst GUI commands `startinstgui.bat` (Windows) and `startinstgui.sh` (UNIX).

Procedure

Activities on Your Remote Host (Where a SAP System is to be Installed)

If your remote host runs on a Windows platform:

1. Log on to your remote host as a user who is a member of the local administration group.

2. Insert the SAPInst CD in your CD drive.

3. Run **Setup.cmd** from the following path:

   `<CD drive>:\SAPinst\NT`

   SAPinst now asks if you want to perform a *Standard* or *Custom* installation

   If you choose a *Custom* installation you can define:

   − Installation directory for SAPinst, *<SAPinst_DIR>*

   − SAPinst folder in the *Start* menu

      The *Start* menu entry is used to create unique *Start* menu entries.

      For example, you enter the following for the *Start* menu during the installation:
      `R3_Enterprise_47`

      Then SAPinst creates the following *Start* menu:
      Start → Programs → R3_Enterprise_47 → …

   Connection parameters (not relevant here)

4. Select *Standard* or *Custom* and choose *Next*.

   SAPinst is now copied to your `<SAPinst_DIR>` and the *Start* menu entries are created.

5. To start SAPinst choose Start → Programs → <menu_entry> → SAPinst Server only

   SAPinst server now starts and waits to connect to SAPinst GUI

6. Start SAPinst GUI on the local host, as described in *Activities on your local host*.

If your remote host runs on a UNIX platform:

1. Log on to your remote host as user `root`.

2. Mount the SAPinst CD.

3. Create `<SAPinst_INSTDIR>` and change to this directory.

4. From `<SAPinst CD>/SAPINST/UNIX/<platform>` run:

   `./INSTALL --nogui`

   SAPinst is now copied to your `<SAPinst_INSTDIR>` without SAPinst GUI.

Activities on Your Remote Host (Where a SAP System is to be Installed)

5. Start SAPinst from your `<SAPinst_INSTDIR>` by entering:

    `./sapinst`

    SAPinst now starts and waits for the connection to the SAPinst GUI. That is, you see the following at the command prompt:

    `guiengine: waiting for connect...`

6. Start SAPinst GUI on your local host, as described below in *Activities on your local host*.

Activities on Your Local Host (Where SAPinst GUI Runs)

If your local host runs on a Windows platform:

1. Log on to your local Windows host.

2. Insert the SAPinst CD into your CD drive.

3. Run **`Setup.cmd`** from the following path:

    `<CD drive>:\SAPinst\NT`

    SAPinst now asks you to perform a *Standard* or *Custom* installation

4. Select *Custom* installation.

    You can define:

    - Installation directory for SAPinst (that is, for the SAPinst GUI)

    - SAPinst folder in the Start menu

    - Connection parameters (host name and port number) to connect to your remote host(s). Use Add Row to enter all known remote hosts and their corresponding free port numbers. Be sure to enter the same port number as SAPinst uses on the corresponding remote computer. If you do not enter a port number, standard port 21212 is used.

        The *Start* menu entry and the connection parameters are used to generate unique *Start* menu entries. For example, you enter the following during the installation:

        - Start menu entry: **`SAPinst GUI`**

        - Connection parameters (remote host / port): **`uwi005`** / **`8000`**

        - Connection parameters (remote host / port): **`hs1101`** / **`5555`**

        Then SAPinst creates the following *Start* menu entries:

        Start → *Programs* → *SAPinst GUI* → *SAPinst GUI uwi005 8000*

        Start → *Programs* → *SAPinst GUI* → *SAPinst GUI hs1101 5555*

5. Enter your data, select the flag *Install SAPinst GUI only*, and choose *Start*.

Activities on Your Local Host (Where SAPinst GUI Runs)

SAPinst GUI is now copied to your `<SAPinst_DIR>` and the *Start* menu entries are created.

6. Choose Start → Programs → <menu_entry> → SAPinst GUI <host><port>

    SAPinst GUI automatically connects to the host, which is waiting to connect.

    That is, SAPinst GUI now starts and the *Welcome* screen is displayed.

    If you have not entered connection parameters before, a dialog now asks you for the following parameters:

    Hostname : Enter the host name of the remote computer

    Port: Enter the same port number as SAPinst uses on the remote host

7. You can now perform the installation from your local host.

 If your local host runs on a UNIX platform:

1. Log on to your local UNIX host as user `root`.

2. Mount the SAPinst CD.

3. Create `<SAPinst_INSTDIR>` and change to this directory:

4. From `<SAPinst CD>/SAPINST/UNIX/<platform>` run

    `./startinstgui.sh`

    SAPinst GUI is now copied to your `<SAPinst_INSTDIR>`.

5. Start SAPinst GUI from your `<SAPinst_INSTDIR>` by entering:

    `./startinstgui.sh`

    SAPinst GUI automatically connects to the host, which is waiting for a connection.

6. You can now perform the installation from your local host.

7.2 Continuing an Interrupted Installation with SAPinst

Use

As SAPinst does not abort the installation in error situations, you can continue an interrupted installation in the following situations:

- You have **not** canceled the installation

- You have **already** canceled the installation

Prerequisites

You solved the problem that caused the error situation.

Procedure

- You have **not** canceled the installation

    That is, the error dialog box is still displayed and SAPinst is waiting for your input. Proceed as follows:

    In the error dialog box, choose *Retry*.

    SAPinst now retries the installation step.

- You have **already** canceled the installation

    That is, the installation was aborted and now you want to continue it. Since SAPinst records the installation progress in the `keydb.xml` file, it can continue the installation from the failed step without repeating previous steps.

    You have two alternatives:

    - o Continuing the installation
    - o Restarting from scratch, that is, starting the installation with the default `keydb.xml` file as delivered

    These two alternatives are described in the tables below.

    In some cases, you must uninstall already installed components, before repeating the installation from scratch. For example, this applies to an SAP system installation. For more information, see the uninstallation description in the corresponding installation guide.

How to Proceed on Windows
Continuing the Installation
1. Check if a SAPinst GUI Java process is still running, and if so, look for `javaw.exe` under *Processes* in your Task Manager, and kill it.
2. Choose *Start → Programs → <menu_entry> → SAPinst Server with GUI* (or *SAPinst GUI* if you want to start the GUI only or *SAPinst Server only* if you want to start SAPinst without the GUI).
Restarting from the Beginning
1. Check if a SAPinst GUI Java process is still running, and if so, look for `javaw.exe` under *Processes* in your Task Manager, and kill it.
2. Choose *Start → Programs → <menu_entry>→ Prepare New Installation* Current log and command files are now copied to a backup directory that indicates the date and time of the backup: `<SAPinst_Dir>\log<month>_<date><time>`
3. Choose *Start → Programs → <menu_entry> → SAPinst Server with GUI* (or *SAPinst GUI* if you want to start the GUI only or *SAPinst Server only* if you want to start SAPinst without the GUI).

How to Proceed on UNIX

Continuing the Installation

1. Check if a SAPinst GUI Java process named `java` is still running:

   `ps -efl | grep java`

   If so, kill it.

2. Make sure that all environment variables are set as described in the corresponding installation documentation.

3. Start SAPinst from your `<SAPinst_INSTDIR>` with:

   `./sapinst`

Restarting from the Beginning

You have the following alternatives

- Restart the installation from installation CD

   Start SAPinst from CD again as described in the corresponding installation documentation.

   SAPinst deletes all files in your installation directory and asks you if you want to overwrite any existing installation directory.

- Prepare the new installation manually (installation CD is not needed)

   In your `<SAPinst_INSTDIR>` do the following:

   a. Rename the `keydb.1.xml` file (original file delivered by SAP) to `keydb.xml`.

   b. Delete all `keydb.<no>.xml` files, if there are any.

   c. Start SAPinst from your `<SAPinst_INSTDIR>` with:

      `./sapinst`

7.3 Deletion of an SAP System Installation

Purpose

The following describes how to delete an SAP system.

Process Flow

1. You delete the central instance.

2. You delete any dialog instances that might exist

3. You delete the database.

4. You delete the database software.

7.3.1 Deleting an SAP Instance

Use

You can remove the SAP software with the help of a wizard.

Prerequisites

The SAP system must be stopped and the database shut down.

Procedure

1. Log on as user with domain administration rights. If you only want to delete a dialog instance, you can log on as `<sapsid>adm`.

2. Choose *Start → Settings → Control Panel → Add/Remove Programs*
    The *Add/Remove Programs* dialog box appears. Scroll to the SAP entries.

    Each central or dialog instance that is installed on the computer is listed with an entry of the form: *SAP Application Server for System <SAPSID>instance*

3. Select the instance you want to delete from the list and choose *Remove*.

    The welcome window of the *SAP Uninstall Wizard* opens.

4. Choose *Next.* A dialog box appears allowing you to select an uninstall method:

Uninstall Method	Explanation
Typical	Uninstalls the SAP instance that you selected in the *Add/Remove Programs Properties* dialog box.
Complete	Select this to remove all the SAP instances that are installed on the local computer. Note that this includes **all** the SAP instances initially listed in the *Add/Remove Programs Properties* dialog box, regardless of the highlighted selection. Choose *Finish* to start the deletion.
Custom	Select *Custom* and choose *Next* to access the *Select Components* dialog box that allows you to mark the instances you want to remove. In the *Select Components* dialog box, use the check box beside an instance to indicate whether only the instance involved or the entire system, with global accounts, is to be deleted.
	Uninstall instance-independent components Select this additional option, if there is no other SAP system on the local machine. In this case directories such as `usr\sap` and `usr\sap\trans` are also deleted.
	Add Choose to manually add instances you want to delete if they do not appear on the list.
	Finish Choose to start the deletion.

The wizard informs you when the SAP system or selected instances have been deleted successfully.

Delete the following file if you want to remove a central instance installation:

> `\usr\sap\trans\bin\tpparam_inst<SAPSID>.`

7.3.2 Deleting the Database

Use

When you delete an entire SAP system, you have to delete the database instance and the Oracle DBMS software.

> Use the following procedure if there is only a single Oracle_Home in your system.
>
> If the instance of a second SAP system is running on the same machine as the database, this means the database software still has to be accessed by the second system .

Prerequisites

You have already deleted the central instance.

Procedure

Deleting the Database Instance

To delete the database instance:

1. Log on as local administrator.

2. Delete the Oracle instance:

   a. Open a command prompt and switch to the directory
      `<DRIVE>:\ORACLE_HOME\bin`

   b. Enter:

      `oradim -delete -sid <SAPSID>`

3. Delete the `ORACLE\<SAPSID>` directories on all drives. This includes the directories containing the SAP data.

4. Delete the following files from the directory `<DRIVE>:\ORACLE_HOME\database\`

   `init<SAPSID>.dba`

   `init<SAPSID>.ora`

   `init<SAPSID>.sap`

5. Delete the following files from the directory `<DRIVE>:\ORACLE_HOME\Network\Admin`

   `listener.ora`

   `tnsnames.ora`

   `sqlnet.ora`

7.3 Deletion of an SAP System Installation

⚠️

> If a second instance is installed on the host do not delete these files. Open the files `listener.ora` and `tnsnames.ora` in an editor and remove all references that include the name of the system <SAPSID> that is being removed.

6. Delete the groups `ORA_<SAPSID>_DBA` and `ORA_<SAPSID>_OPER`:

   a. Choose:

      Start → Programs → Administrative Tools → Computer Management

   b. Choose *Local Users and Groups* → *Groups.*

      Select and delete the local groups `ORA_<SAPSID>_DBA` and `ORA_<SAPSID>_OPER` with *Action* → *Delete*

Deleting the Oracle DBMS Software

💡

> The Oracle software is installed on all hosts where an SAP instance is running: on a central instance host, database host and dialog instance host. Do **not** delete the database software, if another SAP instance is running on the same host.

1. Stop all Oracle Services and the *Microsoft Distributed Transaction Coordinator*. To access the services choose *Start* → *Programs* → *Administrative Tools* → *Services* Select a service and then choose *Action* → *All Tasks* → *Stop*

2. Delete the Oracle home directory and all its subdirectories under `<DRIVE>:\ORACLE_HOME`

3. Edit the Oracle Registry entries as follows:

   a. Choose *Start* → *Run* and enter **REGEDIT**

   b. Delete the key HKEY_LOCAL_*MACHINE* → *SOFTWARE*→ ORACLE

   c. Delete all Oracle references under HKEY_LOCAL_*MACHINE*→ *SYSTEM*→ CURRENTC*ONTROLSET* → SERVICES

4. Delete all Oracle references from the Windows user and system environment. To access the environment choose *Start* → *Settings*→ *Control Panel* → *System.* Choose the *Advanced* tab and then click *Environment Variables*. For example, delete the variables: `TNS_ADMIN, NLS_LANG, ORACLE_HOME` Also delete Oracle from the `PATH` variable.

5. Delete the Oracle entries from the *Start* menu:

   a. Choose *Start* → *Settings*→ *Taskbar & Start Menu*

   b. On the *Advanced tab*, click *Advanced.*

   c. On the *Start Menu* screen, look under `All Users\Start Menu\Programs` Select and delete the folders for Oracle with *File* → *Delete*

   d. Delete the Oracle shortcut from the desktop.

7.4 SAP System Security on Windows

In a standard SAP system installation, all steps relevant for security are automatically performed by SAPinst. Although SAPinst ensures that the system is protected against unauthorized access, it is nevertheless important for the system administrator to ensure that no breaches of security can occur.

Distributed SAP systems with multiple application servers have to be installed in a Windows domain to ensure central and straightforward administration of the SAP system. The following gives you an overview of the user accounts and groups that SAPinst creates during a domain installation.

User Accounts

SAPinst creates two accounts for SAP System Administration:

- `<sapsid>adm`

  SAP system administrator account that enables interactive administration of the system.

- `SAPService<SID>` (this user is **not** created for Informix installations)

  Virtual user account that is required to start the SAP system. Nobody can log on to the system with this account. It has the local user right to *log on as a service* and is a member of the local administrator's group.

The advantage of the additional `SAPService<SAPSID>` account is that it does not allow an interactive logon and thus prevents abuse of the account. It is therefore not necessary to define an expiration date for the password, and the option *user must change password at next logon* does not have to be set.

Groups

SAPinst creates the following groups during a domain installation.

- `SAP_<SAPSID>_GlobalAdmin`

  This global group is a domain-level SAP administration group for organizing SAP system administrators. The only function of a global group is to gather users together at the domain level so that they can be placed in the appropriate local groups.

- `SAP_<SAPSID>_LocalAdmin`

  Only local groups are created and maintained on an application server. A local group can only be given permissions and rights to the system where it is located. The system is part of a particular domain, and the local group can contain users and global groups from this domain.

- `SAP_LocalAdmin`

  This group is created on all hosts, but is particularly important for the transport host. Members of the group have Full Control over the transport directory (`usr\sap\trans`) that allows transports to take place between systems.

  The `SAP_<SAPSID>_GlobalAdmin` groups of all the SAP systems that are part of the transport infrastructure are added to the `SAP_LocalAdmin` group. As a consequence, the users `<sapsid>adm` and `SAPService<SAPSID>` of all systems in the transport infrastructure are members of the `SAP_LocalAdmin` group and have the authorizations necessary to initiate and execute transports.

7.4 SAP System Security on Windows

SAP Directories

SAPinst protects the SAP directories under `usr\sap\<SAPSID>` by only granting the group `SAP_<SAPSID>_LocalAdmin` full control over these directories.

The following graphic illustrates the user accounts and groups created by SAPinst in a system infrastructure consisting of two SAP systems.

User Groups and Accounts
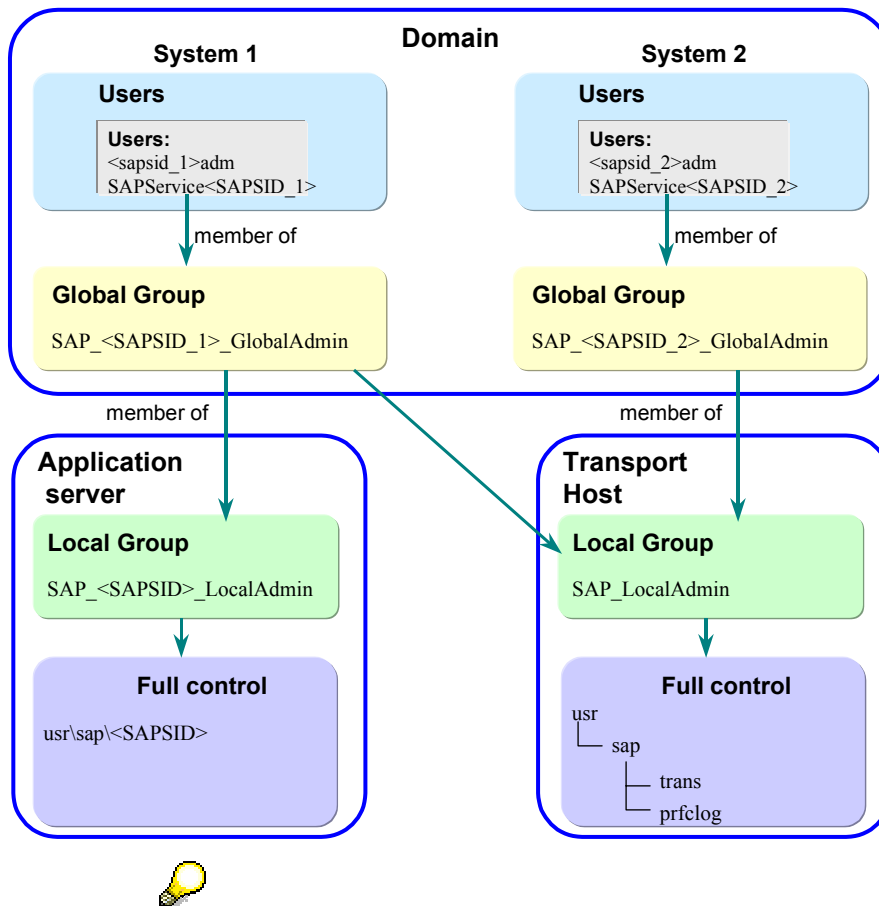
An access control list (ACL) controls the access to the SAP system objects. To ensure a secure system, only the local group `SAP_<SAPSID>_LocalAdmin`, the group `Administrators` and the account `SYSTEM` are members of all SAP system object ACLs.

See also:

7.4.1 Automatic Creation of Accounts and Groups

Purpose

During the installation, SAPinst automatically creates the accounts and groups required for the operation of the SAP system.

Features

The following graphic gives an overview of the steps carried out by SAPinst to create the users and groups for a **domain** installation.

Creation of accounts	Creation of SAP Domain User Accounts **R/3 Administrator :** `<sapsid>adm` **R/3 Service Account:** `SAPService<SAPSID>`

	Creation of **Global Group :** `SAP_<SAPSID>_GlobalAdmin`
Creation and modification of global group in the domain	↓
	Addition of `<sapsid>adm` and `SAPService<SAPSID>` to group `SAP_<SAPSID>_GlobalAdmin`
	↓
	Addition of `<sapsid>adm` and `SAPService<SAPSID>` to the NT `local Administrators` Group
	↓
	Addition of `<sapsid>adm` to the NT `Domain Users` group.

	Creation of a local group on the application server **Local Group :** `SAP_<SAPSID>_LocalAdmin`
	↓
	Addition of the global group `SAP_<SAPSID>_GlobalAdmin` to the local group `SAP_<SAPSID>_LocalAdmin`
Creation and modification of local group on each application server	↓
	Creation of a local group on the application server **Local Group :** `SAP_LocalAdmin`
	↓
	Addition of the global group `SAP_<SAPSID>_GlobalAdmin` to the local group `SAP_LocalAdmin` on the application server
	↓
	Addition of the `SAP_<SAPSID>_GlobalAdmin` group to the local group `SAP_LocalAdmin` on the transport host

	For `Administrators` **and** `SAP_LocalAdmin`
	groups assignment of Full Control over:
	`usr`
	`usr\sap`
	`usr\sap\transport`
	`\usr\sap\prfclog`

Assignment of rights for the SAP directories	↓
	For `Administrators` **and** `SAP_<SAPSID>_LocalAdmin` **groups** **Assignment of Full Control over:** `usr\sap\<SAPSID>`

7.4.2 Manually Granting User Rights for the Installation

Use

The Windows user that performs the SAP system installation must be authorized to perform the actions necessary for the installation. More precisely, this means that for a domain installation the user must belong to the `Domain Admins` group and be authorized to:

- Act as part of the operating system

- Increase quotas

- Replace a process level token

If the installation aborts because of authorization problems, this might be because you are not using the same user that installed the SAPinst tool. The rights required for the installation are automatically assigned to the user who installs the SAPinst tool. You can grant another user the rights listed above manually, using the procedure described here.

Procedure

To grant user rights:

1. Choose *Start* → *Settings* → *Control Panel* → *Administrative Tools* → *Local Security Policy.*

2. In the *Local Security Settings* window, choose *Local Policies* → *User Rights Assignment.*

3. On the right-hand pane, select the policy that is needed for the installation and then right-click. Choose *Security* and then click *Add*.

   The *Select Users and Groups* window opens.

4. Select the user involved and click *Add*.

   The selected user appears in the text box below.

5. Confirm your entry and then repeat the steps for each of the other policies the user requires for the installation.

Part II Cluster Installation with MSCS

Purpose

When you install an SAP system, you can decide to set up a Microsoft Cluster Server (MSCS) configuration. For this type of installation, you have to set up the system on two specially clustered machines and configure it so that it can take advantage of the MSCS software. The MSCS software offers features that can improve the availability of the system and safeguard it against failure and unpredictable downtime. Ideally it enables 24 - hour operation, 365 days a year.

As opposed to a standard installation, an MSCS installation sets up the database and central instance on two different, clustered machines with the aim of enabling critical system components to be automatically switched from one machine to the other if hardware problems arise. Under normal operating conditions, the central instance runs on one of the machines and the database on the other. When hardware fails, the critical resources located on the damaged machine are failed over to the healthy machine, in this way avoiding unplanned system downtime. With the help of this mechanism the system can continue functioning normally, even when a critical hardware error has occurred.

Apart from enabling failover when hardware problems occur, the cluster configuration also has the purpose of enabling system maintenance without causing downtime. For example, if maintenance of the database node is necessary, the database can be moved to the node where the central instance is running and can continue operating there. While maintenance is in progress, the central and database instance temporarily reside on the same node, but when maintenance work is finished the database can easily be moved back to its original node.

> In this documentation the two machines in the cluster are referred to as node A and node B.

Prerequisites

Read the installation notes before you begin the installation. These notes contain the most recent information regarding the installation, as well as corrections to the documentation.

Installation Notes

529118	INST: SAP R/3 Enterprise 4.70 on Windows – MS Cluster Server
529076	INST: R/3 Enterprise 4.70 on Windows – Oracle
529151	INST: R/3 Enterprise 4.70 on Windows – General

Process Flow

The process of setting up an SAP system on an MSCS configuration differs, depending on whether you want to:

- Install a new SAP system

- Move an existing system to cluster hardware

The following sections introduce both of these approaches.

Setting up a New SAP System

If you intend to run a new SAP system on a cluster, the process of installing your system can be subdivided into two main parts:

- In the first part, the **SAP installation**, you perform a standard system installation, but perform a number of supplementary steps specially required for the cluster configuration.

- In the second part, the **Conversion to MSCS**, you configure the database and SAP system so that they can take advantage of the cluster functionality.

The following summarizes important aspects of the installation process and points out the differences between a standard and a MSCS SAP installation.

SAP Installation

The task of installing a MSCS SAP system is essentially the same as the task of installing a standard SAP system which is described earlier in this documentation. However, you have to perform a number of supplementary steps and follow some special cluster-specific guidelines. In particular, because the cluster hardware has two nodes that have access to both local and shared storage devices, you have to install some components on both nodes and observe special rules for distributing components to local or shared disks. Also, because the correct configuration of the network addresses is absolutely essential to enable the cluster to function properly, you have to perform a number of additional steps that are necessary to set up and check addressing in the cluster.

Conversion to MSCS

In the conversion part of the installation, you configure the database and SAP instances so that they can take advantage of the MSCS functionality. This involves running the SAPinst tool to configure the SAP central instance so that it can be administered as a switchable group within the cluster and setting up the database as an Oracle Fail Safe database to enable interaction with the cluster.

Comparison of an MSCS and Standard Installation

When you follow the instructions to set up the SAP system in a MSCS configuration, it is important to keep in mind that the process is a combination of standard installation steps and supplementary steps specifically required for the cluster. Whenever steps correspond to those in the standard installation procedure, you are referred to earlier sections of this documentation. Whenever steps are only cluster-specific these are described in detail in this part of the documentation.

The following list gives you a quick overview of the aspects of the SAP installation that are different on a cluster. It is useful to keep these in mind when you try to get an overview of the procedure as a whole, before concentrating on the details.

As opposed to a standard installation, the installation on cluster hardware involves:

- Performing many of the normal installation steps on **both** nodes instead of only on a single machine.

- Observing rules that stipulate which software components must be stored on local disks and which on disks shared by both nodes.

- Correctly configuring host names and IP addresses

- Installing the MSCS software to provide the underlying functionality that enables the database and SAP system to fail over.

- Installing the Oracle Failsafe software, and on the basis of it, configuring the database as a group of resources that can be switched over from one machine to the other.

- Converting the SAP system for operation in the cluster by binding its critical resources together in a group that can be switched from one machine to the other as an entity.

The entire installation process can be subdivided into the same sequence of phases as a standard installation, except that an additional MSCS conversion phase is required. Necessary phases are:

```
┌─────────────────────────────────────┐
│             Planning                 │
└─────────────────────────────────────┘
                  │
                  ▼
┌─────────────────────────────────────┐
│           Preparations               │
└─────────────────────────────────────┘
                  │
                  ▼
┌─────────────────────────────────────┐
│  Central and DB Instance Installation│
└─────────────────────────────────────┘
                  │
                  ▼
┌─────────────────────────────────────┐
│         Conversion to MSCS           │
└─────────────────────────────────────┘
```
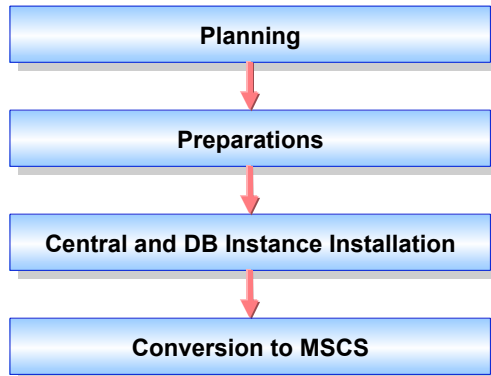
Moving an Existing SAP System

If you have an existing SAP system and plan to migrate to a cluster because you have purchased new hardware, the procedure is essentially the same as for a new system. You have to install the SAP system on the new hardware and subsequently convert the system for operation in a cluster. However, the first part of the process, when the SAP system is installed, has to be performed as a system copy. This means that in preparation for the installation, you have to create a copy of the database, and afterwards, instead of loading the database from the Export CDs, you load it using your exported database.

Depending on your source and target system, you may either have to perform a homogeneous or heterogeneous system copy:

- If the original system and target system have the **same** operating system and database, perform a **homogeneous** system copy.

  For more information, see the documentation *SAP Web AS Homogeneous and Heterogeneous System Copy* at the SAP Service Marketplace at:
  `http://service.sap.com/instguides`

- If the original system and target system have a **different** database or operating system, perform a **heterogeneous** system copy. A prerequisite for this type of copy is a migration package that can be ordered from SAP.

  For more information, see the SAP Service Marketplace at:
  `http://service.sap.com/osdbmigration`

Once you have installed your system on the new hardware, following the instructions for a system copy, you can convert your system to a cluster as described in the section The SAP Conversion to MSCS [Page 132]

7.4 SAP System Security on Windows

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The documentation for a homogeneous or heterogeneous system copy does not include the cluster-specific information you need for cluster hardware. It is therefore important to also carefully read this guide and follow all additional instructions given for the cluster.

8 Installation Planning for MSCS

Purpose

The installation of the SAP system on cluster hardware must begin with a planning phase in which you ensure that the prerequisites for the installation can be met. Careful planning ensures that the actual installation procedure runs smoothly and no time is lost solving avoidable problems.

Process Flow

When you plan the installation, there are a number of points you need to focus on:

- Hardware and software requirements

    You need to make sure that that you can meet the hardware and software requirements that are specified for an SAP MSCS installation. Both SAP and Microsoft specify minimal requirements that you have to fulfill to ensure that the newly installed system can be operated successfully.

- Distribution of components to storage devices

    You need to work out how to distribute the software components to the storage devices of the cluster hardware in accordance with a set of rules and guidelines.

    The cluster hardware is equipped with two sets of disks; local disks that are attached directly to one of the nodes and shared disks that can be accessed by both nodes via a shared interconnect. During the planning phase you must work out which components have to be stored on local disks, which on shared disks and which have to be separated to different disks for performance and security reasons.

- IP Addresses and host names

    The operation of a cluster fundamentally depends on the correct configuration of addresses in the network. In the planning phase, you need to obtain a predefined set of IP addresses and host names from the system administrator so that these are available for the later installation process. Altogether you need at least 7 IP addresses and host names to set up the addressing as prescribed.

8.1 Checking Hardware Requirements for MSCS

Use

The hardware on which you install an SAP system for MSCS must meet certain minimal requirements. This ensures that the system can take advantage of the MSCS functionality and achieve acceptable levels of performance.

Procedure

1. Check that the hardware on which you intend to install the system is included in the Microsoft list of certified hardware for cluster installations and that the hardware components are certified by AddOn Systemhaus GmbH. You can access lists of certified clusters and components on the Internet at:

    ```
    http://www.microsoft.com/hcl
    ```

    ```
    http://addon.saponwin.com
    ```

2. Ensure that both nodes of the cluster are connected by a private and public network:

8.1 Checking Hardware Requirements for MSCS

– The public network enables communication from the nodes of the cluster to other resources in the LAN.

– The private network enables communication internally, between the nodes. In particular, it enables the *Cluster Service* that runs on both nodes, to regularly exchange messages on the state of the nodes so that the failure of resources is quickly detected.

3. Check that sufficient storage space is available. Each of the nodes in the cluster must have its own local disks and have access to shared disks that can be reached by both nodes via a shared bus.

   The Windows operating system, the MSCS software and Oracle DBMS must be stored on the local disks of each node. All the other software must be stored on the shared disks. One of the shared disks must be reserved exclusively for the quorum resource that stores the cluster registry and records information about the state of the cluster.

Disks	Required Space	How to check
1 local disk on each node	8 GB	1. Choose *Start → Programs → Administrative Tools → Computer Management → Disk Management*. 2. Right-click on local disks and choose *Properties.*
At least 6 shared disks	25 GB	1. Choose *Start → Programs → Administrative Tools → Computer Management → Disk Management*. 2. Right-click on the local disks and choose *Properties.*

All disk controllers must be able to support hardware-based RAID.

4. Check the RAM and virtual memory on each node:

Requirement	How to check
RAM of 1 GB	In the *Windows Explorer* choose *Help → About Windows*.
Virtual memory of 5 times RAM. 10 GB is the maximum required.	1. Right-click on *My Computer* and choose *Properties*. 2. On the *Advanced* tab, choose *Performance Options*. 3. If required, in section *Virtual Memory*, choose *Change*. Only select the local disks.

8.2 Checking Software Requirements for MSCS

Use

When you install the SAP system on cluster hardware, you have to use the software versions specified in the list below.

Procedure

Check that the software you install on the cluster nodes meets the following requirements:

| Software Requirement	How to check
English international version with at least service pack 2 of Windows 2000 Advanced Server **or** Windows 2000 Data Center Server 1 hot fix (Service Pack 2 only)	1. Choose *Start → Programs → Accessories → Command Prompt*. 2. Enter the command `winver`
MSCS software	–
Oracle Enterprise Edition Oracle 9.2.0 and patch set 9.2.0.2.1	–
Oracle Fail Safe software version 3.3.1	–
Windows 2000 Resource Kit is strongly recommended to enable support.	–

8.3 Distribution of Components to Disks for MSCS

One of the central points to keep in mind, when planning the installation, is that the cluster has three different sets of disks:

- Disk arrays connected locally to node A

- Disk arrays connected locally to node B

- Disk arrays connected to both node A and B via a shared bus, providing shared storage for both nodes

Some system components have to be installed on both node A and B of the cluster using the local storage of each node, other components have to be installed once for both nodes on the shared storage. The following graphic illustrates how the software must be distributed to different volumes of a RAID disk system. Notice that the database files, the SAP system executables and the quorum resource have to be located on **different** RAID volumes. Only with this distribution of files to distinct volumes is it possible to move the SAP system and database as separate entities in a failover situation.

8.3 Distribution of Components to Disks for MSCS
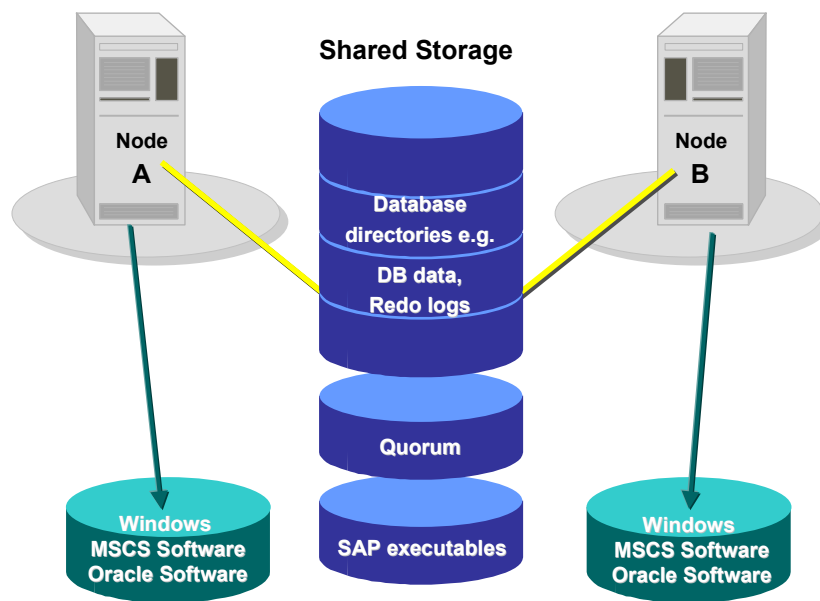
> The Oracle server software in the ORACLE HOME directory must have the same drive letter and path on both nodes.

Quorum Disk

The MSCS `Quorum` disk is unique to a cluster installation and is always owned by one of the nodes. It has two main functions in the cluster:

- It logs changes to the cluster configuration that are entered in the *Registry*.

- It arbitrates between competing nodes, when the communication between nodes breaks down. This means cluster resources are forced to failover to the node that owns the `Quorum` disk.

Database Directories

As illustrated above, the database directories are not allowed to reside on the same RAID volumes as the SAP executables or the quorum resource. In addition, for security and performance reasons, the directories have to be distributed to several RAID volumes. Depending on the disks available and the size of the system, various disk configurations are possible, however the DB data and redo logs must always be located on separate volumes. The following graphic illustrates one of the secure methods for distributing the database directories to volumes. For a discussion of further options, see section "Distribution of Components to Disks" in .

Database RAID Volumes
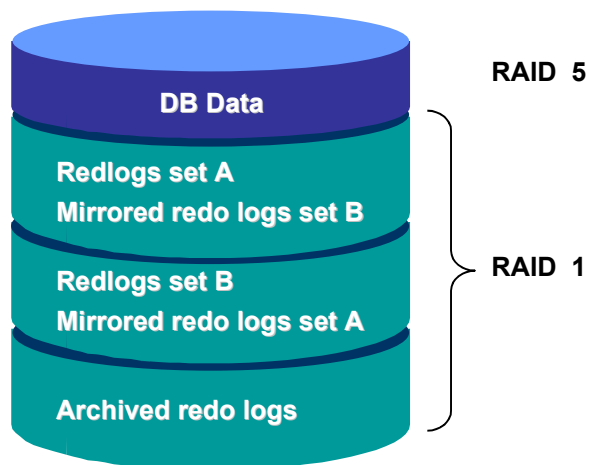
Note the SAPDBA directories `\sapreorg, \saptrace, \sapbackup,\sapcheck` are not shown in the graphic. These can be distributed to any of the database volumes and do not require you to observe any security guidelines.

8.4 Directories in an MSCS Configuration

The following table shows the directories where the main software components for the SAP cluster installation are stored:

Directories on Local RAID Volumes on Both Node A and B

Component	Default Directory	Minimum Size
Windows 2000 Advanced Server **or** Windows 2000 Data Center Server	`\Winnt`	1,5 GB
SAP cluster files	`\Winnt\SAPCluster`	20 MB
Oracle server software	`\oracle\<SAPSID>\920`	Oracle 9.2.0: 2,2 GB
Oracle Fail Safe Software	`\oracle\OFS`	400 MB

Directories on Shared Volumes

Component	Default Directory	Minimum Size
Cluster *quorum resource*	`\MSCS`	100 KB
SAP executables	`\usr\sap...`	1 GB
SAP data files	`\ORACLE\<SAPSID>\DATA1` `        ...\DATA4`	25 GB approx.
Online redo logs, set A	`\ORACLE\<SAPSID>\origlogA`	400 MB
Online redo logs, set B	`...\origlogB`	400 MB
Mirrored online redo logs, set A	`...\mirrlogA`	400 MB

Mirrored online redo logs, set B	`...\mirrlogB`	400 MB
Backup of online redo logs	`...\saparch`	5 - 100 GB
SAPDBA directories	`...\sapreorg,` `...\saptrace,` `...\sapbackup,` `...\sapcheck`	2 GB

In a live system with intense I/O activity, you must reserve at least 3 times the minimum amount of space specified above for the redo logs and mirrored redo logs.

SapCluster Directory

In an SAP cluster installation, an additional directory is created under the Windows system directory: `<DRIVE>:\<Windows_directory>\SapCluster`
This contains all the SAP files required by both cluster nodes, independently of the node the SAP instance is running on. The files are database utilities and executables used by the operating system monitor (saposcol).
The directory is added to the path variable of the user `<SAPSID>adm`.

8.5 Obtaining Adresses for MSCS

Use

An important aspect of the installation on cluster hardware is the correct configuration of addresses. During the installation procedure 7 IP addresses and host names have to be assigned to the system. Therefore, before you can begin with any practical tasks, you have to obtain these names and addresses from the system administrator.

Procedure

Ask the system administrator to give you the addresses and host names listed in the table below. It is helpful to enter your own addresses and names directly under the examples in the columns of the table so that they are available for reference during the course of the installation.

The column *Defined during* indicates at which stage of the installation the addresses are defined in the system.

Record the names exactly as specified by the system administrator, carefully observing upper and lowercase letters.

Physical IP Addresses

Component	Example for Physical IP address	Example for Physical host name	Purpose	Defined during
Node A: adapter for private network	10.1.1.1	decc14_priv	Address for inter-node communication on the private network	Windows installation
Node A: adapter for public network	129.20.5.1	decc14	Address of node A for communication with application servers and LAN (this is the same as the address of node A)	Windows installation
Node B: adapter for private network	10.1.1.2	decc15_priv	Address for inter-node communication on the private network	Windows installation
Node B: adapter for public network	129.20.5.2	decc15	Address of node B for communication with application servers and LAN (this is the same as the address of node B)	Windows installation

Virtual IP Addresses

Component	Example for Virtual IP Address	Example for Name (host name)	Purpose	Defined during
Cluster group	129.20.5.3	clusgrp	Virtual address and name of the cluster group. It identifies the cluster and is used for administration purposes.	MSCS software installation

8.5 Obtaining Adresses for MSCS

Component	Example for Virtual IP Address	Example for Name (host name)	Purpose	Defined during
SAP cluster group	`129.20.5.4`	`sapgrp`	Virtual address and name for accessing the group of SAP resources, regardless of the node it is running on	Configuration of SAP system for the cluster using SAPinst on node A
Database cluster group	`129.20.5.5`	`dbgrp`	Virtual address and name for accessing the group of database resources, regardless of the node it is running on	Execution MSCS Wizard or database-specific cluster scripts

Determining Existing Addresses

If Windows has already been installed on your system, the host names and IP addresses of the network adapters (cards) have already been defined and exist in your system. To find out the existing IP addresses and corresponding host names and addresses, proceed as follows:

1. From the *Start* menu choose *Start → Settings → Network and dial-up Connections*
   The *Network and dial-up Connections* window appears.

2. Select one of the network cards that are displayed and then choose *File → Properties*.
   On the dialog box that opens, select *TCP/IP Protocol* and click *Properties*.
   The *TCP/IP Properties* dialog box appears and shows the IP address of the initially selected network card.

3. To find out the host name that is mapped to the IP address use the `ping` command. At the command prompt enter: **ping -a <IP_Address>**

   The system returns the host name assigned to the IP address. Do not forget to ping your local machine as well.

For more information about the function of addresses in the cluster environment see .

9 Installation Preparations for MSCS

Purpose

In a preparatory phase, before you install the central instance and database of the SAP system, you need to perform a number of practical tasks to ensure that subsequent installation steps run smoothly and can be completed successfully. The following gives you an overview of the tasks involved and their sequence.

Prerequisites

The hardware and software that is available for the installation must meet the requirements specified by SAP and Microsoft.

Process Flow

The following table lists all the preparatory tasks you need to perform before beginning with the installation of the SAP system.

Some of the steps listed in the table are part of the standard SAP installation procedure, others are cluster-specific and are only necessary for the MSCS installation:

- Steps marked with ✔ in the *Cluster-Specific* column are supplementary steps that are only necessary for an installation on cluster hardware. These steps are explained in detail in the following sections.

- Steps that are not marked are part of the standard SAP installation procedure and are described in earlier sections of this documentation. Please refer to these sections whenever they are specified to find detailed instructions.

A machine with a domain controller may not be used as a cluster node.

	Cluster-specific	Task	Comment
1	✔	On both nodes, install the English international version of Windows 2000 Advanced Server with at least service pack 2.	See the Windows documentation.
2	✔	On both nodes, install the MSCS software.	You have to specify the disk on which the *quorum* resource is to be located. It must reside on a shared disk, but not on the same disk as the SAP system or database files and data.
3	✔	Service Pack 2 only: On both nodes, install the Windows 2000 hot fix	Follow the instructions in the *Microsoft*

	Cluster-specific	Task	Comment
			Knowledge Base Article Q265017 to obtain the hot fix from Microsoft.
4	✔	On both nodes, you adjust the size of the paging file and the file cache.	See Hardware and Software Requirements Check [Page 38] and Reducing the Size of the File Cache [Page 46]
5	✔	You map the 7 IP addresses to host names on the Domain Name Server or in the `hosts` file.	See Mapping Host Names to IP Addresses [Page 124].
6	✔	You check the IP address and corresponding host name assignment.	See Checking the Mapping of Host Names for MSCS [Page 125].
7	✔	Only on node A, you manually assign meaningful drive letters to the shared disks using the *Windows Disk Administrator.*	Both nodes must access the shared disks with the same drive letters. The letters assigned on node A are copied to node B in the next step when the MSCS software is installed. See the section below Assigning Drive Letters [Page 127].

9.1 Using Addresses in an MSCS Configuration

A part of the installation process which is unique to a cluster is the configuration of host names and IP addresses in the network. This is a particularly important task because the addressing plays a key role in the switchover procedure. Only if addressing is set up correctly, can the system take advantage of the cluster functionality and switch between nodes when hardware problems arise.

The following briefly explains the different types of addresses and their function in the switchover mechanism of the cluster.

Types of Addresses

In a correctly configured cluster, there are 7 IP addresses and corresponding host names. Some of the addresses are physical addresses that are assigned to the **network adapters (cards)**, others are virtual addresses that are assigned to the **cluster groups**.
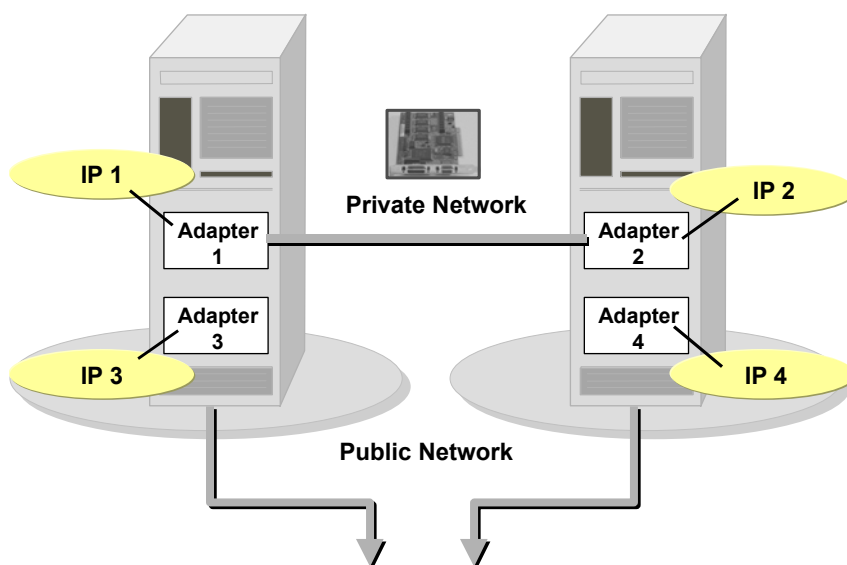
Physical IP Addresses Assigned to Network Adapters

An MSCS configuration usually has two networks:

- A public network that is used for the communication between the central instance, application servers and the LAN.

- A private network that is used internally for communication between the nodes of the cluster.

To set up these two networks, each node needs an adapter (card) for both the private and public network. This means each node must have an adapter for the private network and an adapter for the public network and each of these adapters has its own physical IP address and corresponding host name.

The graphic illustrates the adapters required for the public and private networks, and their corresponding physical IP addresses. A physical address, as opposed to a virtual one, is stationary and permanently mapped to the same adapter.

Host Names Assigned to Network Adapters

Each of the physical IP addresses of the network adapters must have a corresponding host name. For example, on the left-hand node above, the IP addresses of the public and private network adapters could be assigned host names as follows:

IP Addresses and Host Names

Network Adapter	IP address	Host name
Adapter 1 (private network)	10.1.1.1	decc14_priv
Adapter 3 (public network)	129.20.5.1	decc14

⚠️

It is important to note that the IP address and host name of the **public** network adapter is also the IP address and name of the machine. In the above example, this would mean that the machine, which is the node on the left, has the name decc14.

9.1 Using Addresses in an MSCS Configuration

⚠️

Avoiding Confusion

Do not confuse the **host name** with the so-called **computer name**. Each node also has a computer name which is often the same as the host name, but is written in uppercase. The computer name is displayed in the node column of the *Fail Safe Manager* and *Cluster Administrator*, however it is not required for the TCP/IP communication in the cluster. When you configure IP addresses and corresponding names, keep in mind that it is the **host names** that are important for the cluster and not the computer names.

Virtual IP Addresses Assigned to Cluster Groups

When the SAP system has been installed and the cluster fully configured, the critical system resources are bound together in three different **groups**. Each of these groups requires a virtual IP address and host name that is permanently mapped to the group and not to a particular node. This has the advantage that whenever a group is moved between nodes its IP address and host name move together with it.

The three groups in a cluster configuration are the:

- SAP cluster group

- Database cluster group

- Cluster group

Each group comprises a set of related resources that work together to offer a service to the system. So, for example, the database cluster group comprises all the resources that enable the database server to fulfill the requests of a client. When the group is moved from one node to the other, due to node failure, the virtual IP address and host name move with it. Therefore, there is a failover not only of resources, but also of the virtual IP address and host name. As a result, all clients can still reach the database server, using the same address as previously.

The following graphic illustrates the ability of the virtual addresses of the database group and SAP group to move from one node to the other when failover occurs.
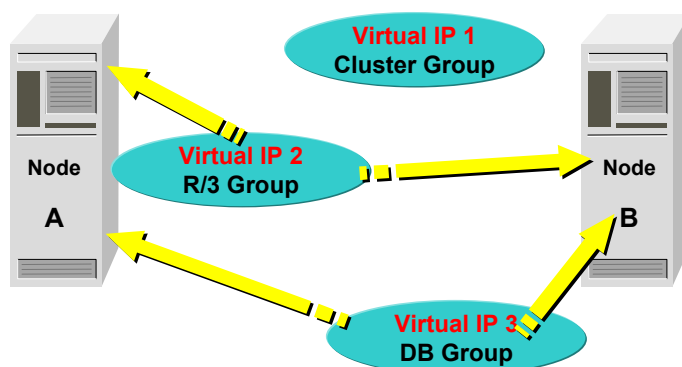
9.2 Mapping Host Names to IP Addresses

Use

To enable correct operation of the failover mechanism, you have to map all IP addresses in the cluster to host names. You can do this on a DNS server or in the Windows `hosts` file. The purpose of the mapping is to enable the system to translate host names into IP addresses. Host names are normally used for administrative tasks because they are easier to use than the long, numeric IP addresses. However, the system can only respond to host names if they are translated into IP addresses on the basis of the information stored on a DNS Server or in the `hosts` file.

Prerequisites

To map IP addresses to host names on the DNS Server or in the `hosts` file, you need the list of addresses [Page 118] you obtained from the system administrator during the planning phase of the installation. Map the host names to addresses after you have installed Windows.

Procedure

⚠️

Enter **each** of the 7 IP addresses required for the cluster configuration! Missing entries or incorrect entries can lead to problems during later stages of the installation.

Take care when entering names. They are case-sensitive and have to be entered exactly as specified by the system administrator.

Two approaches are possible for the mapping:

- On the DNS Server

  If your system infrastructure includes a DNS server, map the host names to IP addresses on this server.

  💡

  This approach is recommended because it only requires a single entry. If the mapping is done in the `hosts` file, several versions of the same file have to be maintained because each machine in the system has its own `hosts` file.

- In the hosts file

  If you do not have a DNS server in your system infrastructure, map the IP addresses to host names in the `hosts` file. This is located in the default directory for Windows:

  `<Drive>:\WINNT\system32\drivers\etc`

  The `hosts` file has to be identical on both nodes of the cluster, and on all application servers and front ends. The newly edited file therefore has to be copied to all these locations in the system.

9.3 Checking the Mapping of Host Names for MSCS

The mapping of host names to IP addresses is crucial for the operation of the cluster. Therefore, after making entries on the DNS Server or in the `hosts` file, you must perform a number of checks to ensure that the mapping has been set up correctly.

> Under no circumstances should these checks be omitted. Errors are frequently discovered and if not corrected they cause problems later.

Prerequisites

You have mapped IP addresses to host names on the DNS Server or in the `hosts` file.

Procedure

Checking Address Mapping

Carry out the following check for **each** of the 7 IP addresses and compare the output with your own record of addresses and host names.

1. Open a command prompt. For each IP address enter the following two commands:

   `ping -a <IP_Address>`

   The system returns the host name that is assigned to the IP address.

   `ping hostname`

   The system returns the IP address that is assigned to the host name.

   Keep in mind that when you ping the IP address of the public network adapter on a specific node, the name returned is not only the name of the network adapter, but also the name of that specific node.

   > If the address you are checking already exists in the system, you will also receive a reply from the host. For example, after the installation of Windows and the configuration of the network, you get a reply when entering the IP addresses of the network adapters.

2. Look out for the following possible errors:

   - If upper and lowercase are incorrect in the output, there is an error. Be sure to eliminate the error before proceeding with the installation.

   - If you enter the name of the **public** network adapter, which is usually also the name of the local host, and the system returns the IP address of the **private** network, there is an error in the network bindings.

Correcting Network Bindings

If you discover an error in the network bindings, you can correct it by doing the following on both nodes:

1. From the *Start* menu choose *Start → Settings → Network and Dial-up Connections*

2. The *Network and Dial-up Connections* window appears.

3. Choose *Advanced → Advanced Settings*

4. On the *Adapters and Bindings* tab, the network cards of the private and public networks are displayed for the current node.

5. Change the order in which the cards are listed, if necessary. The card of the **public** network must be displayed before that of the **private** network. Use the *Move Up* and *Move down* arrows to change the order of entries.

6. Repeat the procedure for any other TCP/IP protocols that might be listed.

9.4 Assigning Drive Letters

Use

In a cluster, the shared disks that can be accessed by both nodes via a common bus must be addressed by both nodes with the same drive letters. During the installation of the MSCS software, the assignment of drive letters on node A is copied to node B. Therefore, to simplify disk administration, it is advisable to assign meaningful drive letters to the shared disks on node A before installing the MSCS software.

Procedure

1. Choose *Start → Programs → Administrative Tools → Computer Management → Storage → Disk Management*.

2. Select a disk and choose *Action → All tasks → Change drive.* In the dialog box that appears, enter a new drive letter.

10 Central and Database Instance Installation for MSCS

Purpose

When you have completed the preparatory steps for the installation of the cluster, you can begin with the installation of the database and SAP system. The table below summarizes the steps required to install these components.

Prerequisites

You have completed the Preparations [Page 121] for the installation of the SAP system and database:

You have installed the following components on both nodes:

- Windows 2000 Advanced Server or Windows Data Center Server

- MSCS software

- You have completed the following actions:

- Adjusted the size of the paging file and the Windows file cache

- Mapped IP addresses to host names and checked the mapping

- Assigned meaningful drive letters to the shared disks

Process Flow

If you have to reboot during the installation process, resources failover to the second node. Consequently, after each reboot, you have to return the system to the state it had before booting. This requires a number of actions that are described below in the section *Actions Required After Rebooting*.

The steps listed have to be performed in the given order. Always log on as Domain Administrator, unless specified otherwise.

Process for Installation of the Central and Database Instance

	Cluster-Specific	Action	Comments
1.	✔	You move all *Disk groups* and the *Cluster group* to node A with the *Cluster Administrator.*	See the section Moving MSCS Groups [Page 129] below.
2.	✔	On both nodes, you install the Oracle **server** software 9.2.0 and patch set 9.2.0.2.1.	See the section Installing the Database Server Software [Page 58]
3.	✔	On **both nodes**, you install the Oracle Fail Safe Software 3.3.1 After the installation reboot. Do **not** install the Fail Safe Software **parallel** on both nodes.	See the section Installing the Oracle Fail Safe Software [Page 130] See the section Rebooting During the Installation for MSCS [Page 129].

	Cluster-Specific	Action	Comments
4.		On node A, in the *Cluster Administrator*, make sure that all existing cluster groups are online. Install the SAPinst tool in preparation for the installation of the central and database instance.	Make sure that you are logged on as a user with domain administration rights. See Running SAPinst [Page 61].
5.		On node A, you install the SAP central instance and database instance with SAPinst.	Make sure that you are logged on as the same user with domain administration rights that installed the SAPinst tool in the previous step. When you are prompted to enter the name for the `saptranshost` or the database, enter the physical host name. **See also:** Distribution of Components to Disks for MSCS [Page 115]

Result

When the installation process is complete the SAP system and database have been installed on the cluster hardware, but can as yet, not exploit the functionality offered by the cluster software. In the next part of the process, the conversion to MSCS, the database and SAP system are configured to enable them to take advantage of cluster capabilities.

10.1 Rebooting During the Installation for MSCS

Use

If you have to reboot during any of the installation steps for the database and central instance, a number of actions are necessary to return the cluster to the state it had before the reboot.

Procedure

1. In the *Cluster Administrator*, move all resources back to the node where they were located before the reboot.

2. Redefine the `SAPMNT` and `SAPLOC` shares for the directory `usr\sap`.

3. In the *Control Panel* under *Services*, restart the SAP Services `SAPOsCol` and `SAP<SAPSID>`.

4. Make sure that the service *OracleService<SAPSID>* is running.

5. Log off and log on again as user `<sapsid>adm`

6. Start up the database:

7. Log off and log on again as domain administrator.

10.2 Moving MSCS Groups

Use

During various stages of the cluster installation, you have to move the database, SAP or disk cluster groups from one node to the other before you can continue.

Prerequisites

The groups you want to move are configured and are visible in the *Cluster Administrator*.

Procedure

1. Start the *Cluster Administrator* from the *Start* menu with *Programs → Administrative Tools → Cluster Administrator*

    The *Cluster Administrator* opens.

2. In the Cluster Administrator, select a group, for example *Disk Group 1*, and then drag it to the required node on the left-hand pane. Repeat this procedure for each group you want to move.

10.3 Installing the Oracle Fail Safe Software

Use

To enable the database to take advantage of the cluster functionality, it is necessary to install an additional component, the Oracle Fail Safe software.

Prerequisites

You have installed the Oracle database software locally on both nodes.

Procedure

Installing the Fail Safe Software

Proceed as follows on both nodes:

1. Make sure that all Oracle Services have been stopped on the node where you are installing.

2. In the *Cluster Administrator* make sure that:

    −   The second cluster node is not set to *Pause*

    −   The SAP group is offline on the node where you are installing

3. Make sure that the *Cluster Server* service is started on both nodes.

4. Insert the CD Oracle Fail Safe in the CD drive.

5. Start the *Oracle Universal Installer*. To do this, double-click the file `sapofs.cmd` in the directory `<CD_DRIVE>:\NT\I386\`

    The *Installer* opens and guides you through the installation process in a series of screens. Enter the required information as follows:

Screen	Entry
Welcome	Choose *Next.*
File Locations	*Source*...
	Path
	The path to the Oracle software on the CD is displayed. Do not change the path.
	Destination...
	Name
	Enter the name of the Oracle Home directory for the *Fail Safe* software **OFS**. The Fail Safe software must be installed in a separate Oracle home directory.
	Path
	Enter the path of the Oracle Home directory for the *Fail Safe* software. It must be on a local disk under **F:\Oracle\OFS**
Available Products	Select *Oracle Fail Safe 3.3.1.0.0* and choose *Next*.
Installation types	Choose *Typical.*
Reboot Needed After Installation	Choose *Next.*
Summary	View the information and choose *Install.*
Install	Wait while the software is installed.
Configuration Tools	On the popup *Oracle Fail Safe Account/Password* enter the account and Password under which the *Fail Safe software* is to run. This must be the same account as the one under which the *Cluster Server* service is running.
	To find out which account must be entered, choose *Start → Programs → Administrative Tools → Services* The log on account for the service is displayed in the *Log On As* column. Enter this account for *Oracle Fail Safe Account/Password.*
End of Installation	Click *Exit* to leave the *Installer.*

6. Reboot and log on again.

11 The Conversion to MSCS

Purpose

The conversion phase of the cluster installation configures the database and the SAP instances to enable them to interact with the cluster software and make use of the failover functionality.

Prerequisites

The installation of the SAP central and database instance has been completed observing all special instructions for a cluster. The Oracle Fail Safe software has been installed on both nodes.

Process Flow

The following table lists all the actions that are necessary during the conversion process and refers to the sections of the documentation where you can find detailed instructions. All actions are cluster-specific and are not part of the standard installation procedure for a SAP system.

> Whenever you reboot during the installation process, resources failover to the second node. Consequently, after each reboot, you have to return the system to the state it had before booting. The actions required depend on the stage of the conversion procedure you have reached and are explained below in the section *Actions Required after Rebooting*.

Process of Converting the System to MSCS

> Before you start the conversion to MSCS, make sure that you are logged on as domain administrator on node A and B. Add this user to the local administration group on both groups.

	Cluster-Specific	Tasks	Comments
1.	✔	On **node A**, make sure that the Oracle database group and SAP disk are online.	
2.	✔	On **node A**, run setup.cmd to install the SAPinst files required for the cluster conversion.	On node A, make sure you are logged on as domain administrator and you are member of the local administration group See Installing SAPinst for Cluster Conversion [Page 134].
3.	✔	**On node A**, you run the SAPinst option *Configure the MSCS Node A for Oracle*.	See the section Configuring Node A for MSCS [Page134].

	Cluster-Specific	Tasks	Comments
4.	✔	**On node A**, you convert the Oracle database to a Fail Safe database.	See the section Converting the DB to a Fail Safe Database [Page 135].
5.	✔	Check that the database group and SAP cluster group are available on **node A**. In the SAP cluster group, the resource `SAP-R/3 <SAPSID>` must be offline. All other resources of the SAP cluster group must be online.	
6.	✔	On **node B**, run `setup.cmd` to install the SAPinst files required for the cluster conversion.	On node B, make sure you are logged on as the same domain administrator as of node A and you are member of the local administrator group. See Installing SAPinst for Cluster Conversion [Page 134].
7.	✔	Configure **node B** for the cluster with SAPinst, using the option *Configure the MSCS Node B for Oracle*.	See the section Configuring Node B for MSCS [Page 137].

11.1 Rebooting during the Conversion

Use

If you have to reboot during any of the cluster conversion steps, a number of actions are necessary to return the cluster to the state it had before booting. Some of the actions depend on the stage of the conversion procedure you have reached, others are always necessary.

Procedure

- After rebooting always:
    - Move all resources back to the original node where they were located before the reboot, using the *Cluster Administrator*.
- If the SAP system is not yet cluster-enabled (**Steps 1, 2** above):
    - Redefine the SAPMNT and SAPLOC shares for the directory usr\sap
    - Restart the SAP Services `SAPOsCol` and `SAP<SAPSID>`
- If the database is not yet cluster-enabled (**Steps 1 to 3** above):
    - Make sure that the service *OracleService<SAPSID>* is running
    - Log off and log on again as user <sapsid>adm
    - Start up the database.
    - Log off and log on again as domain administrator

11.2 Installing SAPinst for Cluster Conversion

Before you can use the SAPinst tool to convert node A and B for cluster operation, you must install the required SAPinst files on both nodes (local hard disks).

> On node A, the SAPinst files were already installed when installing the central instance.
>
> On node B, install the files by running `setup.cmd` from the directory `<CD drive>: \SAPinst\NT`. For more information, see .

11.3 Configuring Node A for MSCS

Use

To configure node A so that it functions properly in the cluster, you have to run the cluster configuration option offered by the SAPinst tool. When you run this option, amongst other things, it:

- Creates the SAP cluster group
- Copies tools to the `SAPCluster` directory
- Sets the SAPService to manual
- Ensures that the `SAPOsCol` service is started from the `SAPCluster` directory

Procedure

1. Make sure that you are logged on to node A as a user with domain and local administration rights and as the **same user** that installed the SAP central and database instance.

2. Add this user to the local admininstration group on node A and B.

3. Run `setup.cmd` to install the SAPinst files required for the cluster conversion. For more information, refer to .

4. From the *Start* menu choose *Programs → <SAPinst_menu_entry> → SAPinst server with GUI*

    The SAPinst window appears.

5. Choose *Configure the MSCS Node A for Oracle*.

6. Enter the parameter values that you are prompted for. For more information, refer to .

When all entries have been made, SAPinst begins processing. It converts the SAP instance on node A for operation in the cluster.

11.4 Converting the DB to a Fail Safe DB

Use

The database must be cluster-enabled so that it can be switched between nodes as a group of resources. To do this, you create an Oracle Fail Safe group and then add the database of the SAP system to this group.

Prerequisites

You have converted node A for operation in the cluster. See also Configuring Node A for MSCS [Page 134].

Procedure

When you set up the Fail Safe database, you have to convert the database to a Fail Safe group and then add the database of the SAP system to this group.

Creating the Oracle Fail Safe Group

On node A, create the *Fail Safe* database group as follows:

1. From the Windows menu choose *Start Programs Oracle - <Home> Oracle Fail Safe Manager*.
    The window *Add Cluster To Tree* appears.

2. Insert your virtual cluster name.

3. Right-click on the cluster and choose Connect to cluster.

4. Enter the following and then confirm your entries with *OK*:

User name	`<user>` (user with the account under which the service *ClusterServer* is running)
Password	`<password>`
Cluster Alias	`<virtual_cluster_name>` (name of the cluster you are installing)
Domain	`<domain_name>`

5. Right-click on the cluster and choose *Verify Cluster*.

    Both cluster nodes must be up and running for this step.

    The window *Clusterwide Operation:Verifying Fail Safe Cluster* shows the steps that are executed to verify the cluster. When you are informed that the operation has completed successfully, close the window.

6. In the *Oracle Fail Safe Manager*, create the *Fail Safe* group ORACLE<SAPSID>.

    Choose *Groups → Create*.

    The window *Create Group:...* appears.

7. Enter the *Group Name* **ORACLE<SAPSID>**.
    In answer to the question *Do you want to allow the group to failback to preferred node?*, select *Prevent failback*.

11.4 Converting the DB to a Fail Safe DB

> The window *Finish Creating the Group* appears and displays information about the group. Choose *OK.*

8. In the window *Add Virtual Address*, select *Yes* to indicate that you want to add a virtual address to the group.

> The *Add Resource to Group: - Virtual Address* appears.

9. Select *Show networks accessible by clients* and enter the following information:

> a. Under *Network* leave the entry **public**.
>
> b. Under *Virtual Address* for *Host Name* enter **<database_group_name>** (the virtual name for the database group).
>
> c. The *IP Address* is automatically recognized
>
> d. Choose *Finish*.

> The window *Finish Adding the Virtual Address to the Group* appears. Choose *OK*.

> If the *Fail Safe Manager* cannot create the *Fail Safe* group, look at the *Windows Event Logs* on both nodes to find out the reason for the failure.

Adding the Database of the SAP System to the Fail Safe Group

Perform the following steps in the Fail Safe Manager on the primary node A:

1. In the tree on the left, expand *<Primary_Node>* → *Standalone Resources* and then select the database <SAPSID>.world
    Choose *Resources → Add to Group.*

2. On the dialog box *Add Resource to Group – Resources:*

> For *Resource Type,* select *Oracle Database*
> For *Group name*, select *Oracle<SAPSID>*

3. On the dialog box *Add Resource to Group – Database Identity,* enter the following and then choose *Next*. Note that if a warning appears about the location of init<sapsid>.ora, you can ignore it.

Service Name	**<SAPSID>.world**
Instance Name	**<SAPSID>**
Database Name	**<SAPSID>**
Parameter File	**<DRIVE>:\<ORACLE_HOME>\database\init<SAPSID>.ora**

4. On the dialog box Confirm Add Database to Group choose Yes to shutdown the database.

5. For each node a PopUp appears: The Oracle Net Listener uses a host name in the host address *parameter. It must be converted to use an IP address.*

> Choose *Yes* to convert to an IP.

> The R/3 database <SAPSID> is now added to the Fail Safe group.

11.5 Configuring Node B for MSCS

Use

To enable the second node in the cluster, node B, to exploit the available cluster functionality, you have to run the SAPinst option for cluster configuration on node B. This option:

- Creates users and groups

- Sets the system and user environment

- Copies tools to the `SAPCluster` directory

- Enters required port numbers in the Windows services file

- Creates the `SAPService` and `SAPOsCol` Services

Prerequisites

The primary node of the cluster, node A, has already been configured for operation in the cluster.

1. Make sure that you are logged on to node B as a user with domain and local administration rights and as the **same user** that installed the SAPinst conversion files.

   ⚠️

   Make sure that the database group and SAP cluster group are available on node A. On node A, all resources except the resource `SAP-R3 <SAPSID>` must be online.

2. Add this user to the local administrators group on node B and A.

3. From the *Start* menu choose:

   Programs → <SAPinst_menu_entry> → SAPinst server with GUI

   The SAPinst window appears.

4. Choose Configure the MSCS Node B for Oracle [Page 137].

   💡

   Make sure that you are logged on to node B as a user with domain and local administration rights and as the **same user** that installed the SAP central and database instances.

   ⚠️

   Make sure that the database group and SAP cluster group are available on node A. On node A, all resources except the resource `SAP-R/3 <SAPSID>` must be online.

5. Run setup.cmd to install the SAPinst files required for the cluster conversion. For more information, refer to Running SAPinst [Page 61].

6. From the *Start* menu choose *Start → Programs → <SAPinst_menu_entry> → SAPinst server with GUI*

   The SAPinst window appears.

7. Choose *Configure the MSCS Node B for Oracle*.

8. Enter the parameter values that you are prompted for. For more information, see Input for Configuring Node A and Node B for MSCS [Page 138].

When all required entries have been made, SAPinst begins processing and converts the SAP instance on node B for operation in the cluster.

9. When SAPinst has finished, start the SAP resource `SAP-R/3 <SAPSID>`.

To do this, open the *Cluster Administrator* with *Start → Programs → Administration Tools → Cluster Administrator.*

Expand the SAP Group, select the SAP resource and choose *File → Bring Online.*

11.6 Input for Configuring Node A and B for MSCS

The following table shows the input parameters that are required for configuring both node A and node B for MSCS. If a prompt is valid for one node only, this is marked specifically.

Names are case-sensitive! Make sure you enter them correctly.

You are prompted for information that you already entered during the installation of the SAP central and database instance. Take care to re-enter the same information that you originally entered.

Window	Prompt	Meaning

Welcome	Installation Task	Node A:
		    Choose *Configure the MSCS Node A for Oracle*
		
		Node B:
		    Choose *Configure the MSCS Node B for Oracle*.

License Agreement		Accept the License Agreement for STL port
Cluster parameter	R/3 Networkname, Database Networkname	Enter the network name (virtual host name) of the **SAP cluster group** and the database networkname.
SAP System Common Parameters for the MSCS	SAP System ID	Enter the SAP system `<SAPSID>` ID for your cluster. Use the same `<SAPSID>` ID that you entered during the central instance installation.
	Central instance: Instance number	Enter exactly the instance number that you have entered during the central instance installation. To find out the instance number, look under the SAP directory `usr\sap\<SAPSID>\DVEBMGS<nn>`. The value `<nn>` is the number assigned to the central instance.
	Database System ID	Enter the database system ID.

Window	Prompt	Meaning
	Virtual Database Host	Enter the virtual database host name ⚠️ The default value for the database hostname is the virtual host name of the SAP cluster group. Use the virtual host name (network name) of the database cluster group instead.
SAP Instance Host Information	Domain Information for the SAP System accounts	Choose one of the following Installation in the Domain of the Current User Installation in a different Domain
	Instance RAM	RAM and swap space that is reserved for the SAP instance. The default value is the entire RAM or swap space. Be sure to reserve at least the minimum values required for your instance.

SAP System LDAP Parameters	LDAP support
	
	(Node A)
		If you want to use LDAP for SAP Logon or the Microsoft Management Console (MMC), choose the type of LDAP integration you want to configure for the SAP system. Otherwise, choose *No LDAP*:
		
		• *Via Active Directory Service*
		
		    Select this option to integrate Windows 2000 Active Directory services. An Active Directory must be available on the network.
		    (Profile parameter `ldap/options=DirType=NT5ADS`)
		
		• *Via Generic LDAP Directory*
		
		    Select this option to configure the system to support LDAP directories that are running on Windows or UNIX machines. A generic LDAP directory must be available on the network.
		
		• *No LDAP*
		
		    Select this option if you do not want to use LDAP for SAP Logon and/or MMC or if you do not want to use LDAP at all.
		
		Required Input
		
		Depending on your selection the information below is required. If you choose *No LDAP*, none of the LDAP parameters listed below has to be specified.

11.6 Input for Configuring Node A and B for MSCS

Window	Prompt	Meaning
	Management Domain	Specifies a container in the Active Directory where information related to the new SAP system is to be stored. Use the distinguished name syntax. The name of the container (that is, management domain) can reflect the organizational structure of your company. For example, if the system is for corporate finance and located in Walldorf, the name can be: `CN=Finance, CN=Walldorf`. Profile parameter: `ldap/saprdn` You need not specify this. However in a large system landscape, we recommend setting this parameter to reflect the structure of multiple SAP installations.
	Container for all SAP-related entries	Enter the DNS host name of the server on which the LDAP directory is running. If the directory is replicated on other servers in the network, specify these as well. For example: `ldapsrv1 ldapsrv2.` Profile parameter: `ldap/servers.` Note that the replica must be writeable. • **Via Active Directory Service:** We do not recommend setting this parameter. If you do not set this parameter, the system automatically finds the best ADS Server. • **Via Generic LDAP Directory** You must specify one or more LDAP servers, separated by blanks.
SAP System Instance Directories	Drive for SAP System Directory	Select the drive for the SAP base directory tree. For example, if you select D:, the directory `usr\sap` is located under drive D. If *saploc* already exists, you cannot select the local drive.
	Host with Transport Directory	Enter the name of the host where the transport directory is located. If the transport directory is located in the cluster you have to enter the virtual host name of the SAP system.

Window	Prompt	Meaning
CD Browser: Location of required installation CDs	Package location Check location Copy package	Enter the path to the directory where the file `LABEL.ASC` of the corresponding CD is located. This dialog only appears if the system wants to check or cannot find the file `LABEL.ASC` that contains the relevant installation information. For more information on the CD Browser dialog, see section Preparing the installation CDs [Page 54]
Database System Common Parameters	DB Home	Enter the name of the Oracle home.
Entering Password for User	SAP System Administrator and SAP System Service Administrator password	Enter and confirm the password for the `<sapsid>adm` and `SAPService<SAPSID>` User ID. Enter and confirm the same password that you used for the central instance.
SAP System Service Ports	Message Port **(Node B)**	Enter the port number of the Message Server. The port number of the Message Port must be the same as the one on the central instance host.

12 Post-Installation Activities for MSCS

Purpose

This section describes how to complete and check the installation of the SAP MSCS System.

Prerequisites

You have completed the installation steps explained in previous sections of this documentation and you have installed at least one SAP front end.

For more information on how to install the front end, see the documentation *SAP Front End Installation Guide* at **http://service.sap.com/instguides**.

Process Flow

The following table lists the tasks you have to perform after the installation and points out where you can find detailed instructions.

	Task	Comment
1.	You check that you can start and stop the SAP System	See Starting and Stopping the SAP System in an MSCS Configuration [Page 143] below.
2.	You check that you can log on	See Logging on to the SAP System [Page 76] When you create the logon entry, make sure you enter the **virtual host name** in the *Application Server* field.
3.	You install the SAP License	See Installing and Using the SAP License [Page 77]
4.	On **both nodes**, you check the SAP System Services	See Checking SAP System Services [Page 78]
5.	You install the SAP online documentation	See Installing the Online Documentation [Page 78]
6.	You configure the SAProuter and the SAPNet R/3 Frontend	See Configuring SAProuter and SAPNet - R/3 Frontend [Page 80]
7.	You configure the Transport Management System	Configure the Transport Management System [Page 80]
8.	You perform basic operations in your SAP System.	See Basic Operations [Page 81].
9.	Check and, if required, adapt the number of Work Processes.	See Configured Number of Work Processes [Page 82].
10.	If required, you install additional languages.	See Installation of Additional Languages [Page 81].
11.	You import support packages.	See Import of Support Packages [Page 83]
12.	If required, you set up secure single sign-on.	See Secure Single Sign On [Page 83] or Kerberos Single Sign-On [Page 88].
13.	You perform client copy.	See Client Copy [Page 92].

	Task	Comment
14.	You perform a full installation backup.	See Performing a Full Backup [Page 93].
15.	Once you have completed and checked the SAP system installation, you need to prepare the SAP system for using business applications. This process includes customizing the basis system and the various business components.	See the SAP Library (choose *Help → SAP Library* in your SAP system or access the SAP Library at: `http://help.sap.com`) and choose *SAP Web Application Server*. Under *mySAP Technology Components* choose *SAP Web Application Server → Customizing.*

12.1 Starting and Stopping the SAP System in an MSCS Configuration

Use

If you want to start or stop the SAP System in an MSCS configuration, use the procedure described here.

Procedure

Starting the System

Start the *Cluster Administrator* from the *Start* menu with *Programs → Administrative Tools → Cluster Administrator*

  The *Cluster Administrator* opens.

In the tree, select the SAP group `SAP-R/3 <SAPSID>` and press the right mouse-button to display the context menu. Choose *Bring online*.

  The SAP system is started.

Stopping the System

Start the *Cluster Administrator* from the *Start* menu with *Programs → Administrative Tools → Cluster Administrator*

In the tree, double-click on the group `SAP-R/3 <SAPSID>` to display the resources belonging to the SAP group.

Select the resource `SAP-R/3 <SAPSID>,` press the right mouse button, and *choose Take offline*.

  The SAP system is stopped.